Zone 2 Landslide Moratorium Ordinance Revisions

Recirculated

Draft Environmental Impact Report

Volume II and III: EIR Appendices

prepared by

City of Rancho Palos Verdes

Community Development Department

30940 Hawthorne Boulevard

Rancho Palos Verdes, CA 90275

Contact: Octavio Silva, Senior Planner

prepared with the assistance of

Rincon Consultants, Inc.

180 N. Ashwood Avenue

Ventura, CA 93003

August 2019

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Final
Environmental Impact Report

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VOLUME II

Appendices

Appendix A1

2011 Initial Study, NOP, and NOP Responses

The Initial Study included herein was prepared in 2011 as part of the original environmental review for the Zone 2 Landslide Moratorium Ordinance Revisions. The Initial Study reflects the 47 lots that were either undeveloped or had no development entitlement at that time. It also reflects the CEQA Guidelines environmental checklist that was in place at that time. Although the Initial Study was not updated when the new NOP was released in 2018, the recirculated Draft EIR reflects both the current number of undeveloped/unentitled lots (31) and new relevant issues (such as tribal cultural resources) that are included in the current CEQA Guidelines.

City of Rancho Palos Verdes

Zone 2 Landslide Moratorium Ordinance Revisions

Initial Study

December 2010

rincon

Environmental Scientists Planners Engineers

Initial Study

Zone 2 Landslide Moratorium Ordinance Revisions

Prepared by:

City of Rancho Palos Verdes
30940 Hawthorne Boulevard
Rancho Palos Verdes, CA 90275
Contact: Kit Fox, AICP, Associate Planner
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Prepared with the assistance of:

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(805) 644-4455

December 2010

This report prepared on 50% recycled paper with 50% post-consumer content.

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INITIAL STUDY

Project Title: Zone 2 Landslide Moratorium Ordinance Revisions

Lead Agency: City of Ranchos Palos Verdes
Department of Planning, Building and Code Enforcement
30940 Hawthorne Boulevard
Rancho Palos Verdes, CA 90275

Contact Person: Kit Fox, AICP
Associate Planner
(310) 544-5228
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Project Location: The proposed ordinance revisions would apply to the approximately 112-acre "Zone 2 Landslide Moratorium Ordinance" area (also referred to in this Initial Study as the "project area"), located north of the intersection of Palos Verdes Drive South and Narcissa Drive in the Portuguese Bend area of the Palos Verdes Peninsula, within the City of Rancho Palos Verdes, County of Los Angeles, California. This area, located on the hills above the south-central coastline of the City, is within the City's larger (approximately 1,200-acre) Landslide Moratorium Area (LMA). Zone 2 consists of 111 individual lots. Of these, 64 are developed with residences and accessory structures and 47 are either undeveloped or underdeveloped (i.e. structures may be present, but only accessory structures, not residences). These latter 47 are the focus of this Initial Study.

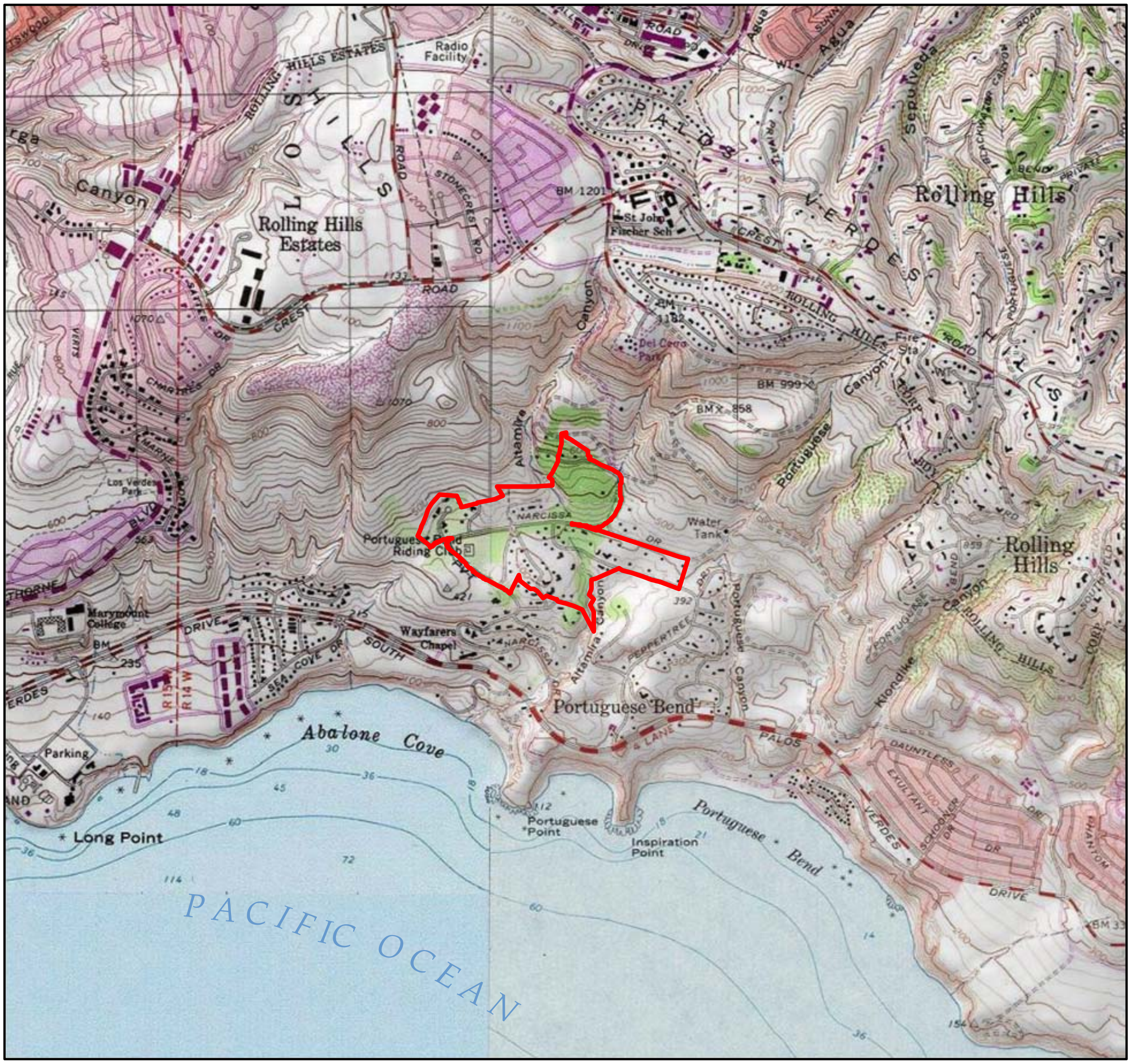
Figure 1 shows the regional vicinity of the Zone 2 area within Los Angeles County. Figure 2 shows the site's location in the City of Rancho Palos Verdes and also shows the 47 undeveloped lots within the Portuguese Bend community.

Project Sponsor's Name and Address: City of Ranchos Palos Verdes
30940 Hawthorne Boulevard
Rancho Palos Verdes, CA 90275

General Plan Designations: Residential, 1 Dwelling Unit/acre and Residential, 1-2 Dwelling Units/acre

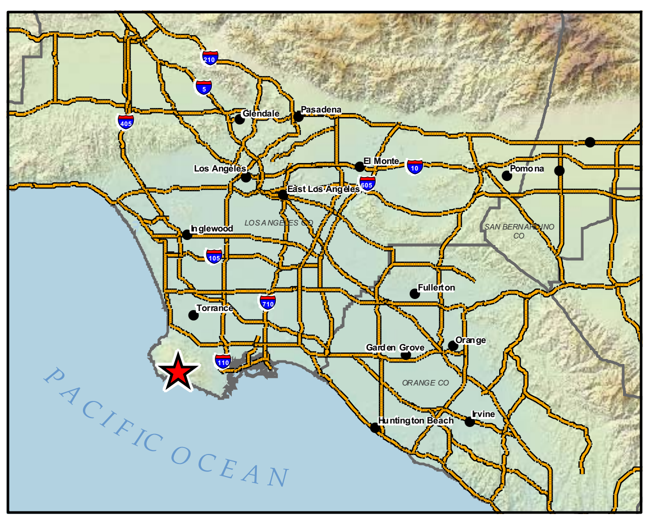
Zoning: RS-1 (Residential, minimum lot size of one acre) and RS-2 (Residential, minimum lot size of two acres)

Overlay Control Districts: Natural and Socio/Cultural



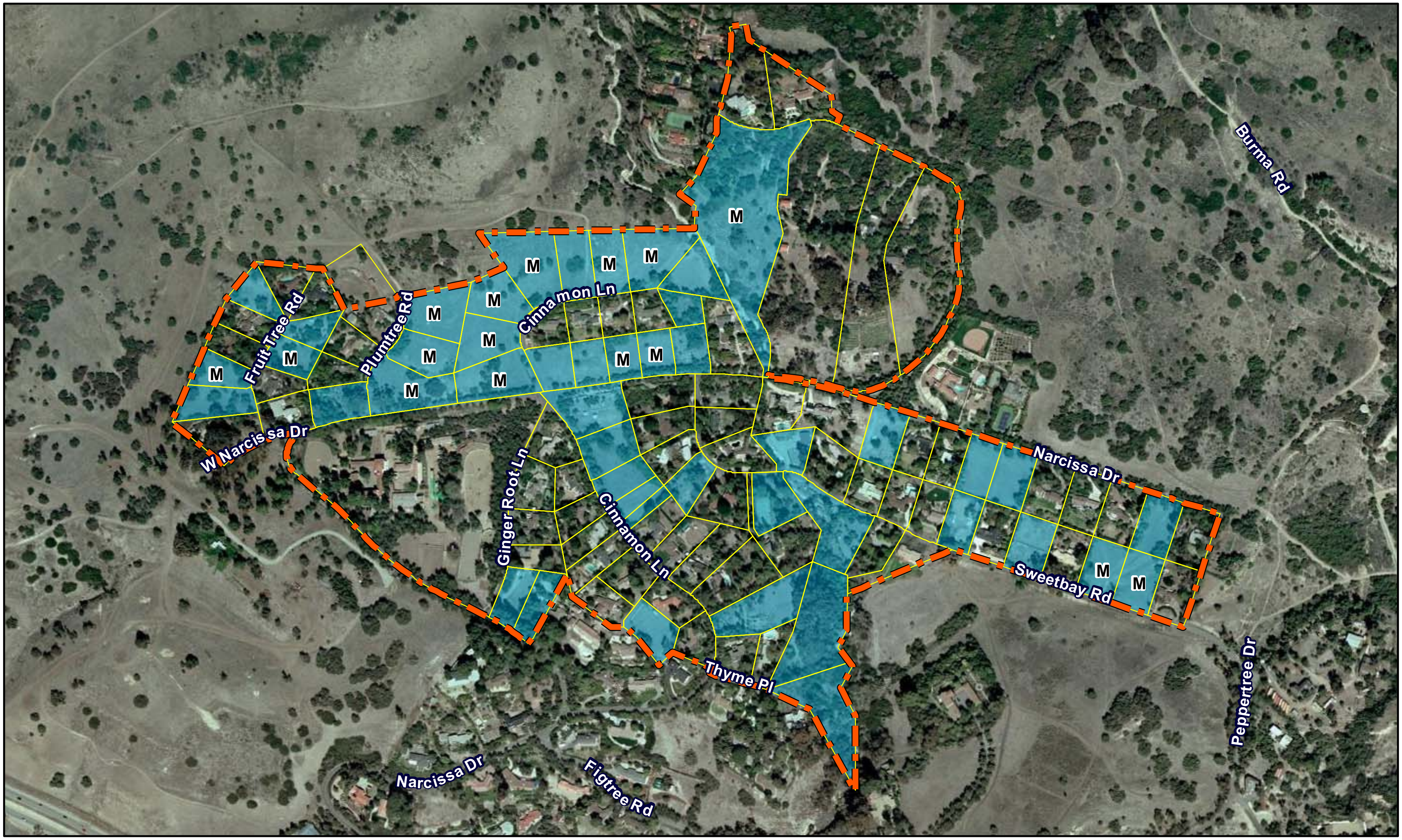
N 0 0.25 0.5 Miles

★ Project Location



Project Location Map

Figure 1



Additional data layer from Los Angeles County Assessor, August, 2010.

Legend

Project Boundary

M *Monks* Plaintiff Lot

Vacant or Underdeveloped, Potentially Developable under Proposed Ordinance Revisions

N

0 290 580 Feet

Project Area and Affected Parcels

Figure 2

Current Land Use:

Of the 111 lots in the 112-acre project area, the vast majority of the developed lots are improved with single-family residences, most dating from the 1950s, and related accessory structures and uses. The largest developed lot in Zone 2 is occupied by the Portuguese Bend Riding Club, a nonconforming commercial stable that was established prior to the City's incorporation in 1973. Private streets within Zone 2 are maintained by the Portuguese Bend Community Association. The majority of the undeveloped lots contain non-native vegetation and some have small, non-habitable structures (e.g., sheds, stables, fences, etc.) for equestrian or horticultural uses. The lots are generally between ¼-acre and one acre or more in size. Figures 3 through 5 show existing conditions in the project area.

In 2002, a group of Portuguese Bend property owners filed applications to exclude their undeveloped lots within the area known as "Zone 2" from the LMA. Shortly after this application was deemed incomplete for processing, the applicants filed suit against the City. As part of the decision on the case (*Monks v. City of Rancho Palos Verdes*), the City has been ordered to remove regulatory impediments in its Municipal Code that prevent the development of the 16 *Monks* plaintiffs' lots. The City began this process with an Ordinance to allow the *Monks* plaintiffs to apply for Landslide Moratorium Exceptions (LMEs) for their lots. As of December 2010, seven (7) *Monks* plaintiffs have obtained Planning entitlements to develop their lots, while the remaining *Monks* plaintiffs are at various stages in obtaining Planning entitlements for the balance of nine (9) lots.

Surrounding Land Uses:

The approximately 112-acre Zone 2 area is primarily surrounded by open space and semi-rural residential development. To the northeast of the project area are developed residential lots in the Portuguese Bend community as well as City-owned open space in the Portuguese Bend Reserve of the Palos Verdes Nature Preserve, both of which are within Zone 1 of the Landslide Moratorium Area. To the northwest and west of the project area are developed residential lots in the Portuguese Bend community and vacant, residentially-zoned land (Upper and Lower Filiorum), which are located in Zone 1 of the Landslide Moratorium Area. To the south, southeast and east of the project area are developed and undeveloped residential lots in the Portuguese Bend community. These lots are located in Zone 5 (the area affected by the 1978 Abalone Cove landslide), Zone 6 (the active Portuguese Bend landslide area) and Zone 3 (located between Altamira Canyon and the westerly edge of the Portuguese Bend landslide area). Individual lots that would gain development potential as a result of the proposed project are located throughout Zone 2 and are, therefore, surrounded by the uses described above as well as other lots, both developed and undeveloped, in Zone 2.

Description of Project:

<u>Landslide Moratorium Ordinance Revisions</u>. Section 15.20.040 of the Rancho Palos Verdes Municipal Code establishes the process for requesting exceptions from the City's landslide moratorium regulations. The current (amended in 2009) Municipal Code Section 15.20.040(P) includes the following category of exception to the moratorium on "the filing,

Photo 1 - View of undeveloped lots in the eastern portion of the Zone 2 area, looking northeast from Sweetbay Road.

Photo 2 - View of undeveloped lot in the northern-central portion of the Zone 2 area, looking northwest from Cinammon Lane/Narcissa Drive.

Existing Conditions in the Project Area

Figure 3

Photo 1 - View of undeveloped lot in the northern-central portion of the Zone 2 area, looking west from Cinammon Lane.

Photo 2 - View of undeveloped lot in the northern-central portion of the Zone 2 area, looking northwest from Cinammon Lane.

Existing Conditions in the Project Area

Figure 4

Photo 1 - View of Undeveloped lot in the northwestern portion of the Zone 2 area, looking northeast from Plumtree Road/Narcissa Drive.

Photo 2 - View of undeveloped lots in the southern-central portion of the Zone 2 area, looking north from Cinnamon Lane.

Existing Conditions in the Project Area

Figure 5

processing, approval or issuance of building, grading or other permits" within the existing landslide moratorium area:

> *The moratorium shall not be applicable to any of the following:…*
>
> *…P. The construction of residential buildings, accessory structures, and grading totaling less than one thousand cubic yards of combined cut and fill and including no more than fifty cubic yards of imported fill material on the sixteen undeveloped lots in Zone 2 of the "Landslide Moratorium Area" as outlined in green on the landslide moratorium map on file in the Director's office, identified as belonging to the plaintiffs in the case "Monks v. City of Rancho Palos Verdes, 167 Cal. App. 4th 263, 84 Cal. Rptr. 3d 75 (Cal. App. 2 Dist., 2008)"; provided, that a landslide moratorium exception permit is approved by the Director, and provided that the project complies with the criteria set forth in Section 15.20.050 of this Chapter. Such projects shall qualify for a landslide moratorium exception permit only if all applicable requirements of this Code are satisfied, and the parcel is served by a sanitary sewer system. Prior to the issuance of a landslide moratorium exception permit, the applicant shall submit to the Director any geological or geotechnical studies reasonably required by the City to demonstrate to the satisfaction of the City geotechnical staff that the proposed project will not aggravate the existing situation.*

The proposed landslide moratorium ordinance revisions would revise the language of this section to encompass all 47 undeveloped lots in Zone 2, rather than restricting it to only the *Monks* plaintiffs' lots. This would allow for the future submittal of LMEs for all of these undeveloped lots. It should be noted, however, that the granting of an LME does not constitute approval of a specific project request. Rather, it simply grants the property owner the ability to submit the appropriate application(s) for consideration of a specific project request.

Future Development Potential. The potential granting of up to 47 LME requests under the proposed ordinance revisions would permit individual property owners to then apply for individual entitlements to develop their lots. The undeveloped lots within Zone 2 are held in multiple private ownerships so the timing and scope of future development is not known. For the purposes of this EIR, it is assumed that development would occur over a period of at least 10 years from adoption of the ordinance revisions in a manner consistent with the private architectural standards adopted by the Portuguese Bend Community Association and the City's underlying RS-1 and RS-2 zoning regulations. Therefore, the future development assumptions for Zone 2 include the following:

- Forty-seven single-story, ranch-style residences with attached or detached three-car garages, with minimum living area of 1,500 square feet and maximum living area of 4,000 square feet or 15% of gross lot area, whichever is less;
- Less than 1,000 cubic yards of grading (cut and fill combined) per lot, with no more than 50 cubic yards of imported fill per lot;
- Maximum 25% (RS-1) or 40% (RS-2) net lot coverage;
- Maximum building height of 16 feet for residences and 12 feet for detached accessory structures;

- Minimum front setbacks of 20 feet, minimum rear setbacks of 15 feet, minimum street-side setbacks of 10 feet, and minimum interior side setbacks of five feet, with setbacks along private street rights-of-way measured from the easement line rather than the property line; and
- No subdivision of existing lots within Zone 2.

As noted above, the City has been ordered to remove regulatory impediments in its Municipal Code that prevent the development of the 16 *Monks* plaintiffs' lots. This was accomplished by the 2009 addition to the moratorium exceptions, cited above. As of December 2010, seven (7) *Monks* plaintiffs have obtained Planning entitlements to develop their lots, while the remaining *Monks* plaintiffs are at various stages in obtaining Planning entitlements for the balance of nine (9) lots. However, to provide a conservative analysis, this document considers the potential environmental impacts of buildout of all 47 undeveloped and underdeveloped lots (16 Monks lots plus 31 additional lots) under the parameters listed above.

Other Agencies Whose Approval is Required:

None. Depending on the location of proposed improvements on properties adjacent to Altamira Canyon within the project area, California department of Fish and Game approval may be required for specific development that could be facilitated by adoption of the proposed ordinance revisions.

Environmental Factors Potentially Affected:

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is "Potentially Significant" or "Potentially Significant Unless Mitigation Incorporated" as indicated by the checklist on the following pages.

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

DETERMINATION:

On the basis of this initial evaluation:

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

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

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

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

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

Kit Fox, AICP Associate Planner City of Rancho Palos Verdes	Date

Environmental Checklist

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
I. **AESTHETICS** – Would the project:				
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 buildings within a state scenic highway?	☒	☐	☐	☐
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☒	☐	☐	☐
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☒	☐	☐	☐

a-b. The project area encompasses approximately 112 acres of highly variable topography, with relatively flat areas as well as moderately to steeply sloping land that is bordered by residential land uses and open space. Of the 111 lots on the 112 acre project area, the vast majority of the developed lots are improved with single-family residences, most dating from the 1950s, and related accessory structures and uses. The largest developed lot in Zone 2 is occupied by the Portuguese Bend Riding Club, a nonconforming commercial stable that was established prior to the City's incorporation in 1973. Private streets within Zone 2 are maintained by the Portuguese Bend Community Association. The majority of the undeveloped lots contain non-native vegetation, and some have small, non-habitable structures (e.g., sheds, stables, fences, etc.) for equestrian or horticultural uses. The proposed project would involve revisions to the Landslide Moratorium Ordinance that would allow for the processing of applications for 47 residences on undeveloped or underdeveloped lots throughout Zone 2. Adding up to 47 residences to the project area could potentially have an adverse effect on scenic views from public and private viewpoints, and could involve removal of trees or other scenic resources. **Impacts are potentially significant and these issues will be studied further in an EIR.**

c. The proposed project involves revisions to the Landslide Moratorium Ordinance that would allow for the processing of applications for 47 residences in Zone 2. Adding 47 residences to the project area would increase the development intensity in Zone 2 and would incrementally alter the existing visual character of the site. **Impacts are potentially significant and this issue will be studied further in an EIR.**

d. The project could result in the construction of up to 47 new residences in an existing residential area, which would increase night lighting in the area. This potential development could also increase glare on the sites. Increased lighting and glare would have the potential to result in adverse aesthetic impacts that **would be potentially significant, and will be further analyzed in the EIR.**

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
II. AGRICULTURE AND FORESTRY RESOURCES -- Would the project:				
a) Convert Prime Farmland, Unique Farmland, Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by 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?	☐	☐	☐	☒

a-c. The project area is located within a residential zone (RS-1 and RS-2) and, therefore, is not zoned for agricultural uses, nor is the site subject to a Williamson Act contract (California Department of Conservation-Los Angeles County Williamson Act Map, 2006). Moreover, the project area is not located in an area designated as Prime or Unique Farmland, or within Farmland of Statewide Importance (California Department of Conservation FMMP, 2008). The project site is not located adjacent to agricultural operations, and currently contains no significant agricultural operations. As such, no impact would occur with respect to Prime or Unique farmland, or Farmland of Statewide Importance, or conflicts with a Williamson Act contract or existing zoning for agricultural use. **This impact would be less than significant and further discussion in an EIR is not warranted.**

d. The project area is located in a residential neighborhood that is designated for residential uses by the General Plan and the Municipal Code. The project would not involve conversion of forest land to non-forest uses. **No impacts would occur and further discussion in an EIR is not warranted.**

e. The proposed project would not involve other changes that could result in conversion of Farmland to non-agricultural uses. **No impact would occur and further discussion in an EIR is not warranted.**

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
III. <u>AIR QUALITY</u> -- Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	☒	☐	☐	☐
b) Violate any air quality standard or contribute substantially 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 an 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?	☐	☐	☐	☒

a-d. The project area is located within the South Coast Air Basin (Basin). The additional development that would be facilitated in the Portuguese Bend area would incrementally increase the population of Rancho Palos Verdes, with a corresponding increase in air pollutant emissions. Increased emissions would occur on temporary basis due to construction activity and in the long-term due to increased motor vehicular activity and energy use. The increased air pollutant emissions could expose new and existing residents in the area to unhealthy air quality. Emissions and localized air pollutant concentrations could also potentially exceed locally adopted thresholds of significance. **Therefore, air quality impacts would be potentially significant and these issues will be studied further in an EIR.**

e. The proposed revisions to the Landslide Moratorium Ordinance would allow for potential development of up to 47 new residential units. However, the proposed project would not generate objectionable odors that would affect a substantial number of people. Residential uses are not included on Figure 5-5 *Land Uses Associated with Odor Complaints* of the 1993 SCAQMD CEQA Air Quality Handbook. Therefore, it is unlikely that the proposed project would generate objectionable odors affecting a substantial number of people. **No impact would occur and further analysis is not warranted.**

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
IV. BIOLOGICAL RESOURCES -- Would the project:				
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 U.S. Fish and Wildlife Service?	☒	☐	☐	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Game 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 a tree preservation policy or ordinance?	☒	☐	☐	☐
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☒	☐	☐	☐

a, b, d. The project area consists of 111 lots on 112 acres. The majority of the project area has been highly modified by road construction, ornamental landscaping and structural development. The majority of the approximately 47 undeveloped lots contain non-native vegetation, and some have small, non-habitable structures (i.e., sheds, stables, fences, etc.) for horse-keeping or horticultural uses.

Altamira Canyon contains natural vegetation and lots that are adjacent to this drainage are subject to the development standards and performance criteria established in the City's Urban Appearance Overlay Control District; nonetheless, development on these lots may have a significant effect on sensitive biological resources. Some lots in the northern end of the project area, such as those north of Cinnamon Lane, contain native vegetation and abut the City's Natural Communities Conservation Plan (NCCP) Preserve, which contains sensitive plants and animals, most notably the federally listed California gnatcatcher and the habitat of the endangered Palos Verde blue butterfly. While most of the developed portions of the project area have been excluded from designated critical habitat for the California gnatcatcher, portions of the project area are potentially within this designation and patches of suitable habitat are present. In addition, although the Palos Verde blue butterfly is potentially extirpated from this specific location, patches of suitable habitat may be present on individual lots. As such, development of up to 47 residential units in the project area has the potential to impact special-status species, species of local importance, and migration corridors present on or adjacent to the project area. **Impacts related to these issues are potentially significant and will be further discussed in an EIR.**

c. The proposed revisions to the Landslide Moratorium would facilitate the potential for development of residences on approximately 47 lots; construction activity associated with this development has the potential to cause increased erosion with subsequent downstream sedimentary effects on the Abalone Cove Ecological Reserve. Therefore, **the proposed project could result in a potentially significant impact to coastal resources and this potential impact will be further analyzed in an EIR.**

e. The City has not adopted a tree preservation ordinance. The City has established the Natural Overlay Control District (OC-1) to "Maintain and enhance land and water areas necessary for the survival of valuable land and marine-based wildlife and vegetation" and "Enhance watershed management, control storm drainage and erosion, and control the water quality of both urban runoff and natural water bodies within the City" (Rancho Palos Verdes Municipal Code Section 17.40.040). According to the City's General Plan Natural Environment Element, portions of the project area are located within Resource Management (RM) District 9 – Natural Vegetation and RM District 4 – Active Landslide. **The project's consistency with these policies will be further analyzed in an EIR.**

f. The Rancho Palos Verdes City Council conceptually approved the Citywide Natural Communities Conservation Planning (NCCP) Subarea Plan in 2004. That plan identifies Biological Resource Areas and establishes the Palos Verdes Nature Preserve primarily for habitat preservation purposes. The Rancho Palos Verdes NCCP provides for conservation and protection of the Palos Verdes blue butterfly and other special-status species through conservation of potential habitat, while permitting limited impacts from development to potential habitat for the covered species, including Coastal Sage Scrub habitat. Several of the undeveloped lots in the project area abut the City-owned Portuguese Bend Reserve or the privately-owned Plumtree property, both of which contain more substantial and cohesive patches of coastal sage scrub habitat. The Portuguese Bend Preserve is currently a part of the

City's larger Palos Verdes Nature Reserve, and the City has recently completed the acquisition of a portion of the Upper Filiorum property for inclusion in the Reserve. As such, construction of residential units within the project area could potentially impact sensitive coastal sage scrub habitat, either through the direct removal of habitat during construction or as a result of Fire Department-mandated fuel modification on- and/or off-site in the Palos Verdes Nature Reserve. **Impacts related to conflicts with the NCCP Subarea Plan will be further analyzed in an EIR.**

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
V. CULTURAL RESOURCES -- Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	☐	☐	☐	☒
b) Cause a substantial adverse change in the significance of an archaeological resource as defined in §15064.5?	☒	☐	☐	☐
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☒	☐	☐	☐
d) Disturb any human remains, including those interred outside of formal cemeteries?	☒	☐	☐	☐

a. Historic designation may be given to a property by National, State, or local authorities. In order for a building to qualify for listing in the National Register of Historic Places, the California Register of Historical Resources, or as a locally significant property in the City of Rancho Palos Verdes, it must meet one or more identified criteria of significance. The property must also retain sufficient architectural integrity to continue to evoke the sense of place and time with which it is historically associated.

The proposed revisions to the Landslide Moratorium Ordinance would facilitate potential development of up to 47 new residential units on lots that are currently undeveloped or underdeveloped. Based on the type of structures that may be demolished for construction of residences on the 47 lots, mostly small sheds or equestrian accessory buildings, impacts to historical resources are not expected. **No impact would occur and further discussion in an EIR is not warranted.**

b-c. According to the City's General Plan (1975), portions of the project area located north and east of Narcissa Drive in upper Portuguese Bend are located within a possible area of archaeological resources. Although the likelihood of finding intact significant cultural resources is low due to historic grading and development on many properties, construction activity for the residential units that could be allowed under the proposed revisions to the Landslide

Moratorium Ordinance would involve earthwork such as grading and trenching which has the potential to unearth yet to be discovered archaeological and paleontological resources. **The potential to damage previously unknown archeological and/or paleontological resources during construction and grading activities would be a potentially significant impact and will be further discussed in the EIR.** The EIR analysis will include a records search performed by Historical Environmental Archaeological Research Team (H.E.A.R.T.) as well an analysis to determine the likelihood of finding intact paleontological resources within the project area.

d. The likelihood of finding intact significant cultural resources, including any human remains, is low. No known burial sites have been identified within the project area or in the vicinity. In addition, Health and Safety Code § 7050.5, Public Resources Code § 5097.98 and § 15064.5 of the California Code of Regulations (CEQA Guidelines) mandate procedures to be followed, including that construction or excavation be stopped in the event of an accidental discovery of any human remains in a location other than a dedicated cemetery until the County coroner or medical examiner can determine whether the remains are those of a Native American. Note that § 7052 of the Health & Safety Code states that disturbance of Native American cemeteries is a felony. Nevertheless, **the potential to disturb human remains during construction and grading activities would be a potentially significant impact and will be further discussed in the EIR.**

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
VI. <u>GEOLOGY and SOILS</u> – Would the project:				
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?	☐	☐	☒	☐
ii) Strong seismic ground shaking?	☒	☐	☐	☐
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐
iv) Landslides?	☒	☐	☐	☐
b) Result in substantial soil erosion or the loss of topsoil?	☒	☐	☐	☐
c) Be located on a geologic unit or soil that is unstable as a result of the project, and potentially result in on- or off-site				

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
VI. GEOLOGY and SOILS – Would the project:				
landslide, lateral spreading, subsidence, liquefaction, or collapse?	☒	☐	☐	☐
d) Be located on expansive soil, as defined in Table 1-B of the Uniform Building Code, creating substantial risks to life or property?	☒	☐	☐	☐
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	☐	☐	☒	☐

a(i). There are no Alquist-Priolo Earthquake Fault Zones within the City (Ranch Palos Verdes General Plan, 1975). The project area is located approximately five miles southeast of the Palos Verdes Fault, and approximately 1.5 miles southwest of the inactive Cabrillo Fault (Southern California Earthquake Data Center, November 2010). As the nearest active fault is located approximately six miles from the project area, the potential for surface rupture at the project area is considered low. **The potential impact from fault rupture within the project area would be less than significant and further discussion in an EIR is not warranted**.

a(ii). Although the nearest active fault is located approximately five miles from the project area, as with any site in the southern California region, the project area is susceptible to strong seismic ground shaking in the event of a major earthquake. Future onsite structures would need to be constructed to withstand potential peak accelerations as defined by the California Building Code (CBC). In addition, the design of individual structures would be subject to review by the City's Building and Safety division, including review by the City Geologist and City Engineer. **Nevertheless, ground shaking may result in potentially significant impacts to proposed habitable structures and this issue will be further examined in the EIR.**

a(iii). Liquefaction describes the phenomenon in which groundshaking works cohesionless soil particles into a tighter packing which induces excess pore pressure. These soils may acquire a high degree of mobility and lead to structurally damaging deformations. Liquefaction begins below the water table, but after liquefaction has developed, the groundwater table will rise and cause the overlying soil to mobilize. Liquefaction typically occurs in areas where the groundwater is less than 30 feet from the surface and where the soils are composed of poorly consolidated fine to medium sand.

According to the Department of Conservation Seismic Hazard Zones Map, Zone 2 is located within an area that has low to no potential for liquefaction (DOC, 1999). In addition, the Rancho

Palos Verdes General Plan Safety Element shows that Zone 2 is located in an area that has low to no potential for liquefaction (City of Rancho Palos Verdes, 1975). **Therefore impacts related to liquefaction would be less than significant and further discussion in an EIR is not warranted**.

a(iv). The geologic character of an area determines its potential for landslides. Steep slopes, the extent of erosion, and the rock composition of a hillside all contribute to the potential for slope failure and landslide events. In order to fail, unstable slopes need to be disturbed; common triggering mechanisms of slope failure include undercutting slopes by erosion or grading, saturation of marginally stable slopes by rainfall or irrigation; and, shaking of marginally stable slopes during earthquakes.

The project area is located within an area that is subject to the City of Rancho Palos Verdes Landslide Moratorium Ordinance. The Rancho Palos Verdes General Plan Safety Element shows that Zone 2 is located in an area that has potential for active landslides (Figure 14, City of Rancho Palos Verdes, 1975). In addition, according to the Department of Conservation Seismic Hazard Zones Map, portions of the project area are located within an area that has potential for seismically induced landslides (DOC, 1999). The proposed project involves revisions to the Landslide Moratorium Area that would facilitate potential development of up to 47 undeveloped lots to be developed with residential units. **The impact related to seismically induced landslides is potentially significant and will be further analyzed in the EIR.**

b. The proposed project involves revisions to the City's Landslide Moratorium Ordinance that would facilitate potential development of up to 47 residential units on the undeveloped lots in the project area. Site preparation would involve grading and drainage improvement that could alter the existing drainage pattern of the area, which has the potential to increase the amount of surface runoff and may have the potential to cause substantial erosion or the loss of topsoil on the undeveloped lots. **This impact would be potentially significant and will be further analyzed in the EIR.**

c. According to the California Department of Conservation Seismic Hazard Zones Map, Zone 2 is not located in an area that is subject to settlement due to seismic shaking, liquefaction, or lateral spreading (DOC, 1999). However, Zone 2 is located in an area that has the potential for earthquake-induced landslides as a result of the steep topography (DOC, 1999). The proposed project involves revisions to the City's Landslide Moratorium Ordinance that would facilitate potential development of up to 47 residential units on the undeveloped lots in the project area. **Since there is the potential for landslide hazards in the project area, impacts are potentially significant and will be further analyzed in the EIR.**

d. The soils of the Palos Verdes Peninsula are known to be expansive and occasionally unstable (City of Rancho Palos Verdes, 1975). Because soils on the approximately 64 developed lots have been previously disturbed and compacted to accommodate existing development, the potential for expansive soils is considered low in these areas. However, the 47 undeveloped lots to accommodate up to 47 residential units may contain soils that have the potential for expansion. **Impacts are potentially significant and will be further analyzed within the EIR.**

e. The City has constructed a sanitary sewer system that serves the Portuguese Bend community. This system was designed to reduce the amount of groundwater within the Landslide Moratorium Area by eliminating the use of private septic systems, thereby attempting to slow goal or stop land movement. New residences that may be constructed in the project area would be required to connect to either the existing sanitary sewer system or to a City approved holding tank system if the sanitary sewer system is not available at the time of building permit issuance. In such cases, when the sanitary sewer system becomes available, the holding tank system shall be removed and a connection would be made to the sanitary sewer system. **With these requirements, any impacts related to septic systems would be less than significant. No further analysis of this issue in an EIR is warranted.**

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
VII. GREENHOUSE GAS EMISSIONS - Would the project:				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☒	☐	☐	☐
b) Conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases?	☒	☐	☐	☐

a-b) The accumulation of greenhouse gases (GHG) in the atmosphere regulates the earth's temperature. However, it is believed that emissions from human activities, particularly the consumption of fossil fuels for electricity production and transportation, have elevated the concentration of these gases in the atmosphere beyond the level of naturally occurring concentrations. In response to an increase in man-made GHG concentrations over the past 150 years, California has implemented AB 32, the "California Global Warming Solutions Act of 2006." AB 32 requires achievement by 2020 of a statewide GHG emissions limit equivalent to 1990 emissions (essentially a 25% reduction below 2005 emission levels) and the adoption of rules and regulations to achieve the maximum technologically feasible and cost-effective GHG emissions reductions.

The proposed project involves revisions to the City's Landslide Moratorium Ordinance that would facilitate potential development of up to 47 residential units on the undeveloped lots in the project area. The proposed project would increase the intensity of development in the project area compared to existing conditions and as described above, the proposed project would also increase the amount of vehicle trips associated with residents in the project area. As such, the project could potentially contribute to cumulative impacts relating to global climate change. **The proposed project's potential contribution to cumulative impacts related to global climate change will be further discussed in an EIR.**

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
VIII. <u>HAZARDS and HAZARDOUS MATERIALS</u> - Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☒	☐
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☒	☐
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within ¼ mile of an existing or proposed school?	☐	☐	☒	☐
d) Be located on a site which is included on a list of hazardous material sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☒	☐
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard 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?	☒	☐	☐	☐

a. The proposed project involves revisions to the City's Landslide Moratorium Ordinance that would facilitate potential development of up to 47 residential units on the undeveloped lots in the project area. By their nature, the proposed use residential uses would not involve the transport, use, or disposal of substantial quantities of hazardous materials and would not introduce any unusual hazardous materials to the area. **Therefore, impacts would be less than significant and further analysis of this issue in an EIR is not warranted.**

b - d. The following databases (pursuant to Government Code Section 65962.5) were checked (November 8, 2010) for known hazardous materials contamination within the project area:

- Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) database;
- Geotracker search for leaking underground fuel tanks;
- Investigations- Cleanups (SLIC) and Landfill sites, Cortese list of Hazardous Waste and Substances Sites; and
- The Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields (Envirostor) Database.

The project area does not appear on the CERCLIS, Geotracker, DTSC's Envirostor Database or the Cortese list. Therefore, no known soil or groundwater contamination is currently present. The nearest school in the vicinity of the project area is the Portuguese Bend Nursery School at Abalone Cove Shoreline Park, approximately one-third of a mile from the project area. However, the project would not emit hazardous emissions or involve handling of hazardous or acutely hazardous materials, substances, or waste within ¼ mile of an existing or proposed school.

Development of the 47 lots over time may increase water runoff and increase the potential for water quality impacts which could affect resources downstream including the Pacific Ocean, which is located ¼ mile from the Portuguese Bend Nursery School. The proposed project would increase the number of onsite visitors and vehicular activity over current conditions. Proposed impermeable surfaces such as driveways would accumulate deposits of oil, grease, and other vehicle fluids and hydrocarbons. In addition, proposed new landscaping, such as lawn areas, could introduce chemical inputs such as pesticides and herbicides. During storms, these deposits would be washed into and through the drainage systems and to the Pacific Ocean within ¼ mile of the Portuguese Bend Nursery School. Urban runoff can have a variety of deleterious effects. Oil and grease contain a number of hydrocarbon compounds, some of which are toxic to aquatic organisms at low concentrations. Heavy metals such as lead, cadmium, and copper are the most common metals found in urban storm water runoff. These metals can be toxic to aquatic organisms, and have the potential to contaminate drinking water supplies. Nutrients from fertilizers, including nitrogen and phosphorous, can result in excessive or accelerated growth of vegetation or algae, resulting in oxygen depletion and additional impaired uses of water. Therefore, the increased impervious surface area, vehicular activity and use of fertilizers onsite could incrementally increase the amount of pollutants in onsite runoff, which could adversely affect the water quality of receiving waters including the Pacific Ocean. However, due to the dispersed locations of the subject lots and the opportunity for infiltration of runoff from the initial flows as part of a rain event, the incremental increase in impervious surfaces would not be expected to result in significant concentrations of hazardous substances, near the nursery school or elsewhere.

Because the project would not be located in an area with known soil or groundwater contamination and would not emit hazardous emissions or involve handling of hazardous materials, **the proposed project's impact related to release of hazardous materials would be less than significant and further discussion in an EIR is not warranted.**

e, f. The project area is located approximately 14 miles from both the Los Angeles International Airport and the Long Beach Airport, and more than 2 miles from Torrance Municipal Airport, and is not included within an airport land use plan. Therefore, significant airport safety hazards are not anticipated. **No impact would occur and further discussion in an EIR is not warranted.**

g. The proposed project involves revisions to the City's Landslide Moratorium Ordinance that would facilitate potential development of up to 47 residential units on the undeveloped lots in the project area. Future development would be on existing lots, and would be served by existing road networks. Evacuation routes from the project area to Palos Verdes Drive South would include Cinnamon Lane and Fruitree Road to Narcissa Drive and Sweetbay Road to Peppertree Drive. The project would not interfere with any emergency response plan or evacuation route. **No impact would occur and further discussion in an EIR is not warranted.** As discussed below under Section XVI *Transportation/Traffic*, however, the capacity of these roads to handle additional project-generated traffic will be studied in the EIR

h. According to the Los Angeles County Fire Department, the City of Rancho Palos Verdes, including the project area, is identified as a High Fire Hazard Area. The proposed project involves revisions to the City's Landslide Moratorium Ordinance that would allow up to 47 residential units on the undeveloped lots in the project area. Development of the proposed residential units may expose people or structures to risk involving wildland fires. **Risk due to wildland fires is considered potentially significant and will be further discussed in an EIR.**

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
IX. <u>HYDROLOGY and WATER QUALITY</u> – Would the project:				
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 or 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)?	☒	☐	☐	☐

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
IX. HYDROLOGY and WATER QUALITY – Would the project:				
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 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?	☐	☐	☒	☐

a - f. Of the 111 lots in the Zone 2 area, 64 are developed with residences and accessory structures and 47 lots are undeveloped or underdeveloped. The majority of the undeveloped lots contain non-native vegetation, and some have small, non-habitable structures (e.g., sheds, stables, fences, etc.) for equestrian or horticultural uses. The proposed project would involve revisions to the Landslide Moratorium Ordinance that would facilitate potential development of up to 47 residences on the approximately 112-acre project area.

The proposed project would intensify the overall development in Zone 2, and would increase impermeable surface area on the subject lots, potentially introducing new residences and driveways. This may incrementally reduce groundwater recharge. Additionally, the proposed project would allow for grading and drainage improvements that may alter the existing drainage pattern of individual lots, which has the potential to increase the amount of surface runoff within Zone 2. Construction activities such as grading may generate additional pollutants that could adversely affect the quality of surface runoff. Additionally operational impacts typically associated with residential uses, such as pollutants from vehicles and landscaping, may generate additional pollutants that could adversely affect the quality of surface runoff. Therefore, buildout of the project area has the potential to ~~adversely~~ affect groundwater ~~supplies~~recharge, and the amount and quality of surface runoff. **Impacts are potentially significant and this issue will be further analyzed in an EIR.**

g, h. The Federal Emergency Management Agency (FEMA) has defined the 100-year flood hazard areas through the publication of Flood Insurance Rate Maps (FIRM). The FIRM for Zone 2 and the surrounding area (Map ID 06037C2026F) indicates that the site and surrounding area are contained within Zone X and Zone D. Zone X designates an area with a minimal risk of flooding (not within the 100-year flood zone) and Zone D designates an area with areas in which flood hazards are undetermined, but possible. The proposed project involves potential construction of 47 single family housing units. Because flood hazards are undetermined, but possible in portions of Zone 2, **impacts are potentially significant and will be analyzed in an EIR.**

i. No dams or levees are located in the vicinity of the project area. In addition, the project area does not lay within any known dam inundation zones (City of Rancho Palos Verdes General Plan Safety Element, 1975). **Thus, the potential for flooding due to dam failure is low. No impact would occur and further discussion in an EIR is not warranted.**

j. The Safety Element of the City of Rancho Palos Verdes General Plan states that south-facing coastal strips should observe special caution during a tsunami alert (General Plan Safety Element, 1975). However, the project area sits inland of steep coastal bluffs above the Pacific Ocean at an average elevation of approximately 350 feet above sea level. In addition, according to the Department of Conservation Tsunami Inundation Map for the Redondo Beach (South) Quadrangle, the project area is located outside a tsunami inundation area (DOC, March 2009). **Therefore, risks from inundation from a tsunami wave or seiche would be less than significant and further discussion in an EIR is not warranted.**

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
X. LAND USE AND PLANNING - Would the proposal:				
a) Physically divide an established community?	☐	☐	☐	☒
b) Conflict with any applicable land use plan,	☐	☐	☒	☐

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
X. LAND USE AND PLANNING - Would the proposal:				
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 an applicable habitat conservation plan or natural community conservation plan?	☐	☐	☒	☐

a. The project would facilitate potential development of 47 existing residential lots within a residential subdivision. No new roads are proposed, and no changes in land uses patterns would result. The project would not physically divide an established community. **No impacts would occur and further analysis in an EIR is not warranted.**

b. The project area has City of Rancho Palos Verdes General Plan designations of Residential, ≤1 Dwelling Unit/acre and Residential, 1-2 Dwelling Unit/acre. As specified in the General Plan, areas within the Residential 1 dwelling unit per acre designation "possess one or both of the following conditions: natural areas delineated in the Natural Environment element as possessing significant habitats (this density is also compatible with the surrounding areas and reflects the general treatment that has been used in the past under similar conditions); areas where governmental bodies (Coastal Commission) and community organizations will possibly have input into the intensity and type of land use to take place, but at this time it is undetermined as to exact definition of this control. A Specific Plan District (see Specific Plan District section) is denoted on the latter areas in order to indicate that further input from other agencies may affect their final use, and that the City must prepare more detailed analysis and plans. The 1-2 Dwelling Units per Acre Land Use Designation includes "Areas containing low or moderate physical constraints with little or no natural significance were denoted within this general density range. This is the density that the original Palos Verdes Project called for and represents a density which is most compatible with the Peninsula's environment."

The following selected policies of the Residential 1 Dwelling Unit per Acre and Residential 1-2 Dwelling Units per Acre Land Use designations from the Urban Environment Element of the City of Rancho Palos Verdes General Plan (1975) would apply to any new construction that would be facilitated by adoption of the proposed Landslide Moratorium Ordinance revisions, as well as the revisions themselves:

- *1 - Retain the present predominance of single-family residences found throughout the community, while continuing to maintain the existing variety of housing types.*

- *2 - Require all new housing developed to include suitable and adequate landscaping, open space, and other design amenities to meet the community standards of environmental quality.*
- *3 - Encourage and assist in the maintenance and improvement of all existing residential neighborhoods so as to maintain optimum local standards of housing quality and design.*
- *10 - Require all developments which propose open space to be held in private ownership to provide legal guarantees to protect these areas from further development.*
- *11 - Control the alteration of natural terrain.*
- *12 - Encourage energy conservation in housing design.*
- *13 - Require proposals for development of areas which impact corridor related views to analyze the site conditions and address the preservation of such views.*
- *14 - Prohibit encroachment on existing scenic views reasonably expected by neighboring residents.*
- *15 - Enforce height controls to further lessen the possibility for view obstructions.*
- *16 - Require proposed housing to show how it ensures the existence of neighboring site privacy, while simultaneously providing privacy to the occupants of the proposed units.*
- *17 - Make an effort through zoning, cooperation with other governmental entities, and acquisition to preserve the rural and open character of the City.*
- *18 - Allow no further development involving any human occupancy within the active landslide area.*

The proposed project would not involve changes to the existing residential land use and zoning designations. The potential residences facilitated by the proposed ordinance revisions would maintain the existing rural and open character of the area by being limited to the existing lot configurations and allowed densities, i.e. one to two units per acre. The proposed residential uses would be compatible with existing residential land uses and development in Zone 2. All residential development would be required to comply with the same existing General Plan policies as development on the other lots in Zone 2.

As listed in the Rancho Palos Verdes Municipal Code (Section 17.02), the following uses may be constructed or conducted in residential districts:

A. *Single-family residential buildings, mobile homes on city approved foundations, as provided in California Government Code Sections 65852.3 and 65852.4 and associated accessory structures for the residential use and occupancy of not more than one family and not more than one dwelling unit per lot, with the exception of second units approved pursuant to Chapter 17.10 (Second Unit Development Standards);*
B. *Home occupations pursuant to Chapter 17.08 (Home Occupations);*
C. *Private outdoor recreational uses, such as tennis courts, swimming pools and basketball courts, which are incidental to the residential use of the property;*
D. *Residential planned development (RPD), pursuant to Chapter 17.42 (Residential Planned Development);*
E. *The keeping of animals customarily referred to as household pets and small domestic animals for noncommercial purposes;*

F. *The keeping of large domestic animals, pursuant to Chapter 17.46 (Equestrian Overlay (Q) District);*
G. *The keeping of a maximum of five bee hives for noncommercial purposes, except for the RS-A-5 residential zoning district, where a maximum of ten bee hives may be kept upon approval by the director of a site plan review application, which shall be appealable to the planning commission pursuant to Chapter 17.80 (Hearing Notice and Appeal Procedures);*
H. *The growing of crops and/or fruits on one acre or less for noncommercial purposes;*
I. *Small family day care;*
J. *Temporary special uses and developments, if a special use permit is first obtained, pursuant to Chapter 17.62 (Special Use Permits);*
K. *Commercial filming or photography, if a city film permit is first obtained, pursuant to Chapter 9.16 (Still Photography, Motion Picture and Television Productions) of this code;*
L. *Any other use which specifically is required to be permitted in a single family residential district by state or federal law; and*
M. *Other uses as provided in any applicable overlay or special district.*

The following uses are allowed in the residential districts with approval of a Conditional Use Permit:

A. *The growing of crops and/or fruits on more than one acre or for commercial purposes;*
B. *Flower and produce stands, wholesale plant nurseries, horse stables and similar commercial/agricultural uses;*
C. *Bed and breakfast inns;*
D. *Residential care facilities involving seven or more patients;*
E. *Large family day care, pursuant to Section 17.76.070 (Miscellaneous Permits and Standards);*
F. *Commercial antennas, pursuant to Section 17.76.020 (Miscellaneous Permits and Standards);*
G. *Golf courses, driving ranges and related ancillary uses;*
H. *Government facilities;*
I. *Private educational uses, not including nursery schools and day nurseries;*
J. *Public utility structures;*
K. *Outdoor active recreational uses and facilities; and*
L. *Such other uses as the director deems to be similar and no more intensive. Such a determination may be appealed to the planning commission and the planning commission's decision may be appealed to the city council pursuant to Section 17.80.050 (Hearing Notice and Appeal Procedure). If a proposed use or development is located in the coastal specific plan district, the city's final decision regarding such other use may be appealed to the California Coastal Commission for a determination that the uses are similar and compatible with the local coastal program.*

The project would involve revisions to the landslide Moratorium Ordinance that would facilitate potential development of 47 new residences in Zone 2. As noted above, this use is permitted under the City's Municipal Code, but for the current moratorium. Any new development would be required to adhere to all existing Municipal Code standards.

Any development potentially facilitated by adoption of the proposed ordinance revisions would be also be required to adhere to the provisions of two overlay control districts as set forth in the Rancho Palos Verdes Municipal Code. Municipal Code Chapter 17.40 introduces these districts as providing "criteria which further reduce potential impacts which could be directly created or indirectly induced by proposed and existing developments in sensitive areas of the city." The overlay districts that are applicable to the project area include the following:

- **Natural Overlay Control District (OC-1).** The purposes of the Natural Overlay Control District are to "Maintain and enhance land and water areas necessary for the survival of valuable land and marine-based wildlife and vegetation," and "Enhance watershed management, control storm drainage and erosion, and control the water quality of both urban runoff and natural water bodies within the city."

- **Socio-Cultural Overlay Control District (OC-2).** The purposes of the OC-2 District are to "Preserve, protect and maintain land and water areas, structures and other improvements which have significant historical, archaeological or cultural importance," and to "Provide for the designation, protection and maintenance of land and water areas and improvements which may be of unique scientific or educational value."

It should also be noted that any proposed residences on the lots that would become potentially developable under the ordinance revisions would also have to adhere to the specific regulations proposed under the revisions themselves to address safety and other concerns. These include requirements that a landslide moratorium exception permit be approved by the City; that the parcel is served by a sanitary sewer system; and that the applicant shall submit geological or geotechnical studies to demonstrate safety in relation to landslide hazards, among other standards. **Impacts would be less than significant and further discussion in an EIR is not warranted.**

c. In 2004 the Rancho Palos Verdes City Council conceptually approved the Citywide Natural Communities Conservation Planning (NCCP) Subarea Plan, which identifies Biological Resource Areas and establishes habitat preserves. The Rancho Palos Verdes NCCP provides for conservation and protection of the Palos Verdes blue butterfly and other special-status species, while permitting impacts from development to potential habitat for the covered species, including Coastal Sage Scrub habitat. Portions of the project area are within Coastal Sage Scrub habitat, Exotic Woodland, Disturbed, and Grassland areas. **Consistency with the NCCP will be discussed in the biological resources section of an EIR**.

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XI. <u>MINERAL RESOURCES</u> -- Would the project:				
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?	☐	☐	☐	☒

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XI. MINERAL RESOURCES -- Would the project:				
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?	☐	☐	☐	☒

a-b. According to the Natural Environment section of the Ranchos Palos Verdes General Plan (1975), from 1948 to 1958 specific areas in Rancho Palos Verdes were quarried for basalt, diatomaceous earth, and Palos Verdes stone. The General Plan states that there are no mineral resources present within the community that would be economically feasible for extraction (Rancho Palos Verdes General Plan, 1975). Potential buildout of 47 residences on lots within an existing residential subdivision would not result in the loss of the availability of a known mineral resource that would be of value locally, regionally, or to the State (California Geological Survey/U.S. Geological Survey, 2003). **There would be no impact and further discussion in an EIR is not warranted.**

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XII. NOISE – Would the project result in:				
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 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				

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XII. NOISE – Would the project result in:				
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?	☐	☐	☐	☒

a-d. The project area currently contains residential uses and vacant land. Current noise sources in Zone 2 include traffic on the streets within the area and noise from residential and equestrian uses. The proposed project would include the potential for 47 homes to be constructed. Construction of these residences could temporarily increase noise levels for nearby residents. Operation of the project would increase ambient noise due to an increase in traffic and residential activities. Therefore, noise impacts during construction and operation of the project are **potentially significant and will be analyzed further in an EIR.**

e, f. The project area is not included within an airport land use plan, and is approximately 14 miles from the Los Angeles and Long Beach airports, and more than 2 miles from Torrance Municipal Airport. The project is also not within the vicinity of a private airstrip. **Thus, no impact related to aircraft noise would occur and further discussion in an EIR is not warranted.**

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XIII. POPULATION AND HOUSING — Would the project:				
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?	☐	☐	☐	☒

a. The proposed project involves revisions to the landslide moratorium ordinance, which would facilitate potential development of up to 47 new residences within Zone 2. The anticipated population increase due to the project would be 130 new residents, based upon the 2010 California Department of Finance's Population and Housing estimates (2.751 persons per household in Rancho Palos Verdes x 47 housing units). Currently, the estimated population of the City is 42,893 (Department of Finance, January 2010). Therefore, with implementation of the proposed project, the population in the City would total 43,023. The population projections for Rancho Palos Verdes anticipate a population of 43,246 in 2015 and 43,251 in 2020 (Southern California Association of Governments, Integrated Growth Forecast, 2008). Therefore, the increase in residents would not exceed planned growth forecasts in the City. **Impacts are less than significant and further analysis of this issue is not warranted.**

b,c. The proposed project would involve revisions to the landslide moratorium ordinance that could permit up to 47 new residences within Zone 2. Existing residences in Zone 2 would remain and the project would not displace existing housing or people. **No impacts would occur and further analysis of these issues is not warranted.**

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XIV. PUBLIC SERVICES				
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
i) Fire protection?	☐	☐	☒	☐
ii) Police protection?	☐	☐	☒	☐
iii) Schools?	☐	☐	☒	☐
iv) Parks?	☐	☐	☒	☐
v) Other public facilities?	☐	☐	☒	☐

a (i.). The City of Rancho Palos Verdes is served by the Los Angeles County Fire Department (LACFD). There are six County fire stations serving the City, including three stations located within City limits. In the event of major fires, the County has "mutual aid agreements" with cities and counties so that additional personnel and firefighting equipment can augment the County Fire Department. The fire station nearest to the project area is Fire Station #53, located at 6124 Palos Verdes Drive South, approximately 0.5 miles east of the project area (LA County Fire Department Website). Station #53 operates three shifts per day and currently utilizes a "three-man crew" with at least three staff members on duty per shift (nine total staff) (Captain Avila, LA County Fire Station #53, December 2009). Station #53 services an area that extends from San Pedro to below the Trump National Golf Club.

Zone 2 is within a developed area currently served by the LACFD and residential development accommodated by the proposed revision to the landslide moratorium would not substantially increase the population in the City. As discussed above in Section VIII, *Hazards and Hazardous Material*, the site is located in High Fire Hazard Area and those issues will be discussed further in an EIR. However, the addition of 47 residences in Zone 2 would not require new or expanded fire facilities (Captain Avila, November 17, 2010). In addition, the project area's close proximity to Fire Station #53 would ensure an adequate response time by the Fire Department in emergency situations. Buildings constructed would also be required to comply with the Fire Code and LACFD standards, including specific construction specifications and design requirements. Therefore, residential development accommodated by the project would not significantly affect community fire protection service and would not result in the need for construction or expansion of fire protection facilities. **Impacts would be less than significant and further discussion of this issue in an EIR is not warranted.**

a (ii.). The City of Rancho Palos Verdes contracts with the Los Angeles County Sheriff's Department (LACSD) to provide law enforcement services to the City. The Lomita Station, located at 26123 Narbonne Avenue in Lomita, provides service to the areas within the city limits of Rancho Palos Verdes, Lomita, Rolling Hills and Rolling Hills Estates as well as unincorporated Los Angeles County areas around Rancho Palos Verdes (LACSD Homepage). The Lomita Station is located approximately 3.75 miles from the project area. The Lomita Station currently has 95 sworn officers on staff. During the daytime shift, approximately 8-10 officers are on duty in the vicinity of the Palos Verdes Peninsula and approximately 3-4 are on duty within the City of Rancho Palos Verdes. During the night shift approximately 6-8 total officers are on duty in the vicinity and approximately 2-3 officers are on duty in Rancho Palos Verdes. The proposed project is not anticipated to require additional police services, as the project area is within a developed area currently served by the LACSD. Although the project would increase the number of residents in the project area, it is not expected to adversely affect police services. The LACSD has sufficient resources to accommodate the proposed project. Therefore, the project would not significantly affect police protection services and would not result in the need for construction or expansion of new police facilities. **Impacts would be less than significant and further discussion of this issue in an EIR is not warranted.**

a (iii). The proposed ordinance revisions could result in the construction of 47 residences, which would increase the population in the City by 130. Therefore, additional school children would likely be introduced into the student population as a result of implementation of the project. In accordance with State law, the developer(s) of the project would be required to pay school impact fees. Pursuant to Section 65995 (3)(h) of the California Government Code (Senate Bill 50, chaptered August 27, 1998), the payment of statutory fees "...is deemed to be full and complete mitigation of the impacts of any legislative or adjudicative act, or both, involving, but not limited to, the planning, use, or development of real property, or any change in governmental organization or reorganization." Thus, payment of the development fees is considered full mitigation for the project's impacts under CEQA and no additional mitigation is required. **Impacts to public schools would be less than significant with payment of mandatory fees and further analysis of this issue in an EIR is not warranted.**

a (iv-v). The Rancho Palos Verdes Recreation and Parks Department is responsible for maintaining and planning for parkland in the City of Rancho Palos Verdes. The City currently maintains approximately 334 acres of parklands and 1,400 acres of open space (City of Rancho Palos Verdes Recreation and Parks Department Staff, December 2010). The public park closest to the project area is the Abalone Cove Shoreline Park, a 53-acre park located approximately 0.35 miles southwest of the project area. Based on the City's current population of 42,893 (Department of Finance, January 2010), there is approximately 7.79 acres of parkland per 1,000 residents. With the addition of approximately 130 new residents (as described above in Section XVIII, *Population and Housing*), the City's parkland to population ratio would be approximately 7.76. The addition of new residents as a result of the proposed project would not significantly decrease the parkland to population ratio and would not result in the need for additional recreation facilities. Therefore, **impacts to parks would be less than significant and additional analysis in an EIR is not warranted.**

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XV. <u>RECREATION</u> —				
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?	☐	☐	☒	☐

a-b. The proposed project involves revisions to the landslide moratorium ordinance that would potentially facilitate development of up to 47 new residences within Zone 2. These residences would increase the City's population by approximately 130 people, which could increase the use of recreational facilities in the project vicinity. However, as described above in Section XIV, *Public Facilities*, the population increase would not cause substantial physical deterioration of recreational facilities. As discussed above under Item XIV *Public Services*, the project area contains existing residential uses and is adequately served by recreational facilities. Additionally, the project would not include recreational facilities or require the construction or expansion of recreational facilities. **Impacts to recreational facilities would be less than significant and additional analysis in an EIR is not warranted.**

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XVI. TRANSPORTATION / TRAFFIC — Would the project:				
a) Exceed the capacity of the existing circulation system, based on an applicable measure of effectiveness (as designated in a general plan policy, ordinance, etc.), taking into account all 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 use (e.g., farm equipment)?	☒	☐	☐	☐
e) Result in inadequate emergency access?	☒	☐	☐	☐
f) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?	☒	☐	☐	☐

a-b, d-f. The proposed project would involve revisions to the Landslide Moratorium Ordinance that would potentially add an additional 47 residences to the Zone 2 area. As no new or reconfigured roads are proposed, and as the land uses in the project area would not change, the project would not increase hazards due to a design feature or incompatible use. Because the proposed project would intensify the use of the project area compared to the existing conditions, traffic to and from the project area would increase. The additional residential traffic could adversely affect emergency access by adding volume to the private road network in the Portuguese Bend area. **These impacts are potentially significant and will be further evaluated in the EIR.** A traffic study will be conducted to analyze and evaluate the project's potential impacts to traffic, circulation, parking and hazards due to design features, and site access.

c. The proposed project involves revisions to the Landslide Moratorium Ordinance, which would facilitate development of up to 47 new residences within Zone 2. The project by its nature would not result in a change in air traffic patterns by increasing traffic levels or a change in location that results in substantial safety risks. **No impact would occur and further discussion in an EIR is not warranted.**

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XVII. UTILITIES AND SERVICE SYSTEMS — Would the project:				
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 project's projected demand in addition to the provider's existing commitments?	☒	☐	☐	☐
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☒	☐
g) Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☒	☐

a, b, e. The City has constructed the Abalone Cove Sewer System, which serves the Portuguese Bend community including the 47 undeveloped lots in Zone 2 that could become developable with implementation of the proposed ordinance amendments. The Abalone Cove system is intended to reduce the amount of groundwater within the Landslide Moratorium Area by eliminating the use of private septic systems, with the ultimate goal or slowing or stopping land movement. The Abalone Cove system was originally intended to serve the 110 developed and the 47 undeveloped lots in the Abalone Cove area or the Portuguese Bend community, which includes the undeveloped lots in Zone 2 (City of Rancho Palos Verdes, "Monks Lots MND", August 2009). As such, the potential future development of up to 47 new residences in Zone 2 would be consistent with the planned sewer system capacity, although the approval of the proposed project would not directly grant any entitlement to develop these lots. The City's Public Works Department has recently confirmed, as a part of the update to the City's Sewer Master Plan, that the Abalone Cove system does have adequate capacity to serve the undeveloped lots. Therefore, the proposed project may significantly affect the existing wastewater conveyance or treatment system and therefore new or expanded facilities may be required. **Impacts are potentially significant and this issue will be further discussed in an EIR.**

c. As discussed in Section VIII, *Hydrology and Water Quality*, currently, the project area contains 111 lots. Of these, 64 are developed with residences and accessory structures and 47 lots are undeveloped or underdeveloped. The majority of the undeveloped lots contain non-native vegetation, and some have small, non-habitable structures (e.g., sheds, stables, fences, etc.) for equestrian or horticultural uses. The proposed project would involve revisions to the Landslide Moratorium Ordinance that would allow up to 47 residences on the approximately 112-acre project area.

The proposed project would represent a more intense use of the project area as compared to the current use, and would increase impermeable surface area onsite, including residences, driveways, and access roads. This may incrementally reduce groundwater recharge. Additionally, the proposed project would allow for grading and drainage improvements that would alter the existing drainage pattern of the Zone 2 area, which has the potential to increase the amount of surface runoff. In addition, construction activities, such as grading, and operational impacts typically associated with residential uses, such as pollutants from vehicles and landscaping pesticides, which may generate additional pollutants that could adversely affect the quality of surface runoff. Therefore, potential buildout of the project has the potential to adversely affect ~~groundwater supplies, and~~ the amount and quality of surface runoff. **Impacts are potentially significant and this issue will be further analyzed in an EIR.**

d. The Rancho Dominguez District of the California Water Service Company (CWSC) is the local purveyor of domestic water. CWSC serves domestic customers in Rancho Palos Verdes, Palos Verdes Estates, Rolling Hills, Rolling Hills Estates, and a portion of Lomita. The Rancho Dominguez District's water supply for the City of Rancho Palos Verdes is 100% reliant on imported water supplies (Colorado River and State Water Project) from the Metropolitan Water District (MWD) of Southern California, which are purchased through the West Basin Municipal Water District (WBMWD). There is no local groundwater extraction for use by the CWSC on the Palos Verdes Peninsula and there are no local supplies currently available to the WBMWD (CWSC Homepage). As a result, the availability of water is dependent on the supply conditions of the MWD. The Rancho Dominguez District's Palos Verdes water system includes 350 miles of pipeline, 18 storage tanks, and 31 booster pumps. CWSC proactively maintains and upgrades its facilities to ensure a reliable, high-quality supply (CWSC Homepage).

The potable water supply for the proposed project would be delivered by the Rancho Dominguez District of CWSC, which in turn purchases all of its supply from WBMWD via MWD sources (the Colorado River and State Water Project). Assuming that water demand is approximately 120% of wastewater generation, the proposed project would require approximately 10,998 gpd, or 12.3 AFY (based on the estimated wastewater generated as shown in Table 1). As shown in Table 1, WBMWD's total water supply currently has an estimated 14,500 AFY greater than the current demand (WBMWD, 2005). In addition, the projected water supply is anticipated to be 260,297 AFY in 2030, which is approximately 42,800 AFY greater than the projected demand for retail, municipal and industrial uses (217,497 AFY) (WBMWD, 2005). As such, the proposed project's demand of approximately 12.3 AFY would represent approximately 0.085% of the current available supply (approximately 14,500 AFY) and approximately 0.029% of the projected available supply in 2030 (approximately 42,800 AFY).

Table 1
Current and Projected WBMWD Water Supply and Demand (AFY)

Water Sources	Current Supply	Current Demand	2030 Supply	2030 Demand
Imported – MWD	129,315	129,315	101,747	101,747
Groundwater	41,535	41,535	52,000	52,000
Recycled Water	13,065	13,065	43,750	43,750
Ocean Desalination	-	-	20,000	20,000
Conservation	14,500	-	42,800	-
Total Water Supply	***198,416***	***183,916***	***260,297***	***217,497***

Source: 2005 Urban Water Management Plan, WBMWD, 2005.

Since the City of Rancho Palos Verdes's water supply via the Rancho Dominguez District is reliant on imported water supplies from MWD, it is important to note that MWD's estimated water supply is expected to meet the demands of its member agencies such as WBMWD. MWD has engaged in substantial water supply projection and planning efforts. In its 2003 Blueprint Report and 2005 Regional Urban Water Management Plan, MWD has consistently found that its existing water supplies, when managed according to its water resource plans, such as the Water Surplus and Drought Management Plan and Integrated Resources Plan, are and will be 100% reliable for at least a 20-year planning period. Since publication of those reports, MWD has continued to implement its water supply programs, as reported in its annual Implementation Reports, the most recent of which was published in February 2009. Although water supply conditions are always subject to uncertainties, MWD has maintained its supply reliability in the face of such uncertainties in the past, and is actively managing its supplies to ensure the same 100% reliability for the future (MWD, February 2009).

It is anticipated that sufficient water will be available to meet demand associated with the proposed project. Impacts related to water supply would be less than significant and further discussion in an EIR is not warranted.

f, g. Solid waste collection service in Rancho Palos Verdes is provided by various haulers who have exclusive agreements with the City to provide disposal service for solid waste generated within the City. Residential solid waste collection within the project area is provided exclusively by Universal Waste Systems (UWS). In addition, for construction waste there are ten authorized commercial haulers who provide dumpster and roll-off service throughout the City. Solid waste generated in the City of Rancho Palos Verdes could be taken to four different landfills; however, Puente Hills Landfill is the primary landfill used by the City. This landfill is operated by the County Sanitation Districts of Los Angeles County within which an independent special district provides water pollution control and solid waste management services under the authorization of the Sanitation Act of 1923. Table 2 summarizes the permitted throughput, estimated capacity, and estimated closure date for these facilities.

Table 2
Solid Waste Disposal Facilities

Facility	Permitted Daily Throughput (tons/day)	Estimated Remaining Capacity (CY)	Estimated Closure Date
Puente Hills Landfill	13,200	35,200,000	10/31/2013
Downey Area Recycling and Transfer Facility [a]	5,000	N/A	N/A
South Gate Transfer Station [a]	2,200	N/A	N/A
Commerce Refuse-to-Energy Facility [a]	1,000	N/A	N/A

Source: California Integrated Waste Management Board Website, http://www.calrecycle.ca.gov/SWFacilities/Directory/search.aspx, accessed on 11/15/2010.
cy=cubic yards
Note: [a] The estimated remaining capacity/estimated closure date is not applicable to this Transfer/Refuse-to-Energy facility

As shown in Table 2, the Puente Hills Landfill has a maximum permitted capacity of 13,200 tons/day and receives on average 9,000 tons/day. There is approximately 4,200 tons of available capacity at the Puente Hills Landfill. Solid waste from Rancho Palos Verdes may also be disposed of at the following facilities: City of Commerce's Waste to Energy Incinerator, the Downey Area Recycling and Transfer Facility, and the South Gate Transfer Station.

The City has completed a comprehensive waste reduction and recycling plan in compliance with State Law AB 939, which required every city in California to reduce the waste it sends to landfills by 50% by the year 2000. The City's Source Reduction and Recycling Element (SRRE) is the solid waste reduction planning document for the City of Rancho Palos Verdes, and establishes goals and policies for the City regarding source reduction, recycling and composting and environmentally safe solid waste management alternatives to land disposal. The SRRE also helps the City in maintaining the 50% diversion rate requirement specified by AB 939. As of 2002 (the last verified date by the CIWMB), the City was recycling 51% of its solid waste, thereby complying with the standards established by AB 939 (CIWMB Waste Stream Profile).

As shown in Table 3, development that could occur within the project area would generate an estimated 575 pounds of solid waste per day or 209,875 pounds of solid waste per year. In keeping with the City's recycling program, approximately 49% of this waste, or 282 pounds per day would be deposited in landfills. The Puente Hills Landfill has a maximum permitted capacity of 13,200 tons/day and receives on average 9,000 tons/day. Therefore, the 282 pounds per day is within the available capacity (4,200 tons per day) at the Puente Hills Landfill and the project impact to solid waste disposal would be less than significant.

Table 3
Solid Waste Generated

Land Use	Size	Generation Rate	Total (lbs/day)	Total (lbs/year)
Residential	47 Residential Units	12.23 lbs/ household/day *	575	209,875
Total Project Solid Waste Generation Increase			**575**	**209,875**

Notes: SF = square feet
*** Source: CalRecycle, 2010*

Although the project would incrementally increase solid waste generation, project area development would be required to comply with local regulations regarding solid waste reduction. **Impacts to the City's solid waste collection and disposal system would be less than significant and further discussion in an EIR is not warranted.**

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XVIII. <u>MANDATORY FINDINGS OF SIGNIFICANCE</u> —				
a) Does the project have the potential to substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self- sustaining levels, eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☒	☐	☐	☐
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☒	☐	☐	☐

	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less than Significant Impact	No Impact
XVIII. MANDATORY FINDINGS OF SIGNIFICANCE —				
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☒	☐	☐	☐

a. As discussed in Section IV, *Biological Resources*, the project's impacts on biological resources are potentially significant. As discussed in Section V, *Cultural Resources*, although no known cultural resources are located in the project area, the proposed project has the potential to disturb previously unknown subsurface archaeological and paleontological resources. Therefore, the project could potentially affect or eliminate important examples of California history or prehistory. **These potentially significant impacts will be further discussed in the EIR.**

b. The project has potential impacts to aesthetics, biological resources, cultural resources, geology, hydrology and water quality, noise, and traffic impacts that could be significant and cumulatively considerable. **These potentially adverse cumulative impacts will be explored and discussed in more detail in the EIR.**

c. The proposed project has potential for adverse effects on human beings due to potential impacts related to aesthetics, geology, hydrology and water quality, noise, and traffic. **The potential for adverse effects on human beings will be explored and discussed in more detail in the EIR.**

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RANCHO PALOS VERDES

NOTICE OF PREPARATION

To: Interested Persons

From: City of Rancho Palos Verdes
Community Development Department
30940 Hawthorne Blvd.
Rancho Palos Verdes, California 90275-5391
310-544-5228 or planning@rpv.com

Subject: **Notice of Preparation of an Environmental Impact Report (EIR) pursuant to the Requirements of the California Environmental Quality Act (CEQA) for proposed Zone 2 Landslide Moratorium Ordinance Revisions.**

The City of Rancho Palos Verdes will be the CEQA Lead Agency and will prepare an Environmental Impact Report (EIR) for the project identified below. We need to know the views of you or your agency as to the scope and content of the environmental information which is germane to you or your agency's statutory responsibilities in connection with the proposed project.

Project Title: Zone 2 Landslide Moratorium Ordinance Revisions

Location: The proposed ordinance revisions would apply to the approximately 112-acre "Zone 2 Landslide Moratorium Ordinance" area, located north of the intersection of Palos Verdes Drive South and Narcissa Drive in the Portuguese Bend area of the Palos Verdes Peninsula, within the City of Rancho Palos Verdes, County of Los Angeles, California. The Zone 2 area, located on the hills above the south-central coastline of the City, is within the City's larger (approximately 1,200-acre) Landslide Moratorium Area (LMA). Zone 2 consists of 111 individual lots. Of these, 64 are developed with residences and accessory structures and 47 are undeveloped or underdeveloped. These latter 47 will be the focus of the EIR.

Project Description:

Landslide Moratorium Ordinance Revisions. Section 15.20.040 of the Rancho Palos Verdes Municipal Code establishes the process for requesting exceptions to the existing moratorium on "the filing, processing, approval or issuance of building, grading or other permits" within the existing landslide moratorium area. The proposed landslide moratorium ordinance revisions would augment the existing exceptions to allow for the future submittal of Landslide Moratorium Exception (LME) applications for 47 undeveloped or underdeveloped lots within Zone 2. It should be noted that the granting of an LME does not constitute approval of a specific project request, but simply grants the property owner the ability to submit the appropriate application(s) for consideration of a specific project request.

Future Development Potential. The potential granting of up to 47 LME requests under the proposed ordinance revisions would permit individual property owners to then apply for individual entitlements to develop their lots. The undeveloped lots within Zone 2 are held in multiple private ownerships so the timing and scope of future development is not known. For the purposes of the EIR, it will be assumed that development would occur over a period of at least 10 years from adoption of the ordinance revisions in a manner consistent with the private architectural standards adopted by the Portuguese Bend Community Association and the City's underlying RS-1 and RS-2 zoning regulations. Therefore, the future development assumptions for Zone 2 include the following:

- Forty-seven single-story, ranch-style residences with attached or detached three-car garages, with minimum living area of 1,500 square feet and maximum living area of 4,000 square feet or 15% of gross lot area, whichever is less;
- Less than 1,000 cubic yards of grading (cut and fill combined) per lot, with no more than 50 cubic yards of imported fill per lot;
- Maximum 25% (RS-1) or 40% (RS-2) net lot coverage;
- Maximum building height of 16 feet for residences and 12 feet for detached accessory structures;
- Minimum front setbacks of 20 feet, minimum rear setbacks of 15 feet, minimum street-side setbacks of 10 feet, and minimum interior side setbacks of five feet, with setbacks along private street rights-of-way measured from the easement line rather than the property line; and
- No subdivision of existing lots within Zone 2.

The detailed project description, location, and potential environmental effects are contained in an Initial Study that, if not attached to this notice, is on file with the Community Development Department at City Hall, 30940 Hawthorne Boulevard, Rancho Palos Verdes, and is available for review between the hours of 7:30 a.m. and 5:30 p.m., Monday through Thursday, and 7:30 a.m. and 4:30 p.m., on Friday. Furthermore, the Notice of Preparation of an EIR / Initial Study is available for public review at the Planning Department at City Hall, the Miraleste Library, the Palos Verdes Main Library, and the City's website. To access the Initial Study on the City's Website or other information regarding the proposed project, log on to www.palosverdes.com/rpv and click on City Departments; then click on Community Development Department; then click on Planning and Zoning on the right side of the page. The link to the Zone 2 Landslide Moratorium Ordinance Revisions Project is under the "Information on Major Proposed Development Projects" links in the center of the page.

You are receiving this notice since City records indicate that you are an interested person or agency, or own property within a 500-foot radius of the project area. If you wish to provide comments on the scope and content of the Initial Study, please submit your comments to:

Kit Fox, AICP, Associate Planner
City of Rancho Palos Verdes, Planning Division
30940 Hawthorne Boulevard
Rancho Palos Verdes, CA 90275
Fax: (310) 544-5293
Email: kitf@rpv.com

Due to the time limits mandated by State law, written comments on the scope and content of the EIR must be sent no later than 30 days after receipt of this notice, or by February 2, 2011. Responsible agencies are requested to indicate their statutory responsibilities in connection with this project when responding.

In addition to written comments, in order to provide ample opportunity for public input, the City will hold a public scoping meeting at **7:00 p.m. on Tuesday, February 1, 2010,** at Hesse Park Community Building, 29301 Hawthorne Blvd., Rancho Palos Verdes, CA 90275.

Please contact Mr. Kit Fox at 310-544-5228 or via e-mail at kitf@rpv.com for further information.

Date: January 3, 2011

Signature____________________
Name and Title: Joel Rojas, Planning Director

6 Fruit Tree Road
Rancho Palos Verdes, CA 90275

February 1, 2011

Re: Zone 2 Moratorium Issues

Honorable Councilmen, ladies, and gentlemen,

My name is Tim Kelly and I am President of the Portuguese Bend Community Association. I am here on behalf of all members of the association, not only those of us that live in the Zone 2 area of our community.

The Community Association represents everyone who owns property in the community including home owners, lot owners, Monk's Litigants, and even the City of Rancho Palos Verdes. Our duty is to respect and protect the interests of all members of the association. To isolate Zone 2 and study the effects of building on this area without considering the cumulative effects that this would have on the remainder of the community would be foolish at best and negligent in the extreme. Any runoff water that is collected in Zone 2 ends up in Altamira Canyon which weaves through other zones in the downstream area of our community. The effects of this water flow in past years prior to development have been devastating for some residents whose properties abut Altamira Canyon. A number of property owners have had to undertake major remedial repairs to their properties in recent years. The community has attempted to mitigate some of the canyon drainage problems through volunteer efforts, but we have neither the expertise nor the resources to accomplish this task.

We urge you to ensure that the scope of the EIR be expanded to look at the effects that this mass development will have on the entire community and not limit it to the narrow scope that is called for today.

Thank you for your time and consideration,

Timothy P. Kelly

Kit Fox

From: SunshineRPV@aol.com
Sent: Thursday, February 03, 2011 8:08 AM
To: kitf@rpv.com
Subject: Fwd: EIR Scoping Meeting
Attachments: EIR Scoping Meeting (77.9 KB)

Hi Kit,

I trust the EIR Consultant has been shown the RPV Conceptual Trails Plan. ...S

Kit Fox

From: ksnell0001@aol.com

Sent: Monday, January 31, 2011 3:49 PM

To: kitf@rpv.com; planning@rpv.com

Subject: Scope of EIR for proposed Zone 2 Landslide Moratorium Ordinance Revisions

The EIR is inadequate because it purposely is not including potential development in Zone 2 for those parcels at 8, 10, 20 & 98 Vanderlip Drive that would be entitled to lot splits in the future. By eliminating parcels in Zone 2 that will be split into one acre lots in the future from the scope of the EIR, the EIR is incomplete and does not properly represent the potential true impact of the future building in Zone 2. These parcels have much more stable land than all of the 47 lots that are being allowed to build homes.

A lot split was recorded in 1989 for John Vanderlip AFTER the moratorium was placed 4 years prior.
-**Staff's Response 7 on page 10-76** that parcel map creating the 2 parcels was recorded in 1982 is incorrect.

Staff commented that Mr. Vanderlip was granted his lot split after the moratorium because he submitted his paper prior to the moratorium. Since William Roberts, 10 Vanderlip, submitted his request for lot splits prior to the moratorium, why wasn't Mr. Roberts allowed the same courtesy to complete his lot splits as was Mr. Vanderlip?

Why is RPV RDA receiving tax increment monies to "...clear the blight..." but won't allow lot splits to 1 acre minimum so the property owners can build on stable land (Vanderlip Drive)? The justification of RDA was to stabilize the property and open up building. Roads, utilities and sewer laterals are in place for the 15 new building sites on Vanderlip Dr. in anticipation of granting lot splits so these parcels need to be included in the EIR impact. Why can't the owners of the more stable property on Vanderlip Drive be allowed to apply for lot splits as outlined in the Community Redevelopment Plan?

The area above upper Narcissa (Vanderlip Dr.) had no land movement and has not moved in modern times.

This EIR is incomplete without evaluating all of the potential home sites in Zone 2 based on RPV zoning. By not including the potential home sites in the EIR, the true impact in the EIR can not be evaluated.

Response 9 page 10-78 from Staff

- "In addition, the system was not designed to accommodate the subdivision of existing lots."

The sewer system was designed to accommodate the subdivision of existing parcels within the ACLAD boundries except for Zone 1. That is why additional sewer laterals were physically installed for 8, 10 and 20 for future development. Those laterals are still in place on the property and can be viewed if your records are incomplete. The parcel at the end East end of Narcissa was also figured into the sewer capacity based on 1 acre per building site.

Sincerely,

Kathy Snell
8 Vanderlip Driveway
Rancho Palos Verdes, Ca 90275
310 707 8876

STATE OF CALIFORNIA
Governor's Office of Planning and Research
State Clearinghouse and Planning Unit

Arnold Schwarzenegger
Governor

Cathleen Cox
Acting Director

Notice of Preparation

December 30, 2010

To: Reviewing Agencies

Re: Zone 2 Landslide Moratorium Ordinance Revisions
SCH# 2010121073

Attached for your review and comment is the Notice of Preparation (NOP) for the Zone 2 Landslide Moratorium Ordinance Revisions draft Environmental Impact Report (EIR).

Responsible agencies must transmit their comments on the scope and content of the NOP, focusing on specific information related to their own statutory responsibility, within 30 days of receipt of the NOP from the Lead Agency. This is a courtesy notice provided by the State Clearinghouse with a reminder for you to comment in a timely manner. We encourage other agencies to also respond to this notice and express their concerns early in the environmental review process.

Please direct your comments to:

Kit Fox
City of Rancho Palos Verdes
30940 Hawthorne Boulevard
Rancho Palos Verdes, CA 90275

with a copy to the State Clearinghouse in the Office of Planning and Research. Please refer to the SCH number noted above in all correspondence concerning this project.

If you have any questions about the environmental document review process, please call the State Clearinghouse at (916) 445-0613.

Sincerely,

Scott Morgan
Director, State Clearinghouse

Attachments
cc: Lead Agency

Document Details Report
State Clearinghouse Data Base

SCH#	2010121073
Project Title	Zone 2 Landslide Moratorium Ordinance Revisions
Lead Agency	Rancho Palos Verdes, City of

Type	NOP Notice of Preparation
Description	Revisions to the City's landslide moratorium regulations (Chapter 15.20 of the Rancho Palos Verdes Municipal Code) to allow for submittal of landslide moratorium exception (LME) applications for 47 undeveloped or undeveloped lots within Zone 2. The potential granting of up to 47 LME requests under the proposed ordinance revisions would permit individual property owners to then apply for individual entitlements to develop their lots. Potential development on the 47 lots would occur over a period of at least 10 years from adoption of the ordinance revisions in a manner consistent with the private architectural standards adopted by the Portuguese Bend Community Association and the City's underlying RS-1 and RS-2 zoning regulations.

Lead Agency Contact

Name	Kit Fox		
Agency	City of Rancho Palos Verdes		
Phone	(310) 544-5228	*Fax*	
email	kitf@rpv.com		
Address	30940 Hawthorne Boulevard		
City	Rancho Palos Verdes	*State* CA	*Zip* 90275

Project Location

County	Los Angeles						
City	Rancho Palos Verdes						
Region							
Cross Streets	N. intersection of Palos Verdes Dr. S. & Narcissa Dr.						
Lat / Long	33° 44' 53" N / 118° 22' .75" W						
Parcel No.	Multiple						
Township		*Range*		*Section*		*Base*	

Proximity to:

Highways	
Airports	
Railways	
Waterways	Pacific Ocean, Altamira Canyon
Schools	PV ES, Ridgecrest, etc...
Land Use	Residential Residential, 1-2 DU/acre Z: Residential, 1-2 DU/acre

Project Issues	Aesthetic/Visual; Agricultural Land; Air Quality; Archaeologic-Historic; Biological Resources; Coastal Zone; Drainage/Absorption; Economics/Jobs; Flood Plain/Flooding; Forest Land/Fire Hazard; Geologic/Seismic; Minerals; Noise; Population/Housing Balance; Public Services; Recreation/Parks; Schools/Universities; Septic System; Sewer Capacity; Soil Erosion/Compaction/Grading; Solid Waste; Toxic/Hazardous; Traffic/Circulation; Vegetation; Water Quality; Water Supply; Wetland/Riparian; Growth Inducing; Landuse; Cumulative Effects; Other Issues

Reviewing Agencies	Resources Agency; Cal Fire; Central Valley Flood Protection Board; Office of Historic Preservation; Department of Parks and Recreation; Department of Water Resources; Department of Fish and Game, Region 5; Office of Emergency Management Agency, California; Native American Heritage Commission; California Highway Patrol; Caltrans, District 7; Regional Water Quality Control Board, Region 4

Note: Blanks in data fields result from insufficient information provided by lead agency.

Date Received 12/30/2010 *Start of Review* 12/30/2010 *End of Review* 01/28/2011

Note: Blanks in data fields result from insufficient information provided by lead agency.

NOP Distribution List

County: Los Angeles

SCH# 2010121070

860

Resources Agency

- [x] **Resources Agency** Nadell Gayou
- [ ] **Dept. of Boating & Waterways** Mike Sotelo
- [ ] **California Coastal Commission** Elizabeth A. Fuchs
- [ ] **Colorado River Board** Gerald R. Zimmerman
- [ ] **Dept. of Conservation** Jonathan Martis
- [ ] **California Energy Commission** Eric Knight
- [x] **Cal Fire** Allen Robertson
- [x] **Central Valley Flood Protection Board** James Herota
- [x] **Office of Historic Preservation** Ron Parsons
- [x] **Dept of Parks & Recreation** Environmental Stewardship Section
- [ ] **California Department of Resources, Recycling & Recovery** Sue O'Leary
- [ ] **S.F. Bay Conservation & Dev't. Comm.** Steve McAdam
- [x] **Dept. of Water Resources** Resources Agency Nadell Gayou
- [ ] ______________ Conservancy

Fish and Game

- [ ] **Depart. of Fish & Game** Scott Flint Environmental Services Division
- [ ] **Fish & Game Region 1** Donald Koch
- [ ] **Fish & Game Region 1E** Laurie Harnsberger
- [ ] **Fish & Game Region 2** Jeff Drongesen
- [ ] **Fish & Game Region 3** Charles Armor
- [ ] **Fish & Game Region 4** Julie Vance
- [x] **Fish & Game Region 5** Don Chadwick Habitat Conservation Program
- [ ] **Fish & Game Region 6** Gabrina Gatchel Habitat Conservation Program
- [ ] **Fish & Game Region 6 I/M** Brad Henderson Inyo/Mono, Habitat Conservation Program
- [ ] **Dept. of Fish & Game M** George Isaac Marine Region

Other Departments

- [ ] **Food & Agriculture** Steve Shaffer Dept. of Food and Agriculture
- [ ] **Depart. of General Services** Public School Construction
- [ ] **Dept. of General Services** Anna Garbeff Environmental Services Section
- [ ] **Dept. of Public Health** Bridgette Binning Dept. of Health/Drinking Water

Independent Commissions,Boards

- [ ] **Delta Protection Commission** Linda Flack
- [x] **Cal EMA (Emergency Management Agency)** Dennis Castrillo
- [ ] **Governor's Office of Planning & Research** State Clearinghouse
- [x] **Native American Heritage Comm.** Debbie Treadway
- [ ] **Public Utilities Commission** Leo Wong
- [ ] **Santa Monica Bay Restoration** Guangyu Wang
- [ ] **State Lands Commission** Marina Brand
- [ ] **Tahoe Regional Planning Agency (TRPA)** Cherry Jacques

Business, Trans & Housing

- [ ] **Caltrans - Division of Aeronautics** Sandy Hesnard
- [ ] **Caltrans - Planning** Terri Pencovic
- [x] **California Highway Patrol** Scott Loetscher Office of Special Projects
- [ ] **Housing & Community Development** CEQA Coordinator Housing Policy Division

Dept. of Transportation

- [ ] **Caltrans, District 1** Rex Jackman
- [ ] **Caltrans, District 2** Marcelino Gonzalez
- [ ] **Caltrans, District 3** Bruce de Terra
- [ ] **Caltrans, District 4** Lisa Carboni
- [ ] **Caltrans, District 5** David Murray
- [ ] **Caltrans, District 6** Michael Navarro
- [x] **Caltrans, District 7** Elmer Alvarez
- [ ] **Caltrans, District 8** Dan Kopulsky
- [ ] **Caltrans, District 9** Gayle Rosander
- [ ] **Caltrans, District 10** Tom Dumas
- [ ] **Caltrans, District 11** Jacob Armstrong
- [ ] **Caltrans, District 12** Chris Herre

Cal EPA

Air Resources Board

- [ ] Airport Projects Jim Lerner
  - [ ] Transportation Projects Douglas Ito
  - [ ] Industrial Projects Mike Tollstrup
- [ ] **State Water Resources Control Board** Regional Programs Unit Division of Financial Assistance
- [ ] **State Water Resources Control Board** Student Intern, 401 Water Quality Certification Unit Division of Water Quality
- [ ] **State Water Resouces Control Board** Steven Herrera Division of Water Rights
- [ ] **Dept. of Toxic Substances Control** CEQA Tracking Center
- [ ] **Department of Pesticide Regulation** CEQA Coordinator

Regional Water Quality Control Board (RWQCB)

- [ ] **RWQCB 1** Cathleen Hudson North Coast Region (1)
- [ ] **RWQCB 2** Environmental Document Coordinator San Francisco Bay Region (2)
- [ ] **RWQCB 3** Central Coast Region (3)
- [x] **RWQCB 4** Teresa Rodgers Los Angeles Region (4)
- [ ] **RWQCB 5S** Central Valley Region (5)
  - [ ] **RWQCB 5F** Central Valley Region (5) Fresno Branch Office
  - [ ] **RWQCB 5R** Central Valley Region (5) Redding Branch Office
- [ ] **RWQCB 6** Lahontan Region (6)
  - [ ] **RWQCB 6V** Lahontan Region (6) Victorville Branch Office
- [ ] **RWQCB 7** Colorado River Basin Region (7)
- [ ] **RWQCB 8** Santa Ana Region (8)
- [ ] **RWQCB 9** San Diego Region (9)
- [ ] Other ______________

Last Updated 12/27/2010

PLUMTREE P.V. ASSOCIATES, LLC
c/o Buss-Shelger Associates
865 S. Figueroa, Suite 3338
Los Angeles, California 90017

RECEIVED

JAN 18 2011

PLANNING, BUILDING AND
CODE ENFORCEMENT

January 14, 2011

City of Rancho Palos Verdes,
Planning Division
30940 Hawthorne Boulevard
Rancho Palos Verdes, CA 90275

Attention: Mr. Kit Fox, AICP
Associate Planner

Reference: Environmental Impact Report
47 Lots – Zone 2 Landslide
Moratorium Ordinance Revisions

Ladies & Gentlemen:

The ownership appreciates and encourages the EIR identified above, and remains willing to participate in its cost in the event the remaining 30 acres in Zone 1 currently being investigated by Plumtree P.V. Associates could be included. In assuming this is not practical at this time, our comments concerning the Draft EIR guidelines are limited to several basic items as set forth below.

- The history of the Landslide Moratorium, nor the origin of the Zone 2 designation is not discussed. It is our understanding that the Zone 2 designation was originally suggested by the City Geologist in 1993, but was never officially adopted as part of the Landslide Moratorium Ordinance or any other ordinance, resolution, policy, nor Council order. The authority designating "Moratorium Zones" should be identified.

- The NOP/IS provides no reference to any "*Responsible Agencies, Trustee Agencies, or involved federal agencies*". Please identify any and all such agencies, as required in the CEQA Guidelines.

- The DEIR should convey to the reader whether or not the Monks plaintiff's properties (16) will have the same development standards proposed applied.

- Limiting the minimum and maximum size of a residence to 1,500 and 4,000 square feet respectively, appears arbitrary and in conflict with the City's Development Code. It is our understanding that the City normally relies on neighborhood compatibility and lot coverage to control structure size. It is noted that a previous version of the City's Development Code would have permitted maximum structure sizes of 11,000 and 8,000 square feet in the RS-1 and RS-2 districts, respectively.

- The DEIR (and ordinance) should clearly define the term *"single-story, ranch-style residence"* and provide rationale why this design genre is the only style appropriate for the Zone 2 area. Several lots in Zone 2 have a slope that would be conducive to a two-story residence rather than a single level with more grading.

- The NOP/IS provides no background or references regarding the basis for the proposed limitation on the amount of grading (<1,000 c.y., cut/fill) and import (50 c.y. maximum) per lot. The technical rationale for the proposed limitations should be set forth and referenced in the DEIR.

- Under the proposed ordinance, no existing lots in the Zone 2 area would be permitted to re-parcelize. Some existing legal lots in Zone 2 substantially exceed the minimum lot size that was established as far back as 1975 (Ordinance 75-78); a provision could be made in the ordinance to allow for subdivision, subject to the underlying zoning.

The subject ownership remains available to assist with any internal studies in our possession; we respectfully request the above items be included or addressed at a minimum. The intent is to avoid reader confusion and ownership constraints as the process unfolds.

Respectfully,

Plumtree P.V. Associates

Ronald J. Buss

Ronald L. Buss
Co-Managing Member

cc: Richard Riordan
Co-Managing Member

RICHARDSON & HARMAN, PC
234 E. Colorado Blvd., Suite 800
Pasadena, California 91101
Telephone: 626.449.5577
Facsimile: 626.449.5572
Toll Free: 877.446.2529

Author E-mail: krichardson@rh4law.com

February 1, 2011

VIA FACSIMILE AND U.S. MAIL

Mr. Kit Fox, Associate Planner
City of Rancho Palos Verdes
30940 Hawthorne Blvd.
Rancho Palos Verdes, CA 90275

Re: Rancho Palos Verdes City Zone 2 Draft Environmental Impact Report Initial Study

Dear Mr. Fox:

This office represents the Portuguese Bend Community Association, an Association comprised of the owners of over 200 improved and unimproved lots in Portuguese Bend. The purpose of this letter is to urge the City to expand the scope of the Environmental Impact Study prior to allowing development to proceed on the 16 "Monk Lots", or the 31 additional lots. Moreover, as the City is well aware, surrounding property owners have as well made their intention known to add additional single family detached homes to the land in the adjacent vicinity.

The Association has a number of deep concerns regarding the scope of the environmental inquiry. Perhaps the greatest concern is the addressing of water runoff from these 47 lots. As you know, the Portuguese Bend community was constructed without storm drains and with extremely minimal ability in the private streets to handle any runoff of surface water. The Association streets are all private, through easements granted on private lots for street purposes. There are <u>no</u> easements provided for drainage devices. Traditionally, the lots were required therefore to be constructed in a way which would handle all surface water without draining it onto adjacent properties. A significant inquiry should be made regarding the impact of water not only from these 47 lots which will in the near future be developed, but also in the adjacent uphill properties which are also certain to add additional water burden to the Portuguese Bend properties. Further, the potential exists not only for overloading the private streets which are clearly not intended to handle any significant water runoff, but also the Altamira Canyon will be burdened if surface runoff is directed away from the new lots. The consequences of further burdening Altamira Canyon in this fashion are quite negative, as I suspect most would agree.

Respectfully, the scope of the Environmental Impact Study should also more realistically address the probability not only that the 47 subject lots will be developed with single family homes, but also the adjacent uphill properties. These additional properties must be considered, because of the possible eventuality that they will also be built, further burdening Altamira Canyon and the Portuguese Bend private streets.

Mr. Kit Fox, Associate Planner
Re: Rancho Palos Verdes City Zone 2 Draft
Environmental Impact Report Initial Study
February 1, 2011
Page 2

The prospect of proceeding into a future without this major issue being addressed leaves my client with two alternate nightmare scenarios. The first scenario is erosion, flooding, and further major soil movement in Altamira Canyon and in many of the improved and unimproved lots. In that scenario, the probability of homeowners suing other homeowners for trespass and nuisance from water flooding is a virtual certainty. This has happened on at least one previous occasion. Alternatively, is the City's action going to as a practical matter result in an enforced installation of a massive storm drain system in the Portuguese Bend community? This second scenario is truly shocking to the homeowners of Portuguese Bend, as the cost of installing a comprehensive storm drain system in the community is so massive (along with the additional environmental consequences) so as to be unthinkable.

Therefore, the Association urges the City to broaden the scope of the Environmental Impact Study to address not only the 47 subject lots but the additional adjacent properties, both inside and outside Portuguese Bend and that it also include a substantial study on the handling of surface runoff water throughout the entire Portuguese Bend community.

Thank you for your consideration of this request.

Very truly yours,

RICHARDSON & HARMAN, PC

Kelly G. Richardson

KGR:pjb
cc: Board of Directors

TO RPV City Council 1 Feb 2011 Mtg

PBCA Mtg 10 Jan 2011
re RPV's Zone 2 EIR
for Zone 2 Landslide Moratorium Ordinance Revisions
The Initial Study - preparation for "Scoping Session"
RPV City Council Mtg 1 Feb 2011

- Mtg w/ Ron Dragoo - RPV Public Works

List of possible PBCA concerns:

1. Altamira Canyon slippage - (form a GHAD?)
2. 1978 Abalone Cove landslide re-occurrence
3. Soils of PVP known to be expansive & occasionally unstable
4. Del Cerro Canyon water run off
5. future funds for ACLAD - type remedies (and McCarrell Canyon drain) reduced because of Calif State budget cut backs
6. our zone a High Fire Hazard Area (p. 33) hence increased problems w/ water run off
7. Zone 6 - the active Portuguese Bend landslide area
8. constant expenses for PV Drive South repairs
9. De Watering wells in Zone 6 broken
10. ACLAD's wells are functioning in times of heavy rains to prevent ground water build up?
11. Legal liability for future (inevitable) slide damage to Monks' developed properties

STATE OF CALIFORNIA Edmund G. Brown, Jr., Governor

NATIVE AMERICAN HERITAGE COMMISSION
915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-6251
Fax (916) 657-5390
Web Site www.nahc.ca.gov
ds_nahc@pacbell.net

RECEIVED
JAN 13 2011
PLANNING, BUILDING AND CODE ENFORCEMENT

January 10, 2011

Ms. Kit Fox, Planner
City of Rancho Palos Verdes
30940 Hawthorne Boulevard
Rancho Palos Verdes, CA 90275

Re: SCH#2010121073; CEQA Notice of Preparation (NOP); draft Environmental Assessment/Finding of No Significant Impact (EA/FONSI) draft Environmental Impact Report (DEIR) for the: **"Zone 2 Landslide Moratorium Ordinance Revisions Project;"** located in the City of Rancho Palos Verdes; Los Angeles County, California

Dear Ms. Fox:

The Native American Heritage Commission (NAHC), the State of California 'Trustee Agency' for the protection and preservation of Native American cultural resources. The NAHC wishes to comment on the above-referenced proposed Project.

This letter includes state and federal statutes relating to Native American historic properties of religious and cultural significance to American Indian tribes and interested Native American individuals as 'consulting parties' under both state and federal law. State law also addresses the freedom of Native American Religious Expression in Public Resources Code §5097.9.

The California Environmental Quality Act (CEQA – CA Public Resources Code 21000-21177, amendments effective 3/18/2010) requires that any project that causes a substantial adverse change in the significance of an historical resource, that includes archaeological resources, is a 'significant effect' requiring the preparation of an Environmental Impact Report (EIR) per the CEQA Guidelines defines a significant impact on the environment as 'a substantial, or potentially substantial, adverse change in any of physical conditions within an area affected by the proposed project, including ...objects of historic or aesthetic significance." In order to comply with this provision, the lead agency is required to assess whether the project will have an adverse impact on these resources within the 'area of potential effect (APE), and if so, to mitigate that effect. The NAHC Sacred Lands File (SLF) search resulted in; **Native American cultural resources were not identified** within ½ mile of the areas of potential effect (e.g. APE). The NAHC "Sacred Sites,' as defined by the Native American Heritage Commission and the California Legislature in California Public Resources Code §§5097.94(a) and 5097.96. Items in the NAHC Sacred Lands Inventory are confidential and exempt from the Public Records Act pursuant to California Government Code §6254.10. The absence of evidence of archaeological items does not indicate that they do not exist at the subsurface and/or when groundbreaking activity occurs.

Early consultation with Native American tribes in your area is the best way to avoid unanticipated discoveries of cultural resources or burial sites once a project is underway. Culturally affiliated tribes and individuals may have knowledge of the religious and cultural significance of the historic properties in the project area (e.g. APE). We strongly urge that you make contact with the list of Native American Contacts on the attached list of Native American contacts, to see if your proposed project might impact Native American cultural resources and to obtain their recommendations concerning the proposed project. Consultation with Native American communities is also a matter of environmental justice as defined by California Government Code §65040.12(e). The NAHC recommends *avoidance* as defined by CEQA Guidelines §15370(a) to pursuing a project that would damage or destroy a Native American cultural resources.

Furthermore we recommend, also, that you contact the California Historic Resources Information System (CHRIS) for pertinent archaeological data within or near the APE, at (916) 445-7000 for the nearest Information Center in order to learn what archaeological fixtures may have been recorded in the APE.

Consultation with tribes and interested Native American consulting parties, on the NAHC list, should be conducted in compliance with the requirements of federal NEPA (42 U.S.C 4321-43351) and Section 106 and 4(f) of federal NHPA (16 U.S.C. 470 *et seq*), 36 CFR Part 800.3 (f) (2) & .5, the President's Council on Environmental Quality (CSQ, 42 U.S.C 4371 *et seq.* and NAGPRA (25 U.S.C. 3001-3013) as appropriate. The 1992 *Secretary of the Interiors Standards for the Treatment of Historic Properties* were revised so that they could be applied to all historic resource types included in the National Register of Historic Places and including cultural landscapes. Also, federal Executive Orders Nos. 11593 (preservation of cultural environment), 13175 (coordination & consultation) and 13007 (Sacred Sites) are helpful, supportive guides for Section 106 consultation.

Furthermore, Public Resources Code Section 5097.98, California Government Code §27491 and Health & Safety Code Section 7050.5 provide for provisions for accidentally discovered archeological resources during construction and mandate the processes to be followed in the event of an accidental discovery of any human remains in a project location other than a 'dedicated cemetery'.

To be effective, consultation on specific projects must be the result of an ongoing relationship between Native American tribes and lead agencies, project proponents and their contractors, in the opinion of the NAHC. Regarding tribal consultation, a relationship built around regular meetings and informal involvement with local tribes will lead to more qualitative consultation tribal input on specific projects.

The response to this search for Native American cultural resources is conducted in the NAHC Sacred Lands Inventory, established by the California Legislature (CA Public Resources Code 5097.94(a) and is exempt from the CA Public Records Act (c.f. California Government Code 6254.10) although Native Americans on the attached contact list may wish to reveal the nature of identified cultural resources/historic properties. Confidentiality of "historic properties of religious and cultural significance" may also be protected under Section 304 of he NHA or at the Secretary of the Interior discretion if not eligible for listing on the National Register of Historic Places. The Secretary may also be advised by the federal Indian Religious Freedom Act (cf. 42 U.S.C., 1996) in issuing a decision on whether or not to disclose items of religious and/or cultural significance identified in or near the APE and possibility threatened by proposed project activity.

If you have any questions about this response to your request, please do not hesitate to contact me at (916) 653-6251.

Sincerely,

Dave Singleton, Program Analyst

Attachment: Native American Contact List

Native American Contacts
Los Angeles County
January 10, 2011

LA City/County Native American Indian Comm
Ron Andrade, Director
3175 West 6th Street, Rm.
Los Angeles, CA 90020
randrade@css.lacounty.gov
(213) 351-5324
(213) 386-3995 FAX

Gabrielino Tongva Nation
Sam Dunlap, Chairperson
P.O. Box 86908 Gabrielino Tongva
Los Angeles, CA 90086
samdunlap@earthlink.net

(909) 262-9351 - cell

Ti'At Society/Inter-Tribal Council of Pimu
Cindi M. Alvitre, Chairwoman-Manisar
6515 E. Seaside Walk, #C Gabrielino
Long Beach, CA 90803
calvitre@yahoo.com
(714) 504-2468 Cell

Gabrielino Tongva Indians of California Tribal Council
Robert F. Doramae, Tribal Chair/Cultural
P.O. Box 490 Gabrielino Tongva
Bellflower, CA 90707
gtongva@verizon.net
562-761-6417 - voice
562-925-7989 - fax

Tongva Ancestral Territorial Tribal Nation
John Tommy Rosas, Tribal Admin.
, Gabrielino Tongva
tattnlaw@gmail.com
310-570-6567

Gabrielino-Tongva Tribe
Bernie Acuna
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This list is current only as of the date of this document.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code. Also, federal National Environmental Policy Act (NEPA), National Historic Preservation Act, Section 106 and fed eral NAGPRA. And 36 CFR Part 800.

This list is only applicable for contacting local Native Americans for consultation purposes with regard to cultural resources impact by the proposed SCH#2010121073; CEQA Notice of Preparation (NOP); draft Environmental Impact Report (DEIR) for the Zone 2 Landslide Morotorium Ordinance Revisions; City of Rancho Palos Verdes; Los Angeles County, California.

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This list is only applicable for contacting local Native Americans for consultation purposes with regard to cultural resources impact by the proposed SCH#2010121073; CEQA Notice of Preparation (NOP); draft Environmental Impact Report (DEIR) for the Zone 2 Landslide Morotorium Ordinance Revisions; City of Rancho Palos Verdes; Los Angeles County, California.

Kit Fox

From: Stuart Miller [stuartmiller@earthlink.net]
Sent: Thursday, February 03, 2011 3:39 PM
To: Kit Fox
Cc: Scott Wellman
Subject: CEQA study
Importance: High

Dear Kit:

On Tuesday evening, Tim Kelly of the Portuguese Bend Community Association addressed the City Council regarding the CEQA Initial Study, purporting to speak on behalf of the *Monks* plaintiffs as well as the other members of the PBCA. I have just learned that the PBCA's attorneys have written a letter about the Initial Study to the City as well.

I am writing to inform you that the PBCA does not represent the views of the *Monks* plaintiffs and that we do not endorse any statements by the PBCA or its attorneys.

Please include this message in the record of proceedings regarding the Initial Study and transmit it to whoever needs to know about it.

Thank you very much.

Regards,
Stuart Miller
stuartmiller@earthlink.net

January 20, 2011

To: Kit Fox
Zone 2 Landslide Moratorium Ordinance Revision EIR Project Planner
From: Gordon Leon
38 Narcissa Dr, RPV Gordon.Leon@gmail.com

RECEIVED
JAN 20 2011
PLANNING, BUILDING AND CODE ENFORCEMENT

Scoping for Zone 2 Landslide Moratorium Ordinance Revision EIR

The initial study uses the standard EIR checklist and doe not specifically address the issues associated with the Portuguese Bend Landslide Complex. The study questions hydrology from the point-of-view of increasing ground water when the Abalone Cove Landslide Abatement District (ACLAD) pumps 300,000 gallons a day out of the ground water to reduce the risk of land movement. It mentions landslides under Geology and Soil, but from the viewpoint of possible landslides rather than existing landslides. The following are areas that need to be assessed in the EIR.

IX Hydrology and Water Quality

(New) Increase in run off water can exacerbate land slide.

- Need to limit impervious surfaces
- Need to keep rainwater on site and release slowly

e. Storm drains

- PBCA rainwater drains into Altamira Canyon and only 40% of it makes it to the ocean. The remaining 60% drops through fissures into the slip plane of the landslide. Additional uncontrolled run-off will exacerbate the landslide.
  - Need to limit storm drainage from lots
  - Need to improve Altamira Canyon drainage from Narcissa Drive to the Ocean

VI Geology and Soils

a) iv) Landslide

Zone 2 is within the active Portuguese Bend Landslide Complex (PBLC). Extreme care must be taken in the development of new houses to protect against destabilizing the land within the PBLC.

- Limit major grading
- Reduce vibration from compaction, earthmovers, and trucks, etc
- Reduce water into the slip plane (see Hydrology)
- Protect large mature trees that reduce ground water.

To: Kit Fox, Associate Planner for the City of Rancho Palos Verdes
From: Jim Knight
Dated Jan. 29, 2010

Comments on Zone 2 Landslide Moratorium Ordinance Revisions Initial Study dated Dec. 2010

GENERAL COMMENTS

PROJECT DESCRIPTION

The project description of this Initial Study (IS) is an approximately 112 acre "'Zone 2 Landslide Moratorium Ordinance" area consisting of 111 individual lots. The EIR must explain how 16 of those 111 lots within this project description (labeled "Monks plaintiffs" in figure 2) already have a certified MND, have been issued Planning entitlements to construct structures and hardscape and how they will subject to any mitigations that may be set forth in this EIR. The EIR must explain how these 16 lots are to be included in this EIR without creating a segmentation of this project and explain how this project requires an EIR and why an EIR was not required of the 16 "Monks plaintiffs" lots under the same CEQA guidelines.

This IS has taken the assumption that there will be no subdivision of these 111 lots. (page 9) A project description must include all relevant aspects of a project, including reasonably foreseeable future activities that are part of the project. The EIR must analyze the impacts of the potential subdivision of some of the 111 lots of the project description thereby potentially increasing the scope and resulting impacts of this project.

OTHER AGENCY APPROVAL

The EIR must explain why this project does not require consultation and/or approval of the RPV Redevelopment Agency, Improvement Authority or the Abalone Cove Landslide Abatement District (ACLAD).

SCOPE OF PROJECT

The EIR must include a description of the environment in the vicinity of the project, as it exists before the commencement of the project, both from a local and regional perspective. The project is within and contiguous to interrelated landslide areas of which have very complex dynamics influencing each other both geologically and hydrological. The EIR must include an analysis of these regional dynamics and address the impacts of the project with respect to areas outside of the project description and must address regional land stability.

The "Zone 2" project area is contiguous with an area designated by the city as "Zone 5". Zone 5 is approximately the boundary of the Abalone Cove Landslide area that became active in the late 1970s and into the early 1980s. This landslide damaged many homes in that time period and caused lending and insurance companies to seize services to these residents. Concern of future movement forced water, gas and sewer to be placed above ground in Zone 5.

The contribution of additional storm water runoff into the landslide prone Zone 5 area as a result of this project poses a potentially significant impact directly to Zone 5 and indirectly to Zone 2. (Any loss of stability in Zone 5 will migrate into the contiguous Zone 2 area). The Abalone Cove storm drain system concentrates the runoff from both Zone 2 and Zone 5 into Altamira Canyon. The City's has administrative records from several decades that have documented Altamira Canyon's deficiency in handling storm water runoff and the potential of land instability from the infusion of water into the canyon floor. Also in that documentation was a plan for the City to fix this inadequacy. That Plan was never implemented.

Aside from the decades of documentation, more recently there is video documentation available for consultant review showing flooding problems and loss of property in lower Altamira Cyn. caused by storm water runoff.

The Abalone Cove Landslide District (ACLAD) has been monitoring dewatering well production for years. Their records are also available for consultant review. The most recent records of water well (WW) 18 located within the city owned area near the toe of the Abalone Cove Landslide seaward of PV Dr. South) showed a tremendous increase of well production after the December 2010 rains. It went from 4.91Kgals/day at the beginning of Dec. 2010 to an unprecedented 29.82 Kgals/day by Jan. 13, 2011. Normally, with most other wells within ACLAD, response to rain events occurs with approximately a 6 month delay. These well production numbers for WW18 seem to indicate that water is infusing directly into lower aquifers through fissures in this lower canyon area seaward of PV Dr. South. This phenomenon can lead to land instability in Zone 5 which can migrate into Zone 2.

Storm water in Altamira canyon can also create severe beach side erosion causing the shoreline to retreat. This loss of revetment compromises land stability as well.

As a part of the CEQA review of the Marymount Project, it was concluded that the project could not contribute any more storm water flow rate to a deficient storm drain system offsite than before the implementation of the project. The scope of this project must include the same analysis for these areas of outside the boundary of the project area and address what mitigation(s) would appropriately reduce this impact to less than significant.

COMMENTS BY SECTION

IV BIOLOGICAL RESOURCES

The IS has not discussed the impact of an increase of fuel modification setbacks created by the addition of habitable structures on the lots which would mandate additional vegetation clearance, especially in the northernmost sections of the project which interface with the NCCP preserve. As such, this could impact biological resources under an NCCP Plan.

VI. GEOLOGY and SOILS

By the IS not including Zone 5 into the scope of this EIR, it has missed the fact that the Dept. of Conservation Seismic Hazard Zone Map shows an area seaward of PV Drive South within Zone 5 (and the Abalone Cove Landslide) which has historic occurrence of liquefaction with local geological, geotechnical and groundwater conditions that indicate a potential for permanent ground displacements such that mitigations would be required. Additional storm water runoff from this project could impact this area and, as mentioned above, there is a geologically and hydrological contiguous interrelationship between what the city calls Zone 2 and Zone 5.

VIII. HAZARDS AND HAZARDOUS MATERIALS

The IS fails to address the impacts of storm water runoff to the sensitive intertidal zone of the State Abalone Cove Ecological Reserve.

IX. HYDROLOGY and WATER QUALITY

The IS must address the impacts of storm water runoff from this project to the entire storm water drainage system including areas outside of Zone 2 as discussed above in SCOPE OF PROJECT. The IS fails to address the impacts of storm water runoff to the sensitive intertidal zone of the State Abalone Cove Ecological Reserve.

X LAND USE/PLANNING

The IS does not include the General Plan's list of Geologic Safety Policies. This project is also subject to Public Resources Code Sec. 2699 which directs cities to "take into account the information provided in available seismic hazard maps when it adopts or revises the safety element of any land-use planning or permitting ordinances." Zone 2 is subject to the Geologic Hazards Mapping Act. Both Zone 2 and Zone 5 are identified on these Geologic Hazard Maps. The Dept of Conservation, Division of Mines and Geology Special Publication 117 sets forth guidelines under that Act for evaluating and mitigating seismic hazards within mapped areas such as this project.

The scope of this project should include the land use policies as set forth in the General Plan, State Ecological Reserve and Geologic Hazards Mapping Act.

XIV PUBLIC SERVICES

The IS does not address the physical change the project creates that could adversely affect fire protection access. Currently fire protection services can access the northerly open space directly over an unobstructed vacant lot from a paved street such as upper Cinnamon Ln. There are numerous lots in the project that back up to natural open space and there needs to be adequate fire protection access between any new homes to the open space in back in order to provide the same level of fire protection to the entire community.

The IS only addresses the number and location of Fire Stations and not whether or not the hydrant service to the project area is adequate. It is my understanding that the Fire Dept. has stated hydrant service is inadequate for this project.

XVI TRANSPORTATION

There are only two emergency access roads for the entire Portuguese Bend community to exit onto P.V. Dr. South. We are surrounded by a large open space which has had fires recently. Persons, as well as a large equestrian community, need these roads for emergency access. Existing roads within the Portuguese Bend community are very old, not compacted well and could be significantly deteriorated by heavy construction equipment, especially accumulatively for the entire project. Additionally, there are some very dangerous curves in which it has already been shown to be a safety issue with large trucks.

The IS must analyze the potential significant impacts to the roads servicing the project.

XVII UTILITES AND SERVICES SYSTEMS

Some lots within the project do not have direct access to the existing utility service distribution system. For instance, homes on upper Cinnamon Ln. currently access the water distribution system from Narcissa Dr. via easements over other properties. The IS must discuss how utilities will be accessed to the project, what easements would be required if any and what will utility services have to provide in terms of additional main supply lines to some of the lots in this project. Without this disclosure, it is unknown what impact the project will have on utility/services systems.

The IS states that the Public Works Department has confirmed that there is adequate sewer capacity to serve the project. Please clarify how the recent failures of the sewer system, without the addition of the project, were taken into account as a part of this analysis.

The IS must clarify how the goal of preventing adverse impacts to incremental reduction of ground water does not conflict with ACLADs opposite goal of trying to pump as much water as possible out of the ground to mitigate landslides.

Thank you for the opportunity to comment on the Initial Study and I am in hopes that this EIR will fully and adequately address all issues related to the project.

Jim Knight

Kit Fox

From: cassiej@aol.com
Sent: Sunday, January 30, 2011 1:08 PM
To: kitf@rpv.com
Subject: Comments on Zone 2 Landslide Moratorium Ordinance Revisions Initial Study Dec. 2010

To: Kit Fox, Associate Planner City of Rancho Palos Verdes
From: Cassie Jones & Lewis Enstedt, Rancho Palos Verdes
Re: Comments on Zone 2 Landslide Moratorium Ordinance Revisions Initial Study Dec. 2010
<!--[if !supportEmptyParas]--> <!--[endif]-->
Comments regarding this Initial Study:
<!--[if !supportEmptyParas]--> <!--[endif]-->

Surrounding Land Uses

The description of the surrounding properties is incomplete. The properties to the NE, E, SE, S, W and NW are described. However, the property to the north of the project has been glaringly omitted and it is of utmost importance. We believe the Plumtree property, as it is known, is residentially zoned and completely landlocked except for access through the Portuguese Bend Community. It is immediately adjacent to at least 7 of the 47 vacant lots. The City has received information regarding the desire to subdivide and develop this property and it is reasonably foreseeable that the cumulative impacts from the project at hand and the development of the Plumtree property are intimately intertwined so as to be one. Any and all aesthetic, drainage, water, fire, safety, ecological and environmental impacts from developing one are virtually the same for developing both, only on a larger scale. The scope of this project is not complete unless it includes this very reasonably foreseeable development. Additionally, the subject property is accessed only through Zones 5 and 6 and all storm water from the project drains into Altamira Canyon. Eight of the subject properties drain or abut directly to the canyon. The canyon is also the source of ground water recharge and of runoff in to the ocean. It is reasonably foreseeable that some impacts to Zone 2 will have bearing on Zone 5 and potentially Zone 6. Therefore the effects on these Zones should be considered.
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Description of Project

The project description improperly incorporates project design criteria, such as minimum and maximum square footage, building height, lot coverage, setbacks, and grading. To the extent these criteria are considered project objectives, the Initial Study improperly gives the City the ability to reject feasible mitigation measures that set lower square footage, building height, lot coverage, setback, and grading requirements. The EIR must make clear that these are the very criteria for which feasible mitigation measures will require revision.
<!--[if !supportEmptyParas]--> <!--[endif]-->
In addition, the description of the project itself is still in question. The revision allowing an exception to the landslide moratorium for the construction of residential buildings with less than 1000 CY grading was part of an emergency ordinance increasing the grading from 50 CY to 1000 CY. The 50 CY was mitigation from the Mitigated Negative Declaration passed by the City due to the sensitive geology in the area. This amount was greatly increased to 1000 CY (a 2000% increase) without any study or justification.
<!--[if !supportEmptyParas]--> <!--[endif]-->
Further, the Initial Study includes the potential impacts from the "16 Monks lots plus 31 additional lots" in order "to provide a conservative analysis" (page 9). However, the Initial Study also indicates that 7 Monks Plaintiffs lots have obtained Planning entitlements and the remaining 9 Monks Plaintiffs lots are

in the process of obtaining such entitlements. Further study must explain how mitigation measures developed and approved in the EIR will be applied to projects that have already received their entitlements or have even been constructed. For example, if lower square footage or height maximums are adopted, will already-constructed homes be required to be demolished and reconstructed to applicable standards, as the law requires? Will already-approved plans be required to be modified and resubmitted, as the law requires? If so, why is the City granting entitlements to the Monks Plaintiffs' lots? If not, why are the Monks Plaintiffs' lots included in this analysis, and wouldn't their inclusion make this analysis a sham?
<!--[if !supportEmptyParas]--> <!--[endif]-->
Finally, the Project Description incorporates the Monks Plaintiffs' lots but makes no mention of the current CEQA challenge that has been brought against the Monks Plaintiffs and the City, and that the Monks Plaintiffs' applications for planning entitlements have been submitted and processed entirely at their own risk.
<!--[if !supportEmptyParas]--> <!--[endif]-->

Future Development Potential

The statement that it is assumed that development would occur over at least a period of 10 years is unsubstantiated and speculative. Truthfully, it is unknown. The reality is that of 16 lots already allowed to begin the process, nearly half have already taken significant steps and all have at least started the process. It is also assumed that they would proceed in a manner consistent with the private architectural standards of the PBCA. The conclusion reached in the Initial Study is "Therefore, the future development assumptions for Zone 2 include the following:" Here the document proceeds to list items that have not or cannot be met or be consistent with the above assumption. The Community standards require side or interior set backs to be significantly greater than the 5 feet declared here by the City. Additionally, the 1000 CY of grading is subject to litigation and the community does not allow ANY import or export of dirt for construction. This document seeks to circumvent community standards in favor of an unsupported and arbitrary standard.
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Environmental Factors Potentially Affected

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Aesthetics

As a general point, the Initial Study should make factual statements supported by evidence and should not pre-judge the significance of impacts. All points have potentially significant impact and should be studied further in an EIR. Statements such as "Adding 47 residences to the project area would.... incrementally alter the visual character of the site" prejudice the reader. As there are only 64 residences in the project area currently, adding 47 more is certainly more than an "incremental" increase! It would be better stated that it would alter the existing visual character of the site by a factor of nearly 75%. Also given the fact that the Plumtree property is indistinguishable from the subject property, the impacts of an additional approximately 20 homes, maybe more, should be considered.
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Air Quality

All points have potentially significant impact and should be studied further in an EIR.
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Biological Resources

All points have potentially significant impact and should be studied further in an EIR. There are some incorrect assumptions in this section that are of significance, however, and should be addressed. It is true that, as the Initial Study states at page 15, some of the subject properties contain sensitive plants and animals. But the Initial Study incorrectly states, "Some lots in the northern end of the project area ... abut the City's [NCCP Property]." (Page 15) However, only *one* of the lots on upper Cinnamon Lane and a fraction of a second lot abut the NCCP Preserve area. Many more actually abut the Plumtree property, which then abuts the NCCP Preserve area to the north. This is again an example of how the Plumtree property is intimately associated with and even mistaken by the Initial Study for these lots in

Zone 2. It is further evidence that they should be considered together in the study of their cumulative impacts, as these impacts would be inseparable.
<!--[if !supportEmptyParas]--> <!--[endif]-->
A number of these properties include Altamira Canyon as part of their legal description. The City has established the Natural Overlay Control District to "Enhance watershed management, control storm drainage and erosion, and control water quality of both urban runoff and natural bodies within the City." As vast amounts of water enter the storm water system in this area and the amount is proposed to increase substantially, this will certainly need to be studied further in an EIR. The Horan Settlement mitigation measures which improve the drainage in Altamira Canyon have yet to be implemented.
<!--[if !supportEmptyParas]--> <!--[endif]-->
Cultural Resources
Points b), c) and d) have potentially significant impact and should be studied further in an EIR. At a minimum, a paleontologist should be employed during grading in this area for each project.
<!--[if !supportEmptyParas]--> <!--[endif]-->
Geology and Soils
Points a) ii), a) iv), b), c), d) and e) have potentially significant impact and should be studied further in an EIR. The remaining points may have some impact. Point e) is of concern because the soils above in the Plumtree property currently do not have sewer hookups and there really is no other way for water to leave that property than for it to either come down Altamira Canyon and back in to the landslide or the open ocean or to come down through the subject property, on to the streets, into Altamira Canyon and back in to the landslide or the open ocean. The sewer system currently does not function properly and is showing signs of obsolescence and disrepair, and will be further impacted by further development. A holding tank system is a completely inadequate and impractical alternative.
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Greenhouse Gas Emissions
All points have potentially significant impact and should be studied further in an EIR.
<!--[if !supportEmptyParas]--> <!--[endif]-->
Hazards and Hazardous Materials
Point c) is of concern and should be further studied in an EIR because the assumption made in the document is that "...due to the dispersed locations of the subject lots and the opportunity for infiltration of runoff from the initial flows as part of a rain event, the incremental increase in impervious surfaces would not be expected to result in significant concentrations of hazardous substances near the nursery school or else where." The "incremental increase" here is substantial. Homes in the area average 2500 SF currently and there are 64 of them. The new homes are permitted to be 4000 SF and many of the proposed homes approach that size and there will be 47 of them. You can do the math, too, but adding that amount of impervious surface area pretty much doubles the amount in the area currently from homes and related hardscape. That is actually a huge increase and is even greater when the roads are expanded and the Plumtree property is built out. The development of more homes and road surfaces is a reasonably foreseeable event and should be studied in this EIR. Additionally, we are seeing that the new homes are being required to hold some water back in a holding tank only to later release it on to the roads. Infiltration of runoff is not being allowed to happen yet here it is being used as mitigation for increasing the impervious surfaces. You can't have it both ways. Regardless of when the water is released from the holding tanks, it and any toxins in it still go into the Canyon eventually and either back in to the landslide or in to the ocean by the nursery school.
<!--[if !supportEmptyParas]--> <!--[endif]-->
Point g) is perhaps of greatest concern and should be studied in an EIR. Evacuation routes to and from the area traverse unstable lands in Zones 5 and 6. These roads have already been overwhelmed in emergency evacuation situations and emergency response is already impaired and they are in active landslide areas.
<!--[if !supportEmptyParas]--> <!--[endif]-->
Hydrology and Water Quality

All points except j) have potentially significant impact and should be studied further in an EIR.
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Any study of impacts from increased surface runoff includes areas outside of Zone 2 because that is where the runoff water ends up. History has shown a correlation between groundwater levels in Zone 5 and its decrease in stability. History has also shown that removing this water, via dewatering wells, dramatically slowed the movement in Zone 5. It is fact that the vast majority of surface runoff in the western portion of the community ultimately ends up in Altamira Canyon, with a potential to increase groundwater levels and to befoul the shore at Abalone Cove. This potentially devastating impact must be thoroughly analyzed and mitigated.
<!--[if !supportEmptyParas]--> <!--[endif]-->
Land Use and Planning
Point c) does conflict with the NCCP and should be marked as significant here and further studied in an EIR.
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Noise
Points a) – d) have potentially significant impact and should be studied further in an EIR.
<!--[if !supportEmptyParas]--> <!--[endif]-->
Population and Housing
Point a) does have potentially significant impact and should be further studied in an EIR. The impacts will be very significant locally. With respect to zone 2, the proposed project represents a 73% increase in the number of homes.
<!--[if !supportEmptyParas]--> <!--[endif]-->
Public Services
Points a) i) and ii) are of concern and should be further studied in an EIR. Especially with respect to fire safety. The document states, "...the project area's close proximity to Fire Station #53 would ensure an adequate response time by the Fire Department in emergency situations." However in reality this was not the case when, almost exactly 1 year ago, a house at Peppertree and Kumquat burned to the ground and there was a very inadequate response to the fire. The fire hydrants in the community are not up to today's standards. In this incident, the fire department had trouble finding the hydrant in front of this house, and when they finally found it, there was a problem with their ability to connect to the hydrant due to it's older design/smaller diameter. Also, the lack of adequate water pressure could be an issue. It is known that a recent remodel/improvement project on Thyme Place was scaled back by the city after it was discovered that the local water pressure was inadequate to support the original size of this remodel. There is no water supply or fire hydrant availability on upper Cinnamon yet there are a number of properties in this project located on that street. The most recent fires in the area have been attributed to Edison power lines. There are power lines running up Altamira Canyon. There is a gas main that crosses the eroding canyon under these power lines through two subject lots on Cinnamon and Vanderlip and there is not a fire hydrant or water service available on Upper Cinnamon. The roads to this project are inadequate to support large fire fighting equipment. The fire situation at the very least warrants some study.
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Transportation and Traffic
All points except c) have potentially significant impact and should be studied further in an EIR.
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Utilities and Service Systems
All points except f) and g) have potentially significant impact and should be studied further in an EIR.
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Point c) is of special concern because here, again, the increase in impervious surfaces is being credited with reducing groundwater recharge, yet holding tanks are also being required to hold water so it does not go back in to the ground (yet it actually does go back there after it is dumped back on the streets). This just does not seem to add up. You can't have your cake and eat it, too. Truthfully, the rain that

falls on the vegetated, undisturbed properties soaks in a few inches, doesn't run off, and eventually evaporates. The vast majority of the run off comes from impervious surfaces and denuded vacant land, such as horse corrals.
<!--[if !supportEmptyParas]--> <!--[endif]-->
Point d) may mean that the service provider has adequate water to supply the area, but the delivery of it is potentially inadequate. As mentioned above, some remodel projects have been scaled back due to lack of water service or pressure, not lack of water itself. The development of the Plumtree property will require adequate water delivery as well. The water supply will have to come up from this area, one would assume. It is better to study it now and know, than to be inadequately prepared in the future.
<!--[if !supportEmptyParas]--> <!--[endif]-->

Mandatory Findings of Significance

All points have potentially significant impact and should be studied further in an EIR.
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Thanks for your attention and the opportunity to comment.
<!--[if !supportEmptyParas]--> <!--[endif]-->

Cassie Jones
Lewis Enstedt

Kit Fox

From: cassiej@aol.com
Sent: Wednesday, February 02, 2011 8:31 AM
To: kitf@rpv.com; CC@rpv.com
Subject: Short video along Narcissa

To: Kit Fox
Re: Zone 2 EIR Initial Study

I was not certain if a copy of Jim Knight's short video of the magnitude of the drainiage issue was left with you. The link below shows three short segments of video during more recent rains in Portuguese Bend. The video is about 4 minutes long but there is over an hour available if needed by the consultant for most other streets. All of this footage is of Narcissa Road.

The first part was taken driving up lower Narcissa after several days and 5 inches of rain, as you can hear right at the beginning on the radio. (Otherwise turn the sound off because my chatter is annoying) It shows that even with max saturation of the ground, there is very little runoff from the planted steeply sloping areas and that runoff comes primarily from driveways and impervious surfaces. The homes you see there are older ones, not a whole lot of runoff, actually.

The next bit is during heavy rain showing the road at upper Narcissa. It takes the runoff from impervious surfaces that have been required to put their water on the road because of remodeling or rebuilding the home or because of disturbed ground, like stables. What you can't see on this short segment is that this water immediately goes directly into Altamira Canyon. The first home here is more along the lines of what is being approved to be built on the vacant lots now. You can see that a holding tank of 1000 gallons would fill up in no time.

The last segment shows how much water runs off and directly into Altamira Canyon at middle Narcissa near the horse stables. It shows foul, muddy water from and large amounts of water from developed properties that drain directly on to the road. The water at the end that goes into what looks like a storm drain actually just goes directly under the road, empties on to Figtree, runs down that road and in to Altamira canyon. My little car can't drive down that road safely when it is running like that so I didn't go there on that day.

I did video into the canyon at some points and that is interesting to watch, too, if anyone is interested.

http://www.youtube.com/watch?v=pttNxj368kg&feature=youtube_gdata_player

Thanks for your time last night.

Cassie Jones

Kit Fox

From: cassiej@aol.com
Sent: Tuesday, February 01, 2011 7:01 AM
To: kitf@rpv.com; pc@rpv.com
Subject: Zone 2 EIR Initial Study Comments- addendum

Mr. Fox,

Sorry for the very late correspondence but it was neglected in my previous comments to mention that the IS states that the "Private streets within Zone 2 are maintained by the Portuguese Bend Community Association." This is true for the majority of the streets but not for all of them. Several, maybe 4?, of the vacant parcels in Zone 2 are accessed by a road or roads not maintained by the PBCA. I honestly don't know who or what entity maintains them but the PBCA does not.

Cassie Jones

Kit Fox

From: katelinkelly@aol.com

Sent: Wednesday, February 02, 2011 11:20 AM

To: kitf@rpv.com

Subject: Drafr EIR zone 2 initial report

Mr Kit Fox

My concern is Narcissa Drive. This is our only access in and out of our homes. I would ask that this issue is included in the EIR study concerning developement in the zone 2 area. Every vehicle coming and going will be accessing up and down Narcissa Drive. It is extremely subject to cracking and movement. We have noticed a lot of cracks especially in the last few years. Will there be room for emergency vehicles such as fire trucks? What about water run off? These factors and more need to be fully studied. Our home is the only home we own. It is everything we have. We know the city of Ranch Palos Verdes will do everything to protect its residents.
Thank you

Joan Kelly

Kit Fox

From: Carla Morreale [carlam@rpv.com]
Sent: Wednesday, February 02, 2011 2:46 PM
To: 'Kit Fox'
Subject: FW: EIR Scope
Importance: High

Kit,

I am forwarding this email to you since I did not see your name as a recipient.

Carla

From: William Hunter [mailto:bill_hunter@cox.net]
Sent: Wednesday, February 02, 2011 1:07 PM
To: City Council
Cc: Marianne Hunter
Subject: EIR Scope
Importance: High

Dear Councilmen, City Staff and Study Director,

Thank you for the presentation last at last nights meeting.

Although we heard last night that the scope will be widely inclusive, the first document that we were able to read on the projects scope left many people very concerned that issues may be ignored or treated more lightly than is in the best interests (other than short term monetarily) of: 1.residents of Portuguese Bend, 2.homeowners above and below the landslide, 3.drivers using PV Dr. South, 4.tax payers responsible for repair of that road and lawsuits against the City, 5.City owned property at Shoreline Park, 6. the nature preserves above and in the ocean below, 7.the Wayfarers Chapel, 8. both Terranea and Trumps and all other businesses relying on PV DR South.

One particular aspect that wasn't mentioned is the ongoing problem with the Edison power lines running through the slide areas. Edison has said that it will not replace the current poles as a remedial project, but only individual poles as they fail. The poles are falling over. Edison has started (correct me if I'm wrong) all but one of the fires in the area. We have power lines hanging over a canyon that is a natural water course. What happens when during runoff, those hot power lines fall into the water? How dangerous is that to anyone down stream working on flood issues? The lines and poles are going to continue to fail and fall, starting brush fires into the future. *How does the expansion of electrical demand affect the dilapidated Edison equipment?*

The issue of fire and emergency vehicles coming to the aid of the community is currently is realistically problelmatic. Ingress, egress to large vehicles through the gates is difficult. We do NOT have adequate water service for fighting fires (as the Himelwright family has tragically experienced). We don't have much capacity for emergency vehicles comig in while residents evacuate. *How will more homes and people who need to be protected, who might need to evacuate (who are building much larger homes) affect fire danger and fire fighting and evacuation?*

To further complicate safety issues in emergencies of all kinds (and day to day convenience) Narcissa Dr is known to have a major fissure running across it (near or at) the very vulnerable hair pin turn above the Wayfarers Chapel. Without some major form of bolstering, it IS going to fail eventaully and we don't know when. Maybe the ***next*** big storm or earthquake, maybe not in our lifetime. Here is a scenario: A brush fire occurs and fire equipment is moving up Narcissa Dr and residents are both coming home and going downhill to evacuate. The fissure causes the road to become impassable. The fire trucks can not go forward, there is **no** room to turn around, cars are stacked up behind them so they can't back down. Cars trying to leave are in the same position with no room to manuever. The fire is burning. ***Now what?*** Now it is more than a brush fire, now homes are in far more danger and the possiblitly of people being trapped exists.

That there is real danger of road failure on both Narcissa and PV Dr South is beyond question. We have all been very lucky in the past 2 decades. *How much damage does the stress of large, heavy vehicles do to these delicate lifelines? This question was asked before construction began for Terranea.* ***How much more has the City had to do in the past 2 years to keep PV Dr from falling to ruin,*** taking sewer and power lines with it? More than it has in the 13 years we've lived here.

These are ony a couple of the really huge threats to the immediate safety and long term stability of this community and it's affect on the City.

We cannot stress enough how critical the water runoff problem already is and how much new construction and hardscaping can exacerbate that problem.

We live in a community that respects the fragility of our land. That is all about to change. Deveolpers, specualtors and the uninformed do not have the long term concerns, experiences or knowledge to tread lightly here. The science has revealed a new picture since reports done long ago. This area is not one plate, sealed from infiltarion, cruising smoothly towards the sea; it is a series of fissured blocks bumping and grinding, affecting one another, on the way to the sea.

We believe it is the height of folly to increase the density in an area infamously known for it's instability. When the next slide occurs, there will be much head shaking and finger pointing about "who let this development go forward?" But, it development seems, imminent so we remind you that your positions of trust and authority *require* you to scrutinize *every aspect* of this project and it's potential impacts on the surrounding areas and do what is then required to protect the public safety.

Sincerely,

William and Marianne Hunter
1 Cinnamon Lane
Portuguese Bend, RPV, Ca
310-377-1871
2hunter@cox.net

Kit Fox

From: tom hoffman [comptonhoffman@yahoo.com]
Sent: Wednesday, February 02, 2011 10:22 AM
To: kitf@rpv.com
Subject: storm runoff in Portuguese Bend

Dear Sir, I have lived at 5 Plumtree Road for 13 years. For 9 of those years I lived without any incidence of flooding. When my current neighbor moved next door (#7) and acquired property from Jim York my problems began. My neighbor cleared all of her property of underbrush while Mr. York was doing the same to create a riding ring above her house. The following two winters were a disaster for my house and my back yard. Storms washed mud and debris up against my house and buried my patio. Despite her efforts to divert water, my neighbor was unsuccessful for two years. This winter we have seen no flooding.
My point to you is; be aware of the very real flooding danger downstream of any significant land clearing in the Portuguese bend area. I have pictures to prove my assertions.

Tom Hoffman
310 265 0200

Kit Fox

From: Corinne Gerrard [corinne.gerrard@gmail.com]
Sent: Wednesday, February 02, 2011 2:39 PM
To: kitf@rpv.com
Subject: EIR

Request the Eir scope be expanded to include the compaction of the roads to the current engineer standards to help in vibration that will occur from truck and tractor loads.

RECEIVED

JAN 18 2011

PLANNING, BUILDING AND CODE ENFORCEMENT

To: City of RPV, Community Development Dept.

Subject: Zone 2 Landslide Moratorium Ordinance Revisions

Reference the specific effects of the Ordinance as presented on the property identifiable as:

Assessor's Parcel Number: 7572 002 024.

I am the owner of the subject property which is over 6.9 acres and has been zoned for one unit per acre for the entire time of my ownership commencing prior to the City's formation. All Governmental actions, to my knowledge, have been consistent with the potential of the subdivision of the parcel. In particular, the lot split of the contiguous parcel, 7572-002-029.owned by the John Vanderlip family in November.1989 and its subsequent inclusion in the "Monks" litigation and settlement. Another City action was the inclusion of sewer laterals at locations other than the current improvements. The various taxes and fees that continue to be levied against the property have also been consistent with its 6.9 acres and the probability of future subdividing.

None of this would have any effect on the validity of the EIR per se, since the added number would be small in proportion. I do however request the City to make the necessary changes to the Ordinance, and to include reference to my property in the numbers of underdeveloped properties.

Date: January 18, 2011.

Signed: Jack Downhill

Property Owner

20 Vanderlip Dr. Rancho Palos Verdes

Kit Fox

From: Jeremy Davies [jdavies@kuboaa.com]
Sent: Monday, January 31, 2011 10:51 AM
To: Kit Fox
Cc: planning@rpv.com; Kelly Richardson
Subject: Zone 2 CEQA EIR for Proposed Landslide Moratorium Ordinance Revisions
Attachments: ZONE 2 DRAFT EIR.doc

Dear Mr Fox
Firstly, thank you for the opportunity to submit concerns and recommendations regarding the scoping of the EIR on Zone 2 contained in the Initial Study dated December 2010.

I attach a memorandum containing input on the scope of the environmental issues contained in the Initial Study Document dated December 2010 prepared by the City with the Assistance of Rincon Consultants Inc.

My overall concerns are:

1) The scope of the EIR is limited in a narrow manner to a block of land designated as Zone 2 as though this land mass is independent of all surrounding areas. Two of these surrounding areas provide the only access to Zone 2 which is abutted by two active landslides (Abalone Cove and Portuguese Bend-Zones 5 & 6) through which all traffic, including heavy construction vehicles, will have to pass. These access roads are some 60 years old and were not designed for additional development and have recently required significant asphalt infill to compensate sinking land due to landslide movement and traffic. In addition, in the case of Peppertree (Zone 6) , a fissure and sink hole appeared during the recent heavy rains and after the infill. The traffic conditions section of the EIR should spell out the fact that access is through roads in active landslide zones and should evaluate the impact of increased traffic including heavy construction equipment and detail the mitigating actions necessary. In addition, it should also be noted that multiple attempts to reduce land movement and fissures with dewatering wells, other measures and a recent (July 2010) $215,000 grading and planting project on PV Drive South in part of the Portuguese Bend landslide was completed. Despite this latest project to reduce fissures, significant repairs have again been necessary in January 2010 to keep the road drivable and the annual costs of repairs are increasing (City data). In October 2009 The Peninsula News reported that the City has spent more than $10 million in repairs to this road since City incorporation as a result of constant land movement.

2) Storm water run off from additional structures will end up entering Altamira Canyon, together with existing run off from above Portuguese Bend and existing residences, and will enter into the the land in Zones 5 and 6 referred to above. There is extensive documented discussion of the concerns surrounding Altamira Canyon over the years, of mitigation actions needed to reduce the land destabilization from water run off entering the canyon and which have not taken place. The scope of the hydrology section of the EIR requires to include the Altamira Canyon matter, including the gross impact of all possible future developments (see below) and the mitigating actions needed. The impact on the existing dewatering wells requires addressing and determination whether additional wells are needed and if not why not.

3) The City is aware of and has supporting evidence that there are several additional probable or possible housing development requests in areas surrounding Zone 2 (Plumtree, York, Downhill, Vanderlip, Yamaguchi), including possible rezoning requests to facilitate further development (the LA Times estimates more than an additional 130 lots on which owners would like to build) . The draft EIR is largely silent on these matters and concentrates only on the future development potential of the 47 lots in Zone 2. There is an indirect reference to "any new development" on page 28 of the Initial Study. However, the gross cumulative impact of such additional probable and possible new developments is required under CEQA. The City needs to explain why such additional possible developments are excluded from this EIR and why the cumulative impact of these developments is not significant. The alternative is to include them in this EIR, detail the assumptions used and consider the gross environmental impact and mitigation actions necessary.

4) The City is the CEQA lead Agency in this EIR. It is important that the public understands the degree and detailed scope of EIR topics in which the "independent" consultants are to be used (Rincon?) and their role versus the City's role. If independent consultants are to be used what restrictions is the City placing on them? If independent

consultants are not to be used the City needs to explain why in the interests of transparency.

5) The Initial Study identifies a number of "Potentially Significant" impacts in the Transportation, Geology and Hydrology sections. Because of the unique geological and soil conditions and their inter relationship, a subset of scope considerations need to be developed with input from organizations such as ACLAD and specialist geological experts and soil experts. These scope considerations should be included in the next iteration of the EIR for the public to provide input during the next phase of review.

Detailed comments and requests for additional scope considerations are attached.

Yours sincerely,

Jeremy Davies

RPV CITY ZONE 2 DRAFT EIR
INITIAL STUDY
JANUARY 2011

Requests for scope clarification, modification and additions to the above submitted by Jeremy Davies of 36 Cinnamon Lane, RPV, CA 90275. Page references are stated at left.

Page 1 Project Location: The project location description and accompanying maps should include the location of the active landslide areas which abut Zone 2. Without this additional information the EIR implies that Zone 2 is a discrete land mass in isolation from surrounding environmental, geological, structural and soil conditions and therefore misleading to any reader/user of the EIR.

Page 4 Surrounding Land Uses This section is silent on probable or possible additional development requests that are well known and documented by the City (Plumtree, York, Downhill, Vanderlip, Yamaguchi). To ignore this information and its cumulative gross impact together with the current project will invalidate the EIR in accordance with CEQA requirements and appropriate environmental mitigation requirements. The City needs to modify the scope of the EIR to include all these possible developments and specify the assumptions used for estimating the gross impact, including the impacts on sewer, water supply and fire protection requirements, of these additional possible developments.

Page 8 The City believed that the Monks building applications would be spread out over a long period of time. In fact the 16 applications have taken a very short period of time to materialize. The build out development period of at least 10 years for the 47 properties may take a lot less based on the timing of the Monks building permit application and approval process. A sensitivity analysis in the scope of the EIR using a range of timelines should used for determining the cumulative environmental impacts.

Page 8 refers to "ranch style" residences. Recently, however, the City has been approving Mediterranean styles for certain of the "Monks" lot owners. I would hope that the EIR will reconfirm the preference for ranch style residences rather than Mediterranean style to ensure that the integrity/integration of new development with existing homes is retained.

Page 9 reference to set backs must acknowledge that the PBCA Architectural Standards establish their criteria for setbacks to maintain the harmonious nature of the community. For example minimum interior side set backs are 20ft not 5ft.

Page 9 mentions that the "City has been ordered to remove regulatory impediments in its Municipal Code that prevent development of the 16 Monks Plaintiffs lots". However, the City has not been ordered to ignore CEQA requirements and has included the Monks lots in this EIR to provide a conservative analysis. However, all other probable/possible developments should be included to provide a "conservative" impact analysis and without these other developments , among others matters, there is no "conservative" analysis.

Page 9 Taking into consideration all other possible developments that could impact Altamira Canyon and run off into the ocean through increased storm water runoff volumes and contaminates the EIR should reassess whether other agencies will require to be involved.

Page 9 The Initial Study identifies a number of "Potentially Significant" impacts in the Transportation, Geology and Hydrology sections. Because of the unique geological and soil conditions and their inter relationship, a subset of scope considerations need to be developed with input from organizations such as ACLAD and specialist geological experts and soil experts. These scope considerations should be included in the next iteration of the EIR for the public to provide input during the next phase of review.

Page 18 item e) is considered a less than significant impact. However, a sewer system was put into the area in 2002 as part of the landslide abatement program and homes were removed from septic tanks and fields. There is evidence that the sewer system is currently inadequate to support the existing homes volume (see letters to the Public Works Department from residents after a pumping station failed more than once). Therefore this issue requires more extensive evaluation through the EIR process with hard data based on existing flows as well as the project and all other possible developments taken into account. This is a "potentially significant impact" not "less than significant impact".

Pages 18 and 19 require a more extensive discussion of the fact that Zone 2 is abutted by existing active landslides, one of which has migrated upwards above Palos Verdes Drive South.

Page 23 item h) the EIR scope should include an assessment of the requirements for new developments required by the Los Angeles County Fire Department, for example the code requirement for hydrant spacing, the adequacy of required water flows through the existing hydrant infrastructure, fire hydrant code for pipe sizes. For example there are cul de sacs that are more than the required distance from hydrants that will contain new residences. Water flow calculations for fire protection should be based upon the existing infrastructure in the PBCA and not generalized City wide water supply and demand calculations used in page 38. Also see comments on page 33 regarding Captain Avila's conclusion and the need for the EIR to spell out the assumptions used by Captain Avila in arriving at his conclusion.

Page 24 The scope should include the mitigating actions to minimize the chance of flooding existing residences as a result of large driveways runoff, particularly those locations for new residences on steep slopes such as upper Cinnamon Lane.

Storm water run off from additional structures will end up entering Altamira Canyon together with existing run off from above Portuguese Bend and existing residences and will enter into the land in Zones 5 and 6 referred to above. There is extensive documented discussion of the concerns surrounding Altamira Canyon over the years (e.g. Horan Settlement), of mitigation actions needed to reduce the land destabilization from water run off entering the Canyon and which have not taken place. The scope of the hydrology section of the EIR should include the gross impact of all possible future developments (see below) on Altamira Canyon, Zones 5 and 6, and on the existing dewatering wells operated by ACLAD, and determination of mitigation actions.

Calculations of run off in heavy storm conditions should be factored into the EIR on the basis of all possible developments and its impact on Altamira Canyon and the residences adjacent to the Canyon as well as the capability of the Canyon to withstand significant additional run off which currently goes directly into the soils of the undeveloped lots.

Page 25 b) should be considered potentially significant impact as it conflicts with the current land use and planning category which is designated under a building moratorium.

Page 27 would be further strengthened by inserting reference to compliance with the PBCA Architectural Standards as referred to in the City's Notice of Preparation.

Page 28 refers to "any new development" which reinforces the need for all possible "new developments" to be included in the scope of the EIR for determining "gross environmental impact" and for determining mitigation actions.

Page 29 refers to the parcel being served by a sanitary sewer system and concludes that impacts would be less than significant and "that further discussion in an EIR is not warranted". I respectfully disagree and believe that there is not adequate detailed evidence that the existing sanitary sewer system can support additional development, particularly given repeated reported failures, that the grinder pump company has openly stated that were they involved again from the outset that the existing technology would not be used etc. The sewer system was put in as a mitigating element to reduce ground water from septic fields etc. entering the land and contributing to landslide movement.

Page 31 refers to noise but is silent on the potential impact of potential damaging compaction processes being adopted. The EIR should address earlier comments from residents regarding the use of very heavy compaction equipment and introduce mitigating processes to avoid unnecessary damage to existing and approved new residences through inappropriate compaction processes for the soil conditions in Zone 2.

Page 32 item a). Please see earlier comments on page 23 regarding fire protection. I believe that item a) should be "potentially significant impact" requiring deeper analysis in the EIR and if necessary mitigating actions to be spelt out.

Page 33 refers to a conclusion made by Captain Avila on November 17, 2010 that "the addition of 47 residences in Zone 2 would not require new or expanded fire facilities". In the interests of transparency, Captain Avila's letter, report (?) and assumptions used to come to this conclusion should be included in the EIR for the public to understand and assess the adequacy of the scope of his study in arriving at this conclusion.

Page 37 item d) should be "potentially significant impact" and address the specific flow characteristics of the PBCA development and not be based upon generalized WBMWD City information. The water delivery infrastructure was built some 50/60 years ago and both the water supply for general use and fire protection purposes, including hydrant size and spacing should be demonstrated to be adequate for the project and specifically for this high fire hazard area. The City in commenting on a recent request for planning permission by a resident on Thyme Place raised concerns about the current water delivery system not being capable of delivering adequate pressure for the requested bathrooms.

Page 41 b) is limited to the project and ignores other known current developments and potential developments (e.g. Plumtree, York, Downhill, Vanderlip, Yamguchi). The potentially cumulative impacts of these together with the project require analysis.

State of California –The Natural Resources Agency
DEPARTMENT OF FISH AND GAME
South Coast Region
4949 Viewridge Avenue
San Diego, CA 92123
(858) 467-4201
www.dfg.ca.gov

Edmund G. Brown, Jr., Governor
John McCamman, Director

RECEIVED
JAN 28 2011
PLANNING, BUILDING AND CODE ENFORCEMENT

January 28, 2011

Mr. Kit Fox
City of Rancho Palos Verdes
30940 Hawthorne Bolevard
Rancho Palos Verdes, CA 90275
Fax #: (310) 544/5293

Subject: Notice of Preparation for the City of Rancho Palos Verdes Zone 2 Landslide Moratorium Ordinance Revisions Environment Impact Report (SCH# 2010121073), Los Angeles County

Dear Mr. Fox:

The Department has received the Notice of Preparation (NOP) for the Environment Impact Report (EIR) for the proposed revisions to the City of Rancho Palos Verdes Zone 2 Landslide Moratorium Ordinance. The revisions would allow the submittal of landslide moratorium exceptions for 47 undeveloped or underdeveloped lots on 114 acres in an area located north of the intersection of Palos Verdes Drive South and Narcissa Drive within City limits. Approval of the moratorium would potentially allow development of the lots, many of which are covered by ornamental landscaping, roads and structural development. However, some of the lots are adjacent to Altamira Canyon, which supports native vegetation, and some contain native vegetation that abut conserved areas that are included in the City's Natural Community Conservation Plan and Habitat Conservation Plan (NCCP-HCP). These NCCP-HCP reserve lands are known to support special status species such as the federal threatened coastal California gnatcatcher (*Polioptila californica californica/CAGN*), the federal endangered Palos Verde blue butterfly (*Glaucopsyche lygdamus palosverdesensis/PVB*), and the state species of special concern coastal cactus wren (*Campylorhynchus brunneicapillus/CACW*).

The Department is California's trustee agency for fish and wildlife resources, holding these resources in trust for the People of State pursuant to various provisions of the California Fish and Game Code [Fish & Game. Code, §§ 711.7, subd. (a), 1802]. The following comments have been prepared pursuant to the Department's authority as Trustee Agency with respect to natural resources affected by the project [California Environmental Quality Act (CEQA) Guidelines §15386 and generally Public Resources Code (PRC) §§ 21070; 21080.4] and pursuant to our authority as a Responsible Agency under CEQA Guidelines §15381 and PRC §21069 over those aspects of the proposed project that come under the purview of the California Endangered Species Act (Fish and Game Code §2050 *et. seq.*) and Fish and Game Code §1600 *et. seq.* The Department also administers the NCCP Program (Fish and Game Code §2800 *et. seq.*). The City of Rancho Palos Verdes participates in the NCCP Program through its draft NCCP-HCP, which is anticipated to be completed in 2011.

To ensure the project is consistent with the City's NCCP-HCP, 1600 requirements and other applicable provisions of the Fish and Game Code (e.g., §3503), we recommend that the following information be included in the draft EIR and/or technical appendices, and included as CEQA mitigation and/or project permit conditions for future development that would be allowed under the proposed Zone 2 Landslide Moratorium Ordinance Revisions (where applicable):

A. NCCP-HCP Consistency

1. The project area appears to be located outside of, but immediately adjacent to areas that are to be included in the City's approximately 1,400 reserve system for the NCCP-HCP (See Section 4.2 of the City's Draft NCCP-HCP (Plan)). Specifically, the project would be located adjacent and to the south of the Portuguese Bend reserve (398-acres), portions of the Upper Filiorum reserve (190-acres), and other areas expected to be included as part of the reserve, such as the 40-acre conservation area (with a 300-foot functional corridor connecting to the Abalone Cove reserve) associated with development on the Lower Filiorum site (See Section 5.3.1 of the Plan) and the 30-acres of land to be conserved as part of the future Plumtree development (See Section 5.3.5 of the Plan). This area of the 1,400-acre City reserve system contains known populations of CAGN, PVB and CACW, as well several sensitive plant species. In addition, a portion of the core area within the Portuguese Bend reserve that supports important populations of sensitive fauna species burned in August 2009. Subsequently, some of these existing populations may have shifted to remnant patches of suitable habitat on the perimeter of the reserve that did not burn. It is expected that these populations could recover within Portuguese Bend with adequate restoration of habitat; however, this will take time as the habitat needs to mature.

2. Due to the location of the project adjacent to existing and planned areas of the City's NCCP-HCP reserve system, we recommend that a complete, recent assessment of flora and fauna within and adjacent to the project area be conducted and the results included in the EIR, with particular emphasis upon identifying potential impacts to federal and state endangered, threatened, and locally unique species and sensitive habitats as outlined in the City's NCCP-HCP. These species include, but are not limited to, the following which are anticipated to receive coverage under the City's NCCP-HCP:

- *Aphanisma, Aphanisma blitoides,* CNPS List 1B
- South Coast Saltscale, *Atriplex pacifica,* CNPS List 1B
- Catalina Crossosoma, *Crossosoma californicum,* CNPS List 1B
- Island Green Dudleya, *Dudleya virens* ssp. *insularis,* CNPS List 1B
- Santa Catalina Island Desert-thorn, *Lycium brevipes* var. *hassei,* CNPS List 1B
- Woolly Seablite, *Suaeda taxifolia,* CNPS List 4
- Palos Verdes Blue Butterfly, *Glaucopsyche lygdamus palosverdesensis,* FE
- El Segundo Blue Butterfly, *Euphilotes battoides allyni,* FE
- Coastal Cactus Wren, *Campylorhynchus brunneicapillus*, NCCP Focal Species, Species of Special Concern, and
- Coastal California Gnatcatcher, *Polioptila californica californica*, FT, NCCP Focal Species, Species of Special Concern.

3. To assess the full range of potential impacts to sensitive flora and fauna from the project, seasonal variations in use within and adjacent to the project area should also be analyzed in the EIR. CEQA Guidelines, §15125(a), direct that knowledge of the regional setting is critical to an assessment of environmental impacts and that special emphasis should be placed on resources that are rare or unique to the region. All surveys should be recent, focused, and for sensitive species, conducted in suitable habitat at the appropriate time of year and time of day when the species are active or otherwise identifiable. Guidance on conducting these surveys can be found in the following resources:

a) The City's draft NCCP-HCP (Section 5.0 and 7.0 of the Plan);
b) The Department's Guidelines for Assessing Impacts to Rare Plants and Rare Natural Communities (Attachment 1, Plant Survey Protocol).
c) Endangered, rare, and threatened species which meet the related definition under the CEQA Guidelines (See Cal. Code Regs., Title 14, §15380).
d) The Department's Biogeographic Data Branch in Sacramento should be contacted at (916) 322-2493 (www.dfg.ca.gov/biogeodata) to obtain current information on any previously reported sensitive species and habitats, including Significant Natural Areas identified under Chapter 12 of the Fish and Game Code.

4. To ensure the project would be consistent with, and would not result in direct or indirect impacts that are beyond the scope of the City's NCCP-HCP, the following should be analyzed and disclosed in the EIR:

a) The project's consistency with Sections 5.2.15 (Fuel Modification); 5.6 (Restrictions and Requirements for Projects/Activities Abutting and Adjacent to the Preserve); 5.7 (Habitat Impact Avoidance and Minimization Measures); and, 6.3.3 (Interim Resource Protection), of the City's NCCP-HCP;

b) The Zone 2 Landslide Moratorium Ordinance Revisions are not identified as a specific covered project in Section 5.0 (Covered Activities) of the City's NCCP-HCP. However, Section 5.2.20 (Other Miscellaneous City Projects) of the Plan notes that there could be unidentified City projects in the future that ccould be covered provided that they comply with the Plan and impacts do not exceed certain limits. The EIR should provide an analysis disclosing how the project would be consistent with this section and other provisions of the City's NCCP-HCP.

B. Impact Analysis

1. A thorough discussion of direct, indirect, and cumulative impacts to biological resources, including the City's NCCP-HCP preserve system and jurisdictional 1600 areas, should be provided in the EIR, including specific mitigation measures/permit conditions to offset such impacts [See CEQA Guidelines §15125(a) and §15130]. This discussion should focus on maximizing avoidance, and minimizing impacts and cover the following topics (See also Comment A4).

a) Analysis should address the potential cumulative impact from other areas within or adjacent to the City's NCCP-HCP reserve being removed from the Zone 2 landslide areas in the future;

b) Project impacts should also be analyzed relative to their effects on off-site habitats, plant and animal populations, and conserved lands. Specifically, this should include potential direct and indirect impacts to nearby public and private lands to be included in the City's NCCP-HCP (See Comment A1), designated open space, adjacent natural habitats, and riparian ecosystems. Impacts to and maintenance of wildlife corridor/movement areas, including access to undisturbed habitat in adjacent areas, should also be assessed. The analysis should also cover potential impacts resulting from such effects as increased vehicle traffic, outdoor artificial lighting, noise, and vibration (e.g., during construction).

c) The proposed project includes areas located adjacent to lands that are to be included in the City's NCCP-HCP preserve as either baseline public lands or lands to be dedicated in the future as part of private development. These areas include the Portuguese Bend reserve, Upper Filiorum reserve, 40-acres on the Lower Filiorum site, and 30-acres (with a 300-foot-wide corridor) on the Plumtree development site (See also Comment A1). The DEIR should analyze potential direct and indirect impacts to these lands and provide mitigation measures and/or permit conditions to ensure that the proposed Zone 2 Landslide Moratorium Ordinance Revisions and subsequent development allowed through the revisions do not impact these reserve lands. Specifically, the EIR should evaluate potential direct and indirect impacts to: a) terrestrial, aquatic and avian wildlife corridors; b) cowbird parasitism; c) fuel/brush clearing; d) public access, including new/unplanned trail connections and increased use on designated trails; e) non-native species and domestic animals; f) drainage, lighting and noise sources; g) manufactured/engineered slopes, grading and erosion; and, h) facility operation and maintenance (See Also Comment A4).

d) Impacts to migratory wildlife affected by the project should be fully evaluated including proposals to remove/disturb native habitat (e.g., coastal sage scrub, chaparral, non-native grassland and riparian areas) and ornamental landscaping (e.g., eucalyptus trees) and other potential nesting habitat for native birds. The impact analysis should also address any migratory butterfly roost sites and neo-tropical bird and waterfowl stop-over and staging sites. All migratory non-game native bird species are protected by international treaty under the Federal Migratory Bird Treaty Act (MBTA) of 1918 (50 C.F.R. Section 10.13). Also, §§3503, 3503.5 and 3513 of the Fish and Game Code prohibit take of birds and their active nests, including raptors and other migratory nongame birds as listed under the MBTA.

e) To minimize the potential for direct and indirect impacts to avian species, we recommend that the project include as a mitigation measure that proposed project activities (including subsequent disturbances to vegetation on individual lots covered under the ordinance revisions) should take place outside of the breeding bird season (January 31-September 30) to avoid take (including disturbances which would cause abandonment of active nests containing eggs and/or young). If project activities cannot avoid the breeding bird season, nest surveys should be conducted and active nests should be avoided and provided with a minimum buffer as determined by a biological monitor (the Department recommends a minimum 500-foot buffer for all active raptor nests). Although not considered a sensitive habitat per se, there are a number of eucalyptus and other trees in and adjacent to the project site that may provide nesting, perching and other functions for raptors and other avian species. (See also Comment A4).

f) To minimize potential conflicts with the City's NCCP-HCP, including the fuel modification activities that are currently anticipated as a covered activity [see Sections 5.2.15 (Fuel Modification) and 5.3.3 (Fuel Modification for Private Projects throughout the City) of the Plan], we recommend that all required City and County fuel clearing areas be included in the lots covered under the project so they do not encroach onto public or private lands that are to be included in the City's NCCP-HCP preserve. Moreover, where stands of native cacti exist, we recommend they be retained and incorporated into any required fuel clearing areas to provide as much habitat as possible for the cactus wren, as a substantial amount of its cactus scrub habitat in the area burned in the August 2009 Portuguese Bend fire.

g) Future development allowed through the proposed Zone 2 Landslide Moratorium Ordinance Revisions should not result in redundant/duplicate access to Portuguese Bend, Upper Filiorum or other lands that are to be included in the City's NCCP-HCP.

C. Project Alternatives

1. The EIR should adequately analyze a reasonable range of alternatives which avoid or otherwise minimize impacts to sensitive biological resources, including wetlands/riparian habitats, alluvial scrub, cactus scrub, coastal sage scrub, non-native grassland and wildlife movement (both terrestrial and avian). Specific alternative locations should also be evaluated in areas with lower resource sensitivity, where appropriate (See CEQA Guidelines §15126.6).

2. An Incidental Take Permit from the Department may be required if the project (and associated activities during the life of the project) would result in "take" as defined by the Fish and Game Code of any species protected by CESA [Fish & G. Code, §§86, 2080, 2081, subd. (b), (c)] and plants listed as rare under the Native Plant Protection Act of 1977 (Fish and Game Code §§1900-1913). The draft EIR should include a thorough analysis of potentially significant impacts to endangered, rare, and threatened species, and their habitat, that may occur as a result of the proposed project guided by the City's NCCP-HCP.

D. 1600/Lake and Streambed Alteration Agreement

1. The Department recommends the avoidance of all jurisdictional watercourses (including concrete channels, blue line streams and other watercourses not designated as blue line streams on USGS maps) and/or the channelization of natural and manmade drainages or conversion to subsurface drains. All wetlands and watercourses, whether intermittent, ephemeral, or perennial, should be retained and provided with substantial setbacks which preserve the riparian and aquatic habitat values and maintain their value to on-site and off-site wildlife populations. The Department recommends a minimum natural buffer of 100-feet from the outside edge of the riparian zone on each side of drainage.

2. For any activity that will divert or obstruct the natural flow, or change the bed, channel, or bank (which may include associated riparian resources) or a river or stream or use material from a streambed, the project applicant (or "entity") must provide written notification to the Department pursuant to Section 1602 of the Fish and Game Code. Based on this notification and other information, the Department then determines whether a Lake and Streambed Alteration (LSA) Agreement is required. The Department's issuance of an LSA is a project subject to CEQA. To facilitate issuance of an Agreement, if necessary, the EIR should fully identify the potential impacts to the lake, stream or riparian resources and provide adequate avoidance, mitigation, monitoring and reporting commitments for issuance of the Agreement. Early consultation is recommended, since modification of the proposed project may be required to avoid or reduce impacts to fish and wildlife resources. Failure to include this analysis in the Project environmental impact report could preclude the Department from relying on the City's analysis to issue an Agreement without the Department first conducting its own, separate lead agency subsequent or supplemental analysis for the Project.

Thank you for the opportunity to provide comments on the NOP for the proposed Zone 2 Landslide Moratorium Ordinance Revisions. For questions regarding CEQA/1600 issues raised in this letter, please contact Mr. Scott Harris, Environmental Scientist, at (626) 797-3170 SPHarris@dfg.ca.gov. For questions related to the NCCP program, please contact Randy F. Rodriguez at (858) 437-2751/RFRodriguez@dfg.ca.gov.

Sincerely,

Stephen M. Juarez
Environmental Program Manager
South Coast Region

Attachment

cc: Ms. Helen Birss, Los Alamitos
Ms. Terri Dickerson, Laguna Niguel
Ms. Kelly Schmoker, Pasadena
Mr. Randy Rodriguez/NCCP
Mr. Scott Harris, Pasadena
Mr. Rick Mayfield, Oxnard
HabCon-Chron, Department/SCR
State Clearinghouse, Sacramento

Kit Fox

From: suzannejoyblack@yahoo.com
Sent: Wednesday, February 02, 2011 1:56 PM
To: kitf@rpv.com
Subject: EIR Scope

I am in complete agreement with the letter submitted by the PBCA Board dated February 1, 2011 regarding the Zone 2 EIR. Thank you.

Thank you.

Suzanne Black Griffith
Suzanne

KIT

LAW OFFICES
MICHAEL A. BARTH
A PROFESSIONAL CORPORATION
31 MALAGA COVE PLAZA
PALOS VERDES ESTATES, CALIFORNIA 90274
TELEPHONE (310) 375-3855
FAX (310) 375-2825

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PLANNING, BUILDING AND
CODE ENFORCEMENT

February 2, 2011

TWO PAGES VIA FAX TO 310-544-5292

Ron Dragoo
Senior Engineer
City of Rancho Palos Verdes, CA
30940 Hawthorne Blvd
Rancho Palos Verdes, CA 90275-5391

Re: Betty Strauss
10 West Pomegranate Road
Portuguese Bend
Rancho Palos Verdes, CA 90275

Dear Mr. Dragoo:

My office represents Betty Strauss. Ms. Strauss lives at 10 West Pomegranate Road in Portuguese Bend. The purpose of this letter is to voice her, and my, concerns about future development in Zone 2 of the Landslide Moratorium area of Portuguese Bend. Specifically I note three major concerns of Ms. Strauss:

1. **Landslide Activity.** Any development in Zone 2 must take into consideration the storm water discharge in Altamira Canyon ("Canyon"). This is the major source of addition to the groundwater system in the area. In reviewing the comments to the proposed Environmental Impact Report by the Abalone Cove Landslide Abatement District I noticed their comment that "Measurements made by Hill and Douglas during major storms in 1998 indicate that less than 20% of the storm discharge in the Canyon at upper Narcissa Drive actually reached the ocean; the rest infiltrated into the Canyon bottom, mostly through major fractures associated with landslides that cross the Canyon. As new houses are added, the additional hardscape will shorten the timing and increase the volume of runoff water entering Altamira Canyon. As groundwater build-up is a key variable in the geological stability of the area, especially in the active Abalone Cove Landslide, it is important that as much of the additional storm runoff as possible be directed to enter the canyon low in its course."

2. **Erosion in Alta Mira Canyon**. Storm Discharge into the Canyon has resulted in erosion occurring along the walls and floor of the Canyon. Water flow continues to reshape the Canyon. Over the last few years the bank of the Canyon contiguous to Ms. Strauss' residence has substantially eroded causing the foundation of her residence to be compromised. Her home is literally splitting apart as a result of this erosion. As noted above, as new houses are added there will be increased runoff water into the Canyon resulting in more erosion and more damage to Ms. Strauss's home as well as all of the residents who's residences abut the Canyon.

3. **Factor of Safety.** Currently the Department of Engineering of the City utilized a Factor of Safety of 2 for assessing a new project's storm water management plans. In establishing the Safety Factor the City will apply to future development in Zone 2 I ask that they consider the potential impact on the Canyon, and on the residents' homes which abut the Canyon.

Thank you for your consideration of these issues.

Yours truly,

Michael A. Barth

cc: Betty Strauss

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JAN 19 2011

PLANNING, BUILDING AND
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ARIZONA LAND ASSOCIATES, L.P.
A California Limited Partnership

January 19, 2011

Kit Fox, AICP, Associate Planner
City of Rancho Palos Verdes, Planning Division
30940 Hawthorne Boulevard
Rancho Palos Verdes, CA 90275

RE : ZONE 2 LANDSLIDE MORATORIUM ORDINANCE REVISIONS

Dear Mr. Fox:

In response to the City's Notice of Preparation for the Environmental Impact Report (EIR) for the Zone 2 Landslide Moratorium Ordinance Revisions, we offer the following comments:

- The Notice of Preparation/Initial Study (NOP/IS) generally refers to the Zone 2 lots as being "added" to the area. However, since the Zone 2 lots existed in 1975 when the City's enduring General Plan/Environmental Impact Report were adopted and were part of the land use analysis and environmental impact analysis, they are not additive. To the extent that state and regional regulations have changed, we understand that certain impacts (e.g., Greenhouse Gases, Air Quality, etc.) must be analyzed, however, it is not necessary to revisit factors such as Transportation/Traffic, Utilities/Service Systems, Noise, etc., which have already been subject to CEQA review.

- The concept of "Moratorium Zones" was recommended in a memo to the Public Works Director in 1993 by Dr. Perry Ehlig (City Geologist) as "suggested guidelines for permitting development in the Moratorium area". It is our understanding, however, that the Moratorium Zone concept has never been adopted as part of the Landslide Moratorium Ordinance or any other formal City Council action. The DEIR should discuss the background and authority regarding the "Moratorium Zones" concept.

- Limiting the maximum size of a residence to 4,000 square feet appears subjective and is inconsistent with the City's Development Code. This proposed standard should be eliminated and each development proposal should be evaluated on a case-by-case basis, pursuant to the existing Development Code. Moreover, the Moratorium Ordinance should not dictate any architectural style (e.g., "*single-story, ranch-style residence*"). The design of each proposed residence should be evaluated on a case-by-case basis. To the extent that a Community Association may have design standards that conflict with City standards should not be enforced by the Ordinance.

- An assumption stated in the NOP/IS would limit a future residence to 16 feet, maximum. We assume that the method of measuring the building height will be consistent with the existing Development Code (Section 17.02.040). The Ordinance and DEIR must clarify this standard, particularly for lots with a slope.

- Under the proposed ordinance, no existing lots in the Zone 2 area would be permitted to subdivide. We understand that some existing legal lots in Zone 2 exceed the minimum lot size that was established as far back as 1975 (Ordinance 75-78). Therefore, a provision should be made in the ordinance to allow for subdivision, subject to the underlying zoning and development standards.

- The NOP/IS is correct that the 2004 NCCP depicted certain lots in the Zone 2 area with sensitive habitat (coastal sage scrub), including our lot at 37 Cinnamon Lane (Lot 15, Block 3, Tract 14195). However, we remind the City that a site-specific Biological Resource Study (Natural Resource Consultants, August 2007) concluded that no sensitive habitat was present on the lot. The City, and it's biologist, reviewed and approved the study. It is our belief that the site characteristics have not changed since 2007. The DEIR should consider all available data when evaluating the impacts of developing single family homes.

As a direct stakeholder in this process, we are available to assist in any way we can. Please contact Gary Weber if you have questions or wish assistance.

Respectfully,

Jim York, President
York Capital Group
General Partner

CC: Gary Weber

Abalone Cove Landslide Abatement District,

A State of California Geohazards District

To: **Kit Fox**, Assoc. Planner, City of Rancho Palos Verdes

From: **Robert Douglas**, Chairman, Board of Directors, **Abalone Cove Landslide Abatement District (ACLAD)**

Date: Jan. 28, 2011

Comments on: Initial Study, Zone 2 Landslide Moratorium Ordinance Revisions, Dec. 2010

Project Scope

Zone 2, the proposed area for the EIR, is bounded to the north and west by mostly open space, to the south by the active Abalone Cove Landslide (ACL) and to the east by the active Portuguese Bend Landslide (PBL). Each of these areas has a direct influence on Zone 2 and, at the minimum the scope of the EIR should be expanded to include contiguous portions of each area. For example, the hillside areas to the north have moderate to steep slopes which drain storm water into Zone 2 and no analysis of the storm drain capacity within zone 2 would be complete without a hydrologic study of these upslope hillsides. In turn, storm waters generated to the north and within Zone 2 flow directly into the ACL and affect its stability. The scope of the proposed EIR is too limited.

Geology and Soils

The Initial Study (IS) concludes that there would be a less than significant impact from seismic-related ground failure. The comments (a(iii)) focus on liquefaction and rightly conclude that this is not a major issue in the area. However, of major concern is slope failure (slumps, landslides) generated by ground acceleration during an earthquake (a(iv)). The entire area to the north of Zone 2 is an ancient landslide complex, composed on numerous landslide masses of varying size, the stability of which is essentially unknown. Except for the fact that these landslides have not moved in historical time, there is no information available which would indicate how these ancient landslide masses would respond to ground shaking. This is a major concern and appropriate and experienced experts in the effects of seismically induced slope failure must be contracted for this portion of the EIR.

The IS concludes that because the soils on the 64 developed lots have previously been disturbed and compacted, the potential for expansive soils is low in these areas. Observations in the developed part of zone 2 suggest that the soils remain expansive and are the source of continued damage in the older houses. As concluded in d, the impact of expansive soils is a major problem and needs to be investigated both within Zone 2 and the adjacent area to better understand how to deal with this problem.

Hydrology and Water Quality

The single biggest problem generated by the addition of new homes in Zone 2 will be the rainwater runoff generated by increased hardscape. This creates two related issues of major importance: adequacy of the storm drain system and the addition of water to the subsurface.

The existing roads are the storm drain system although they were not designed for this task. Over the years, the addition of road-side berms, culverts and drains have made the current system "adequate" under normal rainfall conditions. During greater than 1 inch/hour rainfall the streets tend to flood. During the 1990s a study of storm runoff in the community using hydrological calculations made by the LA County Flood Control cited changes and improvements that should made to the system to accommodate 50 year and 100 year storm events. Few of these recommendations were implemented. To understand the existing system and its capacity to accommodate the addition of new homes, several steps should be taken, including:

a. An analysis of the existing storm drain system to determine its current capacity under different rainfall conditions. Currently we only have "qualitative" information based on observation during rain storms.

b. A hydrological analysis of the runoff generated by normal as well as extreme rainfall conditions originating from the hillside slopes to the north and west of Zone 2. This should include the developed area within the upper reaches of the Altamira Canyon drainage basin. It is important to identify the volume at each location where this runoff enters the road-storm drain system. This analysis also needs to identify where the runoff enters the Altamira Canyon drainage system and the amounts at each location. This is important both for the road-storm drain system as well for ACLAD's efforts in recovering groundwater.

c. A proposal of how the storm runoff can be modified in the case that the potential 47 new homes will produce more runoff than the road-drain system can accommodate, even with improvements.

The storm water discharge in Altamira Canyon is the major source of recharge to the groundwater system in the area. Measurements made by Hill and Douglas during major storms in 1998 indicate that less than 20% of the storm discharge in the canyon at upper Narcissa Drive actually reached the ocean, the rest infiltrated into the canyon bottom, mostly through major fractures associated with landslides that cross the canyon. As new houses are added, the additional hardscape will shorten the timing and increase the volume of runoff water entering Altamira Canyon. As groundwater build-up is a key variable in the geological stability of the area, especially in the active ACL, it is important that as much of the additional storm runoff as possible be directed to enter the canyon low in its course.

Cinnamon Lane, between lower and upper Narcissa Drive is approximately the drainage divide in Zone 2 and water which collects west of Cinnamon flows south and enters Altamira Canyon near the end of Figtree Road, in the lower part of the canyon. This is desirable as this route enters the canyon closer to its terminus and bypasses several major fractures. However, storm water which collects to the east of Cinnamon flows south and east and enters the canyon at several locations, all above the fracture zones that cross the canyon. Any investigation of the storm water drainage in zone 2 and adjacent areas needs to pay special attention to this problem. Ultimately, any suggested design changes to the road-storm drain system must minimize this problem. It is much simpler and cheaper to prevent storm water from entering the ground water than it is to pump it out of the ground.

Thank you for the opportunity to comment on the IS and ACLAD stands ready to provide any assistance or information that may help in the preparation of the EIR.

Robert Douglas

Chairman, Board of Directors, ACLAD

COMMENT ON SCOPE AND CONTENT OF ENVIRONMENTAL IMPACT REPORT FOR PROPOSED ZONE 2 LANDSLIDE MORATORIUM ORDINANCE REVISIONS (PLANNING CASE ZON2009-00409)

The proposed Environmental Impact Report ("EIR") addresses the "other 31 undeveloped lots" in Zone 2 as distinguished from the 16 "Monks" lots.

This comment points out both the need for and the legal appropriateness of additional, modern, scientific evidence to address geology and hydrology issues in this EIR. There now exist geophysical testing and analytical procedures which could scientifically address, at a very reasonable cost, some critical uncertainties in the evidence that was before the California Court of Appeal in *Monks*. The same scientific uncertainties that controlled the legal result in *Monks* also loom large in this EIR.

Modern science can significantly reduce, or even eliminate, some of these legally critical uncertainties. Acoustic profiling of subsurface formations by a geophysicist holds the potential to either confirm or negate, in whole or in part, the "block glide" theory on which the California Court of Appeal based its decision in *Monks*. Such acoustic profiling can be accomplished, or at least validated for critical areas, for a few tens of thousands of dollars. This cost is competitive with, and could substantially reduce, the legal fees and costs and the expenditures of City Staff resources that inevitably will be expended in sterile arguments over the currently-existing scientific uncertainties in Zone 2.

The *Monks* appellate court stated as follows:

> "***This case involves block glides -- large blocks of earth that move slowly along a single plane***. According to Foster, whose testimony on this issue was not challenged, a block glide generally presents no risk of harm to people. The city does not contend that if construction is allowed, one of plaintiff's lots might slide onto an adjacent lot or that one of plaintiffs' homes might slide into the ocean. This case is not comparable to the sudden breakaway of the 18th hole at the Ocean Trails Golf Course. Rather, the gist of the City's nuisance theory is that, if an undeveloped lot is moving at all or might move at some time, the property owner -- for his or her own good-- should not be allowed to build a home that could suffer damage in the distant future, notwithstanding that the potential damage could e repaired. Nor does the city argue that construction on plaintiffs' lots is likely to damage the property of others or to cause a block glide by weakening Zone 2." (bold, italic emphasis added) *Monks, et al v. City of Rancho Palos Verdes (Oct 1, 2008), 167 Cal. App. 4th 263, 307 - 308.*

The California Court of Appeal in *Monks* quoted the U.S. Supreme Court in material part as follows:

> "Third, in examining the factors that would resolve the takings claim, the court relied on common law principles. "The 'total taking' inquiry we require today will ordinarily entail (as the application of state nuisance law ordinarily entails) analysis of, among other things, the degree of harm to public lands and resources,

> or adjacent private property, posed by the claimant's proposed activities, ... the social value of the claimant's activities and their suitability to the locality in question ... and the relative ease with which the alleged harm can be avoided through measures taken by the claimant and the government (or adjacent landowners) alike ... . The fact that a particular use has long been engaged in by similarly situated owners ordinarily imports a lack of any common-law prohibition (***though changed circumstances or new knowledge may make what was previously permissible no longer so ... [ )]*** ." *Monks, supra, 167 Cal. App. 4th at 298 - 299.* (bold, italic emphasis added).

Thus, evidence to show "changed circumstances or new knowledge" plainly is both admissible and appropriate on the issues raised in this EIR.

Please note that the original delineation of the boundaries of Zones 1 - 5 occurred decades ago and was based upon the very coarse and limited geologic data that was available at the time. In addition, significant soil movements have occurred in the intervening decades, especially at the margins. The historic boundaries of Zones 1 - 5 were in significant degree arbitrary when drawn. At that time the City lacked scientific evidence that was as precise as the precision with which the zone boundaries were drawn. Equally importantly, there plainly has been movement at the margins

Modern geophysical and other evidence, collected with scientifically meaningful precision, therefore appropriate on the following critical issues in this Zone 2 EIR:

1. Does scientific evidence establish that one or more "blocks" exist and are "gliding" in Zone 2, or in immediately adjacent zones?

2. Is there a single slide plane or are there multiple slide planes in Zone 2? (See the "block glide" definition adopted by the Court of Appeal, "large blocks of earth that move slowly along a single plane". *Monks*, 167 Cal. App. 4th at 307.)

3. Does a purported "block" possess internal tensile strength or cohesion that mechanically maintains integrity of the "block"? Or is the purported "block" an aggregated mass that lacks internal cohesion or tensile strength?

4. Does a purported "block" exist only because there is some mechanical support external to the "block"? If so, is that external support softening, weakening, or failing? If such external support is necessary to the continued existence of a "block" within Zone 2, then is the geographic area that provides such external support to a "block" also included within the scope of this EIR?

5. Have geographic boundaries been scientifically established for any such "block"? If so, what is the scientific precision, or range of error, in the boundaries of a "block"?

6. Does a "block" have sharply defined margins, or is there some sort of transition zone at the margins where the block is crumbling, collapsing, softening, disintegrating or

otherwise failing? What is the scientific precision with which any margins or transition zones have been established for a purported "block"?

7. Are nearby slide areas encroaching on the purported "block"? If so, at what rate are slide scarps advancing towards or into the "block"? Are transition zones advancing into the purported "block"?

8. Are substantial sections likely to cave or calve off what historically may have been treated as a "block" when defining Zone 2?

9. Are there significant fluctuations of water levels, or of water saturation, in soils within or adjacent to a purported "block" that affect continuing existence of the "block"?

10. Should the historic boundaries of Zone 2 and adjacent zones be re-defined in accord with modern geologic evidence? Should this re-definition of zone boundaries be accomplished as part of the proposed revision of the Zone 2 moratorium?

11. Concerning mitigation measures: Who should pay to assemble the scientific evidence necessary to rationally re-define zone boundaries? How should the cost of scientific re-evaluation be allocated among the interested parties? How much of this cost is properly a public function of the City? How much should be allocated to owners of the "remaining 31 lots" for which development permissions will become available? How much should be allocated to neighbors of the "remaining 31 lots"?

12. Concerning mitigation measures: Will it be more cost effective for the City and other interested parties to pay some or all of the costs of scientific re-evaluation to reduce or eliminate uncertainties, rather than spend the money in expensive, protracted litigation over who should bear the burden of proof with respect to scientific uncertainties?

Lowell R. Wedemeyer

Appendix A2

2018 NOP and NOP Responses

CITY OF RANCHO PALOS VERDES

NOTICE OF PREPARATION

To: Interested Persons

From: City of Rancho Palos Verdes
Community Development Department
30940 Hawthorne Blvd.
Rancho Palos Verdes, California 90275-5391
310-544-5228 or planning@rpvca.gov

Subject: **Notice of Preparation of an Environmental Impact Report (EIR) pursuant to the Requirements of the California Environmental Quality Act (CEQA) for proposed code amendments to Exception "P" of Title 15.20.040 (Landslide Moratorium Ordinance) of the Rancho Palos Verdes Municipal Code pertaining to Zone 2**

The City of Rancho Palos Verdes originally prepared and circulated a Draft Environmental Impact Report (EIR) for the project identified below in 2012. The purpose of this Notice of Preparation is to inform those interested that as the CEQA Lead Agency, the City of Rancho Palos Verdes will recirculate an updated Draft EIR for this project. The recirculated updated Draft EIR will cover the same environmental issue areas that were previously analyzed in the original Draft EIR circulated in 2012. However, the recirculated Draft EIR will be updated with applicable data that is new or has changed since circulation in 2012, as well as pertinent information provided in comments received on the original Draft EIR. The project description has not changed since the City originally circulated the Draft EIR in 2012. We need to know the views of you or your agency as to the scope and content of the environmental information which is germane to you or your agency's statutory responsibilities in connection with the proposed project, particular with regards to new or updated information.

Project Title: Proposed Code Amendments to Exception "P" of Title 15.20.040 (Landslide Moratorium Ordinance) of the Rancho Palos Verdes Municipal Code pertaining to Zone 2

Location: The proposed code amendment would apply to the approximately 112-acre "Zone 2 Landslide Moratorium Ordinance" area, located north of the intersection of Palos Verdes Drive South and Narcissa Drive in the Portuguese Bend area of the Palos Verdes Peninsula, within the City of Rancho Palos Verdes, County of Los Angeles, California. The Zone 2 area, located on the hills above the south-central coastline of the City, is within the City's larger (approximately 1,200-acre) Landslide Moratorium Area (LMA). Zone 2 consists of 111 individual lots, of which 69 lots have been developed with residential structures (includes 5 Monks Plaintiffs' lots), 11 lots have obtained Planning entitlements for development (via Exception "P") and 31 lots remain undeveloped. These latter 31 lots is the focus of the recirculated EIR, consistent with the focus in the original EIR circulated in 2012.

Project Description: The project description, presented below, has not changed since the City of Rancho Palos Verdes circulated the original Draft EIR in 2012.

Landslide Moratorium Ordinance Revisions. Section 15.20.040 of the Rancho Palos Verdes Municipal Code establishes the process for requesting exceptions to the existing moratorium on "the filing, processing, approval or issuance of building, grading or other permits" within the existing LMA. The proposed code amendment to the City's Landslide Moratorium Ordinance would revise existing Exception "P" to allow for the future submittal of Landslide Moratorium Exception (LME) applications for 31 undeveloped or underdeveloped lots within Zone 2. It should be noted that the granting of an LME does not constitute approval of a specific project request, but simply grants the property owner the ability to submit the appropriate application(s) for consideration of a specific project request.

Future Development Potential. The potential granting of up to 31 LME requests under the proposed ordinance revisions would permit individual property owners to then apply for individual entitlements to develop their lots. The undeveloped lots within Zone 2 are held in multiple private ownerships so the timing and scope of future development is not known. For the purposes of the EIR, it will be assumed that development would occur over a period of at least 10 years from adoption of the ordinance revisions in a manner consistent with the private architectural standards adopted by the Portuguese Bend Community Association and the City's underlying RS-1 and RS-2 zoning regulations. Therefore, the future development assumptions for Zone 2 include the following:

- Thirty-one single-story, ranch-style residences with attached or detached three-car garages, with minimum living area of 1,500 square feet and maximum living area of 4,000 square feet or 15% of gross lot area, whichever is less;
- Less than 1,000 cubic yards of grading (cut and fill combined) per lot, with no more than 50 cubic yards of imported fill and up to a 1,000 cubic yards of export per lot;
- Maximum 25% (RS-1) or 40% (RS-2) net lot coverage;
- Maximum building height of 16 feet for residences and 12 feet for detached accessory structures;
- Minimum front setbacks of 20 feet, minimum rear setbacks of 15 feet, minimum street-side setbacks of 10 feet, and minimum interior side setbacks of five feet, with setbacks along private street rights-of-way measured from the easement line rather than the property line; and
- No subdivision of existing lots within Zone 2.

The recirculated updated Draft EIR will cover the same environmental issues areas that were previously analyzed in the original Draft EIR that was circulated in 2012. These issue areas include:

- Aesthetics
- Air Quality
- Biological Resources
- Cultural Resources
- Geology and Soils
- Greenhouse Gas Emissions
- Fire Protection
- Hydrology and Water Quality
- Noise
- Traffic
- Utilities and Service Systems

You are receiving this notice since City records indicate that you are an interested person or agency, or own property within a 500-foot radius of the project area. If you wish to provide comments on the scope and content of the EIR, please submit your comments to:

Octavio Silva,
Senior Planner
City of Rancho Palos Verdes, Planning Division
30940 Hawthorne Boulevard
Rancho Palos Verdes, CA 90275
Phone: (310) 544-5234
Email: Octavios@rpvca.gov

Due to the time limits mandated by State law, written comments on the scope and content of the EIR must be sent no later than 30 days after receipt of this notice, or by December 12, 2018. **Please note that City Hall offices will be closed on November 12th in observance of Veteran's Day, and November 22nd and November 23rd in observance of Thanksgiving.** Responsible agencies are requested to indicate their statutory responsibilities in connection with this project when responding.

CITY OF RANCHO PALOS VERDES

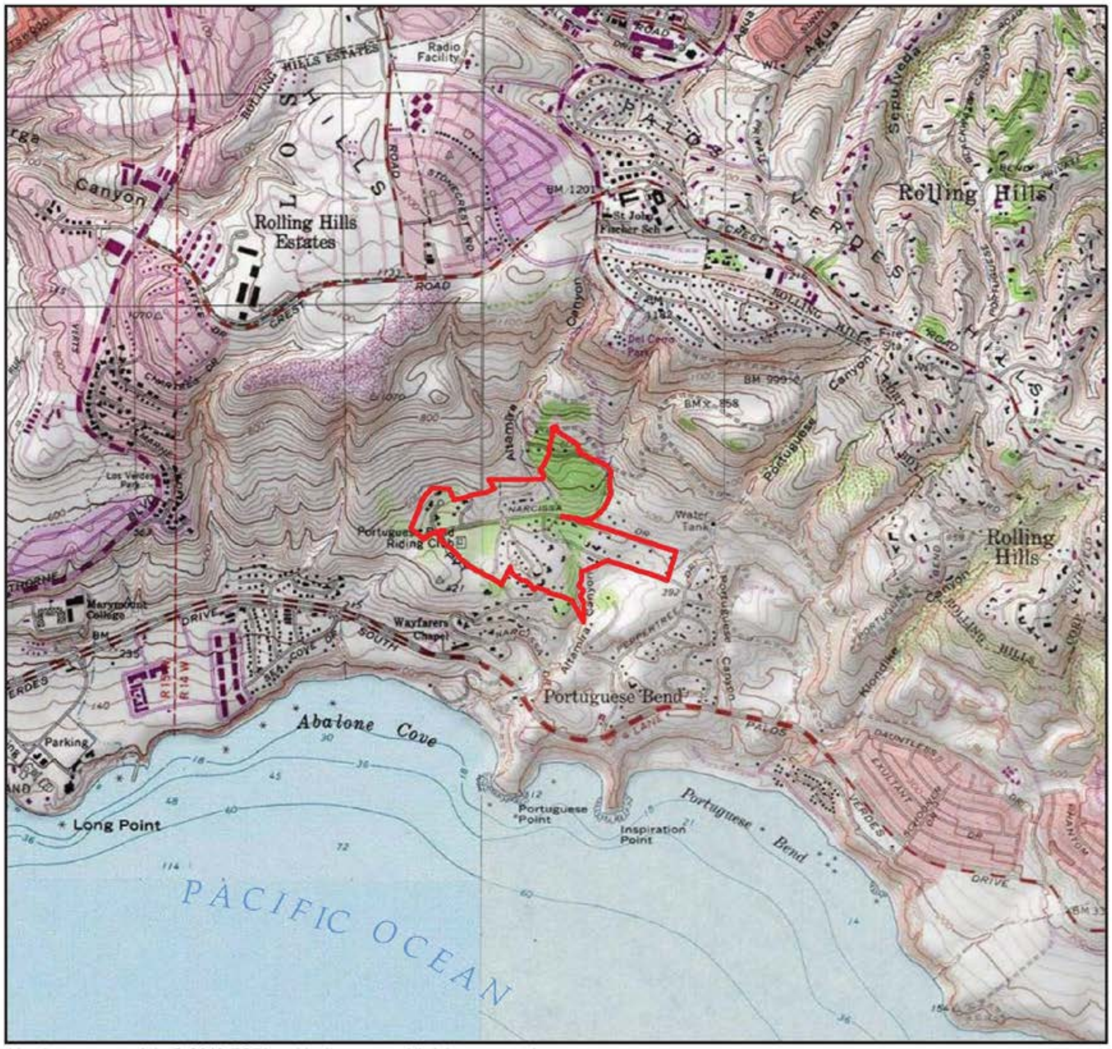
Please contact Mr. Octavio Silva at 310-544-5234 or via e-mail at Octavios@rpvca.gov for further information.

Date: November 8, 2018

Signature____

Name and Title: Ara Mihranian, Director of Community Development

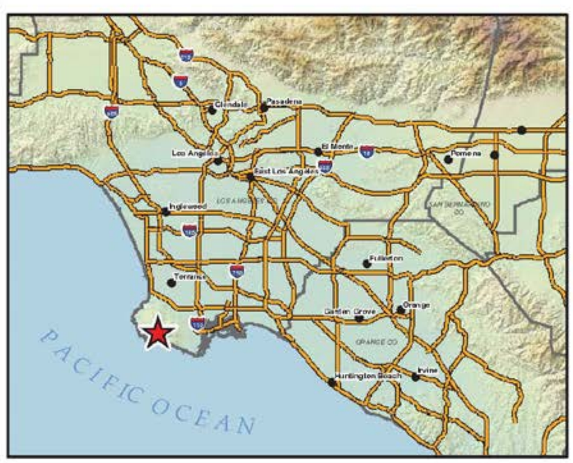
RANCHO PALOS VERDES



Map images copyright © 2010 ESRI and its licensors. All rights reserved. Used by permission. Additional data layer from Los Angeles County Assessor, August, 2010.

N 0 0.25 0.5 Miles

★ Project Location



Project Location Map

Zone 2 Landslide Moratorium Ordinance Revisions

U. S. Fish and Wildlife Service
Carlsbad Fish and Wildlife Office
2177 Salk Avenue, Suite 250
Carlsbad, California 92008
(760) 431-9440
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California Department of Fish and Wildlife
South Coast Region
3883 Ruffin Road
San Diego, California 92123
(858) 467-4201
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In Reply Refer To:
FWS/CDFW-19B0053-19CPA0065

December 13, 2018

Octavio Silva, Senior Planner
City of Rancho Palos Verdes
Planning Division
30940 Hawthorne Boulevard
Rancho Palos Verdes, California 90275

Subject: Comments on the Notice of Preparation of an Environmental Impact Report (EIR) for proposed code amendments to Exception "P" of Title 15.20.040 (Landslide Moratorium Ordinance) of the Rancho Palos Verdes Municipal Code pertaining to Zone 2

Dear Mr. Silva,

The U.S Fish and Wildlife Service (Service) and the California Department of Fish and Wildlife (Department), hereafter collectively referred to as the Wildlife Agencies, have reviewed the above-referenced Notice of Preparation (NOP) dated November 8, 2018. The project details provided herein are based on the information provided in the NOP and associated documents.

The primary concern and mandate of the Service is the protection of public fish and wildlife resources and their habitats. The Service has legal responsibility for the welfare of migratory birds, anadromous fish, and endangered animals and plants occurring in the United States. The Service is also responsible for administering the Federal Endangered Species Act (Act) of 1973, as amended (16 U.S.C. *1531 et seq*.), including habitat conservation plans (HCP) developed under section 10(a)(1)(B) of the Act. The Department is a Trustee Agency and a Responsible Agency pursuant to the California Environmental Quality Act (CEQA; §§ 15386 and 15381, respectively) and is responsible for ensuring appropriate conservation of the state's biological resources, including rare, threatened, and endangered plant and animal species, pursuant to the California Endangered Species Act (CESA; Fish and Game Code § 2050 *et seq*.) and Fish and Game Code section 1600 *et seq*. The Department also administers the Natural Community Conservation Planning (NCCP) program, a California regional habitat conservation planning program. The City of Rancho Palos Verdes (City) is currently participating in the NCCP program through the preparation of a draft NCCP/HCP Subarea Plan (NCCP/HCP) that was submitted to the Federal Register on October 31, 2018.

The proposed amendments to Exception "P" of Title 15.20.040 (Landslide Moratorium Ordinance) of the Rancho Palos Verdes Municipal Code pertaining to Zone 2 (Project) would apply to the 112-acre Zone 2 Landslide Moratorium Area (LMA) located in the Portuguese Bend area of the City. The amendments would allow for future submittal of Landslide Moratorium Exception (LME) applications for an additional 31 undeveloped or underdeveloped lots within Zone 2 of the LMA. Currently, these lots are not eligible to submit an LME application under Exception "P". The City intends to update and recirculate the Draft EIR (DEIR) that was originally prepared in 2012 for this Project. The Wildlife Agencies offer the following comments and recommendations to assist the City in their update of the DEIR and to ensure the Project is consistent with ongoing regional habitat conservation planning efforts.

1. The Wildlife Agencies recommend the City include information in the updated DEIR on the current status of the updated NCCP/HCP, including reference to the City Council's review and approval in March 2018 and submittal to the Federal Register on October 31, 2018; make all appropriate changes to existing NCCP/HCP references in the DEIR; and include any new applicable NCCP/HCP references or references to associated documents. In addition, the City should ensure all habitat impacts associated with future development of the subject parcels will be tracked in accordance with the requirements of the NCCP/HCP (NCCP/HCP Section 9.0).

2. Since the completion of the original DEIR, new monitoring data for NCCP/HCP covered species has been collected as part of the mandatory monitoring requirements of the NCCP/HCP. We recommend the City utilize these monitoring reports when updating the occurrence information for biological resources present in, or adjacent to, the Project area. This would include referencing the most recent survey results for coastal California gnatcatcher (*Polioptila californica californica*) and cactus wren (*Campylorhynchus brunneicapillus*) as reported in "Palos Verdes Nature Preserve Survey for the California Gnatcatcher and the Cactus Wren" (Cooper 2018).

We appreciate the opportunity to comment on this NOP and look forward to continuing to work with the City to finalize and successfully implement the NCCP/HCP. If you have questions or comments regarding this letter, please contact Eric Porter of the Service (760) 431-9440 extension 285 or Kyle Rice of the Department at (858) 467 4250.

Sincerely,

For Karen Goebel
Assistant Field Supervisor
U.S. Fish and Wildlife Service

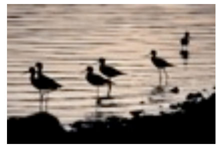
Gail K. Sevrens
Environmental Program Manager
California Department of Fish and Wildlife

cc: State Clearinghouse

Ara Mihranian (City of Rancho Palos Verdes)
AraM@rpvca.gov

Reference

Cooper, D. S. 2018. "Palos Verdes Nature Preserve Survey for the California Gnatcatcher and the Cactus Wren, Final Report." Prepared for Palos Verdes Peninsula Land Conservancy August 9, 2018.



COOPER ECOLOGICAL MONITORING, INC.
EIN 72-1598095
DANIEL S. COOPER, PRESIDENT
255 SATINWOOD AVE
OAK PARK, CA 91377
(323) 397-3562; DAN@COOPERECOLOGICAL.COM

Stacey Love
Recovery Permit Coordinator
USFWS
2177 Salk Ave., Suite 250
Carlsbad, CA 92008

August 9, 2018

Ms. Love,

I certify that the information in this survey report and attached exhibits fully and accurately represents my work.

Daniel Cooper

Daniel S. Cooper
President, CEM, Inc.
USFWS Permit #TE 100008-3

Palos Verdes Nature Preserve Survey for the California Gnatcatcher and the Cactus Wren
Palos Verdes Peninsula Land Conservancy
Los Angeles County

2018
Final Report

San Ramon Reserve, Palos Verdes Peninsula, Feb. 17, 2018
This image is illustrative of the challenging conditions for the two focal bird species, showing essentially no foliage on the native shrubs (*Encelia californica* in the foreground), no forbs along footpaths and between shrubs, and dried weeds from 2016-17 (here *Brassica nigra*) overtopping the remaining cactus patches

Photo by Daniel S. Cooper

Prepared by:
Daniel S. Cooper
Cooper Ecological Monitoring, Inc.
255 Satinwood Ave.
Oak Park, CA 91377

Prepared for:
Palos Verdes Peninsula Land Conservancy
916 Silver Spur Rd., Suite 207
Rolling Hills Estates, CA 90274

August 9, 2018

Introduction and Summary

We report on a single-season survey of two sensitive bird species, the (coastal) California gnatcatcher *Polioptila californica californica* (Federally Threatened) and the coastal-slope population of the cactus wren *Campylorhynchus brunneicapillus* (formerly a Candidate for federal listing; now treated as a California Bird Species of Special Concern[1]) on the Palos Verdes peninsula in 2018. Our study area extended across nine reserves covering a combined 1,225 acres managed by the Palos Verdes Peninsula Land Conservancy (Figures 1a and 1b). Our survey may be compared with previous surveys for these two birds conducted at most of the same sites in 2006, 2009, 2012 and 2015 (Dudek 2007, Hamilton 2009, CEM 2013, CEM 2015), as well as with more limited surveys conducted at various locations on the peninsula since 2010 (e.g., CEM 2011, 2013, and 2014).

For 2018, we estimate 19 territories of California gnatcatcher this year, and just five territories of cactus wren. Compared with previous surveys, the estimate of California gnatcatcher territories for 2018 is down by roughly half, and for cactus wrens is down roughly 75%. This unprecedented drop is extremely alarming, particularly for cactus wren, which may not survive many more years. Both California gnatcatcher and cactus wren were present together at three reserves early in the year, but only at two reserves, Three Sisters/Filiorum, by late spring (vs. five reserves in 2015). The California gnatcatcher was absent (or presumed absent) at two (vs. one in 2015), and the Cactus wren absent at seven of the nine reserves[2]; and unlike in prior years, neither focal species was detected at Agua Amarga Reserve. We attribute these declines to the combination of prolonged drought, cold/wet spring conditions in 2018, the continued degradation of native scrub habitat through growth in invasive shrubs, and an increase in local predators. However, it is not clear which of these factors is driving the decline, nor is it clear that any change in (human) management of the habitat would be able to reverse it.

Methods

We conducted targeted surveys for the California gnatcatcher and the cactus wren on 19 days to eight of nine reserves managed by Palos Verdes Peninsula Land Conservancy (collectively known as the Palos Verdes Nature Preserve) at the southwestern tip of the Palos Verdes peninsula (Table 1; Figures 1a, 1b) between 17 Feb. and 13 June 2018 (Tables 1 and 2). More than one site was visited on most days, for a total of c. 47 survey hours (Table 2). We used a two-visit protocol, with surveys spread at least one week apart, with one early-

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[1] In 2008, coastal populations of the cactus wren north of southern Orange County were deemed distinct from those in southern Orange County (termed *C. b. sandiegensis*) by the most recent publication of California Bird Species of Special Concern (Shuford and Gardali 2008). However, this view is not widely held within the ornithological community, and due to their extreme isolation and a life history that is essentially identical with coastal-slope populations to the south into San Diego County, we, as well as regulatory agencies like the Calif. Dept. of Fish and Game (CDFG; L. Comrack, pers. comm., April 2008), treat the Palos Verdes birds as a sensitive species under state law. In addition, CDFG requires that all playback surveys for the cactus wren in coastal-slope Los Angeles Co. (and Ventura Co.) be conducted under a Memorandum of Understanding reserved for special-status species.

[2] We elected not to survey Vista del Norte in 2018; we have not detected either target species in the 10+ years of focal surveys on the peninsula, and there are no verifiable records of either from this reserve (e.g., www.ebird.org), and virtually no coastal sage scrub.

season visit from late Feb. to early April ("Round 1") and one late-season visit during mid-May to mid-June ("Round 2")[3]. Data from a popular online bird sighting reporting platform (eBird; www.ebird.org) were incorporated into our analysis, as applicable, since many of the reserves were visited by competent birders during the same survey windows.

Following established protocol for California gnatcatcher surveys (USFWS 1997), visits were made between 6:00 a.m. and noon, typically beginning late morning when ambient morning temperatures were above (or were predicted to rise above) 55 degrees F. Surveys were not conducted under extreme weather (temperature, wind) conditions. Taped vocalizations of each species were employed on all surveys, as outlined in guidelines provided by PVPLC and approved by U.S. Fish and Wildlife Service/Department of Fish and Game ("7.3.2 Animal Species Monitoring"). A "zigzag" walking route was used to cover each reserve, following as closely to the most recent (2009) survey as possible (Appendix A). No more than 80 acres of coastal sage scrub was surveyed on any single day, following USFWS (1997) guidelines. The survey routes used in 2018 were intended to follow those used by previous surveyors (Dudek 2007, Hamilton 2009, etc.), though portions of several reserves contained only scattered patches of coastal sage scrub, or had inaccessible areas that could not be reached during the survey; these were generally skipped in 2018 to focus most efficiently on prime coastal sage scrub and cactus habitat within the preserve network, as was done in prior years (Appendix A).

Most surveys were carried out by Daniel S. Cooper (TE 100008-3; SC-10615), assisted by Robert A. Hamilton (TE 799557). Both Cooper and Hamilton have extensive experience with California gnatcatcher surveys throughout Los Angeles and other counties, and have conducted similar target bird surveys at the Portuguese Bend Reserve in prior years for the Palos Verdes Peninsula Land Conservancy.

In addition to recording aural detections of both species, visual scans (using Leica 8x42 Ultravid binoculars) were made of all cactus habitat for cactus wren nests, and sightings of the brown-headed cowbird (*Molothrus ater*), a known parasite of songbird nests, as well as other sensitive species were noted. Basic weather conditions were observed at the start and end of each visit (Table 2). All observations of the two target species were recorded directly onto aerial photographs, with special attention paid to documenting the number and breeding/territorial status of each in notes. For each sighting of a target species, we recorded:

- Date and start time of sighting (sightings were typically very brief, so stop times were typically not recorded unless more than a few seconds);
- Sex/age of individual(s) (if known);
- Banding information (color-banded, metal-banded, etc.);
- Habitat type where found (only if not coastal sage scrub for California gnatcatcher or cactus scrub for cactus wren);
- Number of birds associated with individual (e.g., family group, pair, etc.); and
- Breeding activity observed

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[3] The 2006 preserve-wide surveys had used a 3-visit protocol; a reduction in effort for 2009 and 2012 was made per the NCCP guidelines for RPV.

Locations of all target/special-interest species were transferred from field maps onto Google Earth maps and converted to digital files (.kmz). These are presented in Appendix B.

From these sightings, we estimated the number of territories for each reserve, cognizant that two visits were insufficient to provide a confident estimate of either territory boundaries. Therefore, our territory numbers should be treated as rough approximations, rather than indications of actual population estimates. To allow for the most useful comparisons with prior surveys, we follow Hamilton's (2009) definition of a "territory" to include any discrete location where a territorial bird (male, in the case of the gnatcatcher) or pair was present on at least one visit. Locations where we detected an unmated adult bird of either species, or juvenile(s) of either species away from adults, were not considered "territories". In mapping locations of birds, we noted movements with arrows on our field maps, but mapped only the site of initial detection on the digital maps (otherwise, they would be nearly impossible to read, particularly given multiple visits).

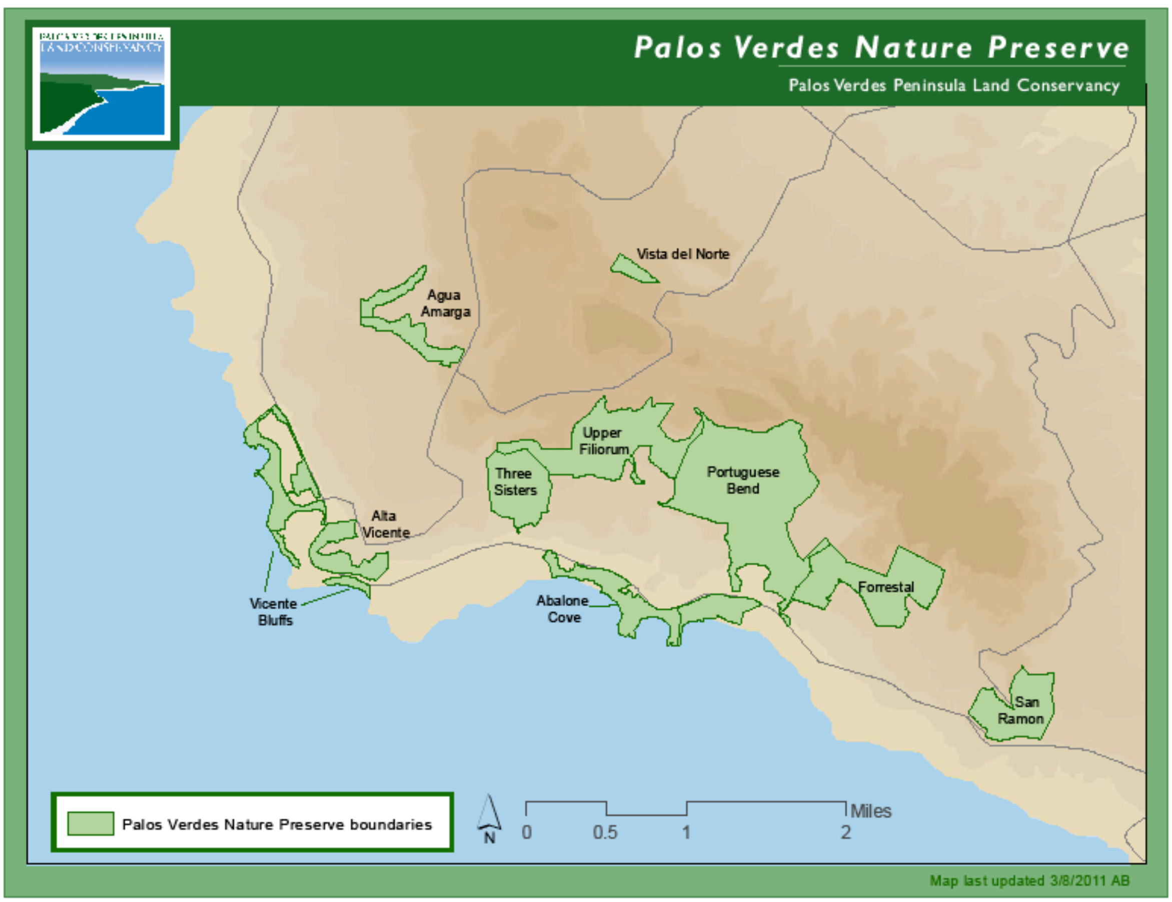

Figure 1a. Reserves in the Palos Verdes Nature Preserve in Rancho Palos Verdes (indicated in top of legend) surveyed during this study (and prior ones). Figure courtesy PVPLC.

Figure 1b. Aerial view of reserves. Clockwise, from upper left: L = Agua Amarga (formerly "Lunada Cyn."); N = Vista del Norte, U = Filiorum; C = Portuguese Bend (formerly "Canyons"); F = Forrestal; R = San Ramon; A = Abalone Cove (east and west); T = Three Sisters; B = Vicente Bluffs (upper and lower); V = Alta Vicente. Figure from Hamilton 2009, courtesy of PVPLC.

Table 1. Reserve acreage and total survey hours, 2012-18. Note that multiple sites were surveyed on some days (see Table 2 for additional detail).

Reserve	**Acres**	**Days surveyed 2012**	**Time afield 2012**	**Days surveyed 2015**	**Time afield 2015**	**Days surveyed 2018**	**Time afield 2018**
Abalone Cove	64	3	7:10	6	5:17	4	4:28
Agua Amarga	59	2	5:05	3	3:21	3	3:26
Alta Vicente	55	2	4:35	4	4:52	2	6:04
Forrestal	155	4	8:40	4	4:05	2	6:02
Portuguese Bend	399	4	12:00	5	6:51	2	11:42
San Ramon	95	3	4:10	2	2:05	2	3:07
Three Sisters/Filiorum (combined)	300	4	10:35	7	9:43	2	10:01
Vicente Bluffs	84	2	4:40	2	2:42	2	2:28
Vista del Norte	14	2	1:05	1	0:20	0	0
TOTAL	**1,225**	**26**	**58 hrs**	**34**	**c. 40 hrs**[4]	**19**	**c. 47 hrs**[5]

4 Actual time surveying: 39:16

5 Actual time surveying: 46:58

Table 2. Summary and description of survey effort in 2018. Number of birds listed is the maximum number of adults estimated (both visits). Letters after the reserve names refer to the abbreviations in Figure 1b.

Date	Survey round	Time	T. start (F)	T. end (F)	Sky/ Wind	Subarea	# CAGN	# CACW	
Abalone Cove (A)									
9 March	1	9:15-12:15	61	63	OC/3-5 mph		1	0	RAH
28 March	1	10:50-11:40	67	67	Clear/calm		4	0	DSC
18 May	2	10:34-10:54	N/A	N/A	N/A		3	0	DSC
31 May	2	10:26-11:44	62	67	PC/calm		2	0	DSC
Agua Amarga (L)									
17 Feb	1	11:03-11:15	69	60	Clear/calm	Eastern	0	0	DSC
28 Mar	1	7:42-9:01	57	57	Clear/calm		0	0	DSC
7 June	2	10:41-12:13	64	64	PC/calm		0	0	DSC
Alta Vicente (V)									
23 Feb	1	8:15-11:15	48	53	Clear/4-8 mph		4	2	RAH
24 May	2	8:20-11:24	58	59	Fog/calm		6	0	DSC
Forrestal (F)									
4 Apr	1	7:48-10:56	55	55	OC/calm		2	0	DSC
31 May	2	7:21-10:15	59	62	PC/0-3 mph		5	0	DSC
Portuguese Bend (C)									
21 Feb	1	8:20-11:20	50	57	Clear/3-5 mph	North	0	0	RAH
21 Feb	1	8:07-11:05	50	57	Clear/3-8 mph	South	2	0	DSC
18 May	2	8:20-11:40	61	66	OC/3-5 mph	North	2	0	RAH
18 May	2	7:56-10:20	60	65	OC/calm	South	3[6]	0	DSC
San Ramon (R)									
17 Feb	1	9:01-10:46	61	61	Clear/calm		2	0	DSC
7 June	2	9:04-10:26	62	64	OC/5-0 mph		2	0	DSC
Three Sisters (T)									
29 Mar	1	8:20-11:05	53	60	PC/3 mph		2	4	RAH
13 June	2	8:10-10:20	64	66	Fog/3-5 mph		6	3	RAH
Filiorum (U)									
29 Mar	1	8:13-10:51	58	58	Clear/calm		10	2	DSC
13 June	2	8:04-10:32	64	68	PC/calm		5	2	DSC
Vicente Bluffs (B)									
28 Mar	1	9:09-10:39	61	64	Clear/3-5 mph		4	0	DSC
24 May	2	11:33-12:31	59	61	OC/calm		6	0	DSC
Vista del Norte (N)									
N/A									

[6] An apparent family group (3-4 birds) was observed just south of the reserve boundary as the survey ended, which likely wandered down from the mapped territory in the southern portion of the reserve, and is not included here.

Results

We estimate 19 territories of California gnatcatcher, and five territories of cactus wren, during the 2018 breeding season (Table 3). This represents a drop of 54% and 74%, respectively, from the prior survey in 2015, and an even larger drop from the 2009-2015 average. Cactus Wren territories have never been estimated to be in the single-digits since monitoring began, and we only had birds survive the season at two (adjacent) reserves, Three Sisters and Filiorum. A former stronghold of the species on the peninsula, Alta Vicente reserve (13 territories estimated in 2012) had zero active territories by June 2018 (the single pair observed in February appeared to be absent as of March 2018). Agua Amarga Reserve, which had at least three territories each of California gnatcatcher and cactus wren in both 2009 and 2015, had zero territories in 2018 (we surveyed there on three separate days, and visited each "arm" of the reserve at least twice). The pattern noted in 2015 held in 2018, that cactus wren was not recorded at any reserve where absent on the prior survey. This year we can add three "new" extirpation locations for the species, Alta Vicente, Agua Amarga, and San Ramon. Maps showing all locations of California gnatcatcher and cactus wren observations, including nests, from the 2018 survey are provided in Appendix B, and are detailed in a table in Appendix C. No brown-headed cowbirds were noted during the 2015 (just one was detected in 2012).

Table 3. Estimates of territories of California gnatcatcher (CAGN) and cactus wren (CACW), by reserve.

		Abalone Cove	Agua Amarga	Alta Vicente	Forrestal	Port. Bend	San Ramon	Three Sisters	Filiorum[7]	Vicente Bluffs	Vista del Norte
2006 (65 CAGN/c. 30 CACW[8])											
	CAGN	8	4	8	12	14	7	8	N/A	4	0
	CACW	9 ad.	4 ad.	4 pr, 7 ad.	6 ad.	4 ad.	10 ad.	7 pr., 1 ad.	N/A	0	0
2009 (40 CAGN/18 CACW)											
	CAGN	3	3	5	5	7	4	4	N/A	10	0
	CACW	0	4	4	2	2	1	5	N/A	0	0
2012 (33 CAGN/38 CACW)											
	CAGN	5	1	5	9	6	1	2	0	4	0
	CACW	3	6	13	1	3	2	10	9	0	0
2015 (33 CAGN/19 CACW)											
	CAGN	1	3	4	7	6	2	2	4	4	0
	CACW	0	3	5	0	0	3	8	6	0	0
2018 (19 CAGN/5 CACW)											
	CAGN	2	0	2	2	3	1	2	4	3	0
	CACW	0	0	0[9]	0	0	0	3	2	0	0

[7] Filiorum was not censused prior to 2012; 10 territories of cactus wrens were detected on Filiorum in 2012 (preserve-wide total: 48).

[8] Assuming two adults per territory. Note that Dudek (2007) conducted three visits during the 2006 survey, while subsequent surveys made two.

Discussion

Overall, 2018 found the lowest numbers of both California gnatcatchers and cactus wrens since required every-three-year monitoring began in 2006. The reasons for this are not entirely clear, but it likely a combination of the following factors[10]:

- Crippling drought that started after 2012 and which has continued into 2018, which resulted in virtually no new foliage or flowering on shrubs/forbs by spring 2018 (and which likely reduced the available food tremendously);
- A relatively wet winter in 2016-17 that resulted in an explosion of weedy growth across the peninsula (esp. black mustard *Brassica nigra*) that altered the structure of the native low scrub habitat and rendered it less suitable for the two focal species;
- Unseasonably cool (and wet) conditions during early spring 2018 (in 2018, temperature data indicate that no survey date reached an air temperature in the 70s, only five days saw end temperatures >65F, and rain canceled several survey dates; by contrast, in 2015, 10 survey dates ended with temperatures at or above 70F);
- The continuing decline of cactus plants from drought and insect pests;
- The continued growth of invasive shrubs such as acacia (Acacia spp.) and others; and
- The continuing increase in predators such as Cooper's hawk (*Accipiter cooperii*) peninsula-wide.

It is also possible that the dramatic loss of cactus wrens is being accelerated by a genetic bottleneck, where viable young are not being produced at a rate that would sustain the population, and with essentially no immigration of new individuals, we're simply waiting for the remaining adults to die. Thus, these seemingly adverse environmental conditions may not be operating on a "normal" population, but one already struggling with low population size.

The following is a more detailed description of observations of California gnatcatcher and cactus wren by site, with reference to results from prior surveys.

<u>Abalone Cove</u>

Following the pattern of steep decline observed in 2015 when just a single California gnatcatcher territory (and no cactus wren) was noted, with one breeding territory again in the restored coastal sage scrub on the point near the center of the reserve (adult bringing in food to a likely nest site in May) (Figure 2). Encouragingly, this year (2018), we also noted a pair in a newer restoration area of the reserve west of here, where the PVPLC had been clearing weeds and planting native shrubs. The area around the main parking lot, and the trail down to the beach, continues to be unsuitable for either species, due to invasion by both non-

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[9] A pair of cactus wrens were recorded here during the February survey (23 Feb. 2018); however, they were not observed during the subsequent survey (24 May 2018), and no reports beyond March 2018 have been entered into eBird.

[10] We base these insights on our own combined 70 year of birding/surveying experience in the Los Angeles region, and on conversations over the years with local biologists who have also worked with cactus wrens, including Dana Kamada, Barbara Kus, Milan Mitrovich, Kristine Preston, Tom Ryan, and Trish Smith.

natives such as acacia and large evergreen native shrubs such as lemonadeberry (*Rhus integrifolia*)[11].

For cactus wrens, we note that while wrens were absent in 2009, they recolonized in 2012, so it is probable that Abalone Cove is a somewhat peripheral site, supporting the species when the population on the peninsula is high, and winking out when fewer pairs are around. It is possible that (at least during "good years") it supports spillover pairs from the adjacent Filiorum Reserve, located just to the north across Palos Verdes Dr. However, we noted again that the cactus stands at Abalone Cove look even more sickly and sparse than in prior years, and clearly unsuitable for nesting wrens at this time[12]. The last pair of birds reported to ebird from Abalone Cove was in May 2013 (https://ebird.org/view/checklist/S14162696).

Figure 2. California gnatcatcher territories (white boxes), Abalone Cove. Note: far eastern portion of reserve was not visited in 2018.

[11] The far eastern area of the reserve adjacent to Portuguese Bend is no longer part of the Nature Preserve, yet had at least one bird in 2006, was graded in 2009, and had recovered enough to support at least one territory in 2012. So, it is possible another pair was present here in 2018. Elsewhere on the reserve, again in 2018 essentially none of the archery range area appeared suitable for gnatcatcher, either because of vegetation clearing or due to drought causing the scrub to be extremely sparse.

[12] While vegetation was not quantitatively measured or assessed, the stands of cactus here were fairly short (i.e., 1-meter tall or lower), did not cover large, impenetrable blocks (as at Filiorum Reserve, for example), and appear to have shrunk in extent, based on "standing dead" individuals observed.

Agua Amarga

With no territories of either species, not much may be said about Agua Amarga. The habitat looks essentially unchanged here, though a relatively large area of weeds had been cleared within northern "arm" of Lunada Canyon (part of Agua Amarga Reserve), and the cactus stands throughout the reserve appear to have suffered due to weed invasion and drought (a phenomenon noted peninsula-wide). On a possibly positive note, a pair of cactus wrens was reported to ebird in April 2018 (https://ebird.org/view/checklist/S44439942), but the exact location was not noted.

Alta Vicente

Perhaps the most surprising change at all the reserves was at Alta Vicente, which had supported a relatively robust population of both California gnatcatchers and cactus wrens in prior years, but in 2018 was down to two – and possibly just one – territory of gnatcatchers and zero wrens (Figure 3); one of the two gnatcatcher pairs ("CAGN 2" at Alta Vicente) was not noted during the June visit, and while it may have fledged young and dispersed by the second survey round, it is possible that only a single (successful) gnatcatcher pair nested at Alta Vicente in 2018 (juveniles noted in June). The loss of cactus wren from this site seems part of a trend since 2012; as we wrote in the 2015 report, "several areas with fresh nests in 2012 were found to not support either nests or birds; thus, the drop in numbers is likely real, and was more similar to the estimate for 2009 (4 territories), and well below that estimated in 2006 (4 pairs plus 7 individuals)." The last pair reported to ebird at Alta Vicente was in March 2018 (https://ebird.org/view/checklist/S43840127).

It is likely that the continuing invasion of the cactus patch areas by weeds (including *Echium*) and acacia is not helping; as noted in 2015, "substantial stands of both cholla and prickly-pear cactus remain here, and while acacia shrubs continue to expand and overtake these native stands, wrens are continuing to build nests in cactus at the edge of these shrubs." It appears that these shrubs may have altered the cactus scrub community to such a degree that these birds could not persist. The increase in Cooper's hawk (*Accipiter cooperii*) may also be a factor, and multiple Cooper's hawks were noted each survey day throughout the study area, including directly over cactus wren habitat.

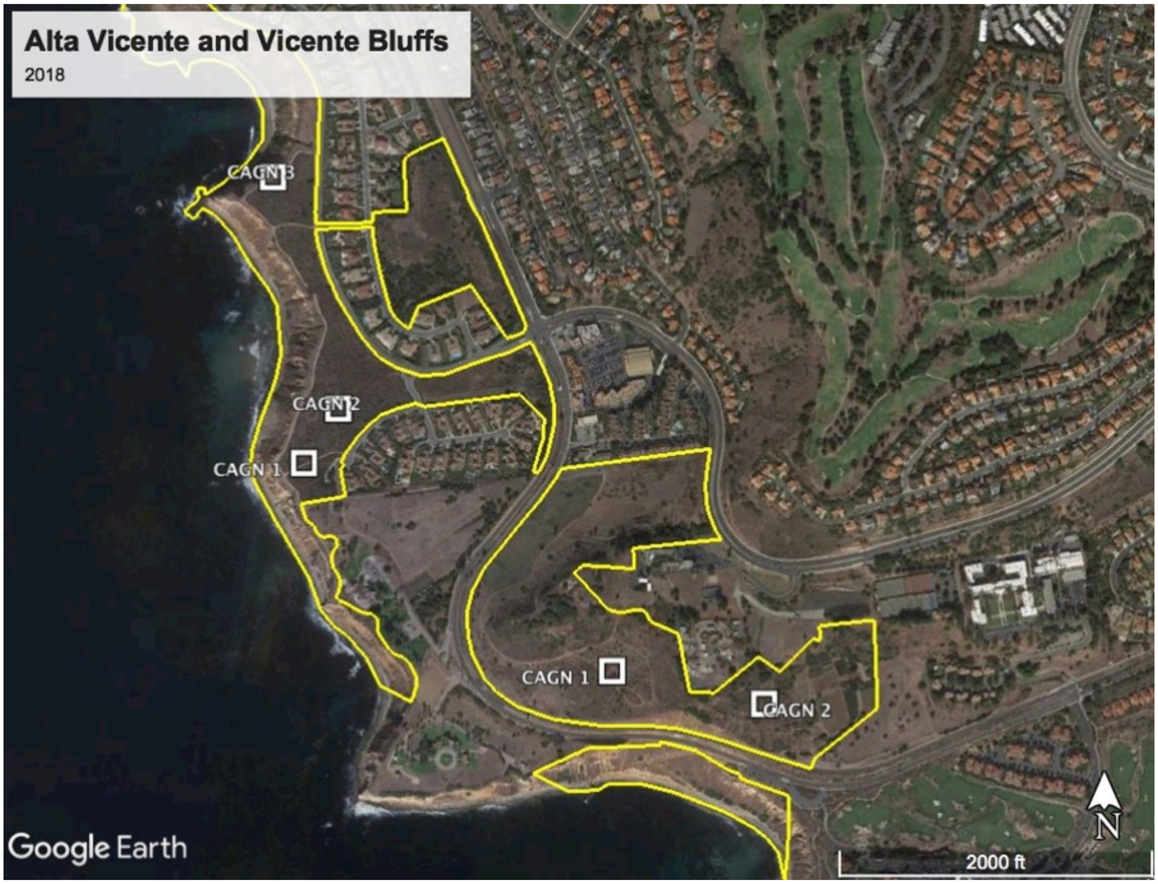

Figure 3. California gnatcatcher territories (white boxes), Alta Vicente (right) and Vicente Bluffs (left).

Forrestal

One of the steepest declines of either species came from Forrestal in 2018, when just two active California gnatcatcher territories were mapped (Figure 4), down from the 5-12 territories estimated since 2006. These territories appear to be in similar areas as in prior years, and at least one had young (female bringing in food 31 May) suggesting that several "peripheral" territories may have been lost, leaving only the highest-quality areas occupied, split between the western and eastern halves of the reserve.

As in 2015, cactus wren was entirely missed here, and the species therefore considered extirpated from the reserve, with no old or new wren nests observed. The last pair reported to ebird was in March 2011 (https://ebird.org/view/checklist/S7806016), with the last single here in March 2016.

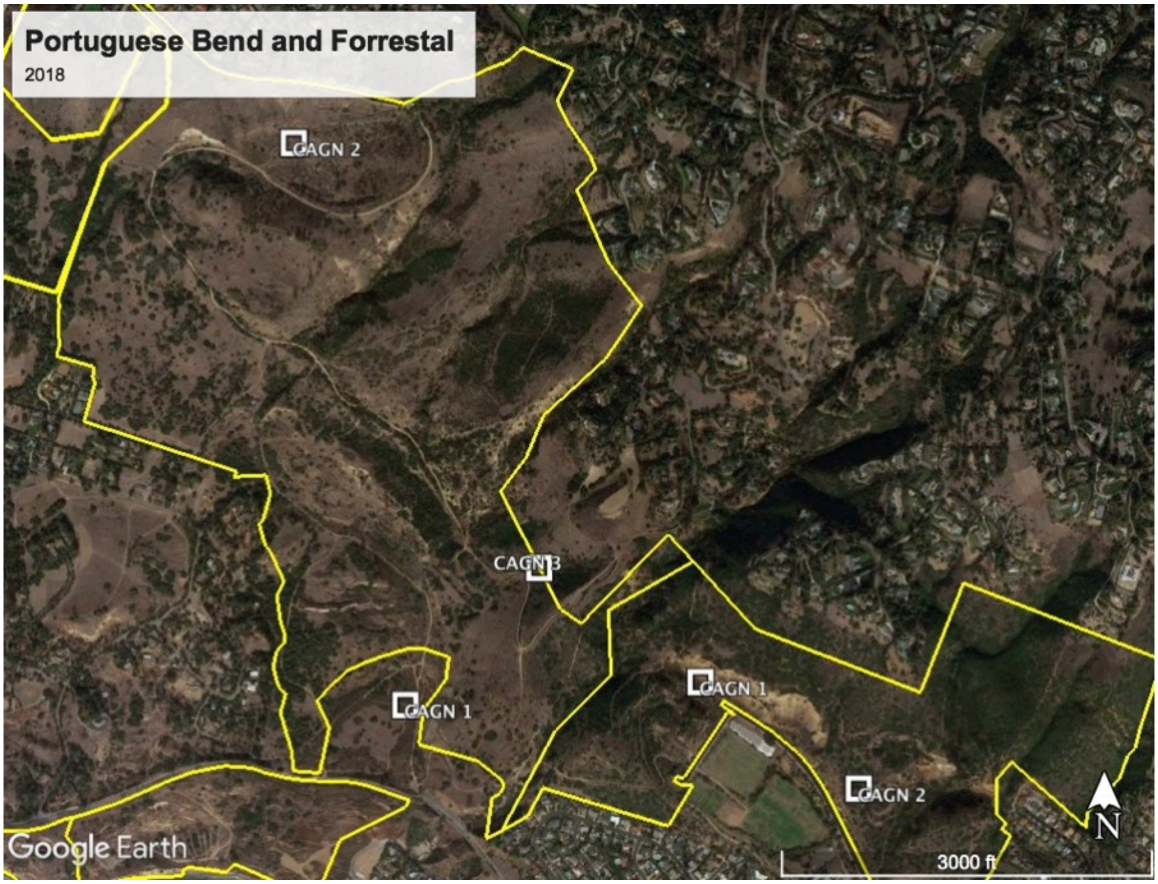

Figure 4. California gnatcatcher territories (white boxes), Forrestal (right) and Portuguese Bend (left).

Portuguese Bend

Unlike in prior surveys, the 2018 survey documented just 2-3 territories of California gnatcatchers (Figure 4) from what had been a local stronghold for the species (from 2015: the pattern of 5-7 territories, most in the southern half, with a smattering of sightings in the northern half, has held since (2009)". Interestingly, one of the two documented/potential nesting areas was within the large restoration area in the northern half of the reserve, which had not had regular sightings in prior surveys.

We note that active gnatcatcher territories were almost concentrated in restoration areas in other reserves, with both of the Abalone Cove territories in restored habitat, Alta Vicente one of the 1-2 territories in an active restoration area, and all three of the Vicente Bluffs territories in restoration habitat. This suggests that birds may be finding scarce resources in these "artificially productive" (via irrigation, weeding) zones.

The pair of cactus wrens noted along the "Barn Owl Trail" at the far eastern edge of Portuguese Bend on July 9, 2015 (CEM 2015) appear to have been the last known record of the species from the reserve (none have been reported to ebird since 2013).

San Ramon

One of the smallest reserves with relatively little coastal sage scrub, San Ramon was down to a single pair of California gnatcatcher 2018 (Figure 5), which was showing no indication of nesting. Therefore, this species – along with cactus wren, which went undetected here – may be vanishing from the reserve. While restoration planting evaluation was not part of our study, very little successfully restored habitat was noted. Whether traffic noise was a factor in this decline (as speculated on in 2015) is unknown, but given the steep declines at every other reserve, it would only be a contributing factor at most.

Figure 5. California gnatcatcher territories (white boxes); cactus wren territories (yellow boxes), San Ramon.

Three Sisters/Filiorum

Note: These reserves are directly adjacent to one another, and so will be discussed together here.

Together, these two adjacent reserves appear to support the last remaining pairs of cactus wrens on the peninsula, as well as an estimated six territories of California gnatcatchers. Additional gnatcatchers may be present in inaccessible areas that border each of these reserves (due to their loud calls, it is unlikely we missed any cactus wrens, however). Most troubling, however, is the loss of multiple pairs of cactus wrens at Three Sisters similar to the situation at Alta Vicente (from six pairs in 2015 to one pair in the upper portion of the reserve in 2018, and the outright loss of all four pairs in the canyon between the two reserves since 2012) despite the persistence of extensive cactus scrub.

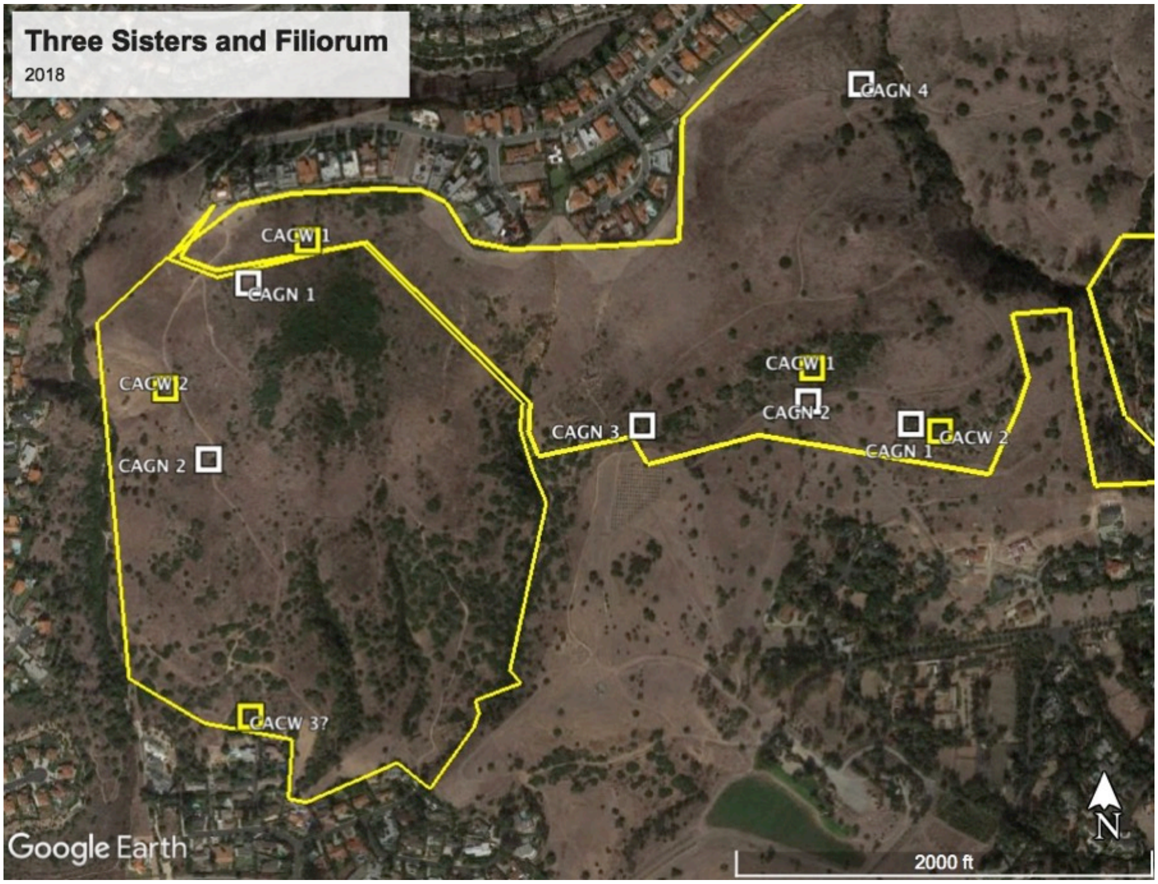

Figure 6. California gnatcatcher territories (white boxes); cactus wren territories (yellow boxes), Three Sisters (left) and Filiorum (right).

<u>Vicente Bluffs</u>
Unlike virtually any other reserve, Vicente Bluffs saw its population of California gnatcatcher remain stable, as in prior years, with three pairs in the main restoration area (Figure 2). The eastern portion of the reserve (located c. 100 meters east of the main reserve, and just west of Palos Verdes Dr., adjacent to a small debris basin; see Figure B-2) that supported a single territory in prior years ("territory 4" in 2015) was inaccessible in 2018 so was not surveyed (a "forest" of black mustard *Brassica nigra* blocked entry to the area that had supported coastal sage scrub in prior years). Cactus wren were again absent here, and with no large cactus patches, will remain so.

Additional notes

Reviewing what we wrote about the 2012 survey (Cooper 2013):

> "The apparent declines in gnatcatcher territories and increases in cactus wren territories should be interpreted with caution. These were based on as few as four visits, over four years, for many reserves, which is far too few to make claims of population trends. So, while these surveys are probably sufficient for presence/absence information – such as that neither species has colonized Vista del Norte reserve, or that California gnatcatcher may be nearing extirpation at Agua Amarga – numbers of both species vary naturally annually, and from decade to decade."

And,

> "Atwood et al. (1998b) noted [gnatcatcher] population swings of c. 50% during annual surveys on the peninsula from 1993-1997, ranging from a high of 56 in 1994 to a low of 26 pairs the following year (1995); our 2012 [and 2015] estimate of 33 pairs fits within this range, as does Hamilton's in 2009 (40 pairs) which used similar methodology. Therefore, only through repeated surveys over multiple years will we be able to assess trends with any confidence."

The 2018 estimate of 19 territories of gnatcatchers falls below Atwood's low of 26 pairs in 1995, though a handful of pairs are present on the peninsula in areas not visited by our survey (e.g., Trump National Golf Course/Ocean Trails, Terranea, and Shoreline Park, etc.). Still, it could be said that 2018 may be a very low ebb of a low period for the species. It is also clear that they are not "holding their own" at Agua Amarga or San Ramon, as suggested in 2015, but rather have retreated to a handful of the densest, most extensive vegetation at a handful of restoration areas (e.g., Vicente Bluffs) and in the most extensive blocks of natural habitat such as Three Sisters/Filiorum.

For cactus wrens, the situation can only be described as dire. A population down to five pairs – of any bird or animal species – is mathematically unlikely to sustain itself without immediate immigration of new individuals. In the case of the Palos Verdes peninsula, given its isolation, this seems essentially impossible in the long term (coastal cactus wren sightings away from nesting territories are virtually unknown in the Los Angeles area, even though stray gnatcatchers are fairly regular and widespread, albeit in low numbers). Even if there is still a pair or two in patches of cactus away from the reserves (e.g., at Ocean Trails, where a single bird was reported to eBird into June 2018), a population below c. 10 pairs is probably unsustainable.

Reversing this trend will be challenging, since these birds only breed in spring/early summer, and tend to occur in small, highly social groups that construct numbers of nests throughout large, adjacent patches of cactus. Having single pairs – much less individuals – at widely-spaced patches may not result in new young produced. Still, we would recommend the following measures be considered to attempt to save this population:

- Immediate and permanent removal (i.e., including the roots) of large acacia, *Caesalpinia*, *Echium*, and other invasive non-native trees and shrubs at Three Sisters, Filiorum, and Alta Vicente (the three last reserves that support/supported cactus wren);

- Installation of cactus wren nest boxes (e.g., similar to those deployed by Irvine Ranch Conservancy and other reserves in Orange County);
- Limiting human use of certain trails that run through prime cactus wren habitat, such as at Alta Vicente and Three Sisters, to reduce stress on the remaining pairs;
- Reducing supplemental irrigation of restoration zones near areas of recent cactus wren use (since this *may* be supporting/encouraging more weeds, more rodents, and possibly more raptors/predators);
- Removal of tall (non-native) trees on the periphery of the preserve known or likely to support nesting Cooper's hawks (e.g., pines, ficus); and
- (if necessary) Translocation of birds from Orange County or Ventura County populations to supplement the breeding population on the peninsula.

Translocation has proven successful in other parts of the birds' range, including Upper Newport Bay, where a population vanished and has subsequently been reestablished, and we will provide PVPLC with information on this as soon as we compile it.

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APPENDICES

Appendix A. Approximate walking routes taken by surveyor (Cooper) in 2015. Different colors represent routes taken on different survey days.

Figure A-1. Agua Amarga routes.

Figure A-2. Abalone Cove routes.

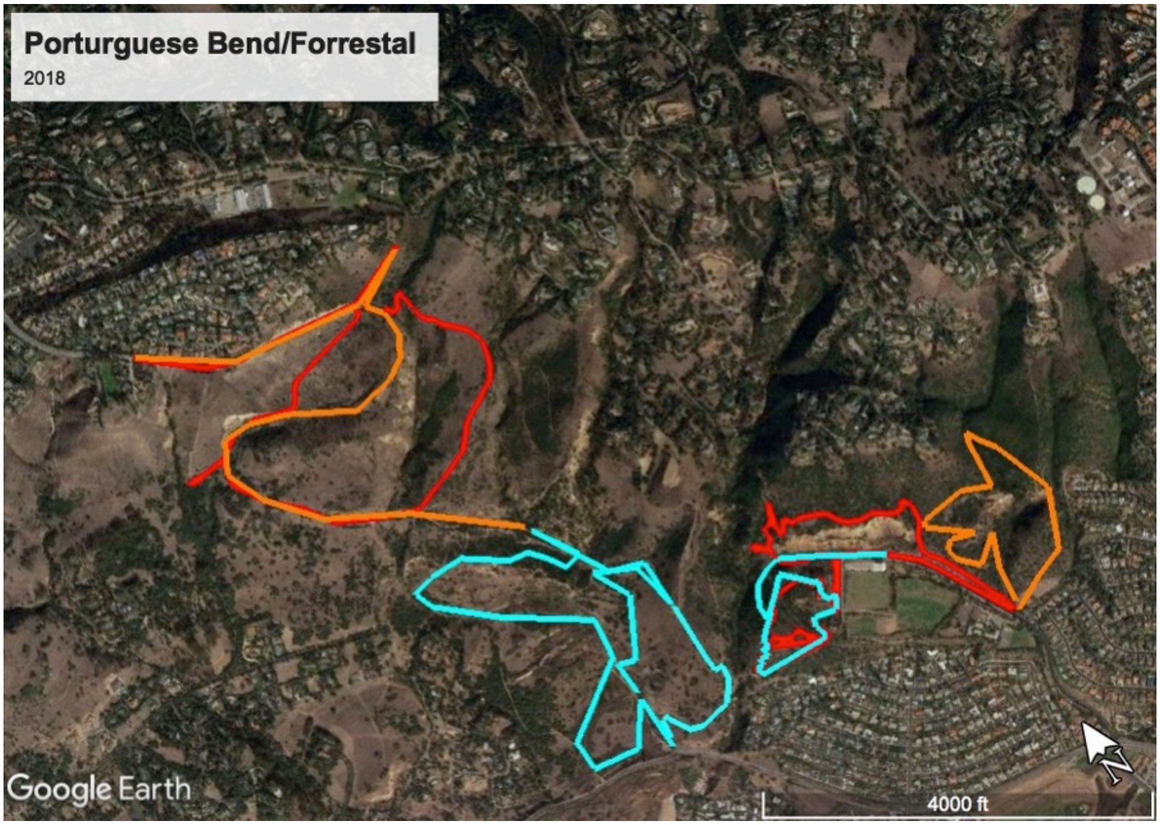

Figure A-3. Forrestal/Portuguese Bend routes.

Figure A-4. San Ramon route.

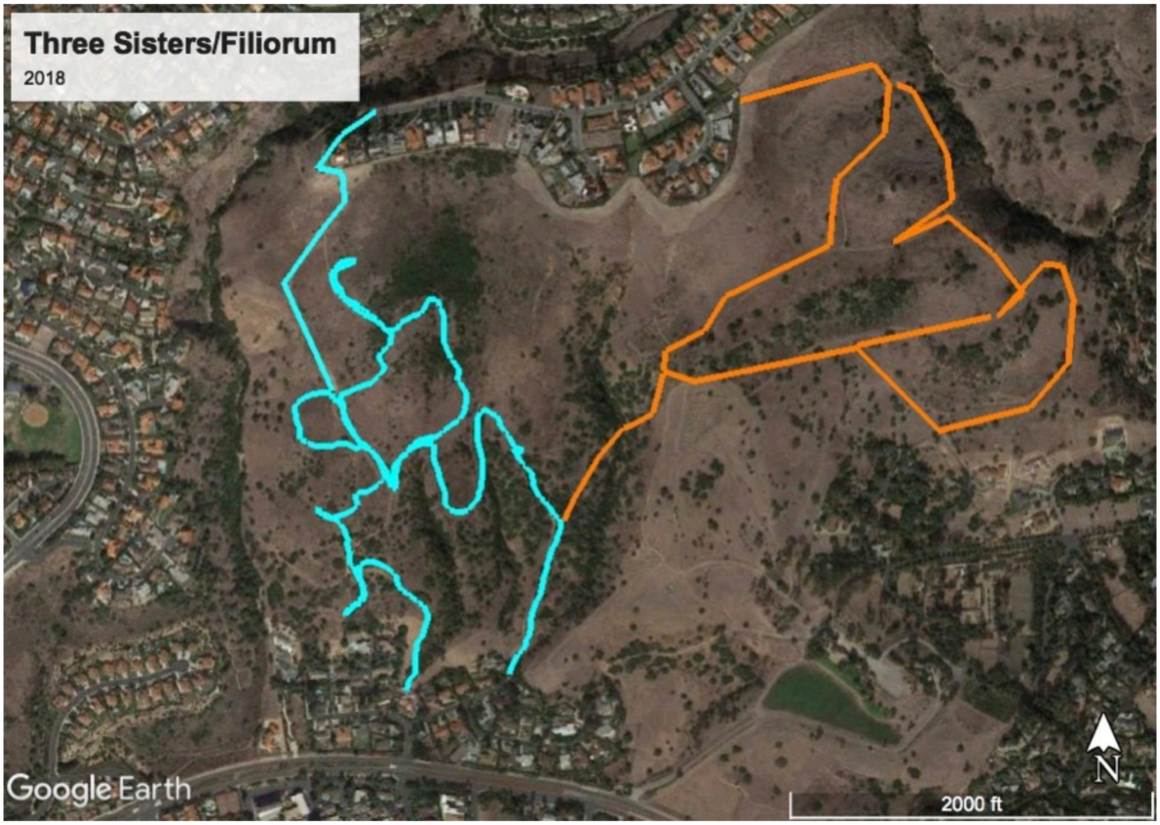

Figure A-5. Three Sisters/Filiorum routes.

Appendix B. Maps of all California gnatcatcher/cactus wren detections, including nests, 2018. Yellow pins represent gnatcatchers, green pins represent cactus wrens. Please refer to Appendix C for additional details on each.

Figure B-1. California gnatcatcher and cactus wren observations, Abalone Cove.

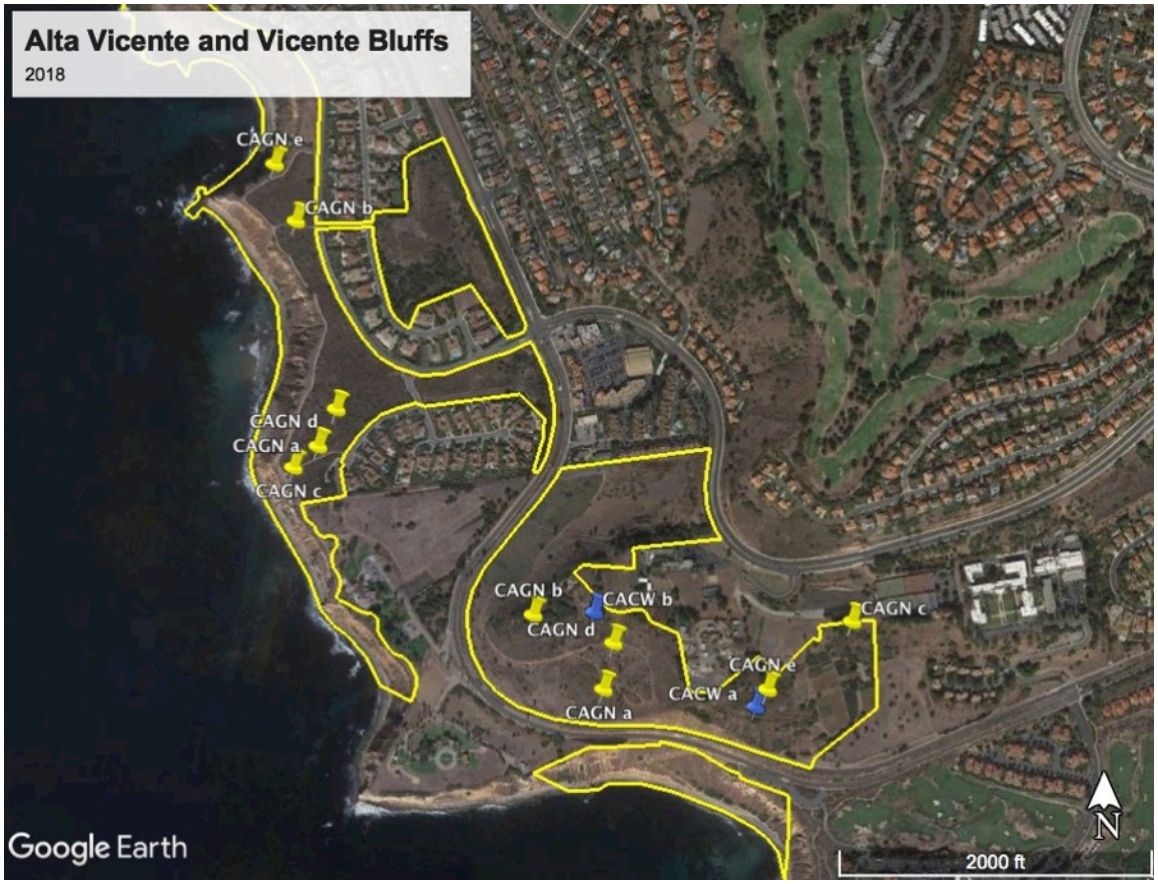

Figure B-2. California gnatcatcher and cactus wren observations, Alta Vicente (right) and Vicente Bluffs (left). Note that Vicente Bluffs is split into a main reserve and an "eastern extension".

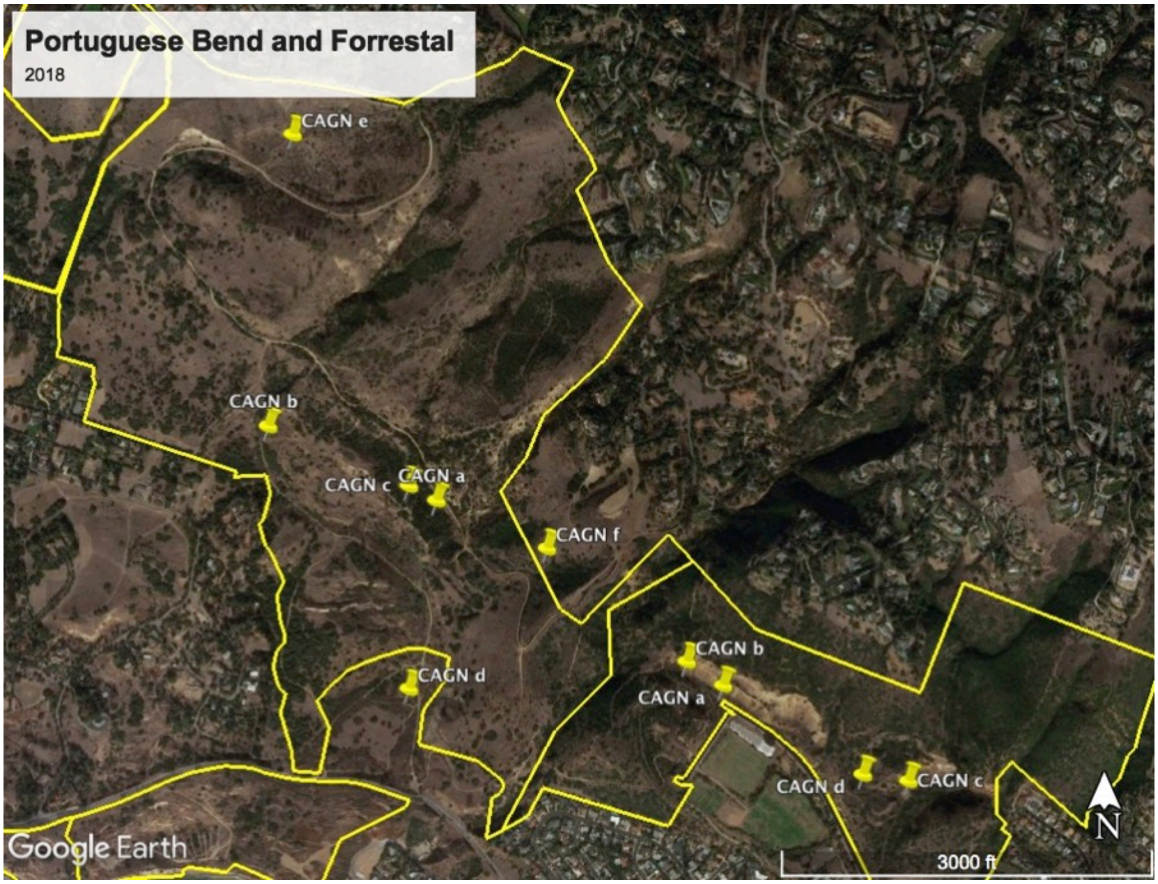

Figure B-3. California gnatcatcher and cactus wren observations, Forrestal and Portuguese Bend.

Figure B-4. California gnatcatcher and cactus wren observations, San Ramon.

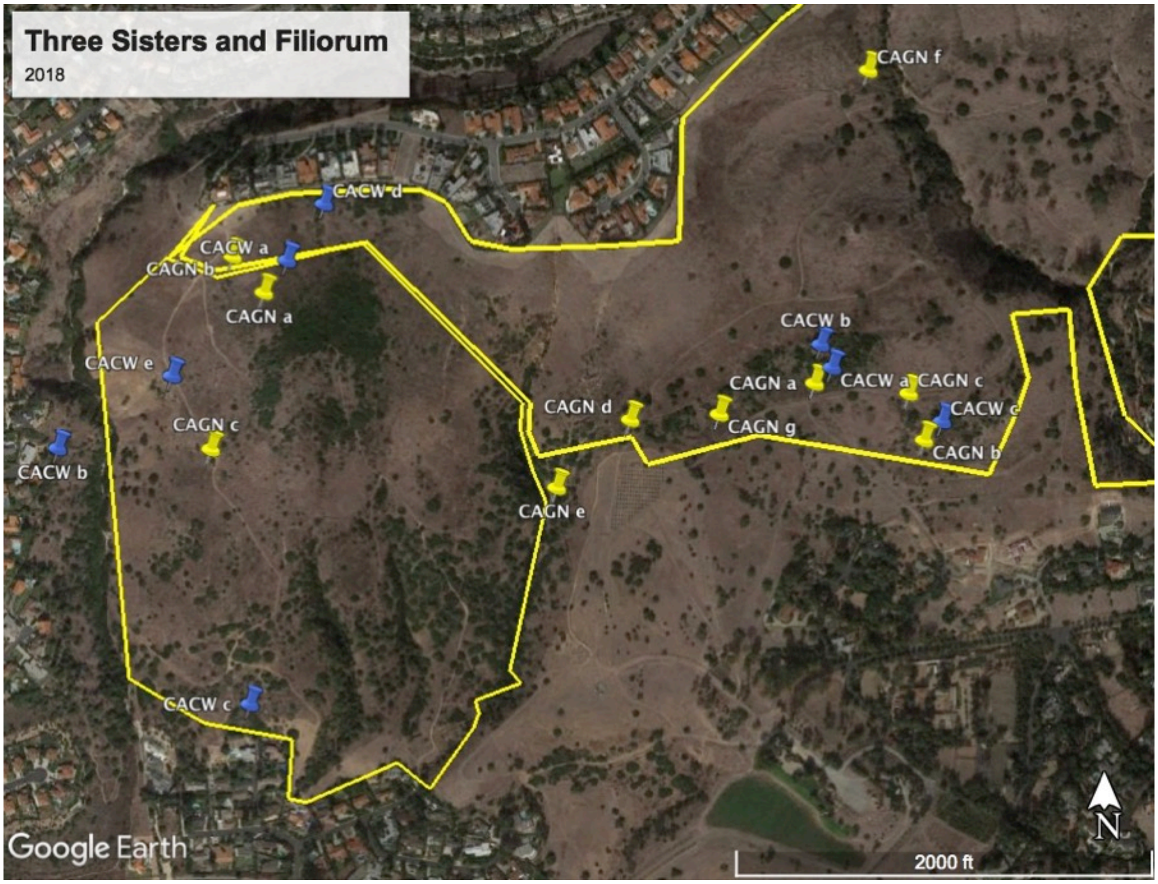

Figure B-5. California gnatcatcher and cactus wren observations, Three Sisters and Filiorum.

Appendix C. List of all California gnatcatcher ("CAGN" shaded) and coastal cactus wren (CACW) observations during 2015 survey, by reserve.
"Status": P = Pair; S = Single; F = Family group; J = Juvenile; N = Nest m/f = male/female; CF = Carrying food; NM = (Carrying) nesting material

Subarea	Date	Species	Status	Time	Notes	
Abalone Cove						
	19 Mar.	CAGN g	Sm	N/A		33.742252°, -118.376977°
	28 Mar.	CAGN a	P	10:58	Calling; male giving 'chuck' notes (nest?)	33.737537°, -118.374510°
	28 Mar.	CAGN b	Sm?	11:03	Poss. alarm calls (unseen)	33.738523°, -118.373875°
	28 Mar.	CAGN c	S	11:13	Loud mewing (heard from archery gate	33.740415°, -118.366707°
	18 May	CAGN d	S?	10:39	Silent, foraging; same or different bird called from slope just to north	33.738794°, -118.373269°
	18 May	CAGN e	P, N?	10:53	Female flew in w/ food	33.7380, -118.3740
	31 May	CAGN f	P	10:47	Flew in to rec., foraging; 3rd bird seen?	33.7401, -118.3753
Agua Amarga						
Subarea	**Date**	**Species**	**Status**	**Time**	**Notes**	
No CAGN or CACW were detected at Agua Amarga Reserve during 2018 survey						
Alta Vicente						
Subarea	**Date**	**Species**	**Status**	**Time**	**Notes**	
	23 Feb	CAGN d	P	N/A		33.743617°, -118.406280°
	23 Feb	CAGN e	P	N/A		33.742807°, -118.403049°
	24 May	CAGN a	P	8:42	"Frantically foraging"; made long flight north to main trail (heard again @ 11:07)	33.7428, -118.4065
	24 May	CAGN b	J (2), S	9:07	2 quiet J's, occ. calls; male seen same area 9:31.	33.7441, -118.4080
	24 May	CAGN c	Sm	10:28	Calling; long flight to east	33.7440, -118.4013
	23 Feb	CACW b	P			33.744148°, -118.406690°
	24 May	CACW a	N	N/A	Single fresh nest[13]	33.7425, -118.4033
Filiorum						
Subarea	**Date**	**Species**	**Status**	**Time**	**Notes**	
	29 Mar.	CAGN a	P, Sm	9:10	Mewing pair @ fence corner (male w/ line above eye); 2nd male (partial cap) just south of pair called 1x and flew c. 80 m south into	33.751876°, -118.378685°

[13] This appears to have been the last Cactus Wren nest in the reserve, presumably built in early spring (March?) 2018 and then unused as the last remaining pair was extirpated. At least 3 old/dilapidated nests observed 5/24 in the northeastern corner of the reserve (near the tennis courts), but not in use, and no birds were detected during the May survey.

					pepper.	
	29 Mar.	CAGN b	S(f?)	9:26	Mewing, flying around	33.751129°, -118.376957°
	29 Mar.	CAGN c	P	9:32	Single, then 2nd bird joined from north side of cactus patch	33.751744°, -118.377200°
	29 Mar.	CAGN d	P	10:09	Resp. to call	33.7514, -118.3816
	29 Mar.	CAGN e	P	10:27	Foraging slowly up cyn.; atypical habitat	33.7503, -118.3828
	13 June	CAGN f	P?	8:10	Two birds, one possibly CF, quiet mewing; no resp. to rec., moved east	33.7560, -118.3778
	13 June	CAGN g	F	9:30	1st heard from distance, then narrowed-down loc. Male (alarm call) + 1-2 others	33.7515,-118.3802
	29 Mar.	CACW a	P, N	9:10	Adult w/ NM, 2nd adult calling c. 20 m west.	33.7521, -118.3784
	13 June	CACW b	S, N	9:00	Ad. calling @ (old?) nest. 2nd bird possibly heard calling same patch @ 10:03.	33.7524, -118.3786
	13 June	CACW c	S, N	9:24	Strong response to recording; 2 nests in patch, one old, the other fair condition	33.751372°, -118.376679°
			Forrestal			
Subarea	**Date**	**Species**	**Status**	**Time**	**Notes**	
West	4 Apr	CAGN a	P	9:22	Male w/ full cap	33.742073°, -118.351733°
West	31 May	CAGN b	P	8:31	Flew in to rec.	33.7426, -118.3527
East	31 May	CAGN c	Sf	9:39	Foraging constantly, didn't resp. to rec.	33.739953°, -118.346801°
East	31 May	CAGN d	P, N?	10:02	Female CF	33.7401, -118.3480
			Portuguese Bend			
South	21 Feb	CAGN a	S?[14]	09:58	See note	33.746171°, -118.359365°
South	21 Feb	CAGN b	S	10:18	Distant mew heard from general area	33.747818°, -118.363846°
South	18 May	CAGN c	S	9:16	Mewing	33.7465, -118.3601
South	18 May	CAGN d	S,S (J?)	9:52	Both probable J, 1 w/ odd alarm-type call	33.7420, -118.3601
North	18 May	CAGN e	Sm, N	N/A	Male at nest	33.754285°, -118.363195°
North	18 May	CAGN f	Sm	N/A		33.745111°, -118.356422°
			Vicente Bluffs			
Subarea	**Date**	**Species**	**Status**	**Time**	**Notes**	
	28 Mar.	CAGN a	P,Sm	9:37	Pair (quiet, furtive) plus single active/vocal male	33.747049°, -118.412482°
	28 Mar.	CAGN b	Sm	9:49	Calling, unresponsive	33.750979°, -118.412948°
	24 May	CAGN c	P, FL?	11:40	Flew in from north (across trail), frantically foraging, FL possibly heard nearby (faint buzzing calls)	33.7467, -118.4130
	24 May	CAGN d	P	12:02	Resp. to call (2nd pair?);	33.7477, -118.4121

[14] "Gnatcatcher sp." flew across trail (twice), called once (equivocal as to species), and vanished.

					flew in from northeast	
	24 May	CAGN e	P	12:23	Flew in in resp. to call	33.7520, -118.4134
San Ramon						
Subarea	**Date**	**Species**	**Status**	**Time**	**Notes**	**Lat/Long**
	17 Feb	CAGN a	P	10:08	Foraging quietly	33.728661°, -118.332498°
	7 June	CAGN b	P	9:46	No CF observed; male flew in to rec. and did odd wing-tremble display; silent; neither actively foraging	33.7285, -118.3337
Three Sisters						
Subarea	**Date**	**Species**	**Status**	**Time**	**Notes**	
	29 Mar	CAGN a	P	N/A		33.753067°, -118.387376°
	13 June	CAGN b	F	N/A		33.753540°, -118.387870°
	13 June	CAGN c	P	N/A		33.751010°, -118.388215°
	29 Mar	CACW a	P	N/A		33.753487°, -118.387016°
	29 Mar	CACW b	S	N/A	Male, calling	33.751018°, -118.390635°
	29 Mar	CACW c	S	N/A	Male, calling	33.747658°, -118.387603°
	13 June	CACW d	S	N/A	Male	33.754227°, -118.386432°
	13 June	CACW e	P	N/A		33.751969°, -118.388832°

DEPARTMENT OF TRANSPORTATION
DISTRICT 7 – Office of Regional Planning
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Making Conservation a California Way of Life.

December 5, 2018

Octavio Silva
City of Rancho Palos Verdes
30940 Hawthorne Boulevard
Rancho Palos Verdes, CA 90275

RE: NOP for Zone 2 Draft EIR
Palos Verdes Drive S. & Narcissa Drive
SCH # 2010121073
GTS # 07-LA-2018-02065

Dear Octavio Silva:

Thank you for including the California Department of Transportation (Caltrans) in the environmental review process for the Rancho Palos Verdes Zone 2 Landslide Moratorium Ordinance (LMO) Revisions draft Environmental Impact Report.

This proposed code amendment focuses on Zone 2 of the Landslide Moratorium Area (LMA) on the Palos Verdes Peninsula, north of the intersection of Palos Verdes Drive S. and Narcissa Drive. This plan consists of making code amendments to Exception "P" of Title 15.20.040 of the Ranchos Palos Verdes Municipal Code, pertaining to Zone 2. The proposed code amendment would apply to the 112-acre LMA of Zone 2 that is currently no longer allowing Landslide Moratorium Exemption (LME) applications. This proposed code amendment would predominantly impact the 31 undeveloped lots in Zone 2.

Based on the review of this NOP for the draft EIR and the lead agencies general plan, Caltrans has the following comments:

By review of this NOP it is evident that the impact to Caltrans facilities would be minimal. The expected project area is over five miles away from the nearest Caltrans facility and if approved would build ~30 homes over multiple years which would not over encumber Caltrans facilities.

If you have any questions, please contact Reece Allen, the project coordinator, at reece.allen@dot.ca.gov, and refer to GTS # 07-LA-2018-02065

Sincerely,

MIYA EDMONSON
IGR/CEQA Branch Chief

cc: Scott Morgan, State Clearinghouse

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City of Rancho Palos Verdes

STATE OF CALIFORNIA Edmund G. Brown Jr., Governor
NATIVE AMERICAN HERITAGE COMMISSION
Cultural and Environmental Department
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West Sacramento, CA 95691
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Email: nahc@nahc.ca.gov
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Building & Safety
City of Rancho Palos Verdes

December 3, 2018

Octavio Silva
City of Rancho Palos Verdes
30940 Hawthrone Boulevard
Rancho Palos Verdes, CA 90275

RE: SCH# 2010121073 Zone 2 Landslide Moratorium Ordinance Revisions (Planning Case No. ZON2009-00409), Los Angeles County

Dear Mr. Silvia:

The Native American Heritage Commission (NAHC) has received the Notice of Preparation (NOP), Draft Environmental Impact Report (DEIR) or Early Consultation for the project referenced above. The California Environmental Quality Act (CEQA) (Pub. Resources Code §21000 et seq.), specifically Public Resources Code §21084.1, states that a project that may cause a substantial adverse change in the significance of a historical resource, is a project that may have a significant effect on the environment. (Pub. Resources Code § 21084.1; Cal. Code Regs., tit.14, §15064.5 (b) (CEQA Guidelines §15064.5 (b)). If there is substantial evidence, in light of the whole record before a lead agency, that a project may have a significant effect on the environment, an Environmental Impact Report (EIR) shall be prepared. (Pub. Resources Code §21080 (d); Cal. Code Regs., tit. 14, § 5064 subd.(a)(1) (CEQA Guidelines §15064 (a)(1)). In order to determine whether a project will cause a substantial adverse change in the significance of a historical resource, a lead agency will need to determine whether there are historical resources within the area of potential effect (APE).

CEQA was amended significantly in 2014. Assembly Bill 52 (Gatto, Chapter 532, Statutes of 2014) (AB 52) amended CEQA to create a separate category of cultural resources, "tribal cultural resources" (Pub. Resources Code §21074) and provides that a project with an effect that may cause a substantial adverse change in the significance of a tribal cultural resource is a project that may have a significant effect on the environment. (Pub. Resources Code §21084.2). Public agencies shall, when feasible, avoid damaging effects to any tribal cultural resource. (Pub. Resources Code §21084.3 (a)). **AB 52 applies to any project for which a notice of preparation, a notice of negative declaration, or a mitigated negative declaration is filed on or after July 1, 2015.** If your project involves the adoption of or amendment to a general plan or a specific plan, or the designation or proposed designation of open space, on or after March 1, 2005, it may also be subject to Senate Bill 18 (Burton, Chapter 905, Statutes of 2004) (SB 18). **Both SB 18 and AB 52 have tribal consultation requirements**. If your project is also subject to the federal National Environmental Policy Act (42 U.S.C. § 4321 et seq.) (NEPA), the tribal consultation requirements of Section 106 of the National Historic Preservation Act of 1966 (154 U.S.C. 300101, 36 C.F.R. §800 et seq.) may also apply.

The NAHC recommends consultation with California Native American tribes that are traditionally and culturally affiliated with the geographic area of your proposed project as early as possible in order to avoid inadvertent discoveries of Native American human remains and best protect tribal cultural resources. Below is a brief summary of portions of AB 52 and SB 18 as well as the NAHC's recommendations for conducting cultural resources assessments.

Consult your legal counsel about compliance with AB 52 and SB 18 as well as compliance with any other applicable laws.

AB 52

AB 52 has added to CEQA the additional requirements listed below, along with many other requirements:

1. Fourteen Day Period to Provide Notice of Completion of an Application/Decision to Undertake a Project: Within fourteen (14) days of determining that an application for a project is complete or of a decision by a public agency to undertake a project, a lead agency shall provide formal notification to a designated contact of, or tribal representative of, traditionally and culturally affiliated California Native American tribes that have requested notice, to be accomplished by at least one written notice that includes:
   a. A brief description of the project.
   b. The lead agency contact information.
   c. Notification that the California Native American tribe has 30 days to request consultation. (Pub. Resources Code §21080.3.1 (d)).
   d. A "California Native American tribe" is defined as a Native American tribe located in California that is on the contact list maintained by the NAHC for the purposes of Chapter 905 of Statutes of 2004 (SB 18). (Pub. Resources Code §21073).

2. Begin Consultation Within 30 Days of Receiving a Tribe's Request for Consultation and Before Releasing a Negative Declaration, Mitigated Negative Declaration, or Environmental Impact Report: A lead agency shall begin the consultation process within 30 days of receiving a request for consultation from a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project. (Pub. Resources Code §21080.3.1, subds. (d) and (e)) and prior to the release of a negative declaration, mitigated negative declaration or Environmental Impact Report. (Pub. Resources Code §21080.3.1(b)).
   a. For purposes of AB 52, "consultation shall have the same meaning as provided in Gov. Code §65352.4 (SB 18). (Pub. Resources Code §21080.3.1 (b)).

3. Mandatory Topics of Consultation If Requested by a Tribe: The following topics of consultation, if a tribe requests to discuss them, are mandatory topics of consultation:
   a. Alternatives to the project.
   b. Recommended mitigation measures.
   c. Significant effects. (Pub. Resources Code §21080.3.2 (a)).

4. Discretionary Topics of Consultation: The following topics are discretionary topics of consultation:
   a. Type of environmental review necessary.
   b. Significance of the tribal cultural resources.
   c. Significance of the project's impacts on tribal cultural resources.
   d. If necessary, project alternatives or appropriate measures for preservation or mitigation that the tribe may recommend to the lead agency. (Pub. Resources Code §21080.3.2 (a)).

5. Confidentiality of Information Submitted by a Tribe During the Environmental Review Process: With some exceptions, any information, including but not limited to, the location, description, and use of tribal cultural resources submitted by a California Native American tribe during the environmental review process shall not be included in the environmental document or otherwise disclosed by the lead agency or any other public agency to the public, consistent with Government Code §6254 (r) and §6254.10. Any information submitted by a California Native American tribe during the consultation or environmental review process shall be published in a confidential appendix to the environmental document unless the tribe that provided the information consents, in writing, to the disclosure of some or all of the information to the public. (Pub. Resources Code §21082.3 (c)(1)).

6. Discussion of Impacts to Tribal Cultural Resources in the Environmental Document: If a project may have a significant impact on a tribal cultural resource, the lead agency's environmental document shall discuss both of the following:
   a. Whether the proposed project has a significant impact on an identified tribal cultural resource.
   b. Whether feasible alternatives or mitigation measures, including those measures that may be agreed to pursuant to Public Resources Code §21082.3, subdivision (a), avoid or substantially lessen the impact on the identified tribal cultural resource. (Pub. Resources Code §21082.3 (b)).

7. Conclusion of Consultation: Consultation with a tribe shall be considered concluded when either of the following occurs:
    a. The parties agree to measures to mitigate or avoid a significant effect, if a significant effect exists, on a tribal cultural resource; or
    b. A party, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached. (Pub. Resources Code §21080.3.2 (b)).

8. Recommending Mitigation Measures Agreed Upon in Consultation in the Environmental Document: Any mitigation measures agreed upon in the consultation conducted pursuant to Public Resources Code §21080.3.2 shall be recommended for inclusion in the environmental document and in an adopted mitigation monitoring and reporting program, if determined to avoid or lessen the impact pursuant to Public Resources Code §21082.3, subdivision (b), paragraph 2, and shall be fully enforceable. (Pub. Resources Code §21082.3 (a)).

9. Required Consideration of Feasible Mitigation: If mitigation measures recommended by the staff of the lead agency as a result of the consultation process are not included in the environmental document or if there are no agreed upon mitigation measures at the conclusion of consultation, or if consultation does not occur, and if substantial evidence demonstrates that a project will cause a significant effect to a tribal cultural resource, the lead agency shall consider feasible mitigation pursuant to Public Resources Code §21084.3 (b). (Pub. Resources Code §21082.3 (e)).

10. Examples of Mitigation Measures That, If Feasible, May Be Considered to Avoid or Minimize Significant Adverse Impacts to Tribal Cultural Resources:
    a. Avoidance and preservation of the resources in place, including, but not limited to:
        i. Planning and construction to avoid the resources and protect the cultural and natural context.
        ii. Planning greenspace, parks, or other open space, to incorporate the resources with culturally appropriate protection and management criteria.
    b. Treating the resource with culturally appropriate dignity, taking into account the tribal cultural values and meaning of the resource, including, but not limited to, the following:
        i. Protecting the cultural character and integrity of the resource.
        ii. Protecting the traditional use of the resource.
        iii. Protecting the confidentiality of the resource.
    c. Permanent conservation easements or other interests in real property, with culturally appropriate management criteria for the purposes of preserving or utilizing the resources or places.
    d. Protecting the resource. (Pub. Resource Code §21084.3 (b)).
    e. Please note that a federally recognized California Native American tribe or a non-federally recognized California Native American tribe that is on the contact list maintained by the NAHC to protect a California prehistoric, archaeological, cultural, spiritual, or ceremonial place may acquire and hold conservation easements if the conservation easement is voluntarily conveyed. (Civ. Code §815.3 (c)).
    f. Please note that it is the policy of the state that Native American remains and associated grave artifacts shall be repatriated. (Pub. Resources Code §5097.991).

11. Prerequisites for Certifying an Environmental Impact Report or Adopting a Mitigated Negative Declaration or Negative Declaration with a Significant Impact on an Identified Tribal Cultural Resource: An Environmental Impact Report may not be certified, nor may a mitigated negative declaration or a negative declaration be adopted unless one of the following occurs:
    a. The consultation process between the tribes and the lead agency has occurred as provided in Public Resources Code §21080.3.1 and §21080.3.2 and concluded pursuant to Public Resources Code §21080.3.2.
    b. The tribe that requested consultation failed to provide comments to the lead agency or otherwise failed to engage in the consultation process.
    c. The lead agency provided notice of the project to the tribe in compliance with Public Resources Code §21080.3.1 (d) and the tribe failed to request consultation within 30 days. (Pub. Resources Code §21082.3 (d)).

The NAHC's PowerPoint presentation titled, "Tribal Consultation Under AB 52: Requirements and Best Practices" may be found online at: http://nahc.ca.gov/wp-content/uploads/2015/10/AB52TribalConsultation_CalEPAPDF.pdf

SB 18

SB 18 applies to local governments and requires local governments to contact, provide notice to, refer plans to, and consult with tribes prior to the adoption or amendment of a general plan or a specific plan, or the designation of open space. (Gov. Code §65352.3). Local governments should consult the Governor's Office of Planning and Research's "Tribal Consultation Guidelines," which can be found online at: https://www.opr.ca.gov/docs/09_14_05_Updated_Guidelines_922.pdf

Some of SB 18's provisions include:

1. Tribal Consultation: If a local government considers a proposal to adopt or amend a general plan or a specific plan, or to designate open space it is required to contact the appropriate tribes identified by the NAHC by requesting a "Tribal Consultation List." If a tribe, once contacted, requests consultation the local government must consult with the tribe on the plan proposal. **A tribe has 90 days from the date of receipt of notification to request consultation unless a shorter timeframe has been agreed to by the tribe.** (Gov. Code §65352.3 (a)(2)).
2. No Statutory Time Limit on SB 18 Tribal Consultation. There is no statutory time limit on SB 18 tribal consultation.
3. Confidentiality: Consistent with the guidelines developed and adopted by the Office of Planning and Research pursuant to Gov. Code §65040.2, the city or county shall protect the confidentiality of the information concerning the specific identity, location, character, and use of places, features and objects described in Public Resources Code §5097.9 and §5097.993 that are within the city's or county's jurisdiction. (Gov. Code §65352.3 (b)).
4. Conclusion of SB 18 Tribal Consultation: Consultation should be concluded at the point in which:
    a. The parties to the consultation come to a mutual agreement concerning the appropriate measures for preservation or mitigation; or
    b. Either the local government or the tribe, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached concerning the appropriate measures of preservation or mitigation. (Tribal Consultation Guidelines, Governor's Office of Planning and Research (2005) at p. 18).

Agencies should be aware that neither AB 52 nor SB 18 precludes agencies from initiating tribal consultation with tribes that are traditionally and culturally affiliated with their jurisdictions before the timeframes provided in AB 52 and SB 18. For that reason, we urge you to continue to request Native American Tribal Contact Lists and "Sacred Lands File" searches from the NAHC. The request forms can be found online at: http://nahc.ca.gov/resources/forms/

NAHC Recommendations for Cultural Resources Assessments

To adequately assess the existence and significance of tribal cultural resources and plan for avoidance, preservation in place, or barring both, mitigation of project-related impacts to tribal cultural resources, the NAHC recommends the following actions:

1. Contact the appropriate regional California Historical Research Information System (CHRIS) Center (http://ohp.parks.ca.gov/?page_id=1068) for an archaeological records search. The records search will determine:
    a. If part or all of the APE has been previously surveyed for cultural resources.
    b. If any known cultural resources have already been recorded on or adjacent to the APE.
    c. If the probability is low, moderate, or high that cultural resources are located in the APE.
    d. If a survey is required to determine whether previously unrecorded cultural resources are present.

2. If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.
    a. The final report containing site forms, site significance, and mitigation measures should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum and not be made available for public disclosure.
    b. The final written report should be submitted within 3 months after work has been completed to the appropriate regional CHRIS center.

3. Contact the NAHC for:
    a. A Sacred Lands File search. Remember that tribes do not always record their sacred sites in the Sacred Lands File, nor are they required to do so. A Sacred Lands File search is not a substitute for consultation with tribes that are traditionally and culturally affiliated with the geographic area of the project's APE.
    b. A Native American Tribal Consultation List of appropriate tribes for consultation concerning the project site and to assist in planning for avoidance, preservation in place, or, failing both, mitigation measures.

4. Remember that the lack of surface evidence of archaeological resources (including tribal cultural resources) does not preclude their subsurface existence.
    a. Lead agencies should include in their mitigation and monitoring reporting program plan provisions for the identification and evaluation of inadvertently discovered archaeological resources per Cal. Code Regs., tit. 14, §15064.5(f) (CEQA Guidelines §15064.5(f)). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American with knowledge of cultural resources should monitor all ground-disturbing activities.
    b. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the disposition of recovered cultural items that are not burial associated in consultation with culturally affiliated Native Americans.
    c. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the treatment and disposition of inadvertently discovered Native American human remains. Health and Safety Code §7050.5, Public Resources Code §5097.98, and Cal. Code Regs., tit. 14, §15064.5, subdivisions (d) and (e) (CEQA Guidelines §15064.5, subds. (d) and (e)) address the processes to be followed in the event of an inadvertent discovery of any Native American human remains and associated grave goods in a location other than a dedicated cemetery.

If you have any questions or need additional information, please contact me at my email address: Katy.Sanchez@nahc.ca.gov.

Sincerely,

for Nancy Gonzalez

Katy Sanchez
Associate Enviromental Planner

cc: State Clearinghouse

WATER RECLAMATION
SOLID WASTE MANAGEMENT

COUNTY SANITATION DISTRICTS
OF LOS ANGELES COUNTY

1955 Workman Mill Road, Whittier, CA 90601-1400
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Telephone: (562) 699-7411, FAX: (562) 699-5422
www.lacsd.org

GRACE ROBINSON HYDE
Chief Engineer and General Manager

December 27, 2018

Ref. Doc. No.: 4815796

Mr. Octovio Silva, Senior Planner
Planning Division
City of Rancho Palos Verdes
30940 Hawthorne Boulevard
Rancho Palos Verdes, CA 90275

Dear Mr. Silva:

NOP Response to the Proposed Code Amendments to Exception "P" of Title 15.20.040 (Landslide Moratorium Ordinance) of the Rancho Palos Verdes Municipal Code pertaining to Zone 2

The Sanitation Districts of Los Angeles County (Districts) received a Notice of Preparation of a Draft Environmental Impact Report for the subject project on November 9, 2018. The proposed project is located within the jurisdictional boundaries of District No. 5.

- The notice states the potential granting of up to 31 Landslide Moratorium Exceptions which would permit individual property owners to then apply for individual entitlements to develop their lots. The Districts should review individual developments within the City to determine whether or not sufficient trunk sewer capacity exists to serve each project and if Districts' facilities will be affected by the project.

If you have any questions, please contact the undersigned at (562) 908-4288, extension 2717.

Very truly yours,

Adriana R

Adriana Raza
Customer Service Specialist
Facilities Planning Department

AR:ar

cc: A. Schmidt
A. Howard

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JAN 03 2019

COMMUNITY DEVELOPMENT
DEPARTMENT

DOC 4868222.D05

COUNTY OF LOS ANGELES
FIRE DEPARTMENT

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LOS ANGELES, CALIFORNIA 90063-3294
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COMMUNITY DEVELOPMENT
DEPARTMENT

December 12, 2018

Octavio Silva, Senior Planner
City of Rancho Palos Verdes
Planning Division
30940 Hawthorne Boulevard
Rancho Palos Verdes, CA 90275

Dear Mr. Silva:

NOTICE OF PREPARATION OF AN ENVIRONMENTAL IMPACT REPORT, "ZONE 2 LANDSLIDE MORATORIUM ORDINANCE," CONSISTS OF 11 INDIVIDUAL LOTS, OF WHICH 69 LOTS HAVE BEEN DEVELOPED WITH RESIDENTIAL STRUCTURES, 11 LOTS HAVE OBTAINED PLANNING ENTITLEMENTS FOR DEVELOPMENT AND 31 LOTS REMAIN UNDEVELOPED, RANCHO PALOS VERDES, FFER 201800127

The Notice of Preparation of an Environmental Impact Report has been reviewed by the Planning Division, Land Development Unit, Forestry Division, and Health Hazardous Materials Division of the County of Los Angeles Fire Department.

The following are their comments:

PLANNING DIVISION:

We will reserve our comments for the Draft EIR.

LAND DEVELOPMENT UNIT:

1. The development of all future projects shall comply with all applicable code and ordinance requirements for construction, access, water mains, fire flows, and fire hydrants.

2. The statutory responsibilities of the County of Los Angeles Fire Department's Land Development Unit are the review of, and comment on, all projects within the unincorporated areas of the County of Los Angeles. Our emphasis is on the availability of sufficient water supplies for firefighting operations and local/regional access issues. However, we review all projects for issues that may have a significant impact on the County of Los Angeles Fire Department. We are responsible for the review of all projects within contract cities (cities that contract with the County of Los Angeles Fire Department for fire protection services). We are responsible for all County facilities located within non-contract cities. The County of Los Angeles Fire Department's Land Development Unit may also comment on conditions that may be imposed on a project by the Fire Prevention Division which may create a potentially significant impact to the environment.

3. This project does not propose construction of structures or any other improvements at this time. Therefore, until actual construction is proposed the project will not have a significant impact to the Fire Department's Land Development Unit.

Should any questions arise regarding subdivision, water systems, or access, please contact the County of Los Angeles Fire Department's Land Development Unit, Inspector Nancy Rodeheffer at (323) 890-4243.

The County of Los Angeles Fire Department's Land Development Unit appreciates the opportunity to comment on this project.

FORESTRY DIVISION – OTHER ENVIRONMENTAL CONCERNS:

The statutory responsibilities of the County of Los Angeles Fire Department's Forestry Division include erosion control, watershed management, rare and endangered species, vegetation, fuel modification for Very High Fire Hazard Severity Zones, archeological and cultural resources, and the County Oak Tree Ordinance. Potential impacts in these areas should be addressed.

Under the Los Angeles County Oak tree Ordinance, a permit is required to cut, destroy, remove, relocate, inflict damage or encroach into the protected zone of any tree of the Oak genus which is 25 inches or more in circumference (eight inches in diameter), as measured 4 1/2 feet above mean natural grade.

If Oak trees are known to exist in the proposed project area further field studies should be conducted to determine the presence of this species on the project site.

The County of Los Angeles Fire Department's Forestry Division has no further comments regarding this project.

HEALTH HAZARDOUS MATERIALS DIVISION:

The Health Hazardous Materials Division of the Los Angeles County Fire Department has no comments or requirements for the project at this time.

If you have any additional questions, please contact this office at (323) 890-4330.

Very truly yours,

MICHAEL Y. TAKESHITA, ACTING CHIEF, FORESTRY DIVISION
PREVENTION SERVICES BUREAU

MYT:ac

Octavio Silva,
Senior Planner
City of Rancho Palos Verdes, Planning Division
30940 Hawthorne Boulevard
Rancho Palos Verdes, CA 90275
Email: Octavios@rpvca.gov

Dear Mr. Silva,

The following are comments on the re-submitted EIR to amend the City's existing Landslide Moratorium Ordinance by expanding Exception Category P.

First, many of the responses to public comments in this EIR by the City's consultant are inadequate. They really do not fully address the concerns and requests for disclosure expressed in those comments. I will not respond comment by comment but rather will cover just a few below that stand out.

1) The EIR has stated it is a Program EIR. The program EIR is a device originally developed by federal agencies under NEPA (*County of Inyo v. Yorty)* and was designed to enable the lead agency to examine the *overall* effects of the proposed course of action and to take steps to avoid unnecessary adverse environmental effects.

   CEQA Section 15168 requires that the Program EIR analysis ensure consideration of cumulative impacts, including regional or secondary impacts that might be slighted and not properly analyzed/mitigated by using a case-by-case analysis.

   This EIR has reduced significant impacts to less than significant by deferring mitigations through city code requirements on a lot by lot basis when lot owners independently apply for permits rather than addressing and mitigating the cumulative impacts of the project as a whole.

2) Mitigation of project impacts is addressed by adopting development code criteria that is to be "identical to the criteria that were adopted for the *Monks* plaintiffs' lots." The Monks lots did not go through a full EIR analysis and was shortened to an MND due to pressure from the Appellate Court to not create any delays or obstacles to those lots being developed. This "borrowed" mitigation standard of the Monks lots falls short of a full EIR accumulative impact analysis needed for proper mitigation of this project.

3) By using the identical development criteria of the Monks lots, it is not clear whether or not the city will be using the Monk's geologic safety standard that

lot development "shall not aggravate the existing condition". First, the EIR acknowledges a FOS of 1.5 is an industry geologic standard and if the Monks standard is used the city will be in conflict with this normal standard used by all other municipalities. Second, the Monks standard of this project is not used in the same zoning elsewhere in the city creating internal inconsistencies in zoning practice. Third, even if the city were to use a 1.5 FOS, the analysis, conclusions and mitigation of applying an FOS of 1.5 is proposed to be lot by lot, permit by permit, is very different than determining a gross project area stability of 1.5. As one prior RPV Councilman put it, it would have made no difference whether or not deck chairs were properly bolted down on the Titanic.

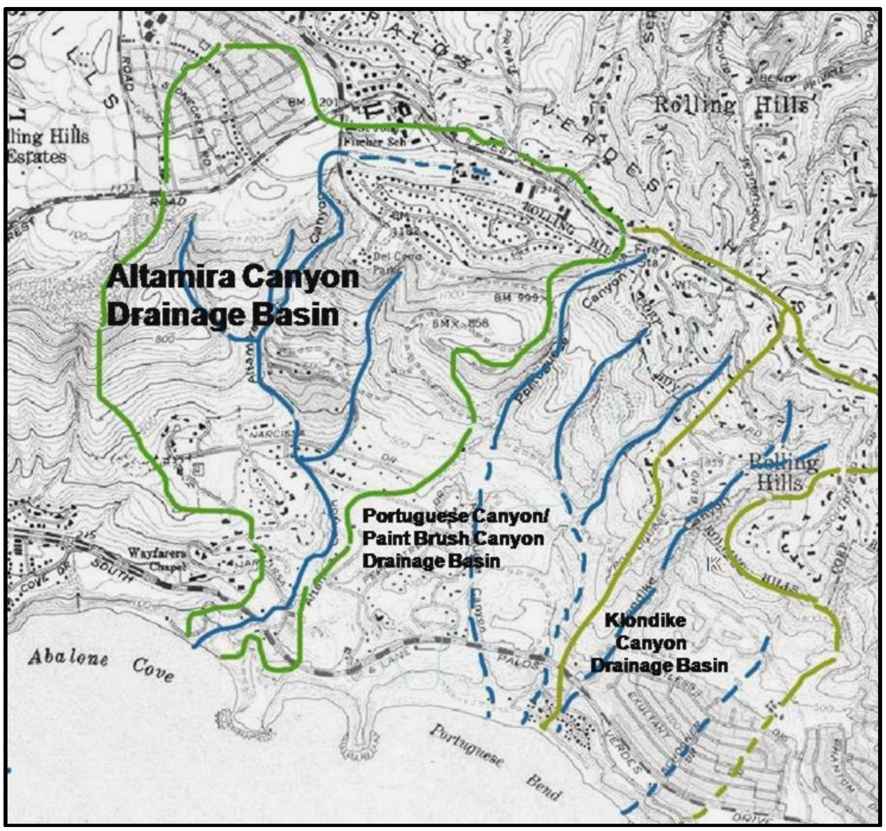
4) The EIR is using this distinction of Zone 2 as its scope based upon the city dividing the larger PBLC into Moratorium zones. Yet the EIR acknowledges that the geology of Zone 2 and Zone 5 are connected within the larger Portuguese Bend Landslide Complex (PBLC) and that that the downhill Zone 5 is supporting the uphill project area of Zone 2. Geologist Bob Douglas confirms that "One of the problems in tracing the landslide from one location to another across the area is that there are very few distinctive beds that can be used to correlate from one borehole to another."

The proposed project amendment to the Landslide Moratorium Ordinance applies to only one section of the PBLC. The separation of Zone 2 and Zone 5 is a man-made delineation and is based upon one activation of one area of the larger PBLC. Dewatering wells in the project area of Zone 2 have help stabilize areas for the moment in both Zone 2 and Zone 5 as evidenced by the GPS monitoring. But any geologist will tell you that this is an ongoing story and that the Abalone Cove Landslide could migrate uphill into the project area. The two areas are geologically and hydrologically connected.
By the EIR applying a development code to one area of the larger PBLC and not another is ignoring this fact and cannot be justified by merely setting the scope of the project area as Zone 2 alone.

5) The EIR states "Flood / Hydrology impacts would be considered significant if the proposed project would create or contribute runoff water which would exceed the capacity of existing or planned storm drain storm water drainage systems." Then concludes that this impact would be less than significant because "The existing drainage system for the Portuguese Bend development was designed for the entire development, including the 47 undeveloped lots. " One Appendix does have some drawings of engineered storm drains on several 1960-1970 developments above the project area but there is no

evidence of any documentation to support the claim that the current storm drain system (streets, culverts and Altamira Canyon) within the project area was designed for full build-out of all lots. If anything, historic observations of the storm water flooding and property damage clearly show that it was not designed for this many homes and hardscape.

6) Beyond the lack of documentation supporting the storm drain engineering design of the project area, the Altamira Canyon watershed has significantly expanded since the project area was originally subdivided. This map was taken from Bob Douglas' book "Creepy Landslides of Portuguese Bend".



Notice that it includes hardscape runoff of developments in Island View and Del Cerro which were built after the Portuguese Bend storm drain system was in place. The orographic effect of these higher elevation drainage basins receives on average about 40 percent more rain than the lower elevations in Portuguese Bend (Hill, 2000). This higher rainfall occurs over the most urbanized area with extensive "hard-surfaces" (pavement, houses, roofs,

sidewalks, etc.) that prevent infiltration into the ground and it generates higher storm run-off into the lower Altamira Canyon areas.
The EIR has not addressed that these upslope developments contribute a significant amount of additional storm water runoff *after* the project's storm drain system was designed.

Thank you and I hope these, as well as other comments, are adequately addressed before Council is asked to deliberate the FEIR.

Jim Knight

Bob Nelson
6612 Channelview Court
Rancho Palos Verdes, CA 90275

Zone 2 EIR Comments

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COMMUNITY DEVELOPMENT
DEPARTMENT

Octavio Silva
Senior Planner
City of Rancho Palos Verdes
Planning Division
Rancho Palos Verdes, CA 90275

December 11, 2018

Response to Your Notice of Preparation (NOP) for an EIR to Complete the Revisions to Zone 2 of the Landslide Area's Ordinance (Case No. PLCA2018-0004)
(Responses due NLT 12/12/18)

Octavio,

For your information I first became interested in land use issues surrounding Zone 2's Environmental Impact Report (EIR), its potential revisions and subsequent City Council action to incorporate (or not) these into our Landslide Moratorium's Ordinance, when Jack Downhill, then residing at 20 Vanderlip Drive, in Zone 2, appraised me of his long history of requesting ability to subdivide his 6.9 acre lot. 50 years ago Jack bought this lot for investment and 40 years ago his city instigated a moratorium affecting his lot, basically preventing his and his neighbors' investment goals and any full use of their property.

So, now that Jack has passed away, I feel I have a duty to bring forward his objectives for inclusion in our EIR revisions.

1. Prior EIRs omitted Vanderlip Drive lots, which are the northeast corner of Zone 2.

2. **This revision, as a matter of equity, should include the Vanderlip Road lots. Having the Ordinance continue to deny the owners of these lots equitable use, at a time when 31 lots are being considered for development, is contra any doctrine of fairness.**

3. **These lots do not belong to the Portuguese Bend Community Association.** Being outside of it, they are not bound by any of this Association's policies, rules or dicta. Their access, Vanderlip Drive, is shown to be under Palos Verdes Land Conservatory management, zoned Open Space Preserve and therefore maintained by the city, not the Community Association. **That is, these are independent lots, subject to RPV codes.**

4. **Zoned R-1, these large lots should have the ability to subdivide (lot split). That was Jack's decades long objective, lot split ability for his lot #20.** It makes little sense to have his R-1 6.9 acre lot deemed 'built out' with two small, historic structures and a garage. **One structure was the Vanderlip's bird keeper's home!**

5. The current EIR NOP clearly states 'No lot splits' however, the 31 lots are of normal size and it makes little sense to split them (though the enacted state law re 'auxiliary dwelling units' would apply). **But to refuse a landowner lot split ability for his 6.9 acre lot, zoned R-1 (one unit per acre), now might be seen, given the development objective of this EIR, as basically a denial of use / enjoyment of his property.**

6. **Nowhere can I find sensible rationale for not allowing a large lot like 20 Vanderlip to be split. Actually the owners, I understand, have simply been told 'no lot split.'**

Thank you for this opportunity. **I look forward to this EIR recognizing and providing equity, after decades of waiting, to 20 Vanderlip Drive and its neighbors.**

Bob Nel

Bob Nelson

Jeremy R. Davies
36 Cinnamon Lane
Rancho Palos Verdes
California 90275
Email: jdavies@kuboaa.com *November 15, 2012*

Mr Eduardo Schonborn
Planning Division, Community Development Department,
City of Rancho Palos Verdes,
30940 Hawthorne Blvd,
Rancho Palos Verdes, CA 90275

Dear Mr Schonborn,

DEIR FOR ZONE 2 LANDSLIDE PROPOSED MORATORIUM ORDINANCE
REVISIONS

This letter includes the concerns I expressed at the City Public hearing on November 7, 2012 and additional observations, comments and suggested mitigation measures.

I am taking the liberty of sending this letter to the Mayor and Council Members particularly since they may not have been involved in the earlier pre Monks settlement hearings. We would like them to fully appreciate and understand the extent and depth of our Community's concerns regarding having adequate scope for the EIR and appropriate mitigation measures in place before considering expanding development in Zone 2.

We have resided at the above address for over 20 years. Upper Cinnamon Lane currently has four residences, is a short Cul de Sac and will have 30% or 14 of the proposed new 47 residences constructed immediately adjacent to these existing four homes.

I respectfully submit the following observations, comments and suggested additional mitigation measures regarding the DEIR:

SCOPE OF PROJECT

1) 4.8a states "Since the existing drainage system was designed for the entire Portuguese Bend development, including the 47 undeveloped lots, each lot is assumed to have a proportional share of the existing drainage capacity provided for the Portuguese Bend development. In other words, regardless of when the lots are constructed, each lot is allowed to drain into the existing drainage system based upon the size of the lot." The original plan for Portuguese Bend goes back to 1949. The DEIR does not spell out where the assumption comes from nor the assumptions used regarding size of homes and garages, number of vehicles per home, hardscape and landscape areas, cumulative storm water run off, standards used for engineering the roads, etc. Please explain and justify the bases for the DEIR's conclusion that the drainage system is adequate for this proposed development 60 years later.

2) Geology section GEO-2 states in the mitigation section " Illustrate that point flow on each of the properties is either normalized, attenuated adequately, or will reach an acceptable conveyance such as a storm drain, channel, or natural drainage course. All runoff shall be directed to an acceptable conveyance and shall not be allowed to drain to localized sumps or catchment areas with no outlet."

A further mitigation measure contained in the DEIR is to "Minimize changes to the character of the runoff at property lines. Changes in character include concentration of flow outletting onto adjacent properties or increasing the frequency or duration of runoff outletting onto adjacent properties."

In the 20 plus years we have lived on Upper Cinnamon Lane we have not experienced any flooding as the result of run off from the lots *above our home. This has been the result of trees, bushes, foliage, grasses and plants on the lots and the protection of yucca plants along the roadside. . With development pending, the slopes (5:1-3:1) are now largely denuded, though the yuccas are for the most part intact at this time of writing. The camber of the road is not appropriate to receive run off from hardscape and landscape and may not even be adequate to receive holding tanks releasing water in a controlled manner without the threat of flooding. The camber of the street will not direct run off to the culvert at the end of Upper Cinnamon which flows into Altamira Canyon nor be carried down Upper Cinnamon to Narcissa and the road system which is the storm drain system for the project.*

Given the state of permit issuances there is an URGENT NEED for a separate hydrology study to be made specifically for the proposed development on Upper Cinnamon Lane. This study should contain the cumulative (not single lot) impact of run off from hardscape and landscape assuming all new residences have been constructed and using sensitivity analyses assuming different levels of storms.

Adequately dimensioned channels are needed at the bottom of the lots on Upper Cinnamon to carry storm run off from hardscape and the landscape either to the culvert at the end of the cul de sac, which flows into Altimira Canyon, or to Narcissa Drive. The culvert needs to be assessed as to its capability to bear these new flows without further mitigation measures.

Until construction is completed the yucca plants which provide some protection against flooding should be kept in place. They should not be removed to install underground SCE power.

3) Appendix D states "It should be plainly understood that because of the inherent potential for instability within adjacent landslides and the fact that Zone 2 is atop a landslide, that should additional significant movement occur in adjacent areas, it is our opinion the loss of support *currently provided from the Abalone Cove and Portuguese Bend Landslides could result in significant structural damage within Zone 2". And I would add within Zones 5 & 6.*

The roads for accessing and exiting Zone 2 are located in Zones 5 and 6, namely in the adjacent Abalone landslide area or the Portuguese landslide area. These roads were built some 60 years ago and were not designed for heavy construction equipment and materials. In the case of Narcissa Drive there is at least one location where heavy equipment can barely leave room for vehicles traveling in the opposite direction to pass. Because of this safety issue the largest and widest traffic will use Peppertree Drive. This street is in an even more active landslide zone. Furthermore, the vibration of this equipment passes homes that are in a particularly sensitive soils and landslide area and where gas lines and water lines have been placed above ground due to the constant landslide movement.

The traffic and circulation section of the DEIR assumes conservatively that all 47 lots are under construction concurrently. This would generate approximately 852 vehicle trips per day for construction worker vehicles and trucks. Furthermore, the City in its 5 year plan, states that "property values tend to suffer from poorly maintained streets. The city completes a full detailed assessment of all streets every 3 years which helps identify any serious issues", including safety. This City policy provides additional justification why a detailed assessment of the impact of concurrent construction on the two access streets is needed.

It is not adequate to merely state that the infrastructure is the responsibility of the Community. The Community has already experienced a historic wall being destroyed by a large cement carrying truck, entrance key pads have been severely damaged and a private property owner's wall has been damaged by construction trucks involved in a Monk's litigant development. In a worst case scenario Wayfarers Chapel is at risk of serious damage if there is road failure. By allowing further development the City will be IMPOSING on *the Community potential road access/exit failures with consequent impacts on human safety, fire safety, etc*

Please explain and justify why the DEIR does not contain a detailed analysis of load bearing pressures on these two delicate road systems, potential impacts on slope stability, impacts on the homes adjacent to these streets and identify any mitigation measures that are needed. Such a study should assume that all 47 lots will be under construction concurrently (this is the assumption contained in "impact T-4 of the EIR).

4) Many studies and documents in the City's records going back to the 1970s, state that no additional development should take place until Altamira Canyon is appropriately made impervious. This is in order to prevent ground water recharge by storm water run offs and includes grading and sealing ground fissures and depressions in the area, correcting street and culvert drainage, and placing fill along the beach. These mitigation measures are not addressed in the DEIR. Altamira Canyon has been identified as a need in the City's Capital Improvement Plans for many years. Councilmember Brian Campbell called Altamira Canyon a "mini San Ramon Canyon" problem at the public hearing on November 7, 2012.

The DEIR must acknowledge that Altamira Canyon is already a deficient storm drain system. Numerous City sponsored reports conclude that the drainage system is already inadequate and is causing property damage. The project will result in additional storm water run off entering Altamira Canyon. Please explain and justify why Altamira Canyon is excluded from the DEIR regarding mitigation measures.

5) ACLAD is stated as a responsible Agency. Have they been consulted by the DEIR consultants and, if so, has ACLAD agreed with the conclusions regarding Altamira Canyon in the DEIR and associated mitigation measures? Have they agreed with the conclusions *regarding the efficacy of the dewatering wells in" stopping" the Abalone landslide, particularly as it applies to the conditions of the Narcissa Drive access road and impact of heavy construction equipment? Are they satisfied that there are adequate dewatering wells to handle the additional storm water run off impact from the project development? Are they in agreement with all of the mitigation measures regarding hydrology and geology? If not please explain whether the City is to modify the mitigation measures to take into account ACLAD's recommendations and if not justify why not.*

6) 3.3 states that CEQA requires an EIR to consider potential cumulative impacts of all currently planned or pending projects. Please explain and justify why the impacts of the following potential projects (already known to the City) are excluded from the DEIR: Plumtree, Mr York, Vanderlip, Mr Downhill. Lot subdivisions should be included in considering the cumulative impacts or the City should state specifically that no subdivisions can take place now or in the future.

7) The DEIR assumes that there will be no subdivison of the 111 lots, nor has it considered that existing homeowners may wish to expand their homes from an average of under 2,500sq ft to 4,000 sq ft plus garages as allowed for the project lots. Please justify and explain why.

8) The Public submitted many comments at the Initial Study stage regarding inadequacy of scope but the City has not responded to each question and comment. Is the Initial Study phase an integral part of the CEQA DEIR? If so why haven't responses been sent to those who wrote to the City as required by CEQA? If it is not considered part of the CEQA process, please explain and justify.

9) Given the public's concerns about scope limitations during the Initial Study phase, please have the DEIR consultants respond directly to the public the following:

Did the City instruct the consultants regarding scope of the DEIR?

If so were there any restrictions imposed on the Consultants?
If not why have the consultants not incorporated into the DEIR the scope concerns of the public at the Initial Study phase in the DEIR?

10) The DEIR uses four separate assumptions regarding build out of the 47 lots. The Traffic and Circulation section assumes concurrent build out; the Air Quality section assumes all lots will be built out by 2015, a 2/3 year period; the Executive Summary in its Future Development Potential assumes a ten year build out; and the Notice of Completion and Environmental Document Transmittal assumes a period of at least ten years. The most conservative assumption should be adopted for all sections of the DEIR. This assumes a concurrent build out and all mitigation measures should be designed on this basis. Please explain and justify why different build out assumptions are used and why the conservative assumption of concurrent build out is not used consistently throughout the DEIR and in designing mitigation measures.

11) Zones 5 & 6 are contiguous with Zone 2. The EIR does not explain Zones 5 & 6 as unstable areas that could migrate upslope into the project area nor does it address the impacts of drainage into Zones 5 & 6. Please explain and justify why.

AESTHETICS

12) AES -3 requires that all new residences shall be subject to neighborhood compatability analysis. Some of the more recent project plans have been allowing a “Mediterranean style” home. This has already impacted negatively the neighborhood compatabiility which historically has comprised for the most part of single story ranch house style homes. Since the City refers in various parts of the DEIR to “ranch house style” we ask that the City hold to this standard in its issuance of any new permits.

AIR QUALITY

13) AQ-1 It is good to know that the construction workers will wear face masks to reduce inhalation of dust which may contain the fungus which causes San Joaquin Valley Fever. What measures are being taken to advise residents of this risk and what actions should they take?

14) AQ-1b Please reference that the Community has more restrictive times allowed for construction than the city's ordinance.

15) Even though there are restrictions for parking on the streets, in the case of Upper Cinnamon because of the narrow street and short street ending in a cul de sac and concentration of the project in this small area, we ask that development be restricted to one lot at a time otherwise there will be serious traffic issues, human safety and fire safety issues.

BIOLOGICAL RESOURCES

16) There is evidence of massive amounts of debris and silt being deposited into a State protected Marine Reserve established by the California Department of Fish and Game. Explain and justify why this is not addressed in the DEIR.

17) BIO 3 Establishing whether an individual lot is within the drainage channel
"within" Altamira Canyon is not adequate. Many of the lots in the project may not be directly "within" the drainage channel of Alatamira Canyon but ultimately by using the street system enter this Canyon . The cumulative effect from the project on the Canyon needs to be quantified.

GEOLOGY AND SOILS

18) Zone 5 is contiguous to this project and is the location of the recent Abalone Cove Landslide. The DEIR has not disclosed this fact nor what impact the cumulative storm water runoff from the project will have on the stability of Zone 5.

19) The DEIR is not disclosing a significant impact if the geological review standard is changed from the current 1.5 factor of safety to the project proposal of “shall not aggravate the existing condition”. GEO-3 states that “ no proposed building activity may cause lessening of stability in the Zone”.

The DEIR must address how this new nebulous, non-quantifiable standard of this project description may have a cumulative impact. In addition, this subjective standard could be used for surrounding areas that are not part of this project leading to further development, which under the old standard may not be allowed. Please explain and justify why an industry acceptable standard for slope stability for this project is not being used?

HYDROLOGY AND WATER QUALITY

20) The DEIR fails to address the impacts of storm water run off to the sensitive intertidal species in the State Abalone Ecological Reserve which is the direct recipient of this storm water run off. Please explain and justify why.

21) Photographic evidence that the street systems are inadequate to handle storm run off in a regular rain season were shown to the City Council on November 7, 2012. This film showed a significant portion of a property owners’s land being destroyed (adjacent to the lower part of Altamira Canyon). Comments on the floods of 1969 and TV coverage were explained. We suggest that the consultants and the Mayor and Council Members visit the Community at a time of heavy rains so as to appreciate first hand the concerns of the Community and before the EIR is finalized.

22) The map supposedly showing the drainage system is inaccurate based on attempts by residents to find such drainage courses. Existing culverts and pipes are seriously undersized and in some cases severed. Please explain and justify the DEIR's inaccurate mapping. The City and its consultants should visit the area during heavy rains and reconsider their conclusions as to the adequacy of the conclusion in 1) above.

23) Additional storm water run off into the landslide prone Zone 5 area as a result of this project poses a potentially significant impact directly to Zone 5 and indirectly to Zone 2. Please explain and justify why this is not addressed.

24) Mitigation HWQ-4 does not quantify the amount or rate of storm water run off that should be allowed from future construction from onsite detention facilities. Nor does it quantify standards for new hardscaping. The Monks lot owners are using pavers on driveways but the DEIR does not address what kind of pavers (pervious or non-pervious) and what grout line is adequate to prevent run off from going into the storm drain system (streets).

25) There are inconsistencies between the conclusions in the DEIR regarding the impact of storm water run off, volume and amounts that go into the soils and Altimira Canyon, which create further destabilization, and the conclusions at the City's own storm water run off workshop held in July of 2012. Please explain and justify these inconsistencies.

FIRE PROTECTION

26) The DEIR does not address whether or not the fire hydrants are large enough to address the impacts of the project and Community, assuming full build out. Please explain and justify why.

27) The open lots lining the northern section of Zone 2 (Upper Cinnamon Lane) allow the fire department to access the open space in the event of fire. The DEIR does not address how the development of these lots will impact the safety of the area by cutting off this access for emergency services. Please explain and justify why.

28) The Community is a high fire hazard area. Mitigation measures need to specifically ban any construction workers from smoking in the open while working in the Community.

TRAFFIC AND CIRCULATION (see DEIR SCOPE section)

29) There are restrictions for parking on the streets in the DEIR. However, in the case of Upper Cinnamon because of the concentration of the project in this small area, because of the narrow street and the short street ending in a cul de sac, we ask that development be restricted to one lot at a time otherwise there will be serious traffic issues, human safety and fire safety issues.

OTHER

30) Are the Monks plaintiff plans that have been approved or are in the approval process required to comply with ALL the mitigation measures that will be in the final EIR in accordance with CEQA? If not which measures specifically are excluded? If not, please explain and justify this segmentation of a project under CEQA.

FEIR DETAILED ADDITIONAL SUPPORT-JEREMY DAVIES LETTER TO MR EDUARDO SCHONBORN –APRIL 29, 2014

References are to the items in the separate letter for the same date.

1) Access Roadways and Pavement Integrity

My letter to you of November 15, 2012 item #3 refers to Appendix D of the DEIR which states *"It should be plainly understood that because of the inherent potential for instability within adjacent landslides and the fact that Zone 2 is atop a landslide, that should additional significant movement occur in adjacent areas, it is our opinion that the loss of support currently provided from the Abalone Cove and Portuguese Bend Landslides could result in significant structural damage within Zone 2*." I added "and Zones 5 and 6" (FEIR Pages 8-56-8-58).

Within the context of the access roads and pavement integrity, I raised questions regarding the access road infrastructure for Zone 2 potential development. These access roads transit Zones 5 and 6 and the impact of large and heavy construction vehicles for which the roads were not designed and the potential impact on human life and safety requires further study. I requested an explanation and justification why the DEIR does not contain a detailed analysis of load bearing pressures on these two delicate road systems, potential impacts on slope stability, impacts on homes adjacent to the two roads and identifying any mitigation measures that are needed.

The Response (Page 8-66) of the consultants' (and presumably of the City) in the FEIR is to refer me to Section 8.1c Topical Response: Traffic and Circulation "Access Roadways and Pavement Integrity" which uses unsubstantiated evidence (see letter attached).

There is no evidence provided by the City or consultants to support their assumptions regarding the integrity of the current road system to bear safely the construction traffic for the build out that would be imposed on the PBCA if additional building permits are issued.

In addition, the consultants confirm that *"the performance of all possible roads and slopes can not be assessed here"* (Page 8-8). But they have already assumed that *"the roadway system was originally engineered for full development and build out of the residential tract and as such the street(s) were designed to accommodate the envisioned loading, including construction vehicles associated with the construction of the envisioned build out as originally reviewed and approved by the County of Los Angeles"* for which they have no evidence. These are conflicting statements.

The consultants also state that *"Surficial slope stability may be a potential hazard to some of the proposed home sites within the project area"* (Page 4.5-12).

"The material near the toe of the landslide has a distinctly different and chaotic structure with very low strength" (Page 4.5-3) which reinforces the need for an in depth assessment of the access roadways leading to Zone 2.

Therefore I repeat my request that an in depth infrastructural study be carried out on the road system including drainage based on current standards and best City practices for safety. Such study must be specific to the present road and underlying soil and slide conditions of Zones 2,5 and 6 for the following additional reasons:

Many of the homes constructed in the early years of development (and before the reactivated landslides took place) were no more that 1,200 square feet and many had only one bedroom. This compares with the average size of new permits under the Monks settlement of 3,500-4,000 square feet plus 600 square feet for garages.

Construction truck sizes and loads were much smaller and building materials lighter when the original development was started in the late 1940s.

The study must contain loading factor conclusions not based on average soils and compaction standards but specific to the road, soil and slide conditions in Zones 2, 5 and 6.

It should be noted that dewatering wells in Zone 5 adjacent to Narcissi have sheared (WW2 several times since the 1980s with continued land movement) indicating the danger to that road as an access for heavy construction traffic. This should be factored into the study as should additional storm water run off volume from new construction that runs into land adjacent to the road access systems. *"The uncertainty with regards to landslide control has been abated"*(Page 4.5-4). This contradicts conclusions of ACLAD.

2) Hydrology

The Palos Verdes General Plan states *"prohibit activities that* --- *increase canyon wall erosion"* (section 4.8 Page 4.8-6) and*" stringently regulate…natural drainage …in new development uses affecting existing or potential slide areas"*(Page 4.8-7). The FEIR contains several conflicting statements (in addition to those contained in the accompanying letter) regarding storm run off and drainage and related information and ignores totally or in part the two areas above contained in the General Plan:

"Runoff to match existing conditions" (ES-14)
"Avoid changes to the character of the runoff at property lines including increasing the concentration of flow out letting onto adjacent properties (HWQ-4 Page ES-20)
"By maintaining post-development drainage conditions at the same level as existing conditions, no increase in runoff rates and volumes to Altamira Canyon would occur" (Page 8-5).

"A detailed hydrological analysis be prepared for each individual lot demonstrating that no net increase in runoff rates and volumes leaving the site occurs, no increase in total infiltration occurs, and no diversion of flows occurs" (Page 8-5).
" Any new development would maintain, and would not exacerbate, the existing runoff and infiltration conditions" (Page 4.8-11 HWQ-3).
"Avoid changes to the character of the runoff at property lines". "Changes in character include …changing the depth and frequency of flooding, concentration of flow out letting onto adjacent properties or streets"(Page 4.8-18)
"Post development peak discharges will not substantially increase peak flood flows or increase flooding"(Page 4.8-20)
"Roof runoff from all buildings and structures on the site shall be contained and directed to the streets or an approved drainage course" (Page 4.5-14). However the FEIR is relying on an "approved" drainage course for which there are no records-see item 1 above.

Many commenters on the DEIR who have lived in the community for many years based on facts and observations indicated that the drainage system is inadequate. The FEIR (Page 4.8-1) concludes that *"the existing drainage system was designed for the entire Portuguese Development, including the 47 undeveloped lots*". As explained in item 1) above the consultants and City are unable to provide evidence of such drainage design.

Ground water *"is also the only factor that can be reasonably manipulated to minimize the slide movement for all areas within the Ancient Portuguese Bend Landslide (APBL) complex." "Control of groundwater is the only effective remediation for landslide instability, and that large- scale failure is otherwise possible outside of the landslides. The commenter is correct"* (Response 5.1 Page 8-39). Another reason for Altamira Canyon to be resolved.

4) Traffic and Circulation-Emergency Evacuation

The FEIR states *"the LLG analysis recommends that the City consider posting these access roads with "no parking-Fire Lane signs"* (Page 4.10-26). It would appear that the consultants did not visit the project site since such signs are posted and have been for many years.

Jeremy Davies, 36 Cinnamon Lane, RPV

Remarks to RPV City Council on responses to the FEIR for the proposed Landslide Moratorium Ordinance Revisions – August 5, 2014 meeting

Mr. Mayor, Mayor Pro-Tem, Council Members and Staff

Thank you for the opportunity to emphasize two points regarding the FEIR.

1) Topical response Section 8.1a of the Hydrology and Drainage Section of the FEIR states that the drainage system was designed for the full build out of all 111 lots, which includes both the Monks lots and the remaining 31 lots. The FEIR also recognizes that the roads are an integral part of the drainage system. The assertion is made that this design was reviewed, approved and permitted by LA County.

Topical response Section 8.1c which includes the Access Roadways and Pavement Integrity Section of the FEIR recognizes that the roadway system was originally designed for the full build out of all 111 lots and was reviewed and approved by LA County. The roadway system passes through zones 5 and 6, both active landslide areas which, incidentally, had not been reactivated at the time of the supposed approved design for the full build out.

In addition, the FEIR asserts that the streets were designed to accommodate the envisioned loading, including construction vehicles associated with the construction of the envisioned build out as originally reviewed and approved by the County of Los Angeles.

On request the City was unable to provide any proof of the assertion regarding the design, review, approval and permitting by LA County for the full build out of the 111 lots.

CEQA section 15384 requires substantial evidence that relevant information is provided to support a conclusion. The conclusions contained in Sections 8.1a and 8.1c of the FEIR are of major importance to the integrity of the FEIR. The FEIR fails on this count.

In responding to the 35 public comment letters the FEIR extensively uses the unsubstantiated assertions contained in these two Sections. The Responses rely on Section 8.1a 110 times and on Section 8.1c 35 times to justify their conclusions and responses to the public comments. In addition, in the Responses to the oral comments made at the City Council Public Hearing of November 7, 2012 these unsubstantiated assertions are used a further 9 times.

Clearly the FEIR fails CEQA section 15384 in at least 154 responses to the public's concerns. I urge you not to approve an FEIR based so extensively on unsubstantiated assertions.

2) Secondly, it is instructive that not one of the 31 remaining lot owners who belong to the Portuguese Bend Homeowners Association submitted any critical analysis of the FEIR. This lack of involvement in the FEIR process leads one to assume that these lot owners are convinced that the City intends to rubber stamp approval of the FEIR allowing them to build, independent of whether the FEIR is adequate or not or whether the mitigation measures are adequate or not and whether major assertions are evidenced or not.

If the City approves this project based on an incomplete FEIR containing unsupported assertions, the public would be right in concluding that the City is more interested in favoring short term profit motives over constituents' safety or a potentially severe impact to the Community and the City.

Finally a personal comment. If I were asked to approve this non compliant CEQA EIR, my professional integrity and my conscience would not allow me to approve such a document.

Jeremy Davies OBE
36 Cinnamon Lane
Rancho Palos Verdes
California 90275
Email: jdavies@kuboaa.com *April 29, 2014*

Mr Eduardo Schonborn
Planning Division, Community Development Department,
City of Rancho Palos Verdes,
30940 Hawthorne Blvd,
Rancho Palos Verdes, CA 90275

Dear Mr Schonborn,

FEIR FOR ZONE 2 LANDSLIDE PROPOSED MORATORIUM ORDINANCE REVISIONS

I am taking the liberty of sending this letter to the Mayor and Council Members. We hope they can fully appreciate and understand the extent and depth of our Community's concerns before considering expanding development in Zone 2.

We have resided at the above address for over 22 years. Upper Cinnamon Lane is a short cul de sac and will have 30% or 14 of the proposed new 47 residences constructed immediately adjacent to the existing four homes.

I summarize below topics that have not been addressed adequately in the FEIR or where the FEIR is deficient or inaccurate and/or does not comply with CEQA. These topics warrant careful consideration by the City Council before making their final decision. Quotes from the DEIR or FEIR are in italics and emphasis has been indicated by bold type in the quotes.

Additional support to the concerns addressed in this letter are attached as a separate document.

1) Access Roadways and Pavement Integrity

The FEIR makes unsubstantiated assumptions that the roadways, pavement integrity and drainage systems (as they use the roadway system) were engineered as though they were

public roads. This leads the reader to false conclusions. CEQA Section 15384 –Substantial Evidence requires that enough relevant information is provided to support a conclusion.

Section 8 Comments and Responses Page 10 of the FEIR states *"It is important to note that the roadway system was originally engineered for full development and build out of the residential tract and as such the street(s) were designed to accommodate the envisioned loading, including construction vehicles associated with the construction of the envisioned build out as originally reviewed and approved by the County of Los Angeles*".

On investigation this turns out to be pure conjecture as the City has no record of studies, reports etc. (confirmed to me in writing on April 4, 2014 by the City). The City's response on April 4, 2014 to my question about the original permit for development is "I researched our archives regarding the original approvals/documentation from LA County, but could not locate any studies, reports, etc". The City goes on to state that "it is reasonable to conclude that the subdivision was approved with improvements and infrastructure designed to the standards in place at the time to handle build out of the tract". This unsubstantiated answer has been used to respond to many other commenters who also expressed concern about the road infrastructure.

For the City to presume "reasonableness" at that time when only a few years later the Portuguese Bend landslide was reactivated due to County incompetence would appear inappropriate. This landslide resulted in the loss of 134 homes and still impacts others in our Community.

Furthermore, the assumptions made in referring to a LA County review and approval predates the reactivation of the Portuguese Bend and the Abalone Cove landslides. So even if a study did exist it is irrelevant since the County could not have foreseen the future impacts of the landslides and the destabilization of the Zones 2,5 and 6.

Without a detailed in depth infrastructural study of the roadway system that provides access to Zone 2, the City will be placing its reliance on approving the project as it applies to access road and pavement conditions, the impact of storm runoff on the road system and related safety issues based on a document that makes an assumption which has no supporting evidence.
"*CEQA requires specific performance standards that must be met and ways to meet those standards* "(Page 8-86 of the Comments and Responses section).

The City has discretionary authority over the proposed project (Page 2-12). If this infrastructural study is not carried out and the City continues to depend on unsubstantiated assumptions and conjectures, as explained above, and there is an accident or major failure of the road system resulting in harm to human life, the City, Council members and the consultants could be at best considered irresponsible for not carrying out this study, and at worst, grossly negligent. The City and Council members should carefully consider their fiduciary responsibility in this regard.

2) Hydrology

a) The FEIR contains conflicting statements regarding storm water runoff impacts. The FEIR admits that Altamira Canyon is a problem that should be addressed but claims infeasibility before full project build out without full discussion as to why and what mitigation measures could be taken. CEQA Sections 15141 and 15384 -Substantial Evidence and Standards for an EIR require information to be contained in the FEIR and enough information to support the conclusions.

The FEIR contains several conflicting statements regarding the impacts of storm run off, for example:
"Runoff rates, runoff volumes and infiltration would remain **generally** *the same as under existing conditions with adherence to mitigation measures in HWQ-4". "Localized flood effects* **may** *occur on an individual lot basis".* "**Increases** *in runoff from an individual lot* **would** *range from approximately 9.8% to 15.1%"* (Page 4.8-15*). "The proposed ordinance revisions* **would not significantly increase** *lot runoff or contribute significantly to the drainage system after mitigation" (Page 8-127).* "**Regardless of the localized flooding that may occur** *under existing conditions,* **if** *no net change occurs due to the development of the 47 lots,…*"(Page 8-3). Several of the above statements are at variance with the assertion that there will be" **no increase** *in runoff rates and volumes to Altamira Canyon*"(Page 8-5).

By permitting development above Zone 2 e.g. Island View, Del Cerro and Valley View etc., the City has already added to the instability of the land in Zones 5,6 and 2 by creating conditions for additional infiltration from runoff from these developments into Altamira Canyon. The FEIR now denies the need for this situation to be fixed before further compounding the infiltration problem by approving further development. The need to resolve the Altamira Canyon issue before any additional development is well documented in City capital plans, the Horan settlement, public statements by Council members and a City workshop on landslides held in July 2012. All ignored or considered infeasible in the FEIR.

It should be noted that Page 8-79 acknowledges that mitigation at Altamira Canyon was discussed by the consultants with the City but no further explanation is given as to the nature of the discussions and conclusions and their rationale. *"While it may be desirable to resolve the site flooding and erosion in Altamira Canyon and other natural drainage courses, it is an existing condition affecting the larger area that* **would be addressed separately** *from these proposed ordinance revisions"* (Page 4.8-17). How is the City to address this issue raised in the FEIR but not explained?

The argument that it is infeasible from an economic perspective to line Altamira Canyon no longer is valid given the money being spent on remediation measures adopted in the case of San Ramon Canyon ($17.8 million as reported in the Daily Breeze April 2013). Furthermore, on February 18, 2014 alternative phased solutions to start to remedy the Altamira Canyon situation were proposed to the City Council which are not discussed in the FEIR.

City deliberations on this issue should consider recent slope failures and other major projects dealing with storm water conditions in the City and adjacent regions and their implications e.g. Paseo Del Mar in San Pedro, Trump Golf Course, the San Ramon project and Bluff Cove, PVE. In addition, national disasters involving slide failures such as Oso, Washington, Jackson, Wyoming and Laguna Niguel, draw additional attention to poor City development standards being adopted, sometimes under economic pressures, ultimate loss of life, property damage and liabilities resulting from these poor decisions. As ACLAD states *"The reactivation of the landslides in the Portuguese Bend area are all related to human activities that led to an increase in groundwater*" (ACLAD 2012).

The City and Council members personally have a fiduciary responsibility to deal with this matter before considering any additional development or alternatively to deny the project.

b) The FEIR uses LA County averages for its calculations for runoff from new construction rather than project specific conditions and makes assumptions on preconstruction conditions that do not reflect actual conditions. This conflicts with CEQA 15151 which requires a sufficient degree of analysis to support a conclusion.

"Post-construction lot infiltration and runoff rates and volume **shall be made equal** *to pre-construction conditions through use of appropriate low impact development principles…."* (GEO-3(a)-Page ES-14).

Pre-construction conditions are neither quantified nor spelled out in the FEIR. The calculations which the consultants have used are not reflective of local conditions in Zone 2 since they use County averages and soil conditions in a non-slide situation which are irrelevant to the project conditions (see HWQ-4 Page ES-19). The likelihood of new developments' storm water runoff creating damage to adjacent properties may constitute both a private and public nuisance.

In 22 years of living in Zone 2 we have not experienced flooding from the land above us in a pre-construction stage. The combination of trees, yucca plants, grasses and absorbent soil conditions (the nature of the landslide soil is capable of absorbing significant storm water before any runoff occurs) has protected us from flooding. By increasing the impervious surface area on the lots above us (steep slopes) by 38% it will not be possible to *"effect post-construction lot infiltration and runoff rates and volume equal to pre-construction condition"*. This comment is based on 22 years of experience of actual conditions and not on hypothetical calculations using County averages (as opposed to using actual conditions in Zone 2).

For example, runoff rates for 37 Cinnamon Lane in a 50 year storm rise to approximately 1400 gallons per minute. With a 1600 gallon holding tank capacity it is not logical that serious flooding conditions and potential damage to the properties below this site can be avoided (source are the planning documents held by the City). Therefore the conclusion that *"runoff from all buildings and runoff areas not infiltrated or retained on site to match existing conditions* **shall be collected** *and directed to the street or to an approved drainage course as approved by the City"* (Page ES-14) is highly suspect.

3) Hydrology - Hold Harmless Agreement

The mitigation does not clarify if the hold harmless letter applies to damages suffered by residents outside the project area. The City is potentially opening itself up to a future Horan type litigation.

The City is to require a Hold Harmless Agreement to defend, indemnify and hold the City harmless from any claims or damages resulting from the requested project prior to issuance of a building permit. This is a distinct inequality of treatment in the event that the individual home owner and the PB Homeowners Association is also potentially damaged by flooding and other consequences etc. resulting from this City authorized and imposed project, if approved. It is noted that the City is required to approve the plan that demonstrates that the individual's lot's drainage does not impact the surrounding properties (Page 8-159). The City should require indemnification for homeowners and the PBCA for damages to existing homeowners and the PBCA as part of their indemnification letter.

4) Traffic and Circulation-Emergency Evacuation

a) The FEIR is deficient in that it ignores the possibility of fire closing one of the two access and egress roads and the estimated evacuation times used in the FEIR are unrealistic. CEQA Section 15384 in determining "substantial evidence" requires providing enough relevant information to support a conclusion.

Section 4.10 page 4.10-26 concludes that the design of the roadway system is adequate for emergency evacuation purposes. This is predicated on both Peppertree and Narcissi being open and available in the event of a fire. What the FEIR does not consider is if a fire starts at the lower part of Narcissa thus causing that street to be impassable. The City needs to restudy this eventuality and factor it into the FEIR calculations. The FEIR also "*concludes that additional width is available among many portions of the roadways"* (Page 4.10-25). This conclusion overlooks the fact that any additional width for streets cannot be obtained without a seizure of homeowners' property or obtainment of an easement.

The estimated clearance times contained on page 8-14 are totally unrealistic. On April 21 it took me 3 minutes to reach the Narcissa gate from my home and 3 and ½ minutes to reach the Peppertree gate. I drove at the posted speed and stopped at all stop signs. There were no other vehicles on the streets at the time, no equestrian evacuation, no construction vehicle evacuation no other residence evacuation, no fire vehicles on the streets and it assumed that both streets were available for evacuation.

Furthermore the statement on Page 8-14 that *"it has been subsequently learned that the horse owners and horse boarders would likely shelter their horses in place and rely on sprinklers"* only applies to Portuguese Bend club members and not to a large number of other horse owners who are not within the club but are within and adjacent to the project .

b) The FEIR is deficient in that it does not address fire vehicle and team access to land above Upper Cinnamon Lane after the full build out. This appears to be a physical change resulting in a significant effect requiring mitigation under CEQA Section 15382. There is a lack of sufficient analysis under CEQA Section 15131.

Once full build out of the project is completed there is no access to land above Upper Cinnamon Lane, an area which has experienced previous brush fires.

5) Environmental Setting-Cumulative Projects Setting

Recent drillings have taken place in 2014 on two potential property developments which questions the FEIR conclusion that no projects are known that can be considered proposed.

The FEIR considers no projects are known that can be considered planned, apart from Downhill, for inclusion in the cumulative development setting (Page 8-51). The Response to several commenters regarding the impact of the cumulative development setting excludes any potential impact from the "Point View" or the "Beanfield" on the basis that these are speculative future projects. Yet there have been drillings taking place in early 2014 on both sites. It is unlikely that the owners would incur these costs if they did not plan to develop their properties. This raises the question of incompleteness of the FEIR and additional analysis of the impacts of these projects being required to be included in the FEIR.

6) CEQA requires all comments received during the circulation of the DEIR to be fully answered. This has not been done in all cases and in some cases answers have depended upon unsubstantiated evidence as described above.

In addition to the topics contained in items 1-5 above, the following questions raised in my letter of November 15, 2012 are either not answered or are incomplete in their content or are referred back to the City:

No response to question # 11 regarding drainage into Zones 5 and 6.
Response to question # 14 explaining that more restrictive construction times are contained in the PBCA architectural standards and as such should also be included in the mitigation measures is

merely “noted” (reference to other PBCA standards are referred to in the FEIR e.g. ranch house style homes).
The response to question #25 which refers to the City workshop is that no response can be given since no specifics have been provided. I assumed that the consultants had access to the workshop discussions, slides and conclusions and therefore already had specifics to which they could respond.
Response to my concern that a ban on constructors’ employees from smoking be included in mitigation measures (question #28) is referred back to the City for their consideration. As a high fire hazard area it should not be so difficult to include such a ban since also it is posted at the gates.
Question #30 which reads “Are all Monks plaintiff plans that have been approved or are in the approval process required to comply with all the mitigation measures that will be in the FEIR in accordance with CEQA? If not which measures specifically are excluded? The response does not address this question.

Sincerely,

Jeremy Davies OBE

Cc
Mayor Jerry.Duhovic@rpv.com
Mayor Pro Tem Jim.Knight@rpv.com
Councilwoman Susan.Brooks@rpv.com
Councilman Brian.Campbell@rpv.com
Councilman Anthony.Misetich@rpv.com

Subject: FW: Zone 2 EIR

From: Leanne Twidwell [mailto:leetwid@yahoo.com]
Sent: Wednesday, December 12, 2018 5:18 PM
To: Octavio Silva <OctavioS@rpvca.gov>
Subject: Zone 2 EIR

Dear Mr. Silva,

We are happy to see that the city has decided to re-visit the Zone 2 Environmental Impact Report.

There were many objections to the original report, and countless predictions of doom should any development be permitted in Zone 2 of Portuguese Bend. However, it is interesting to note that in the interim, at least 14 of the so-called Monks lots now have very large homes on them, and there have been no adverse effects resulting from any of this recent development.

This leads us to believe that the predictions of slipping, sliding and general chaos were wrong and that the remaining lots in Zone 2 could be developed safely using the same parameters that the city has applied to the Monks lots.

We have lived in Portuguese Bend for 42 years and in addition to our home at 32 Sweetbay Road, we also own a lot at 50 Narcissa, which has been the home of Ride to Fly, a developmental horseback riding program, for many years.

We thank you for your efforts on this project and look forward to a positive result this time around.

Sincerely,

George and Leanne Twidwell
310 541-1003

Lisa A. Lawson
Trustee, Jack E. Downhill Trust
Judith H. Foote
Successor Trustee, Jack E. Downhill Trust
20 Vanderlip Drive
Rancho Palos Verdes, CA 90275

Dec. 11, 2018

RECEIVED

DEC 1 1 2018

COMMUNITY DEVELOPMENT
DEPARTMENT

Octavio Silva, Senior Planner
City of Rancho Palos Verdes, Planning Division
30940 Hawthorne Blvd
Rancho Palos Verdes, CA 90274

This is submitted in response to the Nov. 8, 2018, City of Rancho Palos Verdes **(RPV)** Notice of Preparation **(NOP)** of an Environmental Impact Report **(EIR)** "to complete the EIR associated with proposed revisions to Zone 2 of the Landslide Moratorium Ordinance **(Case No. PLCA2018-0004)**." *(City Council* ***(CC)*** *Agenda 9/18/2018, pg.7)*

Summary:
Zone 2 EIR documents do not include all Zone 2 lots! Lots #8, #10 and #20 on Vanderlip Drive have been omitted from any development discussion. These are large, multi-acre lots. Lisa Lawson is Trustee of the Jack Downhill Trust, owner of lot #20, a 6.94-acre parcel zoned R-1. Her father, Lt. Col. Jack Downhill, purchased the lot in 1968, 50 years ago, for investment.

1. We request lot #20 be included in this Zone 2 EIR, since it is in Zone 2.
2. We request the ability for a lot split: lot #20 is 6.94 acres, zoned R-1. With that acreage and zoning, any further denial of long-requested lot 20 split we request be corrected in your EIR.
3. Geological evaluations in 1969, 1977 and 1993 support lot development.
4. Lot #20 already has utilities, including 6 Abalone Cove Landslide Abatement District **(ACLAD)** sewer hookups the Trust has been paying since the inception of sewers.
5. Lot #20 has fire hydrants at the northeast and southwest corners.
6. Both upper and lower portions have water meters in place.
7. Gas and electric are already in place for the upper portion and are within 10 feet of the lower portion.

Again, **Zone 2's Vanderlip Drive lot #20 needs to be included in your EIR and your EIR recognize the ability to split its 6.94 acres, zoned R-1.**

What follows is expansion and further detail of these two requests. Referenced documents quoted herein are available in RPV's Planning Division but are not included here because of their bulk. Our quotes are concise, to the point.

1. This Zone 2 EIR will provide 'build out' parameters for Zone 2 since, of the 111 individual lots, only 28% (31) remain subject to a 40-year old Moratorium dating from 1978. Owners need these so, at long last, they may use / enjoy their property, as all other Zone 2 owners have or can. After 40 years!

2. However, 3 lots are not included. Considerably larger than the 31, these have also waited 40 years to provide their owners full lot use, an ability to split their lots.

Now, as Trustee and Successor Trustee of the Jack Downhill Trust, owner of Zone 2's 6.9 acre lot at 20 Vanderlip, we again ask, at last, your EIR specifically include this lot and the ability to split it; a lot outside the Portuguese Bend Community Association. *(acreage ref: 2010 Assessor's Map)*
It adjoins two other large, multi-acre lots off Vanderlip Drive (#8 and #10). **All three lot owners have requested the ability to split their lots.**

4. Brief History:

RPV's 'Moratorium' has completed its 40th year. There are **at least 3-4 thousand pages apropos to Zone 2 and updating EIR efforts.** For example: **our Feb. 2014 final EIR is 491 pages alone!** Reviewing these is a daunting task!

5. 'In the beginning' - 40 years ago in 1978, RPV CC established a "Moratorium" on development in a landslide area largely known as Portuguese Bend. **15 years later, in 1993, this area was broken into numerical 'zones,' corresponding to a professional judgment on that zone's potential for or actual landslide. This EIR covers zone #2.**

6. In the past **RPV has required site-specific geologic studies.**

1969 the first of these happened on lot #20. Consultant Moore and Taber included borings on lot #20 providing evidence ***"the area is not being part of an active landslide** ... **no ground water** was encountered ... these slides have not moved for several hundred thousand years ... **factor of safety ... significantly and possibly substantially greater than one."*** Weber 10-17-12 letter, pg. 2)

In 1977, as a result of rebuilding the Vanderlip's 'Bird Keeper house' on lot #20 after the 1973 fire, Moore and Taber again provide site–specific geological study concluding ***"the proposed construction is feasible, it will be insignificant with respect to ... the gross stability of the area ...** no direct or adverse affect on adjacent property."* (ibid, pg. 3)

In 1993 Zone # 2 was professionally described as ***"Subdivided land unaffected by large historic landslides (about 130 acres)."*** *(Ehlig Memo: 5/26/93, pg. 1).* Further, Dr. Ehlig states, *"The 25 undeveloped lots ... and* ***an undetermined number of parcels served by Vanderlip Drive, could be developed without adversely affecting the stability of the large, ancient landslide.*** *In fact,* ***if development were combined with installation of additional wells stability, would be improved."*** *(ibid, pg. 3)*

Dr. Ehlig's **'Suggested Guidelines'** for Zone 2 start with, ***"Development of undeveloped lots shall be permitted in ... and the subdivided land served by Vanderlip Drive subject to the following stipulations:"*** (ibid, pg.3)`

7. Time marched on and over these 40 years RPV's CC Minutes reflect **two major Zone 2 Moratorium Ordinance Revision EIR attempts.** The first is found in a draft EIR dated September 2012. The second in a final EIR dated February 2014.

8. What happened? CC Minutes for their August 5, 2014, meeting show that on a motion by Councilman Misetich, seconded by Councilwoman Brooks, this final EIR was 'tabled,' some 36 years after the moratorium's 1978 initiation!

At that meeting numerous local Zone 2 residents continued speaking, as they had for those many years, against any ordinance revisions and **one (Stuart Miller) – threatened another lawsuit.** *(CC Minutes 8/5/14, pg. 3)* (For the record RPV had already undergone Monks 1, Monks 2 lawsuits which concluded with 16 Zone 2 lots having the courts finally provide their ability to be developed). And currently the 'Black' case, just concluded, again involved Zone 2 lot development *(2nd Appellate District, Div. 1.; No. B285135, certified for publication 9/6/18).*

9. Now, in 2018, 40 years after the instigation of RPV's Moratorium, **this 2014 'Final' EIR is being resurrected for 'review and update'** and CC action on a tight 7 month schedule. **Rincon, the consultant for this and both 2012 and 2014 EIRs, had their 'kick-off' meeting Oct. 15, 2018. Given Rincon's 7-month schedule, our CC should see the EIR in May 2019.**

10. Our request: Have the EIR include giving **20 Vanderlip Drive (6.9 acres)** the **ability to split the lot. In the past #8 (4.03 acres) and #10 Vanderlip (3.78 acres) have also requested the ability to apply for splitting their large Zone 2 lots.** *(acreage per Assessor's 2010 map)*

THIS IS NOT A NEW REQUEST.

11. 2009: All three homeowners requested lot split in their Feb. 2009 letters to CC re its 3/3/2009 Meeting re changing 15.20 of our Municipal Code to accommodate court required development of the previous undevelopable 16 Monks lots. *(Planning Case No. 2009-00007)* These letters state:

One, from Kathy Snell, (#8 Vanderlip Dr.) states that **"In approximately 1985, the then-Mayor Jackie Bacharach and the City Council took away the right of subdividing in the Moratorium area with the promise it would be reinstated in a few years after the slide was abated. Mayor Bacharach further stated that paying the "benefit assessment' to ACLAD would benefit the property owners by stopping the slide and allowing subdivision and building to take place."** She further cites a **1990's lot split for John Vanderlip, creating 98 Vanderlip Drive.** That Los Angeles County allowed #8, 10 and 20 Vanderlip splits and continued lot splits into the 1980's until CC placed restrictions on them.

Hastings (#10 Vanderlip Drive) in their 2/23/09 lot split request letter commented that in **2006 he 'approached the Director of Planning and asked about a lot split...'**

Jack Downhill's 2/18/2009 letter asks **the term 'undeveloped'** (later included 'underdeveloped' lots which better describes these 3 lots) ***recognize the lots, because of their size, should be able to be subdivided or lot split into individual lots consistent with the zoning of the immediate properties.*** He states his property is zoned RS-1, one unit per acre. **He has 6 sewer hookups, established gas lines and an electric pole on his property. That is, ACLAD foresaw splitting his lot and installed the necessary hookups – for which #20 Vanderlip now pays for all 6, though only 2 are in use.** A second letter (undated but referencing CC March 3, 2009 agenda) for this item, details his frustration at the Staff Report and past city actions regarding his property. And again, Jack **asked for equity, for equal treatment.**

12. 2011: January 2011 and a draft EIR. **At that time we'd been under the 1978 Moratorium 33 years!**

Jan. 2011: Jeremy Davies, in his 'Initial Study January 2011' letter concludes " ***(the draft EIR) ignores other known current developments and potential developments (... Downhill, Vanderlip ...).***

13. Jan. 18, 2011: Jack Downhill's letter notes he is paying taxes and fees on his 6.9 acre lot as though it would be subdivided in he future. He ***asks his property be included in the draft EIR with those listed as 'underdeveloped.'***

Jan. 19, 2011: Jim York's letter addressed concerns that include, ***"under the proposed ordinance, no existing lots in Zone 2 would be permitted to subdivide.*** We ***understand some existing, legal lots in Zone 2 exceed the minimum lot size that was established as far back as 1975 (Ordinance 75-78). Therefore, a provision should be made in the ordinance to allow a subdivision, subject to the underlying zoning and development standards."***

14. July 20, 2012: Landslide Moratorium Exclusion Application (LME)
Jack Downhill submitted Landslide Moratorium Exclusion Application (ZON2012-00232), deemed incomplete by RPV in a letter dated August 10, 2012, wanting numerous additional details /information then provided in an Oct. 17, 2012 letter.

October 17, 2012: *Jack and Weber Consulting responded to RPV; supporting Jack's Landslide Moratorium Exclusion application for lot #20 with a 30 page letter including* responses directly addressing RPV's requests in their August letter; lot 20's legal description; draft grading approval application; fee payment proof; division of land application and 17 pages of an Environmental Information Form. ***The city stated LME must contain geologic and geotechnical studies that " must be site and project specific." Jack's letter and item #6 above (pg. 2) presents Lot #20's results of three acknowledged geologic studies, all concluding positively for lot #20 development, including one stating such development would improve stability!***

15. 2012: The **EIR** had **a second comment period,** ending Nov. 20, 2012.

Nov. 6, 2012: Jack Downhill wrote "Letter 11" (ref . the assigned comment number) in which **he found the number of lots cited as subdivision lots to be "grossly misleading."** In the case of **Vanderlip Drive the EIR suggests 14 lots** whereas "applying current zoning ... **the number of additions that would merit consideration ... are 7" (not 14). He detailed: 98 Vanderlip = 1 additional; Downhill = 3; Hastings = 1 and Snell = 2 for the 7 additional meriting consideratio**n. **He included his Parcel Map dated July 2012,** showing a potential 4-lot subdivision for 20 Vanderlip.

16. Nov. 8, 2012: RPV's consultant (KCG Kling Consulting Group) letter re Jack's 7/20/2012 LME Application (#14 above)

Jack would now be required to submit:

"... ***geologic and geotechnical reports that are project and site specific*** **... reference and use any geologic and geotechnical reports available for the area (i.e., Zone 2) and specific site, signed by a licensed engineering geologist (CEG) and engineer (PE/GE) and** ***demonstrate that the site may be excluded (removed) from the landslide moratorium area.*** **This** ***requires the site be demonstrated to be not part of the landslide*** **or that the hazard will be eliminated.** ... (lot split project) **falls under the auspices of** ***the Seismic Hazards Mapping Act and SP 117A.*** "

Given 3 completed previous geologic studies cited above (item #6) how could these be considered, by any means, "onerous" as Jack labeled them?

Oct. 18, 2013: Jack Downhill wrote Attachment 1-146 (to the Zone 2 Draft EIR). His frustration with the EIR's statement of work ignoring lot splits comes through. **"It is my contention that all properties in Zone 2 must be treated fairly and equally, considering historic as well as current zoning and density factors; undeveloped as well as underdeveloped."** He **cites the three Vanderlip Drive properties, designated R-1,** each of several acres currently improved with a single unit. "Another factor relating to my property is ***the adjoining lot to the west, a Monks lot, created in Nov. 1989 by a 'lot split'*** *which was* ***allowed under the Moratorium language which still remains unchanged."*** He refers to his Parcel Map showing the 4 lots all subject to the same qualifications as the Monks lots and other undeveloped lots. ... sewer laterals to service these are already in place. He cites ***lots on the "very edge of earth movement ... are OK to develop whereas the properties on Vanderlip Drive, the most distant from any slide activity, are essentially removed from Zone 2."*** He concludes, "These factors need, absolutely, to be included in any final determination."

April 4, 2014: Jack Downhill wrote Attachment 1-118 highlighting that **Staff and the EIR document "fail to provide objective, in essence, any at all, treatment of the omission of the three properties Nos. 8, 10 and 20 Vanderlip Dr..** ***These properties occupy the entire northeast corner of Zone 2 and deserve explicit inclusion, with limited parceling, in the Mitigated category being recommended for allowing development. "***

He goes on to cite the 1989 lot split of the adjacent parcel ... one of the Monks properties.

A second Downhill letter that date formally requests #8, 10 and 20 Vanderlip be included with the 31 "undeveloped lots" for mitigated negative declaration treatment ... "with a stipulation of limited parceling."

April 24, 2014: Jack Downhill submitted 'Weber Consulting" analysis of the landslide moratorium ordinance revisions as they should relate to his property. It ***cites Jack's 1968 acquisition of 20 Vanderlip Drive and his long record of desiring to subdivide only to be 'thwarted' for decades by regulatory impediments, including his filing a Moratorium Exclusion Application (ZON2012-00232) requesting a 4 lot subdivide which came back with" onerous" geological requirements (see #16 above)*** that, based on experience, **would far exceed those required of the Monks lots,** evidencing city's differential treatment of neighbors, something Jack didn't believe was the city's intent. However, it was reality for his property.

This was Jack's last correspondence before his death. Lt. Col. Downhill, a pilot in 3 wars (WW II, Korea, Vietnam), was buried with full military honors in Arlington National Cemetery Dec. 3, 2018. Like Monks, Jack didn't live to see the full use and value of his 1968 Lot #20 acquisition. **1968 – 50 years of waiting.**

17. Now his estate carries on, reiterating Jack's April 24, 2014, letter where he asked the EIR and resulting city Ordinance permit all Zone 2 properties to be fully developed (including Vanderlip Drive lot split ability) ... that any new /revised Moratorium Ordinance treat Zone 2 owners fairly, with equity.

Submitted by:

Lisa Downhill, Trustee, Jack Downhill Trust
Judy Braue-Foote (Successor Trustee and 20 Vanderlip resident)

Since pictures are worth 1,000 words, attached here are:

1. **Google Earth 2018: illustrating size of 20 Vanderlip compared to Zone 2 neighborhood.**
2. **Assessors 2010 map of Vanderlip Drive showing acreages**
3. **RPV Map of Project Area and Affected Parcels**
4. **RPV Map of Monks and Undeveloped Lots**
5. **Jack Downhill's July 20, 2012, Vanderlip Drive, Lot 20, proposed split, stamped "Received" by Community Development Department**

Held in our Planning Division are full copies of these (referenced herein).

1. May 26, 1993: Ehlig Memo (Numbered landslide into zones & described each)
2. Feb. 18, 2009: Downhill letter (10-63) (con't)

He goes on to cite the 1989 lot split of the adjacent parcel ... one of the Monks properties.

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Submitted by:

Lisa A. Lawson
Judith H. Foote

Lisa Downhill, Trustee, Jack Downhill Trust
Judy Braue-Foote (Successor Trustee and 20 Vanderlip resident)

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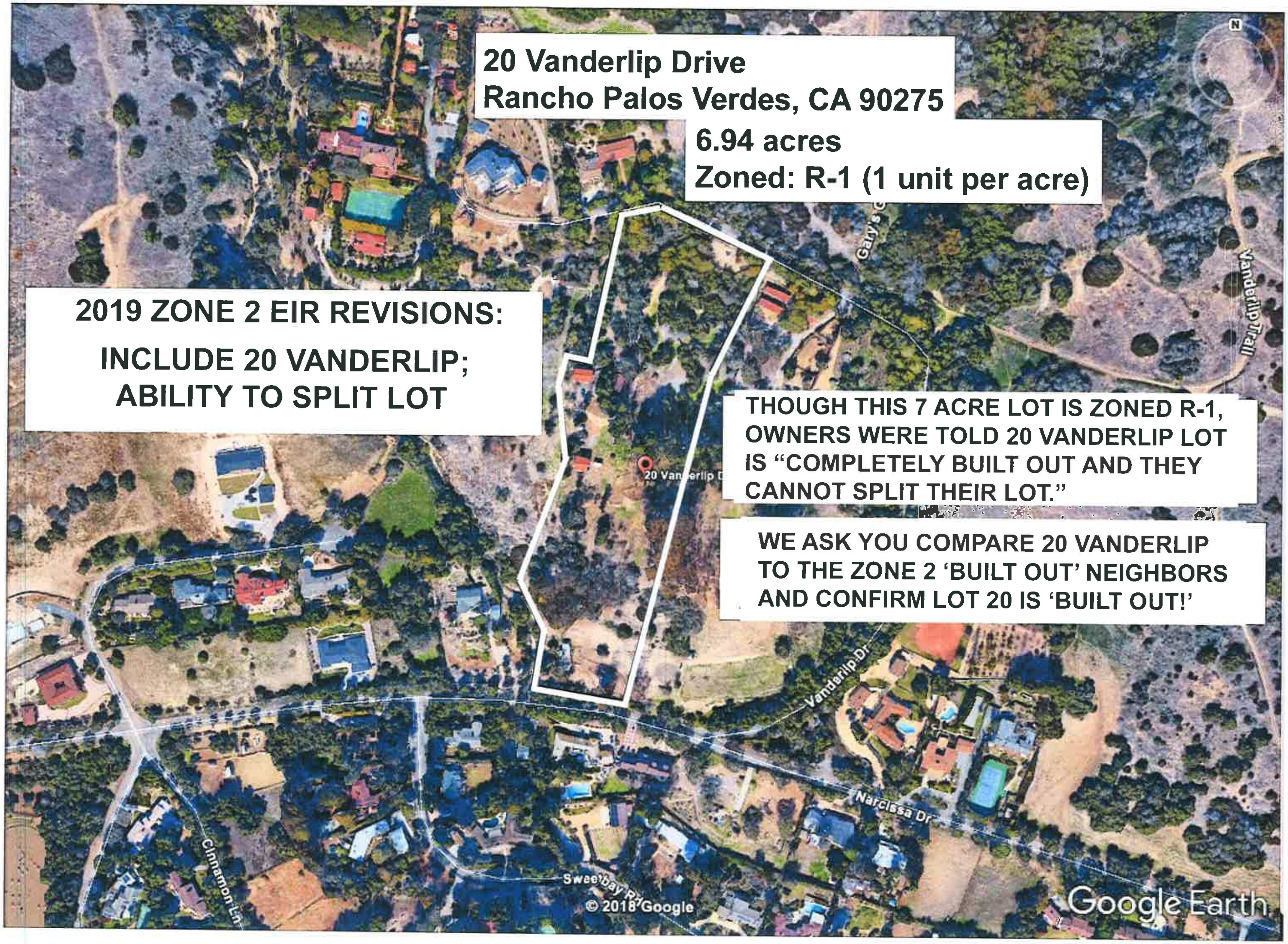
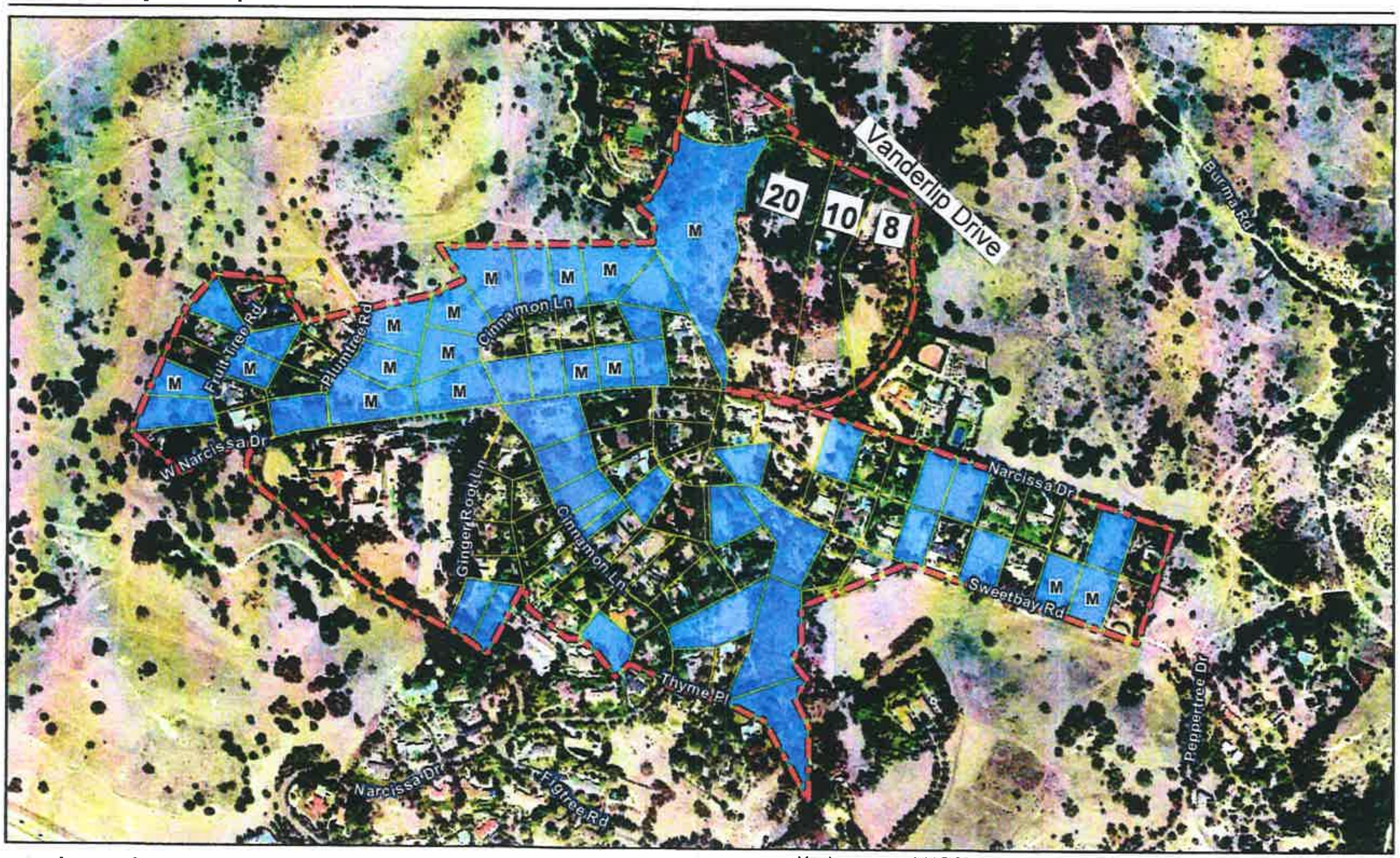
2. Feb. 18, 2009: Downhill letter (10-63) (con't)

3. Feb. 22, 2009: Kathy Snell letter (10-65)
4. Feb. 23, 2009: Michael & Sheri Hastings letter (10-83)
5. Undated 2009: Downhill letter (Case ZON-2009-00007)
6. Jan. 2011: Davies letter (Zone 2 LME revisions)
7. Jan. 18, 2011: Downhill letter (Zone 2 LME revisions)
8. Jan. 19, 2011: Arizona Land Asso. – York letter (Zone 2 LME revisions)
9. Jan. 31, 2011: Snell letter re Zone 2 LME revisions & 1989 lot split
10. Oct. 17, 2012: Weber Consulting on behalf of Downhill: LME response
11. Nov. 5, 2012: Downhill letter (Letter 11 and city response)
12. Oct. 18, 2013: Downhill letter: (1-146)
13. 2012: Downhill Parcel Map (4 lots) – goes with Oct. 18, 2013 letter)
14. Nov. 8, 2012: KCG Kling Consulting Group letter re LME geologic reqmnts
15. April 4, 2014: Downhill letter (Attachment 1-118)
16. April 4, 2014: Downhill paragraph: added to letter
17. April 21, 2014: Weber Consulting on behalf of Downhill (attachment 1-112)
18. Aug. 5, 2014: RPV Council Minutes (tabled Zone 2 Final EIR)
19. Dec. 15, 2015: RPV Landslide Moratorium Exception Permit (16 pages)
20. Sept. 6, 2018: Black vs. RPV: 2nd Appellate District, Division B2851365
21. Sept. 18, 2018: City Council Staff Report (1st 6 of 53 pages)**
22. Sept. 18, 2018: Minutes of City Council Award of Rincon Contract
23. Oct. 18, 2018: Ricon Kick-Off Mtng Complete
24. Nov. 8, 2018: Notice of Preparation of zone 2 EIR

End 12/11/2018



20 Vanderlip Drive
Rancho Palos Verdes, CA 90275
6.94 acres
Zoned: R-1 (1 unit per acre)
2019 ZONE 2 EIR REVISIONS:
INCLUDE 20 VANDERLIP;
ABILITY TO SPLIT LOT
THOUGH THIS 7 ACRE LOT IS ZONED R-1, OWNERS WERE TOLD 20 VANDERLIP LOT IS "COMPLETELY BUILT OUT AND THEY CANNOT SPLIT THEIR LOT."
WE ASK YOU COMPARE 20 VANDERLIP TO THE ZONE 2 'BUILT OUT' NEIGHBORS AND CONFIRM LOT 20 IS 'BUILT OUT!'
Vanderlip Trail
Vanderlip Dr
Narcissa Dr
Cinnamon Ln
© 2018 Google
Google Earth



Additional data layer from Los Angeles County Assessor, August, 2010.

Legend

Project Boundary

Vacant or Underdeveloped, Potentially Developable under Proposed Ordinance Revisions

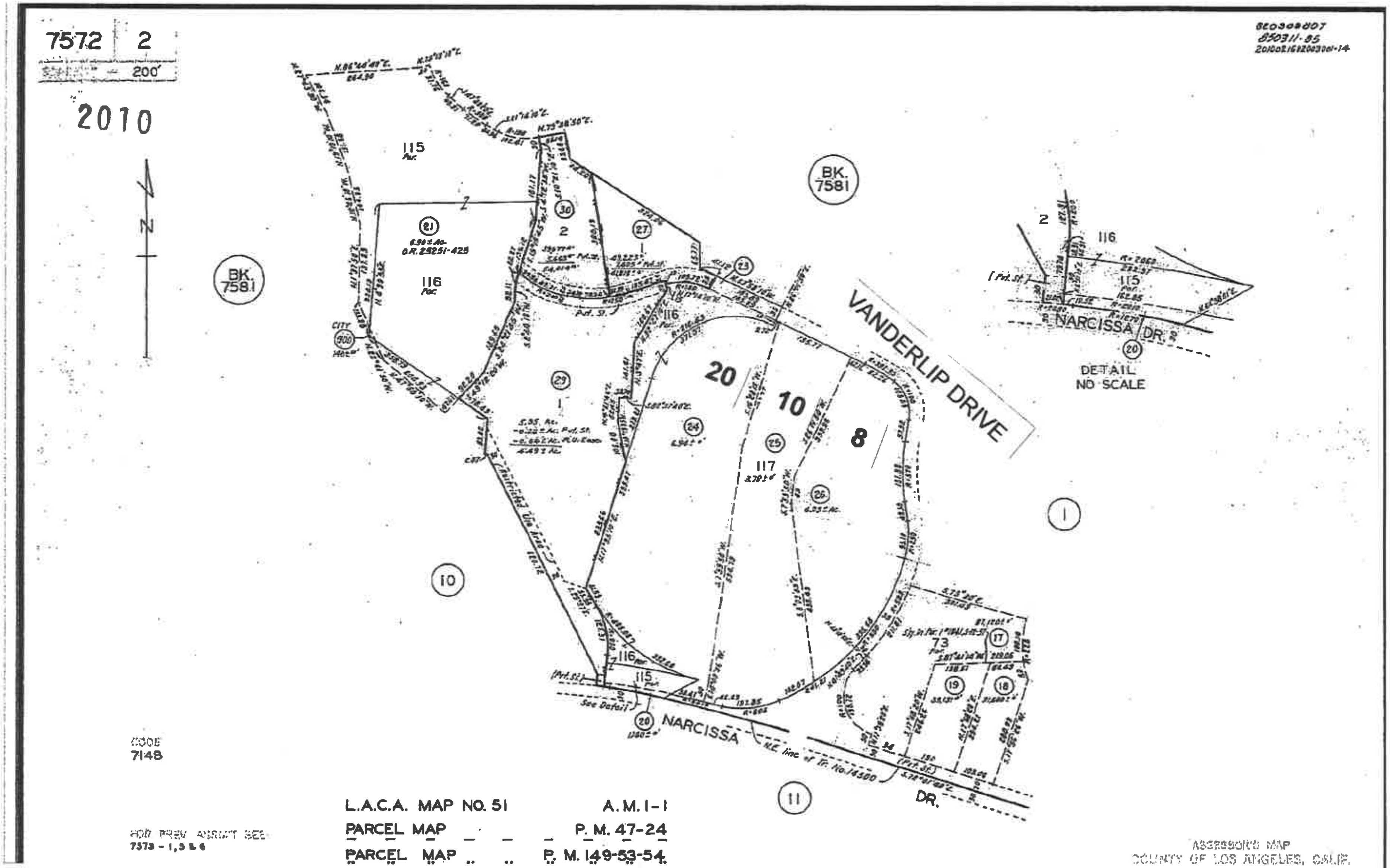
M *Monks* Plaintiff Lot

N

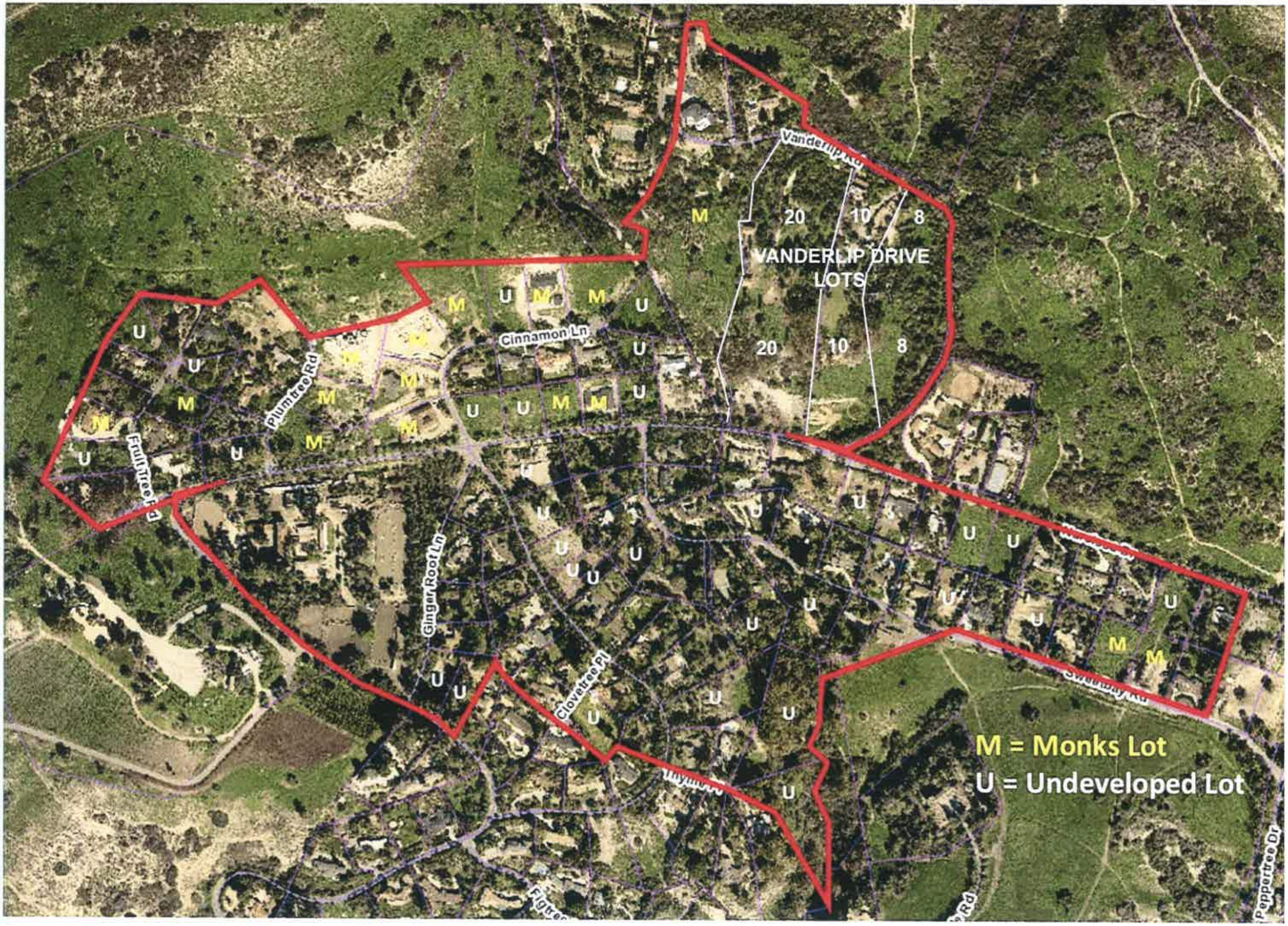
0 290 580 Feet

Project Area and Affected Parcels

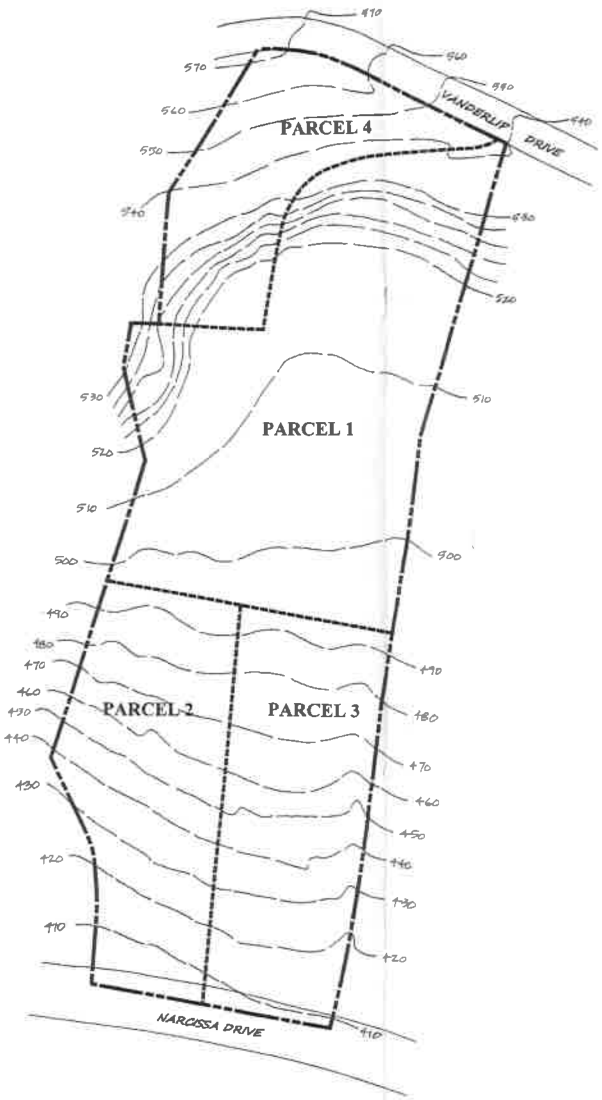
Figure 2-2



http://maps.assessor.lacounty.gov/Geocortex/Essentials/REST/sites/PAIS/VirtualDirectory/AssessorMaps/ViewMap.html?val=7572-002



Vanderlip Rd
VANDERLIP DRIVE LOTS
20
10
8
Cinnamon Ln
Plumtree Rd
Fruit Tree Pl
Ginger Root Ln
Clovetree Pl
Peppertree Dr
M = Monks Lot
U = Undeveloped Lot



GENERAL NOTES

- ASSESSOR PARCEL NO: 7572-002-024
- SITE AREA: 6.94 ACRES +/-
- EXISTING USE: SINGLE FAMILY RESIDENCE
- GENERAL PLAN: SINGLE FAMILY RESIDENTIAL
- ZONING: RS-1
- LANDSLIDE MORATORIUM CATEGORY: ZONE 2
- AVERAGE SLOPE: 17.8%
- PARCELS PROPOSED: 4 RESIDENTIAL LOTS
- PARCEL SUMMARY:
  - PARCEL 1 2.94 ACRES
  - PARCEL 2 1.50 ACRES
  - PARCEL 3 1.50 ACRES
  - PARCEL 4 1.00 ACRE
  - TOTAL: 6.94 ACRES

LEGAL DESCRIPTION

20 VANDERLIP DRIVE, RANCHO PALOS VERDES
CALIFORNIA 90275

THAT PORTION OF LOT H OF THE RANCHO LOS PALOS VERDES, IN THE CITY OF RANCHO PALOS VERDES, COUNTY OF LOS ANGELES, STATE OF CALIFORNIA, ALLOTED TO JOTHAM BIXBY BY DECREE OF PARTITION IN ACTION BIXBY, ET AL., VERSUS BENT ET AL., CASE NO. 2373 IN THE DISTRICT COURT OF THE 17TH JUDICIAL DISTRICT OF SAID STATE, IN AND FOR SAID COUNTY OF LOS ANGELES, AND ENTERED IN BOOK 4 PAGE 57 OF JUDGEMENTS, DESCRIBED AS FOLLOWS:

[illegible]

STAMP:
RECEIVED
JULY 20, 2012
COMMUNITY DEVELOPMENT
DEPARTMENT

RECEIVED
JUL 20 2012
COMMUNITY DEVELOPMENT
DEPARTMENT

NORTH

CONCEPTUAL PARCEL MAP

JACK DOWNHILL PROPERTY ~ ~ 20 VANDERLIP DRIVE

REVISIONS	BY
Date	JULY 2012
Scale	1" = 40'
Drawn	
Job	
Sheet	1
Of	1 Sheets

To: Octavio Silva
Subject: RE: 31 new HOME in PBCA?

From: Madeleine McJones [mailto:Madeleine.McJones@csulb.edu]
Sent: Tuesday, November 13, 2018 12:54 PM
To: Octavio Silva <OctavioS@rpvca.gov>
Subject: 31 new HOME in PBCA?

Hello,

31 homes in Construction will all drive up PEPPERTREE active landslide zone. Will our community getting compensated for road damage these are private roads and some are unpaved because we have NO MONEY, can we coordinate the dumptrucks and cement trucks events? Each home brings in hundreds of trucks, Please we do not need more soil here. Our PBCA East roads are in the Active Landslide not ZONE 2 this impacts Zone that are LANDSLIDING.

We have roads sections not paved for 20 years on the East side! 31 new homes is so much traffic can we get temporary road access for these builders? Can we limit the home building to so many a year?

This means no peace in this community for many years. Keep these trucks off of PEPPERTREE in PBCA.

Madeleine McJones
Website Developer
Instructional Technology
College of Business CSULB
562.985.4924 – ROOM 253

To: Octavio Silva
Subject: RE: 31 Zone 2 Homes

From: Madeleine McJones [mailto:Madeleine.McJones@csulb.edu]
Sent: Tuesday, November 13, 2018 1:21 PM
To: Octavio Silva <OctavioS@rpvca.gov>
Subject: 31 Zone 2 Homes

This is not fair to the people living in this community or using our NOT zone 2 roads for free to haul cement and building material this impacts our way of life for how long 20 + years of construction.

Please have a DEADLINE date to close this building window this is not a new neighborhood you are building many people purchased here for quiet and paid for much need peace and a future of peaceful living you are taking that away for untold unending construction. There needs to be coordination on Dumping and Cements Drop schedules, people are having lives here.

These trucks need to STAY OFF of our ZONED landslide roads. They shake my landslide property and are causing my property damage and my road damage. They need to go up NARCSSIA not active PEPPERTREE with active cracks within 100 feet. This will also impact PV drive South damage.

Madeleine McJones
Website Developer
Instructional Technology
College of Business CSULB
562.985.4924 – ROOM 253

Portuguese Bend Community Association Inc.

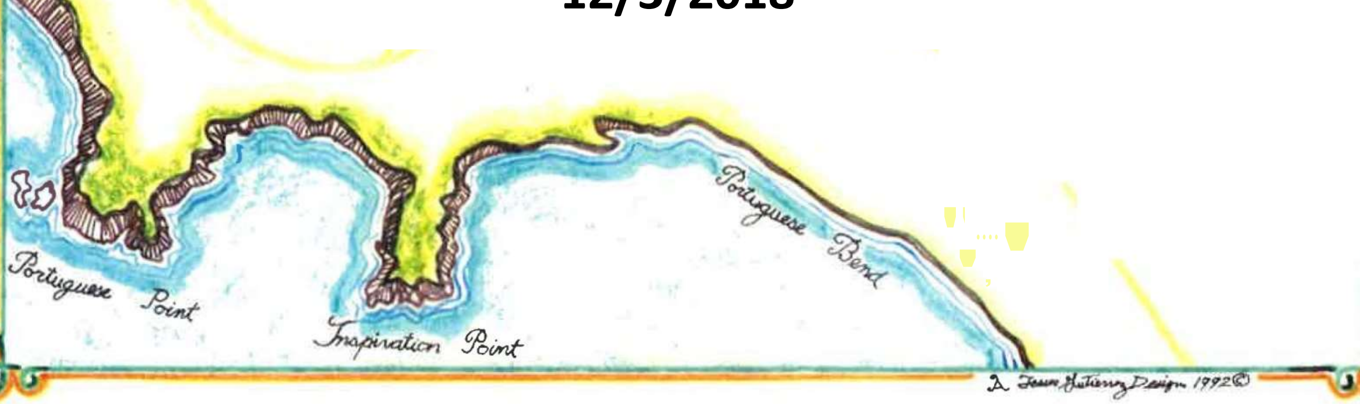
Portuguese Bend Community Association

10·1·92

Building Regulations and Architectural Standards

Revision J

12/3/2018



Revision History

Revision	Date of Incorporation	Summary Description
A	6/1/1991	Revised Equine Criteria
B	3/12/1993	Prohibition of horse keeping on vacant lots not adjacent to residents
C	10/1/2010	Misc. building standards additions and revisions
D	3/1/2012	Changes to Fees and Building Height
E	4/1/2013	For Sale Sign and open house time restrictions
F	4/30/2013	Added Architectural Review and Variance Request Forms
G	1/7/2013	Added compliance penalties, truck routes, allowed soil export
H	10/5/2016	Modified Easements to prohibit on-street parking and require tree Trimming, add “sheds” to accessory structures. Incorporated missed language from Revision D & E. Also added notes for Conditions of Approval and Penalty Procedures and revised document formatting.
J	12/3/2018	Increased Fees and Penalties. Add rules for Concrete Trucks and Noise to conditions and Site Sign. Added Table of Contents. Minor formatting and typo corrections.

These revisions were approved by the PBCA Board of Directors. The revisions add to and/or supersede the 10/1/1992 Document. All revisions are attached at the end of this document.

Table of Contents

PORTUGUESE BEND COMMUNITY ASSOCIATION

10-1-92

BUILDING REGULATIONS/ARCHITECTURAL STANDARDS

SCOPE AND PURPOSE

"Pursuant to the authority granted to the Portuguese Bend Community Association Inc., a California Non-Profit Mutual Benefit Corporation (hereinafter "Association"), by various deed restrictions, the following Building Regulations/Architectural Standards shall apply to the construction, alteration or repair of any building or structure within the area under the jurisdiction and control of the Association, which area is defined in the deed restrictions. These Building Regulations may be amended from time to time. It is the responsibility of the property owner to insure that he or she and their architect are working with the most recent of REGULATIONS.

"The purpose of these Building Regulations is to preserve the attractiveness of the entire area under the jurisdiction of the Association and to prohibit by erection, alteration, maintenance or repair of existing structures, the creation of undesirable or inharmonious types or designs which detract from the aesthetic effects of the proposed construction on neighboring property, protection of privacy, protection and enhancement of landscaping, avoidance of erosion or subsidence and overall protection of property values.

"It is not the purpose or intent of these Building Regulations to control the safety factor of the proposed building or structure, or to provide guidelines or standards concerning either geological conditions or the stability of the soil on which the building or structure is proposed to be constructed. Additions, alterations, and repairs on all buildings and structures shall comply with the provisions herein for new buildings, except as may be modified or permitted by the Board of Directors of the Portuguese Bend Community Association.

"Personal appearance before the Architectural Committee of the Association is not encouraged as it is not the purpose of this Committee to design or engineer any proposed building or structure. The committee's function is to adhere to the principals of good architecture for the purpose of preserving the aesthetic value of all building and structures in the area under the control and jurisdiction of the Association, including those already in existence.

"The approval process begins with the applicant submitting plans to the Architectural Committee. The Architectural Committee, after review of the submitted plans, will give its recommendation to the Board of Directors of the Association who will provide the applicant with written approval or denial of plans submitted.

I

BUILDING DESIGN AND CONSTRUCTION

A) GENERAL DESIGN REQUIREMENTS

1) Design must be of a type or kind as will, in the opinion of the Committee, be appropriate to its site, harmonize with the surroundings, and maintain the quality of the neighborhood. The design must be viewed as "reasonably good of its kind". Pre-fab, modular, and/or mobile homes are not permitted.

   The Architectural Committee need not necessarily be bound by the approval of previous designs or architectural details of existing structures.

2) New residences and additions to existing residences shall be of a design that will follow the contour of the ground and provide a low silhouette in general form. Step down floor levels and roof planes conforming to natural grade are encouraged, as are porches and terraces.

   a) The California Ranch house was developed out of the tum-of-the-century Craftsman bungalow and the period style bungalows of the twenties. The ranch house is a single-floor dwelling, low in profile and closely related to terraces and gardens. Its specific historic images were both the nineteenth-century California adobe house and the nineteenth-century California single wall, board-and-batten, rural farm buildings. The characteristic ranch house did and still does employ a variety of historic images, but the classic design mingles modem imagery with the Colonial. Versions of the California Ranch house were designed as early as the 1920s. But its "hey-day" was in the post-World War II years.

      Characteristics:

      - Single-floor dwelling, composed of informal arrangements of volumes.
      - Low-pitched hip or gable roof with wide eaves.
      - Sheathed in stucco, board and batten, shingles, clap-board, or a combination of one or more of these.
      - Windows often treated as horizontal bands.
      - Glass sliding doors or French type doors (multi-pane) lead to covered porches, terraces, or pergolas.
      - Interior spaces open, and of low horizontal scale.

3) Plans for new residences shall provide a minimum living area of 1500 square feet of floor space and a maximum living area of 4000 square feet of floor space or maximum of 15% lot coverage (building area to lot area) whichever is smaller, exclusive of garages, porches and terraces.

4) Each new residence shall have a fully-enclosed garage with a capacity for three cars. Additional garage requirements will be reviewed on a case-by-case basis.

5) The construction or erection of an accessory building, swimming pool, tennis court may not precede construction of the residential building; may be built concurrently but no use of accessory structure may be made until a certificate of occupancy is issued.

6) In the case of multiple lot ownership, lots must be connected at side or rear lot lines to the residential lot to be used for swimming pool, tennis court, accessory building and/or horse-keeping facilities. Residential

building must be completed with a certificate of occupancy on file with the city of Rancho Palos Verdes prior to the construction of any and all accessory facilities. HORSES MAY NOT UNDER ANY CIRCUMSTANCES BE KEPT ON A VACANT LOT UNLESS THE PROPERTY OF THE OWNER OF THE ADJOINING RESIDENCE. (Clarification 03-12-93).7)

7) Cellars are defined as those portions of a building below the living area floor and which are wholly or partially below grade.

   a) Cellars of minimal size are permitted for use for mechanical equipment and/or storage, but not for habitation purposes and shall not exceed 200 square feet in size.

   b) Cellar outside entrance, access, and/or windows are prohibited.

8) Any improvement, whether proposed to be temporary, portable or permanent, shall meet the standards set forth herein for permanent structures.

9) The maximum height permitted from finished floor level of residence to finished grade is 5'-0". Encouraged are residences designed to hug the ground and provide low silhouette. The difference between the finished grade and finished floor level across on elevation should average no more than 2'-6" with maximum difference of 5'-0". In addition, a maximum difference between existing or “natural grade” and finished grade must be 3’-6”.

10) There shall generally be no habitable area superimposed above another, unless, in the judgment of the Architectural Committee, such construction, because of the topography and contour of the land will allow a building harmonious with the general type, design, and appearance of other buildings in the neighborhood and community.

B) <u>GUIDELINES FOR SUBMITTAL OF NEW RESIDENCES</u>

Before any application for permits for new residence or additions are obtained from the City of Rancho Palos Verdes, final land-use plans must be submitted to the Architectural Committee for approval, which shall include the following:

1) Rough grading plan showing grade elevations of pads or proposed floor elevations. (Show only the "footprint" of perimeter of residence and accessory buildings.). Rough grading plan shall show any proposed changes in existing topography.

2) Approximate area computation of the residence as well as the exterior configuration. Floor plan and exterior elevations are required.

3) Gross area and net area of property. Show lot coverage percentage (Structures shall not cover more than 15% of the gross lot area, not to exceed 4000 square feet for inhabitable improvements, excluding garage and porches.

4) Plans to include the following:

   a) Driveway with material specified, walkway and decking location and grade. b)

   Garage, stable and accessory buildings.

   c) Tennis court, pool or spa.

   d) Location and distance of proposed improvements and distance of all existing improvements from contiguous properties.

   e) View angles (tennis court, pool, riding ring, stable, etc.)

f) Prevailing wind direction.

g) Direction north.

h) Dimension setbacks. Call out on plan.

i) Easements. No grading is permitted in easements.

j) Geology status letter from a license geologist or soils engineer.

k) Any known flood or water drainage hazards.

I) Major existing trees with trunk diameters.

m) Any known natural drainage courses.

5) Landscaping plans must accompany architectural plans and be installed within two months of completion of improvement.

C) MATERIALS

1) Exterior walls may be of wood boarding or siding, stucco or approved masonry left natural or painted.

D) ROOFS

1) The minimum of pitch of all roofs shall be 3:12 and the maximum of 5:12. Flat roofs are prohibited. "M" roofs are not permitted. Shed roofs are not permitted.

2) Skylights are to be parallel to the roof plane, (4" curb See Section N). Plastic bubble lights are not permitted except on the rear of house.

3) Beam-ends may extend a maximum of 6" beyond roof.

4) Soffits may be plastered or left exposed but overhead electrical fixtures must be concealed.

5) Roofing materials shall meet a minimum Class A fire retardant. No wood shingles or wood shake roofs are permitted. Sample of proposed roofing material to be submitted with architectural plans.

E) WTNDOWS AND DOORS

1) Beveled glass, leaded stained glass and lightly tinted glass windows are permitted. No mirror-finish glass is allowed.

2) Windows in a cellar are prohibited.

3) Clerestory windows are permitted.

F) DECKS

1) Decks which are more than 2'-0" above grade must be closed from their undersurface to grade. Decks shall not project more than one foot beyond understructure.

2) Decks shall not be more than 5'-0" above grade, averaging no more than 2'-6" above grade, and may not be of excessive size in relation to the house.

3) Railings as required by City of Rancho Palos Verdes Building and Safety Dept. shall be provided. Design of railing shall be submitted for approval.

G) PAINT, TRIM AND ORNAMENTATION

I) Exterior walls and trim are to be painted a color submitted for approval, by Architectural Committee. Retaining walls not attached to residence shall be painted to match adjacent soil.

2) Residence walls and chimneys of natural stone need not be painted.

3) The finish of other walls, fences or enclosures must be approved by the Architectural Committee.

4) Wrought iron or other ornamentation must be approved by the Architectural Committee.

5) Metal or plastic awnings for window coverings are prohibited.

H) EXTERIOR LIGHTING

I) All exterior lighting must be approved by the Architectural Committee and should be in harmony with, and not encroach upon the privacy and sensitivity of other property owners.

Details of exterior lighting shall be shown on plans or working drawings showing locations of all lighting fixtures or uprights supporting fixtures and the type of light bulb or tube, the candle power thereof, the total wattage expended therewith, and the area affected by the operation of said lights or system of lights. Motion security lights are permitted.

2) Lighting shall be only that necessary to provide adequate visibility and shall meet the following requirements:

a) All glass shall be smoked, frosted or obscure.

b) All garden lights must be designed or equipped with umbrella type shades to cast light downward. Up lighting is only permitted where low voltage equipment is used.

c) Exterior lights on all structures, except those at the front entryway of the main residence, shall be limited to those required for the functional use of the household and not intrude upon privacy of other property owners.

d) The lighting of tennis courts is prohibited.

I) SPAS POOLS AND TENNIS COURTS

I) Pools and tennis courts must comply with all appropriate requirements of these Building Regulations, and in addition, all tennis court fencing shall be either black or dark green vinyl coated chain link, and shall not extend more than ten (I 0) feet in height. Tennis court fencing may require landscaping as determined by the Architectural Committee. (See Grading, Lighting and Fences) To the extent that grading is permitted tennis courts shall be constructed at the lowest elevation possible to aid in noise abatement.

2) All windscreens used on tennis courts must be approved. All types of windscreens for pool areas must be approved.

3) The courts shall not be located on steep slopes, sides or bottoms of canyons.

4) Courts shall not be located in the front yard.

5) Each spa, pool or court must have an area adequate in width on all sides for the maintenance and planting of landscaping. See B) Types of Fencing 4) Other Requirement E).

6) The views of adjacent properties and noise abatement measures must be taken into consideration when siting the tennis court.

7) An adequate drainage system must be incorporated into the overall plan of the court, which drainage system must be approved by the Engineer for the City of Rancho Palos Verdes.

8) The construction of the proposed court shall conform to the lot coverage limitations set forth in Site Requirements, Section II, Paragraph A of these Building Regulations.

9) Retaining walls incorporated as part of the overall plan of the court shall not be greater than 5'-0" from finished grade to top of wall, averaging no more than 2'-6" in height, providing an acceptable landscape design is submitted.

J) MAILBOXES

1) Mailbox posts shall be compatible with the chosen style of house and landscaping.

2) Name sign, if any, shall use only the peacock emblem and association approved paint color(s) and shape.

K) SATELLITE DISH ANTENNAS

The following requirements apply to the installation of a satellite antenna.

1) Submit a "to scale" plot plan showing proposed location of antenna, proposed landscaping, picture of proposed antenna and easements and property line setbacks.

2) Antenna must be located no closer than 10 feet to the side or rear property lines or easements and must not be visible from streets or adjacent properties.

3) Antenna must be installed in a location unobtrusive to surrounding properties.

4) Antenna to be dark flat colored mesh and screened at time of installation. Mature planting to height equal to antenna. No planting permitted within easements.

5) Brochure for satellite dish antenna describing dimension, installation height, providing a general picture of appearance and other particulars regarding the proposed installation, must accompany submittal request.

L) DETACHED ACCESORRY BUILDINGS and SHEDS

1) Size of detached building limited to a maximum of 400 square feet.

2) Accessory building is to be consistent, architecturally, with style of main residence. Design must be of a type or kind as will, in the opinion of the Architectural Committee, be appropriate to its site, harmonize with the surroundings, and maintain the quality of the neighborhood. The design must be viewed as "reasonably good of its kind."

3) Accessory building may be used as cabana, studio, workshop, greenhouse or other hobby use.

4) There shall be a maximum of one accessory building per residence. The exception is a house with a swimming pool. Such a property may have and additional accessory building large enough to house the pool equipment and other pool related mechanical equipment, but no larger than necessary for the purpose of enclosing the equipment.

5) Accessory building shall never be used as a guest house or rented or used as a residence. There shall be no private or separate entrance to the accessory building

6) Sheds of under 120 SF are allowed within rear setbacks. The height must be no more than 8’ from finished grade and located more than 5’ from the property line, unless the written approval is obtained from the adjacent property owner. Sheds must be painted an earth tone color.

M) SKYLIGHTS

1) Skylights shall be located as to not be offensive to neighbors, present or future. Location, color, size and quantity will be evaluated on individual basis. Skylight curb may be 4" maximum height, flat and parallel to roof slope and dark colored aluminum frame. Bubble skylights are permitted on non-street frontage sides of house. N)

N) STABLE CONSTRUCTION

1) Revised Equine Criteria is to be adhered to for the keeping of horses. See attached Exhibit A.

2) Stables must comply with materials, roof paint and trim requirements applicable to houses.

3) Stables shall be one story. Barns and stables are for the exclusive use of keeping permitted domestic animals provided that any such structure for the keeping of horses, cows, goats or other farm pets is located not less than thirty-five feet from any residence and not less than one hundred feet from nearest other house or activity area. Stable cannot have lavatory facilities. Stable not to be less than 400 square feet.

4) All corrals must be located a minimum of thirty-five feet from owner's main residence and a minimum of one hundred feet from the nearest other house. Fencing confining the animals shall located a minimum of fifty feet from nearest other house and a minimum of twenty-five feet from neighboring property line.

5) Vehicular access to stable area must be provided for delivery of feed and removal of waste. Such access need not be paved, but grade must not exceed 25% or 1" in 4'-0".

O) RECREATIONAL VEHICLES

1) Recreational vehicles must not be visible from road. P)

P) CARPORTS

1) Carports are not permitted.

II

SITE REQUIREMENTS

A) GENERAL

1) Only one single-family dwelling shall be constructed on each lot. Main buildings, accessory buildings, structures, tennis courts, spas, swimming pools, stables, driveways, parking spaces, walks, patios, decks and asphalt or concrete paving of any kind shall Not cover more than twenty five (25%) of the net lot area. Prior to final approval the Architectural Committee shall require a silhouette of proposed construction through the use of flags and poles.

2) The definition of the term "gross area" shall exclude all perimeter easements to a maximum of ten feet and that portion of the lot which is used for roadway purposes, and shall also exclude any private drive or driveway which provides ingress and egress to any other lot or parcel of land and access strip portion of any flag lot.

3) Any construction proposed for a front yard requires approval of the Architectural Committee.

4) The posting or erecting of signs of any kind is prohibited, except as sanctioned by the association.

B) EASEMENTS

1) Easements are perimeter areas of one's property dedicated to the Community Association and are reserved for roads, streets and public utilities. Hence, no planting, building, pool fence, pole (except public utility), drainage structure, grading, paving or any obstruction may be placed on any easement.

2) Parking is prohibited on all PBCA roads and right-of-ways. Upon complaint from any PBCA member, the board will post a warning on the vehicle and, after 24 hours, may have any car, truck, trailer, or other vehicle located on PBCA roadways towed at the owner's expense.

3) Owners are responsible for maintaining trees and foliage clear of the roadways. No foliage may extend past the edge of the paved roadway less than 13' in height, to provide safe clearance for cars and trucks. In the event that an owner does not maintain the road clearance, the board will provide a 30 day notice and shall have the foliage trimmed at the owner's expense. The expenses may be added to the annual assessment fees.

C) DRAINAGE

I) Proper drainage facilities shall be provided by the use of non-erosive means.

2) There shall be no open drainage ditches, berms or swales across or in any road easement. D)

D) SETBACKS

1) New residence or additions shall be located on the lot so as to provide:

   a) Front Yard: Not less than 60 feet from the front lot line (to the middle of the road if the residence fronts on a street) Cul-de-sac will be treated on a case by case basis.

b) Side Yard: All parcels of land containing building sites shall have side yards, the widths of which shall be determined by the Architectural Committee, provided that in no event the width of the side yards be less than 20'-0" or City of Rancho Palos Verdes code, whichever is greater, measured from the boundary line of the parcel; provided further that if the side yard abuts on an easement 25'-0" in width, the side yard shall be not less than 10'-0" from the interior boundary of the easement.

c) Rear Yard: Not less than 50 feet from rear easement or lot line. Accessory buildings may be constructed within the rear yard provided they conform to other requirements of these guidelines.

2) Cornices, eaves, belt courses, sills, buttresses or other similar architectural features may not extend or project into a side yard more than two and one-half (2 1/2") for each one (1) foot of the maximum required width of such side yard and may not extend or project into the front or rear yard more than four (4) feet.

E) DRIVEWAYS

1) Driveway surface must be hard surface, i.e. paved surface.

F) LANDSCAPING

1) Landscaping shall be incorporated in and around new residences and on cut and fill banks, and shall be planted within two (2) months of completion of the structure. Replacement of de-watering types of trees is encouraged.

2) Cut and fill bank must be planted in accordance with City of Rancho Palos Verdes requirements.

3) Landscape plan should identify the type and size of plants to be planted provided in each location and a grading plan with grades shown. Grading plan shall show slopes and be prepared on 5'-0" contour map.

4) NO PLANTING OR CONSTRUCTION IS PERMITTED IN ASSOCIATION EASEMENTS USED FOR ACCESS.

5) Do not abbreviate common or scientific names of plants on plans. Adherence to water conserving and drought tolerance planting should be considered.

6) Provide irrigation plan at time of submittal.

7) Highly flammable shrubs and trees such as acacia are discouraged. Applicant and his agent are encouraged to consult local fire department on selection of landscape materials.

8) For every tree removed for construction purposes, one tree must be planted on site. Trees, particularly peppertrees are considered good de-watering trees.

G) RETAINING WALLS

1) Retaining walls must be of a construction compatible with the building materials of the residence. City of Rancho Palos Verdes codes regulating retaining walls must be adhered to by the owner and his agent.

H) EXCAVATIONS

1) City of Rancho Palos Verdes codes regulating excavations must be adhered to by the owner and his agents. Redistributed site material may remain on project site. Import of soil is prohibited. Export of soil is allowed with prior coordination with the Architecture Committee.
2) The maximum difference between existing or "natural grade" and finished grade must be 3'-6".

I) SLOPE LIMITS

1) City of Rancho Palos Verdes codes regulating slope limits must be adhered to by the owner and his agents.

J) CONSTRUCTION IN CANYONS

1) City of Rancho Palos Verdes codes regulating construction in canyons must be adhered to by the owner and his agents. See Section 1, Item I, No.3).

III

FENCING

A) FENCING

1) The use of walls as fencing enclosures is prohibited. Any such fence or enclosure on or near the exterior boundary line of any lot or building site, or which appears to enclose the Site, shall be deemed an enclosure of the exterior or boundary lines of any lot or building site. No enclosure of the exterior or boundary lines of any site, lot or parcel may be erected or maintained except a wooden fence.

B) TYPES OF FENCING

1) Country Estate Fence: Committee members approve P.V.C. Country Estate Fence with the following requirements.

   a) 3-rail P.V.C. fencing should align with existing wooden fencing, if any.

   b) If bracketed fencing is used, brackets should be placed on side of posts away from the street.

   c) Caps should be flat.

   d) Posts should be placed at 8-foot intervals in concrete. e)

   Height of fence posts to be 4'-6".

2) Heritage Three-Rail Fences: Approved with flat cap on posts.

3) Solid wood fencing of a natural color shall be allowed on lot lines between properties, provided there is a residence on at least one of the properties, and further provided both owners of the directly affected lots are in agreement with the proposed fence. Said fence shall be no closer to the street than the front of the house and shall comply with all height and setback requirements.

4) Chain Link Fences: Chain link fences or pipe fences for rear areas and corrals are permissible with the approval of the Committee.

5) Other Requirements:

   a) No fences shall be erected on, constructed in, or enclose any association access easement unless otherwise permitted.

   b) Fences enclosing pools and/or tennis courts may be of chain link or other material with the approval of the Committee.

   c) Barbed wire fences are prohibited. Electric fences are prohibited except for purposes of restraining animals if permitted by the City of Rancho Palos Verdes.

   d) Gates used with three rail fences are to follow the same style. All other gates are to be approved by the Committee.

   e) Equipment for pools and other mechanical apparatus shall be housed or fenced and screened by landscaping. No roof shall be provided unless it cannot be seen from road and the enclosure shall be no larger than that required by the Equipment. If grape stake is used, it may be left natural to blend with the landscaping.

IV

PROCEDURES

No person shall erect, construct, enlarge, alter or have any building or structure or fence in the area under control of the Association without first obtaining approval from the Association. Such approval fee proceeds are to be used to maintain and/or repair road network due to possible stress from heavy vehicle usage during construction period and to defray architect consulting fees and Committee staff fees. The members of the Architectural Committee and the Board of Directors are not reimbursed for their volunteer activity.

A) FILING PLANS

1) Association support of applicant following final approval of plans by the Board of Directors, based on recommendation of the Architectural Committee. The president of the association will stamp the applicant's final plans and provide the applicant with a cover letter of support and a copy forwarded to the City of Rancho Palos Verdes Planning Department.

3) All plans must be to scale and legible.

4) Plans for new residences, residence additions, and remodels over 1000 Sq Ft. shall be submitted to the Committee in PRELIMINARY FORM for conceptual approval early in the design process to ensure compliance. Building and Safety Permit Drawing shall be submitted to the Committee concurrent with the RPV submittal for PBCA Final Design Approval. (See B) GUIDELINES FOR SUBMITTAL OF NEW RESIDENCES RE; SUBMITTAL FORM)

5) All plans shall show the name and address of the owner of the property, lot and tract number, if any, and the name and address of the Architect preparing the plans. Should corrections be necessary, the original plan filed shall remain with the Committee.

7) One Copy of all plans for new construction shall be submitted in the form of prints on clean white drawing paper, floor plans for final working drawings shall be drawn to a scale of 1/4 inch to 1 foot for Architectural Plans and 118 inch to 1 foot for plot plans. Plans must be legible with materials plainly marked. A pdf file of plans must also be submitted.

8) All plans must include a plot plan, grading plan, floor plan and elevations of ALL sides, roof plan, and such sections as may be required for clarity; exterior color scheme and square footage chart of the building shall also be included. ALL OVERHANGS ON ROOF PLAN SHALL BE MARKED WITH DIMENSIONS. Pool and tennis court plans must be submitted separately. The Committee may require a perspective, if, in its opinion, the design is not clearly shown on the plans. Complete elevations affected by the additions or remodeling must be shown on the plans submitted.

9) Plot plan shall include:

a) Roads, driveways and easements with the width thereof.
b) Terraces, pools and paved areas. (Including walks, driveways and all decks paved or otherwise.)
c) Building plan outline, lot dimensions, setbacks, and north arrow.
d) All existing and proposed structures, including fences and service yard areas.
e) A minimum scale of 1" = 10'-0" shall be used.
f) Complete lot must be shown. Small key plan allowed; house area is shown at large scale. g) See

attached example of plot plan.

10) All plans shall be filed by mailing, or hand delivered to an Architectural Board member, to Portuguese Bend Community Association, P. 0. Box 2908, Palos Verdes Peninsula, CA 90274. The Committee meets on the first Monday of each month. Plans should be made available to the Committee one week prior to the meeting. Sec IV-B1.

11) City of Rancho Palos Verdes approval, permit and inspection process must be adhered to by the owner and his agents. All contractors and sub-contractors of the owner must be currently licensed and insured.

12) One set of approved plans shall be retained in the Association files and may be released only to responsible blueprint companies for duplic ation and must be returned to Association files.

B) <u>TIME PROVISIONS</u>

1) The sequence of filing procedure is:

1st. Conceptual drawing one week prior to a regularly scheduled Architectural Committee meeting.

2nd. Architectural Committee renders decision on conceptual drawing within fourteen (14) Days.

3rd. Applicant files actual plans fourteen (14) days prior to a regularly scheduled Architectural Committee meeting.

4th. Architectural Committee renders preliminary decision on actual plans within fourteen (14) days of meeting at which plans are reviewed. Architectural Committee will work with due diligence on all projects submitted for review. Applicant will be notified by mail if a delay is anticipated.

5th. Poles and flags for silhouette shall be erected by applicant (or his agent) within two weeks of applicant receiving preliminary approval.

a) Opportunity for neighbor input.

6th. Final decision of the Architectural Committee within four weeks of erection of flags and poles.

7th. Architectural Committee recommendation made to Board of Directors at next regularly scheduled Board of Directors Monthly Meeting.

8th. Board of Directors votes on applicant's plans (N AI). Plans will be stamped and returned to the applicant with a cover letter to the applicant and a copy to the City of Rancho Palos Verdes.

Applicant must copy Architectural Committee on all changes made by City of Rancho Palos Verdes upon notification by the City.

2) Final plans of new residences shall be submitted to the Committee within one year after approval by the Committee of the preliminary plans.

4) If the proposed building, structure or work is not commenced within one year from the approval of the final plans, then the plans shall be null and void and new plans must be resubmitted.

C) INSPECTION

1) A set of plans, which shall have affixed stamp of approval of the Association, shall be on the job site at all times.

D) CONSTRUCTION

1) All work shall proceed with diligence and it shall be the obligation of the owner or his agent to provide portable chemical toilets placed inconspicuously on location.

2) During construction, the premises shall be kept free from scraps, rubbish, paper or other debris and there shall be no burning on the premises. Entire construction site shall be fenced to stop trespassing.

3) Building Hours for any construction and maintenance trades shall be allowed only between the hours of 7:30 AM to 5:30PM Monday through Friday, and 9 AM to 1PM on Saturday. No construction or maintenance trades shall be allowed to work on Sunday and/or holidays.

4) Construction parking for construction sites to be limited to "on-site" parking, with street parking limited to loading/un-loading only. Limited Variances will be granted on a case by case basis.

5) Large truck deliveries should enter and exit from the Peppertree Gate. Semi-trucks allowed for heavy equipment delivery only. All other deliveries limited to 3 axle or smaller trucks.

6) Concrete Deliveries: Only one truck on site at a time. Second and third trucks can stay on Narcissa or Sweetbay. Nor more than three trucks in BPCA at a time. All trucks must enter and exit through the Peppertree Gate.

7) Noise from radios or other amplified sound devices shall not be audible beyond the property.

E) REAL ESTATE SIGNAGE and OPEN HOUSE TIMES AND PROCEEDURE

1) No Real Estate “For Sale” signs are permitted with the exception of temporary “Open House” signs which are only allowed during the day of the open house. Agents may provide the PBCA board or Secretary with addresses of properties for sale including agent phone numbers. The information will be posted on the community bulletin boards at both gates.

2) Public Open House permitted on the first Sunday of each month from 1pm to 4pm. Brokers Open House permitted on the first Tuesday of each month (or the Tuesday preceding the Public Open House) from 11am to 2pm. Agents may request opening of the access gate during the open house hours and must not post the gate code. Parking is not allowed on streets and traffic laws will be enforced.

DEFINITIONS

Words used in the present tense include the future tense; the singular includes the plural; work "person" includes a corporation, partnership, Association as well as individuals; the term "shall" is mandatory and "may" is permissive.

A) BUILDING

A structure having a roof supported by columns or walls including underground fallout and bomb shelters.

1) Main Building: A building in which is conducted the principal use of the lot or building site on which it is located.

2) Accessory Building: A subordinate building on the same lot or building site, the use of which is incidental to that of the main building, and which is used exclusively by the occupants of the main building, and shall not include a business, or rental unit.

3) Garage: A building for the housing of not more than three (3) motor vehicles with a roof and enclosed on four (4) sides.

4) Single Family Dwelling: A residence or dwelling for one family alone having but one kitchen.

5) Story: That portion of a building or structure included between the surface of any floor and the finished ceiling above it. Applicant is referred to the City of Rancho Palos Verdes for study of City's ordinances relating to height and elevation requirements with respect to residence design.

6) Structure: Anything built, constructed or erected, of any kind, or any piece of work artificially built up or composed of parts joined together in some definite manner which requires more or less permanent location on the ground or attachment to something having a permanent location on the ground.

7) Abandonment: Shall mean the failure of the holder of a building permit for the construction or erection of an improvement, to show month to month progress toward completion or the halting or cessation of improvement within one year after the start or commencement of said work; or the halting of cessation of said work for a continuous period of four weeks, or the failure to have an active, working force of more than one person present and actively engaged in the work of completing said improvement for a period of more than four weeks.

8) Stable: A corral and three-sided covered area of 400 square feet per horse. In addition to the stable area, one single structure of 200 square feet total shall be attached to the stable area for storage of tack and hay. "Q" District requirements will always constitute a minimum.

9) Grandfathered: All structures and improvements approved or existing as of the date of issuance of these standards shall be deemed permittable. Should any of these planned or existing structures be entirely destroyed the new replacement construction must adhere to these Architectural Standards.

10) Cellars: Cellars are defined as those portions of a building below the living area floor and which are wholly or partially below grade with outside access or entrance only.

B) LOTS

1) Any legal parcel of land, the description of which is recorded in the office of the County Recorder. No improvement to be made on other than a legal parcel.

2) Lot Lines: The boundary lines of lots are:

   a) Front Lot Line: The line identified as the center of the road, or in a comer lot, only one street line shall be considered as a front lot line, and such front lot line shall be determined by the Architectural Committee of the Portuguese Bend Community Association.

   b) Rear Lot Line: The line opposite the front lot line.

   c) Side Lot Line: Any lot lines other than the front line or the rear lot line.

3) Easements: The area along the exterior boundary lines of any lot or building site reserved by a Declaration of Restriction, Reservation or Conveyance to be used for roads, streets, bridle trails, parkways, park areas, and for any public or quasi-public utility service or function beneath or above the surface of the ground.

4) Yard: An open space other than a court, on a lot unoccupied and unobstructed from the ground upward, except as otherwise provided in these Regulations.

   a) Front Yard: A yard extending across the full width of the lot or building site between the side lot lines and measured between the front street or road easement and either the nearest line of the main building or the nearest line of any enclosed or covered porch or covered terrace attached thereto.

   b) Rear Yard: A yard extending across the full width of the lot or building site between the side lot lines and measured between the rear lot line and the nearest line of any enclosed or covered porch or covered terrace. Where an easement traverses the rear portion of any lot and the owner of the servant tenement does not have the right to use the surface for building, then the rear lot line shall be considered to be the rear line of that portion of the lot to which the easement does not apply.

5) Gross Lot Area: Total square footage of lot as determined by either professional survey or Los Angeles County Tax Assessor (inclusive of road easement).

VI

BUILDING APPROVAL FEES and PENALTIES

No person shall paint, landscape, erect, construct, enlarge, alter or move any building, fence, or structure in the area under control of the Association without first obtaining approval from the Association. Such approval fee proceeds are to be used to maintain and/or repair road network due to possible stress from heavy vehicle usage during construction period and other related costs. The legal parcel owner shall be liable for any actual damage caused by heavy equipment to the roadway or any other improvement within the Portuguese Bend Community Association area.

City of Rancho Palos Verdes approval, permit and inspection process must be adhered to by the owner and his agents. All contractors and sub-contractors of the owner must be currently licensed and insured.

1) FEES

- **a.** New Home Construction (see definition below)
  - **i.** Conceptual Design Approval Fees
    - **1.** $1,500 for Architectural Review.
  - **ii.** Final Design Approval and Construction Fees
    - **1.** Based on a price per square foot of $5.00 per square foot of residence, out-buildings, garages, etc.

- **b.** Addition to Existing Structure (including remodels > 1000SF, room additions, out-buildings, garages, etc.)
  - **i.** Filing Fees
    - **1.** $500 for Architectural Review
  - **ii.** Construction Fees
    - **1.** Based on a price per square foot of $5.00 per square foot of room additions, out-buildings, garages, etc.
- **c.** Interior Remodel, Fences, or Home Improvement <1000 SF.
  - **i.** Filing Fees
    - **1.** NONE
  - **ii.** Construction Fees
    - **1.** NONE
- d. For new construction and extensive remodels: A refundable $10,000 deposit shall be paid to PBCA for violations of the Conditions of Approval to be refunded at completion of the project (including landscaping) per the approved plans.

New Home Construction is defined as removal and replacement of 50% or more of existing walls. All fees and penalties subject to a 4% escalation to be calculated at Jan 1st each year after January 1st, 2019.

PLEASE NOTE: Your fees help support road and gate maintenance.

2) PENALTIES

a) The Association has the right to liens on properties on which there exist violations of these regulations, which are not corrected in a timely manner. The amount of liens shall be commensurate with the expense the Association incurs to correct the violation. Those structures or other items in existence on the original date of issuance of this document and covered by the terms of this document shall be "grandfathered".

In addition to any other remedies at law or equity that the Association or the Architectural Committee may have, any violation of the rules and regulations may be enjoined by a superior court having jurisdiction over the project. The prevailing party in any such litigation shall be entitled to reasonable attorney's fees and costs.

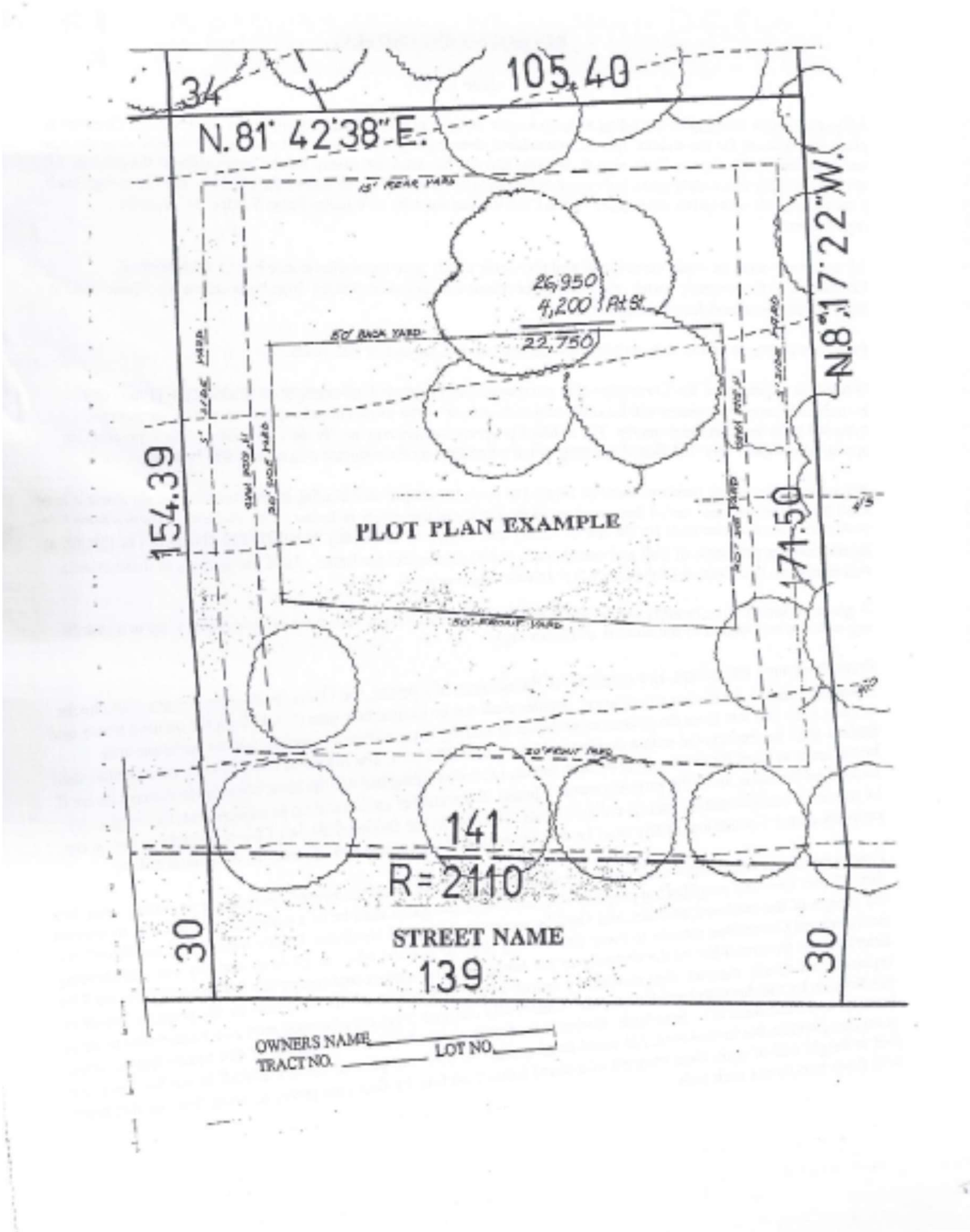
2) Fines for violations of the Conditions of Approval:
   a. First Complaint: $500
   b. Second Complaint: $1000
   c. Third Complaint: $2500
   d. Fourth Complaint: $3000
   e. Fifth Complaint: $3000

3) Appeals of the decisions of the Architectural Committee to the Association may be made at the next regularly scheduled Board of Directors meeting following notification to the owner or his agent by the Architectural Committee of its decision.

Penalty Procedure:

1. The Architectural Committee reacts only to neighbor complaints and will not be pro-active in enforcing the conditions of approval.
2. Owners must send an email with "Violation" in the subject line to the PBCA Board and the Architectural Committee stating the violation of Conditions of Approval. The complaint should include: The violation, the time and date and a date stamped picture would also be beneficial.
3. Owners are given a 3 violation grace period before PBCA assesses any penalties.
4. Each complaint will be followed up with a timely communication with the owner so that he/she can rectify the situation.
5. After 3 violations, any repeat violation will be forwarded to the board for assessing a fine per our Conditions of Approval. (i.e. if a condition other than the first 3 is violated, then the owner will get a warning and not a fine) The board may assess a penalty by majority vote.
6. The PBCA Secretary will send a letter stating the amount that has been deducted from the Owner/Applicants deposit.

Example Plot Plan:



Revisions to Building Standards And Architectural Requirements

REVISED EQUINE CRITERIA

June I, 1991

All persons now keeping or intending to keep horses on their property must submit to the Architectural Committee plans in duplicate for the stables, fences, and related planning together with a plot plan or sketch indicating the size and location of all property lines, streets, houses, and activity areas necessary for the application of the criteria. All applicants shall sign a statement, indicating acceptance of these criteria in lieu of the CC&R's. Failure to sign such a statement will necessitate invocation of the CC&R's and the City of Rancho Palos Verdes "Q" District regulations.

All approvals shall be made conditional and revocable at any time on written notice by the Architectural Committee to the property owner, explaining the reason for such cancellation. Non-compliance with these criteria shall constitute reason for cancellation.

Permits will expire and be subject to review and re-issue at the end of two years.

When it is requested of the Committee that a stable permit be granted, all contiguous (including all road center boundaries) property owners will be consulted and advised of the intention to keep horses and of the number intended to be kept on the property. The notified property owners may notify the Committee of their position, or appear at a regular monthly Board meeting, when a decision on the issuance of a permit will be made.

Regardless of acreage, residents shall be limited to three horses per membership in the Association; all animals kept shall be for the personal use of the members of the family of the owner or lessee of the property. Where a bona fide need exists for extra animals for the use of family members, a variance may be sought and obtained. The minimum square footage per horse of stall and corral space is 400 square feet per horse. As of the printing of these criteria this minimum is reflective of the City's "Q" District requirements.

A grace period of three months will be given to come into compliance with these criteria; foals of up to a year in age will not be counted in the number of horses kept.

Property owners will accept, as a condition of the issuance of a permit, the Committee's right to make spot checks of the premises to determine compliance. Stables shall not be located less than 35 feet from the owner's house, and not less than I00 feet from the nearest other house or activity area, such as swimming pool or barbeque area. Stables shall be constructed with a minimum of three sides and roof. The materials used for such construction shall be the same as used for the property owner's house, i.e. wood siding painted the same color as the owner's house if located on the same lot as the property owner's house. If the stables are located on an adjacent lot, the stables can be painted a complimentary natural color or white. The roof of the stables shall. be of the same style as that of the property owner's house and in any case, be of a fire retardant type to prevent, if possible, the spread of fire.

Fences confining the animals shall not be located less than 50 feet from the nearest other house or activity area, less than 25 feet from the neighboring property line; all fences and gates shall be of a construction sufficient to prevent the escape of the enclosed animals, and shall be maintained in good condition. By the term "good condition", the Architectural Committee intends to mean the fencing shall be painted white at all times and any sections showing deterioration from weather or the chewing of the horses or other causes that render the fencing unsightly shall be repaired in a timely manner, that is within a month of the observance of the condition by the property owner or notification by the Architectural Committee. Electrically charged wires may be used only as a supplement to other fencing, and must meet U.L. Standards. Barbed wire fences are prohibited. A minimum of 400 square feet per horse is required within the fenced area. All wood fencing shall be three rail painted white and shall be not less than four feet in height and of equivalent strength of a wood fence with four-by-four inch posts, no more than ten feet apart, with three two-by-six inch rails.

A weatherproof sign listing the name and address of the person responsible for the animals must be posted for information in the event of escaped animals or a fire or other emergency. In addition, a halter and lead rope for each animal will be provided in an accessible location in case of emergency.

Each property owner or lessee is responsible for the continuous maintenance of sanitary conditions including but not limited to the cleaning of corrals, stables, barns, and other areas to which animals have access, and for the disposal of manure and other, refuse. Animal waste shall not be allowed to accumulate, since this is the prime cause of complaints from neighboring property owners, and must be disposed of by removal frequently enough to control insect and minimize offensive odors. Effectiveness of fly control will be determined by inspection upon complaints from neighboring residents.

Each lot and structure shall be maintained so that there is no standing surface water or ponding within areas in which large domestic animals are kept.

All buildings used for the keeping of large domestic animals and all corral or enclosure fences shall be constructed and maintained in a neat and orderly condition and kept in good repair. Landscaping or other screening as appropriate must be provided for stables, barns, corrals, and stored hay.

Small domestic animals, poultry, birds, etc. may not be kept in numbers sufficient to cause nuisance to neighboring residents. Validated complaints from neighboring residents as to noise and other nuisance factors shall determine when numbers are excessive.

I, we, do hereby accept the Revised Equine Criteria of the Portuguese Bend Community Association Architectural Committee, dated June 1, 1991 in lieu of the standards set forth in the CC&R's of said Association.

Date: ____ Name:

Name: ____ Address:

CLARIFICATION OF BUILDING REGULATIONS AND ARCHITECTURAL STANDARDS

A (6) P.2

To Read:

In case of .... any and all accessory facilities. Horses may not under any circumstances be kept on a vacant lot unless the property of the owner of the adjoining residence.

This clarification was made on March 12, 1993 by telephone vote of the Board of Directors. The vote was unanimous in favor of the above clarification.

Amendments to Current Architectural Standards
Portuguese Bend Community Association
October 1, 2010

1.) Section III - FENCING, B) TYPES OF FENCING, shall be modified to clarify that solid wood fencing of a natural color shall be allowed on lot lines between properties, provided there is a residence on at least one of the properties, and further provided both owners of the directly affected lots are in agreement with the proposed fence. Said fence shall be no closer to the street than the front of the house and shall comply with all height and setback requirements.

2.) Remove Amendment #4-adopted May 13, 2002
L.)Detached Accessory Buildings 2)P.7:
Clarify that no Freestanding Accessory Buildings may be built prior to construction of a residence.

3.) Building Hours:
Building Hours for any construction and maintenance trades shall be allowed only between the hours of 7:30 AM to 5:30PM Monday through Friday, and 9 AM to 1 PM on Saturday. No construction or maintenance trades shall be allowed to work on Sunday and/or holidays.

4.) Drainage system impact:
All drawings for new construction submitted to Architectural Committee for approval shall show 1.) impact of drainage and water flow to adjoining property and/or streets and 2.) plans to contain or restrict excess flow.

5.) Construction traffic parking:
Parking for construction sites to be limited to "on-site" parking, with street parking limited to loading/un-loading only. Limited Variances will be granted on a case by case basis.

CHANGES TO ARCHITECTURAL STANDARDS – March 2012

IV. PROCEDURES (Superseded)

A) FILING PLANS

2) Association support of applicant following final approval of plans by the Board of Directors, based on recommendation of the Architectural Committee. The president of the association will stamp the applicant's final plans and provide the applicant with a cover letter of support and a copy forwarded to the City of Rancho Palos Verdes Planning Department. A Final Construction Approval Letter will be provided to Applicant in exchange for a final payment well as a signature of Applicant, acknowledging understanding of certain issues revolving around Scope of Approval, Approval Term Expirations, Ownership Changes, Drainage, etc.

3) Fees are as follows:

- **a.** New Home Construction (see definition below)
  - **i.** Filing Fees
    - **1.** $1,500 for Architectural Review.
  - **ii.** Construction Fees
    - **1.** Based on a price per square foot of one dollar ($1.00) per square foot of residence, out-buildings, garages, etc.
- **b.** Addition to Existing Structure (including room additions, out-buildings, garages, etc.)
  - **i.** Filing Fees
    - **1.** $500 for Architectural Review
  - **ii.** Construction Fees
    - **1.** Based on a price per square foot of one dollar ($1.00) per square foot of room additions, out-buildings, garages, etc.
- **c.** Interior Remodel or Home Improvement
  - **i.** Filing Fees
    - **1.** NONE
  - **ii.** Construction Fees
    - **1.** NONE

New Home Construction is defined as removal and replacement of 50% or more of existing exterior walls.

PLEASE NOTE: Your fees help support road and gate maintenance.

I. BUILDING DESIGN AND CONSTRUCTION

A) General Building Requirements

9) The maximum height permitted from finished floor level of residence to finished grade is 5'-0”. Encouraged are residences designed to hug the ground and provide low silhouette. The difference between the finished grade and finished floor level across on elevation should average no more than 2'-6” with maximum difference of 5'-0”. In addition, a maximum difference between existing or “natural grade” and finished grade must be 3’-6”.

4/1/2013 Amendment to the Architectural Standards

Note: Similar amendments were approved by the PBCA board of directors on August 3, 1992 and included in the minutes of that meeting.

REAL ESTATE SIGNAGE: No Real Estate "For Sale" signs are permitted with the exception of temporary "Open House" signs which are only allowed during the day of the open house. Agents may provide the PBCA board or Secretary with addresses of properties for sale including agent phone numbers. The information will be posted on the community bulletin boards at both gates.

OPEN HOUSE TIMES AND PROCEEDURE: Public Open House permitted on the first Sunday of each month from 1pm to 4pm. Brokers Open House permitted on the first Tuesday of each month (or the Tuesday preceding the Public Open House) from 11am to 2pm. Agents may request opening of the access gate during the open house hours and must not post the gate code. Parking is not allowed on streets and traffic laws will be enforced.

7/1/2013 Amendment to the Architectural Standards

Section IV, Subsection A #2. Filing Plans:

Amend paragraph to add: Violations of the Conditions of approval will result in a penalty of $500 for each infraction, paid to the PBCA. A deposit of $2000 will be collected in addition to the Final Approval Fee. Any remaining balance after any fines are deducted will be refunded to the applicant after completion of the project.

Section IV, Subsection E. Construction

Amend Subsection E to add:

Large truck deliveries should enter and exit from the Peppertree Gate. Semi-trucks allowed for heavy equipment delivery only. All other deliveries limited to 3 axle or smaller trucks.

Section II, Subsection Site Requirements H. Excavations

Amend Subsection H. to allow Export of soil with approval of the architectural committee and continue to prohibit import of soil.

10/5/2016 Proposed Architectural Standards Changes (Rev H)

SITE REQUIREMENTS , Section 2, Paragraph E. Easements

Is:

B) EASEMENTS

1) Easements are perimeter areas of one's property dedicated to the Community Association and are reserved for roads, streets and public utilities. Hence, no planting, building, pool fence, pole (except public utility), drainage structure, grading, paving or any obstruction may be placed on any easement.

Add Sub Paragraph:

2) Parking is prohibited on all PBCA roads and right-of-ways. Upon complaint from any PBCA member, the board will post a warning on the vehicle and, after 24 hours, may have any car, truck, trailer, or other vehicle located on PBCA roadways towed at the owner's expense.
3) Owners are responsible for maintaining trees and foliage clear of the roadways. No foliage may extend past the edge of the paved roadway less than 13' in height, to provide safe clearance for cars and trucks. In the event that an owner does not maintain the road clearance, the board will provide a 30 day notice and shall have the foliage trimmed at the owner's expense. The expenses may be added to the annual assessment fees.

In Building Design and Construction

L) Detached Accessory Structures

Add: "and Sheds"

Add section 6):

6) Sheds of under 120 SF are allowed within rear setbacks. The height must be no more than 8' from finished grade and located more than 5' from the property line, unless the written approval is obtained from the adjacent property owner. Sheds must be painted an earth tone color.

12/3/2018 Architectural Standards Changes (Revision J)

Added to Conditions of Approval:

10. Owner must post a sign at the site with contact information so that neighbors can call with any complaints regarding the operation of construction

16. Concrete Deliveries: Only one truck on site at a time. Second and third trucks can stay on Narcissa or Sweetbay. No more than three trucks in PBCA at a time. All trucks must enter and exit through the Peppertree Gate.

17. Noise from radios or other amplified sound devices shall not be audible beyond the property.

Change to Penalties for violations of Conditions of Approvals (Approved 10/5/2018)

Change to Building Fees (Approved 12/3/2018)

Prohibit Mobil, Pre-Fabricated and Modular Homes construction

Added Job Site Sign (pg38)

Portuguese Bend Architectural Review Application

Applicant:		Date:	
Address:		Phone:	
Email:			
Property address (if different)			
Project Description:			

Filing Fees for Conceptual Approval: House* ($1, 500 + plot plan and elevations), Interior Remodeling < 1000SF (No fee), Exterior Remodel/Garage/Accessory Structures ($500 + plot plan and elevations)

Construction Fees for Final Approval: House* or Remodel > 1000SF ($5.00/SF + Final Plans: Plot, drainage, elevations, landscaping, grading) Exterior Remodel/Garage/Accessory Structures : ($5.00/SF + Plot, elevations, grading/landscaping if changed)
*New home construction defined as removal or replacement of more than 50% or exterior walls. Fee increase 4% per yr after 1/1/2019

Please include information required for various approvals with a check to the Portuguese Bend Community Assoc. and mail to: Portuguese Bend Architectural Committee, Portuguese Bend Community Assoc, PO Box 2908, Palos Verdes Peninsula, Ca 90274, or hand deliver to member of Architectural Committee, or email to Gordon.Leon@gmail.com

Variance Notification Letter

Date

Applicant:

Address:

Re: Property address____

To Whom It May Concern:

Please be advised that your current plans for the proposed new residence / new addition located at the property address indicated above does not comply with the current PBCA Building Regulations/ Architectural Standards for the following reasons:

____
____
____
____
____
____

If you would like to pursue further action, please follow one of the following procedures:

1. **Make adjustments to your plans and resubmit for further review.**
2. **Complete the Request for Variance Form provided below.**

If you have any further questions, please contact me at __________________________________

Regards,

Gordon Leon

PBCA Architectural Committee

Portuguese Bend Community Association

Request for Variance to Building Regulations/ Architectural Standards

Date: _________

Applicant: ____

Address: ____

Phone number & Email: ____

Property address: ____

Please provide a detailed description of your variance request:

____

____

____

Please state the exceptional or extraordinary circumstances or conditions applicable to your project which do not generally apply to other properties in Portuguese Bend.

____

____

____

Please describe measures taken to mitigate variance conditions and meet the spirit of the Architectural Standard Requirements.

____

____

____

____

Attach drawings (with dimensions), worksheets, records, or other documentation that support your variance request. You may also be requested to gain approval from your adjacent neighbors.

ARCHITECTURAL COMMITTEE ACTION

Date & Description of restriction:

Your request has been: APPROVED DENIED

Conditions of Approval to be included in Construction Drawings and provided to all contractors working on site:

PBCA Architectural Conditions of Approval

1. Construction work may only be performed on Monday through Fridays between 7:30am and 5:30pm, and from 9:00am to 1:00pm on Saturdays
2. All construction vehicles must be parked on site and may not be parked on the streets within PBCA. The entrance gate parking area may be used if requested in advance and vehicles will be required to display parking passes.
3. Owner must post a sign at the site with contact information so that neighbors can call with any complaints regarding the operation of construction
4. All construction debris and trash must be contained on site and removed at regular intervals.
5. Large rammers, vibrators, or impactors, or any other vibration generating compaction method, may not be used for compaction associated with pad or driveway grading, due to the sensitivity of the land slide and risk to neighboring properties.
6. Storm water must be controlled to keep mud from draining on to the streets.
7. Contractor shall not track mud on to the streets from construction vehicles
8. Large truck deliveries must enter and exit from the Peppertree Gate. Semi-trucks allowed for heavy equipment delivery only. All other deliveries limited to 3 axle or smaller trucks.
9. Concrete Deliveries: Only one truck on site at a time. Second and third trucks can stay on Narcissa or Sweetbay. No more than three trucks in PBCA at a time. All trucks must enter and exit through the Peppertree Gate.
10. Noise from radios or other amplified sound devices shall not be audible beyond the property.
11. Owner is responsible for any damage to the PBCA streets, gates, or structures, caused by vehicles associated with this construction project.
12. Export of soil allowed with approval of the architectural committee and import of soil prohibited.
13. Landscaping plans must accompany architectural plans and be installed within two months of completion of improvement.

14. A refundable $10,000 Deposit is required to ensure adherence to these conditions. The remaining balance of the deposit will be refunded at the completion of landscaping per approved plans.

Fine Schedule:

First Complaint: $500

Second Complaint: $1000

Third Complaint: $2500

Fourth Complaint: $3000

Fifth Complaint: $3000

15. A copy of these conditions must be included with the notes on the final drawings and provided to each of the contractors working on this project and posted on the job site.

Penalty Procedure:

1. The Architectural Committee reacts only to neighbor complaints and will not be pro-active in enforcing the conditions of approval.
2. Owners must send an email with "Complaint" in the subject line to PBCA and the Architectural Committee stating the violation of Conditions of Approval. The complaint should include: The violation, the time and date and a date stamped picture would also be beneficial.
3. Owners are given a 3 violation grace period before PBCA assesses any penalties.
4. Each complaint will be followed up with a timely communication with the owner so that he/she can rectify the situation.
5. After 3 violations, any repeat violation will be forwarded to the board for assessing a fine per our Conditions of Approval. (i.e. if a condition other than the first 3 is violated, then the owner will get a warning and not a fine) The board may assess a penalty by majority vote.
6. The PBCA Secretary will send a letter stating the amount that has been deducted from the Owner/Applicants deposit.

Adopted May 2, 2016 by motion of PBCA Board of Directors

WORK RULES

General Contractor:

Phone:

Email:

1. **CONSTRUCTION AND DELIVERY HOURS**
   7:30-5:30 MONDAY – FRIDAY
   9:00-1:00 SATURDAY
   NO WORK ON SUNDAYS OR HOLIDAYS
1. **NO PARKING ON PBCA STREETS**
2. **ALL DELIVERIES THRU PEPPERTREE GATE**
3. **ONLY ONE CONCRETE TRUCK ON SITE AT A TIME, STAGING ADDITIONAL 2 TRUCKS ON NARCISSA OR SWEETBAY. LIMIT OF 3 TRUCKS IN PBCA AT A TIME**
4. **CLEAN UP MUD ON STREETS IMMEDIATELY**
5. **NO LOUD MUSIC AUDIBLE OFF SITE**
6. **OBEY ALL TRAFFIC RULES, STOP SIGNS, NO SPEEDING**

$500 to $6,000 FINES

Laminate and Post on Jobsite Fence (24” x 36” Min)

To: Octavio Silva
Subject: RE: Amended EIR for proposed amendments to the Landslide Moratorium Ordinance that pertains to 31 vacant lots (non-Monks Plaintiffs) in Zone 2 of the Landslide Moratorium Area.

-----Original Message-----
From: Jennifer Jones [mailto:nonmonks@yahoo.com]
Sent: Wednesday, December 12, 2018 10:50 PM
To: Octavio Silva <OctavioS@rpvca.gov>
Subject: Amended EIR for proposed amendments to the Landslide Moratorium Ordinance that pertains to 31 vacant lots (non-Monks Plaintiffs) in Zone 2 of the Landslide Moratorium Area.

Dear Mr. Silva:

Thank you for providing the Notice of Preparation for the proposed amendments to the RPV Landslide Moratorium Ordinance.

We are in support of resuming an update to the EIR Report which was completed four years ago. We own a non-monk lot in Zone 2 and have been trying to build our home on our lot for the past five years. We purchased this lot in 2013 when our kids were in Kindergarten and Elementary school. We moved here right after we purchased this lot, renting an apartment with the expectation that we would be able to start building our home soon after the EIR decision, that would make the remaining 31 non-monk lots buildable. We had reason to believe this, as we could see construction in Zone 2 on the Monk lots all around us. We trusted the city officials would make a fair and unbiased decision based on the recommendations in the EIR study.

My kids are now in Middle School and High School. Our dream to build our home is still on hold due to the decision made to table the EIR. Since 2013, we have seen construction of Monk lot homes in Zone 2. There are houses all around my lot. The house right behind my lot is a Monk lot home that was built in 2018. This goes to show that there is stable land all around in Zone 2 but I cannot build on mine even though I pay taxes on it and maintain the upkeep. I hope this study when completed will give us the long awaited opportunity to build our home and live in this beautiful city before our kids move out for good.

Thank you for this consideration.

Sincerely,

Subhash & Jennifer Mendonca

To: Octavio Silva
Subject: RE: comments on your 8 November notice of preparation: proposed amendments to the Landslide Moratorium Ordinance

From: Neil Siegel [mailto:siegel.neil@gmail.com]
Sent: Friday, November 09, 2018 8:53 AM
To: Octavio Silva <OctavioS@rpvca.gov>; Neil Siegel <siegel.neil@gmail.com>
Subject: comments on your 8 November notice of preparation: proposed amendments to the Landslide Moratorium Ordinance

Dear Mr. Silva:

Thank you for providing the Notice of Preparation for the proposed amendments to the RPV Landslide Moratorium Ordinance. I offer the following comments:

Portuguese Bend was divided into geologic zones in a report commissioned by the City of Rancho Palos Verdes in 1993. This document was written by geologist Dr. Perry Ehlig. In this report, Zone 2 was given the title "Subdivided land unaffected (emphasis added) by large historic landslides"; Dr. Ehlig told me that he chose that particular title for Zone 2 because he found no evidence of recent or active landslide activity in Zone 2 (in contrast to some of the other zones defined in the same report, in which Dr. Ehlig did find evidence of active landslide activity). In the section of this report describing his findings about Zone 2, Dr. Ehlig stated that "The undeveloped lots . . . could be developed without adversely affecting the stability of the large ancient landslide" (emphasis added).

All of the undeveloped properties under consideration in your proposed ordinance are already zoned for single-family residences. Therefore, normal considerations of development – density, traffic, and so forth – ought to be considered resolved by that zoning.

Given that these properties are already each zoned for single-family residences, the only reasonable and proper basis for denying the owners of these properties the right to develop their properties would be proof that it would be unsafe. A court, however, found that it was safe to develop lots within Zone 2 – the so-called Monks properties. The City of Rancho Palos Verdes agreed with this assessment that such development was safe, as memorialized by their change to the City ordinance that allowed development on the Monks lots. Since this change to the City ordinance allowing development on the Monks lots, some of them have in fact safely been developed.

The late Dr. Ehlig's written opinion was that all of the zone-2 lots could safely be developed, and that the geology was similar across all of the lots within Zone 2. This was also the opinion of the late Dr. Robert Douglas, a professor of geology at USC who studied the landslide and Zone 2 for decades, and also chaired the Abalone Cove Landslide Abatement district for many years. I personally knew both Dr. Ehlig and Dr. Douglas, and learned from Dr. Douglas for many years about the landslide during my long tenure as a board member of the Abalone Cove Landslide Abatement District, and during my (overlapping) tenure as a member and president of the Portuguese Bend Community Association.

So, the City's proposal to proceed with change the Landslide Moratorium Ordinance (after completing the EIR) so as to allow development on the remaining (e.g., non-Monks) lots within Zone 2 is the fair and just thing for the City to do. Forty years of study by experts (e.g., Ehlig and Douglas) consistently concluded that it would be safe, and the experience of the houses built by those of the Monks plaintiffs provides a tangible indication that such development on the lots within Zone 2 is safe.

I also support the specific language offered in your current proposal, without change.

I applaud the City's willingness to move forward on this matter, and urge that you do so.

Thank you for listening to my opinion on this matter.

Dr. Neil Siegel
(The IBM Professor of Engineering, USC)
(Member, National Academy of Engineering)

To: Octavio Silva
Subject: RE: EIR - UPDATE

-----Original Message-----
From: Melinda Politeo [mailto:m.politeo@gmail.com]
Sent: Wednesday, December 12, 2018 8:35 AM
To: listserv@civicplus.com
Cc: Octavio Silva <OctavioS@rpvca.gov>
Subject: Re: EIR - UPDATE

>> Dear Mr. Silva,

>> My name is Melinda Politeo, and I am the owner of an undeveloped lot in zone 2, Portuguese Bend RPV. My parents, Frank and Zdenka Politeo, purchased this lot in 1962 before any building moratorium was in effect. My parents paid fair market value for a buildable lot and planned on constructing a family home on our lot.
>>
>> Even though my mother died at 92 a few months ago, and my father is now 94, they never gave up hope that one day our family would be able to build a home on our Portuguese Bend lot.
>>
>> My corner lot is located at the south end of Ginger Root Lane, where Ginger Root intersects with Narcissa Drive, directly across the road from the equestrian center. APN is 7572-014-016.

>> Abutting my lot are occupied homes that were constructed before 1962, and both my lot and these homes have been and continue to be solid as a rock.

>> Therefore, my family supports completing the Zone 2 EIR as outlined on the NOP.

>> Thank you,
>> Melinda Politeo
>>
>>
>> Sent from my iPad

To: Octavio Silva
Subject: RE: I am in favor of updating the Zone 2 EIR.

From: Jesus Jesse Gutierrez [mailto:lamaria.jesus43@gmail.com]
Sent: Tuesday, December 11, 2018 9:17 AM
To: Octavio Silva <OctavioS@rpvca.gov>
Subject: I am in favor of updating the Zone 2 EIR.

To the City of Ranch Palos Verdes,

I am one of the 31 lot owners and I am in favor of updating the Zone 2 EIR.

My name is Jesus Jesse Gutierrez in 1992 my wife and I purchased two lots from the estate of the late Frank Vanderlip. At the time that we purchased the lots, our real estate agent Sharon gave us confidence the lots could be developed. The general assumption was that the CBA board would allow homes in the zone two area to be built if they followed and met certain criteria from the planning department and geologist of the city of Rancho PV. It was with that understanding that we purchased the lots.

It's now been 26 years going back-and-forth to determine whether Zone
2 lots can be developed. The rest of us lot owners still have our properties and would like to have a process in place for development.
In the past few years all the empty lots surrounding my 2 lots have been built on. Ideally we would like the moratorium to be lifted completely. Baring that it would be helpful for a process granting exceptions to the existing moratorium to be put in place.

I hope that you can look at the facts that have already been compiled by independent contractors, geologists, and the RPV planning department, and finally put this matter to rest.

Sincerely yours,

Jesus Jesse Gutierrez

To: Octavio Silva
Subject: RE: In favor of Zone 2 EIR updates

From: Maria Gutierrez [mailto:rainier@q.com]
Sent: Tuesday, December 11, 2018 9:44 AM
To: Octavio Silva <OctavioS@rpvca.gov>
Subject: In favor of Zone 2 EIR updates

To the Rancho Palos Verdes City Council:
I am respectfully asking you to update the Environmental Impact Report from 2012 in order to create a process for the 31 lot owners of Zone 2 to be able to submit applications to build on their lots.
Since the mid-90's, when my parents purchased two lots (44 Cinnamon Lane and 55 Narcissa Drive) in Rancho Palos Verdes, we have been given assurance that the Zone 2 landslide building moratorium would be lifted one day.
It's now been years going back-and-forth to determine whether remaining 31-Zone 2 lots can be developed. The surrounding Monk lots have all been developed, while the remaining 31 lot owners still have our properties and would like to have a process in place for development. In just the past few years all the empty lots surrounding my 2 lots have been built on. Ideally we would like the moratorium to be lifted completely, baring that it would be helpful for a process granting exceptions to the existing moratorium to be put in place.
Thank you for your consideration and I ask that you proceed with updating the Zone 2 EIR landslide moratorium.
Maria Gutierrez, Trustee
APN#'s 7572 010 019, 7572 010 010

To: Octavio Silva
Subject: RE: Notice of Preparation of an EIR pertaining to Zone 2 in Portuguese Bend

From: suzanne black [mailto:suzannejoyblack@yahoo.com]
Sent: Wednesday, December 12, 2018 8:33 PM
To: Octavio Silva <OctavioS@rpvca.gov>; Octavio Silva <OctavioS@rpvca.gov>
Cc: suzannejoyblack@yahoo.com
Subject: Notice of Preparation of an EIR pertaining to Zone 2 in Portuguese Bend

December 12, 2018

Octavio Silva
Senior Planner
City of Rancho Palos Verdes, Planning Division
octavios@rpvca.gov

Subj: Notice of Preparation of an EIR pursuant to the Requirements of the CEQA for proposed code amendments to Exception "P" of Title 15.20.040 (Landslide Moratorium Ordinance) of the Rancho Palos Verdes Municipal Code pertaining to Zone 2.

Dear Octavio,

My husband and I are residents at 13 Fruit Tree Road in Zone 2 of Portuguese Bend. We also own a Zone 2 Lot at 11 Fruit Tree Road. We are in favor of moving forward with updating the EIR that was originally circulated in 2012.

There have been numerous Geological Studies analyzing Zone 2 for the suitability of construction. Most, if not all, have determined that Zone 2 is safe and construction will not have a negative impact on the community.

In addition, a detailed Final EIR was presented to the City Council approximately four years ago. The City chose to "table" their decision and has now brought up the EIR for updating.

Allowing the remainder of the Zone 2 lots to be developed is the right and lawful thing to do. Land owners should have the right to develop their land that has already been zoned for residential use. Let's not have continued litigation over this matter. I commend the City for moving forward and working through the CEQA process.

Please confirm your receipt of this letter that was "sent" via email on December 12, 2018 at 8:32 pm.

Thank you.

Mike & Suzanne Griffith

To: Octavio Silva
Subject: RE: Notice of Preparation of an EIR pertaining to Zone 2

December 6,2018
Dear Mayor and Council Members, Ara Miharanian and Otavio Silva,
Because of the importance to our community and the City of the subject below I am taking the liberty of including the Council Members in this e-mail.
Jeremy Davies

NOTICE OF PREPARATION OF AN EIR PURSUANT TO THE REQUIREMENTS OF CEQA FOR PROPOSED CODE AMENDMENTS TO EXCEPTION 'P' OF TITLE 15.20.040 (LANDSLIDE MORATORIUM ORDINANCE) OF THE RPV MUNICIPAL CODE PERTAINING TO ZONE 2

In response to the City's request for comments on the scope and content of the above EIR I submit the following matters which require addressing in a new EIR (not merely "updated" since so many of the public’s concerns were not addressed and so many of the assertions were unsubstantiated as required by CEQA-see below).

Suggestions regarding the scope of the EIR should consider matters summarized in a)-e) below which are supported by the detailed comments contained in items 1-5:

a) Incorporate the Portuguese Bend Feasibility Study recommendations into the EIR (items 1,2,4 and 5 below).
b) Complete the Hydrology and Drainage Engineering and Analysis Studies prior to the EIR mitigation analysis (items 1,2 and 5 below).
c) Perform an independent review and assessment of the Portuguese Bend hybrid sewer system prior to the EIR mitigation analysis (items 3 and 4 below).
d) Assess roadway and pavement integrity prior to EIR mitigation analysis (items 1,2 and 4 below).
e) Delay issuance of building permits until Altamira Canyon and Portuguese Bend Feasibility Study recommendations are in place (items 1,2,3 and 5 below).
f) Ensure that substantial evidence be provided in the EIR for relevant information to support a conclusion- CEQA section 15384 requirement.

1) The notice acknowledges that the EIR must address the public's comments and input which were not addressed in the draft EIR circulated in 2012. Your notice also acknowledges the need for the ordinance revisions to be consistent with the PBCA private architectural standards. The 2012 draft EIR was shelved partially as the result of it being significantly based upon unsupported and inadequately detailed assertions contained in a

"LA County report" that could not be found. These unsubstantiated assertions concluded that the hydrology and drainage system, the access roadway and pavement integrity systems were designed appropriately for the full build out of the 111 lots in Zone 2 (of which the 47 project lots were included). The quoted report was apparently prepared in the late 1940s before the landslide even began, therefore rendering it totally inappropriate as a source upon which to be relied. Furthermore the size of residences, quantity of hardscape, number and size of vehicles, size and weight of construction equipment would have been very different at the time of the report.

The 2012 draft EIR does not disclose the fact that since the report on which so many assertions were based was also prior to the additional up-slope run off into Altamira Canyon from the hardscape of the developments including Del Cerro and Island View and septic tank systems. The addition of upstream development has placed additional drainage stress on Zone's 2 and 5 that was not anticipated with any Portuguese Bend development. The Draft EIR does not disclose this significant impact. Nor does it disclose that in a November 4, 2015 staff report the City recognized drainage deficiencies in Altamira Canyon and put out an RFP for a consultant to bid on correcting those deficiencies. The staff report stated that the "Altamira Canyon Drainage Project has been identified as a project that will provide additional safeguards to the Abalone Cove Landslide area. Reduction/minimization of groundwater infiltration is a primary target when considering methods to slow movement in landslides". The EIR should recognize this drainage deficiency as a significant impact and use this DB Stephens & Associates RFP as a proper mitigation for the impact of these additional 47 homes.

Since the 2012 draft EIR was prepared, the Council has held multiple meetings to address the Portuguese Bend Landslide Complex (PBLC). In August 2018 a Feasibility Study (FS) was approved by the Council. Staff and the FS recognize that hydrologic and engineering analysis and evaluation is required to identify where, how and to what extent storm water infiltrates into the groundwater into the Portuguese Bend Landslide Complex (PBLC). The City Landslide Committee also identified the need for a "complete characterization of the hydrology of the area". In a number of other areas of the FS the consultants identify the need for the landslide stabilization remediation to be implemented over an area larger than the PLBC or Red Zone itself. Because any construction development in Zone 2 impacts both Zones 5 and 6 (as explained below) and the PBLC, a professional approach to the new EIR scope must require that the matters below be an integral part of filling significant data gaps not addressed in the 2012 draft EIR. CEQA section 15384 requires that substantial evidence be provided for relevant information to support a conclusion.

There are a number of studies and remedial/mitigation actions that are required before consideration of additional development in Zone 2. Several of these studies and remediation actions were requested by the public and were not adequately responded to by the 2012 draft EIR because it relied upon unsupported assertions.

The new EIR must require that the hydrology and drainage system, the access roadways and pavement integrity and the sewer systems are supported by current engineering and hydrology studies in order to support a conclusion that their design is adequate for the additional build out without negatively impacting the community as a whole or further aggravating landslide movement in the area, both Zone 2 and adjacent areas of the community. Remediation actions prior to any further development should be identified and should be consistent those identified by the FS as they apply to Zones 2, 5 and 6.

Failure of infrastructure and damage to homes due to further development approved by the City before the implementation of remediation measures could result in disastrous expense and hardship. Because the development could be construed as an imposition by the City on the PB community the community cannot be expected to bear any resultant expense. The City must recognize that many of the community are elderly and on fixed income pensions.

2) Hydrology and Drainage System

Prior to any development of the Monks properties much of the storm water in Zone 2 was absorbed by the soil of the undeveloped lots. Additions to hardscape through construction in Zone 2 will add to the volume of storm water entering Altamira Canyon and fissures in Zone 5 and the PBLC, even if there is some control of storm run off from roofs and gutters. Furthermore, Zone 5 which is located in an active landslide system (Abalone Cove) provides one of the only two access roads for traffic entering Zone 2 namely Narcissa Drive (see below the issues regarding Access Roads and Pavement Integrity).

Since only 5 of the 16 Monks properties have been constructed and since there has not been a significant long term rain event in the last six years the additional storm water runoff from Monks properties entering Altamira Canyon and landslide fissures (versus its absorption into the previously undeveloped land) has not been adequately evaluated. This requires specific engineering and evaluation similar to that suggested by the FS. CEQA guidelines require that an EIR must analyze the accumulative impacts of the project to the immediate and adjoining environments (see further comments on "immediate and adjoining relationships" in Zones 5 and 6 in comments 4 and 5 below).

The FS (and the public hearings on the landslide) calls for an understanding of the watershed including the canyons that source water that infiltrates into the ground water in the PBLC. This understanding is needed to determine the remediation measures. This should be done before further development in Zone 2. FS calls for a full engineering and hydrologic study be made before the remediation measures are designed to provide liner and channel systems, including for Altamira Canyon, which passes through Zone 2 and 5 and impacts the "Red Zone" and the PBLC.

The new EIR should require an engineering analysis and evaluation of the adequacy of the existing storm water drainage system in Zone 2 and how it impacts the adjacent Zone 5. The evaluation should assume different levels of storm water occurrence and a full build out of the 47 properties. Zone 5 is an active landslide area. Zone 2 uses the streets to channel storm water into Altamira Canyon and fissures which in turn migrate into the "Red Zone" and other parts of the PBLC which the City is seeking to stabilize through remediation measures eventually recommended by the FS. Implementation of remediation actions regarding Altamira Canyon must be a prerequisite before, and not during or after, any further development can be considered.

3) Sewer System

The current sewer system serving Zone 2 has suffered several failures over the years and this is even before the 16 Monks lots have been built out. In my case we have had our grinder pump replaced multiple times. There have been leakages into the road system. The system as designed appears less than optimum.

The new EIR should require an independent (independent from the City) engineering study to analyze and evaluate the adequacy for additional residences using the current system. This engineering study should confirm that the current system meets all standards and regulations at the State, County, City and County Sanitation Department levels and will meet the demands of an additional 47 residences, taking into account that the average size of properties of any new development will be considerably larger than the pre Monks residences.

4) Access Roads and Pavement Integrity
Access by construction traffic to any Zone 2 developments are dependent upon either Narcissa Drive or Peppertree Drive, both of which transit through active landslide areas. Because of the danger to safety experienced by the community resulting from oversize construction equipment and cement trucks using Narcissa Drive for early Monks contractors, the PBCA Architectural Standards were modified to ban such equipment using Narcissa Drive. It is particularly dangerous at the right hand curve going up Narcissa. The City needs to endorse this remedial action regarding Narcissa Drive for any future development before a serious accident occurs or even results in a vehicle being driven off the road and falling onto Wayfarer Chapel grounds.

Consequently all oversize and heavy construction traffic must use Peppertree Drive. This is a fragile road system located in an even more active landslide area (Portuguese Bend Landslide) than Narcissa Drive (Abalone Landslide).

The new EIR should require a separate engineering study that provides an analysis and evaluation of the condition of Peppertree Drive and its ability to handle the volume and size of all construction traffic without creating new safety risks or damage to the residents and their properties.

Such study should take into account the following:
Substrata soil conditions and land movements and additional vibration from all construction traffic
Include the impact of additional construction traffic and activities related to the construction of a proposed main sewer system planned by the FS to substitute the current septic systems from the residences that border Peppertree Drive the objective of which is to remediate water entering the subsurface of the landslide
Include the impact of additional construction traffic and activities for implementing the proposed horizontal drains adjacent to Peppertree Drive residences planned by the FS
Include the impact of additional construction traffic and activities planned by the FS to introduce extraction and monitoring wells on land adjacent to Peppertree Drive residences
Design and implement any remediation actions needed for safety and protecting the integrity of the roadway infrastructure before to handle additional developments in Zone 2.

5) Geological, Hydrology Studies and Slope Stability

During the presentation to Council of the 2012 draft EIR and contained in many of the comments from the public there was a significant concern regarding the lack of a coordinated specific, (and not boilerplate), hydrology and geological study analyzing and evaluating the factor of stability in Zone 2 for additional development.

The new EIR should require such studies (and it is not adequate to just conclude that resolution #2002-43 was repealed). Such studies should also include the impact on the surrounding areas i.e. Zones 5 and 6 which are directly or indirectly impacted by Zone 2 storm water run off and by storm water run off into Altamira Canyon and other landslide fissures. Zones 5 and 6 will be additionally impacted by increased construction traffic volume. The City and not the Monks case must conclude on the stability standard to be used for development in Zone 2 and this standard must be supported by geological and hydrological data (CEQA section 15384 requires substantial evidence).

As to the relationships of Zone 2, 5 and 6, geologists including the late Bob Douglas (to whom Mayor Duhovic referred below), have stated that the relationship of these Zones, although not well understood, probably do have some hydrological connection. In the August 2018 FS for the PBLC, the City identified current environmental issues of water infiltration into the PBLC including the costs of maintaining Palos Verdes Drive South, the possibility of cutting off emergency access for the community, damage to homes, impacts to a NCCP preserve as well as State designated sensitive tidal areas, and City liabilities. The EIR must disclose these potential impacts.

In addition here are some of the comments of the Council regarding the draft 2012 EIR on August 5, 2014:

Council Member Brooks "This EIR is fatally flawed. We are not just dealing with the drainage and hydrology but this issue of creating a Monks geological standard is really scary because the 1.5 stability standard has been in effect in this City for a long time"
Council Member Misetich "I have the same concerns as Council Member Brooks".
Mayor Duhovic "There will always be debate on an EIR but I defer to you on that. The biggest thing that jumps out at me is the commentary with respect to Altamira Canyon. I know we talked about that -it is a very large project. I step back and look at tragedy after tragedy with mudslides, this that and the other. You know I would be very troubled if something like that were to happen in this particular location but even more if we perpetrated that or allowed it to happen-so I am very sensitive to that. Obviously the testimony of Dr Douglas weighs heavy on me also" (Dr Douglas's testimony on behalf of ACLAD disagreed with the staff findings and he stated that he believed that the Council should reject the EIR).

To proceed with further development in Zone 2 before appropriate studies are made and remediation measures are implemented, that are consistent with public safety and with the landslide stabilization objectives of the FS, could be considered both questionable and illogical.
Respectfully,
Jeremy Davies

To: Octavio Silva
Subject: RE: PBC Zone 2

From: Michael Nopper [mailto:mikenopper@aol.com]
Sent: Tuesday, November 20, 2018 10:49 PM
To: Octavio Silva <OctavioS@rpvca.gov>
Subject: PBC Zone 2

Mike and Peter Nopper
Owner of PBC Zone 2 lot
mikenopper@aol.com
619-761-3172

City of Rancho Palos Verdes
Octavio Silva, Senior Planner
octavios@rpvca.gov.
310-544-5234

Dear Octavio Silva and City Council,

We are the owners of an undeveloped lot on Zone 2. With respect to your time, we will keep this message brief .

First, we appreciate that the City Council re-initiated the process to amend the City's Landslide Moratorium Ordinance to allow all property owners in Zone 2 of the Landslide Moratorium Area to develop on the same terms as the Monks plaintiffs' lots.

Secondly, We strongly support the proposed revisions to the Landslide Moratorium Ordinance to include the revision of subsection P to Section 15.20.040 (Exceptions) to apply to all 47 undeveloped lots in Zone 2.

Sincerely,
Mike Nopper
Peter Nopper

To: Octavio Silva
Subject: RE: PBCA Architectural Standards

From: Gordon Leon [mailto:gordon.leon@gmail.com]
Sent: Wednesday, December 19, 2018 7:05 PM
To: Ara Mihranian <AraM@rpvca.gov>; Octavio Silva <OctavioS@rpvca.gov>
Subject: PBCA Architectural Standards

Ara and Octavio,
I have attached a set of PBCA Architectural Standards. The requirements we would like to see you use are:

Setbacks: 20' sideyard, 60' front yard (from center of road), 50' backyard
Coverage area: less than 25%
House SF: max 4000 SF + 600 SF garage
Single story

I would think these could be justified by reducing drainage.

Here are our conditions of approval for new and major remodels:

PBCA Architectural Conditions of Approval
1. Construction work may only be performed on Monday through Fridays between 7:30am and 5:30pm, and from 9:00am to 1:00pm on Saturdays
2. All construction vehicles must be parked on site and may not be parked on the streets within PBCA. The entrance gate parking area may be used if requested in advance and vehicles will be required to display parking passes.
3. Owner must post a sign at the site with contact information so that neighbors can call with any complaints regarding the operation of construction
4. All construction debris and trash must be contained on site and removed at regular intervals.
5. Large rammers, vibrators, or impactors, or any other vibration generating compaction method, may not be used for compaction associated with pad or driveway grading, due to the sensitivity of the land slide and risk to neighboring properties.
6. Storm water must be controlled to keep mud from draining on to the streets.
7. Contractor shall not track mud on to the streets from construction vehicles
8. Large truck deliveries must enter and exit from the Peppertree Gate. Semi-trucks allowed for heavy equipment delivery only. All other deliveries limited to 3 axle or smaller trucks.
9. Concrete Deliveries: Only one truck on site at a time. Second and third trucks can stay on Narcissa or Sweetbay. No more than three trucks in PBCA at a time. All trucks must enter and exit through the Peppertree Gate.
10. Noise from radios or other amplified sound devices shall not be audible beyond the property.
11. Owner is responsible for any damage to the PBCA streets, gates, or structures, caused by vehicles associated with this construction project.
12. Export of soil allowed with approval of the architectural committee and import of soil prohibited.
13. Landscaping plans must accompany architectural plans and be installed within two months of completion of improvement.

14. A refundable $10,000 Deposit is required to ensure adherence to these conditions. The remaining balance of the deposit will be refunded at the completion of landscaping per approved plans.

Fine Schedule:
First Complaint: $500
Second Complaint: $1000
Third Complaint: $2500
Fourth Complaint: $3000
Fifth Complaint: $3000

15. A copy of these conditions must be included with the notes on the final drawings and provided to each of the contractors working on this project and posted on the job site.

I have attached a complete set of standards.

--
Gordon Leon
310-463-9244

To: Octavio Silva
Subject: RE: Requested comments on the City of Rancho Palos Verdes NOP:proposed amendments to the Landslide Moratorium Ordinance

From: Jerry Johnson [mailto:jjmountainman01@aol.com]
Sent: Monday, November 12, 2018 4:44 PM
To: Octavio Silva <OctavioS@rpvca.gov>
Subject: Requested comments on the City of Rancho Palos Verdes NOP:proposed amendments to the Landslide Moratorium Ordinance

Zone 2 has been the subject of numerous studies and analyses over the years. The overwhelming majority have indicated no adverse consequences to constructing single family residences.

The EIR report which is being updated by Rincon Consultants was finalized four years ago and concluded that there would be no negative impact on Zone 2 or the surrounding areas if such building were allowed.

Since the Final Report was submitted for the City Council to consider several years ago, there have been construction projects completed in Zone 2 in perfect safety. By practical application and the passage of time
it is clear that the experts in the field of geology have been proven to be correct and accurate.

The Second District of the California Court of Appeal also agrees with the opinion that building in Zone 2 would be safe. This puts the Doomsayers who predicted an apocalyptic disaster of epic proportions in a
difficult position. There exists no substantive basis for that conclusion.

Passing this amendment will create a fair and just, equal standard for all property owners in Zone 2. It will also justify the huge expense of the tabled EIR Report of four years ago. It will foreclose future unnecessary
litigation and costs to the taxpayers of this City.

I congratulate the City Council for their consideration of everyone who is a taxpayer, a voter, resident or member of our City and community!

Thank You

Jerry E Johnson, property owner Zone 2

To: Octavio Silva
Subject: RE: Sewer System

From: Jeremy Davies [mailto:jeremydavies2014@gmail.com]
Sent: Sunday, January 06, 2019 11:07 AM
To: Ara Mihranian <AraM@rpvca.gov>; Octavio Silva <OctavioS@rpvca.gov>; Gordon & Claire Leon <gordon.leon@gmail.com>; Jim Knight <knightjim33@gmail.com> <knightjim33@gmail.com>; kimnelson <kimnelson@cox.net>; Dennis Gardner <dennisggardner@me.com>
Subject: Fwd: Sewer System

Dear Ara and Octavio
Following the earlier comments on the sewer system that we have sent you, I recently obtained additional input regarding the PB sewer system which was installed under the direction of the City. The observations come from a PB resident who is also a former plumber. The code infractions were reported to Dean Allison, then City manager, who was unreceptive, unhelpful and did not respond formally to the reported issues.
Here are the comments together with two attachments:

" I've attached two photos. One photo of the code itself and the second photo is of the discharge pipe and size that the City used. The CA Unified Plumbing Code states that when using a above ground grinder system for single family dwellings with a water closet the grinder pump systems discharge line has to be (interior size diameter " I.D") 1 1/2" to 2" in diameter (2018). As you can see in the photo, all the discharge lines that were installed exiting the grinder pumps were NOT to CA CODE , up to two sizes too small. I believe the grinder pumps came from Oregon which could be the reason for the incorrect size. None the less, in 1998 CA required a 2" discharge line. The discharge line being small creates a load on the pumps which wear out faster. We have replaced ours 4 times so far (none being new , but rebuilt and swapped out because those are no longer available new. This is what the contractor told me when he was here the last time replacing it . This whole system is suspect to me given when ours was installed I did not tell them I was a plumber. Earlier, during the night I had put a level on the whole run of drain line and they had installed it flowing backwards (uphill). So once he put his level on it he said ,"Yeah , good eye , I'll give it more fall " _____ like the opposite direction, I thought . Well, I had no confidence by this time and after they left for the day , without filling in the ditch , I ran to my supply house and picked up 20 foot lengths of 3'" abs and installed it myself for my pump. They were installing 10 foot lengths { Home Depot } and when I checked , they didn't even have the connections inserted all the way in .That creates issues no one can see after the burial of lines . Example , pipes pop out of fittings underground if any land moment. I could go on but..... lets just say , we should NOT inherit the level of mistakes that the city is trying to hand over to us.

RPV AUGUST 5, 2014 COUNCIL DELIBERATIONS ON THE FINAL ENVIRONMENTAL IMPACT REPORT

Staff recommended that the Council "1) Adopt Resolution no 2014 certifying the EIR, making certain findings pursuant to CEQA, adopting a statement of Overriding Considerations and adopting a Mitigation Monitoring and Reporting Program; and 2) Introduce Ordinance No_, revising the City's Landslide Moratorium Ordinance to establish an exception category to allow the development of the 31 undeveloped (non-Monks plaintiff's lots) lots in Zone 2."

The following are extracts of the Council Members' deliberations following the public's oral comments on the FEIR for Zone 2. Many of the public's oral comments were also submitted to the Council in written form.

Mayor Duhovic requested Council deliberations and questions.

Council Member Brooks "What would be the outcome if this Council were to take no action, tabling the item, thereby not adopting any amendments to the landslide moratorium ordinance and not establishing an exception to allow development of the 31 lots. What would be the ramifications?"

City Attorney "The ramifications first of all would be that the owners of the other undeveloped properties would need to file a Moratorium Exclusion request if they intended to develop rather than rely on the exception category that was proposed. The EIR would not be certified, the ordinance would not be adopted. The owners of the lots could attempt to use that other vehicle –file an exclusion permit and proceed with development that way. If their application were denied it would be up to them to review at that point whether by litigation they challenge the decision to deny development."

Mayor Duhovic "Lets get clarity on the 1949 study. Were we able to find it or not find it? Can we resolve it? Has anyone seen it, did we look for it?"

Staff responded "There is no study. We did in looking at the subdivision development in 1949 that it was required to abide by County standards at that time and the 1945 County ordinance.

City Attorney "We did find the 1945 ordinance. I do not believe we have found any studies".

Mayor Duhovic to the EIR consultants "The issue of the zero additional run off. Mr Miller made the statement that that was not addressed at all by you. Would you concur with that? That was a pretty definitive statement by you."

Consultant "This should be separated into two separate issues. One is the deficiency of the drainage issues and is acknowledged in the EIR. Secondly what would be the impacts of the project on the drainage. In the final EIR the approach we took was to require that the lots to be developed be engineered to mimic existing preconstruction conditions. It is a fairly general engineering standards practice now and is becoming more so. This is what many if not most current applications require in new developments."

Mayor Duhovic "So that I am clear you are saying that the drainage analysis that you did in your opinion the drainage conditions mimics the preconstruction conditions."

Consultant "To be more precise the mitigation measures in the EIR requires that each lot to be developed is required to be engineered to have that result with no additional infiltration or run off"

Mayor Duhovic " The ability to exit is paramount" Extensive comment from a consultant follows.

Mayor Duhovic "Maybe the consultant can talk to me on the consideration of the private roads versus non public roads issue".

Consultant "For evacuation purposes we considered the roads as roads. For some of the pavement integrity and damage during construction and services and ongoing maintenance to repair cracks in the pavement we talked about the Association's responsibility"

Mayor Duhovic "That's all the questions I have. Deliberations, comments questions?"

Council Member Brooks "This has been going on for so many years. After my last stint on the Council all this came forward with development in a landslide area which seems to me to be an insane idea to begin with. This EIR is fatally flawed. We are not just dealing with the drainage and hydrology but this issue of creating a Monks geological standard is really scary because the 1.5 stability standard has been in effect in this City for a long long time.

It is the second or third time we have heard this now. It keeps coming back to us. This has taken a lot of time and money to put this together. I am in a position to not approve this EIR, it is incomplete, it has unsupported assertions that to go back to 1949 –we do have to realize that we are not dealing with the same level of standards here. I would be inclined to not reject the EIR as then the next question is are we going to address the issue in the future or whether we are going to table this item. This is a thousand piece puzzle with 500 pieces missing. Not even the edges are filled in."

Mayor Duhovic "Nor Altamira Canyon".

Council Member Misetich "I have the same concerns as Council Member Brooks. There are still many unanswered questions. I did my best to go through this document. But what I have heard and read to make findings of fact I have to be personally satisfied beyond reasonable doubt. I have some doubts and so I cannot make those findings that we are being asked to in the staff report and so I feel the same way as Council Member Brooks. I cannot support this EIR and the question is how do we want to go to move forward on this. I still have concerns about evacuation of the Community. I still have concerns about the drainage addressing the issue of Altamira Canyon and quite frankly I just cannot support it at this time.

Mayor Duhovic "I appreciate my colleagues' comments. I am looking at it from a little bit of a different standpoint and recognize there will always be debate on an EIR but I defer to you on that. I do not believe the timing is now. I don't see an impending event, I don't see a crisis, I don't see really anything other than the desire to assimilate or standardize the code with respect to those particular laws. I don't see any need to rush into this, especially with so many questions left pending. The biggest thing that jumps out at me is the commentary with respect to Altamira Canyon . I know we talked about that – that is a very large project.

I step back and look at tragedy after tragedy with mudslides, this and that and the other. You know I would obviously be very troubled if something like that were to happen in this particular location but even more if we perpetrated that or allowed it to happen-so I am very sensitive to that. Obviously the testimony of Dr Douglas weighs heavy on me also (Dr Douglas's testimony on behalf of ACLAD disagreed with the staff findings and he stated that he believed that the Council should reject the EIR). Without really opining on the EIR notwithstanding the perception of flaws, I think it was a good exercise, a lot of things were brought forward and just to cut to the chase I concur with my colleagues that I am not prepared to support certification of this EIR right now. I think the question is whether we push this off for a date certain or we just table it indefinitely at this point."

City Attorney "You can certainly table it if you are not going to certify the EIR which is obviously the unanimous sentiment then you can move to table the item."

Council Member Misetich "And we could bring back this EIR some date in the future if we want?

City Attorney "There is certainly always that possibility"

Council Member Misetich "I am just asking for the rule. I am not suggesting that is going to happen, I am just asking for the rule"

City Attorney "That is correct"

Council Member Misetich "I'll make a motion we table this item." Seconded by Council member Brooks.

Council Member Brooks "So this means alternative number three which means take no action and table the item"

Mayor Duhovic "Just to clear that means denying certification and not certifying the EIR just to be clear to the public"

City Attorney "That is correct Mr Mayor".

Mayor Duhovic "We have a quorum here so press forward in the roll call please."

Council Member Brooks - Yes
Council Member Misetich - Yes
Mayor Duhovic - Yes

Motion Passed

To: Ara Miharanian, Octavia Silva 11/12/18

From: Gordon Leon (Resident Portuguese Bend Community)

Subject: Zone 2 EIR

Here are my comments for the revised Portuguese Bend Zone 2 EIR

Hydrology/Altamira Canyon

First of all, the Hydrology section needs to recognize the Portuguese Bend Landslide and the upslope developments occurred after the PBCA neighborhood drainage design was completed and fabricated so it is erroneous to assume that the current design is sufficient for the additional 47 houses. Water infiltration into the Portuguese Landslide substrata is the most significant enabler of land movement. The fissures located in Altamira Canyon direct almost 60% of the water into the substrata before it empties into the ocean. The storm drains in the Portuguese Bend Community Association were designed to drain directly into Altamira Canyon prior to the start of the landslide. Building in PBCA was halted in 1976 in part to limit additional runoff into the canyon. Subsequent to the Monk lawsuit entitling the construction of 16 residences, the city required a number of mitigation measures including water storage tanks to delay the gutter rainwater entry into the PBCA storm drains and thus reducing the loading on Altamira Canyon. The fire department is requiring much larger driveways which results in significant uncontrolled runoff**. I recommend requiring holding tanks, bio-swales, or other measures to mitigate the immediate runoff from driveways and hardscape** in addition to the requirement to store roof runoff.

Geology

Zone 2 is in the "more stable" portion of the Portuguese Bend Landslide Complex. Mitigation measures need to be **imposed for limits on grading, soil imports, use of rammers for compaction, limiting trucks, and large equipment deliveries on the Narcissa curve** in the Abalone Cove slide area.

Traffic

The additional houses will generate significantly more traffic at the corner of Narcissa and PV Drive South. PVDS has become much more crowded over the past few years making it difficult to make a left turn during morning and evening rush hours. **Some sort of traffic control needs to be put in place to mitigated traffic building up at the Narcissa gate.**

Sewer

The pressurized sewer system in PBCA has been plagued by maintenance issues since it was installed. **Verify that the pressurized sewer system can handle the increased load base on the as-built performance**.

Aesthetics

PBCA has Architectural Standards that are enshrined in the CC&Rs in 1992. These regulate aesthetics, setbacks, and a number of other neighborhood compatibility aspects of our community. **We would like the properties in Zone 2 to conform to the PBCA Architectural Standards as compliance with RPV Neighborhood Compatibility.**

Exterior Lighting: The Final 2014 EIR uses old code language (ie watts) and needs to be updated to the current regulations.

Appendix B

Air Quality Data/Worksheets

RPV Zone 2 Landslide Moratorium

Los Angeles-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	31.00	Dwelling Unit	31.00	124,000.00	89

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	33
Climate Zone	8			**Operational Year**	2023
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Per updated details RE built and not-yet built homes in Zone 2.

Construction Phase - Based on schedule used in 2012 EIR

Grading - Based on development assumptions for Zone 2

Architectural Coating - Per SCAQMD Rule 1113.

Area Coating - Per SCAQMD Rule 1113.

Construction Off-road Equipment Mitigation - Watering twice per day per SCAQMD Rule 403.

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	100.00	50.00

tblArchitecturalCoating	EF_Nonresidential_Interior	100.00	50.00
tblAreaCoating	Area_EF_Nonresidential_Exterior	100	50
tblAreaCoating	Area_EF_Nonresidential_Interior	100	50
tblConstDustMitigation	WaterExposedAreaPM10PercentReduction	55	61
tblConstDustMitigation	WaterExposedAreaPM25PercentReduction	55	61
tblConstructionPhase	NumDays	35.00	55.00
tblConstructionPhase	NumDays	500.00	740.00
tblConstructionPhase	NumDays	30.00	50.00
tblConstructionPhase	NumDays	45.00	75.00
tblConstructionPhase	NumDays	35.00	55.00
tblConstructionPhase	NumDays	20.00	30.00
tblConstructionPhase	PhaseEndDate	7/20/2021	11/8/2022
tblConstructionPhase	PhaseEndDate	4/13/2021	6/7/2022
tblConstructionPhase	PhaseEndDate	2/12/2019	3/12/2019
tblConstructionPhase	PhaseEndDate	5/14/2019	8/6/2019
tblConstructionPhase	PhaseEndDate	6/1/2021	8/23/2022
tblConstructionPhase	PhaseEndDate	3/12/2019	4/23/2019
tblConstructionPhase	PhaseStartDate	6/2/2021	8/24/2022
tblConstructionPhase	PhaseStartDate	5/15/2019	8/7/2019
tblConstructionPhase	PhaseStartDate	3/13/2019	4/24/2019
tblConstructionPhase	PhaseStartDate	4/14/2021	6/8/2022
tblConstructionPhase	PhaseStartDate	2/13/2019	3/13/2019
tblGrading	AcresOfGrading	187.50	112.50
tblGrading	MaterialExported	0.00	31,000.00
tblGrading	MaterialImported	0.00	1,550.00
tblLandUse	LandUseSquareFeet	55,800.00	124,000.00
tblLandUse	LotAcreage	10.06	31.00

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	5.2420	67.7352	37.1430	0.0987	18.2675	2.4328	20.6596	9.9840	2.2400	12.1848	0.0000	10,091.9418	10,091.9418	2.2064	0.0000	10,147.1025
2020	2.1811	19.5412	17.4137	0.0290	0.1422	1.1196	1.2617	0.0381	1.0527	1.0909	0.0000	2,765.5429	2,765.5429	0.6320	0.0000	2,781.3431
2021	1.9572	17.7558	17.0944	0.0290	0.1422	0.9602	1.1024	0.0381	0.9028	0.9409	0.0000	2,761.0928	2,761.0928	0.6246	0.0000	2,776.7069
2022	14.3198	15.9219	16.8442	0.0289	0.1677	0.8105	0.9527	0.0445	0.7625	0.8007	0.0000	2,756.9377	2,756.9377	0.7186	0.0000	2,772.4370
Maximum	**14.3198**	**67.7352**	**37.1430**	**0.0987**	**18.2675**	**2.4328**	**20.6596**	**9.9840**	**2.2400**	**12.1848**	**0.0000**	**10,091.9418**	**10,091.9418**	**2.2064**	**0.0000**	**10,147.1025**

2.1 Overall Construction (Maximum Daily Emission)

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	5.2420	67.7352	37.1430	0.0987	7.2470	2.4328	9.6391	3.9263	2.2400	6.1271	0.0000	10,091.9418	10,091.9418	2.2064	0.0000	10,147.1025
2020	2.1811	19.5412	17.4137	0.0290	0.1422	1.1196	1.2617	0.0381	1.0527	1.0909	0.0000	2,765.5429	2,765.5429	0.6320	0.0000	2,781.3431
2021	1.9572	17.7558	17.0944	0.0290	0.1422	0.9602	1.1024	0.0381	0.9028	0.9409	0.0000	2,761.0928	2,761.0928	0.6246	0.0000	2,776.7069
2022	14.3198	15.9219	16.8442	0.0289	0.1677	0.8105	0.9527	0.0445	0.7625	0.8007	0.0000	2,756.9377	2,756.9377	0.7186	0.0000	2,772.4370
Maximum	**14.3198**	**67.7352**	**37.1430**	**0.0987**	**7.2470**	**2.4328**	**9.6391**	**3.9263**	**2.2400**	**6.1271**	**0.0000**	**10,091.9418**	**10,091.9418**	**2.2064**	**0.0000**	**10,147.1025**

	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**	**58.87**	**0.00**	**45.96**	**59.95**	**0.00**	**40.34**	**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	10.8680	0.6727	18.3232	0.0404		2.3822	2.3822		2.3822	2.3822	290.3745	562.6051	852.9796	0.8704	0.0197	880.6123
Energy	0.0236	0.2020	0.0860	1.2900e-003		0.0163	0.0163		0.0163	0.0163		257.8412	257.8412	4.9400e-003	4.7300e-003	259.3734
Mobile	0.5066	2.0985	6.9998	0.0265	2.2323	0.0194	2.2517	0.5974	0.0180	0.6154		2,702.3668	2,702.3668	0.1285		2,705.5784
Total	**11.3982**	**2.9732**	**25.4090**	**0.0682**	**2.2323**	**2.4179**	**4.6502**	**0.5974**	**2.4165**	**3.0139**	**290.3745**	**3,522.8131**	**3,813.1876**	**1.0038**	**0.0244**	**3,845.5641**

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	10.8680	0.6727	18.3232	0.0404		2.3822	2.3822		2.3822	2.3822	290.3745	562.6051	852.9796	0.8704	0.0197	880.6123
Energy	0.0236	0.2020	0.0860	1.2900e-003		0.0163	0.0163		0.0163	0.0163		257.8412	257.8412	4.9400e-003	4.7300e-003	259.3734
Mobile	0.5066	2.0985	6.9998	0.0265	2.2323	0.0194	2.2517	0.5974	0.0180	0.6154		2,702.3668	2,702.3668	0.1285		2,705.5784
Total	**11.3982**	**2.9732**	**25.4090**	**0.0682**	**2.2323**	**2.4179**	**4.6502**	**0.5974**	**2.4165**	**3.0139**	**290.3745**	**3,522.8131**	**3,813.1876**	**1.0038**	**0.0244**	**3,845.5641**

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

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/2/2019	3/12/2019	5	50	
2	Site Preparation	Site Preparation	3/13/2019	4/23/2019	5	30	
3	Grading	Grading	4/24/2019	8/6/2019	5	75	
4	Building Construction	Building Construction	8/7/2019	6/7/2022	5	740	
5	Paving	Paving	6/8/2022	8/23/2022	5	55	
6	Architectural Coating	Architectural Coating	8/24/2022	11/8/2022	5	55	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 112.5

Acres of Paving: 0

Residential Indoor: 251,100; Residential Outdoor: 83,700; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Demolition	Excavators	3	8.00	158	0.38
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Grading	Excavators	2	8.00	158	0.38
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Paving	Pavers	2	8.00	130	0.42
Paving	Rollers	2	8.00	80	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Grading	Graders	1	8.00	187	0.41
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Paving	Paving Equipment	2	8.00	132	0.36
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Building Construction	Welders	1	8.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	3,218.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	11.00	3.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	2.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Demolition - 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	3.5134	35.7830	22.0600	0.0388		1.7949	1.7949		1.6697	1.6697		3,816.8994	3,816.8994	1.0618		3,843.4451
Total	**3.5134**	**35.7830**	**22.0600**	**0.0388**		**1.7949**	**1.7949**		**1.6697**	**1.6697**		**3,816.8994**	**3,816.8994**	**1.0618**		**3,843.4451**

3.2 Demolition - 2019

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	0.0749	0.0551	0.7233	1.8300e-003	0.1677	1.4500e-003	0.1691	0.0445	1.3300e-003	0.0458		181.9429	181.9429	6.2500e-003		182.0992
Total	**0.0749**	**0.0551**	**0.7233**	**1.8300e-003**	**0.1677**	**1.4500e-003**	**0.1691**	**0.0445**	**1.3300e-003**	**0.0458**		**181.9429**	**181.9429**	**6.2500e-003**		**182.0992**

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	3.5134	35.7830	22.0600	0.0388		1.7949	1.7949		1.6697	1.6697	0.0000	3,816.8994	3,816.8994	1.0618		3,843.4451
Total	**3.5134**	**35.7830**	**22.0600**	**0.0388**		**1.7949**	**1.7949**		**1.6697**	**1.6697**	**0.0000**	**3,816.8994**	**3,816.8994**	**1.0618**		**3,843.4451**

3.2 Demolition - 2019

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	0.0749	0.0551	0.7233	1.8300e-003	0.1677	1.4500e-003	0.1691	0.0445	1.3300e-003	0.0458		181.9429	181.9429	6.2500e-003		182.0992
Total	**0.0749**	**0.0551**	**0.7233**	**1.8300e-003**	**0.1677**	**1.4500e-003**	**0.1691**	**0.0445**	**1.3300e-003**	**0.0458**		**181.9429**	**181.9429**	**6.2500e-003**		**182.0992**

3.3 Site Preparation - 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					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	4.3350	45.5727	22.0630	0.0380		2.3904	2.3904		2.1991	2.1991		3,766.4529	3,766.4529	1.1917		3,796.2445
Total	**4.3350**	**45.5727**	**22.0630**	**0.0380**	**18.0663**	**2.3904**	**20.4566**	**9.9307**	**2.1991**	**12.1298**		**3,766.4529**	**3,766.4529**	**1.1917**		**3,796.2445**

3.3 Site Preparation - 2019

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	0.0899	0.0661	0.8679	2.1900e-003	0.2012	1.7300e-003	0.2029	0.0534	1.6000e-003	0.0550		218.3315	218.3315	7.5000e-003		218.5190
Total	**0.0899**	**0.0661**	**0.8679**	**2.1900e-003**	**0.2012**	**1.7300e-003**	**0.2029**	**0.0534**	**1.6000e-003**	**0.0550**		**218.3315**	**218.3315**	**7.5000e-003**		**218.5190**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category					lb/day									lb/day		
Fugitive Dust					7.0458	0.0000	7.0458	3.8730	0.0000	3.8730			0.0000			0.0000
Off-Road	4.3350	45.5727	22.0630	0.0380		2.3904	2.3904		2.1991	2.1991	0.0000	3,766.4529	3,766.4529	1.1917		3,796.2445
Total	**4.3350**	**45.5727**	**22.0630**	**0.0380**	**7.0458**	**2.3904**	**9.4362**	**3.8730**	**2.1991**	**6.0721**	**0.0000**	**3,766.4529**	**3,766.4529**	**1.1917**		**3,796.2445**

3.3 Site Preparation - 2019

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	0.0899	0.0661	0.8679	2.1900e-003	0.2012	1.7300e-003	0.2029	0.0534	1.6000e-003	0.0550		218.3315	218.3315	7.5000e-003		218.5190
Total	**0.0899**	**0.0661**	**0.8679**	**2.1900e-003**	**0.2012**	**1.7300e-003**	**0.2029**	**0.0534**	**1.6000e-003**	**0.0550**		**218.3315**	**218.3315**	**7.5000e-003**		**218.5190**

3.4 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					7.6128	0.0000	7.6128	3.4820	0.0000	3.4820			0.0000			0.0000
Off-Road	4.7389	54.5202	33.3768	0.0620		2.3827	2.3827		2.1920	2.1920		6,140.0195	6,140.0195	1.9426		6,188.5854
Total	**4.7389**	**54.5202**	**33.3768**	**0.0620**	**7.6128**	**2.3827**	**9.9955**	**3.4820**	**2.1920**	**5.6740**		**6,140.0195**	**6,140.0195**	**1.9426**		**6,188.5854**

3.4 Grading - 2019

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	0.4032	13.1416	2.8019	0.0343	0.7502	0.0482	0.7984	0.2056	0.0461	0.2518		3,709.331 8	3,709.331 8	0.2555		3,715.718 2
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	0.0999	0.0734	0.9643	2.4400e-003	0.2236	1.9300e-003	0.2255	0.0593	1.7800e-003	0.0611		242.5906	242.5906	8.3300e-003		242.7989
Total	**0.5031**	**13.2150**	**3.7662**	**0.0367**	**0.9737**	**0.0502**	**1.0239**	**0.2649**	**0.0479**	**0.3128**		**3,951.922 3**	**3,951.922 3**	**0.2638**		**3,958.517 1**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.9690	0.0000	2.9690	1.3580	0.0000	1.3580			0.0000			0.0000
Off-Road	4.7389	54.5202	33.3768	0.0620		2.3827	2.3827		2.1920	2.1920	0.0000	6,140.019 5	6,140.019 5	1.9426		6,188.585 4
Total	**4.7389**	**54.5202**	**33.3768**	**0.0620**	**2.9690**	**2.3827**	**5.3517**	**1.3580**	**2.1920**	**3.5500**	**0.0000**	**6,140.019 5**	**6,140.019 5**	**1.9426**		**6,188.585 4**

3.4 Grading - 2019

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	0.4032	13.1416	2.8019	0.0343	0.7502	0.0482	0.7984	0.2056	0.0461	0.2518		3,709.3318	3,709.3318	0.2555		3,715.7182
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	0.0999	0.0734	0.9643	2.4400e-003	0.2236	1.9300e-003	0.2255	0.0593	1.7800e-003	0.0611		242.5906	242.5906	8.3300e-003		242.7989
Total	**0.5031**	**13.2150**	**3.7662**	**0.0367**	**0.9737**	**0.0502**	**1.0239**	**0.2649**	**0.0479**	**0.3128**		**3,951.9223**	**3,951.9223**	**0.2638**		**3,958.5171**

3.5 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	2.3612	21.0788	17.1638	0.0269		1.2899	1.2899		1.2127	1.2127		2,591.5802	2,591.5802	0.6313		2,607.3635
Total	**2.3612**	**21.0788**	**17.1638**	**0.0269**		**1.2899**	**1.2899**		**1.2127**	**1.2127**		**2,591.5802**	**2,591.5802**	**0.6313**		**2,607.3635**

3.5 Building Construction - 2019

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	0.0125	0.3472	0.0921	7.8000e-004	0.0192	2.2100e-003	0.0214	5.5300e-003	2.1200e-003	7.6500e-003		83.6444	83.6444	5.3600e-003		83.7784
Worker	0.0550	0.0404	0.5304	1.3400e-003	0.1230	1.0600e-003	0.1240	0.0326	9.8000e-004	0.0336		133.4248	133.4248	4.5800e-003		133.5394
Total	**0.0674**	**0.3876**	**0.6225**	**2.1200e-003**	**0.1422**	**3.2700e-003**	**0.1454**	**0.0381**	**3.1000e-003**	**0.0412**		**217.0692**	**217.0692**	**9.9400e-003**		**217.3178**

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	2.3612	21.0788	17.1638	0.0269		1.2899	1.2899		1.2127	1.2127	0.0000	2,591.580 2	2,591.580 2	0.6313		2,607.363 5
Total	**2.3612**	**21.0788**	**17.1638**	**0.0269**		**1.2899**	**1.2899**		**1.2127**	**1.2127**	**0.0000**	**2,591.580 2**	**2,591.580 2**	**0.6313**		**2,607.363 5**

3.5 Building Construction - 2019

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	0.0125	0.3472	0.0921	7.8000e-004	0.0192	2.2100e-003	0.0214	5.5300e-003	2.1200e-003	7.6500e-003		83.6444	83.6444	5.3600e-003		83.7784
Worker	0.0550	0.0404	0.5304	1.3400e-003	0.1230	1.0600e-003	0.1240	0.0326	9.8000e-004	0.0336		133.4248	133.4248	4.5800e-003		133.5394
Total	**0.0674**	**0.3876**	**0.6225**	**2.1200e-003**	**0.1422**	**3.2700e-003**	**0.1454**	**0.0381**	**3.1000e-003**	**0.0412**		**217.0692**	**217.0692**	**9.9400e-003**		**217.3178**

3.5 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	2.1198	19.1860	16.8485	0.0269		1.1171	1.1171		1.0503	1.0503		2,553.0631	2,553.0631	0.6229		2,568.6345
Total	**2.1198**	**19.1860**	**16.8485**	**0.0269**		**1.1171**	**1.1171**		**1.0503**	**1.0503**		**2,553.0631**	**2,553.0631**	**0.6229**		**2,568.6345**

3.5 Building Construction - 2020

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	0.0107	0.3191	0.0836	7.8000e-004	0.0192	1.5000e-003	0.0207	5.5300e-003	1.4400e-003	6.9700e-003		83.1074	83.1074	5.0700e-003		83.2342
Worker	0.0506	0.0360	0.4816	1.3000e-003	0.1230	1.0300e-003	0.1240	0.0326	9.5000e-004	0.0336		129.3724	129.3724	4.0800e-003		129.4744
Total	**0.0613**	**0.3551**	**0.5652**	**2.0800e-003**	**0.1422**	**2.5300e-003**	**0.1447**	**0.0381**	**2.3900e-003**	**0.0405**		**212.4798**	**212.4798**	**9.1500e-003**		**212.7086**

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	2.1198	19.1860	16.8485	0.0269		1.1171	1.1171		1.0503	1.0503	0.0000	2,553.0631	2,553.0631	0.6229		2,568.6345
Total	**2.1198**	**19.1860**	**16.8485**	**0.0269**		**1.1171**	**1.1171**		**1.0503**	**1.0503**	**0.0000**	**2,553.0631**	**2,553.0631**	**0.6229**		**2,568.6345**

3.5 Building Construction - 2020

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	0.0107	0.3191	0.0836	7.8000e-004	0.0192	1.5000e-003	0.0207	5.5300e-003	1.4400e-003	6.9700e-003		83.1074	83.1074	5.0700e-003		83.2342
Worker	0.0506	0.0360	0.4816	1.3000e-003	0.1230	1.0300e-003	0.1240	0.0326	9.5000e-004	0.0336		129.3724	129.3724	4.0800e-003		129.4744
Total	**0.0613**	**0.3551**	**0.5652**	**2.0800e-003**	**0.1422**	**2.5300e-003**	**0.1447**	**0.0381**	**2.3900e-003**	**0.0405**		**212.4798**	**212.4798**	**9.1500e-003**		**212.7086**

3.5 Building Construction - 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	1.9009	17.4321	16.5752	0.0269		0.9586	0.9586		0.9013	0.9013		2,553.3639	2,553.3639	0.6160		2,568.7643
Total	**1.9009**	**17.4321**	**16.5752**	**0.0269**		**0.9586**	**0.9586**		**0.9013**	**0.9013**		**2,553.3639**	**2,553.3639**	**0.6160**		**2,568.7643**

3.5 Building Construction - 2021

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	9.1200e-003	0.2913	0.0762	7.7000e-004	0.0192	6.0000e-004	0.0198	5.5300e-003	5.7000e-004	6.1000e-003		82.4642	82.4642	4.8600e-003		82.5856
Worker	0.0472	0.0324	0.4431	1.2600e-003	0.1230	9.9000e-004	0.1240	0.0326	9.2000e-004	0.0335		125.2647	125.2647	3.6900e-003		125.3570
Total	**0.0563**	**0.3237**	**0.5192**	**2.0300e-003**	**0.1422**	**1.5900e-003**	**0.1438**	**0.0381**	**1.4900e-003**	**0.0396**		**207.7289**	**207.7289**	**8.5500e-003**		**207.9426**

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	1.9009	17.4321	16.5752	0.0269		0.9586	0.9586		0.9013	0.9013	0.0000	2,553.3639	2,553.3639	0.6160		2,568.7643
Total	**1.9009**	**17.4321**	**16.5752**	**0.0269**		**0.9586**	**0.9586**		**0.9013**	**0.9013**	**0.0000**	**2,553.3639**	**2,553.3639**	**0.6160**		**2,568.7643**

3.5 Building Construction - 2021

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	9.1200e-003	0.2913	0.0762	7.7000e-004	0.0192	6.0000e-004	0.0198	5.5300e-003	5.7000e-004	6.1000e-003		82.4642	82.4642	4.8600e-003		82.5856
Worker	0.0472	0.0324	0.4431	1.2600e-003	0.1230	9.9000e-004	0.1240	0.0326	9.2000e-004	0.0335		125.2647	125.2647	3.6900e-003		125.3570
Total	**0.0563**	**0.3237**	**0.5192**	**2.0300e-003**	**0.1422**	**1.5900e-003**	**0.1438**	**0.0381**	**1.4900e-003**	**0.0396**		**207.7289**	**207.7289**	**8.5500e-003**		**207.9426**

3.5 Building Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.7062	15.6156	16.3634	0.0269		0.8090	0.8090		0.7612	0.7612		2,554.3336	2,554.3336	0.6120		2,569.6322
Total	**1.7062**	**15.6156**	**16.3634**	**0.0269**		**0.8090**	**0.8090**		**0.7612**	**0.7612**		**2,554.3336**	**2,554.3336**	**0.6120**		**2,569.6322**

3.5 Building Construction - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	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	8.5600e-003	0.2770	0.0720	7.6000e-004	0.0192	5.2000e-004	0.0197	5.5300e-003	5.0000e-004	6.0300e-003		81.7458	81.7458	4.6900e-003		81.8630
Worker	0.0442	0.0293	0.4088	1.2100e-003	0.1230	9.6000e-004	0.1239	0.0326	8.9000e-004	0.0335		120.8584	120.8584	3.3400e-003		120.9418
Total	**0.0527**	**0.3063**	**0.4808**	**1.9700e-003**	**0.1422**	**1.4800e-003**	**0.1437**	**0.0381**	**1.3900e-003**	**0.0395**		**202.6041**	**202.6041**	**8.0300e-003**		**202.8048**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.7062	15.6156	16.3634	0.0269		0.8090	0.8090		0.7612	0.7612	0.0000	2,554.3336	2,554.3336	0.6120		2,569.6322
Total	**1.7062**	**15.6156**	**16.3634**	**0.0269**		**0.8090**	**0.8090**		**0.7612**	**0.7612**	**0.0000**	**2,554.3336**	**2,554.3336**	**0.6120**		**2,569.6322**

3.5 Building Construction - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	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	8.5600e-003	0.2770	0.0720	7.6000e-004	0.0192	5.2000e-004	0.0197	5.5300e-003	5.0000e-004	6.0300e-003		81.7458	81.7458	4.6900e-003		81.8630
Worker	0.0442	0.0293	0.4088	1.2100e-003	0.1230	9.6000e-004	0.1239	0.0326	8.9000e-004	0.0335		120.8584	120.8584	3.3400e-003		120.9418
Total	**0.0527**	**0.3063**	**0.4808**	**1.9700e-003**	**0.1422**	**1.4800e-003**	**0.1437**	**0.0381**	**1.3900e-003**	**0.0395**		**202.6041**	**202.6041**	**8.0300e-003**		**202.8048**

3.6 Paving - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1028	11.1249	14.5805	0.0228		0.5679	0.5679		0.5225	0.5225		2,207.6603	2,207.6603	0.7140		2,225.5104
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.1028**	**11.1249**	**14.5805**	**0.0228**		**0.5679**	**0.5679**		**0.5225**	**0.5225**		**2,207.6603**	**2,207.6603**	**0.7140**		**2,225.5104**

3.6 Paving - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	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	0.0602	0.0399	0.5574	1.6500e-003	0.1677	1.3100e-003	0.1690	0.0445	1.2100e-003	0.0457		164.8069	164.8069	4.5500e-003		164.9206
Total	**0.0602**	**0.0399**	**0.5574**	**1.6500e-003**	**0.1677**	**1.3100e-003**	**0.1690**	**0.0445**	**1.2100e-003**	**0.0457**		**164.8069**	**164.8069**	**4.5500e-003**		**164.9206**

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	1.1028	11.1249	14.5805	0.0228		0.5679	0.5679		0.5225	0.5225	0.0000	2,207.660 3	2,207.660 3	0.7140		2,225.510 4
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.1028**	**11.1249**	**14.5805**	**0.0228**		**0.5679**	**0.5679**		**0.5225**	**0.5225**	**0.0000**	**2,207.660 3**	**2,207.660 3**	**0.7140**		**2,225.510 4**

3.6 Paving - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	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	0.0602	0.0399	0.5574	1.6500e-003	0.1677	1.3100e-003	0.1690	0.0445	1.2100e-003	0.0457		164.8069	164.8069	4.5500e-003		164.9206
Total	**0.0602**	**0.0399**	**0.5574**	**1.6500e-003**	**0.1677**	**1.3100e-003**	**0.1690**	**0.0445**	**1.2100e-003**	**0.0457**		**164.8069**	**164.8069**	**4.5500e-003**		**164.9206**

3.7 Architectural Coating - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	14.1073					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2045	1.4085	1.8136	2.9700e-003		0.0817	0.0817		0.0817	0.0817		281.4481	281.4481	0.0183		281.9062
Total	**14.3118**	**1.4085**	**1.8136**	**2.9700e-003**		**0.0817**	**0.0817**		**0.0817**	**0.0817**		**281.4481**	**281.4481**	**0.0183**		**281.9062**

3.7 Architectural Coating - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	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	8.0300e-003	5.3200e-003	0.0743	2.2000e-004	0.0224	1.7000e-004	0.0225	5.9300e-003	1.6000e-004	6.0900e-003		21.9743	21.9743	6.1000e-004		21.9894
Total	**8.0300e-003**	**5.3200e-003**	**0.0743**	**2.2000e-004**	**0.0224**	**1.7000e-004**	**0.0225**	**5.9300e-003**	**1.6000e-004**	**6.0900e-003**		**21.9743**	**21.9743**	**6.1000e-004**		**21.9894**

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	14.1073					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2045	1.4085	1.8136	2.9700e-003		0.0817	0.0817		0.0817	0.0817	0.0000	281.4481	281.4481	0.0183		281.9062
Total	**14.3118**	**1.4085**	**1.8136**	**2.9700e-003**		**0.0817**	**0.0817**		**0.0817**	**0.0817**	**0.0000**	**281.4481**	**281.4481**	**0.0183**		**281.9062**

3.7 Architectural Coating - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	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	8.0300e-003	5.3200e-003	0.0743	2.2000e-004	0.0224	1.7000e-004	0.0225	5.9300e-003	1.6000e-004	6.0900e-003		21.9743	21.9743	6.1000e-004		21.9894
Total	**8.0300e-003**	**5.3200e-003**	**0.0743**	**2.2000e-004**	**0.0224**	**1.7000e-004**	**0.0225**	**5.9300e-003**	**1.6000e-004**	**6.0900e-003**		**21.9743**	**21.9743**	**6.1000e-004**		**21.9894**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

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
	lb/day										lb/day					
Mitigated	0.5066	2.0985	6.9998	0.0265	2.2323	0.0194	2.2517	0.5974	0.0180	0.6154		2,702.366 8	2,702.366 8	0.1285		2,705.578 4
Unmitigated	0.5066	2.0985	6.9998	0.0265	2.2323	0.0194	2.2517	0.5974	0.0180	0.6154		2,702.366 8	2,702.366 8	0.1285		2,705.578 4

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Single Family Housing	295.12	307.21	267.22	1,000,752	1,000,752
Total	295.12	307.21	267.22	1,000,752	1,000,752

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
Single Family Housing	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Single Family Housing	0.545842	0.044768	0.205288	0.119317	0.015350	0.006227	0.020460	0.031333	0.002546	0.002133	0.005184	0.000692	0.000862

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
	lb/day										lb/day					
NaturalGas Mitigated	0.0236	0.2020	0.0860	1.2900e-003		0.0163	0.0163		0.0163	0.0163		257.8412	257.8412	4.9400e-003	4.7300e-003	259.3734
NaturalGas Unmitigated	0.0236	0.2020	0.0860	1.2900e-003		0.0163	0.0163		0.0163	0.0163		257.8412	257.8412	4.9400e-003	4.7300e-003	259.3734

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	lb/day										lb/day					
Single Family Housing	2191.65	0.0236	0.2020	0.0860	1.2900e-003		0.0163	0.0163		0.0163	0.0163		257.8412	257.8412	4.9400e-003	4.7300e-003	259.3734
Total		**0.0236**	**0.2020**	**0.0860**	**1.2900e-003**		**0.0163**	**0.0163**		**0.0163**	**0.0163**		**257.8412**	**257.8412**	**4.9400e-003**	**4.7300e-003**	**259.3734**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Single Family Housing	2.19165	0.0236	0.2020	0.0860	1.2900e-003		0.0163	0.0163		0.0163	0.0163		257.8412	257.8412	4.9400e-003	4.7300e-003	259.3734
Total		**0.0236**	**0.2020**	**0.0860**	**1.2900e-003**		**0.0163**	**0.0163**		**0.0163**	**0.0163**		**257.8412**	**257.8412**	**4.9400e-003**	**4.7300e-003**	**259.3734**

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	10.8680	0.6727	18.3232	0.0404		2.3822	2.3822		2.3822	2.3822	290.3745	562.6051	852.9796	0.8704	0.0197	880.6123
Unmitigated	10.8680	0.6727	18.3232	0.0404		2.3822	2.3822		2.3822	2.3822	290.3745	562.6051	852.9796	0.8704	0.0197	880.6123

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	0.2126					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	2.4552					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	8.1231	0.6432	15.7651	0.0402		2.3680	2.3680		2.3680	2.3680	290.3745	558.0000	848.3745	0.8660	0.0197	875.8964
Landscaping	0.0771	0.0295	2.5581	1.4000e-004		0.0142	0.0142		0.0142	0.0142		4.6051	4.6051	4.4300e-003		4.7158
Total	**10.8680**	**0.6727**	**18.3232**	**0.0404**		**2.3822**	**2.3822**		**2.3822**	**2.3822**	**290.3745**	**562.6051**	**852.9796**	**0.8704**	**0.0197**	**880.6123**

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	0.2126					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	2.4552					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	8.1231	0.6432	15.7651	0.0402		2.3680	2.3680		2.3680	2.3680	290.3745	558.0000	848.3745	0.8660	0.0197	875.8964
Landscaping	0.0771	0.0295	2.5581	1.4000e-004		0.0142	0.0142		0.0142	0.0142		4.6051	4.6051	4.4300e-003		4.7158
Total	**10.8680**	**0.6727**	**18.3232**	**0.0404**		**2.3822**	**2.3822**		**2.3822**	**2.3822**	**290.3745**	**562.6051**	**852.9796**	**0.8704**	**0.0197**	**880.6123**

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

RPV Zone 2 Landslide Moratorium

Los Angeles-South Coast County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	31.00	Dwelling Unit	31.00	124,000.00	89

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	33
Climate Zone	8			**Operational Year**	2023
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Per updated details RE built and not-yet built homes in Zone 2.

Construction Phase - Based on schedule used in 2012 EIR

Grading - Based on development assumptions for Zone 2

Architectural Coating - Per SCAQMD Rule 1113.

Area Coating - Per SCAQMD Rule 1113.

Construction Off-road Equipment Mitigation - Watering twice per day per SCAQMD Rule 403.

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	100.00	50.00

tblArchitecturalCoating	EF_Nonresidential_Interior	100.00	50.00
tblAreaCoating	Area_EF_Nonresidential_Exterior	100	50
tblAreaCoating	Area_EF_Nonresidential_Interior	100	50
tblConstDustMitigation	WaterExposedAreaPM10PercentReduction	55	61
tblConstDustMitigation	WaterExposedAreaPM25PercentReduction	55	61
tblConstructionPhase	NumDays	35.00	55.00
tblConstructionPhase	NumDays	500.00	740.00
tblConstructionPhase	NumDays	30.00	50.00
tblConstructionPhase	NumDays	45.00	75.00
tblConstructionPhase	NumDays	35.00	55.00
tblConstructionPhase	NumDays	20.00	30.00
tblConstructionPhase	PhaseEndDate	7/20/2021	11/8/2022
tblConstructionPhase	PhaseEndDate	4/13/2021	6/7/2022
tblConstructionPhase	PhaseEndDate	2/12/2019	3/12/2019
tblConstructionPhase	PhaseEndDate	5/14/2019	8/6/2019
tblConstructionPhase	PhaseEndDate	6/1/2021	8/23/2022
tblConstructionPhase	PhaseEndDate	3/12/2019	4/23/2019
tblConstructionPhase	PhaseStartDate	6/2/2021	8/24/2022
tblConstructionPhase	PhaseStartDate	5/15/2019	8/7/2019
tblConstructionPhase	PhaseStartDate	3/13/2019	4/24/2019
tblConstructionPhase	PhaseStartDate	4/14/2021	6/8/2022
tblConstructionPhase	PhaseStartDate	2/13/2019	3/13/2019
tblGrading	AcresOfGrading	187.50	112.50
tblGrading	MaterialExported	0.00	31,000.00
tblGrading	MaterialImported	0.00	1,550.00
tblLandUse	LandUseSquareFeet	55,800.00	124,000.00
tblLandUse	LotAcreage	10.06	31.00

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	5.2630	67.9184	37.2530	0.0980	18.2675	2.4337	20.6596	9.9840	2.2408	12.1848	0.0000	10,014.8673	10,014.8673	2.2157	0.0000	10,070.2595
2020	2.1872	19.5450	17.3818	0.0289	0.1422	1.1196	1.2618	0.0381	1.0527	1.0909	0.0000	2,755.7140	2,755.7140	0.6321	0.0000	2,771.5166
2021	1.9629	17.7587	17.0645	0.0289	0.1422	0.9602	1.1024	0.0381	0.9028	0.9409	0.0000	2,751.5152	2,751.5152	0.6247	0.0000	2,767.1318
2022	14.3208	15.9243	16.8162	0.0288	0.1677	0.8105	0.9527	0.0445	0.7626	0.8007	0.0000	2,747.6273	2,747.6273	0.7183	0.0000	2,763.1292
Maximum	**14.3208**	**67.9184**	**37.2530**	**0.0980**	**18.2675**	**2.4337**	**20.6596**	**9.9840**	**2.2408**	**12.1848**	**0.0000**	**10,014.8673**	**10,014.8673**	**2.2157**	**0.0000**	**10,070.2595**

2.1 Overall Construction (Maximum Daily Emission)

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	5.2630	67.9184	37.2530	0.0980	7.2470	2.4337	9.6391	3.9263	2.2408	6.1271	0.0000	10,014.8673	10,014.8673	2.2157	0.0000	10,070.2595
2020	2.1872	19.5450	17.3818	0.0289	0.1422	1.1196	1.2618	0.0381	1.0527	1.0909	0.0000	2,755.7140	2,755.7140	0.6321	0.0000	2,771.5166
2021	1.9629	17.7587	17.0645	0.0289	0.1422	0.9602	1.1024	0.0381	0.9028	0.9409	0.0000	2,751.5152	2,751.5152	0.6247	0.0000	2,767.1318
2022	14.3208	15.9243	16.8162	0.0288	0.1677	0.8105	0.9527	0.0445	0.7626	0.8007	0.0000	2,747.6273	2,747.6273	0.7183	0.0000	2,763.1292
Maximum	**14.3208**	**67.9184**	**37.2530**	**0.0980**	**7.2470**	**2.4337**	**9.6391**	**3.9263**	**2.2408**	**6.1271**	**0.0000**	**10,014.8673**	**10,014.8673**	**2.2157**	**0.0000**	**10,070.2595**

	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**	**58.87**	**0.00**	**45.96**	**59.95**	**0.00**	**40.34**	**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	10.8680	0.6727	18.3232	0.0404		2.3822	2.3822		2.3822	2.3822	290.3745	562.6051	852.9796	0.8704	0.0197	880.6123
Energy	0.0236	0.2020	0.0860	1.2900e-003		0.0163	0.0163		0.0163	0.0163		257.8412	257.8412	4.9400e-003	4.7300e-003	259.3734
Mobile	0.4907	2.1529	6.6182	0.0253	2.2323	0.0194	2.2517	0.5974	0.0181	0.6155		2,573.0863	2,573.0863	0.1279		2,576.2825
Total	**11.3823**	**3.0276**	**25.0274**	**0.0669**	**2.2323**	**2.4180**	**4.6503**	**0.5974**	**2.4166**	**3.0140**	**290.3745**	**3,393.5326**	**3,683.9071**	**1.0032**	**0.0244**	**3,716.2681**

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	10.8680	0.6727	18.3232	0.0404		2.3822	2.3822		2.3822	2.3822	290.3745	562.6051	852.9796	0.8704	0.0197	880.6123
Energy	0.0236	0.2020	0.0860	1.2900e-003		0.0163	0.0163		0.0163	0.0163		257.8412	257.8412	4.9400e-003	4.7300e-003	259.3734
Mobile	0.4907	2.1529	6.6182	0.0253	2.2323	0.0194	2.2517	0.5974	0.0181	0.6155		2,573.0863	2,573.0863	0.1279		2,576.2825
Total	**11.3823**	**3.0276**	**25.0274**	**0.0669**	**2.2323**	**2.4180**	**4.6503**	**0.5974**	**2.4166**	**3.0140**	**290.3745**	**3,393.5326**	**3,683.9071**	**1.0032**	**0.0244**	**3,716.2681**

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

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/2/2019	3/12/2019	5	50	
2	Site Preparation	Site Preparation	3/13/2019	4/23/2019	5	30	
3	Grading	Grading	4/24/2019	8/6/2019	5	75	
4	Building Construction	Building Construction	8/7/2019	6/7/2022	5	740	
5	Paving	Paving	6/8/2022	8/23/2022	5	55	
6	Architectural Coating	Architectural Coating	8/24/2022	11/8/2022	5	55	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 112.5

Acres of Paving: 0

Residential Indoor: 251,100; Residential Outdoor: 83,700; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Demolition	Excavators	3	8.00	158	0.38
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Grading	Excavators	2	8.00	158	0.38
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Paving	Pavers	2	8.00	130	0.42
Paving	Rollers	2	8.00	80	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Grading	Graders	1	8.00	187	0.41
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Paving	Paving Equipment	2	8.00	132	0.36
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Building Construction	Welders	1	8.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	3,218.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	11.00	3.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	2.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Demolition - 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	3.5134	35.7830	22.0600	0.0388		1.7949	1.7949		1.6697	1.6697		3,816.8994	3,816.8994	1.0618		3,843.4451
Total	**3.5134**	**35.7830**	**22.0600**	**0.0388**		**1.7949**	**1.7949**		**1.6697**	**1.6697**		**3,816.8994**	**3,816.8994**	**1.0618**		**3,843.4451**

3.2 Demolition - 2019

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	0.0831	0.0610	0.6637	1.7200e-003	0.1677	1.4500e-003	0.1691	0.0445	1.3300e-003	0.0458		171.3196	171.3196	5.8900e-003		171.4670
Total	**0.0831**	**0.0610**	**0.6637**	**1.7200e-003**	**0.1677**	**1.4500e-003**	**0.1691**	**0.0445**	**1.3300e-003**	**0.0458**		**171.3196**	**171.3196**	**5.8900e-003**		**171.4670**

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	3.5134	35.7830	22.0600	0.0388		1.7949	1.7949		1.6697	1.6697	0.0000	3,816.8994	3,816.8994	1.0618		3,843.4451
Total	**3.5134**	**35.7830**	**22.0600**	**0.0388**		**1.7949**	**1.7949**		**1.6697**	**1.6697**	**0.0000**	**3,816.8994**	**3,816.8994**	**1.0618**		**3,843.4451**

3.2 Demolition - 2019

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	0.0831	0.0610	0.6637	1.7200e-003	0.1677	1.4500e-003	0.1691	0.0445	1.3300e-003	0.0458		171.3196	171.3196	5.8900e-003		171.4670
Total	**0.0831**	**0.0610**	**0.6637**	**1.7200e-003**	**0.1677**	**1.4500e-003**	**0.1691**	**0.0445**	**1.3300e-003**	**0.0458**		**171.3196**	**171.3196**	**5.8900e-003**		**171.4670**

3.3 Site Preparation - 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					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	4.3350	45.5727	22.0630	0.0380		2.3904	2.3904		2.1991	2.1991		3,766.4529	3,766.4529	1.1917		3,796.2445
Total	**4.3350**	**45.5727**	**22.0630**	**0.0380**	**18.0663**	**2.3904**	**20.4566**	**9.9307**	**2.1991**	**12.1298**		**3,766.4529**	**3,766.4529**	**1.1917**		**3,796.2445**

3.3 Site Preparation - 2019

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	0.0997	0.0732	0.7965	2.0700e-003	0.2012	1.7300e-003	0.2029	0.0534	1.6000e-003	0.0550		205.5836	205.5836	7.0700e-003		205.7604
Total	**0.0997**	**0.0732**	**0.7965**	**2.0700e-003**	**0.2012**	**1.7300e-003**	**0.2029**	**0.0534**	**1.6000e-003**	**0.0550**		**205.5836**	**205.5836**	**7.0700e-003**		**205.7604**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					7.0458	0.0000	7.0458	3.8730	0.0000	3.8730			0.0000			0.0000
Off-Road	4.3350	45.5727	22.0630	0.0380		2.3904	2.3904		2.1991	2.1991	0.0000	3,766.4529	3,766.4529	1.1917		3,796.2445
Total	**4.3350**	**45.5727**	**22.0630**	**0.0380**	**7.0458**	**2.3904**	**9.4362**	**3.8730**	**2.1991**	**6.0721**	**0.0000**	**3,766.4529**	**3,766.4529**	**1.1917**		**3,796.2445**

3.3 Site Preparation - 2019

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	0.0997	0.0732	0.7965	2.0700e-003	0.2012	1.7300e-003	0.2029	0.0534	1.6000e-003	0.0550		205.5836	205.5836	7.0700e-003		205.7604
Total	**0.0997**	**0.0732**	**0.7965**	**2.0700e-003**	**0.2012**	**1.7300e-003**	**0.2029**	**0.0534**	**1.6000e-003**	**0.0550**		**205.5836**	**205.5836**	**7.0700e-003**		**205.7604**

3.4 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					7.6128	0.0000	7.6128	3.4820	0.0000	3.4820			0.0000			0.0000
Off-Road	4.7389	54.5202	33.3768	0.0620		2.3827	2.3827		2.1920	2.1920		6,140.0195	6,140.0195	1.9426		6,188.5854
Total	**4.7389**	**54.5202**	**33.3768**	**0.0620**	**7.6128**	**2.3827**	**9.9955**	**3.4820**	**2.1920**	**5.6740**		**6,140.0195**	**6,140.0195**	**1.9426**		**6,188.5854**

3.4 Grading - 2019

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	0.4133	13.3169	2.9913	0.0337	0.7502	0.0491	0.7993	0.2056	0.0470	0.2526		3,646.421 7	3,646.421 7	0.2652		3,653.051 5
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	0.1108	0.0813	0.8850	2.2900e-003	0.2236	1.9300e-003	0.2255	0.0593	1.7800e-003	0.0611		228.4262	228.4262	7.8600e-003		228.6226
Total	**0.5240**	**13.3983**	**3.8762**	**0.0360**	**0.9737**	**0.0511**	**1.0248**	**0.2649**	**0.0488**	**0.3137**		**3,874.847 9**	**3,874.847 9**	**0.2731**		**3,881.674 1**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.9690	0.0000	2.9690	1.3580	0.0000	1.3580			0.0000			0.0000
Off-Road	4.7389	54.5202	33.3768	0.0620		2.3827	2.3827		2.1920	2.1920	0.0000	6,140.019 5	6,140.019 5	1.9426		6,188.585 4
Total	**4.7389**	**54.5202**	**33.3768**	**0.0620**	**2.9690**	**2.3827**	**5.3517**	**1.3580**	**2.1920**	**3.5500**	**0.0000**	**6,140.019 5**	**6,140.019 5**	**1.9426**		**6,188.585 4**

3.4 Grading - 2019

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	0.4133	13.3169	2.9913	0.0337	0.7502	0.0491	0.7993	0.2056	0.0470	0.2526		3,646.4217	3,646.4217	0.2652		3,653.0515
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	0.1108	0.0813	0.8850	2.2900e-003	0.2236	1.9300e-003	0.2255	0.0593	1.7800e-003	0.0611		228.4262	228.4262	7.8600e-003		228.6226
Total	**0.5240**	**13.3983**	**3.8762**	**0.0360**	**0.9737**	**0.0511**	**1.0248**	**0.2649**	**0.0488**	**0.3137**		**3,874.8479**	**3,874.8479**	**0.2731**		**3,881.6741**

3.5 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	2.3612	21.0788	17.1638	0.0269		1.2899	1.2899		1.2127	1.2127		2,591.5802	2,591.5802	0.6313		2,607.3635
Total	**2.3612**	**21.0788**	**17.1638**	**0.0269**		**1.2899**	**1.2899**		**1.2127**	**1.2127**		**2,591.5802**	**2,591.5802**	**0.6313**		**2,607.3635**

3.5 Building Construction - 2019

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	0.0130	0.3477	0.1015	7.6000e-004	0.0192	2.2500e-003	0.0215	5.5300e-003	2.1500e-003	7.6800e-003		81.3831	81.3831	5.7200e-003		81.5261
Worker	0.0609	0.0447	0.4867	1.2600e-003	0.1230	1.0600e-003	0.1240	0.0326	9.8000e-004	0.0336		125.6344	125.6344	4.3200e-003		125.7424
Total	**0.0739**	**0.3924**	**0.5883**	**2.0200e-003**	**0.1422**	**3.3100e-003**	**0.1455**	**0.0381**	**3.1300e-003**	**0.0413**		**207.0175**	**207.0175**	**0.0100**		**207.2685**

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	2.3612	21.0788	17.1638	0.0269		1.2899	1.2899		1.2127	1.2127	0.0000	2,591.5802	2,591.5802	0.6313		2,607.3635
Total	**2.3612**	**21.0788**	**17.1638**	**0.0269**		**1.2899**	**1.2899**		**1.2127**	**1.2127**	**0.0000**	**2,591.5802**	**2,591.5802**	**0.6313**		**2,607.3635**

3.5 Building Construction - 2019

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	0.0130	0.3477	0.1015	7.6000e-004	0.0192	2.2500e-003	0.0215	5.5300e-003	2.1500e-003	7.6800e-003		81.3831	81.3831	5.7200e-003		81.5261
Worker	0.0609	0.0447	0.4867	1.2600e-003	0.1230	1.0600e-003	0.1240	0.0326	9.8000e-004	0.0336		125.6344	125.6344	4.3200e-003		125.7424
Total	**0.0739**	**0.3924**	**0.5883**	**2.0200e-003**	**0.1422**	**3.3100e-003**	**0.1455**	**0.0381**	**3.1300e-003**	**0.0413**		**207.0175**	**207.0175**	**0.0100**		**207.2685**

3.5 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	2.1198	19.1860	16.8485	0.0269		1.1171	1.1171		1.0503	1.0503		2,553.0631	2,553.0631	0.6229		2,568.6345
Total	**2.1198**	**19.1860**	**16.8485**	**0.0269**		**1.1171**	**1.1171**		**1.0503**	**1.0503**		**2,553.0631**	**2,553.0631**	**0.6229**		**2,568.6345**

3.5 Building Construction - 2020

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	0.0112	0.3191	0.0922	7.6000e-004	0.0192	1.5300e-003	0.0207	5.5300e-003	1.4600e-003	6.9900e-003		80.8347	80.8347	5.4100e-003		80.9699
Worker	0.0562	0.0399	0.4411	1.2200e-003	0.1230	1.0300e-003	0.1240	0.0326	9.5000e-004	0.0336		121.8162	121.8162	3.8400e-003		121.9122
Total	**0.0674**	**0.3589**	**0.5333**	**1.9800e-003**	**0.1422**	**2.5600e-003**	**0.1447**	**0.0381**	**2.4100e-003**	**0.0405**		**202.6510**	**202.6510**	**9.2500e-003**		**202.8821**

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	2.1198	19.1860	16.8485	0.0269		1.1171	1.1171		1.0503	1.0503	0.0000	2,553.0631	2,553.0631	0.6229		2,568.6345
Total	**2.1198**	**19.1860**	**16.8485**	**0.0269**		**1.1171**	**1.1171**		**1.0503**	**1.0503**	**0.0000**	**2,553.0631**	**2,553.0631**	**0.6229**		**2,568.6345**

3.5 Building Construction - 2020

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	0.0112	0.3191	0.0922	7.6000e-004	0.0192	1.5300e-003	0.0207	5.5300e-003	1.4600e-003	6.9900e-003		80.8347	80.8347	5.4100e-003		80.9699
Worker	0.0562	0.0399	0.4411	1.2200e-003	0.1230	1.0300e-003	0.1240	0.0326	9.5000e-004	0.0336		121.8162	121.8162	3.8400e-003		121.9122
Total	**0.0674**	**0.3589**	**0.5333**	**1.9800e-003**	**0.1422**	**2.5600e-003**	**0.1447**	**0.0381**	**2.4100e-003**	**0.0405**		**202.6510**	**202.6510**	**9.2500e-003**		**202.8821**

3.5 Building Construction - 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	1.9009	17.4321	16.5752	0.0269		0.9586	0.9586		0.9013	0.9013		2,553.3639	2,553.3639	0.6160		2,568.7643
Total	**1.9009**	**17.4321**	**16.5752**	**0.0269**		**0.9586**	**0.9586**		**0.9013**	**0.9013**		**2,553.3639**	**2,553.3639**	**0.6160**		**2,568.7643**

3.5 Building Construction - 2021

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	9.5700e-003	0.2907	0.0842	7.5000e-004	0.0192	6.1000e-004	0.0198	5.5300e-003	5.9000e-004	6.1200e-003		80.2037	80.2037	5.1800e-003		80.3331
Worker	0.0525	0.0359	0.4051	1.1800e-003	0.1230	9.9000e-004	0.1240	0.0326	9.2000e-004	0.0335		117.9476	117.9476	3.4700e-003		118.0344
Total	**0.0620**	**0.3266**	**0.4893**	**1.9300e-003**	**0.1422**	**1.6000e-003**	**0.1438**	**0.0381**	**1.5100e-003**	**0.0396**		**198.1513**	**198.1513**	**8.6500e-003**		**198.3675**

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	1.9009	17.4321	16.5752	0.0269		0.9586	0.9586		0.9013	0.9013	0.0000	2,553.3639	2,553.3639	0.6160		2,568.7643
Total	**1.9009**	**17.4321**	**16.5752**	**0.0269**		**0.9586**	**0.9586**		**0.9013**	**0.9013**	**0.0000**	**2,553.3639**	**2,553.3639**	**0.6160**		**2,568.7643**

3.5 Building Construction - 2021

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	9.5700e-003	0.2907	0.0842	7.5000e-004	0.0192	6.1000e-004	0.0198	5.5300e-003	5.9000e-004	6.1200e-003		80.2037	80.2037	5.1800e-003		80.3331
Worker	0.0525	0.0359	0.4051	1.1800e-003	0.1230	9.9000e-004	0.1240	0.0326	9.2000e-004	0.0335		117.9476	117.9476	3.4700e-003		118.0344
Total	**0.0620**	**0.3266**	**0.4893**	**1.9300e-003**	**0.1422**	**1.6000e-003**	**0.1438**	**0.0381**	**1.5100e-003**	**0.0396**		**198.1513**	**198.1513**	**8.6500e-003**		**198.3675**

3.5 Building Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.7062	15.6156	16.3634	0.0269		0.8090	0.8090		0.7612	0.7612		2,554.3336	2,554.3336	0.6120		2,569.6322
Total	**1.7062**	**15.6156**	**16.3634**	**0.0269**		**0.8090**	**0.8090**		**0.7612**	**0.7612**		**2,554.3336**	**2,554.3336**	**0.6120**		**2,569.6322**

3.5 Building Construction - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	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	8.9900e-003	0.2762	0.0797	7.4000e-004	0.0192	5.4000e-004	0.0197	5.5300e-003	5.1000e-004	6.0400e-003		79.4911	79.4911	5.0000e-003		79.6160
Worker	0.0493	0.0324	0.3731	1.1400e-003	0.1230	9.6000e-004	0.1239	0.0326	8.9000e-004	0.0335		113.8026	113.8026	3.1300e-003		113.8810
Total	**0.0583**	**0.3086**	**0.4528**	**1.8800e-003**	**0.1422**	**1.5000e-003**	**0.1437**	**0.0381**	**1.4000e-003**	**0.0395**		**193.2937**	**193.2937**	**8.1300e-003**		**193.4970**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.7062	15.6156	16.3634	0.0269		0.8090	0.8090		0.7612	0.7612	0.0000	2,554.3336	2,554.3336	0.6120		2,569.6322
Total	**1.7062**	**15.6156**	**16.3634**	**0.0269**		**0.8090**	**0.8090**		**0.7612**	**0.7612**	**0.0000**	**2,554.3336**	**2,554.3336**	**0.6120**		**2,569.6322**

3.5 Building Construction - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	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	8.9900e-003	0.2762	0.0797	7.4000e-004	0.0192	5.4000e-004	0.0197	5.5300e-003	5.1000e-004	6.0400e-003		79.4911	79.4911	5.0000e-003		79.6160
Worker	0.0493	0.0324	0.3731	1.1400e-003	0.1230	9.6000e-004	0.1239	0.0326	8.9000e-004	0.0335		113.8026	113.8026	3.1300e-003		113.8810
Total	**0.0583**	**0.3086**	**0.4528**	**1.8800e-003**	**0.1422**	**1.5000e-003**	**0.1437**	**0.0381**	**1.4000e-003**	**0.0395**		**193.2937**	**193.2937**	**8.1300e-003**		**193.4970**

3.6 Paving - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1028	11.1249	14.5805	0.0228		0.5679	0.5679		0.5225	0.5225		2,207.660 3	2,207.660 3	0.7140		2,225.510 4
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.1028**	**11.1249**	**14.5805**	**0.0228**		**0.5679**	**0.5679**		**0.5225**	**0.5225**		**2,207.660 3**	**2,207.660 3**	**0.7140**		**2,225.510 4**

3.6 Paving - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	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	0.0672	0.0442	0.5088	1.5600e-003	0.1677	1.3100e-003	0.1690	0.0445	1.2100e-003	0.0457		155.1854	155.1854	4.2700e-003		155.2922
Total	**0.0672**	**0.0442**	**0.5088**	**1.5600e-003**	**0.1677**	**1.3100e-003**	**0.1690**	**0.0445**	**1.2100e-003**	**0.0457**		**155.1854**	**155.1854**	**4.2700e-003**		**155.2922**

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	1.1028	11.1249	14.5805	0.0228		0.5679	0.5679		0.5225	0.5225	0.0000	2,207.660 3	2,207.660 3	0.7140		2,225.510 4
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.1028**	**11.1249**	**14.5805**	**0.0228**		**0.5679**	**0.5679**		**0.5225**	**0.5225**	**0.0000**	**2,207.660 3**	**2,207.660 3**	**0.7140**		**2,225.510 4**

3.6 Paving - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	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	0.0672	0.0442	0.5088	1.5600e-003	0.1677	1.3100e-003	0.1690	0.0445	1.2100e-003	0.0457		155.1854	155.1854	4.2700e-003		155.2922
Total	**0.0672**	**0.0442**	**0.5088**	**1.5600e-003**	**0.1677**	**1.3100e-003**	**0.1690**	**0.0445**	**1.2100e-003**	**0.0457**		**155.1854**	**155.1854**	**4.2700e-003**		**155.2922**

3.7 Architectural Coating - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	14.1073					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2045	1.4085	1.8136	2.9700e-003		0.0817	0.0817		0.0817	0.0817		281.4481	281.4481	0.0183		281.9062
Total	**14.3118**	**1.4085**	**1.8136**	**2.9700e-003**		**0.0817**	**0.0817**		**0.0817**	**0.0817**		**281.4481**	**281.4481**	**0.0183**		**281.9062**

3.7 Architectural Coating - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	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	8.9600e-003	5.8900e-003	0.0678	2.1000e-004	0.0224	1.7000e-004	0.0225	5.9300e-003	1.6000e-004	6.0900e-003		20.6914	20.6914	5.7000e-004		20.7056
Total	**8.9600e-003**	**5.8900e-003**	**0.0678**	**2.1000e-004**	**0.0224**	**1.7000e-004**	**0.0225**	**5.9300e-003**	**1.6000e-004**	**6.0900e-003**		**20.6914**	**20.6914**	**5.7000e-004**		**20.7056**

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	14.1073					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2045	1.4085	1.8136	2.9700e-003		0.0817	0.0817		0.0817	0.0817	0.0000	281.4481	281.4481	0.0183		281.9062
Total	**14.3118**	**1.4085**	**1.8136**	**2.9700e-003**		**0.0817**	**0.0817**		**0.0817**	**0.0817**	**0.0000**	**281.4481**	**281.4481**	**0.0183**		**281.9062**

3.7 Architectural Coating - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	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	8.9600e-003	5.8900e-003	0.0678	2.1000e-004	0.0224	1.7000e-004	0.0225	5.9300e-003	1.6000e-004	6.0900e-003		20.6914	20.6914	5.7000e-004		20.7056
Total	**8.9600e-003**	**5.8900e-003**	**0.0678**	**2.1000e-004**	**0.0224**	**1.7000e-004**	**0.0225**	**5.9300e-003**	**1.6000e-004**	**6.0900e-003**		**20.6914**	**20.6914**	**5.7000e-004**		**20.7056**

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	0.4907	2.1529	6.6182	0.0253	2.2323	0.0194	2.2517	0.5974	0.0181	0.6155		2,573.0863	2,573.0863	0.1279		2,576.2825
Unmitigated	0.4907	2.1529	6.6182	0.0253	2.2323	0.0194	2.2517	0.5974	0.0181	0.6155		2,573.0863	2,573.0863	0.1279		2,576.2825

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Single Family Housing	295.12	307.21	267.22	1,000,752	1,000,752
Total	295.12	307.21	267.22	1,000,752	1,000,752

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
Single Family Housing	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Single Family Housing	0.545842	0.044768	0.205288	0.119317	0.015350	0.006227	0.020460	0.031333	0.002546	0.002133	0.005184	0.000692	0.000862

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
	lb/day										lb/day					
NaturalGas Mitigated	0.0236	0.2020	0.0860	1.2900e-003		0.0163	0.0163		0.0163	0.0163		257.8412	257.8412	4.9400e-003	4.7300e-003	259.3734
NaturalGas Unmitigated	0.0236	0.2020	0.0860	1.2900e-003		0.0163	0.0163		0.0163	0.0163		257.8412	257.8412	4.9400e-003	4.7300e-003	259.3734

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	lb/day										lb/day					
Single Family Housing	2191.65	0.0236	0.2020	0.0860	1.2900e-003		0.0163	0.0163		0.0163	0.0163		257.8412	257.8412	4.9400e-003	4.7300e-003	259.3734
Total		**0.0236**	**0.2020**	**0.0860**	**1.2900e-003**		**0.0163**	**0.0163**		**0.0163**	**0.0163**		**257.8412**	**257.8412**	**4.9400e-003**	**4.7300e-003**	**259.3734**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Single Family Housing	2.19165	0.0236	0.2020	0.0860	1.2900e-003		0.0163	0.0163		0.0163	0.0163		257.8412	257.8412	4.9400e-003	4.7300e-003	259.3734
Total		**0.0236**	**0.2020**	**0.0860**	**1.2900e-003**		**0.0163**	**0.0163**		**0.0163**	**0.0163**		**257.8412**	**257.8412**	**4.9400e-003**	**4.7300e-003**	**259.3734**

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	10.8680	0.6727	18.3232	0.0404		2.3822	2.3822		2.3822	2.3822	290.3745	562.6051	852.9796	0.8704	0.0197	880.6123
Unmitigated	10.8680	0.6727	18.3232	0.0404		2.3822	2.3822		2.3822	2.3822	290.3745	562.6051	852.9796	0.8704	0.0197	880.6123

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	0.2126					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	2.4552					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	8.1231	0.6432	15.7651	0.0402		2.3680	2.3680		2.3680	2.3680	290.3745	558.0000	848.3745	0.8660	0.0197	875.8964
Landscaping	0.0771	0.0295	2.5581	1.4000e-004		0.0142	0.0142		0.0142	0.0142		4.6051	4.6051	4.4300e-003		4.7158
Total	**10.8680**	**0.6727**	**18.3232**	**0.0404**		**2.3822**	**2.3822**		**2.3822**	**2.3822**	**290.3745**	**562.6051**	**852.9796**	**0.8704**	**0.0197**	**880.6123**

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	0.2126					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	2.4552					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	8.1231	0.6432	15.7651	0.0402		2.3680	2.3680		2.3680	2.3680	290.3745	558.0000	848.3745	0.8660	0.0197	875.8964
Landscaping	0.0771	0.0295	2.5581	1.4000e-004		0.0142	0.0142		0.0142	0.0142		4.6051	4.6051	4.4300e-003		4.7158
Total	**10.8680**	**0.6727**	**18.3232**	**0.0404**		**2.3822**	**2.3822**		**2.3822**	**2.3822**	**290.3745**	**562.6051**	**852.9796**	**0.8704**	**0.0197**	**880.6123**

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

RPV Zone 2 Landslide Moratorium

Los Angeles-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	31.00	Dwelling Unit	31.00	124,000.00	89

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	33
Climate Zone	8			**Operational Year**	2023
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Per updated details RE built and not-yet built homes in Zone 2.

Construction Phase - Based on schedule used in 2012 EIR

Grading - Based on development assumptions for Zone 2

Architectural Coating - Per SCAQMD Rule 1113.

Area Coating - Per SCAQMD Rule 1113.

Construction Off-road Equipment Mitigation - Watering twice per day per SCAQMD Rule 403.

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	100.00	50.00

tblArchitecturalCoating	EF_Nonresidential_Interior	100.00	50.00
tblAreaCoating	Area_EF_Nonresidential_Exterior	100	50
tblAreaCoating	Area_EF_Nonresidential_Interior	100	50
tblConstDustMitigation	WaterExposedAreaPM10PercentReduction	55	61
tblConstDustMitigation	WaterExposedAreaPM25PercentReduction	55	61
tblConstructionPhase	NumDays	35.00	55.00
tblConstructionPhase	NumDays	500.00	740.00
tblConstructionPhase	NumDays	30.00	50.00
tblConstructionPhase	NumDays	45.00	75.00
tblConstructionPhase	NumDays	35.00	55.00
tblConstructionPhase	NumDays	20.00	30.00
tblConstructionPhase	PhaseEndDate	7/20/2021	11/8/2022
tblConstructionPhase	PhaseEndDate	4/13/2021	6/7/2022
tblConstructionPhase	PhaseEndDate	2/12/2019	3/12/2019
tblConstructionPhase	PhaseEndDate	5/14/2019	8/6/2019
tblConstructionPhase	PhaseEndDate	6/1/2021	8/23/2022
tblConstructionPhase	PhaseEndDate	3/12/2019	4/23/2019
tblConstructionPhase	PhaseStartDate	6/2/2021	8/24/2022
tblConstructionPhase	PhaseStartDate	5/15/2019	8/7/2019
tblConstructionPhase	PhaseStartDate	3/13/2019	4/24/2019
tblConstructionPhase	PhaseStartDate	4/14/2021	6/8/2022
tblConstructionPhase	PhaseStartDate	2/13/2019	3/13/2019
tblGrading	AcresOfGrading	187.50	112.50
tblGrading	MaterialExported	0.00	31,000.00
tblGrading	MaterialImported	0.00	1,550.00
tblLandUse	LandUseSquareFeet	55,800.00	124,000.00
tblLandUse	LotAcreage	10.06	31.00

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	0.4804	5.2654	3.2380	6.8300e-003	0.6067	0.2399	0.8467	0.2932	0.2226	0.5158	0.0000	620.1350	620.1350	0.1463	0.0000	623.7916
2020	0.2858	2.5613	2.2780	3.7900e-003	0.0183	0.1467	0.1649	4.9100e-003	0.1379	0.1428	0.0000	327.8899	327.8899	0.0751	0.0000	329.7675
2021	0.2555	2.3183	2.2278	3.7700e-003	0.0182	0.1253	0.1435	4.8900e-003	0.1178	0.1227	0.0000	326.1329	326.1329	0.0739	0.0000	327.9814
2022	0.5243	1.2382	1.4092	2.3700e-003	0.0129	0.0633	0.0762	3.4600e-003	0.0594	0.0628	0.0000	206.3064	206.3064	0.0499	0.0000	207.5536
Maximum	**0.5243**	**5.2654**	**3.2380**	**6.8300e-003**	**0.6067**	**0.2399**	**0.8467**	**0.2932**	**0.2226**	**0.5158**	**0.0000**	**620.1350**	**620.1350**	**0.1463**	**0.0000**	**623.7916**

2.1 Overall Construction

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	0.4804	5.2654	3.2380	6.8300e-003	0.2673	0.2399	0.5072	0.1226	0.2226	0.3453	0.0000	620.1344	620.1344	0.1463	0.0000	623.7911
2020	0.2858	2.5613	2.2780	3.7900e-003	0.0183	0.1467	0.1649	4.9100e-003	0.1379	0.1428	0.0000	327.8895	327.8895	0.0751	0.0000	329.7672
2021	0.2555	2.3183	2.2278	3.7700e-003	0.0182	0.1253	0.1435	4.8900e-003	0.1178	0.1227	0.0000	326.1325	326.1325	0.0739	0.0000	327.9810
2022	0.5243	1.2382	1.4092	2.3700e-003	0.0129	0.0633	0.0762	3.4600e-003	0.0594	0.0628	0.0000	206.3062	206.3062	0.0499	0.0000	207.5534
Maximum	**0.5243**	**5.2654**	**3.2380**	**6.8300e-003**	**0.2673**	**0.2399**	**0.5072**	**0.1226**	**0.2226**	**0.3453**	**0.0000**	**620.1344**	**620.1344**	**0.1463**	**0.0000**	**623.7911**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**51.74**	**0.00**	**27.57**	**55.65**	**0.00**	**20.20**	**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	**1-2-2019**	**4-1-2019**	1.3437	1.3437
2	**4-2-2019**	**7-1-2019**	2.1917	2.1917
3	**7-2-2019**	**10-1-2019**	1.4162	1.4162
4	**10-2-2019**	**1-1-2020**	0.7847	0.7847
5	**1-2-2020**	**4-1-2020**	0.7063	0.7063
6	**4-2-2020**	**7-1-2020**	0.7060	0.7060
7	**7-2-2020**	**10-1-2020**	0.7137	0.7137
8	**10-2-2020**	**1-1-2021**	0.7133	0.7133

9	**1-2-2021**	**4-1-2021**	0.6339	0.6339
10	**4-2-2021**	**7-1-2021**	0.6407	0.6407
11	**7-2-2021**	**10-1-2021**	0.6477	0.6477
12	**10-2-2021**	**1-1-2022**	0.6473	0.6473
13	**1-2-2022**	**4-1-2022**	0.5686	0.5686
14	**4-2-2022**	**7-1-2022**	0.5287	0.5287
15	**7-2-2022**	**9-30-2022**	0.4469	0.4469
		Highest	2.1917	2.1917

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	0.5980	0.0117	0.5168	5.2000e-004		0.0314	0.0314		0.0314	0.0314	3.2928	6.8498	10.1426	0.0103	2.2000e-004	10.4673
Energy	4.3100e-003	0.0369	0.0157	2.4000e-004		2.9800e-003	2.9800e-003		2.9800e-003	2.9800e-003	0.0000	121.8897	121.8897	4.0900e-003	1.4600e-003	122.4268
Mobile	0.0832	0.3800	1.1662	4.4400e-003	0.3798	3.3600e-003	0.3832	0.1018	3.1300e-003	0.1049	0.0000	410.6360	410.6360	0.0201	0.0000	411.1375
Waste						0.0000	0.0000		0.0000	0.0000	7.4071	0.0000	7.4071	0.4378	0.0000	18.3509
Water						0.0000	0.0000		0.0000	0.0000	0.6408	12.8870	13.5278	0.0664	1.6600e-003	15.6824
Total	**0.6856**	**0.4286**	**1.6987**	**5.2000e-003**	**0.3798**	**0.0377**	**0.4175**	**0.1018**	**0.0375**	**0.1393**	**11.3407**	**552.2626**	**563.6033**	**0.5386**	**3.3400e-003**	**578.0648**

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	0.5980	0.0117	0.5168	5.2000e-004		0.0314	0.0314		0.0314	0.0314	3.2928	6.8498	10.1426	0.0103	2.2000e-004	10.4673
Energy	4.3100e-003	0.0369	0.0157	2.4000e-004		2.9800e-003	2.9800e-003		2.9800e-003	2.9800e-003	0.0000	121.8897	121.8897	4.0900e-003	1.4600e-003	122.4268
Mobile	0.0832	0.3800	1.1662	4.4400e-003	0.3798	3.3600e-003	0.3832	0.1018	3.1300e-003	0.1049	0.0000	410.6360	410.6360	0.0201	0.0000	411.1375
Waste						0.0000	0.0000		0.0000	0.0000	7.4071	0.0000	7.4071	0.4378	0.0000	18.3509
Water						0.0000	0.0000		0.0000	0.0000	0.6408	12.8870	13.5278	0.0664	1.6600e-003	15.6824
Total	**0.6856**	**0.4286**	**1.6987**	**5.2000e-003**	**0.3798**	**0.0377**	**0.4175**	**0.1018**	**0.0375**	**0.1393**	**11.3407**	**552.2626**	**563.6033**	**0.5386**	**3.3400e-003**	**578.0648**

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

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/2/2019	3/12/2019	5	50	
2	Site Preparation	Site Preparation	3/13/2019	4/23/2019	5	30	
3	Grading	Grading	4/24/2019	8/6/2019	5	75	
4	Building Construction	Building Construction	8/7/2019	6/7/2022	5	740	
5	Paving	Paving	6/8/2022	8/23/2022	5	55	
6	Architectural Coating	Architectural Coating	8/24/2022	11/8/2022	5	55	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 112.5

Acres of Paving: 0

Residential Indoor: 251,100; Residential Outdoor: 83,700; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Demolition	Excavators	3	8.00	158	0.38
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Grading	Excavators	2	8.00	158	0.38
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Paving	Pavers	2	8.00	130	0.42
Paving	Rollers	2	8.00	80	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Grading	Graders	1	8.00	187	0.41
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Paving	Paving Equipment	2	8.00	132	0.36
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Building Construction	Welders	1	8.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	3,218.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	11.00	3.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	2.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Demolition - 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	0.0878	0.8946	0.5515	9.7000e-004		0.0449	0.0449		0.0417	0.0417	0.0000	86.5658	86.5658	0.0241	0.0000	87.1679
Total	**0.0878**	**0.8946**	**0.5515**	**9.7000e-004**		**0.0449**	**0.0449**		**0.0417**	**0.0417**	**0.0000**	**86.5658**	**86.5658**	**0.0241**	**0.0000**	**87.1679**

3.2 Demolition - 2019

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	1.8800e-003	1.5700e-003	0.0170	4.0000e-005	4.1100e-003	4.0000e-005	4.1500e-003	1.0900e-003	3.0000e-005	1.1200e-003	0.0000	3.9501	3.9501	1.4000e-004	0.0000	3.9535
Total	**1.8800e-003**	**1.5700e-003**	**0.0170**	**4.0000e-005**	**4.1100e-003**	**4.0000e-005**	**4.1500e-003**	**1.0900e-003**	**3.0000e-005**	**1.1200e-003**	**0.0000**	**3.9501**	**3.9501**	**1.4000e-004**	**0.0000**	**3.9535**

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	0.0878	0.8946	0.5515	9.7000e-004		0.0449	0.0449		0.0417	0.0417	0.0000	86.5657	86.5657	0.0241	0.0000	87.1678
Total	**0.0878**	**0.8946**	**0.5515**	**9.7000e-004**		**0.0449**	**0.0449**		**0.0417**	**0.0417**	**0.0000**	**86.5657**	**86.5657**	**0.0241**	**0.0000**	**87.1678**

3.2 Demolition - 2019

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	1.8800e-003	1.5700e-003	0.0170	4.0000e-005	4.1100e-003	4.0000e-005	4.1500e-003	1.0900e-003	3.0000e-005	1.1200e-003	0.0000	3.9501	3.9501	1.4000e-004	0.0000	3.9535
Total	**1.8800e-003**	**1.5700e-003**	**0.0170**	**4.0000e-005**	**4.1100e-003**	**4.0000e-005**	**4.1500e-003**	**1.0900e-003**	**3.0000e-005**	**1.1200e-003**	**0.0000**	**3.9501**	**3.9501**	**1.4000e-004**	**0.0000**	**3.9535**

3.3 Site Preparation - 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					0.2710	0.0000	0.2710	0.1490	0.0000	0.1490	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0650	0.6836	0.3310	5.7000e-004		0.0359	0.0359		0.0330	0.0330	0.0000	51.2530	51.2530	0.0162	0.0000	51.6584
Total	**0.0650**	**0.6836**	**0.3310**	**5.7000e-004**	**0.2710**	**0.0359**	**0.3069**	**0.1490**	**0.0330**	**0.1820**	**0.0000**	**51.2530**	**51.2530**	**0.0162**	**0.0000**	**51.6584**

3.3 Site Preparation - 2019

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	1.3500e-003	1.1300e-003	0.0123	3.0000e-005	2.9600e-003	3.0000e-005	2.9800e-003	7.9000e-004	2.0000e-005	8.1000e-004	0.0000	2.8441	2.8441	1.0000e-004	0.0000	2.8465
Total	**1.3500e-003**	**1.1300e-003**	**0.0123**	**3.0000e-005**	**2.9600e-003**	**3.0000e-005**	**2.9800e-003**	**7.9000e-004**	**2.0000e-005**	**8.1000e-004**	**0.0000**	**2.8441**	**2.8441**	**1.0000e-004**	**0.0000**	**2.8465**

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					0.1057	0.0000	0.1057	0.0581	0.0000	0.0581	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0650	0.6836	0.3309	5.7000e-004		0.0359	0.0359		0.0330	0.0330	0.0000	51.2530	51.2530	0.0162	0.0000	51.6584
Total	**0.0650**	**0.6836**	**0.3309**	**5.7000e-004**	**0.1057**	**0.0359**	**0.1416**	**0.0581**	**0.0330**	**0.0911**	**0.0000**	**51.2530**	**51.2530**	**0.0162**	**0.0000**	**51.6584**

3.3 Site Preparation - 2019

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	1.3500e-003	1.1300e-003	0.0123	3.0000e-005	2.9600e-003	3.0000e-005	2.9800e-003	7.9000e-004	2.0000e-005	8.1000e-004	0.0000	2.8441	2.8441	1.0000e-004	0.0000	2.8465
Total	**1.3500e-003**	**1.1300e-003**	**0.0123**	**3.0000e-005**	**2.9600e-003**	**3.0000e-005**	**2.9800e-003**	**7.9000e-004**	**2.0000e-005**	**8.1000e-004**	**0.0000**	**2.8441**	**2.8441**	**1.0000e-004**	**0.0000**	**2.8465**

3.4 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					0.2855	0.0000	0.2855	0.1306	0.0000	0.1306	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1777	2.0445	1.2516	2.3300e-003		0.0894	0.0894		0.0822	0.0822	0.0000	208.8800	208.8800	0.0661	0.0000	210.5321
Total	**0.1777**	**2.0445**	**1.2516**	**2.3300e-003**	**0.2855**	**0.0894**	**0.3748**	**0.1306**	**0.0822**	**0.2128**	**0.0000**	**208.8800**	**208.8800**	**0.0661**	**0.0000**	**210.5321**

3.4 Grading - 2019

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	0.0153	0.5092	0.1082	1.2800e-003	0.0277	1.8200e-003	0.0295	7.5900e-003	1.7400e-003	9.3400e-003	0.0000	125.2905	125.2905	8.8400e-003	0.0000	125.5114
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	3.7600e-003	3.1300e-003	0.0341	9.0000e-005	8.2200e-003	7.0000e-005	8.2900e-003	2.1800e-003	7.0000e-005	2.2500e-003	0.0000	7.9002	7.9002	2.7000e-004	0.0000	7.9070
Total	**0.0190**	**0.5124**	**0.1422**	**1.3700e-003**	**0.0359**	**1.8900e-003**	**0.0378**	**9.7700e-003**	**1.8100e-003**	**0.0116**	**0.0000**	**133.1907**	**133.1907**	**9.1100e-003**	**0.0000**	**133.4183**

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					0.1113	0.0000	0.1113	0.0509	0.0000	0.0509	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1777	2.0445	1.2516	2.3300e-003		0.0894	0.0894		0.0822	0.0822	0.0000	208.8797	208.8797	0.0661	0.0000	210.5319
Total	**0.1777**	**2.0445**	**1.2516**	**2.3300e-003**	**0.1113**	**0.0894**	**0.2007**	**0.0509**	**0.0822**	**0.1331**	**0.0000**	**208.8797**	**208.8797**	**0.0661**	**0.0000**	**210.5319**

3.4 Grading - 2019

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	0.0153	0.5092	0.1082	1.2800e-003	0.0277	1.8200e-003	0.0295	7.5900e-003	1.7400e-003	9.3400e-003	0.0000	125.2905	125.2905	8.8400e-003	0.0000	125.5114
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	3.7600e-003	3.1300e-003	0.0341	9.0000e-005	8.2200e-003	7.0000e-005	8.2900e-003	2.1800e-003	7.0000e-005	2.2500e-003	0.0000	7.9002	7.9002	2.7000e-004	0.0000	7.9070
Total	**0.0190**	**0.5124**	**0.1422**	**1.3700e-003**	**0.0359**	**1.8900e-003**	**0.0378**	**9.7700e-003**	**1.8100e-003**	**0.0116**	**0.0000**	**133.1907**	**133.1907**	**9.1100e-003**	**0.0000**	**133.4183**

3.5 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	0.1240	1.1066	0.9011	1.4100e-003		0.0677	0.0677		0.0637	0.0637	0.0000	123.4297	123.4297	0.0301	0.0000	124.1814
Total	**0.1240**	**1.1066**	**0.9011**	**1.4100e-003**		**0.0677**	**0.0677**		**0.0637**	**0.0637**	**0.0000**	**123.4297**	**123.4297**	**0.0301**	**0.0000**	**124.1814**

3.5 Building Construction - 2019

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	6.7000e-004	0.0186	5.0900e-003	4.0000e-005	9.9000e-004	1.2000e-004	1.1100e-003	2.9000e-004	1.1000e-004	4.0000e-004	0.0000	3.9385	3.9385	2.6000e-004	0.0000	3.9451
Worker	2.8900e-003	2.4100e-003	0.0262	7.0000e-005	6.3300e-003	6.0000e-005	6.3800e-003	1.6800e-003	5.0000e-005	1.7300e-003	0.0000	6.0831	6.0831	2.1000e-004	0.0000	6.0884
Total	**3.5600e-003**	**0.0210**	**0.0313**	**1.1000e-004**	**7.3200e-003**	**1.8000e-004**	**7.4900e-003**	**1.9700e-003**	**1.6000e-004**	**2.1300e-003**	**0.0000**	**10.0217**	**10.0217**	**4.7000e-004**	**0.0000**	**10.0335**

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	0.1240	1.1066	0.9011	1.4100e-003		0.0677	0.0677		0.0637	0.0637	0.0000	123.4296	123.4296	0.0301	0.0000	124.1813
Total	**0.1240**	**1.1066**	**0.9011**	**1.4100e-003**		**0.0677**	**0.0677**		**0.0637**	**0.0637**	**0.0000**	**123.4296**	**123.4296**	**0.0301**	**0.0000**	**124.1813**

3.5 Building Construction - 2019

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	6.7000e-004	0.0186	5.0900e-003	4.0000e-005	9.9000e-004	1.2000e-004	1.1100e-003	2.9000e-004	1.1000e-004	4.0000e-004	0.0000	3.9385	3.9385	2.6000e-004	0.0000	3.9451
Worker	2.8900e-003	2.4100e-003	0.0262	7.0000e-005	6.3300e-003	6.0000e-005	6.3800e-003	1.6800e-003	5.0000e-005	1.7300e-003	0.0000	6.0831	6.0831	2.1000e-004	0.0000	6.0884
Total	**3.5600e-003**	**0.0210**	**0.0313**	**1.1000e-004**	**7.3200e-003**	**1.8000e-004**	**7.4900e-003**	**1.9700e-003**	**1.6000e-004**	**2.1300e-003**	**0.0000**	**10.0217**	**10.0217**	**4.7000e-004**	**0.0000**	**10.0335**

3.5 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	0.2777	2.5134	2.2072	3.5300e-003		0.1463	0.1463		0.1376	0.1376	0.0000	303.4091	303.4091	0.0740	0.0000	305.2596
Total	**0.2777**	**2.5134**	**2.2072**	**3.5300e-003**		**0.1463**	**0.1463**		**0.1376**	**0.1376**	**0.0000**	**303.4091**	**303.4091**	**0.0740**	**0.0000**	**305.2596**

3.5 Building Construction - 2020

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	1.4300e-003	0.0426	0.0115	1.0000e-004	2.4800e-003	2.0000e-004	2.6700e-003	7.1000e-004	1.9000e-004	9.0000e-004	0.0000	9.7632	9.7632	6.2000e-004	0.0000	9.7787
Worker	6.6500e-003	5.3600e-003	0.0593	1.6000e-004	0.0158	1.3000e-004	0.0159	4.1900e-003	1.2000e-004	4.3200e-003	0.0000	14.7177	14.7177	4.6000e-004	0.0000	14.7293
Total	**8.0800e-003**	**0.0480**	**0.0709**	**2.6000e-004**	**0.0183**	**3.3000e-004**	**0.0186**	**4.9000e-003**	**3.1000e-004**	**5.2200e-003**	**0.0000**	**24.4808**	**24.4808**	**1.0800e-003**	**0.0000**	**24.5079**

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	0.2777	2.5134	2.2072	3.5300e-003		0.1463	0.1463		0.1376	0.1376	0.0000	303.4087	303.4087	0.0740	0.0000	305.2592
Total	**0.2777**	**2.5134**	**2.2072**	**3.5300e-003**		**0.1463**	**0.1463**		**0.1376**	**0.1376**	**0.0000**	**303.4087**	**303.4087**	**0.0740**	**0.0000**	**305.2592**

3.5 Building Construction - 2020

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	1.4300e-003	0.0426	0.0115	1.0000e-004	2.4800e-003	2.0000e-004	2.6700e-003	7.1000e-004	1.9000e-004	9.0000e-004	0.0000	9.7632	9.7632	6.2000e-004	0.0000	9.7787
Worker	6.6500e-003	5.3600e-003	0.0593	1.6000e-004	0.0158	1.3000e-004	0.0159	4.1900e-003	1.2000e-004	4.3200e-003	0.0000	14.7177	14.7177	4.6000e-004	0.0000	14.7293
Total	**8.0800e-003**	**0.0480**	**0.0709**	**2.6000e-004**	**0.0183**	**3.3000e-004**	**0.0186**	**4.9000e-003**	**3.1000e-004**	**5.2200e-003**	**0.0000**	**24.4808**	**24.4808**	**1.0800e-003**	**0.0000**	**24.5079**

3.5 Building Construction - 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	0.2481	2.2749	2.1631	3.5100e-003		0.1251	0.1251		0.1176	0.1176	0.0000	302.2867	302.2867	0.0729	0.0000	304.1099
Total	**0.2481**	**2.2749**	**2.1631**	**3.5100e-003**		**0.1251**	**0.1251**		**0.1176**	**0.1176**	**0.0000**	**302.2867**	**302.2867**	**0.0729**	**0.0000**	**304.1099**

3.5 Building Construction - 2021

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	1.2200e-003	0.0386	0.0105	1.0000e-004	2.4700e-003	8.0000e-005	2.5400e-003	7.1000e-004	8.0000e-005	7.9000e-004	0.0000	9.6503	9.6503	5.9000e-004	0.0000	9.6651
Worker	6.1800e-003	4.8100e-003	0.0543	1.6000e-004	0.0157	1.3000e-004	0.0159	4.1800e-003	1.2000e-004	4.3000e-003	0.0000	14.1959	14.1959	4.2000e-004	0.0000	14.2064
Total	**7.4000e-003**	**0.0435**	**0.0648**	**2.6000e-004**	**0.0182**	**2.1000e-004**	**0.0184**	**4.8900e-003**	**2.0000e-004**	**5.0900e-003**	**0.0000**	**23.8462**	**23.8462**	**1.0100e-003**	**0.0000**	**23.8715**

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	0.2481	2.2749	2.1631	3.5100e-003		0.1251	0.1251		0.1176	0.1176	0.0000	302.2863	302.2863	0.0729	0.0000	304.1095
Total	**0.2481**	**2.2749**	**2.1631**	**3.5100e-003**		**0.1251**	**0.1251**		**0.1176**	**0.1176**	**0.0000**	**302.2863**	**302.2863**	**0.0729**	**0.0000**	**304.1095**

3.5 Building Construction - 2021

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	1.2200e-003	0.0386	0.0105	1.0000e-004	2.4700e-003	8.0000e-005	2.5400e-003	7.1000e-004	8.0000e-005	7.9000e-004	0.0000	9.6503	9.6503	5.9000e-004	0.0000	9.6651
Worker	6.1800e-003	4.8100e-003	0.0543	1.6000e-004	0.0157	1.3000e-004	0.0159	4.1800e-003	1.2000e-004	4.3000e-003	0.0000	14.1959	14.1959	4.2000e-004	0.0000	14.2064
Total	**7.4000e-003**	**0.0435**	**0.0648**	**2.6000e-004**	**0.0182**	**2.1000e-004**	**0.0184**	**4.8900e-003**	**2.0000e-004**	**5.0900e-003**	**0.0000**	**23.8462**	**23.8462**	**1.0100e-003**	**0.0000**	**23.8715**

3.5 Building Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0956	0.8745	0.9164	1.5100e-003		0.0453	0.0453		0.0426	0.0426	0.0000	129.7661	129.7661	0.0311	0.0000	130.5433
Total	**0.0956**	**0.8745**	**0.9164**	**1.5100e-003**		**0.0453**	**0.0453**		**0.0426**	**0.0426**	**0.0000**	**129.7661**	**129.7661**	**0.0311**	**0.0000**	**130.5433**

3.5 Building Construction - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	4.9000e-004	0.0158	4.2500e-003	4.0000e-005	1.0600e-003	3.0000e-005	1.0900e-003	3.1000e-004	3.0000e-005	3.3000e-004	0.0000	4.1048	4.1048	2.5000e-004	0.0000	4.1109
Worker	2.4900e-003	1.8600e-003	0.0215	7.0000e-005	6.7500e-003	5.0000e-005	6.8000e-003	1.7900e-003	5.0000e-005	1.8400e-003	0.0000	5.8776	5.8776	1.6000e-004	0.0000	5.8816
Total	**2.9800e-003**	**0.0176**	**0.0257**	**1.1000e-004**	**7.8100e-003**	**8.0000e-005**	**7.8900e-003**	**2.1000e-003**	**8.0000e-005**	**2.1700e-003**	**0.0000**	**9.9824**	**9.9824**	**4.1000e-004**	**0.0000**	**9.9925**

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	0.0956	0.8745	0.9164	1.5100e-003		0.0453	0.0453		0.0426	0.0426	0.0000	129.7660	129.7660	0.0311	0.0000	130.5432
Total	**0.0956**	**0.8745**	**0.9164**	**1.5100e-003**		**0.0453**	**0.0453**		**0.0426**	**0.0426**	**0.0000**	**129.7660**	**129.7660**	**0.0311**	**0.0000**	**130.5432**

3.5 Building Construction - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	4.9000e-004	0.0158	4.2500e-003	4.0000e-005	1.0600e-003	3.0000e-005	1.0900e-003	3.1000e-004	3.0000e-005	3.3000e-004	0.0000	4.1048	4.1048	2.5000e-004	0.0000	4.1109
Worker	2.4900e-003	1.8600e-003	0.0215	7.0000e-005	6.7500e-003	5.0000e-005	6.8000e-003	1.7900e-003	5.0000e-005	1.8400e-003	0.0000	5.8776	5.8776	1.6000e-004	0.0000	5.8816
Total	**2.9800e-003**	**0.0176**	**0.0257**	**1.1000e-004**	**7.8100e-003**	**8.0000e-005**	**7.8900e-003**	**2.1000e-003**	**8.0000e-005**	**2.1700e-003**	**0.0000**	**9.9824**	**9.9824**	**4.1000e-004**	**0.0000**	**9.9925**

3.6 Paving - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0303	0.3059	0.4010	6.3000e-004		0.0156	0.0156		0.0144	0.0144	0.0000	55.0758	55.0758	0.0178	0.0000	55.5211
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0303**	**0.3059**	**0.4010**	**6.3000e-004**		**0.0156**	**0.0156**		**0.0144**	**0.0144**	**0.0000**	**55.0758**	**55.0758**	**0.0178**	**0.0000**	**55.5211**

3.6 Paving - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.6600e-003	1.2500e-003	0.0144	4.0000e-005	4.5200e-003	4.0000e-005	4.5600e-003	1.2000e-003	3.0000e-005	1.2300e-003	0.0000	3.9359	3.9359	1.1000e-004	0.0000	3.9386
Total	**1.6600e-003**	**1.2500e-003**	**0.0144**	**4.0000e-005**	**4.5200e-003**	**4.0000e-005**	**4.5600e-003**	**1.2000e-003**	**3.0000e-005**	**1.2300e-003**	**0.0000**	**3.9359**	**3.9359**	**1.1000e-004**	**0.0000**	**3.9386**

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	0.0303	0.3059	0.4010	6.3000e-004		0.0156	0.0156		0.0144	0.0144	0.0000	55.0757	55.0757	0.0178	0.0000	55.5210
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0303**	**0.3059**	**0.4010**	**6.3000e-004**		**0.0156**	**0.0156**		**0.0144**	**0.0144**	**0.0000**	**55.0757**	**55.0757**	**0.0178**	**0.0000**	**55.5210**

3.6 Paving - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.6600e-003	1.2500e-003	0.0144	4.0000e-005	4.5200e-003	4.0000e-005	4.5600e-003	1.2000e-003	3.0000e-005	1.2300e-003	0.0000	3.9359	3.9359	1.1000e-004	0.0000	3.9386
Total	**1.6600e-003**	**1.2500e-003**	**0.0144**	**4.0000e-005**	**4.5200e-003**	**4.0000e-005**	**4.5600e-003**	**1.2000e-003**	**3.0000e-005**	**1.2300e-003**	**0.0000**	**3.9359**	**3.9359**	**1.1000e-004**	**0.0000**	**3.9386**

3.7 Architectural Coating - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.3880					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.6200e-003	0.0387	0.0499	8.0000e-005		2.2500e-003	2.2500e-003		2.2500e-003	2.2500e-003	0.0000	7.0215	7.0215	4.6000e-004	0.0000	7.0329
Total	**0.3936**	**0.0387**	**0.0499**	**8.0000e-005**		**2.2500e-003**	**2.2500e-003**		**2.2500e-003**	**2.2500e-003**	**0.0000**	**7.0215**	**7.0215**	**4.6000e-004**	**0.0000**	**7.0329**

3.7 Architectural Coating - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.2000e-004	1.7000e-004	1.9200e-003	1.0000e-005	6.0000e-004	0.0000	6.1000e-004	1.6000e-004	0.0000	1.6000e-004	0.0000	0.5248	0.5248	1.0000e-005	0.0000	0.5252
Total	**2.2000e-004**	**1.7000e-004**	**1.9200e-003**	**1.0000e-005**	**6.0000e-004**	**0.0000**	**6.1000e-004**	**1.6000e-004**	**0.0000**	**1.6000e-004**	**0.0000**	**0.5248**	**0.5248**	**1.0000e-005**	**0.0000**	**0.5252**

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	0.3880					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.6200e-003	0.0387	0.0499	8.0000e-005		2.2500e-003	2.2500e-003		2.2500e-003	2.2500e-003	0.0000	7.0214	7.0214	4.6000e-004	0.0000	7.0329
Total	**0.3936**	**0.0387**	**0.0499**	**8.0000e-005**		**2.2500e-003**	**2.2500e-003**		**2.2500e-003**	**2.2500e-003**	**0.0000**	**7.0214**	**7.0214**	**4.6000e-004**	**0.0000**	**7.0329**

3.7 Architectural Coating - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.2000e-004	1.7000e-004	1.9200e-003	1.0000e-005	6.0000e-004	0.0000	6.1000e-004	1.6000e-004	0.0000	1.6000e-004	0.0000	0.5248	0.5248	1.0000e-005	0.0000	0.5252
Total	**2.2000e-004**	**1.7000e-004**	**1.9200e-003**	**1.0000e-005**	**6.0000e-004**	**0.0000**	**6.1000e-004**	**1.6000e-004**	**0.0000**	**1.6000e-004**	**0.0000**	**0.5248**	**0.5248**	**1.0000e-005**	**0.0000**	**0.5252**

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	0.0832	0.3800	1.1662	4.4400e-003	0.3798	3.3600e-003	0.3832	0.1018	3.1300e-003	0.1049	0.0000	410.6360	410.6360	0.0201	0.0000	411.1375
Unmitigated	0.0832	0.3800	1.1662	4.4400e-003	0.3798	3.3600e-003	0.3832	0.1018	3.1300e-003	0.1049	0.0000	410.6360	410.6360	0.0201	0.0000	411.1375

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Single Family Housing	295.12	307.21	267.22	1,000,752	1,000,752
Total	295.12	307.21	267.22	1,000,752	1,000,752

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
Single Family Housing	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Single Family Housing	0.545842	0.044768	0.205288	0.119317	0.015350	0.006227	0.020460	0.031333	0.002546	0.002133	0.005184	0.000692	0.000862

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	79.2012	79.2012	3.2700e-003	6.8000e-004	79.4846
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	79.2012	79.2012	3.2700e-003	6.8000e-004	79.4846
NaturalGas Mitigated	4.3100e-003	0.0369	0.0157	2.4000e-004		2.9800e-003	2.9800e-003		2.9800e-003	2.9800e-003	0.0000	42.6885	42.6885	8.2000e-004	7.8000e-004	42.9422
NaturalGas Unmitigated	4.3100e-003	0.0369	0.0157	2.4000e-004		2.9800e-003	2.9800e-003		2.9800e-003	2.9800e-003	0.0000	42.6885	42.6885	8.2000e-004	7.8000e-004	42.9422

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					
Single Family Housing	799952	4.3100e-003	0.0369	0.0157	2.4000e-004		2.9800e-003	2.9800e-003		2.9800e-003	2.9800e-003	0.0000	42.6885	42.6885	8.2000e-004	7.8000e-004	42.9422
Total		**4.3100e-003**	**0.0369**	**0.0157**	**2.4000e-004**		**2.9800e-003**	**2.9800e-003**		**2.9800e-003**	**2.9800e-003**	**0.0000**	**42.6885**	**42.6885**	**8.2000e-004**	**7.8000e-004**	**42.9422**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Single Family Housing	799952	4.3100e-003	0.0369	0.0157	2.4000e-004		2.9800e-003	2.9800e-003		2.9800e-003	2.9800e-003	0.0000	42.6885	42.6885	8.2000e-004	7.8000e-004	42.9422
Total		**4.3100e-003**	**0.0369**	**0.0157**	**2.4000e-004**		**2.9800e-003**	**2.9800e-003**		**2.9800e-003**	**2.9800e-003**	**0.0000**	**42.6885**	**42.6885**	**8.2000e-004**	**7.8000e-004**	**42.9422**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Single Family Housing	248575	79.2012	3.2700e-003	6.8000e-004	79.4846
Total		**79.2012**	**3.2700e-003**	**6.8000e-004**	**79.4846**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Single Family Housing	248575	79.2012	3.2700e-003	6.8000e-004	79.4846
Total		**79.2012**	**3.2700e-003**	**6.8000e-004**	**79.4846**

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	0.5980	0.0117	0.5168	5.2000e-004		0.0314	0.0314		0.0314	0.0314	3.2928	6.8498	10.1426	0.0103	2.2000e-004	10.4673
Unmitigated	0.5980	0.0117	0.5168	5.2000e-004		0.0314	0.0314		0.0314	0.0314	3.2928	6.8498	10.1426	0.0103	2.2000e-004	10.4673

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	0.0388					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.4481					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.1015	8.0400e-003	0.1971	5.0000e-004		0.0296	0.0296		0.0296	0.0296	3.2928	6.3276	9.6204	9.8200e-003	2.2000e-004	9.9325
Landscaping	9.6300e-003	3.6900e-003	0.3198	2.0000e-005		1.7700e-003	1.7700e-003		1.7700e-003	1.7700e-003	0.0000	0.5222	0.5222	5.0000e-004	0.0000	0.5348
Total	**0.5980**	**0.0117**	**0.5168**	**5.2000e-004**		**0.0314**	**0.0314**		**0.0314**	**0.0314**	**3.2928**	**6.8498**	**10.1426**	**0.0103**	**2.2000e-004**	**10.4673**

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	0.0388					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.4481					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.1015	8.0400e-003	0.1971	5.0000e-004		0.0296	0.0296		0.0296	0.0296	3.2928	6.3276	9.6204	9.8200e-003	2.2000e-004	9.9325
Landscaping	9.6300e-003	3.6900e-003	0.3198	2.0000e-005		1.7700e-003	1.7700e-003		1.7700e-003	1.7700e-003	0.0000	0.5222	0.5222	5.0000e-004	0.0000	0.5348
Total	**0.5980**	**0.0117**	**0.5168**	**5.2000e-004**		**0.0314**	**0.0314**		**0.0314**	**0.0314**	**3.2928**	**6.8498**	**10.1426**	**0.0103**	**2.2000e-004**	**10.4673**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	13.5278	0.0664	1.6600e-003	15.6824
Unmitigated	13.5278	0.0664	1.6600e-003	15.6824

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Single Family Housing	2.01977 / 1.27334	13.5278	0.0664	1.6600e-003	15.6824
Total		**13.5278**	**0.0664**	**1.6600e-003**	**15.6824**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Single Family Housing	2.01977 / 1.27334	13.5278	0.0664	1.6600e-003	15.6824
Total		**13.5278**	**0.0664**	**1.6600e-003**	**15.6824**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	7.4071	0.4378	0.0000	18.3509
Unmitigated	7.4071	0.4378	0.0000	18.3509

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Single Family Housing	36.49	7.4071	0.4378	0.0000	18.3509
Total		**7.4071**	**0.4378**	**0.0000**	**18.3509**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Single Family Housing	36.49	7.4071	0.4378	0.0000	18.3509
Total		**7.4071**	**0.4378**	**0.0000**	**18.3509**

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

Greenhouse Gas Emission Worksheet

N20 Mobile Emissions RPV - Zone 2 Project

From CalEEMod v.2016.3.2 Vehicle Fleet Mix Output:

Annual VMT: 1,000,752

Vehicle Type	Percent Type	CH4 Emission Factor (g/mile)*	CH4 Emission (g/mile)**	N2O Emission Factor (g/mile)*	N2O Emission (g/mile)**
Light Auto	54.6%	0.04	0.02184	0.04	0.02184
Light Truck < 3750 lbs	4.5%	0.05	0.00225	0.06	0.0027
Light Truck 3751-5750 lbs	20.5%	0.05	0.01025	0.06	0.0123
Med Truck 5751-8500 lbs	11.9%	0.12	0.01428	0.2	0.0238
Lite-Heavy Truck 8501-10,000 lbs	1.5%	0.12	0.0018	0.2	0.003
Lite-Heavy Truck 10,001-14,000 lbs	0.6%	0.09	0.00054	0.125	0.00075
Med-Heavy Truck 14,001-33,000 lbs	2.1%	0.06	0.00126	0.05	0.00105
Heavy-Heavy Truck 33,001-60,000 lbs	3.1%	0.06	0.00186	0.05	0.00155
Other Bus	0.3%	0.06	0.00018	0.05	0.00015
Urban Bus	0.2%	0.06	0.00012	0.05	0.0001
Motorcycle	0.5%	0.09	0.00045	0.01	0.00005
School Bus	0.1%	0.06	0.0000348	0.05	0.000029
Motor Home	0.1%	0.09	0.00009	0.125	0.000125
Total	**100.0%**		**0.0549548**		**0.067444**

Total Emissions (metric tons) =
Emission Factor by Vehicle Mix (g/mi) x Annual VMT(mi) x 0.000001 metric tons/g

Conversion to Carbon Dioxide Equivalency (CO2e) Units based on Global Warming Potential (GWP)

CH4	21	GWP
N2O	310	GWP
1 ton (short, US) =	0.90718474	metric ton

Annual Mobile Emissions:

	Total Emissions		Total CO2e units	
N20 Emissions:	0.0675	metric tons N2O	**20.92**	metric tons CO2e
		Project Total:	***20.92***	***metric tons CO2e***

References

* from Table C.4: Methane and Nitrous Oxide Emission Factors for Mobile Sources by Vehicle and Fuel Type (g/mile).
in California Climate Action Registry General Reporting Protocol, Reporting Entity-Wide Greenhouse Gas Emissions, Version 3.1, January 2009.
Assume Model year 2000-present, gasoline fueled.

** Source: California Climate Action Registry General Reporting Protocol, Reporting Entity-Wide Greenhouse Gas Emissions, Version 3.1, January 2009.

*** CalEEMod v.2016.3.2 results for mobile sources.

Appendix C

Habitat Assessment

Rancho Palos Verdes Portuguese Bend Habitat Assessment
City of Rancho Palos Verdes, California

Prepared for:

City of Rancho Palos Verdes
Department of Planning, Building and Code Enforcement
30940 Hawthorne Boulevard
Rancho Palos Verdes, California 90275

Prepared by:

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180 N. Ashwood Avenue
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Revised January 2011

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RANCHO PALOS VERDES PORTUGUESE BEND HABITAT ASSESSMENT
CITY OF RANCHO PALOS VERDES, CALIFORNIA

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INTRODUCTION

Rincon Consultants herein present the results of the 2010 habitat assessment prepared for the proposed Portuguese Bend community development (Figure 1) of approximately 112 acres consisting of a total of 111 lots, 64 of which are developed and 47 are undeveloped. This assessment was prepared with respect to the proposed Zone 2 Landslide Moratorium Ordinance revisions which could facilitate the future development of up to 47 new single family residences on undeveloped lots within the Portuguese Bend community. Several of the undeveloped lots abut two of the ten Reserves that comprise the Palos Verdes Nature Preserve (PVNP), which was formed under the California Natural Community Conservation Planning (NCCP) Act of 1991. The intent of the survey was to identify where possible the presence or absence of habitat with the potential to contain rare, threatened, endangered, or special status (RTES) plants or wildlife species within the undeveloped lots of the Portuguese Bend community.

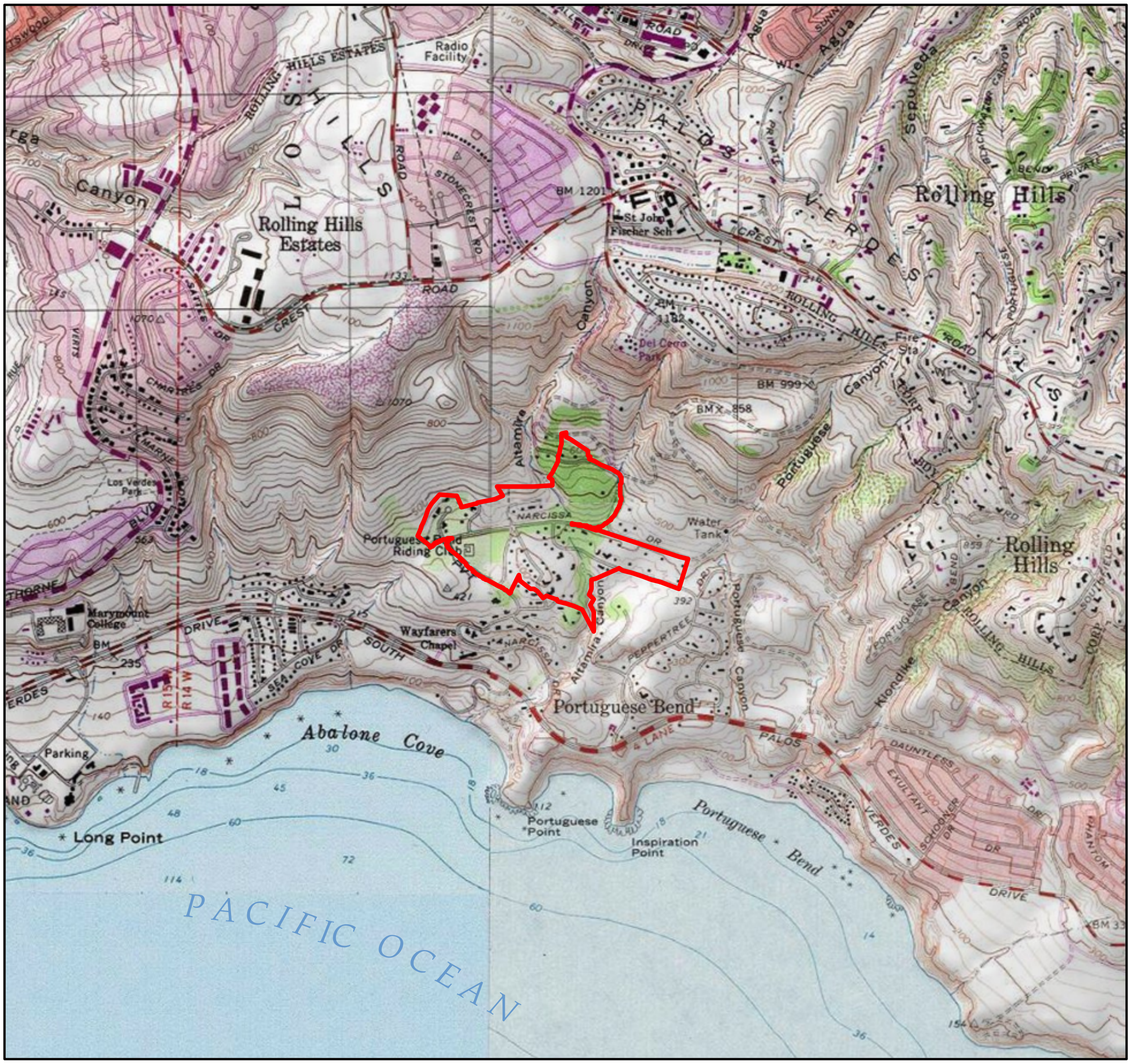
METHODOLOGY

Rincon Consultants' biologists Julie Broughton and Stephanie Lopez conducted a general habitat assessment survey of the undeveloped areas within the Portuguese Bend community associated with the proposed development to determine the quality of the habitat and the potential for presence of RTES plants or animals. A survey was conducted on May 4, 2010 to characterize the existing habitat conditions within the project boundary plus an additional 100-foot wide area at the perimeter (survey area - Figure 2). The reconnaissance-level survey included a rapid assessment of all vegetative habitat types to define relatively large, ecologically cohesive regions. Since access to individual lots was not provided, specific lot-by-lot searches for special status plant and animal species were not conducted. The field reconnaissance was performed via binocular survey from the roadside of the individual lots, and open space areas and the outside perimeter of lots were walked where access was available.

The survey effort was to be focused on those areas where undisturbed habitat types (i.e. coastal sage scrub and grassland) were thought to be present based on aerial photography. However, the survey effort indicated that almost all of the study area had been highly disturbed be various activities. Therefore, the survey concentrated on those areas containing irregular topography (i.e. slumps, swales, outcrops), changes or transitions in vegetative cover, and exposed rock outcrops because they represented the most suitable habitat for the target list of special-status species that were the focus of this investigation. General information gathered during the field reconnaissance included composition, habitat, site quality, dominant plant species, disturbance history and anthropogenic impacts. Assessment of the vegetative habitat types provides a method to define habitat quality and integrity for plant and animal distributions as well and the possible suitability for presence of special-status species. An aerial photograph with APN property boundaries was used during the field surveys to assist in accurately mapping the extent of habitats encountered.

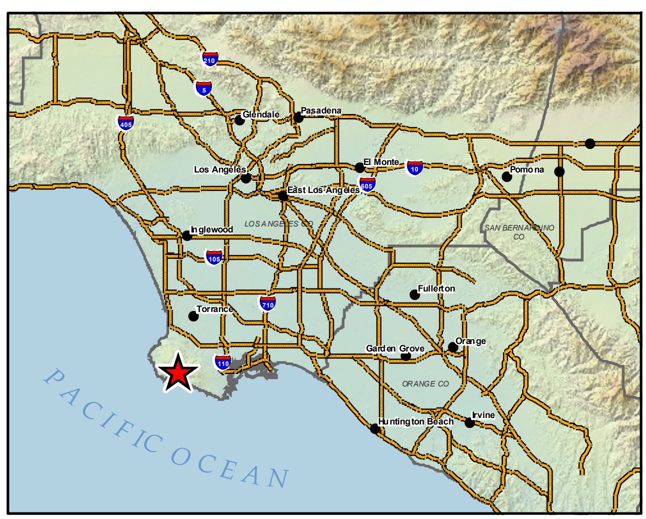
EXISTING CONDITIONS

The habitats within the project boundary at the time of the survey included vacant individual residential lots and contained a high level of disturbance, landscaping and other human interaction. Readily available aerial photography examined prior to the survey suggested the presence of coastal sage scrub-dominated plant communities along the perimeter of the project



N 0 0.25 0.5 Miles

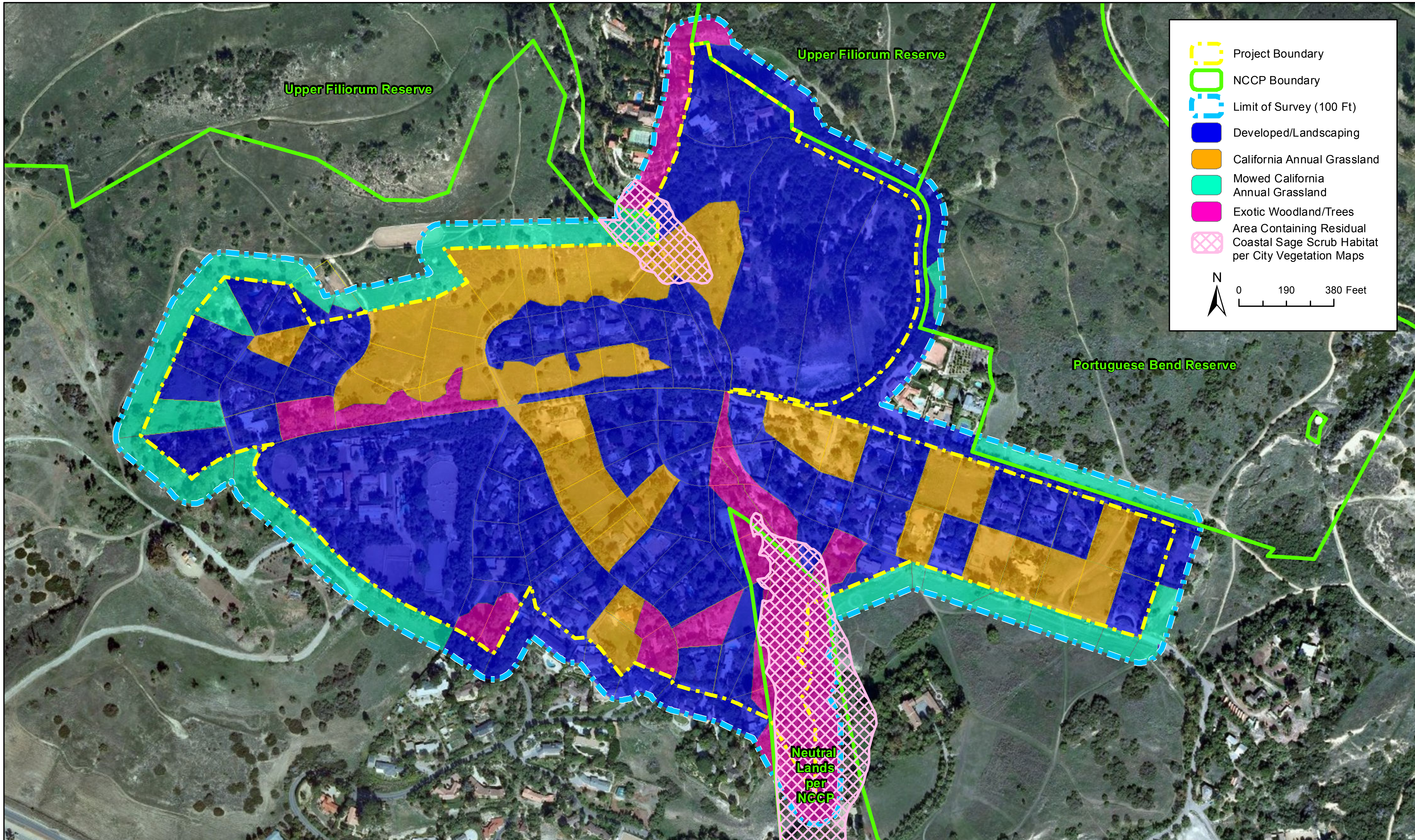
★ Project Location



Project Location Map

Figure 1

City of Rancho Palos Verdes



Generalized Habitat Map
Figure 2

boundary. Furthermore, review of the maps prepared for the NCCP Preserve Properties (2004?) indicated the presence of host plants for Palos Verdes Blue Butterfly and coastal sage scrub adjacent to the northwestern portion of the site within the Upper Filiorum Reserve, and coastal sage scrub along Altamira Canyon. However, during the survey it was found that the perimeter of almost all of the study area had been recently mowed or 'weed-wacked' to approximately 10 inches in height, presumably for fire clearance. Binocular survey of the habitats outside the 100 foot wide buffer area observed patchy and highly disturbed coastal sage scrub habitat with limited distribution of California sage (*Artemisia californica*), California brittlebush (*Encelia californica*), blue elderberry (*Sambucus nigra* ssp. *canadensis*) and toyon (*Heteromeles arbutifolia*) surrounded by non-native annual herbs and grasses. The encelia-dominated coastal sage scrub mapped along Altamira Canyon at the northern project boundary was no longer intact, with the area grazed and mostly comprised of annual grassland with scattered native shrubs. Assessment of the existing habitats visible by the field reconnaissance, which was restricted to as visible from the roads of the study area and a 100 foot wide buffer area outside the project boundary, is best described by the following two habitat types. Please note that Figure 2 includes areas previously mapped as containing coastal sage scrub (maps available at http://palosverdes.com/rpv/planning/NCCP/index.cfm), and remnant stands may still be present, or could regrow in future years prior to development of individual lots.

Habitat Types

California annual grassland series/Ruderal/Disturbed Vegetation/Disturbed Areas. As described by Sawyer et al. (2009), this habitat series includes a collection of species-specific stands strongly dominated by annual or short-lived plants composed of many non-native and native annual species, lacking evenly distributed diagnostic native plants (usually under 5% relative cover) the composition of which varies among stands. The series is found at elevations ranging from 0 – 3900 feet. Biotic factors (precipitation, temperature, canopy cover and topography) can vary the composition even within a relatively small area (under 5 acres). While this is primarily defined as grassland, many annual herbaceous plants are commonly found within this habitat although the overall community height is no greater than 3 feet. As described by Holland (1986), the comparable anthropogenic-ruderal community includes plants and plant communities that thrive in disturbed areas commonly associated with waste areas, roadsides, agriculture, farming or similarly disturbed by human activity. Ruderal communities are dominated by non-native grasses or herbs originating from nearby cultivation, horticultural escapes or other outside sources (soil movement, animal disturbance).

The *2006 Initial Management And Monitoring Report For The Rancho Palos Verdes Draft Natural Community Conservation Plan And Habitat Conservation Plan* (Dudek, 2007) describes this habitat as either Disturbed Areas or Disturbed Vegetation and refers to plant associations on lands where the vegetation has been significantly altered. Disturbed Vegetation refers to habitats that occur on highly disturbed sites in urbanized areas (along roadsides, footpaths and previously graded areas) that support weedy broadleaf and grass species. Disturbed Areas refers to areas where vegetation has been significantly altered by frequent disking or mowing specifically associated with fire protection and little to no vegetation cover remains. These habitats support typically non-native weedy broadleaf species including Russian thistle (*Salsola tragus*), mustards (*Brassica* sps.), and annual non-native grasses.

The dominant species found within this habitat include tocalote (*Centaurea melitensis*), wild oats (*Avena fatua*), horehound (*Marrubium vulgare*), mustards (*Brassica nigra, Brassica campestris,* *Hirschfeldia incana*), fennel (*Foeniculum vulgare*) and bromes (*Bromus diandrus, B. hordeaceus, B. madritensis* ssp. *rubens*). Around the perimeter of the Portuguese Bend community, this habitat had been mowed in a 100 foot swath presumably for prescribed fire clearance.

Exotic Woodland. This habitat includes non-native trees and shrubs planted in the past and naturalized along the Altamira Canyon drainage that bisects the Portuguese Bend community. Some of these introduced species are invasive and have dispersed into the adjacent grassland and native habitats. Within the survey area, this habitat abuts many of the developed properties and associated roadways. The dominant species found within this habitat include many non-native landscape trees including multiple gum trees (*Eucalyptus* sps.), pepper trees (*Schinus molle*), acacia (*Acacia* sps.), myoporum (*Myoporum laetum*), pines (*Pinus* sps.) and olive trees (*Olea europaea*). Some small remnant stands of coastal sage scrub vegetation are present in this habitat type along Altamira Canyon.

Wildlife

The following species were observed at the time of the survey: coyote (*Canis latrans*), California ground squirrel (*Spermophilus beecheyi*), Audubon's cottontail (*Sylvilagus audubonii*), western fence lizard (*Sceloporus occidentalis*), American crow (*Corvus brachyrhynchos*), red-tailed hawk (*Bufeo jamaicensis*), and mourning dove (*Zenaida macroura*). In addition to domesticated species such as dogs, cats, and horses, an extensive population (approximately 80 individuals) of Indian peacocks (*Pavo cristatus*) were observed scattered around the Portuguese Bend community.

SPECIAL-STATUS SPECIES

A list of special-status species targeted in this survey was developed based on a review of the California Natural Diversity Database RareFind3 (March 2010), species listed as part of the NCCP program, previous studies of the region, as well as Rincon staff knowledge of the area. Table 1 details the habitat requirements for special plants and Table 2 details the habitat requirements for wildlife.

Special-Status Species Definitions

Listed species are those taxa that are formally listed as endangered or threatened by the federal government (e.g. U.S. Fish and Wildlife Service [USFWS]), pursuant to the Federal Endangered Species Act (FESA) or as endangered, threatened, or rare (for plants only) by the State of California (i.e. California Fish and Game Commission), pursuant to the California Endangered Species Act (CESA) or the California Native Plant Protection Act. During the listing process for federal species, "critical habitat" may also be designated. Additional species are considered rare (but not formally listed) by various resource agencies, organizations with biological interests/expertise (e.g. Audubon Society, California Native Plant Society [CNPS], The Wildlife Society), and the scientific community. As part of the City's NCCP process, several taxa are included as "covered species" and are considered locally rare.

The CNPS' Inventory of Rare and Endangered Vascular Plants of California (CNPS 2001, 2006[1]) categorizes rare California plants into one of five lists (1A, 1B, 2, 3, and 4) representing five levels of species status, one of which is assigned to a sensitive species to indicate its status of rarity or endangerment and distribution. Most taxa also receive a threat code extension following the List (e.g. 1B.1, 2.3), which replaces the old R-E-D Code previously used by CNPS.

[1] Changes to the *Inventory* as published on CNPS website: http://www.cnps.org/programs/Rare_Plant/inventory/changes/changes_accepted.htm.

Table 1 provides a definition for each List code number, and Table 2 defines the Threat Code Extensions that indicates the level of endangerment within the state as determined by this organization. Please note that the CNPS Inventory is used as a tool by CDFG to help identify those plants that may qualify for listing under the CESA, with the formal list kept by CDFG being the *Special Vascular Plants, Bryophytes and Lichens List*.

Table 1. California Native Plant Society List Definitions

CNPS List	Definition
1A	Presumed Extinct in California
1B	Rare, Threatened, or Endangered in California and elsewhere
2	Rare, Threatened, or Endangered in California, but more common elsewhere
3	Need more information (a Review List)
4	Plants of Limited Distribution (a Watch List)

Table 2. California Native Plant Society List Threat Code Extensions

CNPS Threat Code Extension	Definition
.1	Seriously endangered in California (> 80% of occurrences threatened / high degree and immediacy of threat)
.2	Fairly endangered in California (20-80% occurrences threatened)
.3	Not very endangered in California (<20% of occurrences threatened)

The CNDDB Element Ranking system (Table 3) provides a numeric global and state-ranking system for all special-status species tracked by the CNDDB. The global rank (G-rank) is a reflection of the overall condition of an element (species or natural community) throughout its global range. The state rank (S-rank) is assigned much the same way as the global rank, except state ranks in California often also contain a threat designation attached to the S-rank.

Table 3. California Natural Diversity Database Element Ranking System

Global Ranking (G)	
G1	Less than 6 viable element occurrences (pops for species), OR less than 1,000 individuals, OR <809.4 hectares (ha) (2,000 acres [ac]).
G2	6 to 20 element occurrences OR 809.4 to 4,047 ha (2,000 to 10,000 ac).
G3	21 to 100 occurrences OR 3,000 to 10,000 individuals OR 4,047 to 20,235 ha (10,000 to 50,000 ac).
G4	Apparently secure; rank lower than G3, factors exist to cause some concern (i.e. there is some threat, or somewhat narrow habitat).
G5	Population, or stand, demonstrably secure to ineradicable due to being commonly found in the world.
GH	All sites are historic; the element has not been seen for at least 20 years, but suitable habitat still exists.
GX	All sites are extirpated; this element is extinct in the wild.
GXC	Extinct in the wild; exists in cultivation.
G1Q	The element is very rare, but there is a taxonomic question associated with it.
Subspecies Level: Subspecies receive a T-rank attached to the G-rank. With the subspecies, the G-rank reflects the condition of the entire species, whereas the T-rank reflects the global situation of just the subspecies or variety. For example: *Chorizanthe robusta* var. *hartwegii* is ranked G2T1. The G-rank refers to the whole species range (*Chorizanthe robusta*), whereas the T-rank refers only to the global condition of the variety (var. *hartwegii*).	
State Ranking (S)	
S1	Less than 6 element occurrences OR less than 1,000 individuals OR less than 809.4 ha (2,000 ac). S1.1 = very threatened S1.2 = threatened S1.3 = no current threats known
S2	6 to 20 element occurrences OR 3,000 individuals OR 809.4 to 4,047 ha (2,000 to 10,000 ac). S2.1 = very threatened S2.2 = threatened S2.3 = no current threats known
S3	21 to 100 element occurrences OR 3,000 to 10,000 individuals OR 4,047 to 20,235 ha (10,000 to 50,000 ac). S3.1 = very threatened S3.2 = threatened S3.3 = no current threats known
S4	Apparently secure within California; this rank is clearly lower than S3 but factors exist to cause some concern (i.e., there is some threat, or somewhat narrow habitat). NO THREAT RANK.
S5	Demonstrably secure to ineradicable in California. NO THREAT RANK.

SH	All California sites are historic; the element has not been seen for at least 20 years, but suitable habitat still exists.
SX	All California sites are extirpated; this element is extinct in the wild.
Notes	
1. Other considerations used when ranking a species or natural community include the pattern of distribution of the element on the landscape, fragmentation of the population/stands, and historical extent as compared to its modern range. It is important to take an aerial view when ranking sensitive elements rather than simply counting element occurrences.	
2. Uncertainty about the rank of an element is expressed in two major ways: by expressing the rank as a range of values (e.g. S2S3 means the rank is somewhere between S2 and S3), and by adding a ? to the rank (e.g. S2?). This represents more certainty than S2S3, but less than S2.	

Special Status Plants

Due to the highly disturbed and landscaped nature within the project boundary and the recently mowed condition of the 100 foot buffer area at the time of the May 2010 field reconnaissance, none of the eleven (11) special status plants are considered to be likely to be found within the survey area. Special status plants could potentially occur within the patchy coastal sage scrub outside the survey area but none were observed during the reconnaissance survey. Additionally no rare plants were found to be in the near vicinity of the Portuguese Bend community during previous botanical surveys conducted for the Draft NCCP/HCP (Dudek, April 2007). No critical habitat for listed threatened or endangered plants occurs within the survey area (U.S. Fish and Wildlife Service (USFWS) Critical Habitat Portal (http://criticalhabitat.fws.gov). The following table discusses the special status plant species and their regulatory status, habitat and ecological requirements.

Table 4. Habitat Requirements for Special Status Plant with the Potential for Occurrence

Common Name	Scientific Name	Status* Fed/State Listing/State Rank/CNPS/	Habitat Requirements and Potential for Occurrence
Aphanisma	*Aphanisma blitoides*	--/--/S1.1/1B.2/RPV	Sandy soil near the coast in coastal bluff scrub and coastal sage scrub at elevations between 10 to 200 feet. Small annual herb blooming April to May. *No potential for occurrence, habitat lacking.*
South coast saltscale	*Atriplex pacifica*	--/--/S2.2/1B.2/RPV	Coastal bluffs, coastal sage scrub and alkali playas from 0 – 450 feet. Prefers sandy openings between shrubs in xeric and mildly disturbed locales. Small, wiry, prostrate annual herb blooming March – October. *No potential for occurrence, habitat lacking.*
Parish's brittlescale	*Atriplex parishii*	--/--/S1.1/1B.1/	Shadscale scrub, alkali sink, freshwater wetlands, and wetland-riparian. Alkaline or clay soils below 1000 feet. Blooms June – October. *No potential for occurrence, habitat lacking.*
Davidson's saltscale	*Atriplex serenana var. davidsonii*	--/--/S2?/1B.2/	Coastal bluff scrub, Coastal scrub with alkaline soils at elevations between 30 – 650 feet. Blooms April – October. *No potential for occurrence, habitat lacking.*
Southern tarplant	*Centromadia parryi* ssp. *australis*	--/--/S2.1/1B.1/RPV	Salt marsh margins, mesic valley and foothill grasslands, vernal pools and alkaline areas below 1,400 feet. Blooms May – November. *No potential to occur on site, habitat lacking.*
Catalina crossosoma	*Crossosoma californicum*	--/--/S3.2/1B.2/RPV	Dry, rocky slopes and canyons in coastal sage scrub below 1,600 feet. Deciduous shrub blooming that can reach 16 feet, blooms February - May. *No potential to occur on site, habitat lacking.*

Table 4. Habitat Requirements for Special Status Plant with the Potential for Occurrence

Common Name	Scientific Name	Status* Fed/State Listing/State Rank/CNPS/	Habitat Requirements and Potential for Occurrence
Island green dudleya	*Dudleya virens* ssp. *insularis*	--/--/S2.2/1B.2/RPV	Steep slopes in chaparral, coastal bluff scrub and coastal sage scrub below 1,300 feet. Bright green perennial succulent with basal rosette from caudex, blooms April - June. *No potential to occur on site, habitat lacking.*
Santa Catalina island desert-thorn	*Lycium brevipes* var. *hassei*	--/--/S1.1/1B.1/RPV	Coastal bluff slopes in coastal bluff scrub and coastal sage scrub at elevations below 1,000 feet. Deciduous shrub that can reach 13 feet high, blooms June. *No potential to occur on site, habitat lacking.*
Lyon's pentachaeta	*Pentachaeta lyonii*	FE/SE/S2 /1B.1/RPV	Openings in chaparral and valley/foothill grasslands near the coast at elevations below 500 feet. Diminutive annual herb that blooms March - April. Normally found in soils derived from volcanic rocks. *No potential to occur on site, habitat lacking.*
Brand's star phacelia	*Phacelia stellaris*	FC/--/S1/1b.1/--	Coastal dunes and coastal scrub at elevations below 400 meters. Annual herb that blooms March – June. *No potential to occur on site, habitat lacking.*
Woolly seablite	*Suaeda taxifolia*	--/--/S2S3/4.2/RPV	Coastal bluffs and margins of salt marshes at elevations below 50 feet. Perennial herb that blooms May – October. *No potential to occur on site, habitat lacking.*

Source: DFG CNDDB Special Vascular Plants, Bryophytes, and Lichens List, April 2010; CNDDB 5-mile search radius, April 2010

FE = Federally Endangered; FT = Federally Threatened;
FC = Federal Candidate; FSC = Federal Species of Concern;
SE = State Endangered; SR = State Rare; RPV = listed in Rancho Palos Verdes Subarea Plan as sensitive.

S1=<6 Eos (viable element occurrences) or <1,000 individuals or <2,000 acres
S2=6-20 Eos or 1,000-3,000 individuals or 2,000-10,000 acres
S3=21-80 Eos or 3,000-10,000 individuals or 10,000-50,000 acres

Special Status Wildlife

Due to the highly disturbed and landscaped nature within the project boundary and the recently mowed condition of the 100 foot buffer area, none of the twelve (12) special status wildlife species are likely to be found within the survey area except on a rare, transient basis. Special status wildlife could potentially occur within the patchy coastal sage scrub outside the survey area, but no suitable habitat for these species, including larval and adult host plants, were observed within the study area boundaries. The following table discusses the listed wildlife species and their regulatory status, habitat and ecological requirements.

Table 5. Special Status Wildlife Species with the Potential for Occurrence

Common Name	Scientific Name	Status	Habitat Requirements and Potential for Occurrence
sandy beach tiger beetle	*Cicindela hirticollis gravida*	--/--/S1/--	Inhabits areas adjacent to non-brackish water along the coast, primarily within sand dunes. *No potential for occurrence, habitat lacking.*
coastal cactus wren	*Campylorhynchus brunnelcapillus*	--/--/S3/SSC/NCCP (San Diego & Orange Counties only)	Inhabits coast sage scrub habitat dominated by patches of tall *Opuntia* cactus. Only the sub-populations in Orange and San Diego Counties are considered special status (Shuford & Gardali, 2008). *Suitable nesting habitat not within study area, rarely a cactus wren may use landscaping shrubs on a transient basis.*

Table 5. Special Status Wildlife Species with the Potential for Occurrence

Common Name	Scientific Name	Status	Habitat Requirements and Potential for Occurrence
Western beach tiger beetle	*Cicindela latesignata latesignata*	--/--/S1/--	Mudflats and beaches. *No potential to occur on site, habitat lacking.*
monarch butterfly	*Danaus plexippus*	--/--/S3/--	Overwinters and roosts in wind-protected trees in close proximity to host milkweed plants (*Asclepius* sp.) and nectar food sources. Because this animal is abundant on a national basis, resource concerns are related to aggregate winter roosts. *While Monarchs occur in the study area, no winter aggregate areas are known to be present.*
El Segundo blue butterfly	*Euphilotes battoides allyni*	FE/--/S1/Xerces-CI/RPV	Remnant coastal dune habitats, with coast buckwheat as the larval food source. *No potential to occur on site, habitat and host plants absent.*
Mohave tui chub	*Gila bicolor mohavensis*	FE/FP/SE/S1/--	Found in lacustrine environments with deep pools and slow moving water. *No potential to occur on site, habitat lacking.*
Palos Verdes blue butterfly	*Glaucophsyche lygdamus palosverdesensis*	--/--/S1/RPV	Restricted to open coastal sage scrub habitats supporting preferred larval food source (milk vetch or deerweed). *Not expected to occur within study area; no host plants observed in visible survey area.*
San Diego desert woodrat	*Neotoma lepida intermedia*	--/--/S3?/SSC/	Prefers coastal scrub habitat. Constructs houses with twigs usually in rock outcrops, rocky cliffs and slopes. *Limited potential to occur in study area along drainages, habitat generally lacking.*
pocketed free-tailed bat	*Nyctinomops femorosaccus*	--/--/S3/SSC/	Prefers rock crevices in cliffs for roosting. Feeds on wide variety of flying insects. *Unlikely to roost in area as no rock crevices/cliffs present.*
Pacific pocket mouse	*Perognathus longimembris pacificus*	FE/S1/SSC/RPV	Coastal strand, sand dunes, ruderal vegetation on river alluvium, and open coastal sage scrub on marine terraces. *Not expected to be present given the altered landscape; suitable habitat generally lacking.*
Coastal California gnatcatcher	*Polioptila californica californica*	FT/SSC/RPV/NCCP	Coastal and inland sage scrub primarily below 2,000 feet. *Suitable habitat lacking within study area; occasional transient bird may occur in landscaping shrubs, along drainages, and in residual sage scrub stands.*
El Segundo flower-loving fly	*Rhaphiomidas terminatus terminatus*	--/--/S1/--	Confined to the El Segundo sand dunes ecosystem and portions of the Los Angeles River sandy alluvial plain. *No potential to occur on site, habitat lacking.*
California brackish water snail	*Tryonia imitator*	--/--/S1/--	Inhabits coastal lagoons, estuaries and salt marshes. Found only in permanently submerged areas. *No potential to occur on site, habitat lacking.*

Source: DFG CNDDB Special Animals list, July 2009; CNDDB 5-mile search radius, April 2010

FE = Federally Endangered; FT = Federally Threatened;
FC = Federal Candidate; FP= Federally Protected, Department of Fish and Game; FSC = Federal Species of Concern;
SE = State Endangered; SR = State Rare; SSC=Species of Special Concern, Department of Fish and Game; Xerces Society-CI=Critically Imperiled;

RPV = listed in Rancho Palos Verdes Subarea Plan as sensitive.
S1=<6 Eos (viable element occurrences) or <1,000 individuals or <2,000 acres
S2=6-20 Eos or 1,000-3,000 individuals or 2,000-10,000 acres
S3=21-80 Eos or 3,000-10,000 individuals or 10,000-50,000 acres

Coastal California Gnatcatcher. Coastal California gnatcatcher (CAGN) is listed as a federally threatened species (USFWS 1993) and a CDFG Species of Special Concern. Coastal California gnatcatcher is the northernmost of three subspecies currently recognized for the species. It is restricted to arid, lowland areas and has a range from southwestern California to northwestern Baja California. The remaining two subspecies occur within central and southern Baja California, Mexico. Within the U.S., the current range of the coastal California gnatcatcher is generally within San Diego, Orange, Los Angeles, eastern Ventura and western Riverside counties. It is a permanent resident of coastal sage scrub-dominated plant communities generally below 2,000 feet and while strongly associated with coastal sage scrub, it will also use chaparral, grassland, and riparian plant communities where they occur adjacent to or intermixed with sage scrub. While it is found in coastal sage scrub, not all areas classified as coastal sage scrub are occupied (CDFG 2009). Shorter, less dense shrubs, without a chamise component, are generally used. The breeding season of the CAGN extends from about February 15 through August 31, with the peak of nesting activity occurring from mid-March through mid-May. CAGN normally requires at least five to ten acres of coastal sage scrub for nesting and foraging (Birds of North America, http://bna.birds.cornell.edu/bna), but near coast breeding pairs have been found in coastal sage scrub habitat in areas as small as two to three acres. CAGN have been observed breeding in small patches of suitable sage scrub surrounded by urban development, with the smallest such successful patch being 0.5 acres (Mock 2004). Despite the patchiness of CAGN distribution, the density of CAGN was highest in high-quality habitat and decreased as habitat quality decreased. Recent estimates of population size within more than 111,000 acres of quality habitat by Winchell and Doherty (2008), as reported by the US Fish and Wildlife Service (September 2010), indicate it is likely that more gnatcatchers are present in the U.S. portion of the range than was suggested by earlier estimates. Given that more than 600,000 acres of habitat has been modeled in southern California and the population range estimate by Winchell and Doherty (2008), potential population size within the United States may range from 5,000 – 10,000 pairs.

The survey area contains no intact coastal sage scrub habitat, with only some scattered stands of this vegetation type apparently left along Altamira Canyon. Because coastal California gnatcatchers are present within the adjacent Palos Verdes Nature Preserve, with known presence in the Upper Filiorum Reserve to the north of the study area (URS, July 2004), an occasional transient bird may be found on rare occasions within the study area, but no breeding or long term residency is likely or expected given the lack of suitable habitat. No protocol level studies are recommended for the study area as it does not contain the Primary Constituent Elements (PCEs) for the coastal California gnatcatcher, namely coastal sage scrub habitat or non-sage scrub habitat near to coastal sage scrub that could provide space for dispersal, foraging, and nesting.

Palos Verdes Blue Butterfly. Palos Verdes blue butterflies are small thumbnail-sized butterflies that were federally listed as endangered by the U.S. Fish and Wildlife Service in 1980. By 1983, biologists feared the Palos Verdes blue butterfly had become extinct when habitat supporting the only known population was developed (USFWS, March 6, 2010). After years of conducting annual surveys, researchers could not locate the Palos Verdes blue butterfly; however, in March 1994, a small population was discovered at Defense Fuel Support Point San Pedro (Mattoni, 1995). This was the only known wild population. Subsequently, the U.S. Navy funded the first Palos Verdes blue captive-rearing program facility, and the first release of butterflies into the wild occurred on this base in 2000.

Since then a captive rearing facility has been developed at America's Teaching Zoo at Moorpark College. A butterfly reintroduction occurred in 2008 at Linden H. Chandler Preserve in Rolling Hills Estates where habitat restoration efforts had occurred. On March 6, 2010, federally endangered Palos Verdes blue butterflies were released into 8 acres of restored coastal sage scrub habitat at Deane Dana Friendship Community Regional Park and Nature Center (Friendship Park) located in San Pedro, approximately 3 miles southeast of the Portuguese Bend community. The Palos Verde blue had been historically recorded at Friendship Park in 1981, but not observed for several decades. Future Palos Verdes blue butterfly recovery efforts are planned to include continued rearing of butterflies in captivity for release back into the wild and additional habitat restoration and management efforts.

The Service is currently working with the City of Rancho Palos Verdes (USFWS, March 6, 2010) on a Habitat Conservation Plan (HCP) that would be coordinated with the existing NCCP. Per Mattoni 1995, suitable habitat that includes the food plant *Astragalus trichopodus lonchus* and common deerweed *(Lotus scoparius)* is present within the NCCP areas to the north of the Portuguese Bend community. URS (July 2004) reported historic sightings to the west of the study area (west of Narcissa Drive) and to the northeast (northeast of Vanderlip Road), but not within the study area. The proposed NCCP/NCP areas would be likely receptor sites for additional captive raised butterflies.

Within the survey area suitable habitat for the Palos Verdes blue butterfly is generally lacking because of the long term disturbance of the properties and management for fire prevention. None of the known host plants, either as vegetation, blooms or seed pods, were observed during the survey. Based on the above and the lack of known populations in this area over the last 30 years, areas within the project boundary and 100 foot wide buffer are not expected to support the Palos Verdes blue butterfly.

El Segundo Blue Butterfly. The El Segundo blue butterfly is restricted to remnant coastal dune habitat in southern California. During monitoring conducted for the Draft NCCP (Dudek, 2007) it was documented along and at the base of the cliff bluffs approximately 1.8 miles west of the study area. Its host plant is *Eriogonum parvifolium* and the larvae feed only on this flower and its seeds; adults use this plant as a major nectar source. No *Eriogonum parvifolium* were observed during the habitat assessment, and past regular maintenance of the study makes it highly unlikely that this plant is present. No El Segundo blue butterflies would be expected in this area.

Monarch butterfly. The monarch butterfly over-winters in southern California usually in tree groves or windbreaks near available water and nectar sources. This species commonly uses eucalyptus (*Eucalyptus* sp.), cypress (*Cupressus* sp.) and Monterey pine (*Pinus radiata*) for roosting. While the Monarch butterfly is relatively abundant throughout the North American continent, along the west coast the availability of winter roost sites where the butterflies aggregate by the thousands of individuals is considered a potential concern. The monarch butterfly's preferred food source is milkweed (*Asclepias* sp.) although adults may also feed off nectar from coyote bush (*Baccharis pilularis*) and mule fat (*Baccharis salicifolia*). Monarch butterflies are commonly found in small numbers within landscaped gardens and would be expected to occur within the study area and throughout the City of Rancho Palos Verdes.

Within the survey area suitable habitat for winter roost sites was present throughout, most centralized along the lower reach of Altamira Canyon within eucalyptus groves. Although roost sites were present, none of the preferred food source, milkweed, was observed during the survey. Further, neither the CNDDB nor the Xerces Society (2010) report any large winter aggregations in this area.

"Coastal" Cactus Wren. Cactus wren is resident in arid and semiarid regions from southern California, southern Nevada, extreme southwestern Utah, central Arizona, central New Mexico, and central and southern Texas south to into Mexico and Baja California. The species is considered "common" over most of its range. Based on current taxonomic classifications of this species, the *California Bird Species of Special Concern* indicates that only the San Diego cactus wren (*Campylorhynchus brunneicapillus sandiegensis*) is considered a CDFG species of special concern (see also *Special Animals,* CDFG July 2009). At this time, the project area lacks the cactus stands typically used by this species and its presence is not expected within the project area.

San Diego Desert Woodrat. This woodrat is a CDFG Species of Special Concern that occurs in scrub areas with moderate to dense canopies. San Diego desert woodrat is a small mammal whose range extends from San Luis Obispo County in the north to San Diego County in the south. Two species of woodrat, big-eared (dusky-footed) woodrat (*Neotoma macrotis*) and San Diego desert woodrat (*Neotoma lepida intermedia*[2]) have ranges that overlap within the region. San Diego desert woodrat feeds on fruits, seeds and bark and is known to feed on cholla and buckwheat. Desert woodrats build elaborate dens with several chambers for nesting and food, as well as several entrances. Nests are usually made at the base of perennial vegetation with sticks, rocks, and other plant parts. They are often associated with large cactus patches, and within coastal sage scrub communities, it is almost invariably associated with prickly pear cactus. It also is found in rocky outcroppings on hillsides in coastal scrub. It's nearest known location is within the coastal scrub community located approximately 0.5 miles to the south of the study area. Given the lack of prickly pear cactus and coastal sage scrub plants within the study area, and the proximity of residences that likely have cats which are efficient predators of this species, it is unlikely that this animal maintains a substantial population within the study area. If present within the study area, San Diego desert woodrat are most likely limited to the area along Altamira Canyon within the "Neutral Lands" category of the NCCP (see Figure 2).

Critical Habitat

A search of the USFWS Critical Habitat Portal yielded one Critical Habitat designation in the project vicinity, that for the California gnatcatcher (CAGN). The 2007 habitat mapping overlies a portion of the study area as illustrated in Figure 2, primarily in the northwest portion of the study area and the "Neutral Lands" in the southern portion. Critical habitat mapping is intended to contain those lands essential for the conservation of a species, but any such land within the mapped boundary must also contain the known physical or biological features (Primary Constituent Elements or PCEs) within the geographical area that are essential to the species conservation. For CAGN, the PCEs are 1) dynamic and successional sage scrub habitats and 2) non-sage scrub communities like chaparral, grassland, riparian areas, near to suitable sage scrub habitats. Within the project area and 100 foot wide buffer area, neither coastal sage scrub habitat or key plant species associated with this habitat were found. Due to fire clearance requirements, it is expected that that 100 foot wide buffer area will continue to be highly disturbed and high quality coastal sage scrub habitat preferred by the CAGN will not be allowed to establish. The maintained grasslands of portions of the site are not considered to provide an important PCE under Item 2 above given the distance to quality coastal sage scrub habitat and the regular disturbance. It should also be noted that the designation of critical habitat does not place a regulatory burden on the private landowner; it only provides that federal agencies are to ensure that actions they fund, authorize, or carry out do not destroy or adversely modify critical habitat.

SPECIAL-STATUS COMMUNITIES

In addition to sensitive plant species, Rincon's review of the California Natural Diversity Database (CNDDB, RareFind3, June 2006; database current as of May 2010) yielded one

[2] *Recently reclassified as Neotoma bryanti intermedia.*

sensitive habitat within a five-mile radius of the project site; Southern Coastal Bluff Scrub. Presence or absence of this habitat area was determined using the vegetation classification systems described by Sawyer et al.'s *A Manual of California Vegetation* (2009) and by the CDFG's *Preliminary Descriptions of the Terrestrial Natural Communities of California* (Holland, 1986) and surveying the project site for species associated with this sensitive habitat.

Southern Coastal Bluff Scrub is a low, sometimes prostrate scrub and is widespread along the southern California coastline as a very narrow band, often not extending more than about 100 feet inland (Holland and Keil 1990). Plants usually cling to nearly vertical rock faces just above the surf. Dominant plants associated with this habitat include California sagebrush (*Astemisia californica*), California buckwheat (*Eriogonum fasciculatum*), coast cholla (*Cylindropuntia prolifera*), and coast prickly pear (*Opuntia littoralis*). Dominant associated plants, vertical rock faces, and proximity to the surf which define this community type are lacking within the project area and buffer area.

PALOS VERDES NATURE PRESERVE

The Palos Verdes Peninsula Land Conservancy (PVPLC) serves as the management agency for the Palos Verdes Nature Preserve, previously referred to as the Portuguese Bend Nature Preserve, for the City of Rancho Palos Verdes. The Preserve was formed under a Natural Community Conservation Plan (NCCP) Subarea Plan to "maximize benefits to wildlife and vegetation communities while accommodating appropriate economic development within the City of Rancho Palos Verdes and region pursuant to the requirements of the NCCP Act and Section 10(a) of the ESA" (URS, July 2004). As a primary component of the NCCP, a Preserve design was proposed to conserve regionally important habitat areas and provide habitat linkages to benefit sensitive plants and wildlife. PVPLC manages the Preserve under an operating agreement with the City.

The Portuguese Bend Reserve and Upper Filiorum Reserve are located to the northeast and northwest of the Portuguese Bend community, respectively (see Figure 2). The Portuguese Bend Reserve does not directly adjoin the project site, but is on the other side of Narcissa Drive from the project site. The Upper Filiorum Reserve adjoins three of the lots within the project site in the northern portion of the site along Altamira Canyon, but is otherwise separated from the project site by an open space lot on the northwest and roadway on the northeast. The following further discusses these nearby reserves.

Portuguese Bend NCCP Reserve. The Portuguese Bend NCCP Reserve is a 399-acre area that was preserved in 2005. It consists of rolling hills, steep canyons and rock outcrops, with significant habitat and spectacular views of the Pacific Ocean and Santa Catalina Island. Located below and to the east of Del Cerro Park, it includes the areas known as the lemonade-berry parcel, eagle's nest, the badlands, the active landslide and the dirt extension of Crenshaw Boulevard. This area has numerous important trails and geologic features such as Ailor cliff and the pillow lava outcrop.

Upper Filiorum NCCP Reserve. The Upper Filiorum NCCP Reserve is a 191-acre area that was added to the NCCP December 31, 2009. This parcel connects the Three Sisters and Portuguese Bend NCCP Reserve Parcels and is a mix of steep hills and bowl-like, flatter areas covered in grasses and coastal sage scrub. It is known to contain a population of CAGN and host plants for the Palos Verdes Blue Butterfly. Currently the City is working on a trails plan for this area.

OTHER LAND USE REGULATIONS CONCERNING BIOLOGICAL RESOURCES

Rancho Palos Verdes General Plan. The goal of the City of Rancho Palos Verdes' General Plan is to conserve, protect, and enhance its natural resources, beauty, and open space for the benefit and enjoyment of its residents and the residents of the entire region. All future development is to recognize the sensitivity of the natural environmental and be accomplished in such a manner as to maximize the protection of it.

Rancho Palos Verdes Municipal Code. The City's Municipal Code provides another layer of environmental protection to lands located within the city limits. Title 17, Chapter 40, Section 040 of the City's Municipal Code provides the regulations for the Natural Overlay Control District (OC-1), which includes those areas of the General Plan within Resource Management (RM)-5 (Old Landslide Area), RM-6 (Hydrologic Factors), RM-7 (Marine Resource), RM-8 (Wildlife Habitat), and RM-9 (Natural Vegetation). Similar designations within the Coastal Specific Plan are also within this overlay district. According to the City's General Plan Natural Environment Element, Altamira Canyon is located within Resource Management (RM) District 6 – Hydrologic Factors, which is included within OC-1. Within this district it is the City's policy to prohibit activities which create excessive silt, pollutant runoff, increase canyon wall erosion, or potential for landslide. Performance criteria relevant to biological resources include restrictions against altering the course, carrying capacity or gradient of the drainage; developing uses within 50 feet of the edge of the drainage; clearing or thinning more than 20% of the vegetation within the district; and use of herbicides.

Neutral Lands. This category was developed under the NCCP Subarea Plan (URS, July 2004) to include those open space lands that would contribute to the Palos Verdes Nature Preserve function but cannot be developed because of extreme slopes, open space hazard zoning, or designation as homeowner's association open space. If agreements between the Preserve and landowners of the Neutral Lands are possible, such areas could be managed as part of the Preserve. In some instances, these lands are not prohibited from development, but it is recognized that development constraints already exist pursuant to the City's Municipal Code. Extreme slopes have a greater than 35% grade and occur in undeveloped canyons, such as Altamira Canyon. Open space hazard lands have unstable geologic conditions or other physical constraints requiring a detailed geotechnical investigation prior to removal from the open space hazard designation. Altamira Canyon in the southern portion of the study area is within the Neutral Lands category (see Figure 2) as it is within the RM-6 designation and controlled by the OC-1 regulations as discussed above.

Jurisdictional Drainages and Wetlands. Disturbed riparian habitat and drainage features located within the project boundary and 100 foot wide buffer may contain drainages or wetlands that are under the jurisdiction of the CDFG and/or the US Army Corps of Engineers. Altamira Canyon is an ephemeral drainage channel that originates at Crest Drive and ends at the Pacific Ocean, trending northwest to southeast and bisecting the study area. The northern reach of the drainage within the study area bisects landscaped private property and non-native California annual grassland habitat within undeveloped/underdeveloped lots. The drainage crosses under Narcissa Drive via a storm drain and continues southeast through a steep-banked channel categorized as "Neutral Lands" within the NCCP. Vegetation along this lower drainage feature is dominated by exotic woodland habitat. The drainage channel has hydrological features such as ordinary high water mark or bed, bank, and channel, but lacks any native riparian habitat. The riparian habitat associated with the drainage throughout the project site is dominated by landscape shrubs and trees, primarily pepper trees, pines and eucalyptus, with an understory of non-native annuals and herbaceous perennials, exotic shrubs, and coastal sage scrub patches.

Based upon the reconnaissance level survey, the drainage feature located within the project boundary may be subject to USACE (US Army Corps of Engineer), Los Angeles RWQCB (Regional Water Quality Control Board) and/or CDFG (California Department of Fish and Game) jurisdiction. It should be noted that the regulatory agencies make the final jurisdictional determination.

Wildlife Corridors. The project area is surrounded to the northeast and northwest by the Portuguese Bend Reserve and Upper Filiorum Reserve creating a contiguous section of regionally important habitat areas and natural vegetation. While these contiguous habitat areas are an important corridor for all wildlife, the Portuguese Bend Reserve and Upper Filiorum Reserve include designated CAGN Critical Habitat. Altamira Canyon may also serve as a link for wildlife to pass through the study area; however, such movement is limited by existing residential land uses that are close to the drainage and the dominance of exotic woodlands within the drainage.

POTENTIAL IMPACTS AND RECOMMENDED MITIGATION MEASURES

This impact analysis is based on the following: a review of previous biological studies available for the general area; a field survey of the general study area (but not detailed investigation of each lot); available literature regarding the existing biological resources within the project area; and aerial photography.

Significance Criteria

The California Environmental Quality Act (CEQA), Chapter 1, Section 21001 (c) states that it is the policy of the State of California to "prevent the elimination of fish and wildlife species due to man's activities, ensure that fish and wildlife populations do not drop below self-perpetuating levels, and preserve for future generations representations of all plant and animal communities." Environmental impacts relative to biological resources may be assessed using impact significance criteria encompassing CEQA guidelines and federal, state and local plans, regulations, and ordinances.

The State CEQA Guidelines Appendix G provides the following general statements to determine if significant impacts to biological resources could occur if a project action would:

a) Have a substantial adverse effect (i.e. significantly reduce species population, reduce species habitat, restrict reproductive capacity), either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, regulations, or by CDFG or USFWS;
b) Have a substantial adverse effect (i.e. direct/indirect reduction) on any riparian habitat or other sensitive natural community identified in local or regional plans, policies regulations, or by the CDFG or USFWS;

c) Have a substantial adverse effect (i.e. direct/indirect reduction) 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, or hydrological interruption, or other means;
d) Interfere substantially (i.e. direct/indirect reduction) with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites;
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; and
f) Conflict with the provisions of an adopted Habitat Preservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

The impact assessment contained in the sections below addresses these topical areas in accordance with the above section lists; i.e. BIO A discusses effects associated with item "a)", and BIO B discusses effects associated with item "b)", etc.

Section 15130 of the *State CEQA Guidelines* provides guidance on the discussion of cumulative impacts. Two conditions apply to determine the cumulative effect of a project; first, the overall effect on biological resources caused by existing and known or forecasted projects must be considered significant under the criteria discussed above; and second, the project must have a "cumulatively considerable" contribution to that effect. This section of the Biological Resources Assessment is based on the following considerations with respect to cumulative impacts to biological resources:

- The cumulative contribution of other approved and proposed projects to fragmentation of open space in the project vicinity;
- The loss of sensitive habitats and species;
- Contribution of the project to urban expansion into natural areas; and
- Isolation of open space within the vicinity by the proposed project and future projects.

Effect BIO A - Special-Status Species

As discussed above, no special status plant species would be expected to occur on a regular basis within the 47 lots or the adjacent maintained fuel management buffer because of past alteration of vegetation and the general lack of suitable habitat. In addition, the continued fuel management practices with or without the proposed project would virtually eliminate the ability of any sensitive plants to re-establish within these areas.

Most of the special status animals potentially in the area are not expected to be present because of the lack of habitat. Mobile special status wildlife, such as coastal California gnatcatcher, could rarely occur within the landscaping shrubs present in the study area on a transitory basis during dispersal, but are not likely to be resident or present for long periods of time because of the lack of suitable foraging or nesting habitat. Given the level and frequency of human disturbance onsite and the lack of suitable coastal sage scrub habitat, future development of the individual lots would not be expected to have a direct effect on coastal California gnatcatcher individuals. As noted in Table 5 above, no suitable habitat for listed butterflies is present within the study area.

San Diego desert woodrat is the only special status animal anticipated to potentially occur within the site, possibly within the two lots in the south part of the study area along Altamira Canyon and within the RM-6 designated area. The drainage is steeply incised, with non-native ruderal areas located on the potentially developable upland areas. If developed, construction would not be expected to directly impact any woodrats that may be present as existing regulations under OC-1 would restrict construction to areas not likely occupied by woodrats.

Additional residences in the area would introduce a higher density of human disturbances, including light, noise, and feral animals, into the vicinity of this special status species, as well as others. However, these elements are already present given the existing residential land uses within the study area and to the north and south. A potential problematic effect, the domestic cat, is already present. Available literature on the size of domestic cat home ranges and the extent to which they enter into adjacent natural areas varies considerably, with estimated home ranges in the 0.5 – 5 acre range and the ability to range 250 – 600 feet from their core residence. It should be noted that feral cats, as compared to domestic cats, can have core home range sizes that exceed 400 acres and have an average movement distance of 5 miles (Guttilla and Stapp, 2010). Any woodrats that may be present at the site are already subject to predation pressures from these human associated animals. However, the data gathered by Kays and DeWan (2004) suggests that while small mammals are the most likely prey of domestic cats ranging from residences, their impact on small mammal populations in adjacent reserves is minor. This is in substantial difference to the effect of feral and farm-based rural cats. Therefore, while the increased human presence is considered adverse, it is not substantially different than existing conditions, and no significant effect is anticipated. Impacts to special status species would be **less than significant**. No mitigation is necessary.

Effect BIO B - Sensitive Plant Communities

The project site does not contain any sensitive plant communities because previously mapped coastal sage scrub areas have been reduced to isolated stands. No riparian habitat is associated with the primary drainage, with much of the cover in this area comprised of non-native woodlands. The area adjacent to the Upper Filiorum Reserve has already been cleared sufficiently to maintain adequate distance between the undeveloped lots and sensitive coastal sage scrub vegetation. Therefore, the proposed project based on current conditions would not have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service. However, over time and depending on future fuel management activities, coastal sage scrub vegetation could become re-established in various areas within Zone 2 or in adjacent properties. As shown in Figure 2, some isolated patches of former coastal sage scrub (CSS) habitat may still be present within Altamira Canyon, which traverses several developed and undeveloped lots in Zone 2. In addition, several of the undeveloped lots in Zone 2 abut the City-owned Portuguese Bend Reserve, though fuel management of this Reserve already occurs and would continue under the NCCP Subarea Plan. Nonetheless, it is possible that the development of some of the undeveloped lots in Zone 2 might have significant impacts upon existing or regrowth CSS habitat, either through the direct removal of habitat during construction or as a result of Fire Department-mandated fuel modification on- and/or off-site (i.e., in the Reserve) after construction of new residences is complete. In that event, effects to this sensitive plant community would be considered **significant and mitigation is required**.

Mitigation Measures. The following mitigation measure is recommended to provide for reduction of impacts to possible stands of CSS vegetation and to maintain consistency with the NCCP Subarea Plan and local ordinances (see Effect BIO E and BIO F, below).

BIO B-1 **Biological Survey.** For lots that are identified as containing sensitive habitat on the City's most-recent vegetation maps and/or that abut any portion of the current or proposed future boundary of the Palos Verdes Nature Preserve, the applicant shall be required to prepare a biological survey as a part of a complete application for the development of the lot. Said survey shall identify the presence or absence of sensitive plant and animal species identified in the City's adopted NCCP on the subject property, and shall quantify the direct and indirect impacts of the construction of the residence upon such species, including off-site habitat impacts as a result of Fire Department-mandated fuel modification. The applicant and/or any successors in interest to the subject property shall be required to mitigate such habitat loss through the payment of a mitigation fee to the City's Habitat Restoration Fund.

Effect BIO C - Wetland Habitat and Jurisdictional Drainages

Altamira Canyon divides the study area into east and west portions. This drainage was surveyed during the field reconnaissance from available access points, and within those limited areas it did not contain any riparian or wetland habitat. Review of readily available aerial photographs does not indicate the presence of extensive riparian habitat or possible wetland areas. However, the drainage would be subject to the jurisdiction of the CDFG under Section 1600 et. seq. of the Fish and Game Code and possibly contains "waters of the US" subject to the jurisdictional control of the US Army Corps of Engineers. This drainage passes through or is adjacent to eight lots that are undeveloped or underdeveloped and within which construction activities could potentially affect jurisdictional areas. The extent to which jurisdictional areas may be altered is unknown as no specific building plans are under consideration. At the time of individual lot construction is proposed, the potential for intrusion into jurisdictional areas will need to be assessed and the actual amount of possible fill or other disturbance within jurisdictional drainages determined. Regulatory policies by the jurisdictional agencies require mitigation for permanent loss of riparian habitat, wetlands, and waters of the US, and may also require mitigation for temporary losses. Because development of these lots may affect jurisdictional areas, this impact is considered **significant and mitigation is required**.

Mitigation Measures. The following mitigation measures are recommended to provide for habitat restoration and ensure that regulatory permits have been appropriately obtained prior to work within jurisdictional areas.

BIO C-1 **Agency Coordination.** The City shall review each application for construction and determine if proposed development is within the drainage channel within Altamira Canyon. If so, the applicant shall be required to obtain permits, agreements, and/or water quality certifications or correspondence indicating that none are necessary from applicable state and federal agencies regarding compliance of the proposed development with state and federal laws governing work within jurisdictional waters. Such agencies would include the California Department of Fish and Game, the United States Army Corps of Engineers, and the Los Angeles Regional Water Quality Control Board. The applicant shall provide such permits and/or agreements prior to the granting of a building or grading permit.

BIO C-2 **Habitat Restoration.** In the event that an application for construction would result in the loss of riparian or wetland vegetation, the applicant shall restore such habitat at a minimum ratio of 1:1 for temporary loss and 3:1 for permanent loss. Such restoration can occur either on site or within disturbed areas of the Palos Verdes Nature Preserve as determined and approved by the City.

Effect BIO D - Wildlife Movement

Future development of the lots that would be allowed under the proposed project is likely to include landscape and other improvements that may remove existing trees within the various lots. While these trees are non-native pepper, eucalyptus, pine, acacia, and olive trees, they may nonetheless support birds that are protected by the Migratory Bird Treaty Act (MBTA) and the Fish and Game Code of California (3503, 3503.5, 3511, 3513 and 3800). These regulations protect almost all native nesting birds, not just special-status birds. A significant impact could occur as a result of harm to the reproductive success of species protected by the MBTA and the Fish and Game Code of California if any bird species are nesting in the existing trees at the time of tree removal. The impact to nesting birds as a result of tree removal would be **potentially significant unless mitigation is incorporated**.

Exterior night lighting and the noise associated with residential uses could potentially disrupt normal behavior and breeding for some wildlife species. However, such noise and light effects already exist in the area, and the increased density of residences would not be expected to substantially decrease the populations of common wildlife in the area. The introduction of additional landscape vegetation to these sites would potentially increase the local population levels of urban tolerant wildlife, primarily bird species such as Anna’s hummingbird, western mockingbird, and California towhee. No significant impact is anticipated with respect to night lighting and noise given the existing residential use of the area.

The southern portion of Altamira Canyon within the project boundary that is designated RM-6 was also identified by the NCCP (URS, 2004) as a regionally important habitat area (RIHA) as it was mapped as containing coastal sage scrub along its steep slopes. A review of readily available photographs indicate that the vegetation in this area has apparently changed with the intrusion of additional non-native trees and other elements, and the coastal scrub vegetation appears reduced. The steep canyon slope is not optimal for CAGN, which prefers slopes of less than 40%, and given the lack of suitable vegetation further north within the canyon, it is unlikely that it is used as a significant transit route that provides connectivity for the local CAGN population. That function is largely served by the adjacent preserve areas (for instance Upper Filiorum and Portuguese Bend Reserves). As this area is protected by the policies of the natural overlay district (OC-1), the proposed project would not be expected to cause a significant effect on possible CAGN movement.

Mitigation Measures. The following measures shall be implemented to reduce impacts related to nesting birds to a less than significant level.

BIO D-1 **Nesting Bird Surveys and Avoidance**. Tree pruning and removal shall be conducted outside of the bird breeding season (generally February 1 through August 31). If vegetation clearing (including tree pruning and removal) or other project construction is to be initiated during the bird breeding season, pre-construction nesting bird surveys shall be conducted by a qualified biologist. To avoid the destruction of active nests and to protect the reproductive success of birds protected by MBTA and the Fish and Game Code of California, nesting bird surveys shall be performed twice per week during the three weeks prior to the scheduled felling of the trees on the site. The surveys shall be conducted by a qualified biologist approved by the Community Development Director. If any active non-raptor bird nests are found, the tree(s) or vegetation shall not be cut down and a suitable buffer area (varying from 25-300 feet) depending on the particular species found is established from the nest, and that area is avoided until the nest becomes inactive (vacated). If any active raptor bird nests are found, a suitable buffer area (typically 250-500 feet from the nest) depending upon the species, the proposed work activity, and existing disturbances associated with land uses outside of the site, shall be determined and demarcated by the biologist with bright orange construction fencing, flagging, construction lathe, or other means to mark the boundary. All construction personnel shall be notified as to the existence of the buffer zone and to avoid entering the buffer zone during the nesting season. No ground disturbing activities shall occur within this buffer until the City-approved biologist has confirmed that breeding/nesting is completed and the young have fledged the nest. Nesting birds surveys are not required for construction activities occurring from September 1 to January 31.

The proposed project's potential impact related to nesting birds would be less than significant with implementation of pre-construction nesting bird surveys. The possible cumulative effect to wildlife movement is considered to be **less than significant**.

Effect BIO E - Local Policies and Ordinances

The City of Rancho Palos Verdes has not adopted a tree preservation ordinance. The City has established the Natural Overlay Control District (OC-1) to "Maintain and enhance land and water areas necessary for the survival of valuable land and marine-based wildlife and vegetation" and "Enhance watershed management, control storm drainage and erosion, and control the water quality of both urban runoff and natural water bodies within the City" (Rancho Palos Verdes Municipal Code Section 17.40.040). As noted above, OC-1 has specific performance criteria and regulations that limit the potential for development within areas with important resources and any development that could proceed as a result of the proposed project would need to conform to those standards. While the project would provide for increased residential development within the Portuguese Bend community, the consistency of individual lot developments will need to be determined at such time that a lot is proposed for development. This is a standard requirement of the City planning process. As such, the proposed project would conform to this local policy and indirect impacts would be **less than significant**.

The City has a Coastal Sage Scrub Conservation and Management Ordinance, which is codified as Chapter 17.41 of the Rancho Palos Verdes Municipal Code. However, this ordinance only applies to parcels over two (2) acres in size that contain CSS habitat. Only one (1) of the undeveloped lots in Zone 2 exceeds this size threshold and contains CSS habitat. Consistency and any ordinance-required conservation actions would be determined at such time that this lot is proposed for development. As such, any conflicts of the proposed project with local policies or ordinances protecting biological resources are expected to be **less than significant**.

Effect BIO F - Conflict with Adopted Habitat Preservation Plan or Natural Communities Conservation Plan

As discussed above in the *Regulatory Setting*, the Rancho Palos Verdes City Council conceptually approved the Citywide Natural Communities Conservation Planning (NCCP) Subarea Plan in 2004. The plan identifies Biological Resource Areas and establishes the Palos Verdes Nature Preserve primarily for habitat preservation purposes. The Rancho Palos Verdes NCCP provides for conservation and protection of the habitat of the Palos Verdes blue butterfly and other special-status species, while permitting impacts from development to potential habitat for the covered species, including coastal sage scrub habitat. The City is currently working with CDFG to update, finalize, and authorize the NCCP. Several issues of compatibility of the Zone 2 proposed development with the NCCP are addressed below.

Fuel Modification. As stated in the NCCP Final EIR (URS, 2004), the existing distribution of native vegetation within the Subarea Plan area is highly fragmented and edge-affected by existing development. Fuel management activities outside of the Zone 2 property lines has already substantially altered the biological communities adjacent to the residential lots that could potentially be developed. The northwest portion of the study area contains the majority of the undeveloped/underdeveloped lots, and these lot boundaries are generally more than 200 feet from the boundary of the Upper Filiorum Reserve. An exception is that three lots along Altamira Canyon adjoin the Upper Filiorum Reserve property boundary along an approximate 450 foot linear boundary. The field reconnaissance indicated that this portion of the Reserve has already been subjected to fuel management activities that have reduced the habitat to a non-native grassland. Since no fuel management activities beyond that which has already occurred is expected for the individual lots, no additional impacts to the Reserve area are expected. It should be noted that the Portuguese Bend Reserve has been and will continue to be subjected to fuel management activities along the north edge of Narcissa Drive. For existing private development, the L.A. County Fire Department and L.A. County Department of Agricultural

Commissioner have reviewed the existing private development that abuts the Preserve and have determined the amount of brush clearance needed within the Preserve to provide the code required fuel modification zone for the protection of existing structures outside the Preserve. Development of residential structures in this eastern portion of the project site will not alter that existing practice.

Section 6.2.3 of the City-approved NCCP addresses Fire and Brush Management. It requires a brush management zone of a minimum of 50 feet from houses, buildings, or other structures with provision of up to 100 feet. In addition, brush management for new development is to occur outside Reserves. As discussed above, this level of brush management can be accommodated within the proposed project without affecting any additional Reserve lands.

Development Adjacent Reserves. Site specific project design issues are discussed in Section 6.2.2 of the current NCCP Subarea Plan. Issues associated with development relate to access and staging areas, fuel modification zones (discussed above), introduction of non-native species, night lighting, stormwater and urban runoff, increased noise levels, and access into Reserve lands. Each site to be developed in the proposed project (Zone 2) will need to be required to stay outside of the Reserve areas. Based on the location of the potentially developable lots and Reserve lands, no grading, access or staging areas are expected to affect Reserve lands. Nonetheless, construction activities on those lots that abut the Reserves could have an impact on wildlife and vegetation; therefore, the use of the Best Management Practices recommended under Section 6.2.2.2 are required to maintain consistency with the NCCP.

A Predator Control Plan (PCP) was developed as part of the *2006 Initial Management And Monitoring Report* (Dudek, 2007). It noted that brown-headed cowbirds were observed in the Portuguese Bend Reserve area and another reserve further to the southeast. The PCP recommended that a cowbird trapping program be implemented within the Portuguese Bend Reserve during the second year of the plan to reduce the potential for cowbirds to parasitize nests of native birds. One trap would be sufficient to cover this area. The status of this cowbird trapping program is unknown.

Brown-headed cowbirds are typically associated with land uses that have abundant grass seed, such as equestrian facilities, barns with livestock, and golf courses. Many of the residential lots currently within the study area have horses and other livestock, and an equestrian facility is located in the west portion of the project site. The proposed project would not alter the ability of lot owners to house livestock on their lots, and so would not change the extent to which such facilities could occur within the site under existing conditions. Development of the lots would not change the current presence of brown-headed cowbirds in the area, though it has the potential to increase the population of cowbirds in the local vicinity. Cowbird management is likely to be an ongoing management issue for the Palos Verdes Nature Preserve because of existing land uses that support cowbird populations. In the event that cowbird populations increase, the single trap recommended to control populations in the area of known coastal California gnatcatcher nesting is anticipated to be sufficient.

As previously stated, buildout of the residential lots could increase the number of domestic animals in the local area that could affect local wildlife. The PCP indicates that the extent of damage to NCCP focus species from feral animals is currently unknown, with additional data to be gathered to determine if a feral animal trapping program is necessary. Based on the study conducted by Kays and DeWan (2004), 80% of observed domestic cat hunts occurred in a garden/yard or within the first 33 feet of the adjacent forest preserve. Radio-tracked domestic cats rarely entered the forest preserve during their study, with scent station recordings indicating that the domestic cats rarely ventured more than 130 feet into the preserve. A caveat of this finding was that the preserve was sufficiently large to sustain predators known to kill cats (coyotes and fishers), and these were domestic cats. Feral cats are known to range more widely into natural habitats, especially in the absence of such predators (such as on Santa Catalina Island, Guttilla and Stapp, 2010). Both the Upper Filiorum and Portuguese Bend Reserves adjoin residential land uses on their northern sides, and the project site already contains residences that support domestic cats. The possible increase in the number of residences as proposed by the project is not likely to cause a substantial increase in the number of domestic animal problems within these Reserves given the existing conditions.

As discussed under Effect BIO D above, increased exterior night lighting and the noise associated with residential uses could potentially disrupt normal behavior and breeding for some wildlife species. However, such noise and light effects already exist in the area, and the increased density of residences would not be expected to substantially decrease the populations of common wildlife in the area. In addition, Section 17.56.030 of the City's Municipal Code specifically restricts exterior lighting in residential zones (such as the proposed project), generally that "no outdoor lighting shall be permitted where the light source is directed toward or results in direct illumination of a parcel of property or properties other than that upon which such light source is physically located." No substantial conflict with the Reserves related to noise and lighting effects are anticipated.

Conformance with stormwater and urban runoff with the Natural Overlay Control District (OC-1) is a standard requirement of the City's planning process and approvals on the individual lots at such time that they are proposed for development would maintain consistency with the NCCP Subarea Plan.

Section 6.2.4 of the City-adopted NCCP Subarea Plan provides for locating any new fences within Reserves so as not to impede wildlife movement, and also recommends that signage be established for access control and education at the periphery of the Reserves. As noted above, the proposed Zone 2 development does not directly adjoin Reserve land, except for three lots along Altamira Canyon that adjoin the Upper Filiorum Reserve property boundary along an approximate 450 foot linear boundary. As part of the review process for these lots at such time that they are proposed for development, they would be reviewed for compliance with access features and fencing, including controls on access into the Reserve lands. Therefore, the project is considered to conform to the Subarea Plan requirements.

Habitat Protection. The Rancho Palos Verdes Coastal Sage Scrub Conservation Ordinance (Section 17.41 of the Municipal Code) was enacted to specifically preserve lands that contain coastal sage scrub habitat and to implement resource protection per Section 5.8.2 of the City – adopted NCCP (2004). Compliance with this ordinance would be required for the individual lots at such time that they are proposed for development. It is noted that very little vegetation within Zone 2 can be described as "coastal sage scrub" given past and current fuel modification practices. Therefore, the proposed project is considered to be in conformance with the habitat protection features of the NCCP Subarea Plan.

Existing City ordinances, the standard City permit approval process, the adopted 2004 NCCP Subarea Plan, and future adoption of an Implementing Agreement for the NCCP would serve to minimize the potential for conflicts of future proposed development within the Zone 2 area from conflicting with the Draft NCCP/HCP. Therefore, this effect is considered to be **less than significant** under CEQA regulations. The proposed project would not have a cumulative effect with respect to conflicts with provisions of the adopted Natural Community Conservation Plan.

Mitigation Measures. The following applicable measures are recommended to enhance the value of the adjacent Reserves, to limit private access into Reserve lands, and to maintain consistency with the requirement that no fuel management for new development be allowed within the Reserves.

BIO F-1 **Structure Location**. To avoid the need for continued fuel management within the Upper Filiorum Reserve, all structures for those lots abutting the Upper Filiorum Reserve property boundary shall be located at least 100 feet from that boundary.

BIO F-2 **Perimeter Fences**. Lots adjoining the Upper Filiorum Reserve shall be fenced sufficient to prevent the ready egress of domestic animals into the Reserve. In addition, no gates or other means of ingress into the Reserve shall be permitted.

BIO F-3 **Construction Best Management Practices.** The following measures shall be required for those lots that abut Reserve lands as part of construction monitoring for the site:

- Contractors shall be educated regarding the off-site Reserve and the need to keep equipment and personnel within the project site prior to the initiation of construction.
- Temporary construction fencing shall be placed at the planned limits of disturbance adjacent to the Reserve.
- Construction should be scheduled to avoid the bird nesting season.
- Construction grading adjacent to drainages shall be scheduled for the dry season whenever feasible.

BIO F-4 **Construction Staging and Stockpiling Areas.** Grading and building plans submitted for City review and approval for those lots abutting Reserve lands shall identify areas for construction staging, fueling and stockpiling if needed. These areas shall be located as far as practical from Reserve lands, and not closer than 50 feet from the PVNP boundary.

LIMITATIONS

This Biological Habitat Assessment has been performed in accordance with good commercial, customary, and generally accepted biological investigation practices conducted at this time and in this geographic area. The biological investigations are limited by the scope of work performed. The identification of potential special-status species habitat has been based on a suitability analysis level only and did not include definitive surveys for the presence or absence of the species that may be present. Definitive surveys for special-status wildlife and plant species generally require specific survey protocols requiring extensive field survey time to be conducted only at certain times of the year. No other guarantee or warranties, expressed or implied are provided.

The findings and opinions conveyed in this report are based on findings derived from site reconnaissance, review of the CNDDB Special-status Species Database, and specified historical and literature sources. Standard data sources relied upon during the completion of this report, such as the CNDDB, may vary with regard to accuracy and completeness. In particular, the CNDDB is compiled from research and observations reported to CDFG that may or may not have been the result of comprehensive or site-specific field surveys. Although Rincon believes the data sources are reasonably reliable, Rincon cannot and does not guarantee the authenticity or reliability of the data sources it has used. Additionally, pursuant to our contract, the data sources reviewed included only those that are practically reviewable without the need for extraordinary research and analysis.

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Appendix D

Geotechnical Study

LGC Valley, Inc.

Geotechnical Consulting

GEOTECHNICAL STUDY FOR THE PREPARATION OF AN ENVIRONMENTAL IMPACT REPORT FOR THE ZONE 2 LANDSLIDE MORATORIUM ORDINANCE REVISION WITHIN THE CITY OF RANCHO PALOS VERDES, CALIFORNIA

Dated: March 29, 2011

Project No. 103002-01

Prepared For:

Rincon Consultants, Inc.
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Ventura, California 93003

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LGC Valley, Inc.

Geotechnical Consulting

March 29, 2011 Project No. 103002-01

Mr. Abe Leider
Rincon Consultants, Inc.
180 North Ashwood Avenue
Ventura, California 93003

Subject: ***Geotechnical Study for Preparation of an Environmental Impact Report for the Zone 2 Landslide Moratorium Ordinance Revision within the City of Rancho Palos Verdes, California.***

In accordance with your request, LGC Valley, Inc. (LGC) has performed a geotechnical study for preparation of an Environmental Impact Report (EIR) for the Zone 2 Landslide Moratorium Ordinance Revision which would allow a Landslide Moratorium Exception for all of the existing 47 undeveloped lots within the Zone 2 Area. These 47 lots are the focus of this geotechnical study.

The purpose of our work was to review the available literature provided to us from the City of Rancho Palos Verdes archives and synthesize the data into a summary of the geologic and geotechnical history of the Zone 2 area and surrounding property relevant to this study. Our work was performed to determine the potential geotechnical/geologic impacts to Zone 2 and the surrounding area from development of all 47 undeveloped lots.

The work provided herein is intended to be as comprehensive an analysis as possible without reiterating in great detail the intricacies of the site and surrounding Rancho Palos Verdes peninsula. Thus, by its nature, the information provided herein is incomplete, but should provide a useful understanding for the purposes of the EIR.

If you have any questions regarding our report, please contact this office. We appreciate this opportunity to be of service.

Respectfully submitted,

LGC VALLEY, INC.

Matthew Hawley

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BIH/MCH/kse

Distribution: (6) Addressee

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Appendices

1.0 EXECUTIVE SUMMARY

The Zone 2 area, located within the Abalone Cove Landslide Abatement District (ACLAD), resides within the 900-acre Ancient Portuguese Bend Landslide complex of Rancho Palos Verdes. Historical movement of the Abalone Cove and Portuguese Bend landslides immediately adjacent to Zone 2 reflect the on-going instability of the area and the general threat to property located atop landslide features. Though no recent landslide activity has occurred within Zone 2, slight creep-type movement may be occurring in local areas of Zone 2 as a result of the loss of support from the slow, down slope movement of the adjacent Abalone Cove and/or Portuguese Bend landslides.

Several ground water control methods, especially within the Abalone Cove landslide appear to have significantly reduced landslide movement and possibly creep-type movement within Zone 2. These water control processes have reduced movement within the Abalone Cove Landslide to minute displacements on the order of fractions of an inch/year, and such displacement is not considered a threat to life and limb. Rather, these very small movements tend to create nuisance –type cracking and displacements that over time, can result in higher than average maintenance costs to local home owners.

Because the Abalone Cove and Portuguese Bend landslides are quite thick, the depth to the basal rupture surface is deep. Thus small amounts of earth grading at the ground surface and the weight of homes atop the landslides in response to lot development will have a negligible effect to overall stability. However, as indicated above, groundwater resulting from additional home sites could have serious consequences if not strictly controlled. Several recommendations with regard to water collection devices, control of water to streets and other structures, and the addition of all future home owners within Zone 2 into ACLAD, which encourages the development of additional monitoring and/or pumping wells, should be mandatory. This recommendation is imperative because Zone 2 is and always will be a community linked by a common geological risk, and ground water control is the only reasonable geotechnical mitigation technique available to control the potential for landslides and ground movement in the Zone 2 area.

It is our conclusion that the development of the 47 lots within Zone 2 will not have a negative impact to the gross stability of either Zone 2 or adjacent areas, provided the recommendations of the architectural standards adopted by the Portuguese Bend Community Association and the City's Landslide Moratorium Exception Conditions are implemented into all future design and construction. However, it should be plainly understood that because of the inherent potential for instability within adjacent landslides and the fact that Zone 2 is atop a landslide, that should additional significant movement occur in adjacent areas, it is our opinion the loss of support currently provided from the Abalone Cove and Portuguese Bend Landslides could result in significant structural damage within Zone 2.

2.0 INTRODUCTION

2.1 Purpose and Scope of Services

The main purpose of our work was to review the available literature provided to us from the City of Rancho Palos Verdes archives and synthesize the data into a summary of the geologic and geotechnical history of the Zone 2 area and surrounding property relevant to this study. Our work was performed to determine the potential geotechnical/geologic impacts to Zone 2 and the surrounding area from development of all 47 undeveloped lots.

The work provided herein is intended to be as comprehensive an analysis as possible without reiterating in great detail the intricacies of the site and surrounding Rancho Palos Verdes peninsula. Thus, by its nature, the information provided herein is incomplete, but should provide a useful understanding for the purposes of the EIR.

This report includes the results of geotechnical/geologic study, and provides our conclusions, opinions and recommendations to address the potential geotechnical/geologic impacts to Zone 2 and the surrounding area and the limitations and potential mitigations for development of the 47 undeveloped lots in Zone 2.

Our scope of services for preparation of this document included:

- Review of geotechnical reports, geologic maps and other documents relevant to the site (Appendix A).

- Perform a site visit to observe the existing condition.

- Preparation of this report presenting our findings, conclusions, opinions and recommendations with respect to the evaluated geologic and geotechnical conditions at the site.

2.2 Site Description and Exiting conditions

The subject Zone 2 area is located in a gated community north of the intersection of Narcissa Drive and Palos Verdes Drive South in the Portuguese Bend area of the Palos Verdes Peninsula, within the City of Rancho Palos Verdes, County of Los Angeles, California. Zone 2 consists of approximately 112-acres with a total of 111 individual lots, of which there are 64 developed lots, and 47 undeveloped/underdeveloped lots. Zone 2 is currently located within the City's Landslide Moratorium Area (LMA).

Generally the developed lots are improved with single-family residences and associated improvements, built prior to the landslide moratorium, with the largest developed lot in Zone 2 being occupied by the Portuguese Bend Riding Club that was established prior to the City's incorporation in 1973. Zone 2 consists of a number of interior private streets that service the site, and it is our understanding that these streets are maintained by the Portuguese Bend Community Association. The remaining 47 undeveloped lots range from nearly flat to gently sloping, with moderate vegetation, and some lots contain small structures (i.e. non-habitable structures).

3.0 GEOTECHNICAL/GEOLOGIC CONDITIONS

3.1 Regional Geology

Zone 2 is located within the southern flank of the Palos Verdes Peninsula, a northwest-trending dome-shaped ridge, nine miles long by five miles wide, which bounds the southwest margin of the Los Angeles Coastal Plain (Ehlig, 1982). The peninsula is bordered by the Pacific Ocean on the south and west, the Los Angeles and Long Beach Harbors on the east, and the greater Los Angeles metropolitan area on the north. The peninsula rose from the sea during Early Pleistocene time through the combined effects of local and regional uplift. As the peninsula emerged, platforms or benches were eroded into all sides of the uplift by waves, creating a series of at least thirteen nearly level terraces (Bryant, 1982). Though located around the entire peninsula, these marine-cut terraces are especially pronounced on the southern and western sides of the peninsula as these areas face the Pacific Ocean.

The peninsula rises to an elevation of approximately 1,480 feet and the result of this uplift are several canyons that cut into and through the terraces, ancient landslides, and underlying bedrock. Canyons along the southern margin of the peninsula, including the Altamira Canyon and Portuguese Canyon just to the east of Zone 2, drain to the ocean forming notches into wave eroded bluffs that rise on the order of 100 to 150 feet in height from the beach. Recent landsliding has altered the course of the mouths of these canyons and lowered the overall profile of the bluffs as compared to adjacent more resistant bluffs and points.

The retreating coast line in this area of the peninsula has created two points, Portuguese Point and Inspiration Point that protrude into the ocean from the main terrace (Terrace 3 of Bryant, 1982) upon which Palos Verdes Drive South extends. These points, interpreted to be the result of more resistant basalt intrusions, are located at the ocean interface and have created three coves just south of Zone 2. Abalone Cove lies west of Portuguese Point, while Portuguese Cove (or Portuguese Bend) lies east of Inspiration Point. Between the points is Harden Cove. The sea floor within these coves is relatively gentle and at low tide, bedrock outcrops can be viewed within the surf zone.

Because of the tilt of the overall land surface from the ridgeline to the top of the bluffs just above the beach, nearly everywhere (except local portions of areas affected by recent landsliding) views a spectacular panorama of the Pacific Ocean and nearby Channel Islands.

3.2 Geologic Setting

The marine Middle Miocene to Early Pliocene Monterey formation constitutes the exposed bedrock over most of the Palos Verdes Peninsula (Ehlig, 1982a). The Altamira Shale Member of the Monterey formation is the lowest of three distinct phases of the Monterey formation in the area and is the source of the Ancient Portuguese Bend Landslide (APBL), and all subsequent landslides within the APBL including the Recent Portuguese Bend Landslide (PBL) and the Abalone Cove Landslide (ACL). Through much study, the Altamira Shale is further sub-divided into three distinct lithofacies or zones of distinct deposition and thus rock types; these are: the Portuguese Tuff, the Cherty Lithofacies and the Phosphatic Lithofacies. Of these three, the Portuguese Tuff is the most prominent and encountered unit in the area, and is typically used as a reference point in discussing stratigraphy. Because of its thickness, estimated at between 50 feet and 75 feet (L&A, 2001;

Neblett, 2001; Ehlig, 1982a), and its composition, an altered ash tuff to bentonite clay, it is also commonly considered to have the greatest potential of impact to the slope stability of the local area.

Overall, the local Altamira Shale generally consists of siltstone, tuffaceous siltstone, shale, and tuff that are often intruded by basaltic dikes, sills and flows (L&A, 2001). Thick beds of dolostone (an altered limestone) were also recorded in the area along with the Portuguese Tuff. Other ash tuff beds were also recorded, many of these also altered to bentonite clay.

The dome shape of the peninsula is interpreted as a broad doubly-plunging anticline along the south side of the northwest-trending Palos Verdes fault (Ehlig, 1982a). Overall, the south-facing Palos Verdes Peninsula bedrock bedding is inclined at approximately 20 degrees or more toward the south or the ocean, with local superimposed northwest to west trending folds that give an overall rippling effect to this sheet of rock. Several reviewers interpret some of these folds as the result of emplacement of volcanic intrusions into the Altamira Shale while others identify these folds as the result of local and regional compressional tectonics.

3.3 Geologic Units

The main geologic units at the site and surrounding area are the Monterey formation and ancient and recent landslide deposits. Surficial units of marine and non-marine terrace soils, along with alluvium, colluvium and fill mantle the thicker deposits of landslide and bedrock.

3.3.1 Artificial Fill

Local areas of artificial fill are interpreted throughout the Zone 2 area. Fill soil thickness is likely variable from a few inches to perhaps on the order of ten feet or more in response to the filling of low points, swales or grabens from ancient landsliding events in order to create roads and/or pads. The quality of the fill is uncertain as only a couple of reviewed documents indicated observation and testing of placed soils for subsequent housing construction. It is possible that some of the minor cracking observed within roadways, trenches and within lots in the Zone 2 area is due to settlement of poorly compacted fill soils.

3.3.2 Colluvium

Colluvium is located at the ground surface in areas unaffected by grading activities and is the in-situ development of soil from the underlying materials. The colluvium or topsoil is composed of dark brown to black silty clay and clayey silt and is prone to shrinkage and cracking when drying (L&A, 2001). It is fair to interpret that the colluvium is thicker in low areas such as swales and grabens and thinner on steep hillsides and likely has an average thickness on the order of three feet for gently dipping surfaces in the study area.

Laboratory testing reported in individual lot investigations indicate that the topsoil is expansive. Expansive soils are very hard on structures and may also be responsible for some of the cracking observed in the Zone 2 area, especially within roadways.

3.3.3 Alluvium

Alluvium is the down slope migration of particles by moving water that is typically confined within the elongated troughs of streams and canyons. Alluvium may be fine to coarse-grained and even consist of cobbles and boulders. Alluvium is generally confined to the active stream channels that cut across the southern flank of the peninsula and are interpreted at approximately ten feet or less in thickness in the adjacent Altamira and Portuguese Canyons. Thinner deposits are interpreted within the short streams that feed into these primary canyons.

3.3.4 Landslides

Landslides occur throughout the peninsula, but none are more prominent than those of the approximately 900-acre Ancient Portuguese Bend Landslide complex and surrounding areas. In general, these landslides are the result of inclined bedding to the south that becomes unsupported due to erosion from beach waves and intrusion from water run-off. As landslides fail into the beach zone due to loss of support from erosion, the material up-slope from these areas loses support and becomes susceptible to landsliding as well. Further instability comes from the now fractured nature of the landslide material which allows more water to infiltrate into the landslide mass, adding weight, creating buoyancy and further decreasing clay strength, while erosion from beach processes at the toe restrict the landslide masses from natural buttressing. The overall effect is a series of landslides that “shingle” up slope nearly to the crest of the anticline that forms the backbone of the peninsula.

Many reviewers of the history of the peninsula suggest that the initial landsliding that occupies the bulk of the area observed today occurred approximately 120,000 years ago with possibly initial movements as early as 500,000 years ago (Lass and Eagen, 1982). Studies of the South Shore landslide (Ray, 1982) yielded dates of approximately 16,200 years old, and historical landsliding of the PBL and ACL indicate that mass movements still occur in the area today. Thus it is reasonable to conclude that landsliding occurs nearly continuously, at least in geologic terms, throughout the APBL complex and that landsliding is a very real potential that will continue into the future.

Overall, the various landslides are interpreted or known to be founded on the weak bentonite clay beds that comprise within the Altamira Shale and all landslides appear to fail in a down slope direction toward the ocean. Because of numerous land movements, head scarps and grabens of varying length, height and arc occur throughout the APBL area. Over time, erosion wore down these initially sharp angled features into subdued hills and depressions. Coupled with the formation of terraces over much time, the APBL has a gently rolling, hilly appearance except in the areas of recent landsliding.

3.3.5 Non-marine Terrace Deposits

In the study area, non-marine terrace deposits are crudely-stratified and poorly compacted deposits primarily derived from slope wash, creep effects and cliff talus. These deposits can include all grain sizes and may range from ten feet to up to approximately 100 feet in thickness (L&A, 2001). Commonly, non-marine deposits immediately overly marine deposits and may extend across several terraces without interruption. Though many of the individual lot reports reviewed for this study did not indicate the occurrence of these deposits, it is likely that they exist in several areas across Zone 2.

3.3.6 Marine Terrace Deposits

Marine terrace deposits are sediments deposited on the wave cut abrasion platform at about sea level and by sea forces, as compared to alluvial or non-marine terrace deposits which are typically deposited or acted upon by running "fresh" water sources. As these deposits are generated at sea level and deposited by ocean processes, the make-up of these soils is commonly beach sands, gravels and cobbles with lesser finer-grained material. Shell and shell hash is common and the gravels and cobbles tend to have well rounded shapes due to re-working by wave action.

Because of the continued uplift of the peninsula, marine terrace deposits may be located well above current sea level and likely at the base of any of the thirteen terraces cut into the side of the peninsula dome. However, because these deposits are typically mantled by non-marine terraces and the anticipated depths of remedial removals for home sites within Zone 2 will be minimal, it is unlikely, though not improbable, that these soils will be encountered during lot grading.

3.4 Historical Landslides

The preponderance of the documents reviewed interpret that the APBL moved as a translational-type landslide along a pre-existing weak layer(s) likely composed of bentonite clay that is inclined toward the ocean. Some geologic reviewers interpret that the APBL initially moved as a single sheet (Steiner, 2004) in part because of the lateral continuity of the entire landslide complex, and then broke into smaller landslides shortly thereafter. Others hypothesize that landsliding occurred in several relatively smaller stages that then migrated up-slope as a series of landslides as successive parcels of land became unsupported from the down-slope failures.

Recent historical movement and ground water data such as that identified in the ACL and PBL, among others, generally supports this later interpretation as these slides occurred along seaward dipping strata, that appears to have begun within the beach zone with very high water levels high up-slope (though the PBL really accelerated when grading activities created an imbalance in that area). Reports that leech fields, seepage pits and cesspools were in common practice for residences atop the APBL indicate primary sources for ground water build-up which would be a primary catalyst for movement.

Though both of these slides generally moved “at once”, surface monument data as well as historical data indicate that the first and greater movement occurs at the toe of the slide and then decreases up-slope such that the slides “shingle” up-slope with the toe area showing a greater “rubble” appearance than those areas higher up. This is generally because the pieces of rock at the toe become over-turned as the landslide mass breaks up across bedding and through the surf zone and then subsequently over-run by blocks higher in the landslide mass as the entire mass moves down slope. The result is an area of severely over-turned, broken down and rotated blocks in the toe area of the landslide that tends to decrease in severity rather rapidly up slope becoming large blocks separated by extensional tears, gaps and down drops. The larger tears, gaps and down drops ultimately show at the ground surface as scarps and sags that separate the large “intact” blocks of bedrock from each other. Thus the material near the toe of the landslide has a distinctly different and chaotic structure with very low strength as compared to the landslide debris higher up hill which is more intact and has a greater inherent strength.

As indicated above, the movement of lower land masses subsequently decreases support of the land higher up creating distinct zones within each landslide that are progressively less broken and therefore stronger up slope. So it should not be misconstrued that the larger uphill masses are severely weak and comparable to the rubble observed at the landslide toe. Rather these very large blocks still provide significant support to up-slope property because it remains fairly intact.

Because of the proximity to the Zone 2 area and the inherent make-up of uphill blocks, significant support from the ACL is provided to Zone 2. Therefore, it is our opinion that further down slope movement of the PBL and especially the ACL be kept at minimums as much as possible in order to provide long term support to the developments planned in Zone 2.

3.4.1 <u>Abalone Cove Landslide</u>

The Abalone Cove Landslide (ACL) has been reviewed and analyzed by many geotechnical firms and geologists (see References). This landslide is the re-activation of part of the APBL complex and is relevant for the Zone 2 area because it abuts Zone 2 immediately to the south. Movement of the ACL initiated in 1974 and continued significant movement until 1985 encompassing a total of approximately 85 acres. A reduction of the ground water level within the slide mass began in early 1980 and movement had nearly stopped near the end of 1985 (Ehlig and Bean, 1982; Ehlig 1982).

Beginning in 1994 a series of survey monuments were installed across the ACL and Zone 2. The monuments were set-up to be reviewed through Global Positioning Satellite networks (GPS) and recordings have been collected at least through 2006 (GeoKinetics, 2007). The data from these monuments indicates small amounts of movement occurred even through that report’s most recent readings just prior to submittal. Interpretations vary as to causation of the movement, ranging from slope creep, stress relaxation of the landslide from the primary movement that occurred between 1974 and 1985, continued creep movement along the basal rupture surface of the landslide, effects from high rainfall, damage or disturbance to monuments, to possible error in data points or some combination thereof.

Between the twelve year time frame of 1994 to 2006, movement of the ACL (from data provided by GeoKinetics, 2007) indicates the magnitude of displacement at the toe of the ACL is approximately 1.9 feet, the mid-portion 0.8 feet, and the head area approximately 0.6 feet. This movement roughly correlates to a yearly slip of 1.9 inches, 0.8 inches and 0.6 inches, respectively, though the movement is not steady on a year-to-year basis. Instead, the data appears to indicate that movement occurs in pulses typically regulated by rainfall.

Though significant in terms of the potential for cracking and separations to structures, flatwork and other block or concrete structures, the movement within the ACL is slow over enough time that it is not considered by most geologists as a hazard to life and limb as long as the abatement activities (ground water dewatering and monitoring) within the ACL continue.

The overall relevance of movement of the ACL to the subject site is the interpreted loss of support to the up-slope Zone 2 area. Monuments within Zone 2 indicate average movement of approximately 0.3 inches/year or 3 inches/10 year period. This rate likely fluctuates from spot-to-spot within Zone II, with those areas further away from the ACL receiving even less movement and those closer to the ACL with slightly more, but it provides a simplistic basis from which to judge how property will be regulated in terms of repairs over the long term and that life and limb are not truly in jeopardy provided this rate and the geologic conditions regulating it does not significantly change.

3.4.1.1 __Landslide Moratorium Ordinance__

Because the ACL area contained numerous home sites and the boundaries of the affected areas were unclear at the time of initial and even continued landsliding, a Landslide Moratorium Ordinance was adopted in 1978. This ordinance was adopted also in part because it was uncertain if the slide could be controlled or prevented from spreading into areas beyond the area characterized by visible surface cracks (Ehlig, 1992).

Shortly after the adoption of the Landslide Moratorium Ordinance, a geotechnical investigation of the ACL was sponsored by the City. The subsequent report by Robert Stone and Associates (1979) provided recommendations for removal of ground water and noted the lack of youthful landslides uphill (Zone 2) of the ACL. The report indicated that there were only two naturally occurring processes capable of destabilizing the slides uphill from the active ACL. One was loss of support on the downhill side as a result of movement of the ACL, and the other was a rise in the water table. From these conclusions, the report recommended against further development in Zone 2 until slide movement was stopped within the ACL, the water table was lowered, and surface drainage was improved.

Within Zone 2, pumping wells have lowered the ground water table, drainage has been improved, and all but the slightest movement has ceased on the adjacent ACL. With the exception of differences of opinion with regard to why or even if there is true land movement in ACL and Zone 2, it appears that these conditions have generally been met, and that the uncertainty with regard to landslide control has been abated. Thus provided additional measures to control of ground water, reduce water infiltration and limiting earth grading are taken into consideration during the development of Zone 2 parcels, Zone 2 can be developed in as safe a manner as conditions allow.

3.4.2 Portuguese Bend Landslide

The 260-acre active Portuguese Bend Landslide (PBL) has been moving continuously since re-activation in 1956. Like the ACL, the PBL is a portion of the much larger APBL complex, however its' rate of movement is estimated at approximately 3 feet per year versus the fraction of an inch per year for the ACL (Steiner, 2004b). The cause of reactivation was due to over-burden fill and loss of support from cut operations located nearly 2,500 feet from the beach during the construction of Crenshaw Boulevard extension (Vonder Linden, 1972). However, other reviewed reports indicate movement was observed along the toe of the landslide some time between 1931 and 1947, the time between coastal photographs that show a change between no movement and a landslide scarp. Thus, initial movement likely occurred during the early time frame stated above and was exacerbated due to construction activities years later.

Eventually, the landslide displaced Palos Verdes Drive South, eliminated the extension of Crenshaw Boulevard, damaged a pier just east of Inspiration Point, and affected approximately 160 homes of which about 134 were destroyed (Steiner, 2004b). The remaining home owners moved to nearby areas that were more stable or created clever methods to account for ground movements such as continuous use of hydraulic jacks and timbers to keep their foundations level.

Excavation shafts explored by geologists into the PBL located the basal rupture surface on a sheared bentonite clay bed located about 30 to 40 feet above the Portuguese Tuff (Steiner, 2004b). Studies indicate that the movement is complex in that the western margin of the PBL moves over inactive landslide debris of the APBL while the eastern portion moves over in-place bedrock.

Similar to the ACL, the PBL is composed of rubble within the toe areas and numerous large blocks up-slope that move at different rates. Ehlig (1992) divided the landslide into five semi-independent subslides. Like the ACL, the seaward portion of the slide mass moves at a faster rate than those parcels further away from the coast and all parcels accelerate after periods of high rainfall.

Steiner (2004b) indicates that the rate of movement of the landslide reached a whopping 1.5 inches per day after seasons of high rainfall and that only through continued redistribution of landslide mass in three distinct pulses between 1986 to 1995 did the movement reduced to 0.05 inches per day. However, lapses in maintenance, increased infiltration of water into the landslide, weight at the head of the slide due to other landslides and additional weight due to alluvial build-up led to additional failures.

Over several decades, numerous attempts to stabilize the landslide have failed. These include: the installation of 23 steel-reinforced concrete caissons; earth re-distribution across the landslide; the installation of dewatering wells, attempts to control beach erosion through the installation of gabions, drainage improvements, and the sealing of fissures. Additional ideas for an elaborate system of drains, shear keys and walls have been proposed. However, the landslide still moves.

3.5 Groundwater

According to Ehlig and Bean (1982) the 80-acre ACL began moving in February 1976, while the upper portion did not appear to start moving until the spring of 1978. Groundwater was concluded to be the most likely agent responsible for the slide movement and subsequent to the numerous cesspools and other septic systems initially in the area, the rise in the water table is directly attributed to rainfall which apparently has both an immediate and delayed effect on groundwater conditions and therefore slope stability conditions. The data and graphs prepared by Ehlig and Bean indicate a strong positive correlation between ground water levels in the slide mass and the rate of movement. GeoKinetics (2007) also show this correlation in their analysis of GPS monitoring stations.

The dewatering system installed in the ACL as part of the recommendations by Robert Stone and Associates (1979) was effective in lowering the ground water table and slowing the rate of land movement. Correlations between ground water pumping and a decline in the rate of movement of the slide began immediately after the start of dewatering. Subsequent wells further reduced movement to negligible amounts.

Early in the development of the Portuguese Bend area septic systems, leach lines and cesspools installed as part of residential development on the APBL contributed high volumes of water directly into the landslide and were likely catalysts for inception of movement. The current sources of ground water are primarily rainfall. However, supplemental water may also result from infiltration from adjacent canyons, up-slope areas and broken pipes due to landsliding.

In their report for the city of Rancho Palos Verdes, Robert Stone & Associates (RSA, 1979) clearly described three ways in which ground water negatively affects a landslide mass. First, the water increases the plasticity of clay gouge along the slide surface and allows it to deform more freely with less frictional resistance. Once saturation occurs along a slide surface, the further accumulation of water decreases stability through the action of water pressure. The buoyancy effect of water reduces the weight of solid material pushing down on the slide surface; thus reducing frictional resistance to sliding. At the same time, fluid pressure acting in the direction of slide movement provides an additional driving force similar to water behind a dam. For the ACL, RSA (1979) concluded that evaluation of the driving force produced by the ground water head indicates it is the controlling factor causing the slide movement.

Nearly all the referenced reports indicate that not only is ground water the controlling factor in initiating slide movement, it is also the only factor that can be reasonably manipulated to minimize slide movement for all areas within the APBL complex. We are in agreement with this conclusion.

3.6 Surface Water

Based on our review of site studies for individual lots, typical lot drainage recommendations is to direct run-off toward the streets through controlled mechanisms such as roof gutters and down spouts. Because of the expansive soils in Zone 2, surface water runoff should be directed away from planned structures to reduce cracking that may occur to foundations and flatwork. This cracking may be misconstrued as a result from the effects of landsliding. Further, because of the underlying geologic conditions beneath the Zone 2 and adjacent areas, it is in the community's best interest to keep ground water low and under control.

Continuing with the above theme, storm water run-off should not be allowed to percolate into the ground in the Zone 2 area through the adoption of common BMP practices. Such local containment of first flush flows and idealized concepts of encouraging recharge of the ground water table in this area can lead to re-activation of the APBL.

3.7 Seismicity, Faulting and Related Effects

3.7.1 Seismicity

The main seismic parameters to be considered when discussing the potential for earthquake-induced damage on the site are the distances to the causative faults, earthquake magnitudes, and expected ground accelerations.

The Palos Verdes Fault is located approximately 4 miles (6.5 km) from the site and is considered to have the most significant effect at the site from a probabilistic design standpoint. The performance of the proposed development of the 47 lots within Zone 2 should be designed in accordance with the city of Palos Verdes and the latest adopted building code requirements. Given the building codes seismic zone construction requirements, no additional recommendations for strong seismic shaking mitigation are needed.

3.7.2 Seismic Design Criteria

Seismic design criteria for should be developed in accordance with the latest adopted California Building Code on a lot by lot basis.

3.7.3 Faulting

The subject site is not located within an Alquist-Priolo Earthquake Fault Zone and there are no known active or potentially active faults onsite. The possibility of damage due to ground rupture from earthquake fault rupture is considered nil since active faults are not known to cross the site.

Secondary effects of seismic shaking resulting from large earthquakes on the major faults in the southern California region, which may affect the site, include soil liquefaction and dynamic settlement. Other secondary seismic effects include shallow ground rupture, and seiches and tsunamis. In general, these secondary effects of seismic shaking are a possibility throughout the Southern California region and are dependant on the distance between the site and causative fault and the onsite geology. The major active fault that could produce these secondary effects is the Palos Verde Fault located approximately 4 miles (6.5 km) from the site. Other faults that may result in shaking to the site include the Newport Inglewood (LA Basin) Fault, Santa Monica Fault, Malibu Coast Fault, and Hollywood Fault among others. The subject site is located in a State of California Seismic Hazard Zone for landslides. Discussions regarding the secondary effects of large earthquake shaking are provided in the following sections.

3.7.4 Shallow Ground Rupture

The subject site may have a potential for shallow ground rupture due to the nearby Palos Verdes Fault and the inherent broken nature of the underlying APBL complex as an earthquake in the local area could result in differential movement along bedding planes and other areas of weakness. However, assessing the risk from this phenomenon is difficult due to the lack of available information and overall knowledge of the hazard. Overall, we do not considered shallow ground rupture to be a significant hazard, although it is a possibility at any site.

3.7.5 Liquefaction

Liquefaction is a seismic phenomenon in which loose, saturated, granular soils behave similarly to a fluid when subject to high-intensity ground shaking. Liquefaction occurs when three general conditions exist: 1) shallow groundwater; 2) low density non-cohesive (granular) soils; and 3) high-intensity ground motion. Liquefaction is typified by a buildup of pore-water pressure in the affected soil layer to a point where a total loss of shear strength occurs, causing the soil to behave as a liquid. Studies indicate that saturated, loose to medium dense, near surface cohesionless soils exhibit the highest liquefaction potential, while dry, dense, cohesionless soils and cohesive soils exhibit low to negligible liquefaction potential. Effects of liquefaction on level ground include potential seismic settlement, and sand boils.

Based on our review of the Seismic Hazard Zone Maps (CGS, 1999a, 1999b) for the Redondo Beach and San Pedro Quadrangles Zone 2 is not located within a Seismic Hazards Zone for Liquefaction. Previous geotechnical studies indicate the site is underlain by the ancient landslide consisting generally of the Altamira Shale with lesser deposits of various surficial soils. The shale is not considered susceptible to liquefaction however the thin surficial soils may be susceptible. Therefore, liquefaction potential on the project site likely varies from very low to nil.

3.7.6 Seismically Induced Settlement

Seismically induced settlements can occur due to liquefaction or within dry and partially saturated cohesionless materials due to densification as a result of ground shaking and redistribution of the soil particles. Uniform seismically induced settlements beneath a structure may cause minimal damage; however, due to variations in soil stratigraphy, soil densities, and confining conditions of the soils, seismic settlement is generally non-uniform (i.e. causes differential settlement) and can cause serious structural damage.

The project site is underlain by ancient landslide material composed of Altamira Shale and locally thin surficial deposits such as non-marine terrace soils and colluvium or alluvium. Based on our review of LME applications and soils reports for the first 16 undeveloped lots completed to date, the foundations for the undeveloped lots will be founded into newly placed fill over landslide soils or directly into the landslide material. Based on those studies, the underlying landslide material would not be prone to dynamic settlements. Due to the minimal thickness of proposed engineered fill beneath foundations, the potential for dynamic settlement is low.

3.7.7 Sand Boils and Ground Fissures

The possible effect of liquefaction on level ground includes surface manifestations such as sand boils, and ground fissures, although liquefaction may occur with no evidence of surface manifestation. During a seismic event, seismically induced excess pore pressures are commonly dissipated by the upward flow of pore water, which produces upward acting forces on soil particles. If the hydraulic gradient reaches a critical value, the vertical effective stress will drop to zero and the soil will be in a quick "liquefied" condition. In these cases the water velocity during a seismic event may be sufficient to carry soil particles to the surface causing sand boils and/or ground fissures.

Due to the lack of loose sandy soils underlying the site and a very low potential for liquefaction, the site is not considered to be susceptible to sand boils and ground fissures.

3.7.8 Lateral Spread

Lateral spread involves the lateral displacement of large surface blocks atop liquefiable soil due to liquefaction of subsurface layers. Lateral spread generally develops on gentle slopes (commonly less than three degrees) that move toward a free face such as a stream or channel. Due to the very low potential for liquefaction, we consider the potential for liquefaction induced lateral spreading at the site to be nil.

3.7.9 Tsunamis and Seiches

Based on the elevation of the proposed development at the site with respect to sea level and the lack of large nearby open bodies of water, the potential of seiche and/or tsunami is considered to be low.

3.7.10 Earthquake Induced Landslides

The project site is located within a Seismic Hazard Zone for earthquake induced landslides (CGS, 2001). Landslides occur when slopes become unstable and masses of earth material move down slope. Landslides are generally rapid events, often triggered during periods of rainfall or by earthquakes. Mudslides and slumps are a more shallow type of slope failure compared to landslides. These typically affect the upper soil horizons, and are commonly not along-bedding bedrock planes. Mudslides and slumps typically occur during or soon after periods of rainfall. Erosion can occur along manufactured slopes that are improperly designed or not adequately vegetated.

The size of a landslide can vary from minor slope scars to hundreds of acres of hillside land movement. The underlying bedrock bedding planes, groundwater level, steepness of a slope, and shear strengths of the soils all contribute to the stability of a hillside. Lateral erosion caused by natural or human-induced modifications to the contour of a hill, which includes grading, have the potential to destabilize a hillside.

As indicated above, the project site is located within a Seismic Hazard Zone for earthquake induced landslides. The project site and offsite areas are within the boundaries of the Ancient Portuguese Bend Landslide, and the site is upslope of the well investigated, studied and mapped ACL and PBL landslides. Depending on the intensity of seismic shaking, seismically-induced landsliding could occur in the subject area if ground shaking is very high. Therefore we conclude that the probability of seismically-induced landslides is at least a moderate risk.

3.8 *Expansive Soils*

Expansive soils expand with increases in moisture content and shrink with decreases in moisture content. Clayey soils are most susceptible to expansion. Within the Zone 2 area the upper site soils consist of fill, colluvium, and landslide material that contain expansive soils. These upper soils consist of clays, clayey silts, and silty clays which through laboratory testing performed as a part of individual lot investigations (see References) indicate the expansion potential is medium to high. Therefore, foundations for structures constructed on these soils should be designed based on the latest adopted building codes.

3.9 *Corrosivity of Soils*

A severely corrosive area is when any of the following conditions exist: the soil contains more than 500 ppm of chlorides, more than 2,000 ppm (0.2 percent) of sulfates, a minimum resistivity of less than 1,000 ohm-centimeters, or a pH of 5.5 or less. Based on the reviewed reports, site soils generally have a negligible soluble sulfate content and a potential for minimum resistivity less than 1,000 ohm-centimeters. Site specific testing should be completed on a lot by lot basis and concrete and corrosion design should be performed per the latest adopted building codes and American Concrete Institute (ACI) guidelines.

3.10 *Slope Stability Analysis for Zone 2 Area*

Geotechnical studies, investigations, and reviews of the APBL, PBL, and ACL have been performed by numerous geotechnical professionals over the years to determine and document the factor of safety of the ancient and active landslides within the subject area. There are many varying opinions regarding the overall stability within Zone 2. These opinions range from the area being at unity, i.e. factor of safety at or just below 1.0, (GeoKinetics, 2007), a factor of safety that is probably greater than 1.0 however is less than 1.5 (Cotton Shires, 2001) to a factor of safety of greater than 1.5 (Leighton, 2001 and 2006).

The primary factors used in determining a factor of safety for a site are: the profile of the ground surface; the geologic structure of the underlying bedrock or soils; the ground water table; and the strength of the soil column, plus the method of analysis. Secondary factors are also considered. For the subject area these include: previous earthwork and redistribution of land mass; erosion along the beach zone and a reduction in support to up-slope areas; and control of run-off and potential infiltration of water into the slide mass through ground fractures and other avenues.

Based on our review there appears to be general agreement in the topography of the area, ground water levels used in the slope stability analyses, the strength of the various soil units, the general location of the various rupture surfaces and the overall structure of site bedrock at depth. There is also general consensus that erosion along the beach zone contributes to instability, that instability generally decreases away from the beach zone and that control of ground water is fundamental for long term stability. Further, there is additional agreement between the various reviewers that any future development that may occur in the area should be bound by a set of conditions that range from becoming a part of the community abatement district to the control of run-off from roofs.

However, the items most in contention did not include the fundamental parameters into which a slope stability analysis is considered. Rather it was the *method* of analysis that created the greatest disparities between various geotechnical firms and reviewers. These methods, coupled with the interpretation of the GPS survey monument data resulted in wild swings between site failure (factor of safety less than 1.0) to a site viewed as grossly stable (factor of safety of 1.5 or greater).

Based on our review and experiences we are of the position that the site slope stability is likely somewhere higher than 1.0, but less than 1.5. This is the position taken by Cotton Shires (2001).

Also based on our review of the referenced documents, we conclude that the development of the 47 undeveloped lots within Zone 2 will not have a negative affect on the overall stability of the ancient or active landslides or the remainder of Zone 2, provided the development of the lots are designed within the guidelines of the conditions of approval and in accordance with the city of Palos Verdes and the latest adopted building codes, and provided additional measures with respect to control of ground water, reduction in infiltration of water and limiting of earth grading are taken into consideration during development.

4.0 CONCLUSIONS AND RECOMMENDATIONS

It is our conclusion that the development of the 47 lots within Zone 2 will not have a negative impact to the gross stability of either Zone 2 or adjacent areas, provided the recommendations of the architectural standards adopted by the Portuguese Bend Community Association and the City's Landslide Moratorium Exception Conditions are implemented into all future design and construction.

Therefore, from a geotechnical perspective, it is our opinion that the future development assumptions for Zone 2 should include at least the following types of considerations prior to grading and construction:

- Conform to the City of Rancho Palos Verdes Landslide Moratorium Ordinance (Rancho Palos Verdes Municipal Code Chapter 15.20).
- Less than 1,000 cubic yards of grading (cut and fill combined) per lot, with no more than 50 cubic yards of imported fill per lot;
- The property should agree to participate in ACLAD and/or other recognized or approved districts whose purpose is to maintain the land in a geologically stable condition. No proposed building activity may cause lessening of stability in the zone.
- Prior to issuance of a building permit, a geotechnical report must be submitted to and approved by the City's geotechnical reviewers indicating what, if any, lot-local and immediately adjacent geologic hazards must be addressed and/or corrected prior to, or during construction. Said report shall specify foundation designs based on field and laboratory studies.
- All houses shall connect to a public sanitary sewer system. Any necessary easements must be provided.
- Storm drainage improvements to reduce lot infiltration of run-off should be designed and approved by the City prior to issuance of building permits.
- All lot drainage deficiencies, if any, identified by the City staff must be corrected. The design of pools, ponds and sumps will be subject to City review and approval.
- Runoff from all buildings and paved areas must be collected and directed to the street or to an approved drainage course as approved by the City Engineer.
- All other relevant building code requirements must be met.

5.0 LIMITATIONS

Our geotechnical/geologic 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 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.

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Appendix E

Drainage and Water Quality Report

Conceptual Drainage and SUSMP (Water Quality) Report for Portuguese Bend Zone 2 Landslide Moratorium Ordinance Revisions EIR

City of Rancho Palos Verdes
County of Los Angeles

Hunsaker Project No: 0159-001-001
May 6, 2011
Revised ~~April 2013~~June 2014

Prepared for:

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1.0 INTRODUCTION

1.1 REPORT SUMMARY

The purpose of this report is to present the Conceptual Drainage and Standard Urban Stormwater Mitigation Plan (SUSMP) analysis for the EIR for the “Zone 2 Landslide Moratorium Ordinance.” The report analyzes pre and post-development conditions for the SUSMP, 2–year, 5-year, 10-year, 25-year, 50-year, and Capital Storms, as well as total debris load.

Drainage (flood) and water quality related impacts and mitigation are addressed consistent with City of Rancho Palos Verdes ordinances and policies. All calculations are based upon the procedures outlined in the County of Los Angeles 2006 Hydrology Manual, 2002 SUSMP Manual, and 2006 Sedimentation Manual.

This report identifies the pre and post-development runoff from the project. Since each lot would have to acquire permits individually, it would be the responsibility of the owner to adhere to the policies in place at the time permits are pulled. Since this EIR addresses the lots cumulatively, the project exceeds the threshold for mitigation and treatment. The individual homeowners will need to provide mitigation onsite prior to outletting runoff from their property.

Our analysis has determined that there would be an increase in runoff from the 2-year, 5-year, 10-year, 25-year and 50-year storm events. Treatment is required for the SUSMP event. See section 6.0 Standard Urban Stormwater Mitigation Plan for a definition of the SUSMP event.). Additionally, the lots may be required to employ Low Impact Development (LID) principles as well as hydromodification mitigation to minimize impacts to the natural water courses. See Section 7.0: Summary and Recommendations for a more detailed analysis.

This report is divided into several sections. Section 1 contains the introduction; Section 2 discusses the methodology used in the hydrologic analysis; Section 3 summarizes the design criteria used; Section 4 is a description of the hydrologic model and brief description of the watershed and its land uses; Section 5 summarizes the analysis for the Interim Peak Flow Runoff Criteria and LID analysis; Section 6 describes the Standard Urban Stormwater Mitigation Plan (SUSMP); Section 7 includes the conclusions and recommendations of this report; and Section 8 includes a list of the references used in the preparation of this report.

1.2 PROJECT DESCRIPTION

"Zone 2 Landslide Moratorium Ordinance" area (referred to as "project") is located north of the intersection of Palos Verdes Drive South and Narcissa Drive in the Portuguese Bend area of the Palos Verdes Peninsula, City of Rancho Palos Verdes, and County of Los Angeles, California. This area, located on the hills above the south-central coastline of the City, is within the City's larger Landslide Moratorium Area (LMA). Zone 2 consists of 111 individual lots. Of these, 64 are developed with residences and 47 are either undeveloped or underdeveloped. For the purposes of this drainage analysis, the "Project Site" is considered to be the entire Portuguese Bend development, while the "Project" is the 47 lots that are the focus of this EIR.

The project site is part of an 855± acre watershed that includes developed and undeveloped land uses. Offsite areas to the north of the project site include existing Tracts 27789, 31617 and 31714, as well as natural hillside and canyon open space areas. Palos Verdes Drive and the Pacific Ocean abut the southerly edge of the project site. Altamira Canyon is the main natural drainage course that drains the project site and offsite tributary areas. Altamira Canyon has and continues to experience erosion due to runoff from the existing on and off site developments.

The pre and post development drainage watersheds have identical limits and drainage patterns. The pre-development watershed within the project site boundary consists of 64 developed lots totaling 81 acres, and 47 undeveloped lots totaling 43 acres. The post – development condition includes development of the 47 undeveloped lots as single story, ranch-style residences with attached or detached three-car garages, with maximum 40% net lot coverage. ~~Since the existing drainage system was designed for the entire Portuguese Bend development, including the 47 undeveloped lots, each lot is assumed to have a proportional share of the existing drainage capacity provided for the Portuguese Bend development. Regardless of when the lots are constructed, each lot is allowed to drain into the existing drainage system based upon the size of the lot. Any deficiencies in the drainage system should be mitigated by the entire Portuguese Bend development rather than the last 47 lots to be constructed.~~ The existing drainage system in the project area is a private system originally permitted by the County. The system utilizes culverts, storm drains, open drainage courses, and the roads to convey runoff. Testimony and video provided by residents indicates that some culverts and roads are inadequate to convey existing runoff. However, since the existing drainage system was designed for the entire Portuguese Bend development, including the 47 undeveloped lots, each lot is allowed to drain into the existing drainage system

Existing storm drains (PD 407, 1382, 1403 and 1703) discharge from the existing offsite areas into the undeveloped canyon areas north of the project site. Runoff drains through the project site in a generally north to south direction, crosses Palos Verdes Drive South, and discharges into the Pacific Ocean.

Within the project site runoff is conveyed within existing drainage courses, storm drains, and culverts that traverse the site. The project site is divided into two major drainage watersheds by Cinnamon Lane. The area east of Cinnamon Lane drains a total of 637 acres, of which approximately 82 acres are located in the Zone 2. Drainage in the easterly watershed is conveyed by Altamira Canyon southwesterly to Narsissa Drive. The area west of Cinnamon Lane drains a total of 115 acres, of which approximately 42 acres are located in the Zone 2.

Drainage in the westerly watershed is conveyed by a combination of an existing subsurface storm drain system and surface flow in a southeasterly direction along Figtree Road to the cul-de-sac at the end of Figtree Road. The storm drain continues southeasterly in private lots to a junction with Altamira Canyon (the easterly watershed) approximately 400 feet north of Narcissa Drive. From the junction, the storm drain drains southwesterly across Narsissa Drive and Palos Verdes Drive South and outlets into the lower reaches of Altamira Canyon. Altamira Canyon drains directly into the Pacific Ocean from Palos Verdes Drive South.

The majority of the project area is located within FEMA Flood Zone "X," and the canyon area is clarified as FEMA Flood Zone "D" on the FEMA FIRM Panel 06037C2025F and 06037C2026F, effective September 28, 2008. Flood Zone "X" is defined as an area of minimal flood hazard, usually depicted on FIRMs as above the 500-year flood level. Zone "X" is the area determined to be outside the 500-year flood and protected by levee from 100-year flood. Flood Zone "D" is defined as an area with possible but undetermined flood hazards. No flood hazard analysis has been conducted.

2. METHODOLOGY

The analysis performed for this project was prepared at a programmatic level to determine the overall hydrological impact of the proposed project. Each of the individual property owners would need to prepare a detailed hydrologic analysis to demonstrate compliance with the mitigation measures listed below. The mitigation measures address individual site development impacts due to flooding and erosion. Although the project area currently experiences flooding and erosion, resolving existing conditions is not a part of the mitigation required for the proposed project's impacts. While it may be desirable to resolve the site flooding and erosion in Altamira Canyon and other natural drainage courses, it is an existing condition affecting the larger area and therefor is not addressed in in this analysis.

A detailed field survey was not conducted to determine the exact size and location of every drainage facility located on the site. The existing drainage facilities were based upon record data provided by the City and supplemented by a visual field inspection of the roads and areas immediately adjacent to the roads. Since the proposed project is the development of individual lots located within a developed neighborhood and no changes are proposed to the existing roads, culverts, storm drains, and open drainage conveyances (natural and constructed) at this time, a detailed survey and analysis was determined to be unnecessary at this time.

Reference plans and design calculations were not available for confirmation of the capacity of the existing drains. A detailed hydrologic and hydraulic analysis of the existing drainage system, including culverts, streets, and open drainage courses was not prepared as a part of this analysis. The impacts are described quantitatively for the overll project as increases in runoff rates and volumes, and mitigation is required to attenuate the increase in runoff so that no net change occurs. As such, regardless of the localized flooding that may occur in existing conditions, if no net change occurs due to the development of the 47 undeveloped lots, detailing the existing flooding is not required to determine project related impacts.

The project site is located within one watershed which, including offsite areas, covers a total of 855± acres. The drainage watershed was delineated based on existing topography and improvement plans, the existing City Master Plan of Drainage, Los Angeles County Drainage Watershed Maps, and a site visit. Two hydrologic methods were used for the drainage analysis - the Rational and Modified Rational Methods are included in Section 7.2 and 7.3 of the 2006 Los Angeles County Hydrology Manual, respectively. The SUSMP is based upon the Los Angeles County SUSMP Manual dated September 2002.

A 24-Hour storm analysis based upon the Los Angeles County Rational and Modified Rational Method of Hydrology was used for clear, burned, and burned and bulked conditions for the watershed(s).

The time of concentration (T_c) for each subarea was computed using the Los Angeles County approved Time of Concentration calculator based upon the Rational Method. The calculator evaluates several hydrologic parameters such as soil type, land use, imperviousness, storm frequency, length and slope of each reach to calculate a time of concentration. This data was used with the Los Angeles County approved LAR04 software application to determine peak flow rates for all storm events.

Using the times of concentrations for each subarea, the Modified Rational Method was then used to calculate the 50-Year, 24-Hour peak runoff flow for each subarea. The undeveloped tributary areas were analyzed using a burned coefficient to calculate peak runoff rates. Unburned coefficients were used for all developed conditions as well as undeveloped conditions for storms other than the 50-year Capital Storm event.

The project's land use and imperviousness was determined from the Land Use and Imperviousness Table provided in the Los Angeles County Hydrology Manual (see Appendix 9.B.3). Soil types and rainfall corresponding to each subarea were obtained from the Hydrologic Maps in the Los Angeles County Hydrology Manual. The maps used were maps 1-H1.3 and 1-H1.4 (see Appendix 9.B.1).

The project is located within the Coast Watershed and the undeveloped areas were analyzed for debris potential, as well as peak burned and bulked runoff rates utilizing the County's charts for the Los Angeles Basin. The watershed lies within Debris Potential Zone DPA-6. DPA6- has a debris potential of 48,000 cubic yards (cy) / mi^2 for areas less than or equal to 0.1 mi^2. Debris volumes were calculated for each undeveloped subarea based on this debris production rate. Bulking is the increase in flow rates that occur when debris is included in the runoff rates. Within the Los Angeles Basin, DPA-6 has a bulking factor of 1.61 for areas less than or equal to 0.1 mi^2. The burned and bulked peak runoff rates were calculated by factoring the peak burned runoff rates by the bulking factor.

A summary of the project's Q_{50} burned and bulk flows and debris volume can be found in Table 5: Debris and Burn & Bulked Flow Summary Table.

3. DESIGN CRITERIA

Los Angeles County requires that several design criteria be followed when using the Rational and Modified Rational Method of Hydrology to determine capital flood flow.

The 50-year, 24-hour rainfall isohyets used in the hydrologic calculations were obtained from the Los Angeles County Hydrology Manual's Hydrologic Maps. Watershed has 4.9" isohyet. Other storm events were determined by factoring the 50-year isohyets.

The soil types within the project site were determined to be 2 and 4 from the hydrologic maps.

The project was assumed to have 42 % imperviousness in single-family residential areas, 2% for base vacant undifferentiated (onsite undeveloped lots), 1% for offsite vacant areas and 40% for proposed residences. A weighted imperviousness was used for areas consisting of two or more land use types.

The project watershed falls in a debris potential area in the Los Angeles Basin, DPA-6. The respective debris and bulking rate factor are 48,000 cy / mi^2 and 1.61.

The design criteria used is summarized below:

Hydrology Method:	Los Angeles County Flood Control District Rational Method and Modified Rational Method.
Hydrology Modeling Software:	LAR04
Design Storm:	SUSMP, 2-Year, 5-Year, 10-Year, 25-Year, 50-Year, Capital Storm
50-Year Isohyet:	4.9"
Soil Types:	2 and 4
Land Use and Imperviousness:	Existing Single-Family (42 %) Proposed Single-Family (40 %) Base vacant undifferentiated – Onsite Undeveloped lots (2 %) Offsite vacant area (1%)
Debris Potential Zone:	DPA-6 - 48,000 cy / mi^2 for area $\leq$ 0.1 mi^2
Peak Bulking Rate:	DPA-6 - 1.61 – for area $\leq$ 0.1 mi^2

4. MODIFIED RATIONAL HYDROLOGY / FLOOD CONTROL

The hydrology analysis was based upon Los Angeles County design criteria for the Modified Rational Method, utilizing the LAR04 program. Drainage areas were determined and the corresponding sub-areas delineated based on the existing topography and existing improvements on the project site. Post-development conditions were identical to the pre-development conditions, with the exception that the 47 lots are assumed to be developed under post-development conditions.

The level of flood protection required ranges from a 10-year to a Capital Storm event depending upon the facility impacted. According to the Policy on Levels of Protection (Chapter 4, Hydrology Manual of Los Angeles County), public storm drains must at least carry flow from the 10-year storm event, the street or highway must carry the balance of the 25-year storm event. The capital flood level of protection applies to all facilities constructed to drain natural depressions or sumps, as well as natural drainage courses. In addition, all building pads must be a minimum of 1 foot above the maximum ponding level during the Capital Storm event. The Capital Storm event is defined as the burned and bulked runoff from a 50-year storm event with a 100% burn factor applied to all undeveloped areas within the watershed.

For the project site, a 10-year level of protection with the pads maintaining 1 foot of freeboard above the Capital Storm event is required. In sump conditions a 25-year level of protection is required.

5. INTERIM PEAK FLOW ANALYSIS / LOW IMPACT DEVELOPMENT (LID)

The Los Angeles County Interim Peak Flow Runoff Standard involves the analysis of the 2-Year, 24-Hour storm event for both existing and proposed conditions. The purpose of the analysis is to determine that the flow from the 2-Year, 24-Hour storm would not exceed the existing peak flow, burned, provided the proposed peak flow rates equals or exceeds five cubic feet per second. The Standard also requires the proposed runoff from the 50-Year Capital Storm shall not exceed the predevelopment peak flow rate, burned and bulked, from the 50-Year Capital Storm.

In order to verify compliance with the Interim Peak Flow Standard requirement for this site, both the 50-year, 24-Hour storm as well as the 2-year, 24-Hour storm events were analyzed for all of the subareas per the County's procedures. To comply with the current LID and Hydromodification requirements, the 5, 10, and 25 year storms were also calculated.

The hydromodification analysis specifically addresses all of the characteristics that may lead to drainage impacts to natural water courses, including changes in flow rates and volume, as well as flow velocity, depth of flow, frequency and duration of runoff, and limits of inundation.

The analysis is based upon the County of Los Angeles Low Impact Development Standards, dated January 2009. While the manual has not been adopted by the City of Rancho Palos Verdes, the procedures for the analysis are valid, and serve as the basis for this report. While the current Los Angeles County MS4 permit does not specifically require addressing hydromodification effects and Low Impact Development (LID) principles, an interim clarification letter sent in 2006 to the County of Los Angeles and its co-permittees specifically discussed shortcomings in the current MS4 Permit that required attention. The County of Los Angeles and City of Los Angeles have since adopted ordinances or policies that specifically address LID and hydromodification requirements. The County's Low Impact Development Ordinance adopted in January 2009 requires that impacts due to development be treated at the source.

Future MS4 permits will ~~most~~ likely incorporate these requirements specifically. All future construction on the site would need to comply with the ordinances and policies in place at the time the construction permits are applied for. We have provided the changes in runoff rates, treatment volumes, and treatment flow rates for the range of storm events currently in place. These rates can be prorated and utilized as the basis for mitigation for individual sites, or a new analysis prepared by the applicant.

Any post-development runoff rates that exceed existing runoff rates will require drainage acceptance letters and / or mitigation. Any hydromodification effects will need to be addressed onsite for areas tributary to natural watercourses subject to erosion.

6. STANDARD URBAN STORMWATER MITIGATION PLAN

The objective of implementing a Standard Urban Stormwater Mitigation Plan (SUSMP) is to effectively control or treat the pollutants from urban activities prior to outletting into receiving waters. The SUSMP requires that runoff volume or flow be treated and / or mitigated based upon one of the following criteria:

a. Runoff from the 85th percentile 24-hour runoff event.
b. Capture of 80% or more of the annual runoff.
c. 0.75 inch 24-hour storm event.

For this analysis, the 0.75 inch event was used.

Each of the individual sub-areas was analyzed to determine the peak mitigated flow rate, Q_{PM}, as well as the peak mitigated volume, V_M, from the new development based on the Rational Method. This was achieved by using the Los Angeles County approved Time of Concentration calculator developed for the SUSMP analysis (using a rainfall of 0.75 inches).

The SUSMP event was calculated for the entire watershed for the hydromodifcation / LID analysis. For treatment of runoff from the development, a treatment rate and volume was developed as a unit rate on a per acre basis, assuming 40% imperviousness for the 47 lots proposed to be developed.

The peak mitigated flow rate and volume would provide support for the design of the post construction Best Management Practices (BMPs) proposed for the development onsite, or at water quality basins located within the project site. Each individual lot can use the analysis as the basis for their design.

7. CONCLUSIONS & RECOMMENDATIONS

The Flood (Hydrology) / Water Quality (SUSMP) analysis was prepared for the range of design storms required by the City of Rancho Palos Verdes, and described in the sections above. The results are shown below for the range of storm events and compares pre and post-development runoff for the watershed, project site, and median lot.

The following tables identify the pre and post-development runoff from the Watershed (Table 1); the Project Site (Table 2); and the Median Lot (Table 3). Table 1 – the watershed data provides the cumulative impacts for the development. Table 2 - the project site table provides the project specific impacts. Table 3 – the median lot table provides the impacts and changes specific to a typical lot. The actual mitigation will vary by the size and extent of improvements on a specific lot.

The analysis for the Flood and Water Quality impacts are presented separately below.

Flood (Hydrology)

Flood / Hydrology impacts would be considered significant if the proposed project would:

- *Substantially alter the existing drainage pattern of the area such that substantial erosion or siltation occurs.*
- *Substantially alter existing drainage pattern or substantially increase the rate or volume of surface runoff in a manner that results in flooding.*
- *Create or contribute runoff water which would exceed the capacity of existing or planned storm drain storm water drainage systems.*
- *Increase infiltration which could affect the stability of existing landslides in the project vicinity.*

Changes to the peak runoff rates for the design storm events (SUSMP, 2, 5, 10, 25, 50-year, and Capital Storm) were analyzed to determine the project impacts.

The hydrologic analysis determined that the post-development condition c~~w~~ould result in an increase in runoff to the existing lots and natural watercourses. The increase in runoff would be~~is~~ due to an increase in impervious area that would occur when the 47 lots are developed. The combined impacts resulting from the development of the 47 lots is deemed to be insignificant for the following reasons:

- The existing ~~(natural)~~ drainage patterns are maintained. ~~and the combination of the natural and constructed drainage conveyances and surface flow has the capacity to convey the runoff from the project site~~.
- The existing drainage system for the Portuguese Bend development was designed for the entire development, including the 47 undeveloped lots. ~~Therefore, the lots have on a proportional basis, a share of the capacity of the existing drainage system.~~ Should any deficiencies exist, it is a regional issue and should be addressed accordingly.

- Changes to the peak runoff rates for the design storm events (SUSMP, 2, 5, 10, 25, 50-year, and Capital Storm) are minimal and insignificant. They range in between 0.5% and 1% for the entire watershed, and 2.9% - 4.5% for the project site. Since, the entire watershed drains through the project development, flood impacts are based upon changes relative to the entire watershed.
- The addition of impervious area will reduce the total infiltration from the site. Due to the low permeability of the existing soils (clays) and steepness of the natural canyons, infiltration in the natural areas is likely to be low. For a given storm event, the total infiltration will not exceed the existing condition.

However, on an individual lot basis, localized flood impacts may occur and may be considered significant. The analysis shows that increases in runoff from an individual lot ranges between 9.8% and 15.1%. Since each lot would acquire permits individually; it would be the responsibility of the owner to adhere to the policies and procedures in place at the time permits are pulled for all flood and water quality related impacts.

To identify and mitigate potential localized flood impacts to adjacent properties and facilities to a level not considered significant the project applicants must do the following:

- *A detailed Hydrology Study shall be prepared by a Licensed Civil Engineer and approved by the City. The study shall address impacts to the proposed building site, as well as upstream and downstream properties. The analysis will include the SUSMP. 2,5, 10, 25, 50-yeear, and Capital Storms to determine impacts. The analysis will follow the methodology outlined in the Los Angeles County Hydrology and Sedimentation Manual (latest edition), the Los Angeles County Low Impact Development Manual, and Los Angeles County Stormwater Best Management Practices Design and Maintenance Manual for preparation of the design calculations. Improvements will be based upon the policies and codes of the City.*
- ~~Prepare a hydrology consistent with City policies at the time the project is permitted that demonstrates that significant increases in runoff or impacts do not occur.~~
- The limits of the analysis should be to the point flow is either normalized or attenuated adequately to demonstrate no significant impacts will occur, or to the point the runoff has reached an acceptable conveyance such as a storm drain, channel, or natural drainage course. All runoff should be directed to an acceptable conveyance and not be allowed to drain to localized sumps or catchment areas with no outlet. *An acceptable conveyance is defined as one that is adequate to convey any increases in runoff without causing additional impacts such as flooding and erosion.*
- Maintain existing drainage patterns and outlet at historical outlet points.
- Minimize changes to the character of the runoff at property lines. Changes in character include *obstructing or diverting existing runoff entering the site, changing the depth and frequency of flooding,* concentration of flow outletting onto adjacent properties, ~~or~~ and increasing the frequency or duration of runoff outletting onto adjacent properties.
- Reduce significant increases in runoff *rates and volume* in localized areas by low impact development principles *such as, but not limited to, infiltration trenches, cisterns, bio-retention areas, or permeable pavement.* ~~identified in the County's LID manual.~~

- Provide onsite detention facilities*, infiltration facilities,* or conveyance to acceptable off-lot conveyance devices *to eliminate impacts from increases in runoff rates and volumes*.
- *The project shall address impacts to the immediate vicinity as well as downstream facilities, including culverts, roads, open drainage courses, and Altamira Canyon, or demonstrate there is no change from existing conditions.*
- Secure drainage acceptance letters from affected properties if mitigation cannot be achieved.
- Temporary impacts during construction can be minimized by performing grading during the dry season, or implement an erosion control plan that directs runoff away from exposed grading and property lines, or provides soil stabilization and desilting measures.
- Avoid watering graded soils during construction, use of soil blinders or other measure to minimize impact.
- Minimize "Dry Weather": runoff which could add to the total infiltration from the project.

Water Quality (SUSMP)

Changes to the runoff rates and volumes for the SUSMP and water quality treatment events 2, 5, 10, 25, and 50-year Storms were analyzed to determine the project impacts. The SUSMP event is used for stormwater pollutant treatment. The remaining events are utilized to determine hydromodification impacts.

Changes in water quality are considered significant and mitigation is required. Since, the entire watershed drains through the project development, erosion impacts are based upon changes relative to the entire watershed. Changes to the peak runoff rates for the design storm events (2, 5, 10, 25, 50-year and capital storm) are minimal and insignificant. They range in between 0.5% and 2.0% for the entire watershed. Changes to the total volume of runoff range between 2.8% and 5.3% and may be considered significant.

Water Quality impacts would be considered significant if the proposed project would:

- *Violate any water quality standards or water discharge requirements.*
- *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 groundwater table level.*
- *Substantially alter the existing drainage pattern of the area such that substantial erosion or siltation occurs.*
- *Create or contribute runoff water which would provide substantial additional sources of polluted runoff.*

Current Los Angeles County ordinances require that water quality treatment occur for single-family hillside homes with development of one acre or more of surface area, or when developing ten or more unit homes, including single family homes, multifamily homes, condominiums and apartments. Since this EIR addresses the lots cumulatively, the project exceeds the threshold for mitigation and treatment. The individual homeowners would need to provide treatment onsite prior to outletting runoff from their property. Runoff from the SUSMP event or other acceptable criteria available at the time the permits are pulled will be utilized to size the onsite facilities.

Additional clarification to the current MS4 permit requires that Low Impact Development (LID) and hydromodification principles be incorporated into the project water quality management plans.

Hydromodification addresses increases in runoff that may change the characteristics of the natural watercourses, such as depth of flow, velocity, as well long term erosion in the watercourse due to an increase in the frequency and quantity of runoff during storm and dry weather conditions.

Mitigation measures related to Water Quality include the following:

- Prepare a SUSMP (Standard Urban Stormwater Management Plan) consistent with City policies at the time the project is permitted that demonstrates that water quality impacts are mitigated.

- Provide stormwater treatment measures that may include the use of bio-filters, filter strips, sand filters, roof drain filters, planter box filters, and other acceptable Best Management Practices (BMPs).
- Onsite treatment on a lot by lot basis meets the intent of Low Impact Development (LID) principles.
- Provide mitigation for hydromodification to local natural drainage courses though flow – duration control methods. Use of onsite detention facilities, cisterns, or underground storage devices may be used.
- Infiltrate on-lot, where feasible, runoff from the SUSMP event. However, the area is subject to geotechnical hazards and any mitigation utilizing infiltration will need the approval of a geotechnical engineer. Infiltration may be allowed on a lot by lot basis, or consistent with existing conditions if no hazard is determined to exist.
- If the SUSMP event cannot be infiltrated, a combination of detention and infiltration of the change in runoff volume will mitigate some of the impacts due to hydromodification.

Table 1 - Watershed (Cumulative) Drainage Runoff Summary

Year		Pre-development	Post-development	Delta	% change
SUSMP	Area (ac)	854.7	854.7	0.00	0.0%
	Q (cfs)	37.4	40.1	2.70	6.7%
	q (cfs/ac)	0.044	0.047	0.003	6.7%
	Vol (ac-ft)	12.0	12.9	0.90	7.0%
	vol (ac-ft/ac)	0.014	0.015	0.001	7.0%
2-year	Area (ac)	854.7	854.7	0.00	0.0%
	Q (cfs)	276.7	282.5	5.78	2.0%
	q (cfs/ac)	0.324	0.331	0.007	2.0%
	Vol (ac-ft)	53.4	55.4	2.00	3.6%
	vol (ac-ft/ac)	0.062	0.065	0.002	3.6%
2-year (Burn)	Area (ac)	854.7	854.7	0.00	0.0%
	Q (cfs)	312.0	317.3	5.3	1.7%
	q (cfs/ac)	0.365	0.371	0.006	1.7%
	Vol (ac-ft)	65.2	68.2	3.0	4.4%
	vol (ac-ft/ac)	0.076	0.080	0.004	4.4%
5-year	Area (ac)	854.7	854.7	0.00	0.0%
	Q (cfs)	579.62	587.37	7.75	1.3%
	q (cfs/ac)	0.678	0.687	0.009	1.3%
	Vol (ac-ft)	91.44	96.56	5.12	5.3%
	vol (ac-ft/ac)	0.107	0.113	0.006	5.3%
10-year	Area (ac)	854.7	854.7	0.00	0.0%
	Q (cfs)	876.86	885.38	8.52	1.0%
	q (cfs/ac)	1.026	1.036	0.010	1.0%
	Vol (ac-ft)	121.6	126.68	5.08	4.0%
	vol (ac-ft/ac)	0.142	0.148	0.006	4.0%

Table 1 - Watershed (Cumulative) Drainage Runoff Summary (continuous)

Year		Pre-development	Post-development	Delta	% change
25-year	Area (ac)	854.7	854.7	0.00	0.0%
	Q (cfs)	1230.7	1237.3	6.63	0.5%
	q (cfs/ac)	1.440	1.448	0.008	0.5%
	Vol (ac-ft)	164.78	170.7	5.92	3.5%
	vol (ac-ft/ac)	0.193	0.200	0.007	3.5%
50-year	Area (ac)	854.7	854.7	0.00	0.0%
	Q (cfs)	1505.4	1515.53	10.13	0.7%
	q (cfs/ac)	1.761	1.773	0.012	0.7%
	Vol (ac-ft)	197.98	204.58	6.60	3.2%
	vol (ac-ft/ac)	0.232	0.239	0.008	3.2%
Capital	Area (ac)	854.7	854.7	0.00	0.0%
	Q (cfs)	2116.30	2128.40	12.10	0.6%
	q (cfs/ac)	2.476	2.490	0.014	0.6%
	Flow Vol (ac-ft)	228.3	234.91	6.61	2.8%
	Debris Vol (ac-ft)	20.3	20.3	0.00	0.0%
	total Vol (ac-ft)	230.8	237.4	6.62	2.8%
	vol (ac-ft/ac)	0.270	0.278	0.008	2.8%

Table 2 – Project Site (Zone 2) Drainage Runoff Summary

Year		Pre-development	Post-development	Delta	% change
SUSMP	Area (ac)	145.8	145.8	0.00	0.0%
	Q (cfs)	9.7	12.0	2.30	19.2%
	q (cfs/ac)	0.067	0.082	0.016	19.2%
	Vol (ac-ft)	3.1	3.8	0.70	18.4%
	vol (ac-ft/ac)	0.021	0.026	0.005	18.4%
2-year	Area (ac)	145.8	145.8	0.00	0.0%
	Q (cfs)	62.4	70.8	8.40	11.9%
	q (cfs/ac)	0.428	0.486	0.058	11.9%
	Vol (ac-ft)	9.7	12.7	3.00	23.6%
	vol (ac-ft/ac)	0.067	0.087	0.02	23.6%
5-year	Area (ac)	145.8	145.8	0.00	0.0%
	Q (cfs)	129.3	138.9	9.60	6.9%
	q (cfs/ac)	0.887	0.953	0.066	6.9%
	Vol (ac-ft)	16.3	21.4	5.10	23.8%
	vol (ac-ft/ac)	0.112	0.147	0.03	23.8%
10-year	Area (ac)	145.8	145.8	0.00	0.0%
	Q (cfs)	187.9	196.7	8.80	4.5%
	q (cfs/ac)	1.289	1.349	0.060	4.5%
	Vol (ac-ft)	21.2	26.2	5.00	19.1%
	vol (ac-ft/ac)	0.145	0.180	0.03	19.1%
25-year	Area (ac)	145.8	145.8	0.00	0.0%
	Q (cfs)	263.2	271.1	7.87	2.9%
	q (cfs/ac)	1.805	1.859	0.054	2.9%
	Vol (ac-ft)	27.8	33.9	6.10	18.0%
	vol (ac-ft/ac)	0.191	0.233	0.04	18.0%
50-year	Area (ac)	145.8	145.8	0.00	0.0%
	Q (cfs)	314.3	324.45	10.15	3.1%
	q (cfs/ac)	2.156	2.225	0.070	3.1%
	Vol (ac-ft)	35.9	39.8	3.90	9.8%
	vol (ac-ft/ac)	0.246	0.273	0.03	9.8%

Table 3 – Median Lot Drainage Runoff Summary

Year		Pre-development	Post-development	Delta	% change
SUSMP	Area (ac)	0.74	0.74	0.00	0.0%
	Q (cfs)	0.02	0.06	0.04	64.8%
	q (cfs/ac)	0.03	0.08	0.053	64.8%
	Vol (ac-ft)	0.01	0.02	0.01	62.3%
	vol (ac-ft/ac)	0.01	0.03	0.016	62.3%
2-year	Area (ac)	0.74	0.74	0.00	0.0%
	Q (cfs)	0.22	0.36	0.14	40.1%
	q (cfs/ac)	0.29	0.49	0.195	40.1%
	Vol (ac-ft)	0.01	0.06	0.05	79.9%
	vol (ac-ft/ac)	0.02	0.09	0.07	79.9%
5-year	Area (ac)	0.74	0.74	0.00	0.0%
	Q (cfs)	0.54	0.70	0.16	23.4%
	q (cfs/ac)	0.73	0.95	0.223	23.4%
	Vol (ac-ft)	0.02	0.11	0.09	80.6%
	vol (ac-ft/ac)	0.03	0.15	0.12	80.6%
10-year	Area (ac)	0.74	0.74	0.00	0.0%
	Q (cfs)	0.85	1.00	0.15	15.1%
	q (cfs/ac)	1.14	1.35	0.204	15.1%
	Vol (ac-ft)	0.05	0.13	0.09	64.6%
	vol (ac-ft/ac)	0.06	0.18	0.12	64.6%
25-year	Area (ac)	0.74	0.74	0.00	0.0%
	Q (cfs)	1.24	1.38	0.14	9.8%
	q (cfs/ac)	1.68	1.86	0.183	9.8%
	Vol (ac-ft)	0.07	0.17	0.10	60.9%
	vol (ac-ft/ac)	0.09	0.23	0.14	60.9%
50-year	Area (ac)	0.74	0.74	0.00	0.0%
	Q (cfs)	1.47	1.65	0.17	10.6%
	q (cfs/ac)	1.99	2.23	0.235	10.6%
	Vol (ac-ft)	0.14	0.20	0.07	33.1%
	vol (ac-ft/ac)	0.18	0.27	0.09	33.1%

Table 4 - Debris Summary Table

SUB AREA	AREA (Ac)	QB (cfs) (Burned flow rate)	Capital (cfs) (Burned and Bulked flow rate)	DEBRIS (CY)
125A	60.0	156.8	252.4	4,500
132B	68.7	200.0	321.9	5,153
141C	61.2	154.4	248.6	4,590
142C	23.3	91.6	147.4	1,748
143C	48.3	121.8	196.1	3,623
151B	21.6	53.9	84.5	1,588
154B	7.7	22.8	47.9	566
156B	64.9	180.6	283.2	4,770
162A	11.5	27.1	43.7	863

Table 5- Imperious Area Summary Table

Pre-development Imp. Area (ac)	115
Post-development Imp. Area (ac)	122.1
Δ Imp. Area (ac) (Δ%)	7.1 (6.2%)
Overall Watershed Area (ac)	854.7
Pre-development % Imp in Overall Watershed	13.46%
Post-development % Imp in Overall Watershed	14.29%
Δ % Imp. in Overall Watershed	0.83%

8. REFERENCES

i. Los Angeles County Department of Public Works Hydrology Manual, January 2006

ii. Los Angeles County Department of Public Works Sedimentation Manual, March 2006

iii. Interim Peak Flow Runoff Criteria for New Development, January 31, 2005

iv. County of Los Angeles Low Impact Development (LID) Standard Manual, January 2009

v. Los Angeles County Department of Public Works SUSMP Manual, September 2002

9. APPENDICES

A. Capital Storm Hydrologic Summary Table

1. Capital Storm Hydrologic Summary Table
2. TC Calculations
3. SUSMP Calculations
4. 2-year, 2-year (burn), 5-year, 10-year, 25-year, 50-year and 50-year (burn) Storm Modified Rational of Hydrology Result and Hydrograph

9.A.1. Capital Storm Hydrologic Summary Table

SUB AREA	NODE	AREA (Ac)	Sub-total Area (Ac)	% IMPERVIOUSNESS (Existing Condition)	% IMPERVIOUSNESS (Proposed Condition)	SOIL TYPE	ISOHYET	50-YR TC (min)	QB (cfs) (Pre-development)	Capital (cfs) (Pre-development)	QB (cfs) (Post-development)	Capital (cfs) (Post-development)	DEBRIS (CY)
108A		8.1		21	21	002	4.9	13		18.9		18.9	
	109A												
110A		46.7		2	2	002	4.9	18		91.3		91.3	
	111A												
112B		16.2		21	21	004	4.9	18		28.1		28.1	
	113AB												
114B		23.8		42	42	004	4.9	18		43.6		43.6	
	115AB												
116A		27.9		21	21	004	4.9	21		44.2		44.2	
117B		8.8		42	42	004	4.9	22		14.1		14.1	
	118AB												
119A		7.0		21	21	004	4.9	6		21.2		21.2	
	120A												
121B		3.5		21	21	004	4.9	6		10.6		10.6	
	122B												
	123AB		**142.0**							**170.0**		**170.0**	
	124A												
125A		60.0		1	1	004	4.9	9	156.8	252.4	156.8	252.4	4500.0
	126A												
127B		14.5		42	42	004	4.9	9		37.0		37.0	
	128B												
129C		53.3		42	42	004	4.9	13		112.4		112.4	
	130C												
	131BC		**67.8**							**147.5**		**147.5**	
132B		68.7		1	1	002	4.9	9	200.0	321.9	200.0	321.9	5152.5
	133AB		**338.5**						**598.8**	**737.7**	**598.8**	**737.7**	
	134A												
135B		15.8		42	42	004	4.9	17		29.0		29.0	
	136B												
137C		1.3		21	21	004	4.9	5		4.4		4.4	
	138BC		**17.1**							**32.7**		**32.7**	
139B		59.1		2	2	004	4.9	12	132.8	213.8	132.8	213.8	4432.5
140B		16.5		38	40	002	4.9	9					
141C		61.2		1	1	002	4.9	12	154.4	248.6	154.4	248.6	4590.0
142C		23.3		1	1	002	4.9	5	91.6	147.4	91.6	147.4	1747.5
143C		48.3		5	5	002	4.9	12	121.8	196.1	121.8	196.1	3622.5
	144BC		**225.5**						**499.2**	**723.9**	**499.2**	**723.9**	
	145B												
146A		31.6		13	23	002	4.9	7					
	147AB		**595.6**						**1076.0**	**1464.0**	**1076.3**	**1464.4**	
148A		16.2		22	40	004	4.9	8					
	149A												
150B		13.9		26	40	004	4.9	7					
151B		21.6		2	2	005	4.9	10	53.9	84.5	53.9	84.5	1587.6
152A		12.5		18	40	004	4.9	7					
	153AB		**659.8**						**1102.7**	**1483.7**	**1165.7**	**1568.4**	
154B		7.7		2	2	004	4.9	7	22.8	36.7	51.9	47.9	566.0
155B		21.3		13	40	005	4.9	7					
156B		64.9		2	2	002	4.9	10	180.6	283.2	180.6	283.2	4770.2

9.A.1. Capital Storm Hydrologic Summary Table

SUB AREA	NODE	AREA (Ac)	Sub-total Area (Ac)	% IMPERVIOUSNESS (Existing Condition)	% IMPERVIOUSNESS (Proposed Condition)	SOIL TYPE	ISOHYET	50-YR TC (min)	QB (cfs) (Pre-development)	Capital (cfs) (Pre-development)	QB (cfs) (Post-development)	Capital (cfs) (Post-development)	DEBRIS (CY)
	157B												
158B		33.8		16	20	004	4.9	12					
	159B												
160B		33.8		36	36	004	4.9	11					
	161B												
162A		11.5		2	2	004	4.9	11	27.1	43.7	27.1	43.7	862.5
	163AB		932.8						1541.5	**2025.2**	1585.9	**2083.5**	
	164A												
165A		21.9		42	42	004	4.9	11					
	166A		854.6						1577.2	**2092.5**	1586.3	**2128.4**	

9.A.2. TC Calculations

- Pre-development
  - SUSMP
  - 2-year
  - 5-year
  - 10-year
  - 25-year
  - 50-year

Portuguese Bend: Tc Calculator (SUSMP- Pre-development)

Project	Subarea	Area (acres)	%imp	Frequency	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in.)	Tc-calculated (min.)	Intensity (in./hr)	Cu	Cd	Flowrate (cfs)
HPB	108A	8.1	0.21	SUSMP	2	1360	0.02	0.75	30	0.19	0.26	0.39	0.6
HPB	110A	46.7	0.02	SUSMP	2	2500	0.05	0.75	30	0.19	0.26	0.27	2.4
HPB	112B	16.2	0.21	SUSMP	4	1860	0.04	0.75	30	0.19	0.1	0.27	0.83
HPB	114B	23.8	0.42	SUSMP	4	2220	0.05	0.75	30	0.19	0.1	0.44	1.99
HPB	116A	27.9	0.21	SUSMP	4	1880	0.02	0.75	30	0.19	0.1	0.27	1.43
HPB	117B	8.8	0.42	SUSMP	4	2000	0.01	0.75	30	0.19	0.1	0.44	0.74
HPB	119A	7	0.21	SUSMP	4	540	0.11	0.75	30	0.19	0.1	0.27	0.36
HPB	121B	3.5	0.21	SUSMP	4	425	0.08	0.75	30	0.19	0.1	0.27	0.18
HPB	125A	60	0.01	SUSMP	4	1260	0.40	0.75	30	0.19	0.1	0.11	1.25
HPB	127B	14.5	0.42	SUSMP	4	780	0.04	0.75	30	0.19	0.1	0.44	1.21
HPB	129C	53.3	0.42	SUSMP	4	1570	0.07	0.75	30	0.19	0.1	0.44	4.46
HPB	132B	68.7	0.01	SUSMP	2	1580	0.33	0.75	30	0.19	0.26	0.27	3.52
HPB	135B	15.8	0.42	SUSMP	4	2120	0.05	0.75	30	0.19	0.1	0.44	1.32
HPB	137C	1.3	0.21	SUSMP	4	290	0.05	0.75	30	0.19	0.1	0.27	0.07
HPB	139B	59.1	0.02	SUSMP	4	1922	0.32	0.75	30	0.19	0.1	0.12	1.35
HPB	140B	16.5	0.38	SUSMP	2	1350	0.16	0.75	30	0.19	0.26	0.52	1.63
HPB	141C	61.2	0.01	SUSMP	2	2170	0.19	0.75	30	0.19	0.26	0.27	3.14
HPB	142C	23.3	0.01	SUSMP	2	630	0.27	0.75	30	0.19	0.26	0.27	1.2
HPB	143C	48.3	0.05	SUSMP	2	2020	0.18	0.75	30	0.19	0.26	0.29	2.66
HPB	146A	31.6	0.13	SUSMP	2	920	0.30	0.75	30	0.19	0.26	0.29	1.74
HPB	148A	16.2	0.22	SUSMP	4	590	0.04	0.75	30	0.19	0.1	0.28	0.86
HPB	150B	13.9	0.26	SUSMP	4	760	0.20	0.75	30	0.19	0.1	0.31	0.82
HPB	151B	21.6	0.02	SUSMP	4	1140	0.20	0.75	30	0.19	0.1	0.12	0.49
HPB	152A	12.5	0.18	SUSMP	4	750	0.14	0.75	30	0.19	0.1	0.24	0.57
HPB	154B	7.7	0.02	SUSMP	4	700	0.26	0.75	30	0.19	0.1	0.12	0.18
HPB	155B	21.3	0.13	SUSMP	4	750	0.13	0.75	30	0.19	0.1	0.2	0.81
HPB	156B	64.9	0.02	SUSMP	2	1680	0.26	0.75	30	0.19	0.26	0.27	3.33
HPB	158B	33.8	0.16	SUSMP	4	1000	0.03	0.75	30	0.19	0.1	0.23	1.48
HPB	160B	33.8	0.36	SUSMP	4	1185	0.09	0.75	30	0.19	0.1	0.39	2.5
HPB	162A	11.5	0.02	SUSMP	4	1220	0.15	0.75	30	0.19	0.1	0.12	0.26
HPB	165A	21.9	0.42	SUSMP	4	1170	0.06	0.75	30	0.19	0.1	0.44	1.83

Portuguese Bend: Tc Calculator (2-year Pre-development)

Project	Subarea	Area (acres)	%imp	Frequency	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in.)	Tc-calculated (min.)	Intensity (in./hr)	Cu	Cd	Flowrate (cfs)
HPB	108A	8.1	0.21	2	2	1360	0.02	1.9	30	0.49	0.56	0.63	2.5
HPB	110A	46.7	0.02	2	2	2500	0.05	1.9	30	0.49	0.56	0.57	13.04
HPB	112B	16.2	0.21	2	4	1860	0.04	1.9	30	0.49	0.2	0.35	2.78
HPB	114B	23.8	0.42	2	4	2220	0.05	1.9	30	0.49	0.2	0.49	5.71
HPB	116A	27.9	0.21	2	4	1880	0.02	1.9	30	0.49	0.2	0.35	4.78
HPB	117B	8.8	0.42	2	4	2000	0.01	1.9	30	0.49	0.2	0.49	2.11
HPB	119A	7	0.21	2	4	540	0.11	1.9	16	0.66	0.35	0.47	2.17
HPB	121B	3.5	0.21	2	4	425	0.08	1.9	15	0.68	0.36	0.47	1.12
HPB	125A	60	0.01	2	4	1260	0.40	1.9	30	0.49	0.2	0.21	6.17
HPB	127B	14.5	0.42	2	4	780	0.04	1.9	22	0.56	0.27	0.53	4.3
HPB	129C	53.3	0.42	2	4	1570	0.07	1.9	30	0.49	0.2	0.49	12.8
HPB	132B	68.7	0.01	2	2	1580	0.33	1.9	23	0.55	0.58	0.58	21.92
HPB	135B	15.8	0.42	2	4	2120	0.05	1.9	30	0.49	0.2	0.49	3.79
HPB	137C	1.3	0.21	2	4	290	0.05	1.9	12	0.75	0.41	0.51	0.5
HPB	139B	59.1	0.02	2	4	1922	0.32	1.9	30	0.49	0.2	0.21	6.08
HPB	140B	16.5	0.38	2	2	1350	0.16	1.9	20	0.59	0.59	0.71	6.91
HPB	141C	61.2	0.01	2	2	2170	0.19	1.9	30	0.49	0.56	0.56	16.79
HPB	142C	23.3	0.01	2	2	630	0.27	1.9	12	0.75	0.65	0.65	11.36
HPB	143C	48.3	0.05	2	2	2020	0.18	1.9	29	0.5	0.56	0.58	14.01
HPB	146A	31.6	0.13	2	2	920	0.30	1.9	16	0.66	0.61	0.62	12.93
HPB	148A	16.2	0.22	2	4	590	0.04	1.9	22	0.56	0.27	0.41	3.72
HPB	150B	13.9	0.26	2	4	760	0.20	1.9	18	0.62	0.31	0.46	3.96
HPB	151B	21.6	0.02	2	4	1140	0.20	1.9	30	0.49	0.2	0.21	2.22
HPB	152A	12.5	0.18	2	4	750	0.14	1.9	22	0.56	0.27	0.38	2.66
HPB	154B	7.7	0.02	2	4	700	0.26	1.9	25	0.53	0.25	0.26	1.06
HPB	155B	21.3	0.13	2	4	750	0.13	1.9	25	0.53	0.24	0.33	3.73
HPB	156B	64.9	0.02	2	2	1680	0.26	1.9	25	0.53	0.57	0.58	19.95
HPB	158B	33.8	0.16	2	4	1000	0.03	1.9	30	0.49	0.2	0.31	5.13
HPB	160B	33.8	0.36	2	4	1185	0.09	1.9	28	0.5	0.22	0.46	7.77
HPB	162A	11.5	0.02	2	4	1220	0.15	1.9	30	0.49	0.2	0.21	1.18
HPB	165A	21.9	0.42	2	4	1170	0.06	1.9	28	0.5	0.22	0.51	5.58

Portuguese Bend: Tc Calculator (5-year Pre-development)

Project	Subarea	Area (acres)	%imp	Frequency	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in.)	Tc-calculated (min.)	Intensity (in./hr)	Cu	Cd	Flowrate (cfs)
HPB	108A	8.1	0.21	5	2	1360	0.02	2.5	24	0.71	0.63	0.69	3.97
HPB	110A	46.7	0.02	5	2	2500	0.05	2.5	30	0.64	0.61	0.62	18.53
HPB	112B	16.2	0.21	5	4	1860	0.04	2.5	30	0.64	0.33	0.45	4.67
HPB	114B	23.8	0.42	5	4	2220	0.05	2.5	30	0.64	0.33	0.57	8.68
HPB	116A	27.9	0.21	5	4	1880	0.02	2.5	30	0.64	0.33	0.45	8.04
HPB	117B	8.8	0.42	5	4	2000	0.01	2.5	30	0.64	0.33	0.57	3.21
HPB	119A	7	0.21	5	4	540	0.11	2.5	12	0.99	0.49	0.58	4.02
HPB	121B	3.5	0.21	5	4	425	0.08	2.5	11	1.03	0.5	0.58	2.09
HPB	125A	60	0.01	5	4	1260	0.40	2.5	20	0.78	0.42	0.42	19.66
HPB	127B	14.5	0.42	5	4	780	0.04	2.5	16	0.86	0.45	0.64	7.98
HPB	129C	53.3	0.42	5	4	1570	0.07	2.5	24	0.71	0.38	0.6	22.71
HPB	132B	68.7	0.01	5	2	1580	0.33	2.5	17	0.84	0.68	0.68	39.24
HPB	135B	15.8	0.42	5	4	2120	0.05	2.5	30	0.64	0.33	0.57	5.76
HPB	137C	1.3	0.21	5	4	290	0.05	2.5	9	1.13	0.52	0.6	0.88
HPB	139B	59.1	0.02	5	4	1922	0.32	2.5	30	0.64	0.33	0.34	12.86
HPB	140B	16.5	0.38	5	2	1350	0.16	2.5	16	0.86	0.68	0.76	10.78
HPB	141C	61.2	0.01	5	2	2170	0.19	2.5	24	0.71	0.63	0.63	27.37
HPB	142C	23.3	0.01	5	2	630	0.27	2.5	9	1.13	0.75	0.75	19.75
HPB	143C	48.3	0.05	5	2	2020	0.18	2.5	23	0.73	0.64	0.65	22.92
HPB	146A	31.6	0.13	5	2	920	0.30	2.5	12	0.99	0.73	0.74	23.15
HPB	148A	16.2	0.22	5	4	590	0.04	2.5	15	0.89	0.46	0.56	8.07
HPB	150B	13.9	0.26	5	4	760	0.20	2.5	12	0.99	0.49	0.6	8.26
HPB	151B	21.6	0.02	5	4	1140	0.20	2.5	21	0.76	0.41	0.42	6.89
HPB	152A	12.5	0.18	5	4	750	0.14	2.5	14	0.92	0.47	0.55	6.33
HPB	154B	7.7	0.02	5	4	700	0.26	2.5	13	0.95	0.48	0.49	3.58
HPB	155B	21.3	0.13	5	4	750	0.13	2.5	15	0.89	0.46	0.52	9.86
HPB	156B	64.9	0.02	5	2	1680	0.26	2.5	19	0.8	0.66	0.66	34.27
HPB	158B	33.8	0.16	5	4	1000	0.03	2.5	26	0.69	0.37	0.45	10.49
HPB	160B	33.8	0.36	5	4	1185	0.09	2.5	19	0.8	0.42	0.59	15.95
HPB	162A	11.5	0.02	5	4	1220	0.15	2.5	23	0.73	0.4	0.41	3.44
HPB	165A	21.9	0.42	5	4	1170	0.06	2.5	20	0.78	0.42	0.62	10.59

Portuguese Bend: Tc Calculator (10-year Pre-development)

Project	Subarea	Area (acres)	%imp	Frequency	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in.)	Tc-calculated (min.)	Intensity (in./hr)	Cu	Cd	Flowrate (cfs)
HPB	108A	8.1	0.21	10	2	1360	0.02	3.5	18	1.14	0.75	0.78	7.2
HPB	110A	46.7	0.02	10	2	2500	0.05	3.5	24	1	0.73	0.73	34.09
HPB	112B	16.2	0.21	10	4	1860	0.04	3.5	24	1	0.49	0.58	9.4
HPB	114B	23.8	0.42	10	4	2220	0.05	3.5	24	1	0.49	0.66	15.71
HPB	116A	27.9	0.21	10	4	1880	0.02	3.5	29	0.91	0.46	0.55	13.96
HPB	117B	8.8	0.42	10	4	2000	0.01	3.5	30	0.9	0.46	0.64	5.07
HPB	119A	7	0.21	10	4	540	0.11	3.5	8	1.67	0.61	0.67	7.83
HPB	121B	3.5	0.21	10	4	425	0.08	3.5	8	1.67	0.61	0.67	3.92
HPB	125A	60	0.01	10	4	1260	0.40	3.5	13	1.33	0.55	0.55	43.89
HPB	127B	14.5	0.42	10	4	780	0.04	3.5	12	1.38	0.56	0.7	14.01
HPB	129C	53.3	0.42	10	4	1570	0.07	3.5	18	1.14	0.52	0.68	41.32
HPB	132B	68.7	0.01	10	2	1580	0.33	3.5	12	1.38	0.77	0.77	73
HPB	135B	15.8	0.42	10	4	2120	0.05	3.5	23	1.02	0.5	0.67	10.8
HPB	137C	1.3	0.21	10	4	290	0.05	3.5	6	1.92	0.65	0.7	1.75
HPB	139B	59.1	0.02	10	4	1922	0.32	3.5	18	1.14	0.52	0.53	35.71
HPB	140B	16.5	0.38	10	2	1350	0.16	3.5	12	1.38	0.77	0.82	18.67
HPB	141C	61.2	0.01	10	2	2170	0.19	3.5	17	1.17	0.75	0.75	53.7
HPB	142C	23.3	0.01	10	2	630	0.27	3.5	7	1.78	0.82	0.82	34.01
HPB	143C	48.3	0.05	10	2	2020	0.18	3.5	16	1.21	0.75	0.76	44.42
HPB	146A	31.6	0.13	10	2	920	0.30	3.5	9	1.58	0.79	0.8	39.94
HPB	148A	16.2	0.22	10	4	590	0.04	3.5	11	1.44	0.57	0.64	14.93
HPB	150B	13.9	0.26	10	4	760	0.20	3.5	9	1.58	0.58	0.66	14.49
HPB	151B	21.6	0.02	10	4	1140	0.20	3.5	14	1.29	0.54	0.55	15.33
HPB	152A	12.5	0.18	10	4	750	0.14	3.5	10	1.51	0.58	0.64	12.08
HPB	154B	7.7	0.02	10	4	700	0.26	3.5	9	1.58	0.59	0.6	7.3
HPB	155B	21.3	0.13	10	4	750	0.13	3.5	11	1.44	0.57	0.61	18.71
HPB	156B	64.9	0.02	10	2	1680	0.26	3.5	13	1.33	0.77	0.77	66.46
HPB	158B	33.8	0.16	10	4	1000	0.03	3.5	18	1.14	0.52	0.58	22.35
HPB	160B	33.8	0.36	10	4	1185	0.09	3.5	14	1.29	0.54	0.67	29.21
HPB	162A	11.5	0.02	10	4	1220	0.15	3.5	15	1.25	0.54	0.55	7.91
HPB	165A	21.9	0.42	10	4	1170	0.06	3.5	15	1.25	0.54	0.69	18.89

Portuguese Bend: Tc Calculator (25-year Pre-development)

Project	Subarea	Area (acres)	%imp	Frequency	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in.)	Tc-calculated (min.)	Intensity (in./hr)	Cu	Cd	Flowrate (cfs)
HPB	108A	8.1	0.21	25	2	1360	0.02	4.3	15	1.53	0.79	0.81	10.04
HPB	110A	46.7	0.02	25	2	2500	0.05	4.3	20	1.34	0.77	0.77	48.19
HPB	112B	16.2	0.21	25	4	1860	0.04	4.3	20	1.34	0.55	0.62	13.46
HPB	114B	23.8	0.42	25	4	2220	0.05	4.3	20	1.34	0.55	0.7	22.32
HPB	116A	27.9	0.21	25	4	1880	0.02	4.3	23	1.25	0.54	0.62	21.62
HPB	117B	8.8	0.42	25	4	2000	0.01	4.3	25	1.2	0.53	0.69	7.29
HPB	119A	7	0.21	25	4	540	0.11	4.3	7	2.19	0.68	0.73	11.19
HPB	121B	3.5	0.21	25	4	425	0.08	4.3	6	2.35	0.69	0.73	6
HPB	125A	60	0.01	25	4	1260	0.40	4.3	10	1.85	0.64	0.64	71.04
HPB	127B	14.5	0.42	25	4	780	0.04	4.3	10	1.85	0.64	0.75	20.12
HPB	129C	53.3	0.42	25	4	1570	0.07	4.3	15	1.53	0.59	0.72	58.72
HPB	132B	68.7	0.01	25	2	1580	0.33	4.3	10	1.85	0.82	0.82	104.22
HPB	135B	15.8	0.42	25	4	2120	0.05	4.3	19	1.37	0.56	0.7	15.15
HPB	137C	1.3	0.21	25	4	290	0.05	4.3	5	2.57	0.7	0.74	2.47
HPB	139B	59.1	0.02	25	4	1922	0.32	4.3	14	1.58	0.59	0.6	56.03
HPB	140B	16.5	0.38	25	2	1350	0.16	4.3	10	1.85	0.82	0.85	25.95
HPB	141C	61.2	0.01	25	2	2170	0.19	4.3	14	1.58	0.79	0.79	76.39
HPB	142C	23.3	0.01	25	2	630	0.27	4.3	6	2.35	0.85	0.85	46.54
HPB	143C	48.3	0.05	25	2	2020	0.18	4.3	13	1.64	0.8	0.81	64.16
HPB	146A	31.6	0.13	25	2	920	0.30	4.3	7	2.19	0.85	0.85	58.82
HPB	148A	16.2	0.22	25	4	590	0.04	4.3	9	1.95	0.66	0.71	22.43
HPB	150B	13.9	0.26	25	4	760	0.20	4.3	8	2.06	0.67	0.73	20.9
HPB	151B	21.6	0.02	25	4	1140	0.20	4.3	11	1.77	0.63	0.64	24.47
HPB	152A	12.5	0.18	25	4	750	0.14	4.3	8	2.06	0.67	0.71	18.28
HPB	154B	7.7	0.02	25	4	700	0.26	4.3	7	2.19	0.68	0.68	11.47
HPB	155B	21.3	0.13	25	4	750	0.13	4.3	9	1.95	0.66	0.69	28.66
HPB	156B	64.9	0.02	25	2	1680	0.26	4.3	11	1.77	0.81	0.81	93.05
HPB	158B	33.8	0.16	25	4	1000	0.03	4.3	14	1.58	0.59	0.64	34.18
HPB	160B	33.8	0.36	25	4	1185	0.09	4.3	12	1.7	0.61	0.71	40.8
HPB	162A	11.5	0.02	25	4	1220	0.15	4.3	12	1.7	0.61	0.62	12.12
HPB	165A	21.9	0.42	25	4	1170	0.06	4.3	12	1.7	0.61	0.73	27.18

Portuguese Bend: Tc Calculator (50-year Pre-development)

Project	Subarea	Area (acres)	%imp	Frequency	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in.)	Tc-calculated (min.)	Intensity (in./hr)	Cu	Cd	Flowrate (cfs)
HPB	108A	8.1	0.21	50	2	1360	0.02	4.9	13	1.87	0.83	0.84	12.72
HPB	110A	46.7	0.02	50	2	2500	0.05	4.9	18	1.6	0.8	0.8	59.78
HPB	112B	16.2	0.21	50	4	1860	0.04	4.9	18	1.6	0.6	0.66	17.11
HPB	114B	23.8	0.42	50	4	2220	0.05	4.9	18	1.6	0.6	0.73	27.8
HPB	116A	27.9	0.21	50	4	1880	0.02	4.9	21	1.49	0.58	0.65	27.02
HPB	117B	8.8	0.42	50	4	2000	0.01	4.9	22	1.46	0.57	0.71	9.12
HPB	119A	7	0.21	50	4	540	0.11	4.9	6	2.68	0.71	0.75	14.07
HPB	121B	3.5	0.21	50	4	425	0.08	4.9	6	2.68	0.71	0.75	7.04
HPB	125A	60	0.01	50	4	1260	0.40	4.9	9	2.22	0.68	0.68	90.58
HPB	127B	14.5	0.42	50	4	780	0.04	4.9	9	2.22	0.68	0.77	24.79
HPB	129C	53.3	0.42	50	4	1570	0.07	4.9	13	1.87	0.64	0.75	74.75
HPB	132B	68.7	0.01	50	2	1580	0.33	4.9	9	2.22	0.85	0.85	129.64
HPB	135B	15.8	0.42	50	4	2120	0.05	4.9	17	1.64	0.6	0.73	18.92
HPB	137C	1.3	0.21	50	4	290	0.05	4.9	5	2.92	0.73	0.77	2.92
HPB	139B	59.1	0.02	50	4	1922	0.32	4.9	12	1.94	0.66	0.66	75.67
HPB	140B	16.5	0.38	50	2	1350	0.16	4.9	9	2.22	0.85	0.87	31.87
HPB	141C	61.2	0.01	50	2	2170	0.19	4.9	12	1.94	0.83	0.83	98.54
HPB	142C	23.3	0.01	50	2	630	0.27	4.9	5	2.92	0.88	0.88	59.87
HPB	143C	48.3	0.05	50	2	2020	0.18	4.9	12	1.94	0.83	0.83	77.77
HPB	146A	31.6	0.13	50	2	920	0.30	4.9	7	2.5	0.86	0.86	67.94
HPB	148A	16.2	0.22	50	4	590	0.04	4.9	8	2.34	0.69	0.74	28.05
HPB	150B	13.9	0.26	50	4	760	0.20	4.9	7	2.5	0.7	0.75	26.06
HPB	151B	21.6	0.02	50	4	1140	0.20	4.9	10	2.11	0.67	0.67	30.54
HPB	152A	12.5	0.18	50	4	750	0.14	4.9	7	2.5	0.7	0.78	24.38
HPB	154B	7.7	0.02	50	4	700	0.26	4.9	7	2.5	0.7	0.7	13.48
HPB	155B	21.3	0.13	50	4	750	0.13	4.9	8	2.34	0.69	0.72	35.89
HPB	156B	64.9	0.02	50	2	1680	0.26	4.9	10	2.11	0.84	0.84	115.03
HPB	158B	33.8	0.16	50	4	1000	0.03	4.9	12	1.94	0.66	0.7	45.9
HPB	160B	33.8	0.36	50	4	1185	0.09	4.9	11	2.02	0.67	0.75	51.21
HPB	162A	11.5	0.02	50	4	1220	0.15	4.9	11	2.02	0.67	0.67	15.56
HPB	165A	21.9	0.42	50	4	1170	0.06	4.9	11	2.02	0.67	0.77	34.06

9.A.2. TC Calculations

- Post-development
    - SUSMP
    - 2-year
    - 5-year
    - 10-year
    - 25-year
    - 50-year

Portuguese Bend: Tc Calculator (SUSMP-year Post-development)

Project	Subarea	Area (acres)	%imp	Frequency	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in.)	Tc-calculated (min.)	Intensity (in./hr)	Cu	Cd	Flowrate (cfs)
HPB	108A	8.1	0.21	SUSMP	2	1360	0.02	0.75	30	0.19	0.26	0.39	0.6
HPB	110A	46.7	0.02	SUSMP	2	2500	0.05	0.75	30	0.19	0.26	0.27	2.4
HPB	112B	16.2	0.21	SUSMP	4	1860	0.04	0.75	30	0.19	0.1	0.27	0.83
HPB	114B	23.8	0.42	SUSMP	4	2220	0.05	0.75	30	0.19	0.1	0.44	1.99
HPB	116A	27.9	0.21	SUSMP	4	1880	0.02	0.75	30	0.19	0.1	0.27	1.43
HPB	117B	8.8	0.42	SUSMP	4	2000	0.01	0.75	30	0.19	0.1	0.44	0.74
HPB	119A	7	0.21	SUSMP	4	540	0.11	0.75	30	0.19	0.1	0.27	0.36
HPB	121B	3.5	0.21	SUSMP	4	425	0.08	0.75	30	0.19	0.1	0.27	0.18
HPB	125A	60	0.01	SUSMP	4	1260	0.40	0.75	30	0.19	0.1	0.11	1.25
HPB	127B	14.5	0.42	SUSMP	4	780	0.04	0.75	30	0.19	0.1	0.44	1.21
HPB	129C	53.3	0.42	SUSMP	4	1570	0.07	0.75	30	0.19	0.1	0.44	4.46
HPB	132B	68.7	0.01	SUSMP	2	1580	0.33	0.75	30	0.19	0.26	0.27	3.52
HPB	135B	15.8	0.42	SUSMP	4	2120	0.05	0.75	30	0.19	0.1	0.44	1.32
HPB	137C	1.3	0.21	SUSMP	4	290	0.05	0.75	30	0.19	0.1	0.27	0.07
HPB	139B	59.1	0.02	SUSMP	4	1922	0.32	0.75	30	0.19	0.1	0.12	1.35
HPB	140B	16.5	0.4	SUSMP	2	1350	0.16	0.75	30	0.19	0.26	0.52	1.63
HPB	141C	61.2	0.01	SUSMP	2	2170	0.19	0.75	30	0.19	0.26	0.27	3.14
HPB	142C	23.3	0.01	SUSMP	2	630	0.27	0.75	30	0.19	0.26	0.27	1.2
HPB	143C	48.3	0.05	SUSMP	2	2020	0.18	0.75	30	0.19	0.26	0.29	2.66
HPB	146A	31.6	0.23	SUSMP	2	920	0.30	0.75	30	0.19	0.26	0.29	1.74
HPB	148A	16.2	0.4	SUSMP	4	590	0.04	0.75	30	0.19	0.1	0.28	0.86
HPB	150B	13.9	0.4	SUSMP	4	760	0.20	0.75	30	0.19	0.1	0.43	1.14
HPB	151B	21.6	0.02	SUSMP	4	1140	0.20	0.75	30	0.19	0.1	0.12	0.49
HPB	152A	12.5	0.4	SUSMP	4	750	0.14	0.75	30	0.19	0.1	0.43	1.02
HPB	154B	7.7	0.02	SUSMP	4	700	0.26	0.75	30	0.19	0.1	0.12	0.18
HPB	155B	21.3	0.4	SUSMP	4	750	0.13	0.75	30	0.19	0.1	0.43	1.74
HPB	156B	64.9	0.02	SUSMP	2	1680	0.26	0.75	30	0.19	0.26	0.27	3.33
HPB	158B	33.8	0.2	SUSMP	4	1000	0.03	0.75	30	0.19	0.1	0.23	1.48
HPB	160B	33.8	0.36	SUSMP	4	1185	0.09	0.75	30	0.19	0.1	0.39	2.5
HPB	162A	11.5	0.02	SUSMP	4	1220	0.15	0.75	30	0.19	0.1	0.12	0.26
HPB	165A	21.9	0.42	SUSMP	4	1170	0.06	0.75	30	0.19	0.1	0.44	1.83

Portuguese Bend: Tc Calculator (02-year Post-development)

Project	Subarea	Area (acres)	%imp	Frequency	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in.)	Tc-calculated (min.)	Intensity (in./hr)	Cu	Cd	Flowrate (cfs)
HPB	108A	8.1	0.21	2	2	1360	0.02	1.9	30	0.49	0.56	0.63	2.5
HPB	110A	46.7	0.02	2	2	2500	0.05	1.9	30	0.49	0.56	0.57	13.04
HPB	112B	16.2	0.21	2	4	1860	0.04	1.9	30	0.49	0.2	0.35	2.78
HPB	114B	23.8	0.42	2	4	2220	0.05	1.9	30	0.49	0.2	0.49	5.71
HPB	116A	27.9	0.21	2	4	1880	0.02	1.9	30	0.49	0.2	0.35	4.78
HPB	117B	8.8	0.42	2	4	2000	0.01	1.9	30	0.49	0.2	0.49	2.11
HPB	119A	7	0.21	2	4	540	0.11	1.9	16	0.66	0.35	0.47	2.17
HPB	121B	3.5	0.21	2	4	425	0.08	1.9	15	0.68	0.36	0.47	1.12
HPB	125A	60	0.01	2	4	1260	0.40	1.9	30	0.49	0.2	0.21	6.17
HPB	127B	14.5	0.42	2	4	780	0.04	1.9	22	0.56	0.27	0.53	4.3
HPB	129C	53.3	0.42	2	4	1570	0.07	1.9	30	0.49	0.2	0.49	12.8
HPB	132B	68.7	0.01	2	2	1580	0.33	1.9	23	0.55	0.58	0.58	21.92
HPB	135B	15.8	0.42	2	4	2120	0.05	1.9	30	0.49	0.2	0.49	3.79
HPB	137C	1.3	0.21	2	4	290	0.05	1.9	12	0.75	0.41	0.51	0.5
HPB	139B	59.1	0.02	2	4	1922	0.32	1.9	30	0.49	0.2	0.21	6.08
HPB	140B	16.5	0.4	2	2	1350	0.16	1.9	20	0.59	0.59	0.72	7.01
HPB	141C	61.2	0.01	2	2	2170	0.19	1.9	30	0.49	0.56	0.56	16.79
HPB	142C	23.3	0.01	2	2	630	0.27	1.9	12	0.75	0.65	0.65	11.36
HPB	143C	48.3	0.05	2	2	2020	0.18	1.9	29	0.5	0.56	0.58	14.01
HPB	146A	31.6	0.23	2	2	920	0.30	1.9	16	0.66	0.61	0.62	12.93
HPB	148A	16.2	0.4	2	4	590	0.04	1.9	22	0.56	0.27	0.41	3.72
HPB	150B	13.9	0.4	2	4	760	0.20	1.9	15	0.68	0.36	0.58	5.48
HPB	151B	21.6	0.02	2	4	1140	0.20	1.9	30	0.49	0.2	0.21	2.22
HPB	152A	12.5	0.4	2	4	750	0.14	1.9	17	0.64	0.33	0.56	4.48
HPB	154B	7.7	0.02	2	4	700	0.26	1.9	25	0.53	0.25	0.26	1.06
HPB	155B	21.3	0.4	2	4	750	0.13	1.9	17	0.64	0.33	0.56	7.63
HPB	156B	64.9	0.02	2	2	1680	0.26	1.9	25	0.53	0.57	0.58	19.95
HPB	158B	33.8	0.2	2	4	1000	0.03	1.9	30	0.49	0.2	0.31	5.13
HPB	160B	33.8	0.36	2	4	1185	0.09	1.9	28	0.5	0.22	0.46	7.77
HPB	162A	11.5	0.02	2	4	1220	0.15	1.9	30	0.49	0.2	0.21	1.18
HPB	165A	21.9	0.42	2	4	1170	0.06	1.9	28	0.5	0.22	0.51	5.58

Portuguese Bend: Tc Calculator (05-year Post-development)

Project	Subarea	Area (acres)	%imp	Frequency	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in.)	Tc-calculated (min.)	Intensity (in./hr)	Cu	Cd	Flowrate (cfs)
HPB	108A	8.1	0.21	5	2	1360	0.02	2.5	24	0.71	0.63	0.69	3.97
HPB	110A	46.7	0.02	5	2	2500	0.05	2.5	30	0.64	0.61	0.62	18.53
HPB	112B	16.2	0.21	5	4	1860	0.04	2.5	30	0.64	0.33	0.45	4.67
HPB	114B	23.8	0.42	5	4	2220	0.05	2.5	30	0.64	0.33	0.57	8.68
HPB	116A	27.9	0.21	5	4	1880	0.02	2.5	30	0.64	0.33	0.45	8.04
HPB	117B	8.8	0.42	5	4	2000	0.01	2.5	30	0.64	0.33	0.57	3.21
HPB	119A	7	0.21	5	4	540	0.11	2.5	12	0.99	0.49	0.58	4.02
HPB	121B	3.5	0.21	5	4	425	0.08	2.5	11	1.03	0.5	0.58	2.09
HPB	125A	60	0.01	5	4	1260	0.40	2.5	20	0.78	0.42	0.42	19.66
HPB	127B	14.5	0.42	5	4	780	0.04	2.5	16	0.86	0.45	0.64	7.98
HPB	129C	53.3	0.42	5	4	1570	0.07	2.5	24	0.71	0.38	0.6	22.71
HPB	132B	68.7	0.01	5	2	1580	0.33	2.5	17	0.84	0.68	0.68	39.24
HPB	135B	15.8	0.42	5	4	2120	0.05	2.5	30	0.64	0.33	0.57	5.76
HPB	137C	1.3	0.21	5	4	290	0.05	2.5	9	1.13	0.52	0.6	0.88
HPB	139B	59.1	0.02	5	4	1922	0.32	2.5	30	0.64	0.33	0.34	12.86
HPB	140B	16.5	0.4	5	2	1350	0.16	2.5	16	0.86	0.68	0.77	10.93
HPB	141C	61.2	0.01	5	2	2170	0.19	2.5	24	0.71	0.63	0.63	27.37
HPB	142C	23.3	0.01	5	2	630	0.27	2.5	9	1.13	0.75	0.75	19.75
HPB	143C	48.3	0.05	5	2	2020	0.18	2.5	23	0.73	0.64	0.65	22.92
HPB	146A	31.6	0.23	5	2	920	0.30	2.5	12	0.99	0.73	0.74	23.15
HPB	148A	16.2	0.4	5	4	590	0.04	2.5	15	0.89	0.46	0.56	8.07
HPB	150B	13.9	0.4	5	4	760	0.20	2.5	12	0.99	0.49	0.66	9.08
HPB	151B	21.6	0.02	5	4	1140	0.20	2.5	21	0.76	0.41	0.42	6.89
HPB	152A	12.5	0.4	5	4	750	0.14	2.5	12	0.99	0.49	0.66	8.17
HPB	154B	7.7	0.02	5	4	700	0.26	2.5	13	0.95	0.48	0.49	3.58
HPB	155B	21.3	0.4	5	4	750	0.13	2.5	13	0.95	0.48	0.65	13.15
HPB	156B	64.9	0.02	5	2	1680	0.26	2.5	19	0.8	0.66	0.66	34.27
HPB	158B	33.8	0.2	5	4	1000	0.03	2.5	26	0.69	0.37	0.45	10.49
HPB	160B	33.8	0.36	5	4	1185	0.09	2.5	19	0.8	0.42	0.59	15.95
HPB	162A	11.5	0.02	5	4	1220	0.15	2.5	23	0.73	0.4	0.41	3.44
HPB	165A	21.9	0.42	5	4	1170	0.06	2.5	20	0.78	0.42	0.62	10.59

Portuguese Bend: Tc Calculator (10-year Post-development)

Project	Subarea	Area (acres)	%imp	Frequency	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in.)	Tc-calculated (min.)	Intensity (in./hr)	Cu	Cd	Flowrate (cfs)
HPB	108A	8.1	0.21	10	2	1360	0.02	3.5	18	1.14	0.75	0.78	7.2
HPB	110A	46.7	0.02	10	2	2500	0.05	3.5	24	1	0.73	0.73	34.09
HPB	112B	16.2	0.21	10	4	1860	0.04	3.5	24	1	0.49	0.58	9.4
HPB	114B	23.8	0.42	10	4	2220	0.05	3.5	24	1	0.49	0.66	15.71
HPB	116A	27.9	0.21	10	4	1880	0.02	3.5	29	0.91	0.46	0.55	13.96
HPB	117B	8.8	0.42	10	4	2000	0.01	3.5	30	0.9	0.46	0.64	5.07
HPB	119A	7	0.21	10	4	540	0.11	3.5	8	1.67	0.61	0.67	7.83
HPB	121B	3.5	0.21	10	4	425	0.08	3.5	8	1.67	0.61	0.67	3.92
HPB	125A	60	0.01	10	4	1260	0.40	3.5	13	1.33	0.55	0.55	43.89
HPB	127B	14.5	0.42	10	4	780	0.04	3.5	12	1.38	0.56	0.7	14.01
HPB	129C	53.3	0.42	10	4	1570	0.07	3.5	18	1.14	0.52	0.68	41.32
HPB	132B	68.7	0.01	10	2	1580	0.33	3.5	12	1.38	0.77	0.77	73
HPB	135B	15.8	0.42	10	4	2120	0.05	3.5	23	1.02	0.5	0.67	10.8
HPB	137C	1.3	0.21	10	4	290	0.05	3.5	6	1.92	0.65	0.7	1.75
HPB	139B	59.1	0.02	10	4	1922	0.32	3.5	18	1.14	0.52	0.53	35.71
HPB	140B	16.5	0.4	10	2	1350	0.16	3.5	12	1.38	0.77	0.82	18.67
HPB	141C	61.2	0.01	10	2	2170	0.19	3.5	17	1.17	0.75	0.75	53.7
HPB	142C	23.3	0.01	10	2	630	0.27	3.5	7	1.78	0.82	0.82	34.01
HPB	143C	48.3	0.05	10	2	2020	0.18	3.5	16	1.21	0.75	0.76	44.42
HPB	146A	31.6	0.23	10	2	920	0.30	3.5	9	1.58	0.79	0.8	39.94
HPB	148A	16.2	0.4	10	4	590	0.04	3.5	11	1.44	0.57	0.64	14.93
HPB	150B	13.9	0.4	10	4	760	0.20	3.5	9	1.58	0.59	0.72	15.81
HPB	151B	21.6	0.02	10	4	1140	0.20	3.5	14	1.29	0.54	0.55	15.33
HPB	152A	12.5	0.4	10	4	750	0.14	3.5	10	1.51	0.58	0.71	13.4
HPB	154B	7.7	0.02	10	4	700	0.26	3.5	9	1.58	0.59	0.6	7.3
HPB	155B	21.3	0.4	10	4	750	0.13	3.5	10	1.51	0.58	0.71	22.84
HPB	156B	64.9	0.02	10	2	1680	0.26	3.5	13	1.33	0.77	0.77	66.46
HPB	158B	33.8	0.2	10	4	1000	0.03	3.5	18	1.14	0.52	0.58	22.35
HPB	160B	33.8	0.36	10	4	1185	0.09	3.5	14	1.29	0.54	0.67	29.21
HPB	162A	11.5	0.02	10	4	1220	0.15	3.5	15	1.25	0.54	0.55	7.91
HPB	165A	21.9	0.42	10	4	1170	0.06	3.5	15	1.25	0.54	0.69	18.89

Portuguese Bend: Tc Calculator (25-year Post-development)

Project	Subarea	Area (acres)	%imp	Frequency	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in.)	Tc-calculated (min.)	Intensity (in./hr)	Cu	Cd	Flowrate (cfs)
HPB	108A	8.1	0.21	25	2	1360	0.02	4.3	15	1.53	0.79	0.81	10.04
HPB	110A	46.7	0.02	25	2	2500	0.05	4.3	20	1.34	0.77	0.77	48.19
HPB	112B	16.2	0.21	25	4	1860	0.04	4.3	20	1.34	0.55	0.62	13.46
HPB	114B	23.8	0.42	25	4	2220	0.05	4.3	20	1.34	0.55	0.7	22.32
HPB	116A	27.9	0.21	25	4	1880	0.02	4.3	23	1.25	0.54	0.62	21.62
HPB	117B	8.8	0.42	25	4	2000	0.01	4.3	25	1.2	0.53	0.69	7.29
HPB	119A	7	0.21	25	4	540	0.11	4.3	7	2.19	0.68	0.73	11.19
HPB	121B	3.5	0.21	25	4	425	0.08	4.3	6	2.35	0.69	0.73	6
HPB	125A	60	0.01	25	4	1260	0.40	4.3	10	1.85	0.64	0.64	71.04
HPB	127B	14.5	0.42	25	4	780	0.04	4.3	10	1.85	0.64	0.75	20.12
HPB	129C	53.3	0.42	25	4	1570	0.07	4.3	15	1.53	0.59	0.72	58.72
HPB	132B	68.7	0.01	25	2	1580	0.33	4.3	10	1.85	0.82	0.82	104.22
HPB	135B	15.8	0.42	25	4	2120	0.05	4.3	19	1.37	0.56	0.7	15.15
HPB	137C	1.3	0.21	25	4	290	0.05	4.3	5	2.57	0.7	0.74	2.47
HPB	139B	59.1	0.02	25	4	1922	0.32	4.3	14	1.58	0.59	0.6	56.03
HPB	140B	16.5	0.4	25	2	1350	0.16	4.3	10	1.85	0.82	0.85	25.95
HPB	141C	61.2	0.01	25	2	2170	0.19	4.3	14	1.58	0.79	0.79	76.39
HPB	142C	23.3	0.01	25	2	630	0.27	4.3	6	2.35	0.85	0.85	46.54
HPB	143C	48.3	0.05	25	2	2020	0.18	4.3	13	1.64	0.8	0.81	64.16
HPB	146A	31.6	0.23	25	2	920	0.30	4.3	7	2.19	0.85	0.85	58.82
HPB	148A	16.2	0.4	25	4	590	0.04	4.3	9	1.95	0.66	0.71	22.43
HPB	150B	13.9	0.4	25	4	760	0.20	4.3	7	2.19	0.68	0.77	23.44
HPB	151B	21.6	0.02	25	4	1140	0.20	4.3	11	1.77	0.63	0.64	24.47
HPB	152A	12.5	0.4	25	4	750	0.14	4.3	8	2.06	0.67	0.76	19.57
HPB	154B	7.7	0.02	25	4	700	0.26	4.3	7	2.19	0.68	0.68	11.47
HPB	155B	21.3	0.4	25	4	750	0.13	4.3	8	2.06	0.67	0.76	33.35
HPB	156B	64.9	0.02	25	2	1680	0.26	4.3	11	1.77	0.81	0.81	93.05
HPB	158B	33.8	0.2	25	4	1000	0.03	4.3	14	1.58	0.59	0.64	34.18
HPB	160B	33.8	0.36	25	4	1185	0.09	4.3	12	1.7	0.61	0.71	40.8
HPB	162A	11.5	0.02	25	4	1220	0.15	4.3	12	1.7	0.61	0.62	12.12
HPB	165A	21.9	0.42	25	4	1170	0.06	4.3	12	1.7	0.61	0.73	27.18

Portuguese Bend: Tc Calculator (50-year Post-development)

Project	Subarea	Area (acres)	%imp	Frequency	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in.)	Tc-calculated (min.)	Intensity (in./hr)	Cu	Cd	Flowrate (cfs)
HPB	108A	8.1	0.21	50	2	1360	0.02	4.9	13	1.87	0.83	0.84	12.72
HPB	110A	46.7	0.02	50	2	2500	0.05	4.9	18	1.6	0.8	0.8	59.78
HPB	112B	16.2	0.21	50	4	1860	0.04	4.9	18	1.6	0.6	0.66	17.11
HPB	114B	23.8	0.42	50	4	2220	0.05	4.9	18	1.6	0.6	0.73	27.8
HPB	116A	27.9	0.21	50	4	1880	0.02	4.9	21	1.49	0.58	0.65	27.02
HPB	117B	8.8	0.42	50	4	2000	0.01	4.9	22	1.46	0.57	0.71	9.12
HPB	119A	7	0.21	50	4	540	0.11	4.9	6	2.68	0.71	0.75	14.07
HPB	121B	3.5	0.21	50	4	425	0.08	4.9	6	2.68	0.71	0.75	7.04
HPB	125A	60	0.01	50	4	1260	0.40	4.9	9	2.22	0.68	0.68	90.58
HPB	127B	14.5	0.42	50	4	780	0.04	4.9	9	2.22	0.68	0.77	24.79
HPB	129C	53.3	0.42	50	4	1570	0.07	4.9	13	1.87	0.64	0.75	74.75
HPB	132B	68.7	0.01	50	2	1580	0.33	4.9	9	2.22	0.85	0.85	129.64
HPB	135B	15.8	0.42	50	4	2120	0.05	4.9	17	1.64	0.6	0.73	18.92
HPB	137C	1.3	0.21	50	4	290	0.05	4.9	5	2.92	0.73	0.77	2.92
HPB	139B	59.1	0.02	50	4	1922	0.32	4.9	12	1.94	0.66	0.66	75.67
HPB	140B	16.5	0.4	50	2	1350	0.16	4.9	9	2.22	0.85	0.87	31.87
HPB	141C	61.2	0.01	50	2	2170	0.19	4.9	12	1.94	0.83	0.83	98.54
HPB	142C	23.3	0.01	50	2	630	0.27	4.9	5	2.92	0.88	0.88	59.87
HPB	143C	48.3	0.05	50	2	2020	0.18	4.9	12	1.94	0.83	0.83	77.77
HPB	146A	31.6	0.23	50	2	920	0.30	4.9	7	2.5	0.86	0.86	67.94
HPB	148A	16.2	0.4	50	4	590	0.04	4.9	8	2.34	0.69	0.74	28.05
HPB	150B	13.9	0.4	50	4	760	0.20	4.9	7	2.5	0.7	0.78	27.11
HPB	151B	21.6	0.02	50	4	1140	0.20	4.9	10	2.11	0.67	0.67	30.54
HPB	152A	12.5	0.4	50	4	750	0.14	4.9	7	2.5	0.7	0.78	24.38
HPB	154B	7.7	0.02	50	4	700	0.26	4.9	7	2.5	0.7	0.7	13.48
HPB	155B	21.3	0.4	50	4	750	0.13	4.9	7	2.5	0.7	0.78	41.54
HPB	156B	64.9	0.02	50	2	1680	0.26	4.9	10	2.11	0.84	0.84	115.03
HPB	158B	33.8	0.2	50	4	1000	0.03	4.9	12	1.94	0.66	0.7	45.9
HPB	160B	33.8	0.36	50	4	1185	0.09	4.9	11	2.02	0.67	0.75	51.21
HPB	162A	11.5	0.02	50	4	1220	0.15	4.9	11	2.02	0.67	0.67	15.56
HPB	165A	21.9	0.42	50	4	1170	0.06	4.9	11	2.02	0.67	0.77	34.06

9.A.2. SUSMP Calculations

– Pre-development
– Post-development

PROJECT NAME / TRACT NUMBER **Zone 2 Landslide**
Prepared By: ***Wai Lan***
Date: ***3/30/2011***

Standard Urban Stormwater Mitigation Peak Flowrate and Volume Calculations (Pre-development-Project Site)

Subarea No.	A_{Total} (ac)	Site Proportion Imp *	A_I (ac)	A_P (ac)	A_u (ac)	Overall Trib, Area Prportion Imp	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in.)	Tc-calculated (min.)	Ix - Intensity (in./hr)	Cu	Cd	Cd * Ix*1.008333	Qpm (cfs)	V_M (ft3)	V_M (Ac-ft)
140B	16.5	0.38	5.9	9.6	1.0	0.357	2	1350	0.16	0.75	30	0.193	1.100	1.029	0.200	3.30	46,206	1.06
146A	31.6	0.13	4.1	27.5	0.0	0.130	2	920	0.30	0.75	30	0.193	0.100	0.204	0.040	1.25	17,550	0.40
148A	16.2	0.22	3.6	12.6	0.0	0.220	4	590	0.04	0.75	30	0.193	0.100	0.276	0.054	0.87	12,173	0.28
150B	13.9	0.26	3.6	10.3	0.0	0.260	4	760	0.20	0.75	30	0.193	0.100	0.308	0.060	0.83	11,656	0.27
152A	12.5	0.18	2.3	10.3	0.0	0.180	4	750	0.14	0.75	30	0.193	0.100	0.244	0.047	0.59	8,304	0.19
155B	21.3	0.13	2.8	18.5	0.0	0.130	4	750	0.13	0.75	30	0.193	0.100	0.204	0.040	0.85	11,830	0.27
158B	33.8	0.16	5.4	28.4	0.0	0.160	4	1000	0.03	0.75	30	0.193	0.100	0.228	0.044	1.50	20,981	0.48

∑A (ac)	145.8
∑Qpm (cfs)	9.2
∑VM (ft3)	128,699
∑VM (ac-ft)	3.0

Cu	Based upon Ix
Ix	Based upon TC
A_u	Undeveloped Upstraem Area that Flows directly into the BMP - Usually zero if included with subarea
TC	Ranges from 5 min to 30 min

PROJECT NAME / TRACT NUMBER **Zone 2 Landslide**
Prepared By: ***Wai Lan***
Date: ***3/30/2011***

Standard Urban Stormwater Mitigation Peak Flowrate and Volume Calculations (Pre-development)

Subarea No.	A_{Total} (ac)	Site Proportion Imp *	A_I (ac)	A_P (ac)	A_u (ac)	Overall Trib, Area Prportion Imp	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in.)	Tc-calculated (min.)	Ix - Intensity (in./hr)	Cu	Cd	Cd * Ix*1.008333	Qpm (cfs)	V_M (ft3)	V_M (Ac-ft)
108A	8.1	0.21	1.7	6.4	0.0	0.210	2	1360	0.02	0.75	30	0.193	0.100	0.268	0.052	0.42	5,910	0.14
110A	46.7	0.02	0.9	45.8	0.0	0.020	2	2500	0.05	0.75	30	0.193	0.100	0.116	0.023	1.05	14,748	0.34
112B	16.2	0.21	3.4	12.8	0.0	0.210	4	1860	0.04	0.75	30	0.193	0.100	0.268	0.052	0.84	11,820	0.27
114B	23.8	0.42	10.0	13.8	0.0	0.420	4	2220	0.05	0.75	30	0.193	0.100	0.436	0.085	2.02	28,251	0.65
116A	27.9	0.21	5.9	22.0	0.0	0.210	4	1880	0.02	0.75	30	0.193	0.100	0.268	0.052	1.46	20,357	0.47
117B	8.8	0.42	3.7	5.1	0.0	0.420	4	2000	0.01	0.75	30	0.193	0.100	0.436	0.085	0.75	10,446	0.24
119A	7	0.21	1.5	5.5	0.0	0.210	4	540	0.11	0.75	30	0.193	0.100	0.268	0.052	0.37	5,107	0.12
121B	3.5	0.21	0.7	2.8	0.0	0.210	4	425	0.08	0.75	30	0.193	0.100	0.268	0.052	0.18	2,554	0.06
125A	60	0.01	0.6	59.4	0.0	0.010	4	1260	0.40	0.75	30	0.193	0.100	0.108	0.021	1.26	17,642	0.41
127B	14.5	0.42	6.1	8.4	0.0	0.420	4	780	0.04	0.75	30	0.193	0.100	0.436	0.085	1.23	17,212	0.40
129C	53.3	0.42	22.4	30.9	0.0	0.420	4	1570	0.07	0.75	30	0.193	0.100	0.436	0.085	4.52	63,268	1.45
132B	68.7	0.01	0.7	68.0	0.0	0.010	2	1580	0.33	0.75	30	0.193	0.100	0.108	0.021	1.44	20,200	0.46
135B	15.8	0.42	6.6	9.2	0.0	0.420	4	2120	0.05	0.75	30	0.193	0.100	0.436	0.085	1.34	18,755	0.43
137C	1.3	0.21	0.3	1.0	0.0	0.210	4	290	0.05	0.75	30	0.193	0.100	0.268	0.052	0.07	949	0.02
139B	59.1	0.02	1.2	57.9	0.0	0.020	4	1922	0.32	0.75	30	0.193	0.100	0.116	0.023	1.33	18,664	0.43
140B	16.5	0.38	5.9	9.6	1.0	0.357	2	1350	0.16	0.75	30	0.193	1.100	1.029	0.200	3.30	46,206	1.06
141C	61.2	0.01	0.6	60.6	0.0	0.010	2	2170	0.19	0.75	30	0.193	0.100	0.108	0.021	1.29	17,995	0.41
142C	23.3	0.01	0.2	23.1	0.0	0.010	2	630	0.27	0.75	30	0.193	0.100	0.108	0.021	0.49	6,851	0.16
143C	48.3	0.05	2.4	45.9	0.0	0.050	2	2020	0.18	0.75	30	0.193	0.100	0.140	0.027	1.32	18,410	0.42
146A	31.6	0.13	4.1	27.5	0.0	0.130	2	920	0.30	0.75	30	0.193	0.100	0.204	0.040	1.25	17,550	0.40
148A	16.2	0.22	3.6	12.6	0.0	0.220	4	590	0.04	0.75	30	0.193	0.100	0.276	0.054	0.87	12,173	0.28
150B	13.9	0.26	3.6	10.3	0.0	0.260	4	760	0.20	0.75	30	0.193	0.100	0.308	0.060	0.83	11,656	0.27
151B	21.6	0.02	0.4	21.2	0.0	0.020	4	1140	0.20	0.75	30	0.193	0.100	0.116	0.023	0.49	6,821	0.16
152A	12.5	0.18	2.3	10.3	0.0	0.180	4	750	0.14	0.75	30	0.193	0.100	0.244	0.047	0.59	8,304	0.19
154B	7.7	0.02	0.2	7.5	0.0	0.020	4	700	0.26	0.75	30	0.193	0.100	0.116	0.023	0.17	2,432	0.06
155B	21.3	0.13	2.8	18.5	0.0	0.130	4	750	0.13	0.75	30	0.193	0.100	0.204	0.040	0.85	11,830	0.27
156B	64.9	0.02	1.3	63.6	0.0	0.020	2	1680	0.26	0.75	30	0.193	0.100	0.116	0.023	1.47	20,496	0.47
158B	33.8	0.16	5.4	28.4	0.0	0.160	4	1000	0.03	0.75	30	0.193	0.100	0.228	0.044	1.50	20,981	0.48
160B	33.8	0.36	12.2	21.6	0.0	0.360	4	1185	0.09	0.75	30	0.193	0.100	0.388	0.076	2.55	35,704	0.82
162A	11.5	0.02	0.23	11.27	0	0.02	4	1220	0.15	0.75	30	0.193	0.1	0.116	0.023	0.26	3,632	0.08
165A	21.9	0.42	9.198	12.702	0	0.42	4	1170	0.06	0.75	30	0.193	0.1	0.436	0.085	1.86	25,996	0.60

∑A (ac)	854.7
∑Qpm (cfs)	37.4
∑VM (ft3)	522,916
∑VM (ac-ft)	12.0

Cu	Based upon Ix
Ix	Based upon TC
A_u	Undeveloped Upstraem Area that Flows directly into the BMP - Usually zero if included with subarea
TC	Ranges from 5 min to 30 min

PROJECT NAME / TRACT NUMBER **Zone 2 Landslide**
Prepared By: ***Wai Lan***
Date: ***3/30/2011***

Standard Urban Stormwater Mitigation Peak Flowrate and Volume Calculations (Post-Development-Project Site)

Subarea No.	A_{Total} (ac)	Site Proportion Imp *	A_I (ac)	A_P (ac)	A_u (ac)	Overall Trib, Area Prportion Imp	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in.)	Tc-calculated (min.)	Ix - Intensity (in./hr)	Cu	Cd	Cd * Ix*1.008333	Qpm (cfs)	V_M (ft3)	V_M (Ac-ft)
140B	16.5	0.400	6.2	9.3	1.0	0.376	2	1350	0.16	0.75	30	0.193	1.100	1.025	0.199	3.29	46,037	1.06
146A	31.6	0.230	7.3	24.3	0.0	0.230	2	920	0.30	0.75	30	0.193	0.100	0.284	0.055	1.75	24,433	0.56
148A	16.2	0.400	6.5	9.7	0.0	0.400	4	590	0.04	0.75	30	0.193	0.100	0.420	0.082	1.32	18,524	0.43
150B	13.9	0.400	5.6	8.3	0.0	0.400	4	760	0.20	0.75	30	0.193	0.100	0.420	0.082	1.14	15,894	0.36
152A	12.5	0.400	5.0	7.5	0.0	0.400	4	750	0.14	0.75	30	0.193	0.100	0.420	0.082	1.02	14,293	0.33
155B	21.3	0.400	8.5	12.8	0.0	0.400	4	750	0.13	0.75	30	0.193	0.100	0.420	0.082	1.74	24,355	0.56
158B	33.8	0.200	6.8	27.0	0.0	0.200	4	1000	0.03	0.75	30	0.193	0.100	0.260	0.051	1.71	23,925	0.55

∑A (ac)	145.8
∑Qpm (cfs)	12.0
∑VM (ft3)	167,462
∑VM (ac-ft)	3.8

Cu	Based upon Ix
Ix	Based upon TC
A_u	Undeveloped Upstraem Area that Flows directly into the BMP - Usually zero if included with subarea
TC	Ranges from 5 min to 30 min

PROJECT NAME / TRACT NUMBER **Zone 2 Landslide**
Prepared By: ***Wai Lan***
Date: ***3/30/2011***

Standard Urban Stormwater Mitigration Peak Flowrate and Volume Calculations (Post-Development)

Subarea No.	A_{Total} (ac)	Site Proportion Imp *	A_I (ac)	A_P (ac)	A_u (ac)	Overall Trib, Area Prportion Imp	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in.)	Tc-calculated (min.)	Ix - Intensity (in./hr)	Cu	Cd	Cd * Ix*1.008333	Qpm (cfs)	V_M (ft3)	V_M (Ac-ft)
108A	8.1	0.210	1.7	6.4	0.0	0.210	2	1360	0.02	0.75	30	0.193	0.100	0.268	0.052	0.42	5,910	0.14
110A	46.7	0.020	0.9	45.8	0.0	0.020	2	2500	0.05	0.75	30	0.193	0.100	0.116	0.023	1.05	14,748	0.34
112B	16.2	0.210	3.4	12.8	0.0	0.210	4	1860	0.04	0.75	30	0.193	0.100	0.268	0.052	0.84	11,820	0.27
114B	23.8	0.420	10.0	13.8	0.0	0.420	4	2220	0.05	0.75	30	0.193	0.100	0.436	0.085	2.02	28,251	0.65
116A	27.9	0.210	5.9	22.0	0.0	0.210	4	1880	0.02	0.75	30	0.193	0.100	0.268	0.052	1.46	20,357	0.47
117B	8.8	0.420	3.7	5.1	0.0	0.420	4	2000	0.01	0.75	30	0.193	0.100	0.436	0.085	0.75	10,446	0.24
119A	7	0.210	1.5	5.5	0.0	0.210	4	540	0.11	0.75	30	0.193	0.100	0.268	0.052	0.37	5,107	0.12
121B	3.5	0.210	0.7	2.8	0.0	0.210	4	425	0.08	0.75	30	0.193	0.100	0.268	0.052	0.18	2,554	0.06
125A	60	0.010	0.6	59.4	0.0	0.010	4	1260	0.40	0.75	30	0.193	0.100	0.108	0.021	1.26	17,642	0.41
127B	14.5	0.420	6.1	8.4	0.0	0.420	4	780	0.04	0.75	30	0.193	0.100	0.436	0.085	1.23	17,212	0.40
129C	53.3	0.420	22.4	30.9	0.0	0.420	4	1570	0.07	0.75	30	0.193	0.100	0.436	0.085	4.52	63,268	1.45
132B	68.7	0.010	0.7	68.0	0.0	0.010	2	1580	0.33	0.75	30	0.193	0.100	0.108	0.021	1.44	20,200	0.46
135B	15.8	0.420	6.6	9.2	0.0	0.420	4	2120	0.05	0.75	30	0.193	0.100	0.436	0.085	1.34	18,755	0.43
137C	1.3	0.210	0.3	1.0	0.0	0.210	4	290	0.05	0.75	30	0.193	0.100	0.268	0.052	0.07	949	0.02
139B	59.1	0.020	1.2	57.9	0.0	0.020	4	1922	0.32	0.75	30	0.193	0.100	0.116	0.023	1.33	18,664	0.43
140B	16.5	0.400	6.2	9.3	1.0	0.376	2	1350	0.16	0.75	30	0.193	1.100	1.025	0.199	3.29	46,037	1.06
141C	61.2	0.010	0.6	60.6	0.0	0.010	2	2170	0.19	0.75	30	0.193	0.100	0.108	0.021	1.29	17,995	0.41
142C	23.3	0.010	0.2	23.1	0.0	0.010	2	630	0.27	0.75	30	0.193	0.100	0.108	0.021	0.49	6,851	0.16
143C	48.3	0.050	2.4	45.9	0.0	0.050	2	2020	0.18	0.75	30	0.193	0.100	0.140	0.027	1.32	18,410	0.42
146A	31.6	0.230	7.3	24.3	0.0	0.230	2	920	0.30	0.75	30	0.193	0.100	0.284	0.055	1.75	24,433	0.56
148A	16.2	0.400	6.5	9.7	0.0	0.400	4	590	0.04	0.75	30	0.193	0.100	0.420	0.082	1.32	18,524	0.43
150B	13.9	0.400	5.6	8.3	0.0	0.400	4	760	0.20	0.75	30	0.193	0.100	0.420	0.082	1.14	15,894	0.36
151B	21.6	0.020	0.4	21.2	0.0	0.020	4	1140	0.20	0.75	30	0.193	0.100	0.116	0.023	0.49	6,821	0.16
152A	12.5	0.400	5.0	7.5	0.0	0.400	4	750	0.14	0.75	30	0.193	0.100	0.420	0.082	1.02	14,293	0.33
154B	7.7	0.020	0.2	7.5	0.0	0.020	4	700	0.26	0.75	30	0.193	0.100	0.116	0.023	0.17	2,432	0.06
155B	21.3	0.400	8.5	12.8	0.0	0.400	4	750	0.13	0.75	30	0.193	0.100	0.420	0.082	1.74	24,355	0.56
156B	64.9	0.020	1.3	63.6	0.0	0.020	2	1680	0.26	0.75	30	0.193	0.100	0.116	0.023	1.47	20,496	0.47
158B	33.8	0.200	6.8	27.0	0.0	0.200	4	1000	0.03	0.75	30	0.193	0.100	0.260	0.051	1.71	23,925	0.55
160B	33.8	0.360	12.2	21.6	0.0	0.360	4	1185	0.09	0.75	30	0.193	0.100	0.388	0.076	2.55	35,704	0.82
162A	11.5	0.020	0.2	11.3	0.0	0.020	4	1220	0.15	0.75	30	0.193	0.100	0.116	0.023	0.26	3,632	0.08
165A	21.9	0.420	9.2	12.7	0.0	0.420	4	1170	0.06	0.75	30	0.193	0.100	0.436	0.085	1.86	25,996	0.60

∑A (ac)	854.7
∑Qpm (cfs)	40.1
∑VM (ft3)	561,679
∑VM (ac-ft)	12.9

Cu	Based upon Ix
Ix	Based upon TC
A_u	Undeveloped Upstraem Area that Flows directly into the BMP - Usually zero if included with subarea
TC	Ranges from 5 min to 30 min

9.A.4. 2-year, 2-year (burn), 5-year, 10-year, 25-year, 50-year and 50-year (burn) Storm Modified Rational of Hydrology Result and Hydrograph

– Pre-development

– Post-development

Pre-development

(Watershed)

2-YEAR

Program Package Serial Number: 2061

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LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 2 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	108A	8.1	4.01	8.1	4.01	0	0.	.00000	.00	.00	0.	2	30	A35	.21
159	109A	.0	.00	8.1	4.01	4	135.	2.00000	2.00	.00	0.	2	99	A35	.00
159	110A	46.7	21.63	54.8	25.64	2	735.	.01400	.00	.00	0.	2	30	A35	.02
159	111A	.0	.00	54.8	25.36	2	1660.	.00200	.00	.00	0.	2	99	A35	.00
159	112B	16.2	5.41	16.2	5.41	4	270.	.01900	2.75	.00	0.	4	30	A35	.21
159	113AB	16.2	5.41	71.0	20.72	1	735.	.01400	.00	.00	0.	4	0	A35	.00
159	114B	23.8	9.79	23.8	9.79	0	0.	.00000	.00	.00	0.	4	30	A35	.42
159	115AB	23.8	9.79	94.8	22.10	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159	116A	27.9	9.31	122.7	27.94	4	560.	.02300	3.50	.00	0.	4	30	A35	.21
159	117B	8.8	3.62	8.8	3.62	4	350.	.06600	2.00	.00	0.	4	30	A35	.42
159	118AB	8.8	3.62	131.5	31.32	4	220.	.16800	3.50	.00	0.	4	0	A35	.00
159	119A	7.0	3.69	138.5	33.83	1	210.	.54200	.00	.00	0.	4	16	A35	.21
159	120A	.0	.00	138.5	33.81	1	215.	.27900	.00	.00	0.	4	99	A35	.00
159	121B	3.5	1.93	3.5	1.93	0	0.	.00000	.00	.00	0.	4	15	A35	.21
159	122B	.0	.00	3.5	1.93	1	510.	.43100	.00	.00	0.	4	99	A35	.00

CONFLUENCE Q'S

159 123A TA 1164 QA 33.77 QAB 35.40 QB 1.63 159 123B TB 1158 QB 1.89 QBA 34.08 QA 32.19

159 123AB TAB 1164 QAB 35.40 QA 33.77 QB 1.63

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	123AB	3.5	1.89	142.0	35.40	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159	124A	.0	.00	142.0	35.40	1	1675.	.17900	.00	.00	0.	4	99	A35	.00
159	125A	60.0	15.60	202.0	48.95	0	0.	.00000	.00	.00	0.	4	30	A35	.01
159	126A	.0	.00	202.0	48.95	1	550.	.13600	.00	.00	0.	4	99	A35	.00
159	127B	14.5	7.28	14.5	7.28	4	570.	.07000	2.00	.00	0.	4	22	A35	.42
159	128B	.0	.00	14.5	7.28	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	129C	53.3	21.91	53.3	21.91	4	1260.	.03000	3.25	.00	0.	4	30	A35	.42
159	130C	.0	.00	53.3	21.88	0	0.	.00000	.00	.00	0.	4	99	A35	.00

CONFLUENCE Q'S

159 131B TB 1158 QB 7.28 QBC 28.81 QC 21.53 159 131C TC 1161 QC 21.88 QCB 29.00 QB 7.12

159 131BC TBC 1160 QBC 29.03 QB 7.19 QC 21.84

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	131BC	53.3	21.88	67.8	29.03	1	2640.	.21200	.00	.00	0.	4	0	A35	.00
159	132B	68.7	37.14	136.5	60.05	0	0.	.00000	.00	.00	0.	2	23	A35	.01
159	133AB	136.5	60.05	338.5	108.52	0	0.	.00000	.00	.00	0.	2	0	A35	.00
159	134A	.0	.00	338.5	108.52	1	1955.	.08700	.00	.00	0.	2	99	A35	.00
159	135B	15.8	6.50	15.8	6.50	2	165.	.09100	2.00	.00	0.	4	30	A35	.42
159	136B	.0	.00	15.8	6.50	4	300.	.11700	3.00	.00	0.	4	99	A35	.00
159	137C	1.3	.83	1.3	.83	1	320.	.53100	.00	.00	0.	4	12	A35	.21

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LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 2 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

STORM DAY 4

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV

CONFLUENCE Q'S
159 138B TB 1160 QB 6.49 QBC 7.25 QC .76 159 138C TC 1157 QC .82 QCB 7.26 QB 6.44
159 138BC TBC 1158 QBC 7.28 QB 6.47 QC .81

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 138BC	1.3	.82	17.1	7.28	1	1600.	.33800	.00	.00	0.	4	0	A35	.00
159 139B	59.1	15.58	76.2	22.06	1	1880.	.09600	.00	.00	0.	4	30	A35	.02
159 140B	16.5	10.77	92.7	28.13	0	0.	.00000	.00	.00	0.	2	20	A35	.38
159 141C	61.2	28.24	61.2	28.24	0	0.	.00000	.00	.00	0.	2	30	A35	.01
159 142C	23.3	18.56	84.5	46.44	0	0.	.00000	.00	.00	0.	2	12	A35	.01
159 143C	48.3	23.10	132.8	69.38	0	0.	.00000	.00	.00	0.	2	29	A35	.05

CONFLUENCE Q'S
159 144B TB 1168 QB 28.13 QBC 78.57 QC 50.43 159 144C TC 1156 QC 69.38 QCB 86.26 QB 16.88
159 144BC TBC 1160 QBC 89.41 QB 22.20 QC 67.21

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 144BC	132.8	69.38	225.5	89.41	0	0.	.00000	.00	.00	0.	2	0	A35	.00
159 145B	.0	.00	225.5	89.41	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 146A	31.6	21.97	370.1	111.06	0	0.	.00000	.00	.00	0.	2	16	A35	.13

CONFLUENCE Q'S
159 147A TA 1167 QA 111.06 QAB 190.41 QB 79.36 159 147B TB 1160 QB 89.41 QBA 182.24 QA 92.84
159 147AB TAB 1166 QAB 190.67 QA 110.42 QB 80.25

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 147AB	225.5	89.41	595.6	190.67	1	590.	.08500	.00	.00	0.	2	0	A35	.00
159 148A	16.2	6.90	611.8	196.07	0	0.	.00000	.00	.00	0.	4	22	A35	.22
159 149A	.0	.00	611.8	196.07	1	1180.	.05100	.00	.00	0.	4	99	A35	.00
159 150B	13.9	7.03	13.9	7.03	0	0.	.00000	.00	.00	0.	4	18	A35	.26
159 151B	21.6	5.70	35.5	12.66	0	0.	.00000	.00	.00	0.	4	30	A35	.02
159 152A	12.5	5.13	624.3	198.48	0	0.	.00000	.00	.00	0.	4	22	A35	.18

CONFLUENCE Q'S
159 153A TA 1170 QA 198.48 QAB 204.96 QB 6.47 159 153B TB 1157 QB 12.66 QBA 152.42 QA 139.76
159 153AB TAB 1168 QAB 205.87 QA 197.39 QB 8.48

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 153AB	35.5	12.66	659.8	205.87	1	990.	.06100	.00	.00	0.	4	0	A35	.00
159 154B	7.7	2.41	7.7	2.41	0	0.	.00000	.00	.00	0.	4	25	A35	.02
159 155B	21.3	7.55	29.0	9.96	4	1470.	.03400	3.00	.00	0.	4	25	A35	.13

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 2 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	156B	64.9	33.57	93.9	43.05	4	520.	.05800	3.00	.00	0.	2	25	A35	.02
159	157B	.0	.00	93.9	43.02	4	1760.	.04100	2.00	.00	0.	2	99	A35	.00
159	158B	33.8	10.66	127.7	53.07	0	0.	.00000	.00	.00	0.	4	30	A35	.16
159	159B	.0	.00	127.7	53.07	4	1400.	.08400	3.50	.00	0.	4	99	A35	.00
159	160B	33.8	13.83	161.5	66.19	0	0.	.00000	.00	.00	0.	4	28	A35	.36
159	161B	.0	.00	161.5	66.19	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	162A	11.5	3.03	671.3	207.49	0	0.	.00000	.00	.00	0.	4	30	A35	.02

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* CONFLUENCE Q'S *

* 159 163A TA 1171 QA 207.49 QAB 267.83 QB 60.34 159 163B TB 1164 QB 66.19 QBA 252.17 QA 185.98 *

* 159 163AB TAB 1169 QAB 268.82 QA 205.96 QB 62.86 *

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LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	163AB	161.5	66.19	832.8	268.82	4	450.	.06700	5.00	.00	0.	4	0	A35	.00
159	164A	.0	.00	832.8	268.81	4	460.	.04300	9.50	.00	0.	4	99	A35	.00
159	165A	21.9	9.45	854.7	276.73	4	180.	.16700	9.50	.00	0.	4	28	A35	.42
159	166A	.0	.00	854.7	276.70	0	0.	.00000	.00	.00	0.	4	99	A35	.00

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 2 SOIL DATA FILE:

HYDROGRAPH AT 159 166A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	11.02	200	11.32	300	11.88	400	12.53
500	13.30	600	14.25	700	15.48	800	17.12	900	19.47
1000	25.46	1050	33.91	1100	48.88	1110	53.04	1120	59.60
1130	69.98	1131	71.18	1132	72.40	1133	73.67	1134	74.97
1135	76.34	1136	77.73	1137	79.19	1138	80.71	1139	82.27
1140	83.89	1141	85.60	1142	87.39	1143	89.27	1144	91.23
1145	93.36	1146	95.67	1147	98.32	1148	101.45	1149	105.88
1150	111.58	1151	118.24	1152	126.22	1153	135.51	1154	145.21
1155	155.23	1156	166.07	1157	177.87	1158	190.41	1159	203.84
1160	216.80	1161	228.45	1162	238.82	1163	247.68	1164	255.40
1165	261.63	1166	266.98	1167	271.04	1168	274.19	1169	275.99
1170	276.70	1171	276.33	1172	275.08	1173	272.82	1174	269.75
1175	265.96	1176	261.48	1177	255.55	1178	248.15	1179	240.63
1180	232.48	1181	223.96	1182	215.23	1183	206.83	1184	198.62
1185	190.70	1186	182.87	1187	174.88	1188	166.81	1189	159.09
1190	151.60	1191	144.53	1192	137.89	1193	131.80	1194	126.27
1195	121.24	1196	116.36	1197	111.89	1198	107.56	1199	103.66
1200	99.87	1201	96.38	1202	93.04	1203	89.91	1204	86.87
1205	84.01	1206	81.28	1207	78.71	1208	76.28	1209	74.01
1210	71.92	1211	69.96	1212	68.18	1213	66.51	1214	64.88
1215	63.40	1216	62.01	1217	60.73	1218	59.52	1219	58.43
1220	57.42	1221	56.45	1222	55.55	1223	54.71	1224	53.92
1225	53.17	1226	52.46	1227	51.79	1228	51.14	1229	50.52
1230	49.92	1231	49.32	1232	48.72	1233	48.14	1234	47.54
1235	46.95	1236	46.37	1237	45.78	1238	45.21	1239	44.62
1240	44.04	1241	43.46	1242	42.89	1243	42.33	1244	41.78
1245	41.23	1246	40.67	1247	40.13	1248	39.58	1249	39.03
1250	38.49	1251	37.96	1252	37.44	1253	36.93	1254	36.43
1255	35.94	1256	35.45	1257	34.97	1258	34.49	1259	34.04
1260	33.62	1261	33.18	1262	32.77	1263	32.35	1264	31.95
1265	31.56	1266	31.18	1267	30.82	1268	30.47	1269	30.13
1270	29.80	1271	29.48	1272	29.15	1273	28.83	1274	28.52
1275	28.21	1276	27.90	1277	27.60	1278	27.29	1279	26.99
1280	26.70	1281	26.42	1282	26.14	1283	25.86	1284	25.59
1285	25.35	1286	25.10	1287	24.85	1288	24.61	1289	24.37
1290	24.14	1291	23.92	1292	23.70	1293	23.49	1294	23.29
1295	23.10	1296	22.92	1297	22.74	1298	22.57	1299	22.39
1300	22.22	1310	20.57	1320	19.15	1330	17.99	1340	17.05
1350	16.22	1360	15.49	1370	14.92	1380	14.37	1390	13.91
1400	13.48	1420	12.79	1440	12.21	1460	11.02	1500	11.02

TOTAL VOLUME THIS HYDROGRAPH = 52.35(Ac.Ft)

2-YEAR

(BURN)

Program Package Serial Number: 2061
03/30/11 FILE: HPBE INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 1
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 2 SOIL DATA FILE: C:\civild\cst_soilx_83.dat
STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	108A	8.1	4.01	8.1	4.01	0	0.	.00000	.00	.00	0.	2	30	A35	.21
159	109A	.0	.00	8.1	4.01	4	135.	2.00000	2.00	.00	0.	2	99	A35	.00
159	110A	46.7	21.63	54.8	25.64	2	735.	.01400	.00	.00	0.	2	30	A35	.02
159	111A	.0	.00	54.8	25.36	2	1660.	.00200	.00	.00	0.	2	99	A35	.00
159	112B	16.2	5.41	16.2	5.41	4	270.	.01900	2.75	.00	0.	4	30	A35	.21
159	113AB	16.2	5.41	71.0	20.72	1	735.	.01400	.00	.00	0.	4	0	A35	.00
159	114B	23.8	9.79	23.8	9.79	0	0.	.00000	.00	.00	0.	4	30	A35	.42
159	115AB	23.8	9.79	94.8	22.10	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159	116A	27.9	9.31	122.7	27.94	4	560.	.02300	3.50	.00	0.	4	30	A35	.21
159	117B	8.8	3.62	8.8	3.62	4	350.	.06600	2.00	.00	0.	4	30	A35	.42
159	118AB	8.8	3.62	131.5	31.32	4	220.	.16800	3.50	.00	0.	4	0	A35	.00
159	119A	7.0	3.69	138.5	33.83	1	210.	.54200	.00	.00	0.	4	16	A35	.21
159	120A	.0	.00	138.5	33.81	1	215.	.27900	.00	.00	0.	4	99	A35	.00
159	121B	3.5	1.93	3.5	1.93	0	0.	.00000	.00	.00	0.	4	15	A35	.21
159	122B	.0	.00	3.5	1.93	1	510.	.43100	.00	.00	0.	4	99	A35	.00

CONFLUENCE Q'S
159 123A TA 1164 QA 33.77 QAB 35.40 QB 1.63 159 123B TB 1158 QB 1.89 QBA 34.08 QA 32.19
159 123AB TAB 1164 QAB 35.40 QA 33.77 QB 1.63

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	123AB	3.5	1.89	142.0	35.40	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159	124A	.0	.00	142.0	35.40	1	1675.	.17900	.00	.00	0.	4	99	A35	.00
159	125A	60.0	22.01	202.0	55.21	0	0.	.00000	.00	.00	0.	204	30	A35	.01
159	126A	.0	.00	202.0	55.21	1	550.	.13600	.00	.00	0.	204	99	A35	.00
159	127B	14.5	7.28	14.5	7.28	4	570.	.07000	2.00	.00	0.	4	22	A35	.42
159	128B	.0	.00	14.5	7.28	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	129C	53.3	21.91	53.3	21.91	4	1260.	.03000	3.25	.00	0.	4	30	A35	.42
159	130C	.0	.00	53.3	21.88	0	0.	.00000	.00	.00	0.	4	99	A35	.00

CONFLUENCE Q'S
159 131B TB 1158 QB 7.28 QBC 28.81 QC 21.53 159 131C TC 1161 QC 21.88 QCB 29.00 QB 7.12
159 131BC TBC 1160 QBC 29.03 QB 7.19 QC 21.84

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	131BC	53.3	21.88	67.8	29.03	1	2640.	.21200	.00	.00	0.	4	0	A35	.00
159	132B	68.7	41.44	136.5	64.16	0	0.	.00000	.00	.00	0.	202	23	A35	.01
159	133AB	136.5	64.16	338.5	118.86	0	0.	.00000	.00	.00	0.	2	0	A35	.00
159	134A	.0	.00	338.5	118.86	1	1955.	.08700	.00	.00	0.	2	99	A35	.00
159	135B	15.8	6.50	15.8	6.50	2	165.	.09100	2.00	.00	0.	4	30	A35	.42
159	136B	.0	.00	15.8	6.50	4	300.	.11700	3.00	.00	0.	4	99	A35	.00
159	137C	1.3	.83	1.3	.83	1	320.	.53100	.00	.00	0.	4	12	A35	.21

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 Program Package Serial Number:  2061
03/30/11   FILE: HPBE     INPUT DATA: English Units  RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units     PAGE     2
                                        LOS ANGELES COUNTY FLOOD CONTROL DISTRICT                                 PROG F0601M

                     MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR =  2  SOIL DATA FILE: C:\civild\cst_soilx_83.dat
                                                                                                            STORM DAY 4
                    SUBAREA  SUBAREA    TOTAL   TOTAL  CONV  CONV     CONV    CONV   CONV   CONTROL SOIL      RAIN  PCT
    LOCATION        AREA(Ac) Q(CFS)    AREA(Ac) Q(CFS) TYPE LNGTH(Ft) SLOPE  SIZE(Ft)  Z     Q(CFS) NAME  TC  ZONE  IMPV
*****************************************************************************************************************************
*                                                         CONFLUENCE Q'S                                                    *
*    159  138B  TB 1160 QB     6.49 QBC     7.25 QC      .76     159  138C  TC 1157 QC      .82 QCB     7.26 QB     6.44   *
*                                 159  138BC TBC 1158 QBC     7.28 QB     6.47 QC      .81                                   *
*****************************************************************************************************************************
                    SUBAREA  SUBAREA    TOTAL   TOTAL  CONV  CONV     CONV    CONV   CONV   CONTROL SOIL      RAIN  PCT
    LOCATION        AREA(Ac) Q(CFS)    AREA(Ac) Q(CFS) TYPE LNGTH(Ft) SLOPE  SIZE(Ft)  Z     Q(CFS) NAME  TC  ZONE  IMPV
     159  138BC    1.3        .82       17.1      7.28   1    1600.  .33800      .00   .00        0.    4   0   A35   .00
     159  139B    59.1      21.84       76.2     28.28   1    1880.  .09600      .00   .00        0.  204  30   A35   .02
     159  140B    16.5      10.77       92.7     34.96   0       0.  .00000      .00   .00        0.    2  20   A35   .38
     159  141C    61.2      31.75       61.2     31.75   0       0.  .00000      .00   .00        0.  202  30   A35   .01
     159  142C    23.3      20.25       84.5     51.62   0       0.  .00000      .00   .00        0.  202  12   A35   .01
     159  143C    48.3      25.78      132.8     77.23   0       0.  .00000      .00   .00        0.  202  29   A35   .05
*****************************************************************************************************************************
*                                                         CONFLUENCE Q'S                                                    *
*    159  144B  TB 1168 QB    34.96 QBC    92.03 QC    57.08     159  144C  TC 1156 QC    77.23 QCB   100.31 QB    23.08   *
*                                 159  144BC TBC 1160 QBC   104.49 QB    29.50 QC    74.98                                   *
*****************************************************************************************************************************
                    SUBAREA  SUBAREA    TOTAL   TOTAL  CONV  CONV     CONV    CONV   CONV   CONTROL SOIL      RAIN  PCT
    LOCATION        AREA(Ac) Q(CFS)    AREA(Ac) Q(CFS) TYPE LNGTH(Ft) SLOPE  SIZE(Ft)  Z     Q(CFS) NAME  TC  ZONE  IMPV
     159  144BC  132.8      77.23      225.5    104.49   0       0.  .00000      .00   .00        0.    2   0   A35   .00
     159  145B      .0        .00      225.5    104.49   0       0.  .00000      .00   .00        0.    2  99   A35   .00
     159  146A    31.6      21.97      370.1    122.39   0       0.  .00000      .00   .00        0.    2  16   A35   .13
*****************************************************************************************************************************
*                                                         CONFLUENCE Q'S                                                    *
*    159  147A  TA 1167 QA   122.39 QAB   215.42 QB    93.03     159  147B  TB 1160 QB   104.49 QBA   208.90 QA   104.41   *
*                                 159  147AB TAB 1164 QAB   216.75 QA   119.17 QB    97.58                                   *
*****************************************************************************************************************************
                    SUBAREA  SUBAREA    TOTAL   TOTAL  CONV  CONV     CONV    CONV   CONV   CONTROL SOIL      RAIN  PCT
    LOCATION        AREA(Ac) Q(CFS)    AREA(Ac) Q(CFS) TYPE LNGTH(Ft) SLOPE  SIZE(Ft)  Z     Q(CFS) NAME  TC  ZONE  IMPV
     159  147AB  225.5     104.49      595.6    216.75   1     590.  .08500      .00   .00        0.    2   0   A35   .00
     159  148A    16.2       6.90      611.8    222.03   0       0.  .00000      .00   .00        0.    4  22   A35   .22
     159  149A      .0        .00      611.8    222.03   1    1180.  .05100      .00   .00        0.    4  99   A35   .00
     159  150B    13.9       7.03       13.9      7.03   0       0.  .00000      .00   .00        0.    4  18   A35   .26
     159  151B    21.6       7.98       35.5     14.94   0       0.  .00000      .00   .00        0.  204  30   A35   .02
     159  152A    12.5       5.13      624.3    224.43   0       0.  .00000      .00   .00        0.    4  22   A35   .18
*****************************************************************************************************************************
*                                                         CONFLUENCE Q'S                                                    *
*    159  153A  TA 1169 QA   224.43 QAB   234.06 QB     9.64     159  153B  TB 1157 QB    14.94 QBA   177.09 QA   162.15   *
*                                 159  153AB TAB 1168 QAB   234.67 QA   223.99 QB    10.68                                   *
*****************************************************************************************************************************
                    SUBAREA  SUBAREA    TOTAL   TOTAL  CONV  CONV     CONV    CONV   CONV   CONTROL SOIL      RAIN  PCT
    LOCATION        AREA(Ac) Q(CFS)    AREA(Ac) Q(CFS) TYPE LNGTH(Ft) SLOPE  SIZE(Ft)  Z     Q(CFS) NAME  TC  ZONE  IMPV
     159  153AB   35.5      14.94      659.8    234.67   1     990.  .06100      .00   .00        0.    4   0   A35   .00
     159  154B     7.7       3.27        7.7      3.27   0       0.  .00000      .00   .00        0.  204  25   A35   .02
     159  155B    21.3       7.55       29.0     10.82   4    1470.  .03400     3.00   .00        0.    4  25   A35   .13
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MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 2 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	156B	64.9	37.48	93.9	47.82	4	520.	.05800	3.00	.00	0.	202	25	A35	.02
159	157B	.0	.00	93.9	47.80	4	1760.	.04100	2.00	.00	0.	2	99	A35	.00
159	158B	33.8	10.66	127.7	57.69	0	0.	.00000	.00	.00	0.	4	30	A35	.16
159	159B	.0	.00	127.7	57.69	4	1400.	.08400	3.50	.00	0.	4	99	A35	.00
159	160B	33.8	13.83	161.5	70.81	0	0.	.00000	.00	.00	0.	4	28	A35	.36
159	161B	.0	.00	161.5	70.81	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	162A	11.5	4.25	671.3	237.37	0	0.	.00000	.00	.00	0.	204	30	A35	.02

****
* CONFLUENCE Q'S *
* 159 163A TA 1170 QA 237.37 QAB 303.82 QB 66.46 159 163B TB 1164 QB 70.81 QBA 286.95 QA 216.14 *
* 159 163AB TAB 1169 QAB 304.23 QA 236.56 QB 67.67 *
****

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	163AB	161.5	70.81	832.8	304.23	4	450.	.06700	5.00	.00	0.	4	0	A35	.00
159	164A	.0	.00	832.8	304.01	4	460.	.04300	9.50	.00	0.	4	99	A35	.00
159	165A	21.9	9.45	854.7	312.02	4	180.	.16700	9.50	.00	0.	4	28	A35	.42
159	166A	.0	.00	854.7	312.00	0	0.	.00000	.00	.00	0.	4	99	A35	.00

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 2 SOIL DATA FILE:

HYDROGRAPH AT 159 166A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	14.60	200	15.03	300	15.81	400	16.69
500	17.75	600	19.04	700	20.72	800	22.94	900	26.18
1000	33.55	1050	43.63	1100	61.23	1110	66.11	1120	73.92
1130	86.01	1131	87.40	1132	88.77	1133	90.20	1134	91.68
1135	93.20	1136	94.81	1137	96.50	1138	98.26	1139	100.07
1140	101.95	1141	103.93	1142	106.03	1143	108.24	1144	110.56
1145	113.06	1146	115.76	1147	118.80	1148	122.35	1149	127.48
1150	133.86	1151	141.53	1152	150.07	1153	159.93	1154	170.36
1155	181.44	1156	193.43	1157	206.78	1158	220.71	1159	234.64
1160	248.26	1161	260.95	1162	271.79	1163	281.50	1164	289.60
1165	296.63	1166	302.24	1167	306.74	1168	309.84	1169	311.64
1170	312.00	1171	311.28	1172	309.47	1173	306.68	1174	302.96
1175	298.51	1176	293.31	1177	286.63	1178	278.40	1179	269.94
1180	261.03	1181	251.38	1182	241.80	1183	232.25	1184	222.97
1185	213.67	1186	204.57	1187	195.58	1188	186.84	1189	178.23
1190	169.99	1191	162.23	1192	155.06	1193	148.36	1194	142.12
1195	136.32	1196	130.95	1197	126.02	1198	121.60	1199	117.26
1200	112.90	1201	108.99	1202	105.14	1203	101.60	1204	98.18
1205	95.03	1206	92.05	1207	89.26	1208	86.61	1209	84.14
1210	81.86	1211	79.73	1212	77.75	1213	75.91	1214	74.19
1215	72.61	1216	71.13	1217	69.73	1218	68.45	1219	67.26
1220	66.16	1221	65.18	1222	64.30	1223	63.40	1224	62.54
1225	61.73	1226	60.94	1227	60.20	1228	59.49	1229	58.79
1230	58.13	1231	57.46	1232	56.80	1233	56.13	1234	55.46
1235	54.81	1236	54.17	1237	53.53	1238	52.88	1239	52.22
1240	51.57	1241	50.91	1242	50.25	1243	49.59	1244	48.95
1245	48.30	1246	47.67	1247	47.05	1248	46.44	1249	45.83
1250	45.23	1251	44.65	1252	44.09	1253	43.54	1254	43.00
1255	42.46	1256	41.94	1257	41.43	1258	40.93	1259	40.46
1260	39.99	1261	39.56	1262	39.14	1263	38.73	1264	38.31
1265	37.90	1266	37.49	1267	37.08	1268	36.68	1269	36.28
1270	35.88	1271	35.49	1272	35.11	1273	34.74	1274	34.39
1275	34.03	1276	33.69	1277	33.37	1278	33.03	1279	32.71
1280	32.40	1281	32.10	1282	31.80	1283	31.50	1284	31.23
1285	30.97	1286	30.73	1287	30.48	1288	30.24	1289	29.99
1290	29.74	1291	29.51	1292	29.27	1293	29.04	1294	28.80
1295	28.57	1296	28.35	1297	28.13	1298	27.92	1299	27.71
1300	27.51	1310	25.67	1320	24.15	1330	22.84	1340	21.75
1350	20.80	1360	19.95	1370	19.21	1380	18.57	1390	18.00
1400	17.47	1420	16.63	1440	15.92	1460	14.60	1500	14.60

TOTAL VOLUME THIS HYDROGRAPH = 65.18(Ac.Ft)

5-YEAR

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 5 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

STORM DAY 4

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 108A	8.1	7.45	8.1	7.45	0	0.	.00000	.00	.00	0.	2	24	A35	.21
159 109A	.0	.00	8.1	7.45	4	135.	2.00000	2.00	.00	0.	2	99	A35	.00
159 110A	46.7	36.48	54.8	43.93	2	735.	.01400	.00	.00	0.	2	30	A35	.02
159 111A	.0	.00	54.8	43.59	2	1660.	.00200	.00	.00	0.	2	99	A35	.00
159 112B	16.2	10.05	16.2	10.05	4	270.	.01900	2.75	.00	0.	4	30	A35	.21
159 113AB	16.2	10.05	71.0	38.51	1	735.	.01400	.00	.00	0.	4	0	A35	.00
159 114B	23.8	16.80	23.8	16.80	0	0.	.00000	.00	.00	0.	4	30	A35	.42
159 115AB	23.8	16.80	94.8	42.84	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159 116A	27.9	17.30	122.7	54.58	4	560.	.02300	3.50	.00	0.	4	30	A35	.21
159 117B	8.8	6.21	8.8	6.21	4	350.	.06600	2.00	.00	0.	4	30	A35	.42
159 118AB	8.8	6.21	131.5	60.43	4	220.	.16800	3.50	.00	0.	4	0	A35	.00
159 119A	7.0	7.65	138.5	64.45	1	210.	.54200	.00	.00	0.	4	12	A35	.21
159 120A	.0	.00	138.5	64.36	1	215.	.27900	.00	.00	0.	4	99	A35	.00
159 121B	3.5	4.04	3.5	4.04	0	0.	.00000	.00	.00	0.	4	11	A35	.21
159 122B	.0	.00	3.5	4.04	1	510.	.43100	.00	.00	0.	4	99	A35	.00

CONFLUENCE Q'S

159 123A TA 1161 QA   64.34 QAB   67.75 QB   3.41   159 123B TB 1157 QB   3.98 QBA   65.93 QA   61.95

159 123AB TAB 1161 QAB   67.75 QA   64.34 QB   3.41

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 123AB	3.5	3.98	142.0	67.75	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159 124A	.0	.00	142.0	67.75	1	1675.	.17900	.00	.00	0.	4	99	A35	.00
159 125A	60.0	43.28	202.0	105.69	0	0.	.00000	.00	.00	0.	4	20	A35	.01
159 126A	.0	.00	202.0	105.69	1	550.	.13600	.00	.00	0.	4	99	A35	.00
159 127B	14.5	14.73	14.5	14.73	4	570.	.07000	2.00	.00	0.	4	16	A35	.42
159 128B	.0	.00	14.5	14.71	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159 129C	53.3	42.97	53.3	42.97	4	1260.	.03000	3.25	.00	0.	4	24	A35	.42
159 130C	.0	.00	53.3	42.89	0	0.	.00000	.00	.00	0.	4	99	A35	.00

CONFLUENCE Q'S

159 131B TB 1156 QB   14.71 QBC   56.38 QC   41.68   159 131C TC 1159 QC   42.89 QCB   57.20 QB   14.31

159 131BC TBC 1158 QBC   57.31 QB   14.51 QC   42.80

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 131BC	53.3	42.89	67.8	57.31	1	2640.	.21200	.00	.00	0.	4	0	A35	.00
159 132B	68.7	74.00	136.5	119.28	0	0.	.00000	.00	.00	0.	2	17	A35	.01
159 133AB	136.5	119.28	338.5	224.03	0	0.	.00000	.00	.00	0.	2	0	A35	.00
159 134A	.0	.00	338.5	224.03	1	1955.	.08700	.00	.00	0.	2	99	A35	.00
159 135B	15.8	11.16	15.8	11.16	2	165.	.09100	2.00	.00	0.	4	30	A35	.42
159 136B	.0	.00	15.8	11.15	4	300.	.11700	3.00	.00	0.	4	99	A35	.00
159 137C	1.3	1.68	1.3	1.68	1	320.	.53100	.00	.00	0.	4	9	A35	.21

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 5 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

STORM DAY 4

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV

* CONFLUENCE Q'S *
* 159 138B TB 1160 QB 11.15 QBC 12.37 QC 1.22 159 138C TC 1156 QC 1.65 QCB 12.65 QB 11.00 *
* 159 138BC TBC 1157 QBC 12.70 QB 11.08 QC 1.62 *

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 138BC	1.3	1.65	17.1	12.70	1	1600.	.33800	.00	.00	0.	4	0	A35	.00
159 139B	59.1	32.07	76.2	43.97	1	1880.	.09600	.00	.00	0.	4	30	A35	.02
159 140B	16.5	19.37	92.7	55.73	0	0.	.00000	.00	.00	0.	2	16	A35	.38
159 141C	61.2	54.31	61.2	54.31	0	0.	.00000	.00	.00	0.	2	24	A35	.01
159 142C	23.3	35.52	84.5	89.01	0	0.	.00000	.00	.00	0.	2	9	A35	.01
159 143C	48.3	44.21	132.8	133.06	0	0.	.00000	.00	.00	0.	2	23	A35	.05

* CONFLUENCE Q'S *
* 159 144B TB 1164 QB 55.73 QBC 155.25 QC 99.53 159 144C TC 1155 QC 133.06 QCB 172.21 QB 39.15 *
* 159 144BC TBC 1157 QBC 175.75 QB 44.39 QC 131.36 *

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 144BC	132.8	133.06	225.5	175.75	0	0.	.00000	.00	.00	0.	2	0	A35	.00
159 145B	.0	.00	225.5	175.75	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 146A	31.6	41.82	370.1	231.55	0	0.	.00000	.00	.00	0.	2	12	A35	.13

* CONFLUENCE Q'S *
* 159 147A TA 1164 QA 231.55 QAB 386.81 QB 155.25 159 147B TB 1157 QB 175.75 QBA 369.09 QA 193.35 *
* 159 147AB TAB 1160 QAB 389.02 QA 221.42 QB 167.60 *

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 147AB	225.5	175.75	595.6	389.02	1	590.	.08500	.00	.00	0.	2	0	A35	.00
159 148A	16.2	15.65	611.8	401.89	0	0.	.00000	.00	.00	0.	4	15	A35	.22
159 149A	.0	.00	611.8	401.89	1	1180.	.05100	.00	.00	0.	4	99	A35	.00
159 150B	13.9	15.51	13.9	15.51	0	0.	.00000	.00	.00	0.	4	12	A35	.26
159 151B	21.6	15.16	35.5	30.61	0	0.	.00000	.00	.00	0.	4	21	A35	.02
159 152A	12.5	12.32	624.3	405.25	0	0.	.00000	.00	.00	0.	4	14	A35	.18

* CONFLUENCE Q'S *
* 159 153A TA 1164 QA 405.25 QAB 424.31 QB 19.06 159 153B TB 1155 QB 30.61 QBA 306.46 QA 275.85 *
* 159 153AB TAB 1163 QAB 424.53 QA 403.20 QB 21.33 *

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 153AB	35.5	30.61	659.8	424.53	1	990.	.06100	.00	.00	0.	4	0	A35	.00
159 154B	7.7	7.37	7.7	7.37	0	0.	.00000	.00	.00	0.	4	13	A35	.02
159 155B	21.3	19.74	29.0	27.11	4	1470.	.03400	3.00	.00	0.	4	15	A35	.13

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 5 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	156B	64.9	65.77	93.9	91.86	4	520.	.05800	3.00	.00	0.	2	19	A35	.02
159	157B	.0	.00	93.9	91.77	4	1760.	.04100	2.75	.00	0.	2	99	A35	.00
159	158B	33.8	22.38	127.7	113.18	0	0.	.00000	.00	.00	0.	4	26	A35	.16
159	159B	.0	.00	127.7	113.18	4	1400.	.08400	3.50	.00	0.	4	99	A35	.00
159	160B	33.8	30.28	161.5	141.41	0	0.	.00000	.00	.00	0.	4	19	A35	.36
159	161B	.0	.00	161.5	141.41	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	162A	11.5	7.57	671.3	429.39	0	0.	.00000	.00	.00	0.	4	23	A35	.02

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*                                              CONFLUENCE Q'S                                                   *
*    159  163A  TA 1166 QA   429.39 QAB   560.14 QB   130.75     159  163B  TB 1161 QB   141.41 QBA   535.43 QA   394.02  *
*                           159  163AB TAB 1165 QAB   563.31 QA   429.13 QB   134.18                            *
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LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	163AB	161.5	141.41	832.8	563.31	4	450.	.06700	5.00	.00	0.	4	0	A35	.00
159	164A	.0	.00	832.8	563.26	4	460.	.04300	9.50	.00	0.	4	99	A35	.00
159	165A	21.9	19.62	854.7	579.77	4	180.	.16700	9.50	.00	0.	4	20	A35	.42
159	166A	.0	.00	854.7	579.62	0	0.	.00000	.00	.00	0.	4	99	A35	.00

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 5 SOIL DATA FILE:

HYDROGRAPH AT 159 166A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	16.63	200	17.12	300	17.98	400	19.01
500	20.25	600	22.03	700	25.49	800	30.72	900	38.08
1000	50.31	1050	64.59	1100	89.75	1110	97.70	1120	111.64
1130	136.04	1131	139.18	1132	142.21	1133	145.38	1134	148.70
1135	152.16	1136	155.80	1137	159.64	1138	163.76	1139	168.13
1140	172.77	1141	177.74	1142	183.06	1143	188.73	1144	194.83
1145	201.78	1146	209.42	1147	217.69	1148	226.74	1149	238.33
1150	252.91	1151	269.91	1152	289.80	1153	313.15	1154	338.75
1155	366.79	1156	397.49	1157	429.29	1158	462.03	1159	491.91
1160	518.36	1161	539.73	1162	556.83	1163	569.18	1164	576.94
1165	579.62	1166	578.49	1167	573.96	1168	566.21	1169	554.08
1170	539.73	1171	523.59	1172	504.96	1173	484.52	1174	464.55
1175	444.96	1176	424.77	1177	404.59	1178	384.25	1179	364.44
1180	344.75	1181	325.18	1182	307.12	1183	290.46	1184	275.48
1185	262.02	1186	250.32	1187	239.80	1188	230.59	1189	222.19
1190	214.62	1191	207.41	1192	200.67	1193	194.15	1194	187.95
1195	181.76	1196	175.62	1197	169.59	1198	163.77	1199	158.16
1200	152.75	1201	147.55	1202	142.63	1203	137.98	1204	133.82
1205	129.96	1206	126.25	1207	122.81	1208	119.67	1209	116.73
1210	114.03	1211	111.52	1212	109.28	1213	107.12	1214	105.16
1215	103.33	1216	101.68	1217	100.09	1218	98.61	1219	97.20
1220	95.87	1221	94.57	1222	93.34	1223	92.10	1224	90.85
1225	89.60	1226	88.38	1227	87.19	1228	86.00	1229	84.83
1230	83.65	1231	82.45	1232	81.24	1233	80.05	1234	78.88
1235	77.70	1236	76.54	1237	75.36	1238	74.20	1239	73.02
1240	71.86	1241	70.69	1242	69.55	1243	68.44	1244	67.38
1245	66.32	1246	65.25	1247	64.23	1248	63.33	1249	62.39
1250	61.43	1251	60.54	1252	59.66	1253	58.82	1254	58.03
1255	57.26	1256	56.46	1257	55.69	1258	54.91	1259	54.16
1260	53.41	1261	52.69	1262	51.98	1263	51.28	1264	50.59
1265	49.92	1266	49.27	1267	48.61	1268	48.00	1269	47.41
1270	46.82	1271	46.27	1272	45.77	1273	45.29	1274	44.79
1275	44.31	1276	43.84	1277	43.38	1278	42.90	1279	42.42
1280	41.96	1281	41.47	1282	41.00	1283	40.54	1284	40.10
1285	39.68	1286	39.26	1287	38.85	1288	38.46	1289	38.06
1290	37.69	1291	37.32	1292	36.94	1293	36.59	1294	36.23
1295	35.90	1296	35.58	1297	35.27	1298	35.00	1299	34.70
1300	34.40	1310	31.56	1320	29.17	1330	27.24	1340	25.68
1350	24.43	1360	23.41	1370	22.53	1380	21.76	1390	21.02
1400	20.36	1420	19.27	1440	18.28	1460	16.63	1500	16.63

TOTAL VOLUME THIS HYDROGRAPH = 91.44(Ac.Ft)

10-YEAR

Program Package Serial Number: 2061
03/30/11 FILE: HPBE INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 1
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 10 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

STORM DAY 4

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 108A	8.1	10.98	8.1	10.98	0	0.	.00000	.00	.00	0.	2	18	A35	.21
159 109A	.0	.00	8.1	10.98	4	135.	2.00000	2.00	.00	0.	2	99	A35	.00
159 110A	46.7	52.86	54.8	63.83	2	735.	.01400	.00	.00	0.	2	24	A35	.02
159 111A	.0	.00	54.8	63.12	2	1660.	.00200	.00	.00	0.	2	99	A35	.00
159 112B	16.2	15.16	16.2	15.16	4	270.	.01900	2.75	.00	0.	4	24	A35	.21
159 113AB	16.2	15.16	71.0	52.75	1	735.	.01400	.00	.00	0.	4	0	A35	.00
159 114B	23.8	24.46	23.8	24.46	0	0.	.00000	.00	.00	0.	4	24	A35	.42
159 115AB	23.8	24.46	94.8	58.25	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159 116A	27.9	23.27	122.7	78.26	4	560.	.02300	3.50	.00	0.	4	29	A35	.21
159 117B	8.8	7.97	8.8	7.97	4	350.	.06600	2.00	.00	0.	4	30	A35	.42
159 118AB	8.8	7.97	131.5	85.93	4	220.	.16800	3.50	.00	0.	4	0	A35	.00
159 119A	7.0	12.24	138.5	89.37	1	210.	.54200	.00	.00	0.	4	8	A35	.21
159 120A	.0	.00	138.5	89.22	1	215.	.27900	.00	.00	0.	4	99	A35	.00
159 121B	3.5	6.12	3.5	6.12	0	0.	.00000	.00	.00	0.	4	8	A35	.21
159 122B	.0	.00	3.5	6.12	1	510.	.43100	.00	.00	0.	4	99	A35	.00

CONFLUENCE Q'S

159 123A TA 1157 QA 89.19 QAB 95.08 QB 5.89 159 123B TB 1156 QB 6.02 QBA 94.50 QA 88.48
159 123AB TAB 1157 QAB 95.08 QA 89.19 QB 5.89

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 123AB	3.5	6.02	142.0	95.08	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159 124A	.0	.00	142.0	95.08	1	1675.	.17900	.00	.00	0.	4	99	A35	.00
159 125A	60.0	74.92	202.0	158.90	0	0.	.00000	.00	.00	0.	4	13	A35	.01
159 126A	.0	.00	202.0	158.90	1	550.	.13600	.00	.00	0.	4	99	A35	.00
159 127B	14.5	21.76	14.5	21.76	4	570.	.07000	2.00	.00	0.	4	12	A35	.42
159 128B	.0	.00	14.5	21.75	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159 129C	53.3	64.30	53.3	64.30	4	1260.	.03000	3.25	.00	0.	4	18	A35	.42
159 130C	.0	.00	53.3	64.02	0	0.	.00000	.00	.00	0.	4	99	A35	.00

CONFLUENCE Q'S

159 131B TB 1155 QB 21.75 QBC 83.13 QC 61.39 159 131C TC 1158 QC 64.02 QCB 84.89 QB 20.87
159 131BC TBC 1157 QBC 85.35 QB 21.41 QC 63.94

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 131BC	53.3	64.02	67.8	85.35	1	2640.	.21200	.00	.00	0.	4	0	A35	.00
159 132B	68.7	113.21	136.5	174.42	0	0.	.00000	.00	.00	0.	2	12	A35	.01
159 133AB	136.5	174.42	338.5	332.93	0	0.	.00000	.00	.00	0.	2	0	A35	.00
159 134A	.0	.00	338.5	332.93	1	1955.	.08700	.00	.00	0.	2	99	A35	.00
159 135B	15.8	16.62	15.8	16.62	2	165.	.09100	2.00	.00	0.	4	23	A35	.42
159 136B	.0	.00	15.8	16.62	4	300.	.11700	3.00	.00	0.	4	99	A35	.00
159 137C	1.3	2.67	1.3	2.67	1	320.	.53100	.00	.00	0.	4	6	A35	.21

Program Package Serial Number: 2061

03/30/11 FILE: HPBE INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 10 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

STORM DAY 4

CONFLUENCE Q'S

159 138B TB 1157 QB 16.62 QBC 18.65 QC 2.03 159 138C TC 1155 QC 2.59 QCB 19.01 QB 16.42

159 138BC TBC 1155 QBC 19.01 QB 16.42 QC 2.59

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 138BC	1.3	2.59	17.1	19.01	1	1600.	.33800	.00	.00	0.	4	0	A35	.00
159 139B	59.1	60.67	76.2	77.06	1	1880.	.09600	.00	.00	0.	4	18	A35	.02
159 140B	16.5	27.94	92.7	91.66	0	0.	.00000	.00	.00	0.	2	12	A35	.38
159 141C	61.2	83.70	61.2	83.70	0	0.	.00000	.00	.00	0.	2	17	A35	.01
159 142C	23.3	50.67	84.5	133.93	0	0.	.00000	.00	.00	0.	2	7	A35	.01
159 143C	48.3	68.67	132.8	202.11	0	0.	.00000	.00	.00	0.	2	16	A35	.05

CONFLUENCE Q'S

159 144B TB 1160 QB 91.66 QBC 250.04 QC 158.38 159 144C TC 1154 QC 202.11 QCB 267.17 QB 65.06

159 144BC TBC 1155 QBC 272.32 QB 70.24 QC 202.08

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 144BC	132.8	202.11	225.5	272.32	0	0.	.00000	.00	.00	0.	2	0	A35	.00
159 145B	.0	.00	225.5	272.32	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 146A	31.6	61.04	370.1	340.00	0	0.	.00000	.00	.00	0.	2	9	A35	.13

CONFLUENCE Q'S

159 147A TA 1161 QA 340.00 QAB 583.62 QB 243.61 159 147B TB 1155 QB 272.32 QBA 545.78 QA 273.46

159 147AB TAB 1159 QAB 588.85 QA 331.82 QB 257.03

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 147AB	225.5	272.32	595.6	588.85	1	590.	.08500	.00	.00	0.	2	0	A35	.00
159 148A	16.2	24.02	611.8	607.51	0	0.	.00000	.00	.00	0.	4	11	A35	.22
159 149A	.0	.00	611.8	607.51	1	1180.	.05100	.00	.00	0.	4	99	A35	.00
159 150B	13.9	23.24	13.9	23.24	0	0.	.00000	.00	.00	0.	4	9	A35	.26
159 151B	21.6	25.92	35.5	49.17	0	0.	.00000	.00	.00	0.	4	14	A35	.02
159 152A	12.5	19.42	624.3	609.51	0	0.	.00000	.00	.00	0.	4	10	A35	.18

CONFLUENCE Q'S

159 153A TA 1162 QA 609.51 QAB 636.60 QB 27.08 159 153B TB 1154 QB 49.17 QBA 459.21 QA 410.04

159 153AB TAB 1161 QAB 640.01 QA 608.82 QB 31.19

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 153AB	35.5	49.17	659.8	640.01	1	990.	.06100	.00	.00	0.	4	0	A35	.00
159 154B	7.7	12.00	7.7	12.00	0	0.	.00000	.00	.00	0.	4	9	A35	.02
159 155B	21.3	30.68	29.0	42.68	4	1470.	.03400	3.00	.00	0.	4	11	A35	.13

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 10 SOIL DATA FILE: C:\civild\cst_soilx_83.dat
STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	156B	64.9	102.56	93.9	143.04	4	520.	.05800	3.00	.00	0.	2	13	A35	.02
159	157B	.0	.00	93.9	142.67	4	1760.	.04100	3.00	.00	0.	2	99	A35	.00
159	158B	33.8	36.82	127.7	175.73	0	0.	.00000	.00	.00	0.	4	18	A35	.16
159	159B	.0	.00	127.7	175.73	4	1400.	.08400	3.50	.00	0.	4	99	A35	.00
159	160B	33.8	45.84	161.5	216.55	0	0.	.00000	.00	.00	0.	4	14	A35	.36
159	161B	.0	.00	161.5	216.55	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	162A	11.5	13.27	671.3	647.29	0	0.	.00000	.00	.00	0.	4	15	A35	.02

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****************************************************************************************************
*                                        CONFLUENCE Q'S                                            *
*   159  163A  TA 1163 QA   647.29 QAB   847.93 QB   200.65    159  163B  TB 1160 QB   216.55 QBA   834.81 QA   618.25   *
*                          159  163AB TAB 1162 QAB   855.59 QA   645.20 QB   210.39                *
****************************************************************************************************
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LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	163AB	161.5	216.55	832.8	855.59	4	450.	.06700	5.00	.00	0.	4	0	A35	.00
159	164A	.0	.00	832.8	852.63	4	460.	.04300	9.50	.00	0.	4	99	A35	.00
159	165A	21.9	29.27	854.7	877.16	4	180.	.16700	9.50	.00	0.	4	15	A35	.42
159	166A	.0	.00	854.7	876.86	0	0.	.00000	.00	.00	0.	4	99	A35	.00

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 10 SOIL DATA FILE:

HYDROGRAPH AT 159 166A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	20.44	200	21.05	300	22.60	400	25.02
500	27.98	600	31.73	700	36.51	800	42.92	900	52.11
1000	67.54	1050	86.17	1100	117.41	1110	132.55	1120	163.03
1130	204.50	1131	209.25	1132	213.92	1133	218.86	1134	224.10
1135	229.60	1136	235.30	1137	241.33	1138	247.82	1139	254.79
1140	261.95	1141	269.95	1142	278.58	1143	288.04	1144	298.14
1145	309.49	1146	321.88	1147	335.69	1148	350.59	1149	369.90
1150	394.97	1151	424.23	1152	460.36	1153	502.34	1154	549.20
1155	600.40	1156	654.26	1157	705.87	1158	760.43	1159	812.62
1160	846.51	1161	866.97	1162	876.86	1163	875.75	1164	860.84
1165	836.55	1166	807.01	1167	772.58	1168	737.72	1169	701.45
1170	664.25	1171	623.17	1172	583.39	1173	544.62	1174	507.82
1175	474.10	1176	443.54	1177	417.14	1178	393.81	1179	373.12
1180	354.60	1181	337.78	1182	322.53	1183	308.68	1184	295.63
1185	283.48	1186	272.29	1187	261.91	1188	252.26	1189	243.33
1190	234.79	1191	226.82	1192	219.30	1193	212.19	1194	205.48
1195	199.27	1196	193.34	1197	187.59	1198	182.19	1199	177.08
1200	172.23	1201	167.59	1202	163.15	1203	158.99	1204	155.16
1205	151.60	1206	148.41	1207	145.43	1208	142.74	1209	140.22
1210	137.90	1211	135.70	1212	133.58	1213	131.53	1214	129.58
1215	127.64	1216	125.67	1217	123.77	1218	121.83	1219	119.90
1220	117.99	1221	116.20	1222	114.37	1223	112.51	1224	110.58
1225	108.67	1226	106.81	1227	105.02	1228	103.32	1229	101.68
1230	99.99	1231	98.30	1232	96.64	1233	95.00	1234	93.37
1235	91.79	1236	90.24	1237	88.74	1238	87.32	1239	85.95
1240	84.59	1241	83.24	1242	81.95	1243	80.72	1244	79.57
1245	78.50	1246	77.46	1247	76.43	1248	75.36	1249	74.33
1250	73.32	1251	72.31	1252	71.36	1253	70.40	1254	69.49
1255	68.59	1256	67.70	1257	66.86	1258	66.09	1259	65.27
1260	64.48	1261	63.78	1262	63.06	1263	62.40	1264	61.77
1265	61.11	1266	60.47	1267	59.85	1268	59.24	1269	58.60
1270	57.98	1271	57.40	1272	56.85	1273	56.31	1274	55.79
1275	55.26	1276	54.71	1277	54.18	1278	53.66	1279	53.14
1280	52.63	1281	52.12	1282	51.59	1283	51.09	1284	50.63
1285	50.23	1286	49.81	1287	49.39	1288	48.99	1289	48.58
1290	48.20	1291	47.82	1292	47.44	1293	47.09	1294	46.71
1295	46.32	1296	45.96	1297	45.61	1298	45.27	1299	44.90
1300	44.56	1310	41.46	1320	38.86	1330	36.68	1340	34.74
1350	32.99	1360	31.20	1370	29.66	1380	28.29	1390	27.01
1400	25.77	1420	23.97	1440	22.70	1460	20.44	1500	20.44

TOTAL VOLUME THIS HYDROGRAPH = 121.62(Ac.Ft)

25-YEAR

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

STORM DAY 4

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 108A	8.1	15.26	8.1	15.26	0	0.	.00000	.00	.00	0.	2	15	A35	.21
159 109A	.0	.00	8.1	15.26	4	135.	2.00000	2.00	.00	0.	2	99	A35	.00
159 110A	46.7	74.46	54.8	89.64	2	735.	.01400	.00	.00	0.	2	20	A35	.02
159 111A	.0	.00	54.8	88.40	2	1660.	.00200	.00	.00	0.	2	99	A35	.00
159 112B	16.2	21.93	16.2	21.93	4	270.	.01900	2.75	.00	0.	4	20	A35	.21
159 113AB	16.2	21.90	71.0	73.77	1	735.	.01400	.00	.00	0.	4	0	A35	.00
159 114B	23.8	34.53	23.8	34.53	0	0.	.00000	.00	.00	0.	4	20	A35	.42
159 115AB	23.8	34.53	94.8	79.89	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159 116A	27.9	34.80	122.7	112.07	4	560.	.02300	3.50	.00	0.	4	23	A35	.21
159 117B	8.8	11.30	8.8	11.30	4	350.	.06600	2.00	.00	0.	4	25	A35	.42
159 118AB	8.8	11.30	131.5	122.94	4	220.	.16800	3.50	.00	0.	4	0	A35	.00
159 119A	7.0	16.75	138.5	128.49	1	210.	.54200	.00	.00	0.	4	7	A35	.21
159 120A	.0	.00	138.5	128.47	1	215.	.27900	.00	.00	0.	4	99	A35	.00
159 121B	3.5	9.13	3.5	9.13	0	0.	.00000	.00	.00	0.	4	6	A35	.21
159 122B	.0	.00	3.5	9.13	1	510.	.43100	.00	.00	0.	4	99	A35	.00

CONFLUENCE Q'S

159 123A TA 1157 QA 128.33 QAB 135.59 QB 7.26 159 123B TB 1155 QB 8.87 QBA 135.11 QA 126.24

159 123AB TAB 1156 QAB 136.60 QA 128.26 QB 8.34

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 123AB	3.5	8.87	142.0	136.60	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159 124A	.0	.00	142.0	136.60	1	1675.	.17900	.00	.00	0.	4	99	A35	.00
159 125A	60.0	114.49	202.0	232.11	0	0.	.00000	.00	.00	0.	4	10	A35	.01
159 126A	.0	.00	202.0	232.11	1	550.	.13600	.00	.00	0.	4	99	A35	.00
159 127B	14.5	30.53	14.5	30.53	4	570.	.07000	2.00	.00	0.	4	10	A35	.42
159 128B	.0	.00	14.5	30.35	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159 129C	53.3	90.39	53.3	90.39	4	1260.	.03000	3.25	.00	0.	4	15	A35	.42
159 130C	.0	.00	53.3	89.75	0	0.	.00000	.00	.00	0.	4	99	A35	.00

CONFLUENCE Q'S

159 131B TB 1155 QB 30.35 QBC 117.22 QC 86.87 159 131C TC 1157 QC 89.75 QCB 118.83 QB 29.07

159 131BC TBC 1156 QBC 119.06 QB 29.85 QC 89.21

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 131BC	53.3	89.75	67.8	119.06	1	2640.	.21200	.00	.00	0.	4	0	A35	.00
159 132B	68.7	158.81	136.5	241.55	0	0.	.00000	.00	.00	0.	2	10	A35	.01
159 133AB	136.5	241.55	338.5	471.43	0	0.	.00000	.00	.00	0.	2	0	A35	.00
159 134A	.0	.00	338.5	471.43	1	1955.	.08700	.00	.00	0.	2	99	A35	.00
159 135B	15.8	23.54	15.8	23.54	2	165.	.09100	2.00	.00	0.	4	19	A35	.42
159 136B	.0	.00	15.8	23.54	4	300.	.11700	3.00	.00	0.	4	99	A35	.00
159 137C	1.3	3.79	1.3	3.79	1	320.	.53100	.00	.00	0.	4	5	A35	.21

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

STORM DAY 4

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV

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*                                            CONFLUENCE Q'S                                                     *
*    159  138B  TB 1156 QB    23.51 QBC    26.38 QC     2.87     159  138C  TC 1154 QC     3.52 QCB    26.33 QB    22.81   *
*                              159  138BC TBC 1155 QBC    26.74 QB    23.38 QC     3.36                              *
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LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 138BC	1.3	3.52	17.1	26.74	1	1600.	.33800	.00	.00	0.	4	0	A35	.00
159 139B	59.1	92.49	76.2	114.45	1	1880.	.09600	.00	.00	0.	4	14	A35	.02
159 140B	16.5	38.59	92.7	132.35	0	0.	.00000	.00	.00	0.	2	10	A35	.38
159 141C	61.2	117.89	61.2	117.89	0	0.	.00000	.00	.00	0.	2	14	A35	.01
159 142C	23.3	69.28	84.5	187.17	0	0.	.00000	.00	.00	0.	2	6	A35	.01
159 143C	48.3	96.81	132.8	283.98	0	0.	.00000	.00	.00	0.	2	13	A35	.05

```
*                                            CONFLUENCE Q'S                                                     *
*    159  144B  TB 1159 QB   132.35 QBC   351.29 QC   218.94     159  144C  TC 1154 QC   283.98 QCB   384.01 QB   100.03   *
*                              159  144BC TBC 1154 QBC   384.01 QB   100.03 QC   283.98                              *
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LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 144BC	132.8	283.98	225.5	384.01	0	0.	.00000	.00	.00	0.	2	0	A35	.00
159 145B	.0	.00	225.5	384.01	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 146A	31.6	86.62	370.1	475.09	0	0.	.00000	.00	.00	0.	2	7	A35	.13

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*                                            CONFLUENCE Q'S                                                     *
*    159  147A  TA 1161 QA   475.09 QAB   804.67 QB   329.59     159  147B  TB 1154 QB   384.01 QBA   760.99 QA   376.98   *
*                              159  147AB TAB 1158 QAB   832.53 QA   465.11 QB   367.43                              *
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LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 147AB	225.5	384.01	595.6	832.53	1	590.	.08500	.00	.00	0.	2	0	A35	.00
159 148A	16.2	34.18	611.8	854.71	0	0.	.00000	.00	.00	0.	4	9	A35	.22
159 149A	.0	.00	611.8	854.71	1	1180.	.05100	.00	.00	0.	4	99	A35	.00
159 150B	13.9	31.35	13.9	31.35	0	0.	.00000	.00	.00	0.	4	8	A35	.26
159 151B	21.6	38.90	35.5	70.25	0	0.	.00000	.00	.00	0.	4	11	A35	.02
159 152A	12.5	27.71	624.3	857.40	0	0.	.00000	.00	.00	0.	4	8	A35	.18

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*                                            CONFLUENCE Q'S                                                     *
*    159  153A  TA 1160 QA   857.40 QAB   899.37 QB    41.97     159  153B  TB 1154 QB    70.25 QBA   685.85 QA   615.60   *
*                              159  153AB TAB 1159 QAB   901.21 QA   850.04 QB    51.17                              *
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LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 153AB	35.5	70.25	659.8	901.21	1	990.	.06100	.00	.00	0.	4	0	A35	.00
159 154B	7.7	17.72	7.7	17.72	0	0.	.00000	.00	.00	0.	4	7	A35	.02
159 155B	21.3	44.02	29.0	61.74	4	1470.	.03400	3.00	.00	0.	4	9	A35	.13

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	156B	64.9	142.12	93.9	200.60	4	520.	.05800	3.00	.00	0.	2	11	A35	.02
159	157B	.0	.00	93.9	199.49	4	1760.	.04100	3.50	.00	0.	2	99	A35	.00
159	158B	33.8	55.13	127.7	249.37	0	0.	.00000	.00	.00	0.	4	14	A35	.16
159	159B	.0	.00	127.7	249.37	4	1400.	.08400	3.50	.00	0.	4	99	A35	.00
159	160B	33.8	63.25	161.5	305.02	0	0.	.00000	.00	.00	0.	4	12	A35	.36
159	161B	.0	.00	161.5	305.02	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	162A	11.5	19.65	671.3	910.47	0	0.	.00000	.00	.00	0.	4	12	A35	.02

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*                                              CONFLUENCE Q'S                                                     *
*    159  163A  TA 1161 QA   910.47 QAB  1197.74 QB   287.28     159  163B  TB 1159 QB   305.02 QBA  1185.26 QA   880.24   *
*                          159  163AB TAB 1160 QAB  1204.69 QA   903.89 QB   300.80                               *
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LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	163AB	161.5	305.02	832.8	1204.69	4	450.	.06700	5.00	.00	0.	4	0	A35	.00
159	164A	.0	.00	832.8	1202.31	4	460.	.04300	9.50	.00	0.	4	99	A35	.00
159	165A	21.9	41.61	854.7	1231.21	4	180.	.16700	9.50	.00	0.	4	12	A35	.42
159	166A	.0	.00	854.7	1230.66	0	0.	.00000	.00	.00	0.	4	99	A35	.00

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE:

HYDROGRAPH AT 159 166A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	28.76	200	30.36	300	33.11	400	36.19
500	39.96	600	44.54	700	50.50	800	58.38	900	70.27
1000	90.29	1050	113.69	1100	166.73	1110	195.71	1120	242.49
1130	300.17	1131	306.79	1132	313.47	1133	320.23	1134	327.34
1135	334.75	1136	342.59	1137	350.83	1138	359.91	1139	369.55
1140	380.14	1141	391.54	1142	404.30	1143	417.69	1144	432.29
1145	448.39	1146	466.40	1147	486.11	1148	507.66	1149	536.07
1150	572.95	1151	617.98	1152	672.23	1153	734.66	1154	820.92
1155	912.37	1156	998.82	1157	1083.27	1158	1153.53	1159	1203.38
1160	1229.95	1161	1230.66	1162	1212.34	1163	1174.36	1164	1125.73
1165	1065.95	1166	1006.36	1167	946.25	1168	884.67	1169	824.78
1170	768.12	1171	720.22	1172	672.13	1173	622.07	1174	583.72
1175	548.24	1176	518.67	1177	491.25	1178	466.81	1179	444.38
1180	423.89	1181	405.09	1182	387.37	1183	370.64	1184	355.38
1185	340.66	1186	327.30	1187	314.63	1188	302.76	1189	291.17
1190	280.52	1191	270.30	1192	260.97	1193	252.19	1194	244.17
1195	236.73	1196	229.75	1197	223.49	1198	217.84	1199	212.79
1200	208.19	1201	204.01	1202	199.95	1203	196.13	1204	192.52
1205	189.18	1206	185.78	1207	182.45	1208	179.20	1209	175.94
1210	172.73	1211	169.62	1212	166.61	1213	163.64	1214	160.65
1215	157.68	1216	154.71	1217	151.82	1218	149.03	1219	146.42
1220	143.80	1221	141.22	1222	138.64	1223	136.10	1224	133.55
1225	131.07	1226	128.70	1227	126.34	1228	124.11	1229	121.98
1230	119.95	1231	117.90	1232	115.91	1233	113.95	1234	112.15
1235	110.37	1236	108.78	1237	107.17	1238	105.64	1239	104.14
1240	102.73	1241	101.32	1242	99.94	1243	98.60	1244	97.28
1245	95.94	1246	94.63	1247	93.39	1248	92.15	1249	90.97
1250	89.84	1251	88.76	1252	87.67	1253	86.62	1254	85.64
1255	84.71	1256	83.80	1257	82.91	1258	82.07	1259	81.17
1260	80.30	1261	79.51	1262	78.70	1263	77.91	1264	77.16
1265	76.41	1266	75.64	1267	74.87	1268	74.17	1269	73.51
1270	72.85	1271	72.22	1272	71.62	1273	71.00	1274	70.40
1275	69.86	1276	69.36	1277	68.81	1278	68.19	1279	67.57
1280	66.98	1281	66.43	1282	65.91	1283	65.42	1284	64.94
1285	64.47	1286	63.96	1287	63.48	1288	63.03	1289	62.55
1290	62.13	1291	61.71	1292	61.24	1293	60.79	1294	60.36
1295	59.98	1296	59.60	1297	59.19	1298	58.83	1299	58.45
1300	58.07	1310	54.53	1320	51.54	1330	49.10	1340	46.90
1350	44.78	1360	42.65	1370	40.86	1380	39.24	1390	37.70
1400	36.20	1420	34.06	1440	32.08	1460	28.76	1500	28.76

TOTAL VOLUME THIS HYDROGRAPH = 164.78(Ac.Ft)

50-YEAR

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

STORM DAY 4

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 108A	8.1	18.88	8.1	18.88	0	0.	.00000	.00	.00	0.	2	13	A35	.21
159 109A	.0	.00	8.1	18.88	4	135.	2.00000	2.00	.00	0.	2	99	A35	.00
159 110A	46.7	91.34	54.8	110.21	2	735.	.01400	.00	.00	0.	2	18	A35	.02
159 111A	.0	.00	54.8	108.67	2	1660.	.00200	.00	.00	0.	2	99	A35	.00
159 112B	16.2	27.23	16.2	27.23	4	270.	.01900	2.75	.00	0.	4	18	A35	.21
159 113AB	16.2	27.19	71.0	90.05	1	735.	.01400	.00	.00	0.	4	0	A35	.00
159 114B	23.8	42.37	23.8	42.37	0	0.	.00000	.00	.00	0.	4	18	A35	.42
159 115AB	23.8	42.37	94.8	97.47	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159 116A	27.9	43.03	122.7	138.10	4	560.	.02300	3.50	.00	0.	4	21	A35	.21
159 117B	8.8	14.07	8.8	14.07	4	350.	.06600	2.00	.00	0.	4	22	A35	.42
159 118AB	8.8	14.07	131.5	151.59	4	220.	.16800	3.50	.00	0.	4	0	A35	.00
159 119A	7.0	21.17	138.5	157.54	1	210.	.54200	.00	.00	0.	4	6	A35	.21
159 120A	.0	.00	138.5	157.48	1	215.	.27900	.00	.00	0.	4	99	A35	.00
159 121B	3.5	10.59	3.5	10.59	0	0.	.00000	.00	.00	0.	4	6	A35	.21
159 122B	.0	.00	3.5	10.59	1	510.	.43100	.00	.00	0.	4	99	A35	.00

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*****************************************************************************************************************
*                                            CONFLUENCE Q'S                                                     *
*   159  123A  TA 1156 QA   157.44 QAB   167.07 QB     9.63     159  123B  TB 1155 QB    10.29 QBA   166.72 QA   156.43   *
*                            159  123AB TAB 1156 QAB  167.07 QA   157.44 QB     9.63                             *
*****************************************************************************************************************
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LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 123AB	3.5	10.29	142.0	167.07	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159 124A	.0	.00	142.0	167.07	1	1675.	.17900	.00	.00	0.	4	99	A35	.00
159 125A	60.0	141.02	202.0	286.64	0	0.	.00000	.00	.00	0.	4	9	A35	.01
159 126A	.0	.00	202.0	286.64	1	550.	.13600	.00	.00	0.	4	99	A35	.00
159 127B	14.5	36.97	14.5	36.97	4	570.	.07000	2.00	.00	0.	4	9	A35	.42
159 128B	.0	.00	14.5	36.81	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159 129C	53.3	112.42	53.3	112.42	4	1260.	.03000	3.25	.00	0.	4	13	A35	.42
159 130C	.0	.00	53.3	111.74	0	0.	.00000	.00	.00	0.	4	99	A35	.00

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*****************************************************************************************************************
*                                            CONFLUENCE Q'S                                                     *
*   159  131B  TB 1155 QB    36.81 QBC   145.84 QC   109.02     159  131C  TC 1157 QC   111.74 QCB   146.85 QB    35.11   *
*                            159  131BC TBC 1156 QBC  147.51 QB    36.08 QC   111.43                             *
*****************************************************************************************************************
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LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 131BC	53.3	111.74	67.8	147.51	1	2640.	.21200	.00	.00	0.	4	0	A35	.00
159 132B	68.7	192.09	136.5	293.77	0	0.	.00000	.00	.00	0.	2	9	A35	.01
159 133AB	136.5	293.77	338.5	575.64	0	0.	.00000	.00	.00	0.	2	0	A35	.00
159 134A	.0	.00	338.5	575.64	1	1955.	.08700	.00	.00	0.	2	99	A35	.00
159 135B	15.8	28.97	15.8	28.97	2	165.	.09100	2.00	.00	0.	4	17	A35	.42
159 136B	.0	.00	15.8	28.97	4	300.	.11700	3.00	.00	0.	4	99	A35	.00
159 137C	1.3	4.39	1.3	4.39	1	320.	.53100	.00	.00	0.	4	5	A35	.21

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 Program Package Serial Number:  2061
03/30/11   FILE: HPBE     INPUT DATA: English Units  RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units     PAGE     2
                                        LOS ANGELES COUNTY FLOOD CONTROL DISTRICT                                    PROG F0601M

                     MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50  SOIL DATA FILE: C:\civild\cst_soilx_83.dat
                                                                                                                 STORM DAY 4
                         SUBAREA  SUBAREA     TOTAL    TOTAL  CONV   CONV     CONV     CONV   CONV   CONTROL SOIL      RAIN  PCT
         LOCATION        AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z      Q(CFS) NAME  TC  ZONE  IMPV
     ****************************************************************************************************************************
     *                                                     CONFLUENCE Q'S                                                         *
     *    159  138B  TB 1156 QB    28.94 QBC    32.23 QC     3.30     159  138C  TC 1154 QC     4.09 QCB    32.37 QB    28.28  *
     *                                 159  138BC TBC 1155 QBC    32.72 QB    28.85 QC     3.87                                   *
     ****************************************************************************************************************************
                         SUBAREA  SUBAREA     TOTAL    TOTAL  CONV   CONV     CONV     CONV   CONV   CONTROL SOIL      RAIN  PCT
         LOCATION        AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z      Q(CFS) NAME  TC  ZONE  IMPV
          159  138BC    1.3       4.09       17.1     32.72   1     1600.   .33800       .00   .00          0.     4   0   A35   .00
          159  139B    59.1     118.59       76.2    145.31   1     1880.   .09600       .00   .00          0.     4  12   A35   .02
          159  140B    16.5      46.36       92.7    165.18   0        0.   .00000       .00   .00          0.     2   9   A35   .38
          159  141C    61.2     147.74       61.2    147.74   0        0.   .00000       .00   .00          0.     2  12   A35   .01
          159  142C    23.3      88.65       84.5    234.31   0        0.   .00000       .00   .00          0.     2   5   A35   .01
          159  143C    48.3     116.73      132.8    349.39   0        0.   .00000       .00   .00          0.     2  12   A35   .05
     ****************************************************************************************************************************
     *                                                     CONFLUENCE Q'S                                                         *
     *    159  144B  TB 1159 QB   165.18 QBC   424.51 QC   259.34     159  144C  TC 1153 QC   349.39 QCB   467.00 QB   117.61   *
     *                                 159  144BC TBC 1154 QBC   471.06 QB   128.37 QC   342.69                                   *
     ****************************************************************************************************************************
                         SUBAREA  SUBAREA     TOTAL    TOTAL  CONV   CONV     CONV     CONV   CONV   CONTROL SOIL      RAIN  PCT
         LOCATION        AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z      Q(CFS) NAME  TC  ZONE  IMPV
          159  144BC  132.8     349.39      225.5    471.06   0        0.   .00000       .00   .00          0.     2   0   A35   .00
          159  145B      .0        .00      225.5    471.06   0        0.   .00000       .00   .00          0.     2  99   A35   .00
          159  146A    31.6      99.76      370.1    588.89   0        0.   .00000       .00   .00          0.     2   7   A35   .13
     ****************************************************************************************************************************
     *                                                     CONFLUENCE Q'S                                                         *
     *    159  147A  TA 1159 QA   588.89 QAB  1013.41 QB   424.51     159  147B  TB 1154 QB   471.06 QBA   940.50 QA   469.43   *
     *                                 159  147AB TAB 1157 QAB  1022.04 QA   566.67 QB   455.37                                   *
     ****************************************************************************************************************************
                         SUBAREA  SUBAREA     TOTAL    TOTAL  CONV   CONV     CONV     CONV   CONV   CONTROL SOIL      RAIN  PCT
         LOCATION        AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z      Q(CFS) NAME  TC  ZONE  IMPV
          159  147AB  225.5     471.06      595.6   1022.04   1      590.   .08500       .00   .00          0.     2   0   A35   .00
          159  148A    16.2      42.06      611.8   1048.64   0        0.   .00000       .00   .00          0.     4   8   A35   .22
          159  149A      .0        .00      611.8   1048.64   1     1180.   .05100       .00   .00          0.     4  99   A35   .00
          159  150B    13.9      38.92       13.9     38.92   0        0.   .00000       .00   .00          0.     4   7   A35   .26
          159  151B    21.6      48.40       35.5     87.32   0        0.   .00000       .00   .00          0.     4  10   A35   .02
          159  152A    12.5      34.51      624.3   1050.71   0        0.   .00000       .00   .00          0.     4   7   A35   .18
     ****************************************************************************************************************************
     *                                                     CONFLUENCE Q'S                                                         *
     *    159  153A  TA 1160 QA  1050.71 QAB  1092.19 QB    41.47     159  153B  TB 1154 QB    87.32 QBA   866.93 QA   779.60   *
     *                                 159  153AB TAB 1159 QAB  1102.70 QA  1049.42 QB    53.27                                   *
     ****************************************************************************************************************************
                         SUBAREA  SUBAREA     TOTAL    TOTAL  CONV   CONV     CONV     CONV   CONV   CONTROL SOIL      RAIN  PCT
         LOCATION        AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z      Q(CFS) NAME  TC  ZONE  IMPV
          159  153AB   35.5      87.32      659.8   1102.70   1      990.   .06100       .00   .00          0.     4   0   A35   .00
          159  154B     7.7      20.66        7.7     20.66   0        0.   .00000       .00   .00          0.     4   7   A35   .02
          159  155B    21.3      54.36       29.0     75.02   4     1470.   .03400      3.00   .00          0.     4   8   A35   .13
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MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\cst_soilx_83.dat
STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	156B	64.9	173.32	93.9	242.34	4	520.	.05800	3.00	.00	0.	2	10	A35	.02
159	157B	.0	.00	93.9	241.52	4	1760.	.04100	3.75	.00	0.	2	99	A35	.00
159	158B	33.8	70.11	127.7	303.81	0	0.	.00000	.00	.00	0.	4	12	A35	.16
159	159B	.0	.00	127.7	303.81	4	1400.	.08400	3.50	.00	0.	4	99	A35	.00
159	160B	33.8	76.98	161.5	371.07	0	0.	.00000	.00	.00	0.	4	11	A35	.36
159	161B	.0	.00	161.5	371.07	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	162A	11.5	24.30	671.3	1112.77	0	0.	.00000	.00	.00	0.	4	11	A35	.02

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*******************************************************************************************************************************
*                                                    CONFLUENCE Q'S                                                           *
*    159  163A  TA 1160 QA  1112.77 QAB  1469.48 QB   356.71     159  163B  TB 1158 QB   371.07 QBA  1428.52 QA  1057.45   *
*                            159  163AB TAB 1160 QAB  1469.48 QA  1112.77 QB   356.71                                         *
*******************************************************************************************************************************
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LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	163AB	161.5	371.07	832.8	1469.48	4	450.	.06700	5.00	.00	0.	4	0	A35	.00
159	164A	.0	.00	832.8	1469.22	4	460.	.04300	9.50	.00	0.	4	99	A35	.00
159	165A	21.9	50.51	854.7	1505.69	4	180.	.16700	9.50	.00	0.	4	11	A35	.42
159	166A	.0	.00	854.7	1505.43	0	0.	.00000	.00	.00	0.	4	99	A35	.00

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE:

HYDROGRAPH AT 159 166A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	36.01	200	37.88	300	41.03	400	44.55
500	48.86	600	54.08	700	60.86	800	70.39	900	84.46
1000	107.32	1050	135.20	1100	208.15	1110	246.67	1120	303.81
1130	373.13	1131	381.18	1132	388.68	1133	396.82	1134	405.01
1135	413.88	1136	423.09	1137	433.54	1138	444.74	1139	456.90
1140	469.74	1141	484.09	1142	499.47	1143	516.03	1144	533.52
1145	553.14	1146	575.37	1147	599.78	1148	626.27	1149	661.63
1150	706.50	1151	764.99	1152	847.08	1153	941.62	1154	1044.52
1155	1157.75	1156	1269.17	1157	1368.93	1158	1445.64	1159	1494.85
1160	1505.43	1161	1488.79	1162	1443.38	1163	1380.06	1164	1302.03
1165	1220.82	1166	1138.95	1167	1056.27	1168	978.57	1169	904.39
1170	838.72	1171	781.16	1172	734.82	1173	690.56	1174	648.63
1175	612.63	1176	580.29	1177	551.57	1178	525.66	1179	501.15
1180	478.68	1181	457.54	1182	437.69	1183	418.86	1184	401.63
1185	384.88	1186	369.14	1187	354.62	1188	340.79	1189	328.24
1190	316.62	1191	306.02	1192	296.29	1193	287.55	1194	279.42
1195	272.16	1196	265.53	1197	259.56	1198	254.04	1199	248.75
1200	243.67	1201	238.62	1202	233.72	1203	228.93	1204	224.31
1205	219.81	1206	215.46	1207	211.18	1208	206.85	1209	202.53
1210	198.18	1211	193.91	1212	189.83	1213	185.94	1214	182.20
1215	178.58	1216	174.98	1217	171.40	1218	167.95	1219	164.55
1220	161.26	1221	158.12	1222	155.12	1223	152.19	1224	149.31
1225	146.56	1226	143.88	1227	141.36	1228	139.01	1229	136.78
1230	134.65	1231	132.60	1232	130.41	1233	128.36	1234	126.43
1235	124.72	1236	123.12	1237	121.44	1238	119.80	1239	118.15
1240	116.57	1241	115.00	1242	113.54	1243	112.08	1244	110.63
1245	109.28	1246	107.89	1247	106.59	1248	105.34	1249	104.09
1250	102.95	1251	101.84	1252	100.77	1253	99.71	1254	98.71
1255	97.71	1256	96.69	1257	95.74	1258	94.73	1259	93.76
1260	92.83	1261	91.94	1262	91.08	1263	90.26	1264	89.45
1265	88.58	1266	87.73	1267	86.94	1268	86.21	1269	85.53
1270	84.82	1271	84.14	1272	83.45	1273	82.79	1274	82.17
1275	81.56	1276	80.95	1277	80.31	1278	79.60	1279	78.88
1280	78.20	1281	77.61	1282	76.99	1283	76.37	1284	75.81
1285	75.26	1286	74.71	1287	74.16	1288	73.66	1289	73.16
1290	72.67	1291	72.18	1292	71.67	1293	71.24	1294	70.80
1295	70.34	1296	69.94	1297	69.54	1298	69.14	1299	68.68
1300	68.31	1310	64.42	1320	61.02	1330	58.42	1340	56.01
1350	53.65	1360	51.25	1370	49.27	1380	47.48	1390	45.73
1400	44.04	1420	41.74	1440	39.50	1460	36.01	1500	36.01

TOTAL VOLUME THIS HYDROGRAPH = 197.98(Ac.Ft)

50-YEAR

(BURN)

Program Package Serial Number: 2061

03/30/11 FILE: HPBE INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 1

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	108A	8.1	18.88	8.1	18.88	0	0.	.00000	.00	.00	0.	2	13	A35	.21
159	109A	.0	.00	8.1	18.88	4	135.	2.00000	2.00	.00	0.	2	99	A35	.00
159	110A	46.7	91.34	54.8	110.21	2	735.	.01400	.00	.00	0.	2	18	A35	.02
159	111A	.0	.00	54.8	108.67	2	1660.	.00200	.00	.00	0.	2	99	A35	.00
159	112B	16.2	27.23	16.2	27.23	4	270.	.01900	2.75	.00	0.	4	18	A35	.21
159	113AB	16.2	27.19	71.0	90.05	1	735.	.01400	.00	.00	0.	4	0	A35	.00
159	114B	23.8	42.37	23.8	42.37	0	0.	.00000	.00	.00	0.	4	18	A35	.42
159	115AB	23.8	42.37	94.8	97.47	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159	116A	27.9	43.03	122.7	138.10	4	560.	.02300	3.50	.00	0.	4	21	A35	.21
159	117B	8.8	14.07	8.8	14.07	4	350.	.06600	2.00	.00	0.	4	22	A35	.42
159	118AB	8.8	14.07	131.5	151.59	4	220.	.16800	3.50	.00	0.	4	0	A35	.00
159	119A	7.0	21.17	138.5	157.54	1	210.	.54200	.00	.00	0.	4	6	A35	.21
159	120A	.0	.00	138.5	157.48	1	215.	.27900	.00	.00	0.	4	99	A35	.00
159	121B	3.5	10.59	3.5	10.59	0	0.	.00000	.00	.00	0.	4	6	A35	.21
159	122B	.0	.00	3.5	10.59	1	510.	.43100	.00	.00	0.	4	99	A35	.00

CONFLUENCE Q'S

159 123A TA 1156 QA 157.44 QAB 167.07 QB 9.63 159 123B TB 1155 QB 10.29 QBA 166.72 QA 156.43

159 123AB TAB 1156 QAB 167.07 QA 157.44 QB 9.63

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	123AB	3.5	10.29	142.0	167.07	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159	124A	.0	.00	142.0	167.07	1	1675.	.17900	.00	.00	0.	4	99	A35	.00
159	125A	60.0	156.79	202.0	301.78	0	0.	.00000	.00	.00	0.	204	9	A35	.01
159	126A	.0	.00	202.0	301.78	1	550.	.13600	.00	.00	0.	204	99	A35	.00
159	127B	14.5	36.97	14.5	36.97	4	570.	.07000	2.00	.00	0.	4	9	A35	.42
159	128B	.0	.00	14.5	36.81	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	129C	53.3	112.42	53.3	112.42	4	1260.	.03000	3.25	.00	0.	4	13	A35	.42
159	130C	.0	.00	53.3	111.74	0	0.	.00000	.00	.00	0.	4	99	A35	.00

CONFLUENCE Q'S

159 131B TB 1155 QB 36.81 QBC 145.84 QC 109.02 159 131C TC 1157 QC 111.74 QCB 146.85 QB 35.11

159 131BC TBC 1156 QBC 147.51 QB 36.08 QC 111.43

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	131BC	53.3	111.74	67.8	147.51	1	2640.	.21200	.00	.00	0.	4	0	A35	.00
159	132B	68.7	199.95	136.5	301.46	0	0.	.00000	.00	.00	0.	202	9	A35	.01
159	133AB	136.5	301.46	338.5	598.81	0	0.	.00000	.00	.00	0.	202	0	A35	.00
159	134A	.0	.00	338.5	598.81	1	1955.	.08700	.00	.00	0.	202	99	A35	.00
159	135B	15.8	28.97	15.8	28.97	2	165.	.09100	2.00	.00	0.	4	17	A35	.42
159	136B	.0	.00	15.8	28.97	4	300.	.11700	3.00	.00	0.	4	99	A35	.00
159	137C	1.3	4.39	1.3	4.39	1	320.	.53100	.00	.00	0.	4	5	A35	.21

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 Program Package Serial Number:  2061
03/30/11   FILE: HPBE     INPUT DATA: English Units  RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units     PAGE     2
                                        LOS ANGELES COUNTY FLOOD CONTROL DISTRICT                                    PROG F0601M

                  MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50  SOIL DATA FILE: C:\civild\cst_soilx_83.dat
                                                                                                          STORM DAY 4
                       SUBAREA  SUBAREA    TOTAL    TOTAL  CONV   CONV     CONV     CONV   CONV   CONTROL SOIL      RAIN  PCT
      LOCATION       AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
    ******************************************************************************************************************************
    *                                                           CONFLUENCE Q'S                                                   *
    *    159  138B  TB 1156 QB    28.94 QBC    32.23 QC     3.30     159  138C  TC 1154 QC     4.09 QCB    32.37 QB    28.28   *
    *                                 159  138BC TBC 1155 QBC    32.72 QB    28.85 QC     3.87                                   *
    ******************************************************************************************************************************
                       SUBAREA  SUBAREA    TOTAL    TOTAL  CONV   CONV     CONV     CONV   CONV   CONTROL SOIL      RAIN  PCT
      LOCATION       AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
       159  138BC    1.3       4.09      17.1     32.72   1    1600.   .33800      .00   .00         0.    4   0   A35   .00
       159  139B    30.8      76.76      47.9    101.40   1    1880.   .09600      .00   .00         0.  204  10   A35   .01
       159  140B    44.8     118.33      92.7    195.38   0       0.   .00000      .00   .00         0.  202  11   A35   .01
       159  141C    61.2     154.41      61.2    154.41   0       0.   .00000      .00   .00         0.  202  12   A35   .01
       159  142C    23.3      91.55      84.5    243.84   0       0.   .00000      .00   .00         0.  202   5   A35   .01
       159  143C    48.3     121.78     132.8    363.96   0       0.   .00000      .00   .00         0.  202  12   A35   .05
    ******************************************************************************************************************************
    *                                                           CONFLUENCE Q'S                                                   *
    *    159  144B  TB 1159 QB   195.38 QBC   467.78 QC   272.40     159  144C  TC 1153 QC   363.96 QCB   528.51 QB   164.55   *
    *                                 159  144BC TBC 1154 QBC   529.86 QB   172.64 QC   357.21                                   *
    ******************************************************************************************************************************
                       SUBAREA  SUBAREA    TOTAL    TOTAL  CONV   CONV     CONV     CONV   CONV   CONTROL SOIL      RAIN  PCT
      LOCATION       AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
       159  144BC  132.8     363.96     225.5    529.86   0       0.   .00000      .00   .00         0.  202   0   A35   .00
       159  145B      .0        .00     225.5    529.86   0       0.   .00000      .00   .00         0.  202  99   A35   .00
       159  146A    31.6     103.32     370.1    615.48   0       0.   .00000      .00   .00         0.  202   7   A35   .05
    ******************************************************************************************************************************
    *                                                           CONFLUENCE Q'S                                                   *
    *    159  147A  TA 1159 QA   615.48 QAB  1083.27 QB   467.78     159  147B  TB 1154 QB   529.86 QBA  1025.27 QA   495.42   *
    *                                 159  147AB TAB 1157 QAB  1093.13 QA   594.62 QB   498.52                                   *
    ******************************************************************************************************************************
                       SUBAREA  SUBAREA    TOTAL    TOTAL  CONV   CONV     CONV     CONV   CONV   CONTROL SOIL      RAIN  PCT
      LOCATION       AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
       159  147AB  225.5     529.86     595.6   1093.13   1     590.   .08500      .00   .00         0.  202   0   A35   .00
       159  148A    16.2      45.51     611.8   1124.42   0       0.   .00000      .00   .00         0.  204   8   A35   .22
       159  149A      .0        .00     611.8   1124.42   1    1180.   .05100      .00   .00         0.  204  99   A35   .00
       159  150B    13.9      38.92      13.9     38.92   0       0.   .00000      .00   .00         0.    4   7   A35   .26
       159  151B    21.6      53.88      35.5     92.80   0       0.   .00000      .00   .00         0.  204  10   A35   .02
       159  152A    12.5      34.51     624.3   1129.57   0       0.   .00000      .00   .00         0.    4   7   A35   .18
    ******************************************************************************************************************************
    *                                                           CONFLUENCE Q'S                                                   *
    *    159  153A  TA 1159 QA  1129.57 QAB  1187.67 QB    58.10     159  153B  TB 1154 QB    92.80 QBA   957.52 QA   864.71   *
    *                                 159  153AB TAB 1158 QAB  1189.06 QA  1118.69 QB    70.37                                   *
    ******************************************************************************************************************************
                       SUBAREA  SUBAREA    TOTAL    TOTAL  CONV   CONV     CONV     CONV   CONV   CONTROL SOIL      RAIN  PCT
      LOCATION       AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
       159  153AB   35.5      92.80     659.8   1189.06   1     990.   .06100      .00   .00         0.  204   0   A35   .00
       159  154B     7.7      22.80       7.7     22.80   0       0.   .00000      .00   .00         0.  204   7   A35   .02
       159  155B    21.3      54.36      29.0     77.16   4    1470.   .03400     3.00   .00         0.    4   8   A35   .13
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MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	156B	64.9	180.58	93.9	251.71	4	520.	.05800	3.00	.00	0.	202	10	A35	.02
159	157B	.0	.00	93.9	250.91	4	1760.	.04100	3.75	.00	0.	202	99	A35	.00
159	158B	33.8	70.11	127.7	312.70	0	0.	.00000	.00	.00	0.	4	12	A35	.16
159	159B	.0	.00	127.7	312.70	4	1400.	.08400	3.50	.00	0.	4	99	A35	.00
159	160B	33.8	76.98	161.5	378.42	0	0.	.00000	.00	.00	0.	4	11	A35	.36
159	161B	.0	.00	161.5	378.42	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	162A	11.5	27.14	671.3	1203.88	0	0.	.00000	.00	.00	0.	204	11	A35	.02

****
*   CONFLUENCE Q'S   *
*   159 163A TA 1160 QA 1203.88 QAB 1570.59 QB   366.71   159 163B TB 1158 QB   378.42 QBA 1537.75 QA 1159.33   *
*   159 163AB TAB 1159 QAB 1572.49 QA 1194.47 QB   378.02   *
****

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	163AB	161.5	378.42	832.8	1572.49	4	450.	.06700	5.00	.00	0.	4	0	A35	.00
159	164A	.0	.00	832.8	1570.77	4	460.	.04300	9.50	.00	0.	4	99	A35	.00
159	165A	21.9	50.51	854.7	1608.47	4	180.	.16700	9.50	.00	0.	4	11	A35	.42
159	166A	.0	.00	854.7	1608.33	0	0.	.00000	.00	.00	0.	4	99	A35	.00

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE:

HYDROGRAPH AT 159 166A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	46.07	200	48.40	300	52.24	400	56.49
500	61.69	600	68.00	700	76.22	800	87.56	900	104.31
1000	131.45	1050	164.87	1100	243.13	1110	284.55	1120	346.38
1130	419.73	1131	427.92	1132	436.07	1133	444.35	1134	453.17
1135	462.34	1136	472.24	1137	483.02	1138	494.89	1139	507.54
1140	521.09	1141	536.02	1142	552.23	1143	569.76	1144	588.48
1145	609.25	1146	632.68	1147	658.33	1148	686.17	1149	721.20
1150	773.64	1151	845.32	1152	923.94	1153	1022.21	1154	1135.04
1155	1255.77	1156	1375.77	1157	1479.40	1158	1556.38	1159	1601.87
1160	1608.33	1161	1587.73	1162	1535.83	1163	1465.25	1164	1378.20
1165	1287.80	1166	1194.54	1167	1101.34	1168	1012.84	1169	931.31
1170	858.68	1171	797.37	1172	749.11	1173	708.80	1174	669.26
1175	632.57	1176	602.62	1177	574.80	1178	549.89	1179	526.74
1180	504.57	1181	484.13	1182	464.33	1183	445.85	1184	428.19
1185	411.89	1186	396.22	1187	381.53	1188	367.88	1189	355.29
1190	343.45	1191	332.89	1192	322.83	1193	313.98	1194	306.03
1195	299.02	1196	292.50	1197	286.36	1198	280.57	1199	275.05
1200	269.67	1201	264.48	1202	259.41	1203	254.53	1204	249.90
1205	245.35	1206	240.85	1207	236.27	1208	231.57	1209	226.83
1210	222.27	1211	217.99	1212	213.91	1213	209.90	1214	205.82
1215	201.85	1216	197.93	1217	194.08	1218	190.38	1219	186.76
1220	183.28	1221	180.00	1222	176.87	1223	173.82	1224	170.79
1225	167.88	1226	165.06	1227	162.45	1228	160.04	1229	157.71
1230	155.52	1231	153.32	1232	151.13	1233	149.00	1234	146.92
1235	144.97	1236	143.12	1237	141.23	1238	139.42	1239	137.62
1240	135.89	1241	134.16	1242	132.56	1243	131.00	1244	129.58
1245	128.14	1246	126.71	1247	125.37	1248	124.10	1249	122.83
1250	121.63	1251	120.41	1252	119.19	1253	117.96	1254	116.81
1255	115.67	1256	114.53	1257	113.46	1258	112.34	1259	111.28
1260	110.26	1261	109.30	1262	108.37	1263	107.48	1264	106.59
1265	105.65	1266	104.73	1267	103.89	1268	103.11	1269	102.39
1270	101.64	1271	100.94	1272	100.23	1273	99.53	1274	98.86
1275	98.16	1276	97.45	1277	96.69	1278	95.85	1279	95.02
1280	94.24	1281	93.56	1282	92.86	1283	92.17	1284	91.55
1285	90.95	1286	90.33	1287	89.71	1288	89.14	1289	88.57
1290	88.03	1291	87.49	1292	86.94	1293	86.47	1294	85.99
1295	85.48	1296	85.01	1297	84.55	1298	84.11	1299	83.60
1300	83.17	1310	78.61	1320	74.74	1330	71.83	1340	69.04
1350	66.27	1360	63.45	1370	61.10	1380	59.10	1390	56.98
1400	54.99	1420	52.39	1440	49.78	1460	46.07	1500	46.07

TOTAL VOLUME THIS HYDROGRAPH = 232.77(Ac.Ft)

Post-development

(Watershed)

2-YEAR

Program Package Serial Number: 2061
03/30/11 FILE: HPBP INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 1
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 2 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	108A	8.1	4.01	8.1	4.01	0	0.	.00000	.00	.00	0.	2	30	A35	.21
159	109A	.0	.00	8.1	4.01	4	135.	2.00000	2.00	.00	0.	2	99	A35	.00
159	110A	46.7	21.63	54.8	25.64	2	735.	.01400	.00	.00	0.	2	30	A35	.02
159	111A	.0	.00	54.8	25.36	2	1660.	.00200	.00	.00	0.	2	99	A35	.00
159	112B	16.2	5.41	16.2	5.41	4	270.	.01900	2.75	.00	0.	4	30	A35	.21
159	113AB	16.2	5.41	71.0	20.72	1	735.	.01400	.00	.00	0.	4	0	A35	.00
159	114B	23.8	9.79	23.8	9.79	0	0.	.00000	.00	.00	0.	4	30	A35	.42
159	115AB	23.8	9.79	94.8	22.10	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159	116A	27.9	9.31	122.7	27.94	4	560.	.02300	3.50	.00	0.	4	30	A35	.21
159	117B	8.8	3.62	8.8	3.62	4	350.	.06600	2.00	.00	0.	4	30	A35	.42
159	118AB	8.8	3.62	131.5	31.32	4	220.	.16800	3.50	.00	0.	4	0	A35	.00
159	119A	7.0	3.69	138.5	33.83	1	210.	.54200	.00	.00	0.	4	16	A35	.21
159	120A	.0	.00	138.5	33.81	1	215.	.27900	.00	.00	0.	4	99	A35	.00
159	121B	3.5	1.93	3.5	1.93	0	0.	.00000	.00	.00	0.	4	15	A35	.21
159	122B	.0	.00	3.5	1.93	1	510.	.43100	.00	.00	0.	4	99	A35	.00

CONFLUENCE Q'S

159 123A TA 1164 QA 33.77 QAB 35.40 QB 1.63 159 123B TB 1158 QB 1.89 QBA 34.08 QA 32.19

159 123AB TAB 1164 QAB 35.40 QA 33.77 QB 1.63

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	123AB	3.5	1.89	142.0	35.40	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159	124A	.0	.00	142.0	35.40	1	1675.	.17900	.00	.00	0.	4	99	A35	.00
159	125A	60.0	15.60	202.0	48.95	0	0.	.00000	.00	.00	0.	4	30	A35	.01
159	126A	.0	.00	202.0	48.95	1	550.	.13600	.00	.00	0.	4	99	A35	.00
159	127B	14.5	7.28	14.5	7.28	4	570.	.07000	2.00	.00	0.	4	22	A35	.42
159	128B	.0	.00	14.5	7.28	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	129C	53.3	21.91	53.3	21.91	4	1260.	.03000	3.25	.00	0.	4	30	A35	.42
159	130C	.0	.00	53.3	21.88	0	0.	.00000	.00	.00	0.	4	99	A35	.00

CONFLUENCE Q'S

159 131B TB 1158 QB 7.28 QBC 28.81 QC 21.53 159 131C TC 1161 QC 21.88 QCB 29.00 QB 7.12

159 131BC TBC 1160 QBC 29.03 QB 7.19 QC 21.84

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	131BC	53.3	21.88	67.8	29.03	1	2640.	.21200	.00	.00	0.	4	0	A35	.00
159	132B	68.7	37.14	136.5	60.05	0	0.	.00000	.00	.00	0.	2	23	A35	.01
159	133AB	136.5	60.05	338.5	108.52	0	0.	.00000	.00	.00	0.	2	0	A35	.00
159	134A	.0	.00	338.5	108.52	1	1955.	.08700	.00	.00	0.	2	99	A35	.00
159	135B	15.8	6.50	15.8	6.50	2	165.	.09100	2.00	.00	0.	4	30	A35	.42
159	136B	.0	.00	15.8	6.50	4	300.	.11700	3.00	.00	0.	4	99	A35	.00
159	137C	1.3	.83	1.3	.83	1	320.	.53100	.00	.00	0.	4	12	A35	.21

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 2 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

STORM DAY 4

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV

CONFLUENCE Q'S

159 138B TB 1160 QB 6.49 QBC 7.25 QC .76 159 138C TC 1157 QC .82 QCB 7.26 QB 6.44
159 138BC TBC 1158 QBC 7.28 QB 6.47 QC .81

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 138BC	1.3	.82	17.1	7.28	1	1600.	.33800	.00	.00	0.	4	0	A35	.00
159 139B	59.1	15.58	76.2	22.06	1	1880.	.09600	.00	.00	0.	4	30	A35	.02
159 140B	16.5	10.82	92.7	28.19	0	0.	.00000	.00	.00	0.	2	20	A35	.40
159 141C	61.2	28.24	61.2	28.24	0	0.	.00000	.00	.00	0.	2	30	A35	.01
159 142C	23.3	18.56	84.5	46.44	0	0.	.00000	.00	.00	0.	2	12	A35	.01
159 143C	48.3	23.10	132.8	69.38	0	0.	.00000	.00	.00	0.	2	29	A35	.05

CONFLUENCE Q'S

159 144B TB 1168 QB 28.19 QBC 78.62 QC 50.43 159 144C TC 1156 QC 69.38 QCB 86.32 QB 16.93
159 144BC TBC 1160 QBC 89.46 QB 22.26 QC 67.21

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 144BC	132.8	69.38	225.5	89.46	0	0.	.00000	.00	.00	0.	2	0	A35	.00
159 145B	.0	.00	225.5	89.46	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 146A	31.6	22.50	370.1	111.55	0	0.	.00000	.00	.00	0.	2	16	A35	.23

CONFLUENCE Q'S

159 147A TA 1167 QA 111.55 QAB 190.96 QB 79.41 159 147B TB 1160 QB 89.46 QBA 182.83 QA 93.37
159 147AB TAB 1166 QAB 191.23 QA 110.93 QB 80.30

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 147AB	225.5	89.46	595.6	191.23	1	590.	.08500	.00	.00	0.	2	0	A35	.00
159 148A	16.2	8.01	611.8	197.74	0	0.	.00000	.00	.00	0.	4	22	A35	.40
159 149A	.0	.00	611.8	197.74	1	1180.	.05100	.00	.00	0.	4	99	A35	.00
159 150B	13.9	8.72	13.9	8.72	0	0.	.00000	.00	.00	0.	4	15	A35	.40
159 151B	21.6	5.70	35.5	14.29	0	0.	.00000	.00	.00	0.	4	30	A35	.02
159 152A	12.5	7.25	624.3	198.53	0	0.	.00000	.00	.00	0.	4	17	A35	.40

CONFLUENCE Q'S

159 153A TA 1170 QA 198.53 QAB 205.00 QB 6.47 159 153B TB 1155 QB 14.29 QBA 136.95 QA 122.66
159 153AB TAB 1168 QAB 205.45 QA 198.36 QB 7.09

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 153AB	35.5	14.29	659.8	205.45	1	990.	.06100	.00	.00	0.	4	0	A35	.00
159 154B	7.7	2.41	7.7	2.41	0	0.	.00000	.00	.00	0.	4	25	A35	.02
159 155B	21.3	12.35	29.0	14.75	4	1470.	.03400	3.00	.00	0.	4	17	A35	.40

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 2 SOIL DATA FILE: C:\civild\cst_soilx_83.dat
STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	156B	64.9	33.57	93.9	47.90	4	520.	.05800	3.00	.00	0.	2	25	A35	.02
159	157B	.0	.00	93.9	47.88	4	1760.	.04100	2.00	.00	0.	2	99	A35	.00
159	158B	33.8	11.16	127.7	58.20	0	0.	.00000	.00	.00	0.	4	30	A35	.20
159	159B	.0	.00	127.7	58.20	4	1400.	.08400	3.50	.00	0.	4	99	A35	.00
159	160B	33.8	13.83	161.5	71.33	0	0.	.00000	.00	.00	0.	4	28	A35	.36
159	161B	.0	.00	161.5	71.33	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	162A	11.5	3.03	671.3	207.43	0	0.	.00000	.00	.00	0.	4	30	A35	.02

CONFLUENCE Q'S

159 163A TA 1171 QA 207.43 QAB 271.78 QB 64.35 159 163B TB 1164 QB 71.33 QBA 262.12 QA 190.78

159 163AB TAB 1168 QAB 274.47 QA 205.67 QB 68.79

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	163AB	161.5	71.33	832.8	274.47	4	450.	.06700	5.00	.00	0.	4	0	A35	.00
159	164A	.0	.00	832.8	274.33	4	460.	.04300	9.50	.00	0.	4	99	A35	.00
159	165A	21.9	9.45	854.7	282.51	4	180.	.16700	9.50	.00	0.	4	28	A35	.42
159	166A	.0	.00	854.7	282.48	0	0.	.00000	.00	.00	0.	4	99	A35	.00

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 2 SOIL DATA FILE:

HYDROGRAPH AT 159 166A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	11.91	200	12.25	300	12.86	400	13.56
500	14.39	600	15.43	700	16.76	800	18.52	900	21.10
1000	27.37	1050	36.23	1100	51.77	1110	56.15	1120	63.09
1130	74.26	1131	75.44	1132	76.71	1133	78.05	1134	79.38
1135	80.79	1136	82.23	1137	83.75	1138	85.33	1139	86.97
1140	88.66	1141	90.46	1142	92.34	1143	94.32	1144	96.42
1145	98.74	1146	101.25	1147	104.11	1148	107.48	1149	112.12
1150	118.01	1151	125.02	1152	133.53	1153	143.19	1154	153.46
1155	164.04	1156	175.62	1157	187.82	1158	201.20	1159	214.66
1160	227.54	1161	239.29	1162	249.59	1163	258.37	1164	265.52
1165	271.60	1166	276.28	1167	279.77	1168	281.80	1169	282.48
1170	282.08	1171	280.86	1172	278.99	1173	276.40	1174	273.03
1175	268.94	1176	264.08	1177	257.70	1178	249.84	1179	241.95
1180	233.61	1181	224.98	1182	216.25	1183	207.91	1184	199.81
1185	192.08	1186	184.24	1187	176.51	1188	168.58	1189	160.85
1190	153.47	1191	146.44	1192	139.92	1193	133.84	1194	128.32
1195	123.25	1196	118.54	1197	114.03	1198	109.71	1199	105.76
1200	101.97	1201	98.45	1202	95.09	1203	91.94	1204	88.92
1205	86.04	1206	83.30	1207	80.71	1208	78.27	1209	75.98
1210	73.87	1211	71.94	1212	70.09	1213	68.34	1214	66.73
1215	65.24	1216	63.85	1217	62.54	1218	61.46	1219	60.36
1220	59.26	1221	58.31	1222	57.38	1223	56.54	1224	55.73
1225	54.99	1226	54.27	1227	53.59	1228	52.93	1229	52.29
1230	51.67	1231	51.06	1232	50.44	1233	49.84	1234	49.23
1235	48.64	1236	48.06	1237	47.46	1238	46.87	1239	46.27
1240	45.68	1241	45.09	1242	44.53	1243	43.96	1244	43.39
1245	42.83	1246	42.26	1247	41.70	1248	41.14	1249	40.58
1250	40.03	1251	39.49	1252	38.96	1253	38.44	1254	37.93
1255	37.43	1256	36.93	1257	36.45	1258	35.97	1259	35.51
1260	35.06	1261	34.61	1262	34.19	1263	33.77	1264	33.35
1265	32.96	1266	32.59	1267	32.23	1268	31.89	1269	31.55
1270	31.21	1271	30.87	1272	30.53	1273	30.20	1274	29.88
1275	29.55	1276	29.24	1277	28.93	1278	28.62	1279	28.31
1280	28.02	1281	27.73	1282	27.44	1283	27.20	1284	26.91
1285	26.65	1286	26.39	1287	26.14	1288	25.90	1289	25.65
1290	25.42	1291	25.20	1292	24.98	1293	24.79	1294	24.59
1295	24.39	1296	24.20	1297	24.01	1298	23.82	1299	23.64
1300	23.46	1310	21.76	1320	20.31	1330	19.14	1340	18.16
1350	17.31	1360	16.55	1370	15.90	1380	15.34	1390	14.89
1400	14.41	1420	13.73	1440	13.09	1460	11.91	1500	11.91

TOTAL VOLUME THIS HYDROGRAPH = 55.35(Ac.Ft))

2-YEAR

(BURN)

Program Package Serial Number: 2061
03/30/11 FILE: HPBP INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 1
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 2 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

STORM DAY 4

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 108A	8.1	4.01	8.1	4.01	0	0.	.00000	.00	.00	0.	2	30	A35	.21
159 109A	.0	.00	8.1	4.01	4	135.	2.00000	2.00	.00	0.	2	99	A35	.00
159 110A	46.7	21.63	54.8	25.64	2	735.	.01400	.00	.00	0.	2	30	A35	.02
159 111A	.0	.00	54.8	25.36	2	1660.	.00200	.00	.00	0.	2	99	A35	.00
159 112B	16.2	5.41	16.2	5.41	4	270.	.01900	2.75	.00	0.	4	30	A35	.21
159 113AB	16.2	5.41	71.0	20.72	1	735.	.01400	.00	.00	0.	4	0	A35	.00
159 114B	23.8	9.79	23.8	9.79	0	0.	.00000	.00	.00	0.	4	30	A35	.42
159 115AB	23.8	9.79	94.8	22.10	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159 116A	27.9	9.31	122.7	27.94	4	560.	.02300	3.50	.00	0.	4	30	A35	.21
159 117B	8.8	3.62	8.8	3.62	4	350.	.06600	2.00	.00	0.	4	30	A35	.42
159 118AB	8.8	3.62	131.5	31.32	4	220.	.16800	3.50	.00	0.	4	0	A35	.00
159 119A	7.0	3.69	138.5	33.83	1	210.	.54200	.00	.00	0.	4	16	A35	.21
159 120A	.0	.00	138.5	33.81	1	215.	.27900	.00	.00	0.	4	99	A35	.00
159 121B	3.5	1.93	3.5	1.93	0	0.	.00000	.00	.00	0.	4	15	A35	.21
159 122B	.0	.00	3.5	1.93	1	510.	.43100	.00	.00	0.	4	99	A35	.00

CONFLUENCE Q'S
159 123A TA 1164 QA 33.77 QAB 35.40 QB 1.63 159 123B TB 1158 QB 1.89 QBA 34.08 QA 32.19
159 123AB TAB 1164 QAB 35.40 QA 33.77 QB 1.63

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 123AB	3.5	1.89	142.0	35.40	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159 124A	.0	.00	142.0	35.40	1	1675.	.17900	.00	.00	0.	4	99	A35	.00
159 125A	60.0	22.01	202.0	55.21	0	0.	.00000	.00	.00	0.	204	30	A35	.01
159 126A	.0	.00	202.0	55.21	1	550.	.13600	.00	.00	0.	204	99	A35	.00
159 127B	14.5	7.28	14.5	7.28	4	570.	.07000	2.00	.00	0.	4	22	A35	.42
159 128B	.0	.00	14.5	7.28	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159 129C	53.3	21.91	53.3	21.91	4	1260.	.03000	3.25	.00	0.	4	30	A35	.42
159 130C	.0	.00	53.3	21.88	0	0.	.00000	.00	.00	0.	4	99	A35	.00

CONFLUENCE Q'S
159 131B TB 1158 QB 7.28 QBC 28.81 QC 21.53 159 131C TC 1161 QC 21.88 QCB 29.00 QB 7.12
159 131BC TBC 1160 QBC 29.03 QB 7.19 QC 21.84

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 131BC	53.3	21.88	67.8	29.03	1	2640.	.21200	.00	.00	0.	4	0	A35	.00
159 132B	68.7	41.44	136.5	64.16	0	0.	.00000	.00	.00	0.	202	23	A35	.01
159 133AB	136.5	64.16	338.5	118.86	0	0.	.00000	.00	.00	0.	2	0	A35	.00
159 134A	.0	.00	338.5	118.86	1	1955.	.08700	.00	.00	0.	2	99	A35	.00
159 135B	15.8	6.50	15.8	6.50	2	165.	.09100	2.00	.00	0.	4	30	A35	.42
159 136B	.0	.00	15.8	6.50	4	300.	.11700	3.00	.00	0.	4	99	A35	.00
159 137C	1.3	.83	1.3	.83	1	320.	.53100	.00	.00	0.	4	12	A35	.21

Program Package Serial Number: 2061
03/30/11 FILE: HPBP INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 2
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 2 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV

CONFLUENCE Q'S
159 138B TB 1160 QB 6.49 QBC 7.25 QC .76 159 138C TC 1157 QC .82 QCB 7.26 QB 6.44
159 138BC TBC 1158 QBC 7.28 QB 6.47 QC .81

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 138BC	1.3	.82	17.1	7.28	1	1600.	.33800	.00	.00	0.	4	0	A35	.00
159 139B	59.1	21.84	76.2	28.28	1	1880.	.09600	.00	.00	0.	204	30	A35	.02
159 140B	16.5	10.82	92.7	35.01	0	0.	.00000	.00	.00	0.	2	20	A35	.40
159 141C	61.2	31.75	61.2	31.75	0	0.	.00000	.00	.00	0.	202	30	A35	.01
159 142C	23.3	20.25	84.5	51.62	0	0.	.00000	.00	.00	0.	202	12	A35	.01
159 143C	48.3	25.78	132.8	77.23	0	0.	.00000	.00	.00	0.	202	29	A35	.05

CONFLUENCE Q'S
159 144B TB 1168 QB 35.01 QBC 92.09 QC 57.08 159 144C TC 1156 QC 77.23 QCB 100.37 QB 23.14
159 144BC TBC 1160 QBC 104.54 QB 29.56 QC 74.98

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 144BC	132.8	77.23	225.5	104.54	0	0.	.00000	.00	.00	0.	2	0	A35	.00
159 145B	.0	.00	225.5	104.54	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 146A	31.6	22.50	370.1	122.89	0	0.	.00000	.00	.00	0.	2	16	A35	.23

CONFLUENCE Q'S
159 147A TA 1167 QA 122.89 QAB 215.97 QB 93.08 159 147B TB 1160 QB 104.54 QBA 209.49 QA 104.94
159 147AB TAB 1164 QAB 217.34 QA 119.71 QB 97.64

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 147AB	225.5	104.54	595.6	217.34	1	590.	.08500	.00	.00	0.	2	0	A35	.00
159 148A	16.2	8.01	611.8	223.70	0	0.	.00000	.00	.00	0.	4	22	A35	.40
159 149A	.0	.00	611.8	223.70	1	1180.	.05100	.00	.00	0.	4	99	A35	.00
159 150B	13.9	8.72	13.9	8.72	0	0.	.00000	.00	.00	0.	4	15	A35	.40
159 151B	21.6	7.98	35.5	16.56	0	0.	.00000	.00	.00	0.	204	30	A35	.02
159 152A	12.5	7.25	624.3	224.95	0	0.	.00000	.00	.00	0.	4	17	A35	.40

CONFLUENCE Q'S
159 153A TA 1168 QA 224.95 QAB 234.24 QB 9.28 159 153B TB 1155 QB 16.56 QBA 160.01 QA 143.44
159 153AB TAB 1167 QAB 234.39 QA 224.33 QB 10.06

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 153AB	35.5	16.56	659.8	234.39	1	990.	.06100	.00	.00	0.	4	0	A35	.00
159 154B	7.7	3.27	7.7	3.27	0	0.	.00000	.00	.00	0.	204	25	A35	.02
159 155B	21.3	12.35	29.0	15.61	4	1470.	.03400	3.00	.00	0.	4	17	A35	.40

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 2 SOIL DATA FILE: C:\civild\cst_soilx_83.dat
STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	156B	64.9	37.48	93.9	52.68	4	520.	.05800	3.00	.00	0.	202	25	A35	.02
159	157B	.0	.00	93.9	52.66	4	1760.	.04100	2.25	.00	0.	2	99	A35	.00
159	158B	33.8	11.16	127.7	63.29	0	0.	.00000	.00	.00	0.	4	30	A35	.20
159	159B	.0	.00	127.7	63.29	4	1400.	.08400	3.50	.00	0.	4	99	A35	.00
159	160B	33.8	13.83	161.5	76.53	0	0.	.00000	.00	.00	0.	4	28	A35	.36
159	161B	.0	.00	161.5	76.53	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	162A	11.5	4.25	671.3	237.47	0	0.	.00000	.00	.00	0.	204	30	A35	.02

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* CONFLUENCE Q'S *
* 159 163A TA 1170 QA 237.47 QAB 307.40 QB 69.93 159 163B TB 1163 QB 76.53 QBA 290.52 QA 213.99 *
* 159 163AB TAB 1168 QAB 309.33 QA 236.39 QB 72.94 *
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LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	163AB	161.5	76.53	832.8	309.33	4	450.	.06700	5.00	.00	0.	4	0	A35	.00
159	164A	.0	.00	832.8	309.11	4	460.	.04300	9.50	.00	0.	4	99	A35	.00
159	165A	21.9	9.45	854.7	317.26	4	180.	.16700	9.50	.00	0.	4	28	A35	.42
159	166A	.0	.00	854.7	317.25	0	0.	.00000	.00	.00	0.	4	99	A35	.00

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 2 SOIL DATA FILE:

HYDROGRAPH AT 159 166A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	15.49	200	15.96	300	16.78	400	17.72
500	18.84	600	20.22	700	21.99	800	24.36	900	27.79
1000	35.49	1050	45.94	1100	64.10	1110	69.31	1120	77.48
1130	90.16	1131	91.57	1132	92.99	1133	94.51	1134	96.05
1135	97.66	1136	99.33	1137	101.09	1138	102.93	1139	104.86
1140	106.84	1141	108.93	1142	111.11	1143	113.39	1144	115.80
1145	118.41	1146	121.27	1147	124.62	1148	128.52	1149	133.94
1150	140.64	1151	148.26	1152	157.23	1153	167.65	1154	178.85
1155	190.56	1156	203.80	1157	217.75	1158	232.10	1159	246.57
1160	260.60	1161	272.74	1162	283.63	1163	292.64	1164	300.44
1165	306.68	1166	311.66	1167	315.01	1168	316.95	1169	317.25
1170	316.52	1171	314.78	1172	312.39	1173	309.20	1174	305.24
1175	300.54	1176	295.05	1177	288.00	1178	279.41	1179	270.66
1180	261.61	1181	251.98	1182	242.49	1183	233.19	1184	224.01
1185	215.01	1186	206.06	1187	197.24	1188	188.49	1189	180.26
1190	171.99	1191	164.22	1192	157.11	1193	150.41	1194	144.26
1195	138.44	1196	133.07	1197	128.08	1198	123.70	1199	119.39
1200	115.10	1201	111.12	1202	107.30	1203	103.71	1204	100.30
1205	97.10	1206	94.10	1207	91.30	1208	88.65	1209	86.16
1210	83.86	1211	81.71	1212	79.71	1213	77.85	1214	76.09
1215	74.48	1216	72.97	1217	71.57	1218	70.27	1219	69.09
1220	68.00	1221	66.99	1222	66.03	1223	65.11	1224	64.25
1225	63.44	1226	62.74	1227	61.99	1228	61.27	1229	60.58
1230	59.89	1231	59.22	1232	58.53	1233	57.86	1234	57.18
1235	56.53	1236	55.88	1237	55.23	1238	54.56	1239	53.89
1240	53.22	1241	52.54	1242	51.88	1243	51.21	1244	50.55
1245	49.90	1246	49.25	1247	48.63	1248	48.00	1249	47.38
1250	46.78	1251	46.19	1252	45.62	1253	45.05	1254	44.50
1255	43.97	1256	43.43	1257	42.92	1258	42.41	1259	41.94
1260	41.48	1261	41.05	1262	40.62	1263	40.19	1264	39.76
1265	39.34	1266	38.92	1267	38.51	1268	38.09	1269	37.69
1270	37.28	1271	36.89	1272	36.50	1273	36.12	1274	35.76
1275	35.40	1276	35.05	1277	34.71	1278	34.37	1279	34.04
1280	33.73	1281	33.43	1282	33.12	1283	32.83	1284	32.56
1285	32.30	1286	32.05	1287	31.79	1288	31.54	1289	31.29
1290	31.04	1291	30.79	1292	30.55	1293	30.31	1294	30.07
1295	29.83	1296	29.61	1297	29.38	1298	29.17	1299	28.95
1300	28.75	1310	26.88	1320	25.31	1330	23.98	1340	22.85
1350	21.89	1360	20.99	1370	20.24	1380	19.57	1390	18.99
1400	18.43	1420	17.57	1440	16.82	1460	15.49	1500	15.49

TOTAL VOLUME THIS HYDROGRAPH = 68.18(Ac.Ft)

5-YEAR

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 5 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	108A	8.1	7.45	8.1	7.45	0	0.	.00000	.00	.00	0.	2	24	A35	.21
159	109A	.0	.00	8.1	7.45	4	135.	2.00000	2.00	.00	0.	2	99	A35	.00
159	110A	46.7	36.48	54.8	43.93	2	735.	.01400	.00	.00	0.	2	30	A35	.02
159	111A	.0	.00	54.8	43.59	2	1660.	.00200	.00	.00	0.	2	99	A35	.00
159	112B	16.2	10.05	16.2	10.05	4	270.	.01900	2.75	.00	0.	4	30	A35	.21
159	113AB	16.2	10.05	71.0	38.51	1	735.	.01400	.00	.00	0.	4	0	A35	.00
159	114B	23.8	16.80	23.8	16.80	0	0.	.00000	.00	.00	0.	4	30	A35	.42
159	115AB	23.8	16.80	94.8	42.84	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159	116A	27.9	17.30	122.7	54.58	4	560.	.02300	3.50	.00	0.	4	30	A35	.21
159	117B	8.8	6.21	8.8	6.21	4	350.	.06600	2.00	.00	0.	4	30	A35	.42
159	118AB	8.8	6.21	131.5	60.43	4	220.	.16800	3.50	.00	0.	4	0	A35	.00
159	119A	7.0	7.65	138.5	64.45	1	210.	.54200	.00	.00	0.	4	12	A35	.21
159	120A	.0	.00	138.5	64.36	1	215.	.27900	.00	.00	0.	4	99	A35	.00
159	121B	3.5	4.04	3.5	4.04	0	0.	.00000	.00	.00	0.	4	11	A35	.21
159	122B	.0	.00	3.5	4.04	1	510.	.43100	.00	.00	0.	4	99	A35	.00

CONFLUENCE Q'S

159 123A TA 1161 QA 64.34 QAB 67.75 QB 3.41 159 123B TB 1157 QB 3.98 QBA 65.93 QA 61.95

159 123AB TAB 1161 QAB 67.75 QA 64.34 QB 3.41

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	123AB	3.5	3.98	142.0	67.75	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159	124A	.0	.00	142.0	67.75	1	1675.	.17900	.00	.00	0.	4	99	A35	.00
159	125A	60.0	43.28	202.0	105.69	0	0.	.00000	.00	.00	0.	4	20	A35	.01
159	126A	.0	.00	202.0	105.69	1	550.	.13600	.00	.00	0.	4	99	A35	.00
159	127B	14.5	14.73	14.5	14.73	4	570.	.07000	2.00	.00	0.	4	16	A35	.42
159	128B	.0	.00	14.5	14.71	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	129C	53.3	42.97	53.3	42.97	4	1260.	.03000	3.25	.00	0.	4	24	A35	.42
159	130C	.0	.00	53.3	42.89	0	0.	.00000	.00	.00	0.	4	99	A35	.00

CONFLUENCE Q'S

159 131B TB 1156 QB 14.71 QBC 56.38 QC 41.68 159 131C TC 1159 QC 42.89 QCB 57.20 QB 14.31

159 131BC TBC 1158 QBC 57.31 QB 14.51 QC 42.80

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	131BC	53.3	42.89	67.8	57.31	1	2640.	.21200	.00	.00	0.	4	0	A35	.00
159	132B	68.7	74.00	136.5	119.28	0	0.	.00000	.00	.00	0.	2	17	A35	.01
159	133AB	136.5	119.28	338.5	224.03	0	0.	.00000	.00	.00	0.	2	0	A35	.00
159	134A	.0	.00	338.5	224.03	1	1955.	.08700	.00	.00	0.	2	99	A35	.00
159	135B	15.8	11.16	15.8	11.16	2	165.	.09100	2.00	.00	0.	4	30	A35	.42
159	136B	.0	.00	15.8	11.15	4	300.	.11700	3.00	.00	0.	4	99	A35	.00
159	137C	1.3	1.68	1.3	1.68	1	320.	.53100	.00	.00	0.	4	9	A35	.21

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 Program Package Serial Number:  2061
03/30/11   FILE: HPBP     INPUT DATA: English Units  RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units     PAGE     2
                                            LOS ANGELES COUNTY FLOOD CONTROL DISTRICT                              PROG F0601M

                MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR =  5  SOIL DATA FILE: C:\civild\cst_soilx_83.dat
                                                                                                          STORM DAY 4
                    SUBAREA  SUBAREA     TOTAL    TOTAL  CONV   CONV     CONV     CONV   CONV   CONTROL SOIL       RAIN  PCT
    LOCATION     AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
*****************************************************************************************************************************
*                                                            CONFLUENCE Q'S                                                   *
*    159  138B  TB 1160 QB    11.15 QBC    12.37 QC     1.22     159  138C  TC 1156 QC     1.65 QCB    12.65 QB    11.00   *
*                                159  138BC TBC 1157 QBC    12.70 QB    11.08 QC     1.62                                    *
*****************************************************************************************************************************
                    SUBAREA  SUBAREA     TOTAL    TOTAL  CONV   CONV     CONV     CONV   CONV   CONTROL SOIL       RAIN  PCT
    LOCATION     AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
     159  138BC    1.3       1.65      17.1      12.70   1    1600.  .33800      .00   .00         0.    4   0   A35   .00
     159  139B    59.1      32.07      76.2      43.97   1    1880.  .09600      .00   .00         0.    4  30   A35   .02
     159  140B    16.5      19.42      92.7      55.78   0       0.  .00000      .00   .00         0.    2  16   A35   .40
     159  141C    61.2      54.31      61.2      54.31   0       0.  .00000      .00   .00         0.    2  24   A35   .01
     159  142C    23.3      35.52      84.5      89.01   0       0.  .00000      .00   .00         0.    2   9   A35   .01
     159  143C    48.3      44.21     132.8     133.06   0       0.  .00000      .00   .00         0.    2  23   A35   .05
*****************************************************************************************************************************
*                                                            CONFLUENCE Q'S                                                   *
*    159  144B  TB 1164 QB    55.78 QBC   155.31 QC    99.53     159  144C  TC 1155 QC   133.06 QCB   172.26 QB    39.20   *
*                                159  144BC TBC 1157 QBC   175.80 QB    44.44 QC   131.36                                    *
*****************************************************************************************************************************
                    SUBAREA  SUBAREA     TOTAL    TOTAL  CONV   CONV     CONV     CONV   CONV   CONTROL SOIL       RAIN  PCT
    LOCATION     AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
     159  144BC  132.8     133.06     225.5     175.80   0       0.  .00000      .00   .00         0.    2   0   A35   .00
     159  145B      .0        .00     225.5     175.80   0       0.  .00000      .00   .00         0.    2  99   A35   .00
     159  146A    31.6      42.27     370.1     232.09   0       0.  .00000      .00   .00         0.    2  12   A35   .23
*****************************************************************************************************************************
*                                                            CONFLUENCE Q'S                                                   *
*    159  147A  TA 1164 QA   232.09 QAB   387.39 QB   155.31     159  147B  TB 1157 QB   175.80 QBA   369.61 QA   193.81   *
*                                159  147AB TAB 1161 QAB   389.57 QA   226.29 QB   163.28                                    *
*****************************************************************************************************************************
                    SUBAREA  SUBAREA     TOTAL    TOTAL  CONV   CONV     CONV     CONV   CONV   CONTROL SOIL       RAIN  PCT
    LOCATION     AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
     159  147AB  225.5     175.80     595.6     389.57   1     590.  .08500      .00   .00         0.    2   0   A35   .00
     159  148A    16.2      16.94     611.8     403.69   0       0.  .00000      .00   .00         0.    4  15   A35   .40
     159  149A      .0        .00     611.8     403.69   1    1180.  .05100      .00   .00         0.    4  99   A35   .00
     159  150B    13.9      16.38      13.9      16.38   0       0.  .00000      .00   .00         0.    4  12   A35   .40
     159  151B    21.6      15.16      35.5      31.49   0       0.  .00000      .00   .00         0.    4  21   A35   .02
     159  152A    12.5      14.73     624.3     405.69   0       0.  .00000      .00   .00         0.    4  12   A35   .40
*****************************************************************************************************************************
*                                                            CONFLUENCE Q'S                                                   *
*    159  153A  TA 1164 QA   405.69 QAB   425.49 QB    19.79     159  153B  TB 1155 QB    31.49 QBA   311.77 QA   280.28   *
*                                159  153AB TAB 1163 QAB   426.00 QA   403.89 QB    22.10                                    *
*****************************************************************************************************************************
                    SUBAREA  SUBAREA     TOTAL    TOTAL  CONV   CONV     CONV     CONV   CONV   CONTROL SOIL       RAIN  PCT
    LOCATION     AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
     159  153AB   35.5      31.49     659.8     426.00   1     990.  .06100      .00   .00         0.    4   0   A35   .00
     159  154B     7.7       7.37       7.7       7.37   0       0.  .00000      .00   .00         0.    4  13   A35   .02
     159  155B    21.3      24.01      29.0      31.38   4    1470.  .03400     3.00   .00         0.    4  13   A35   .40
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MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 5 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	156B	64.9	65.77	93.9	96.24	4	520.	.05800	3.00	.00	0.	2	19	A35	.02
159	157B	.0	.00	93.9	96.13	4	1760.	.04100	2.75	.00	0.	2	99	A35	.00
159	158B	33.8	24.34	127.7	119.45	0	0.	.00000	.00	.00	0.	4	26	A35	.30
159	159B	.0	.00	127.7	119.45	4	1400.	.08400	3.50	.00	0.	4	99	A35	.00
159	160B	33.8	30.28	161.5	147.69	0	0.	.00000	.00	.00	0.	4	19	A35	.36
159	161B	.0	.00	161.5	147.69	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	162A	11.5	7.57	671.3	430.80	0	0.	.00000	.00	.00	0.	4	23	A35	.02

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*****************************************************************************************************************************
*                                                  CONFLUENCE Q'S                                                           *
*    159  163A  TA 1165 QA   430.80 QAB   570.51 QB   139.71     159  163B  TB 1161 QB   147.69 QBA   546.49 QA   398.81   *
*                                    159  163AB TAB 1164 QAB   571.06 QA   428.13 QB   142.93                               *
*****************************************************************************************************************************
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LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	163AB	161.5	147.69	832.8	571.06	4	450.	.06700	5.00	.00	0.	4	0	A35	.00
159	164A	.0	.00	832.8	570.60	4	460.	.04300	9.50	.00	0.	4	99	A35	.00
159	165A	21.9	19.62	854.7	587.42	4	180.	.16700	9.50	.00	0.	4	20	A35	.42
159	166A	.0	.00	854.7	587.37	0	0.	.00000	.00	.00	0.	4	99	A35	.00

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 5 SOIL DATA FILE:

HYDROGRAPH AT 159 166A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	18.22	200	18.77	300	19.72	400	20.85
500	22.21	600	24.13	700	27.77	800	33.21	900	40.90
1000	53.68	1050	68.62	1100	94.87	1110	103.29	1120	118.12
1130	143.32	1131	146.33	1132	149.42	1133	152.61	1134	155.98
1135	159.45	1136	163.16	1137	167.08	1138	171.27	1139	175.66
1140	180.31	1141	185.26	1142	190.59	1143	196.42	1144	202.75
1145	209.72	1146	217.38	1147	225.70	1148	234.84	1149	246.59
1150	261.55	1151	278.53	1152	298.98	1153	322.49	1154	349.07
1155	377.50	1156	408.47	1157	440.95	1158	473.61	1159	503.51
1160	529.76	1161	550.95	1162	567.78	1163	579.33	1164	585.86
1165	587.37	1166	585.45	1167	580.17	1168	571.77	1169	559.34
1170	544.55	1171	528.06	1172	509.08	1173	488.49	1174	468.57
1175	449.10	1176	429.16	1177	408.98	1178	388.93	1179	369.18
1180	349.25	1181	330.06	1182	311.83	1183	295.52	1184	280.26
1185	266.80	1186	254.92	1187	244.43	1188	235.20	1189	226.70
1190	219.10	1191	211.81	1192	204.97	1193	198.34	1194	192.01
1195	185.81	1196	179.70	1197	173.59	1198	167.71	1199	162.02
1200	156.58	1201	151.36	1202	146.39	1203	141.75	1204	137.54
1205	133.50	1206	129.78	1207	126.35	1208	123.17	1209	120.21
1210	117.50	1211	115.09	1212	112.72	1213	110.58	1214	108.55
1215	106.73	1216	105.04	1217	103.46	1218	101.94	1219	100.50
1220	99.12	1221	97.79	1222	96.51	1223	95.24	1224	93.96
1225	92.71	1226	91.47	1227	90.26	1228	89.05	1229	87.85
1230	86.64	1231	85.41	1232	84.19	1233	83.00	1234	81.82
1235	80.60	1236	79.40	1237	78.20	1238	77.01	1239	75.82
1240	74.64	1241	73.46	1242	72.30	1243	71.18	1244	70.09
1245	69.02	1246	67.95	1247	67.02	1248	66.01	1249	65.00
1250	64.06	1251	63.16	1252	62.29	1253	61.44	1254	60.66
1255	59.85	1256	59.04	1257	58.24	1258	57.45	1259	56.68
1260	55.92	1261	55.19	1262	54.46	1263	53.75	1264	53.05
1265	52.38	1266	51.73	1267	51.07	1268	50.45	1269	49.86
1270	49.27	1271	48.72	1272	48.22	1273	47.72	1274	47.21
1275	46.71	1276	46.23	1277	45.76	1278	45.27	1279	44.78
1280	44.30	1281	43.81	1282	43.33	1283	42.86	1284	42.42
1285	41.99	1286	41.56	1287	41.14	1288	40.74	1289	40.33
1290	39.95	1291	39.58	1292	39.19	1293	38.83	1294	38.47
1295	38.14	1296	37.83	1297	37.51	1298	37.23	1299	36.92
1300	36.61	1310	33.66	1320	31.20	1330	29.26	1340	27.66
1350	26.40	1360	25.29	1370	24.38	1380	23.55	1390	22.79
1400	22.06	1420	20.94	1440	19.89	1460	18.22	1500	18.22

TOTAL VOLUME THIS HYDROGRAPH = 96.56(Ac.Ft)

10-YEAR

Program Package Serial Number: 2061

03/30/11 FILE: HPBP INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 1

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 10 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

STORM DAY 4

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 108A	8.1	10.98	8.1	10.98	0	0.	.00000	.00	.00	0.	2	18	A35	.21
159 109A	.0	.00	8.1	10.98	4	135.	2.00000	2.00	.00	0.	2	99	A35	.00
159 110A	46.7	52.86	54.8	63.83	2	735.	.01400	.00	.00	0.	2	24	A35	.02
159 111A	.0	.00	54.8	63.12	2	1660.	.00200	.00	.00	0.	2	99	A35	.00
159 112B	16.2	15.16	16.2	15.16	4	270.	.01900	2.75	.00	0.	4	24	A35	.21
159 113AB	16.2	15.16	71.0	52.75	1	735.	.01400	.00	.00	0.	4	0	A35	.00
159 114B	23.8	24.46	23.8	24.46	0	0.	.00000	.00	.00	0.	4	24	A35	.42
159 115AB	23.8	24.46	94.8	58.25	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159 116A	27.9	23.27	122.7	78.26	4	560.	.02300	3.50	.00	0.	4	29	A35	.21
159 117B	8.8	7.97	8.8	7.97	4	350.	.06600	2.00	.00	0.	4	30	A35	.42
159 118AB	8.8	7.97	131.5	85.93	4	220.	.16800	3.50	.00	0.	4	0	A35	.00
159 119A	7.0	12.24	138.5	89.37	1	210.	.54200	.00	.00	0.	4	8	A35	.21
159 120A	.0	.00	138.5	89.22	1	215.	.27900	.00	.00	0.	4	99	A35	.00
159 121B	3.5	6.12	3.5	6.12	0	0.	.00000	.00	.00	0.	4	8	A35	.21
159 122B	.0	.00	3.5	6.12	1	510.	.43100	.00	.00	0.	4	99	A35	.00

CONFLUENCE Q'S

159 123A TA 1157 QA 89.19 QAB 95.08 QB 5.89 159 123B TB 1156 QB 6.02 QBA 94.50 QA 88.48

159 123AB TAB 1157 QAB 95.08 QA 89.19 QB 5.89

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 123AB	3.5	6.02	142.0	95.08	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159 124A	.0	.00	142.0	95.08	1	1675.	.17900	.00	.00	0.	4	99	A35	.00
159 125A	60.0	74.92	202.0	158.90	0	0.	.00000	.00	.00	0.	4	13	A35	.01
159 126A	.0	.00	202.0	158.90	1	550.	.13600	.00	.00	0.	4	99	A35	.00
159 127B	14.5	21.76	14.5	21.76	4	570.	.07000	2.00	.00	0.	4	12	A35	.42
159 128B	.0	.00	14.5	21.75	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159 129C	53.3	64.30	53.3	64.30	4	1260.	.03000	3.25	.00	0.	4	18	A35	.42
159 130C	.0	.00	53.3	64.02	0	0.	.00000	.00	.00	0.	4	99	A35	.00

CONFLUENCE Q'S

159 131B TB 1155 QB 21.75 QBC 83.13 QC 61.39 159 131C TC 1158 QC 64.02 QCB 84.89 QB 20.87

159 131BC TBC 1157 QBC 85.35 QB 21.41 QC 63.94

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 131BC	53.3	64.02	67.8	85.35	1	2640.	.21200	.00	.00	0.	4	0	A35	.00
159 132B	68.7	113.21	136.5	174.42	0	0.	.00000	.00	.00	0.	2	12	A35	.01
159 133AB	136.5	174.42	338.5	332.93	0	0.	.00000	.00	.00	0.	2	0	A35	.00
159 134A	.0	.00	338.5	332.93	1	1955.	.08700	.00	.00	0.	2	99	A35	.00
159 135B	15.8	16.62	15.8	16.62	2	165.	.09100	2.00	.00	0.	4	23	A35	.42
159 136B	.0	.00	15.8	16.62	4	300.	.11700	3.00	.00	0.	4	99	A35	.00
159 137C	1.3	2.67	1.3	2.67	1	320.	.53100	.00	.00	0.	4	6	A35	.21

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 Program Package Serial Number:  2061
03/30/11   FILE: HPBP     INPUT DATA: English Units  RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units     PAGE     2
                                        LOS ANGELES COUNTY FLOOD CONTROL DISTRICT                                     PROG F0601M

                    MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 10  SOIL DATA FILE: C:\civild\cst_soilx_83.dat
                                                                                                              STORM DAY 4
                       SUBAREA  SUBAREA     TOTAL   TOTAL  CONV   CONV     CONV     CONV   CONV   CONTROL SOIL      RAIN  PCT
       LOCATION        AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
*****************************************************************************************************************************
  *                                                          CONFLUENCE Q'S                                                     *
  *    159  138B  TB 1157 QB    16.62 QBC    18.65 QC     2.03     159  138C  TC 1155 QC     2.59 QCB    19.01 QB    16.42  *
  *                               159  138BC TBC 1155 QBC    19.01 QB    16.42 QC     2.59                                      *
*****************************************************************************************************************************
                       SUBAREA  SUBAREA     TOTAL   TOTAL  CONV   CONV     CONV     CONV   CONV   CONTROL SOIL      RAIN  PCT
       LOCATION        AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
        159  138BC    1.3        2.59       17.1      19.01   1    1600.   .33800      .00   .00         0.    4   0   A35   .00
        159  139B    59.1       60.67       76.2      77.06   1    1880.   .09600      .00   .00         0.    4  18   A35   .02
        159  140B    16.5       27.99       92.7      91.70   0       0.   .00000      .00   .00         0.    2  12   A35   .40
        159  141C    61.2       83.70       61.2      83.70   0       0.   .00000      .00   .00         0.    2  17   A35   .01
        159  142C    23.3       50.67       84.5     133.93   0       0.   .00000      .00   .00         0.    2   7   A35   .01
        159  143C    48.3       68.67      132.8     202.11   0       0.   .00000      .00   .00         0.    2  16   A35   .05
*****************************************************************************************************************************
  *                                                          CONFLUENCE Q'S                                                     *
  *    159  144B  TB 1160 QB    91.70 QBC   250.08 QC   158.38     159  144C  TC 1154 QC   202.11 QCB   267.21 QB    65.10  *
  *                               159  144BC TBC 1155 QBC   272.36 QB    70.29 QC   202.08                                      *
*****************************************************************************************************************************
                       SUBAREA  SUBAREA     TOTAL   TOTAL  CONV   CONV     CONV     CONV   CONV   CONTROL SOIL      RAIN  PCT
       LOCATION        AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
        159  144BC  132.8      202.11      225.5     272.36   0       0.   .00000      .00   .00         0.    2   0   A35   .00
        159  145B      .0         .00      225.5     272.36   0       0.   .00000      .00   .00         0.    2  99   A35   .00
        159  146A    31.6       61.37      370.1     340.53   0       0.   .00000      .00   .00         0.    2   9   A35   .23
*****************************************************************************************************************************
  *                                                          CONFLUENCE Q'S                                                     *
  *    159  147A  TA 1161 QA   340.53 QAB   584.19 QB   243.66     159  147B  TB 1155 QB   272.36 QBA   546.16 QA   273.80  *
  *                               159  147AB TAB 1159 QAB   589.34 QA   332.27 QB   257.07                                      *
*****************************************************************************************************************************
                       SUBAREA  SUBAREA     TOTAL   TOTAL  CONV   CONV     CONV     CONV   CONV   CONTROL SOIL      RAIN  PCT
       LOCATION        AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
        159  147AB  225.5      272.36      595.6     589.34   1     590.   .08500      .00   .00         0.    2   0   A35   .00
        159  148A    16.2       25.38      611.8     609.30   0       0.   .00000      .00   .00         0.    4  11   A35   .40
        159  149A      .0         .00      611.8     609.30   1    1180.   .05100      .00   .00         0.    4  99   A35   .00
        159  150B    13.9       24.16       13.9      24.16   0       0.   .00000      .00   .00         0.    4   9   A35   .40
        159  151B    21.6       25.92       35.5      50.09   0       0.   .00000      .00   .00         0.    4  14   A35   .02
        159  152A    12.5       20.71      624.3     612.43   0       0.   .00000      .00   .00         0.    4  10   A35   .40
*****************************************************************************************************************************
  *                                                          CONFLUENCE Q'S                                                     *
  *    159  153A  TA 1162 QA   612.43 QAB   640.26 QB    27.82     159  153B  TB 1154 QB    50.09 QBA   463.44 QA   413.35  *
  *                               159  153AB TAB 1161 QAB   643.79 QA   611.80 QB    31.99                                      *
*****************************************************************************************************************************
                       SUBAREA  SUBAREA     TOTAL   TOTAL  CONV   CONV     CONV     CONV   CONV   CONTROL SOIL      RAIN  PCT
       LOCATION        AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
        159  153AB   35.5       50.09      659.8     643.79   1     990.   .06100      .00   .00         0.    4   0   A35   .00
        159  154B     7.7       12.00        7.7      12.00   0       0.   .00000      .00   .00         0.    4   9   A35   .02
        159  155B    21.3       35.30       29.0      47.30   4    1470.   .03400     3.00   .00         0.    4  10   A35   .40
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MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 10 SOIL DATA FILE: C:\civild\cst_soilx_83.dat
STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	156B	64.9	102.56	93.9	147.55	4	520.	.05800	3.00	.00	0.	2	13	A35	.02
159	157B	.0	.00	93.9	147.06	4	1760.	.04100	3.25	.00	0.	2	99	A35	.00
159	158B	33.8	37.43	127.7	181.88	0	0.	.00000	.00	.00	0.	4	18	A35	.20
159	159B	.0	.00	127.7	181.88	4	1400.	.08400	3.50	.00	0.	4	99	A35	.00
159	160B	33.8	45.84	161.5	223.39	0	0.	.00000	.00	.00	0.	4	14	A35	.36
159	161B	.0	.00	161.5	223.39	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	162A	11.5	13.27	671.3	651.05	0	0.	.00000	.00	.00	0.	4	15	A35	.02

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***********************************************************************************************************************************
*                                                    CONFLUENCE Q'S                                                              *
*    159  163A  TA 1163 QA   651.05 QAB   853.74 QB   202.70     159  163B  TB 1159 QB   223.39 QBA   819.57 QA   596.18   *
*                           159  163AB TAB 1162 QAB   862.90 QA   649.09 QB   213.82                                         *
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LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	163AB	161.5	223.39	832.8	862.90	4	450.	.06700	5.00	.00	0.	4	0	A35	.00
159	164A	.0	.00	832.8	862.13	4	460.	.04300	9.50	.00	0.	4	99	A35	.00
159	165A	21.9	29.27	854.7	885.64	4	180.	.16700	9.50	.00	0.	4	15	A35	.42
159	166A	.0	.00	854.7	885.38	0	0.	.00000	.00	.00	0.	4	99	A35	.00

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 10 SOIL DATA FILE:

HYDROGRAPH AT 159 166A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	22.08	200	22.75	300	24.39	400	26.90
500	29.97	600	33.85	700	38.80	800	45.44	900	54.94
1000	70.91	1050	90.23	1100	122.52	1110	138.16	1120	168.98
1130	210.83	1131	215.41	1132	220.15	1133	225.10	1134	230.38
1135	235.88	1136	241.58	1137	247.59	1138	254.23	1139	261.00
1140	268.35	1141	276.29	1142	285.12	1143	294.57	1144	304.77
1145	316.08	1146	328.69	1147	342.61	1148	357.59	1149	377.14
1150	402.18	1151	431.91	1152	468.14	1153	510.58	1154	557.93
1155	610.07	1156	664.79	1157	715.45	1158	774.61	1159	826.52
1160	856.88	1161	877.02	1162	885.38	1163	882.29	1164	866.02
1165	840.50	1166	809.26	1167	774.62	1168	738.62	1169	705.47
1170	668.91	1171	626.04	1172	587.52	1173	548.34	1174	512.33
1175	478.40	1176	448.08	1177	421.61	1178	398.33	1179	377.67
1180	359.09	1181	342.35	1182	326.99	1183	313.23	1184	300.21
1185	288.06	1186	276.80	1187	266.39	1188	256.67	1189	247.59
1190	239.16	1191	230.99	1192	223.52	1193	216.28	1194	209.59
1195	203.29	1196	197.26	1197	191.46	1198	186.05	1199	180.86
1200	175.98	1201	171.26	1202	166.81	1203	162.65	1204	158.75
1205	155.17	1206	151.96	1207	148.96	1208	146.26	1209	143.72
1210	141.37	1211	139.12	1212	136.97	1213	134.90	1214	132.83
1215	130.84	1216	128.87	1217	126.93	1218	124.98	1219	123.04
1220	121.23	1221	119.38	1222	117.55	1223	115.62	1224	113.69
1225	111.74	1226	109.89	1227	108.10	1228	106.38	1229	104.69
1230	102.98	1231	101.26	1232	99.57	1233	97.91	1234	96.26
1235	94.66	1236	93.09	1237	91.58	1238	90.15	1239	88.75
1240	87.38	1241	86.01	1242	84.71	1243	83.47	1244	82.34
1245	81.26	1246	80.20	1247	79.14	1248	78.05	1249	76.99
1250	75.96	1251	74.94	1252	73.97	1253	73.00	1254	72.08
1255	71.17	1256	70.29	1257	69.47	1258	68.62	1259	67.78
1260	66.99	1261	66.29	1262	65.58	1263	64.91	1264	64.26
1265	63.59	1266	62.94	1267	62.31	1268	61.68	1269	61.04
1270	60.40	1271	59.82	1272	59.26	1273	58.71	1274	58.17
1275	57.62	1276	57.06	1277	56.52	1278	55.99	1279	55.46
1280	54.94	1281	54.42	1282	53.90	1283	53.38	1284	52.92
1285	52.51	1286	52.09	1287	51.67	1288	51.27	1289	50.85
1290	50.46	1291	50.08	1292	49.69	1293	49.33	1294	48.94
1295	48.54	1296	48.17	1297	47.82	1298	47.48	1299	47.10
1300	46.76	1310	43.59	1320	40.93	1330	38.71	1340	36.74
1350	34.94	1360	33.09	1370	31.51	1380	30.11	1390	28.79
1400	27.51	1420	25.69	1440	24.37	1460	22.08	1500	22.08

TOTAL VOLUME THIS HYDROGRAPH = 126.68(Ac.Ft)

25-YEAR

Program Package Serial Number: 2061

03/30/11 FILE: HPBP INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 1

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	108A	8.1	15.26	8.1	15.26	0	0.	.00000	.00	.00	0.	2	15	A35	.21
159	109A	.0	.00	8.1	15.26	4	135.	2.00000	2.00	.00	0.	2	99	A35	.00
159	110A	46.7	74.46	54.8	89.64	2	735.	.01400	.00	.00	0.	2	20	A35	.02
159	111A	.0	.00	54.8	88.40	2	1660.	.00200	.00	.00	0.	2	99	A35	.00
159	112B	16.2	21.93	16.2	21.93	4	270.	.01900	2.75	.00	0.	4	20	A35	.21
159	113AB	16.2	21.90	71.0	73.77	1	735.	.01400	.00	.00	0.	4	0	A35	.00
159	114B	23.8	34.53	23.8	34.53	0	0.	.00000	.00	.00	0.	4	20	A35	.42
159	115AB	23.8	34.53	94.8	79.89	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159	116A	27.9	34.80	122.7	112.07	4	560.	.02300	3.50	.00	0.	4	23	A35	.21
159	117B	8.8	11.30	8.8	11.30	4	350.	.06600	2.00	.00	0.	4	25	A35	.42
159	118AB	8.8	11.30	131.5	122.94	4	220.	.16800	3.50	.00	0.	4	0	A35	.00
159	119A	7.0	16.75	138.5	128.49	1	210.	.54200	.00	.00	0.	4	7	A35	.21
159	120A	.0	.00	138.5	128.47	1	215.	.27900	.00	.00	0.	4	99	A35	.00
159	121B	3.5	9.13	3.5	9.13	0	0.	.00000	.00	.00	0.	4	6	A35	.21
159	122B	.0	.00	3.5	9.13	1	510.	.43100	.00	.00	0.	4	99	A35	.00

CONFLUENCE Q'S

159 123A TA 1157 QA 128.33 QAB 135.59 QB 7.26 159 123B TB 1155 QB 8.87 QBA 135.11 QA 126.24

159 123AB TAB 1156 QAB 136.60 QA 128.26 QB 8.34

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	123AB	3.5	8.87	142.0	136.60	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159	124A	.0	.00	142.0	136.60	1	1675.	.17900	.00	.00	0.	4	99	A35	.00
159	125A	60.0	114.49	202.0	232.11	0	0.	.00000	.00	.00	0.	4	10	A35	.01
159	126A	.0	.00	202.0	232.11	1	550.	.13600	.00	.00	0.	4	99	A35	.00
159	127B	14.5	30.53	14.5	30.53	4	570.	.07000	2.00	.00	0.	4	10	A35	.42
159	128B	.0	.00	14.5	30.35	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	129C	53.3	90.39	53.3	90.39	4	1260.	.03000	3.25	.00	0.	4	15	A35	.42
159	130C	.0	.00	53.3	89.75	0	0.	.00000	.00	.00	0.	4	99	A35	.00

CONFLUENCE Q'S

159 131B TB 1155 QB 30.35 QBC 117.22 QC 86.87 159 131C TC 1157 QC 89.75 QCB 118.83 QB 29.07

159 131BC TBC 1156 QBC 119.06 QB 29.85 QC 89.21

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	131BC	53.3	89.75	67.8	119.06	1	2640.	.21200	.00	.00	0.	4	0	A35	.00
159	132B	68.7	158.81	136.5	241.55	0	0.	.00000	.00	.00	0.	2	10	A35	.01
159	133AB	136.5	241.55	338.5	471.43	0	0.	.00000	.00	.00	0.	2	0	A35	.00
159	134A	.0	.00	338.5	471.43	1	1955.	.08700	.00	.00	0.	2	99	A35	.00
159	135B	15.8	23.54	15.8	23.54	2	165.	.09100	2.00	.00	0.	4	19	A35	.42
159	136B	.0	.00	15.8	23.54	4	300.	.11700	3.00	.00	0.	4	99	A35	.00
159	137C	1.3	3.79	1.3	3.79	1	320.	.53100	.00	.00	0.	4	5	A35	.21

Program Package Serial Number: 2061

03/30/11 FILE: HPBP INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 2

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

STORM DAY 4

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV

CONFLUENCE Q'S

159 138B TB 1156 QB 23.51 QBC 26.38 QC 2.87 159 138C TC 1154 QC 3.52 QCB 26.33 QB 22.81

159 138BC TBC 1155 QBC 26.74 QB 23.38 QC 3.36

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 138BC	1.3	3.52	17.1	26.74	1	1600.	.33800	.00	.00	0.	4	0	A35	.00
159 139B	59.1	92.49	76.2	114.45	1	1880.	.09600	.00	.00	0.	4	14	A35	.02
159 140B	16.5	38.62	92.7	132.38	0	0.	.00000	.00	.00	0.	2	10	A35	.40
159 141C	61.2	117.89	61.2	117.89	0	0.	.00000	.00	.00	0.	2	14	A35	.01
159 142C	23.3	69.28	84.5	187.17	0	0.	.00000	.00	.00	0.	2	6	A35	.01
159 143C	48.3	96.81	132.8	283.98	0	0.	.00000	.00	.00	0.	2	13	A35	.05

CONFLUENCE Q'S

159 144B TB 1159 QB 132.38 QBC 351.32 QC 218.94 159 144C TC 1154 QC 283.98 QCB 384.04 QB 100.05

159 144BC TBC 1154 QBC 384.04 QB 100.05 QC 283.98

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 144BC	132.8	283.98	225.5	384.04	0	0.	.00000	.00	.00	0.	2	0	A35	.00
159 145B	.0	.00	225.5	384.04	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 146A	31.6	86.75	370.1	475.62	0	0.	.00000	.00	.00	0.	2	7	A35	.23

CONFLUENCE Q'S

159 147A TA 1161 QA 475.62 QAB 805.25 QB 329.64 159 147B TB 1154 QB 384.04 QBA 761.15 QA 377.11

159 147AB TAB 1158 QAB 832.97 QA 465.51 QB 367.46

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 147AB	225.5	384.04	595.6	832.97	1	590.	.08500	.00	.00	0.	2	0	A35	.00
159 148A	16.2	35.59	611.8	856.46	0	0.	.00000	.00	.00	0.	4	9	A35	.40
159 149A	.0	.00	611.8	856.46	1	1180.	.05100	.00	.00	0.	4	99	A35	.00
159 150B	13.9	34.55	13.9	34.55	0	0.	.00000	.00	.00	0.	4	7	A35	.40
159 151B	21.6	38.90	35.5	73.45	0	0.	.00000	.00	.00	0.	4	11	A35	.02
159 152A	12.5	29.04	624.3	860.35	0	0.	.00000	.00	.00	0.	4	8	A35	.40

CONFLUENCE Q'S

159 153A TA 1160 QA 860.35 QAB 899.26 QB 38.91 159 153B TB 1154 QB 73.45 QBA 692.29 QA 618.84

159 153AB TAB 1159 QAB 901.70 QA 853.00 QB 48.69

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 153AB	35.5	73.45	659.8	901.70	1	990.	.06100	.00	.00	0.	4	0	A35	.00
159 154B	7.7	17.72	7.7	17.72	0	0.	.00000	.00	.00	0.	4	7	A35	.02
159 155B	21.3	49.48	29.0	67.20	4	1470.	.03400	3.00	.00	0.	4	8	A35	.40

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	156B	64.9	142.12	93.9	206.20	4	520.	.05800	3.00	.00	0.	2	11	A35	.02
159	157B	.0	.00	93.9	205.01	4	1760.	.04100	3.50	.00	0.	2	99	A35	.00
159	158B	33.8	55.77	127.7	255.43	0	0.	.00000	.00	.00	0.	4	14	A35	.20
159	159B	.0	.00	127.7	255.43	4	1400.	.08400	3.50	.00	0.	4	99	A35	.00
159	160B	33.8	63.25	161.5	310.93	0	0.	.00000	.00	.00	0.	4	12	A35	.36
159	161B	.0	.00	161.5	310.93	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	162A	11.5	19.65	671.3	911.00	0	0.	.00000	.00	.00	0.	4	12	A35	.02

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*************************************************************************************************************************
*                                                   CONFLUENCE Q'S                                                      *
*    159  163A  TA 1161 QA   911.00 QAB  1203.12 QB   292.12     159  163B  TB 1159 QB   310.93 QBA  1192.96 QA   882.03   *
*                                 159  163AB TAB 1160 QAB  1211.42 QA   904.90 QB   306.52                              *
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LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	163AB	161.5	310.93	832.8	1211.42	4	450.	.06700	5.00	.00	0.	4	0	A35	.00
159	164A	.0	.00	832.8	1209.17	4	460.	.04300	9.50	.00	0.	4	99	A35	.00
159	165A	21.9	41.61	854.7	1237.97	4	180.	.16700	9.50	.00	0.	4	12	A35	.42
159	166A	.0	.00	854.7	1237.29	0	0.	.00000	.00	.00	0.	4	99	A35	.00

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE:

HYDROGRAPH AT 159 166A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	30.74	200	32.41	300	35.26	400	38.45
500	42.36	600	47.09	700	53.25	800	61.41	900	73.70
1000	94.37	1050	118.62	1100	172.41	1110	201.64	1120	248.64
1130	306.45	1131	313.04	1132	319.75	1133	326.54	1134	333.83
1135	341.17	1136	349.03	1137	357.39	1138	366.53	1139	376.40
1140	386.94	1141	398.55	1142	411.27	1143	424.92	1144	439.56
1145	455.78	1146	473.83	1147	493.67	1148	515.32	1149	543.92
1150	581.03	1151	626.35	1152	681.06	1153	745.49	1154	832.95
1155	923.57	1156	1010.91	1157	1094.69	1158	1163.09	1159	1211.61
1160	1236.77	1161	1237.29	1162	1217.10	1163	1179.09	1164	1129.88
1165	1069.30	1166	1009.23	1167	949.08	1168	887.66	1169	828.19
1170	772.21	1171	724.03	1172	675.45	1173	626.58	1174	588.48
1175	552.90	1176	523.50	1177	496.04	1178	471.73	1179	449.27
1180	428.80	1181	409.92	1182	392.30	1183	375.60	1184	360.31
1185	345.73	1186	332.23	1187	319.47	1188	307.69	1189	296.10
1190	285.36	1191	275.19	1192	265.79	1193	257.03	1194	248.93
1195	241.51	1196	234.40	1197	228.18	1198	222.42	1199	217.38
1200	212.71	1201	208.51	1202	204.38	1203	200.54	1204	196.91
1205	193.44	1206	189.99	1207	186.64	1208	183.33	1209	180.05
1210	176.81	1211	173.68	1212	170.63	1213	167.64	1214	164.57
1215	161.55	1216	158.56	1217	155.64	1218	152.87	1219	150.23
1220	147.56	1221	144.93	1222	142.31	1223	139.73	1224	137.17
1225	134.66	1226	132.27	1227	129.89	1228	127.64	1229	125.49
1230	123.44	1231	121.36	1232	119.35	1233	117.46	1234	115.60
1235	113.82	1236	112.18	1237	110.59	1238	109.04	1239	107.54
1240	106.09	1241	104.66	1242	103.26	1243	101.91	1244	100.56
1245	99.20	1246	97.87	1247	96.62	1248	95.37	1249	94.17
1250	93.02	1251	91.94	1252	90.83	1253	89.77	1254	88.78
1255	87.86	1256	86.93	1257	86.03	1258	85.16	1259	84.25
1260	83.36	1261	82.55	1262	81.73	1263	80.92	1264	80.16
1265	79.40	1266	78.62	1267	77.84	1268	77.14	1269	76.47
1270	75.81	1271	75.16	1272	74.56	1273	73.91	1274	73.31
1275	72.77	1276	72.22	1277	71.65	1278	71.02	1279	70.39
1280	69.80	1281	69.24	1282	68.72	1283	68.21	1284	67.72
1285	67.23	1286	66.71	1287	66.22	1288	65.77	1289	65.28
1290	64.85	1291	64.43	1292	63.94	1293	63.48	1294	63.05
1295	62.66	1296	62.28	1297	61.85	1298	61.49	1299	61.11
1300	60.74	1310	57.09	1320	54.04	1330	51.53	1340	49.29
1350	47.09	1360	44.90	1370	43.07	1380	41.44	1390	39.85
1400	38.30	1420	36.13	1440	34.08	1460	30.74	1500	30.74

TOTAL VOLUME THIS HYDROGRAPH = 170.73(Ac.Ft)

50-YEAR

Program Package Serial Number: 2061
03/30/11 FILE: HPBP INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\cst_soilx_83.dat
STORM DAY 4

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 108A	8.1	18.88	8.1	18.88	0	0.	.00000	.00	.00	0.	2	13	A35	.21
159 109A	.0	.00	8.1	18.88	4	135.	2.00000	2.00	.00	0.	2	99	A35	.00
159 110A	46.7	91.34	54.8	110.21	2	735.	.01400	.00	.00	0.	2	18	A35	.02
159 111A	.0	.00	54.8	108.67	2	1660.	.00200	.00	.00	0.	2	99	A35	.00
159 112B	16.2	27.23	16.2	27.23	4	270.	.01900	2.75	.00	0.	4	18	A35	.21
159 113AB	16.2	27.19	71.0	90.05	1	735.	.01400	.00	.00	0.	4	0	A35	.00
159 114B	23.8	42.37	23.8	42.37	0	0.	.00000	.00	.00	0.	4	18	A35	.42
159 115AB	23.8	42.37	94.8	97.47	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159 116A	27.9	43.03	122.7	138.10	4	560.	.02300	3.50	.00	0.	4	21	A35	.21
159 117B	8.8	14.07	8.8	14.07	4	350.	.06600	2.00	.00	0.	4	22	A35	.42
159 118AB	8.8	14.07	131.5	151.59	4	220.	.16800	3.50	.00	0.	4	0	A35	.00
159 119A	7.0	21.17	138.5	157.54	1	210.	.54200	.00	.00	0.	4	6	A35	.21
159 120A	.0	.00	138.5	157.48	1	215.	.27900	.00	.00	0.	4	99	A35	.00
159 121B	3.5	10.59	3.5	10.59	0	0.	.00000	.00	.00	0.	4	6	A35	.21
159 122B	.0	.00	3.5	10.59	1	510.	.43100	.00	.00	0.	4	99	A35	.00

CONFLUENCE Q'S
159 123A TA 1156 QA 157.44 QAB 167.07 QB 9.63 159 123B TB 1155 QB 10.29 QBA 166.72 QA 156.43
159 123AB TAB 1156 QAB 167.07 QA 157.44 QB 9.63

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 123AB	3.5	10.29	142.0	167.07	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159 124A	.0	.00	142.0	167.07	1	1675.	.17900	.00	.00	0.	4	99	A35	.00
159 125A	60.0	141.02	202.0	286.64	0	0.	.00000	.00	.00	0.	4	9	A35	.01
159 126A	.0	.00	202.0	286.64	1	550.	.13600	.00	.00	0.	4	99	A35	.00
159 127B	14.5	36.97	14.5	36.97	4	570.	.07000	2.00	.00	0.	4	9	A35	.42
159 128B	.0	.00	14.5	36.81	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159 129C	53.3	112.42	53.3	112.42	4	1260.	.03000	3.25	.00	0.	4	13	A35	.42
159 130C	.0	.00	53.3	111.74	0	0.	.00000	.00	.00	0.	4	99	A35	.00

CONFLUENCE Q'S
159 131B TB 1155 QB 36.81 QBC 145.84 QC 109.02 159 131C TC 1157 QC 111.74 QCB 146.85 QB 35.11
159 131BC TBC 1156 QBC 147.51 QB 36.08 QC 111.43

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 131BC	53.3	111.74	67.8	147.51	1	2640.	.21200	.00	.00	0.	4	0	A35	.00
159 132B	68.7	192.09	136.5	293.77	0	0.	.00000	.00	.00	0.	2	9	A35	.01
159 133AB	136.5	293.77	338.5	575.64	0	0.	.00000	.00	.00	0.	2	0	A35	.00
159 134A	.0	.00	338.5	575.64	1	1955.	.08700	.00	.00	0.	2	99	A35	.00
159 135B	15.8	28.97	15.8	28.97	2	165.	.09100	2.00	.00	0.	4	17	A35	.42
159 136B	.0	.00	15.8	28.97	4	300.	.11700	3.00	.00	0.	4	99	A35	.00
159 137C	1.3	4.39	1.3	4.39	1	320.	.53100	.00	.00	0.	4	5	A35	.21

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              MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50  SOIL DATA FILE: C:\civild\cst_soilx_83.dat
                                                                                                              STORM DAY 4
                SUBAREA   SUBAREA     TOTAL    TOTAL  CONV   CONV     CONV     CONV   CONV   CONTROL SOIL      RAIN  PCT
    LOCATION    AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
*************************************************************************************************************************
*                                                          CONFLUENCE Q'S                                                 *
*    159  138B  TB 1156 QB    28.94 QBC    32.23 QC     3.30     159  138C  TC 1154 QC     4.09 QCB    32.37 QB    28.28  *
*                                159  138BC TBC 1155 QBC    32.72 QB    28.85 QC     3.87                                 *
*************************************************************************************************************************
                SUBAREA   SUBAREA     TOTAL    TOTAL  CONV   CONV     CONV     CONV   CONV   CONTROL SOIL      RAIN  PCT
    LOCATION    AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
     159  138BC    1.3       4.09      17.1     32.72   1    1600.  .33800       .00   .00        0.    4   0   A35   .00
     159  139B    59.1     118.59      76.2    145.31   1    1880.  .09600       .00   .00        0.    4  12   A35   .02
     159  140B    16.5      46.37      92.7    165.21   0       0.  .00000       .00   .00        0.    2   9   A35   .40
     159  141C    61.2     147.74      61.2    147.74   0       0.  .00000       .00   .00        0.    2  12   A35   .01
     159  142C    23.3      88.65      84.5    234.31   0       0.  .00000       .00   .00        0.    2   5   A35   .01
     159  143C    48.3     116.73     132.8    349.39   0       0.  .00000       .00   .00        0.    2  12   A35   .05
*************************************************************************************************************************
*                                                          CONFLUENCE Q'S                                                 *
*    159  144B  TB 1159 QB   165.21 QBC   424.55 QC   259.34     159  144C  TC 1153 QC   349.39 QCB   467.01 QB   117.62  *
*                                159  144BC TBC 1154 QBC   471.07 QB   128.38 QC   342.69                                 *
*************************************************************************************************************************
                SUBAREA   SUBAREA     TOTAL    TOTAL  CONV   CONV     CONV     CONV   CONV   CONTROL SOIL      RAIN  PCT
    LOCATION    AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
     159  144BC  132.8     349.39     225.5    471.07   0       0.  .00000       .00   .00        0.    2   0   A35   .00
     159  145B      .0        .00     225.5    471.07   0       0.  .00000       .00   .00        0.    2  99   A35   .00
     159  146A    31.6      99.78     370.1    589.34   0       0.  .00000       .00   .00        0.    2   7   A35   .23
*************************************************************************************************************************
*                                                          CONFLUENCE Q'S                                                 *
*    159  147A  TA 1159 QA   589.34 QAB  1013.88 QB   424.55     159  147B  TB 1154 QB   471.07 QBA   940.53 QA   469.45  *
*                                159  147AB TAB 1157 QAB  1022.30 QA   566.92 QB   455.39                                 *
*************************************************************************************************************************
                SUBAREA   SUBAREA     TOTAL    TOTAL  CONV   CONV     CONV     CONV   CONV   CONTROL SOIL      RAIN  PCT
    LOCATION    AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
     159  147AB  225.5     471.07     595.6   1022.30   1     590.  .08500       .00   .00        0.    2   0   A35   .00
     159  148A    16.2      43.48     611.8   1050.32   0       0.  .00000       .00   .00        0.    4   8   A35   .40
     159  149A      .0        .00     611.8   1050.32   1    1180.  .05100       .00   .00        0.    4  99   A35   .00
     159  150B    13.9      39.88      13.9     39.88   0       0.  .00000       .00   .00        0.    4   7   A35   .40
     159  151B    21.6      48.40      35.5     88.28   0       0.  .00000       .00   .00        0.    4  10   A35   .02
     159  152A    12.5      35.86     624.3   1053.55   0       0.  .00000       .00   .00        0.    4   7   A35   .40
*************************************************************************************************************************
*                                                          CONFLUENCE Q'S                                                 *
*    159  153A  TA 1160 QA  1053.55 QAB  1095.85 QB    42.29     159  153B  TB 1154 QB    88.28 QBA   871.03 QA   782.76  *
*                                159  153AB TAB 1159 QAB  1106.44 QA  1052.29 QB    54.15                                 *
*************************************************************************************************************************
                SUBAREA   SUBAREA     TOTAL    TOTAL  CONV   CONV     CONV     CONV   CONV   CONTROL SOIL      RAIN  PCT
    LOCATION    AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z     Q(CFS) NAME  TC  ZONE  IMPV
     159  153AB   35.5      88.28     659.8   1106.44   1     990.  .06100       .00   .00        0.    4   0   A35   .00
     159  154B     7.7      20.66       7.7     20.66   0       0.  .00000       .00   .00        0.    4   7   A35   .02
     159  155B    21.3      61.11      29.0     81.76   4    1470.  .03400      3.00   .00        0.    4   7   A35   .40
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MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	156B	64.9	173.32	93.9	248.98	4	520.	.05800	3.00	.00	0.	2	10	A35	.02
159	157B	.0	.00	93.9	248.10	4	1760.	.04100	3.75	.00	0.	2	99	A35	.00
159	158B	33.8	70.76	127.7	310.57	0	0.	.00000	.00	.00	0.	4	12	A35	.20
159	159B	.0	.00	127.7	310.57	4	1400.	.08400	3.50	.00	0.	4	99	A35	.00
159	160B	33.8	76.98	161.5	376.90	0	0.	.00000	.00	.00	0.	4	11	A35	.36
159	161B	.0	.00	161.5	376.90	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	162A	11.5	24.30	671.3	1116.56	0	0.	.00000	.00	.00	0.	4	11	A35	.02

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*****************************************************************************************************************************
*                                                    CONFLUENCE Q'S                                                         *
*    159  163A  TA 1160 QA  1116.56 QAB  1479.48 QB   362.92     159  163B  TB 1158 QB   376.90 QBA  1438.34 QA  1061.44   *
*                                 159  163AB TAB 1160 QAB  1479.48 QA  1116.56 QB   362.92                                  *
*****************************************************************************************************************************
```

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	163AB	161.5	376.90	832.8	1479.48	4	450.	.06700	5.00	.00	0.	4	0	A35	.00
159	164A	.0	.00	832.8	1479.24	4	460.	.04300	9.50	.00	0.	4	99	A35	.00
159	165A	21.9	50.51	854.7	1515.79	4	180.	.16700	9.50	.00	0.	4	11	A35	.42
159	166A	.0	.00	854.7	1515.53	0	0.	.00000	.00	.00	0.	4	99	A35	.00

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE:

HYDROGRAPH AT 159 166A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	38.23	200	40.18	300	43.45	400	47.10
500	51.55	600	56.95	700	63.97	800	73.81	900	88.34
1000	111.91	1050	140.81	1100	214.01	1110	252.72	1120	310.11
1130	379.61	1131	387.61	1132	395.19	1133	403.35	1134	411.58
1135	420.45	1136	429.86	1137	440.26	1138	451.49	1139	463.71
1140	476.62	1141	491.09	1142	506.57	1143	523.24	1144	540.81
1145	560.49	1146	582.86	1147	607.25	1148	633.87	1149	669.14
1150	713.84	1151	774.06	1152	856.76	1153	950.30	1154	1054.28
1155	1167.57	1156	1279.23	1157	1378.83	1158	1455.60	1159	1504.81
1160	1515.53	1161	1498.11	1162	1450.76	1163	1385.07	1164	1305.50
1165	1223.24	1166	1141.37	1167	1059.02	1168	982.00	1169	908.15
1170	842.89	1171	785.54	1172	738.59	1173	695.32	1174	654.44
1175	617.34	1176	585.62	1177	556.47	1178	530.92	1179	506.26
1180	483.82	1181	462.68	1182	442.81	1183	424.01	1184	406.68
1185	390.11	1186	374.31	1187	359.72	1188	345.94	1189	333.36
1190	321.77	1191	311.15	1192	301.48	1193	292.70	1194	284.56
1195	277.29	1196	270.66	1197	264.68	1198	259.12	1199	253.78
1200	248.68	1201	243.57	1202	238.66	1203	233.80	1204	229.15
1205	224.59	1206	220.23	1207	215.88	1208	211.53	1209	207.16
1210	202.72	1211	198.43	1212	194.31	1213	190.40	1214	186.64
1215	182.98	1216	179.33	1217	175.73	1218	172.25	1219	168.82
1220	165.49	1221	162.31	1222	159.28	1223	156.33	1224	153.43
1225	150.66	1226	147.95	1227	145.40	1228	143.03	1229	140.78
1230	138.71	1231	136.50	1232	134.31	1233	132.25	1234	130.34
1235	128.63	1236	127.00	1237	125.27	1238	123.59	1239	121.91
1240	120.32	1241	118.72	1242	117.23	1243	115.74	1244	114.27
1245	112.88	1246	111.49	1247	110.20	1248	108.93	1249	107.67
1250	106.52	1251	105.40	1252	104.32	1253	103.24	1254	102.22
1255	101.20	1256	100.16	1257	99.20	1258	98.17	1259	97.18
1260	96.23	1261	95.33	1262	94.46	1263	93.62	1264	92.80
1265	91.92	1266	91.06	1267	90.28	1268	89.54	1269	88.86
1270	88.15	1271	87.46	1272	86.76	1273	86.08	1274	85.45
1275	84.82	1276	84.20	1277	83.55	1278	82.82	1279	82.08
1280	81.39	1281	80.79	1282	80.15	1283	79.52	1284	78.95
1285	78.39	1286	77.83	1287	77.27	1288	76.76	1289	76.26
1290	75.76	1291	75.26	1292	74.73	1293	74.29	1294	73.85
1295	73.38	1296	72.97	1297	72.53	1298	72.13	1299	71.66
1300	71.28	1310	67.28	1320	63.80	1330	61.22	1340	58.70
1350	56.28	1360	53.77	1370	51.77	1380	49.93	1390	48.12
1400	46.38	1420	44.07	1440	41.75	1460	38.23	1500	38.23

TOTAL VOLUME THIS HYDROGRAPH = 204.58(Ac.Ft)

50-YEAR

(BURN)

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	108A	8.1	18.88	8.1	18.88	0	0.	.00000	.00	.00	0.	2	13	A35	.21
159	109A	.0	.00	8.1	18.88	4	135.	2.00000	2.00	.00	0.	2	99	A35	.00
159	110A	46.7	91.34	54.8	110.21	2	735.	.01400	.00	.00	0.	2	18	A35	.02
159	111A	.0	.00	54.8	108.67	2	1660.	.00200	.00	.00	0.	2	99	A35	.00
159	112B	16.2	27.23	16.2	27.23	4	270.	.01900	2.75	.00	0.	4	18	A35	.21
159	113AB	16.2	27.19	71.0	90.05	1	735.	.01400	.00	.00	0.	4	0	A35	.00
159	114B	23.8	42.37	23.8	42.37	0	0.	.00000	.00	.00	0.	4	18	A35	.42
159	115AB	23.8	42.37	94.8	97.47	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159	116A	27.9	43.03	122.7	138.10	4	560.	.02300	3.50	.00	0.	4	21	A35	.21
159	117B	8.8	14.07	8.8	14.07	4	350.	.06600	2.00	.00	0.	4	22	A35	.42
159	118AB	8.8	14.07	131.5	151.59	4	220.	.16800	3.50	.00	0.	4	0	A35	.00
159	119A	7.0	21.17	138.5	157.54	1	210.	.54200	.00	.00	0.	4	6	A35	.21
159	120A	.0	.00	138.5	157.48	1	215.	.27900	.00	.00	0.	4	99	A35	.00
159	121B	3.5	10.59	3.5	10.59	0	0.	.00000	.00	.00	0.	4	6	A35	.21
159	122B	.0	.00	3.5	10.59	1	510.	.43100	.00	.00	0.	4	99	A35	.00

CONFLUENCE Q'S

159 123A TA 1156 QA   157.44 QAB   167.07 QB   9.63   159 123B TB 1155 QB   10.29 QBA   166.72 QA   156.43

159 123AB TAB 1156 QAB   167.07 QA   157.44 QB   9.63

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	123AB	3.5	10.29	142.0	167.07	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159	124A	.0	.00	142.0	167.07	1	1675.	.17900	.00	.00	0.	4	99	A35	.00
159	125A	60.0	156.79	202.0	301.78	0	0.	.00000	.00	.00	0.	204	9	A35	.01
159	126A	.0	.00	202.0	301.78	1	550.	.13600	.00	.00	0.	204	99	A35	.00
159	127B	14.5	36.97	14.5	36.97	4	570.	.07000	2.00	.00	0.	4	9	A35	.42
159	128B	.0	.00	14.5	36.81	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	129C	53.3	112.42	53.3	112.42	4	1260.	.03000	3.25	.00	0.	4	13	A35	.42
159	130C	.0	.00	53.3	111.74	0	0.	.00000	.00	.00	0.	4	99	A35	.00

CONFLUENCE Q'S

159 131B TB 1155 QB   36.81 QBC   145.84 QC   109.02   159 131C TC 1157 QC   111.74 QCB   146.85 QB   35.11

159 131BC TBC 1156 QBC   147.51 QB   36.08 QC   111.43

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	131BC	53.3	111.74	67.8	147.51	1	2640.	.21200	.00	.00	0.	4	0	A35	.00
159	132B	68.7	199.95	136.5	301.46	0	0.	.00000	.00	.00	0.	202	9	A35	.01
159	133AB	136.5	301.46	338.5	598.81	0	0.	.00000	.00	.00	0.	2	0	A35	.00
159	134A	.0	.00	338.5	598.81	1	1955.	.08700	.00	.00	0.	2	99	A35	.00
159	135B	15.8	28.97	15.8	28.97	2	165.	.09100	2.00	.00	0.	4	17	A35	.42
159	136B	.0	.00	15.8	28.97	4	300.	.11700	3.00	.00	0.	4	99	A35	.00
159	137C	1.3	4.39	1.3	4.39	1	320.	.53100	.00	.00	0.	4	5	A35	.21

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\cst_soilx_83.dat
STORM DAY 4

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV

CONFLUENCE Q'S
159 138B TB 1156 QB 28.94 QBC 32.23 QC 3.30 159 138C TC 1154 QC 4.09 QCB 32.37 QB 28.28
159 138BC TBC 1155 QBC 32.72 QB 28.85 QC 3.87

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 138BC	1.3	4.09	17.1	32.72	1	1600.	.33800	.00	.00	0.	4	0	A35	.00
159 139B	59.1	132.81	76.2	159.47	1	1880.	.09600	.00	.00	0.	204	12	A35	.02
159 140B	16.5	46.37	92.7	180.21	0	0.	.00000	.00	.00	0.	2	9	A35	.40
159 141C	61.2	154.41	61.2	154.41	0	0.	.00000	.00	.00	0.	202	12	A35	.01
159 142C	23.3	91.55	84.5	243.84	0	0.	.00000	.00	.00	0.	202	5	A35	.01
159 143C	48.3	121.78	132.8	363.96	0	0.	.00000	.00	.00	0.	202	12	A35	.05

CONFLUENCE Q'S
159 144B TB 1159 QB 180.21 QBC 452.61 QC 272.40 159 144C TC 1153 QC 363.96 QCB 493.96 QB 130.01
159 144BC TBC 1155 QBC 499.21 QB 154.72 QC 344.49

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 144BC	132.8	363.96	225.5	499.21	0	0.	.00000	.00	.00	0.	2	0	A35	.00
159 145B	.0	.00	225.5	499.21	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 146A	31.6	99.78	370.1	613.56	0	0.	.00000	.00	.00	0.	2	7	A35	.23

CONFLUENCE Q'S
159 147A TA 1159 QA 613.56 QAB 1066.17 QB 452.61 159 147B TB 1155 QB 499.21 QBA 1036.56 QA 537.35
159 147AB TAB 1157 QAB 1076.27 QA 591.84 QB 484.43

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 147AB	225.5	499.21	595.6	1076.27	1	590.	.08500	.00	.00	0.	2	0	A35	.00
159 148A	16.2	43.48	611.8	1104.14	0	0.	.00000	.00	.00	0.	4	8	A35	.40
159 149A	.0	.00	611.8	1104.14	1	1180.	.05100	.00	.00	0.	4	99	A35	.00
159 150B	13.9	39.88	13.9	39.88	0	0.	.00000	.00	.00	0.	4	7	A35	.40
159 151B	21.6	53.88	35.5	93.76	0	0.	.00000	.00	.00	0.	204	10	A35	.02
159 152A	12.5	35.86	624.3	1107.37	0	0.	.00000	.00	.00	0.	4	7	A35	.40

CONFLUENCE Q'S
159 153A TA 1160 QA 1107.37 QAB 1154.09 QB 46.72 159 153B TB 1154 QB 93.76 QBA 923.38 QA 829.62
159 153AB TAB 1159 QAB 1165.70 QA 1106.72 QB 58.98

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 153AB	35.5	93.76	659.8	1165.70	1	990.	.06100	.00	.00	0.	4	0	A35	.00
159 154B	7.7	22.80	7.7	22.80	0	0.	.00000	.00	.00	0.	204	7	A35	.02
159 155B	21.3	61.11	29.0	83.91	4	1470.	.03400	3.00	.00	0.	4	7	A35	.40

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\cst_soilx_83.dat
STORM DAY 4

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 156B	64.9	180.58	93.9	258.34	4	520.	.05800	3.00	.00	0.	202	10	A35	.02
159 157B	.0	.00	93.9	257.48	4	1760.	.04100	3.75	.00	0.	2	99	A35	.00
159 158B	33.8	70.76	127.7	319.28	0	0.	.00000	.00	.00	0.	4	12	A35	.20
159 159B	.0	.00	127.7	319.28	4	1400.	.08400	3.50	.00	0.	4	99	A35	.00
159 160B	33.8	76.98	161.5	383.05	0	0.	.00000	.00	.00	0.	4	11	A35	.36
159 161B	.0	.00	161.5	383.05	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159 162A	11.5	27.14	671.3	1178.56	0	0.	.00000	.00	.00	0.	204	11	A35	.02

****
* CONFLUENCE Q'S *
* 159 163A TA 1160 QA 1178.56 QAB 1550.99 QB 372.42 159 163B TB 1159 QB 383.05 QBA 1546.44 QA 1163.39 *
* 159 163AB TAB 1160 QAB 1550.99 QA 1178.56 QB 372.42 *
****

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 163AB	161.5	383.05	832.8	1550.99	4	450.	.06700	5.00	.00	0.	4	0	A35	.00
159 164A	.0	.00	832.8	1548.02	4	460.	.04300	9.50	.00	0.	4	99	A35	.00
159 165A	21.9	50.51	854.7	1586.65	4	180.	.16700	9.50	.00	0.	4	11	A35	.42
159 166A	.0	.00	854.7	1586.33	0	0.	.00000	.00	.00	0.	4	99	A35	.00

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE:

HYDROGRAPH AT 159 166A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	47.78	200	50.09	300	53.87	400	58.08
500	63.21	600	69.45	700	77.56	800	88.77	900	105.20
1000	131.96	1050	164.65	1100	242.22	1110	283.01	1120	343.70
1130	416.42	1131	424.53	1132	432.70	1133	440.99	1134	449.73
1135	458.83	1136	468.57	1137	479.22	1138	490.96	1139	503.55
1140	517.01	1141	531.88	1142	547.99	1143	565.28	1144	583.77
1145	604.13	1146	626.97	1147	652.27	1148	679.45	1149	715.05
1150	763.97	1151	833.78	1152	913.08	1153	1007.91	1154	1116.53
1155	1231.53	1156	1345.86	1157	1445.65	1158	1523.19	1159	1573.52
1160	1586.33	1161	1571.67	1162	1524.17	1163	1453.30	1164	1367.71
1165	1281.17	1166	1194.98	1167	1108.76	1168	1027.58	1169	950.82
1170	881.87	1171	821.16	1172	771.45	1173	727.65	1174	689.06
1175	649.75	1176	616.20	1177	586.61	1178	559.01	1179	534.70
1180	511.04	1181	489.59	1182	468.94	1183	449.77	1184	431.59
1185	414.71	1186	398.79	1187	383.69	1188	369.84	1189	357.05
1190	345.17	1191	334.48	1192	324.49	1193	315.50	1194	307.35
1195	300.16	1196	293.61	1197	287.52	1198	281.70	1199	276.19
1200	270.77	1201	265.55	1202	260.40	1203	255.40	1204	250.63
1205	246.03	1206	241.49	1207	236.94	1208	232.23	1209	227.50
1210	222.87	1211	218.53	1212	214.41	1213	210.45	1214	206.40
1215	202.45	1216	198.55	1217	194.75	1218	191.09	1219	187.50
1220	184.03	1221	180.74	1222	177.62	1223	174.59	1224	171.59
1225	168.72	1226	165.90	1227	163.27	1228	160.87	1229	158.52
1230	156.25	1231	154.01	1232	151.84	1233	149.80	1234	147.78
1235	145.89	1236	144.05	1237	142.16	1238	140.35	1239	138.57
1240	136.88	1241	135.18	1242	133.60	1243	132.03	1244	130.61
1245	129.17	1246	127.74	1247	126.36	1248	125.10	1249	123.83
1250	122.66	1251	121.46	1252	120.26	1253	119.05	1254	117.92
1255	116.80	1256	115.66	1257	114.61	1258	113.50	1259	112.45
1260	111.43	1261	110.47	1262	109.55	1263	108.67	1264	107.79
1265	106.87	1266	105.96	1267	105.13	1268	104.35	1269	103.63
1270	102.87	1271	102.14	1272	101.40	1273	100.70	1274	100.03
1275	99.34	1276	98.63	1277	97.87	1278	97.03	1279	96.21
1280	95.45	1281	94.80	1282	94.12	1283	93.45	1284	92.85
1285	92.27	1286	91.66	1287	91.06	1288	90.51	1289	89.95
1290	89.40	1291	88.86	1292	88.30	1293	87.83	1294	87.36
1295	86.85	1296	86.38	1297	85.92	1298	85.49	1299	85.00
1300	84.57	1310	80.06	1320	76.20	1330	73.30	1340	70.54
1350	67.80	1360	65.02	1370	62.71	1380	60.72	1390	58.60
1400	56.65	1420	54.08	1440	51.44	1460	47.78	1500	47.78

TOTAL VOLUME THIS HYDROGRAPH = 234.91(Ac.Ft)

Pre-development

(Project Site)

2-YEAR

Program Package Serial Number: 2061

03/31/11 FILE: HPBE INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 1

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 2 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

STORM DAY 4

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 139A	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159 140B	16.5	10.77	16.5	10.77	0	0.	.00000	.00	.00	0.	2	20	A35	.38
159 141C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 142C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 143C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 144C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 145B	.0	.00	16.5	10.77	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 146A	31.6	21.97	31.6	21.97	0	0.	.00000	.00	.00	0.	2	16	A35	.13

CONFLUENCE Q'S

159 147A TA 1155 QA 21.97 QAB 32.72 QB 10.75 159 147B TB 1156 QB 10.77 QBA 32.70 QA 21.93

159 147AB TAB 1155 QAB 32.72 QA 21.97 QB 10.75

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 147AB	16.5	10.77	48.1	32.72	1	590.	.08500	.00	.00	0.	2	0	A35	.00
159 148A	16.2	6.90	64.3	39.20	0	0.	.00000	.00	.00	0.	4	22	A35	.22
159 149A	.0	.00	64.3	39.20	1	1180.	.05100	.00	.00	0.	4	99	A35	.00
159 150B	13.9	7.03	13.9	7.03	0	0.	.00000	.00	.00	0.	4	18	A35	.26
159 151B	.0	.00	13.9	7.03	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159 152A	12.5	5.13	76.8	41.44	0	0.	.00000	.00	.00	0.	4	22	A35	.18

CONFLUENCE Q'S

159 153A TA 1165 QA 41.44 QAB 46.94 QB 5.50 159 153B TB 1155 QB 7.03 QBA 29.85 QA 22.82

159 153AB TAB 1164 QAB 46.95 QA 41.16 QB 5.79

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 153AB	13.9	7.03	90.7	46.95	1	990.	.06100	.00	.00	0.	4	0	A35	.00
159 154B	.0	.00	.0	7.03	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159 155B	21.3	7.55	21.3	7.55	4	1470.	.03400	3.00	.00	0.	4	25	A35	.13
159 156B	.0	.00	21.3	7.43	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 157B	.0	.00	21.3	7.43	4	1760.	.04100	2.00	.00	0.	2	99	A35	.00
159 158B	33.8	10.66	55.1	17.39	0	0.	.00000	.00	.00	0.	4	30	A35	.16

CONFLUENCE Q'S

159 159A TA 1169 QA 45.82 QAB 62.30 QB 16.48 159 159B TB 1164 QB 17.39 QBA 57.59 QA 40.20

159 159AB TAB 1168 QAB 62.40 QA 45.62 QB 16.77

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 159AB	55.1	17.39	145.8	62.40	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159 160A	.0	.00	145.8	62.40	0	0.	.00000	.00	.00	0.	4	99	A35	.00

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 2 SOIL DATA FILE:

HYDROGRAPH AT 159 160A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	2.26	200	2.33	300	2.45	400	2.59
500	2.75	600	2.95	700	3.21	800	3.56	900	4.05
1000	5.08	1050	6.50	1100	8.97	1110	9.68	1120	10.81
1130	12.66	1131	12.88	1132	13.10	1133	13.33	1134	13.57
1135	13.81	1136	14.07	1137	14.35	1138	14.63	1139	14.93
1140	15.23	1141	15.56	1142	15.89	1143	16.22	1144	16.57
1145	16.98	1146	17.40	1147	17.84	1148	18.70	1149	20.67
1150	22.47	1151	24.26	1152	26.29	1153	28.65	1154	30.54
1155	32.68	1156	35.12	1157	37.74	1158	40.45	1159	43.26
1160	46.24	1161	49.26	1162	52.29	1163	55.10	1164	57.59
1165	59.59	1166	61.05	1167	61.97	1168	62.40	1169	62.30
1170	61.66	1171	60.49	1172	58.96	1173	57.10	1174	55.03
1175	52.59	1176	50.00	1177	47.34	1178	44.63	1179	40.87
1180	37.35	1181	34.62	1182	31.92	1183	29.33	1184	27.13
1185	25.15	1186	23.36	1187	21.77	1188	20.33	1189	19.06
1190	17.92	1191	16.89	1192	15.96	1193	15.13	1194	14.38
1195	13.70	1196	13.09	1197	12.54	1198	12.04	1199	11.60
1200	11.18	1201	10.79	1202	10.43	1203	10.11	1204	9.82
1205	9.54	1206	9.28	1207	9.04	1208	8.82	1209	8.61
1210	8.42	1211	8.23	1212	8.06	1213	7.88	1214	7.72
1215	7.57	1216	7.42	1217	7.28	1218	7.14	1219	7.00
1220	6.87	1221	6.76	1222	6.64	1223	6.53	1224	6.42
1225	6.32	1226	6.22	1227	6.14	1228	6.05	1229	5.97
1230	5.89	1231	5.80	1232	5.73	1233	5.66	1234	5.58
1235	5.51	1236	5.44	1237	5.37	1238	5.30	1239	5.23
1240	5.17	1241	5.11	1242	5.05	1243	4.99	1244	4.94
1245	4.88	1246	4.82	1247	4.78	1248	4.73	1249	4.68
1250	4.64	1251	4.58	1252	4.54	1253	4.49	1254	4.46
1255	4.42	1256	4.38	1257	4.34	1258	4.30	1259	4.26
1260	4.23	1261	4.21	1262	4.17	1263	4.14	1264	4.11
1265	4.08	1266	4.05	1267	4.03	1268	4.00	1269	3.98
1270	3.95	1271	3.93	1272	3.90	1273	3.88	1274	3.86
1275	3.84	1276	3.83	1277	3.80	1278	3.78	1279	3.76
1280	3.74	1281	3.72	1282	3.70	1283	3.69	1284	3.67
1285	3.65	1286	3.63	1287	3.62	1288	3.60	1289	3.58
1290	3.57	1291	3.55	1292	3.53	1293	3.52	1294	3.50
1295	3.49	1296	3.47	1297	3.46	1298	3.45	1299	3.43
1300	3.42	1310	3.28	1320	3.17	1330	3.06	1340	2.98
1350	2.89	1360	2.81	1370	2.74	1380	2.67	1390	2.61
1400	2.54	1420	2.45	1440	2.36	1460	1.94	1500	1.79

TOTAL VOLUME THIS HYDROGRAPH = 9.70(Ac.Ft)

5-YEAR

Program Package Serial Number: 2061

03/31/11 FILE: HPBE INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 1

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 5 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

STORM DAY 4

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 139A	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159 140B	16.5	19.37	16.5	19.37	0	0.	.00000	.00	.00	0.	2	16	A35	.38
159 141C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 142C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 143C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 144C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 145B	.0	.00	16.5	19.37	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 146A	31.6	41.82	31.6	41.82	0	0.	.00000	.00	.00	0.	2	12	A35	.13

CONFLUENCE Q'S

159 147A TA 1155 QA 41.82 QAB 61.19 QB 19.37 159 147B TB 1155 QB 19.37 QBA 61.19 QA 41.82

159 147AB TAB 1155 QAB 61.19 QA 41.82 QB 19.37

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 147AB	16.5	19.37	48.1	61.19	1	590.	.08500	.00	.00	0.	2	0	A35	.00
159 148A	16.2	15.65	64.3	75.99	0	0.	.00000	.00	.00	0.	4	15	A35	.22
159 149A	.0	.00	64.3	75.99	1	1180.	.05100	.00	.00	0.	4	99	A35	.00
159 150B	13.9	15.51	13.9	15.51	0	0.	.00000	.00	.00	0.	4	12	A35	.26
159 151B	.0	.00	13.9	15.51	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159 152A	12.5	12.32	76.8	81.66	0	0.	.00000	.00	.00	0.	4	14	A35	.18

CONFLUENCE Q'S

159 153A TA 1162 QA 81.66 QAB 91.12 QB 9.46 159 153B TB 1155 QB 15.51 QBA 68.54 QA 53.03

159 153AB TAB 1160 QAB 92.38 QA 79.06 QB 13.32

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 153AB	13.9	15.51	90.7	92.38	1	990.	.06100	.00	.00	0.	4	0	A35	.00
159 154B	.0	.00	.0	15.51	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159 155B	21.3	19.74	21.3	19.74	4	1470.	.03400	3.00	.00	0.	4	15	A35	.13
159 156B	.0	.00	21.3	19.31	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 157B	.0	.00	21.3	19.31	4	1760.	.04100	2.00	.00	0.	2	99	A35	.00
159 158B	33.8	22.38	55.1	40.72	0	0.	.00000	.00	.00	0.	4	26	A35	.16

CONFLUENCE Q'S

159 159A TA 1164 QA 89.61 QAB 129.30 QB 39.69 159 159B TB 1161 QB 40.72 QBA 121.60 QA 80.88

159 159AB TAB 1164 QAB 129.30 QA 89.61 QB 39.69

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 159AB	55.1	40.72	145.8	129.30	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159 160A	.0	.00	145.8	129.30	0	0.	.00000	.00	.00	0.	4	99	A35	.00

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 5 SOIL DATA FILE:

HYDROGRAPH AT 159 160A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	3.41	200	3.52	300	3.71	400	3.91
500	4.16	600	4.50	700	5.06	800	5.89	900	7.06
1000	9.00	1050	11.31	1100	15.30	1110	16.63	1120	18.96
1130	24.28	1131	25.07	1132	25.87	1133	26.72	1134	27.59
1135	28.46	1136	29.41	1137	30.39	1138	31.44	1139	32.48
1140	33.60	1141	34.87	1142	36.19	1143	37.56	1144	39.02
1145	40.82	1146	42.69	1147	44.61	1148	46.73	1149	50.41
1150	54.31	1151	58.62	1152	63.83	1153	70.05	1154	75.74
1155	82.15	1156	88.93	1157	95.68	1158	102.55	1159	109.38
1160	115.91	1161	121.60	1162	126.03	1163	128.63	1164	129.30
1165	128.18	1166	125.44	1167	121.29	1168	116.23	1169	110.40
1170	104.07	1171	97.16	1172	90.14	1173	83.12	1174	76.43
1175	68.75	1176	61.50	1177	54.79	1178	48.51	1179	42.21
1180	38.68	1181	35.72	1182	33.14	1183	30.88	1184	28.90
1185	27.16	1186	25.63	1187	24.29	1188	23.11	1189	22.06
1190	21.09	1191	20.21	1192	19.42	1193	18.70	1194	18.06
1195	17.49	1196	16.94	1197	16.45	1198	15.99	1199	15.59
1200	15.20	1201	14.83	1202	14.49	1203	14.19	1204	13.89
1205	13.61	1206	13.33	1207	13.05	1208	12.81	1209	12.56
1210	12.34	1211	12.12	1212	11.92	1213	11.71	1214	11.51
1215	11.34	1216	11.16	1217	10.99	1218	10.84	1219	10.69
1220	10.55	1221	10.42	1222	10.29	1223	10.15	1224	10.00
1225	9.88	1226	9.76	1227	9.65	1228	9.54	1229	9.43
1230	9.32	1231	9.21	1232	9.10	1233	9.01	1234	8.91
1235	8.83	1236	8.74	1237	8.65	1238	8.57	1239	8.49
1240	8.41	1241	8.32	1242	8.26	1243	8.18	1244	8.11
1245	8.03	1246	7.96	1247	7.88	1248	7.81	1249	7.74
1250	7.69	1251	7.62	1252	7.55	1253	7.48	1254	7.43
1255	7.36	1256	7.30	1257	7.25	1258	7.19	1259	7.13
1260	7.08	1261	7.03	1262	6.97	1263	6.92	1264	6.87
1265	6.83	1266	6.78	1267	6.74	1268	6.69	1269	6.65
1270	6.59	1271	6.55	1272	6.51	1273	6.46	1274	6.42
1275	6.38	1276	6.33	1277	6.29	1278	6.25	1279	6.21
1280	6.16	1281	6.13	1282	6.08	1283	6.05	1284	6.02
1285	5.98	1286	5.94	1287	5.90	1288	5.87	1289	5.83
1290	5.80	1291	5.77	1292	5.73	1293	5.70	1294	5.66
1295	5.63	1296	5.61	1297	5.57	1298	5.54	1299	5.50
1300	5.47	1310	5.17	1320	4.92	1330	4.69	1340	4.50
1350	4.33	1360	4.19	1370	4.08	1380	3.98	1390	3.88
1400	3.80	1420	3.66	1440	3.53	1460	2.86	1500	2.70

TOTAL VOLUME THIS HYDROGRAPH = 16.27(Ac.Ft)

10-YEAR

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 10 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

STORM DAY 4

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 139A	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159 140B	16.5	27.94	16.5	27.94	0	0.	.00000	.00	.00	0.	2	12	A35	.38
159 141C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 142C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 143C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 144C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 145B	.0	.00	16.5	27.94	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 146A	31.6	61.04	31.6	61.04	0	0.	.00000	.00	.00	0.	2	9	A35	.13

****
CONFLUENCE Q'S
159 147A TA 1154 QA 61.04 QAB 88.99 QB 27.94 159 147B TB 1154 QB 27.94 QBA 88.99 QA 61.04
159 147AB TAB 1154 QAB 88.99 QA 61.04 QB 27.94
****

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 147AB	16.5	27.94	48.1	88.99	1	590.	.08500	.00	.00	0.	2	0	A35	.00
159 148A	16.2	24.02	64.3	111.11	0	0.	.00000	.00	.00	0.	4	11	A35	.22
159 149A	.0	.00	64.3	111.11	1	1180.	.05100	.00	.00	0.	4	99	A35	.00
159 150B	13.9	23.24	13.9	23.24	0	0.	.00000	.00	.00	0.	4	9	A35	.26
159 151B	.0	.00	13.9	23.24	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159 152A	12.5	19.42	76.8	115.45	0	0.	.00000	.00	.00	0.	4	10	A35	.18

****
CONFLUENCE Q'S
159 153A TA 1160 QA 115.45 QAB 127.69 QB 12.24 159 153B TB 1154 QB 23.24 QBA 98.02 QA 74.78
159 153AB TAB 1159 QAB 130.03 QA 114.75 QB 15.28
****

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 153AB	13.9	23.24	90.7	130.03	1	990.	.06100	.00	.00	0.	4	0	A35	.00
159 154B	.0	.00	.0	23.24	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159 155B	21.3	30.68	21.3	30.68	4	1470.	.03400	3.00	.00	0.	4	11	A35	.13
159 156B	.0	.00	21.3	29.94	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 157B	.0	.00	21.3	29.94	4	1760.	.04100	2.00	.00	0.	2	99	A35	.00
159 158B	33.8	36.82	55.1	64.04	0	0.	.00000	.00	.00	0.	4	18	A35	.16

****
CONFLUENCE Q'S
159 159A TA 1162 QA 125.76 QAB 187.88 QB 62.11 159 159B TB 1160 QB 64.04 QBA 183.73 QA 119.69
159 159AB TAB 1162 QAB 187.88 QA 125.76 QB 62.11
****

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 159AB	55.1	64.04	145.8	187.88	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159 160A	.0	.00	145.8	187.88	0	0.	.00000	.00	.00	0.	4	99	A35	.00

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 10 SOIL DATA FILE:

HYDROGRAPH AT   159 160A   STORM DAY 4   REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	4.16	200	4.31	300	4.59	400	4.97
500	5.44	600	6.03	700	6.78	800	7.79	900	9.23
1000	11.65	1050	14.61	1100	19.56	1110	22.66	1120	30.03
1130	39.12	1131	40.15	1132	41.19	1133	42.29	1134	43.41
1135	44.54	1136	45.79	1137	47.14	1138	48.59	1139	49.90
1140	51.36	1141	53.11	1142	54.96	1143	56.92	1144	59.01
1145	61.70	1146	64.53	1147	67.61	1148	71.01	1149	77.14
1150	83.61	1151	90.96	1152	100.13	1153	111.02	1154	120.93
1155	131.98	1156	143.44	1157	154.83	1158	166.04	1159	176.09
1160	183.73	1161	187.66	1162	187.88	1163	184.13	1164	177.27
1165	168.11	1166	157.66	1167	143.90	1168	129.72	1169	115.58
1170	101.87	1171	88.92	1172	79.46	1173	71.25	1174	64.22
1175	58.06	1176	52.55	1177	47.88	1178	43.96	1179	40.74
1180	37.92	1181	35.49	1182	33.37	1183	31.52	1184	29.84
1185	28.36	1186	27.03	1187	25.93	1188	24.90	1189	23.97
1190	23.11	1191	22.35	1192	21.66	1193	21.03	1194	20.47
1195	19.93	1196	19.43	1197	18.96	1198	18.56	1199	18.16
1200	17.80	1201	17.43	1202	17.08	1203	16.76	1204	16.45
1205	16.16	1206	15.87	1207	15.58	1208	15.32	1209	15.07
1210	14.84	1211	14.61	1212	14.39	1213	14.18	1214	13.99
1215	13.83	1216	13.63	1217	13.45	1218	13.27	1219	13.09
1220	12.94	1221	12.80	1222	12.64	1223	12.48	1224	12.30
1225	12.18	1226	12.03	1227	11.91	1228	11.77	1229	11.65
1230	11.52	1231	11.40	1232	11.30	1233	11.19	1234	11.07
1235	10.98	1236	10.88	1237	10.77	1238	10.69	1239	10.56
1240	10.48	1241	10.38	1242	10.31	1243	10.21	1244	10.13
1245	10.04	1246	9.94	1247	9.87	1248	9.78	1249	9.71
1250	9.64	1251	9.56	1252	9.49	1253	9.41	1254	9.35
1255	9.29	1256	9.21	1257	9.15	1258	9.07	1259	9.02
1260	8.95	1261	8.91	1262	8.84	1263	8.79	1264	8.73
1265	8.66	1266	8.62	1267	8.57	1268	8.50	1269	8.45
1270	8.39	1271	8.34	1272	8.28	1273	8.24	1274	8.20
1275	8.15	1276	8.09	1277	8.05	1278	7.99	1279	7.93
1280	7.89	1281	7.85	1282	7.79	1283	7.75	1284	7.72
1285	7.68	1286	7.63	1287	7.59	1288	7.57	1289	7.52
1290	7.48	1291	7.44	1292	7.38	1293	7.35	1294	7.29
1295	7.25	1296	7.24	1297	7.19	1298	7.15	1299	7.10
1300	7.08	1310	6.73	1320	6.42	1330	6.16	1340	5.92
1350	5.71	1360	5.50	1370	5.30	1380	5.11	1390	4.92
1400	4.77	1420	4.52	1440	4.31	1460	3.30	1500	3.30

TOTAL VOLUME THIS HYDROGRAPH =   21.17(Ac.Ft)

25-YEAR

Program Package Serial Number: 2061

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

STORM DAY 4

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 139A	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159 140B	16.5	38.59	16.5	38.59	0	0.	.00000	.00	.00	0.	2	10	A35	.38
159 141C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 142C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 143C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 144C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 145B	.0	.00	16.5	38.59	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 146A	31.6	86.62	31.6	86.62	0	0.	.00000	.00	.00	0.	2	7	A35	.13

CONFLUENCE Q'S

159 147A TA 1154 QA 86.62 QAB 125.21 QB 38.59 159 147B TB 1154 QB 38.59 QBA 125.21 QA 86.62

159 147AB TAB 1154 QAB 125.21 QA 86.62 QB 38.59

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 147AB	16.5	38.59	48.1	125.21	1	590.	.08500	.00	.00	0.	2	0	A35	.00
159 148A	16.2	34.18	64.3	155.97	0	0.	.00000	.00	.00	0.	4	9	A35	.22
159 149A	.0	.00	64.3	155.97	1	1180.	.05100	.00	.00	0.	4	99	A35	.00
159 150B	13.9	31.35	13.9	31.35	0	0.	.00000	.00	.00	0.	4	8	A35	.26
159 151B	.0	.00	13.9	31.35	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159 152A	12.5	27.71	76.8	159.15	0	0.	.00000	.00	.00	0.	4	8	A35	.18

CONFLUENCE Q'S

159 153A TA 1159 QA 159.15 QAB 176.30 QB 17.15 159 153B TB 1153 QB 31.35 QBA 129.88 QA 98.53

159 153AB TAB 1158 QAB 179.68 QA 158.23 QB 21.46

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 153AB	13.9	31.35	90.7	179.68	1	990.	.06100	.00	.00	0.	4	0	A35	.00
159 154B	.0	.00	.0	31.35	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159 155B	21.3	44.02	21.3	44.02	4	1470.	.03400	3.00	.00	0.	4	9	A35	.13
159 156B	.0	.00	21.3	42.72	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 157B	.0	.00	21.3	42.72	4	1760.	.04100	2.00	.00	0.	2	99	A35	.00
159 158B	33.8	55.13	55.1	92.49	0	0.	.00000	.00	.00	0.	4	14	A35	.16

CONFLUENCE Q'S

159 159A TA 1161 QA 173.32 QAB 261.34 QB 88.02 159 159B TB 1158 QB 92.49 QBA 247.55 QA 155.06

159 159AB TAB 1160 QAB 263.23 QA 172.27 QB 90.95

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 159AB	55.1	92.49	145.8	263.23	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159 160A	.0	.00	145.8	263.23	0	0.	.00000	.00	.00	0.	4	99	A35	.00

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE:

HYDROGRAPH AT 159 160A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	5.51	200	5.78	300	6.22	400	6.70
500	7.29	600	8.01	700	8.94	800	10.18	900	12.02
1000	15.10	1050	18.81	1100	28.35	1110	34.93	1120	44.68
1130	56.48	1131	57.84	1132	59.21	1133	60.70	1134	62.21
1135	63.54	1136	65.03	1137	66.68	1138	68.52	1139	70.39
1140	72.53	1141	75.11	1142	77.79	1143	80.70	1144	83.86
1145	87.82	1146	91.99	1147	96.39	1148	101.26	1149	110.61
1150	120.66	1151	132.28	1152	146.71	1153	163.96	1154	179.55
1155	196.36	1156	213.82	1157	231.41	1158	247.55	1159	258.31
1160	263.23	1161	261.34	1162	252.62	1163	234.26	1164	213.05
1165	190.99	1166	168.51	1167	146.61	1168	130.05	1169	115.64
1170	103.36	1171	92.74	1172	83.71	1173	75.96	1174	69.32
1175	63.72	1176	58.73	1177	54.47	1178	50.68	1179	47.37
1180	44.35	1181	41.71	1182	39.04	1183	37.07	1184	35.20
1185	33.62	1186	32.16	1187	30.91	1188	29.78	1189	28.73
1190	27.78	1191	26.89	1192	26.11	1193	25.41	1194	24.78
1195	24.16	1196	23.60	1197	23.05	1198	22.58	1199	22.11
1200	21.65	1201	21.23	1202	20.80	1203	20.43	1204	20.07
1205	19.75	1206	19.42	1207	19.11	1208	18.81	1209	18.54
1210	18.30	1211	18.05	1212	17.81	1213	17.57	1214	17.35
1215	17.15	1216	16.96	1217	16.73	1218	16.52	1219	16.31
1220	16.11	1221	15.97	1222	15.77	1223	15.61	1224	15.40
1225	15.25	1226	15.09	1227	14.95	1228	14.81	1229	14.65
1230	14.53	1231	14.38	1232	14.26	1233	14.14	1234	14.00
1235	13.85	1236	13.74	1237	13.61	1238	13.54	1239	13.40
1240	13.30	1241	13.16	1242	13.06	1243	12.93	1244	12.84
1245	12.75	1246	12.63	1247	12.54	1248	12.45	1249	12.34
1250	12.25	1251	12.17	1252	12.06	1253	11.98	1254	11.90
1255	11.83	1256	11.73	1257	11.65	1258	11.56	1259	11.50
1260	11.43	1261	11.36	1262	11.29	1263	11.22	1264	11.12
1265	11.06	1266	11.00	1267	10.94	1268	10.85	1269	10.79
1270	10.71	1271	10.66	1272	10.61	1273	10.55	1274	10.49
1275	10.40	1276	10.34	1277	10.28	1278	10.21	1279	10.16
1280	10.12	1281	10.07	1282	10.00	1283	9.97	1284	9.95
1285	9.91	1286	9.83	1287	9.78	1288	9.72	1289	9.64
1290	9.59	1291	9.55	1292	9.50	1293	9.46	1294	9.39
1295	9.35	1296	9.34	1297	9.27	1298	9.23	1299	9.16
1300	9.15	1310	8.71	1320	8.36	1330	8.05	1340	7.78
1350	7.52	1360	7.25	1370	7.01	1380	6.78	1390	6.55
1400	6.37	1420	6.07	1440	5.79	1460	4.44	1500	4.44

TOTAL VOLUME THIS HYDROGRAPH = 27.99(Ac.Ft)

50-YEAR

Program Package Serial Number: 2061
03/31/11 FILE: hpbe INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 1
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\cst_soilx_83.dat
STORM DAY 4

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 139A	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159 140B	16.5	46.36	16.5	46.36	0	0.	.00000	.00	.00	0.	2	9	A35	.38
159 141C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 142C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 143C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 144C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 145B	.0	.00	16.5	46.36	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 146A	31.6	99.76	31.6	99.76	0	0.	.00000	.00	.00	0.	2	7	A35	.13

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*                                                        CONFLUENCE Q'S                                                        *
*   159  147A  TA 1154 QA    99.76 QAB   146.11 QB    46.36     159  147B  TB 1153 QB    46.36 QBA   146.11 QA    99.76   *
*                                  159  147AB TAB 1154 QAB   146.11 QA    99.76 QB    46.36                                *
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LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 147AB	16.5	46.36	48.1	146.11	1	590.	.08500	.00	.00	0.	2	0	A35	.00
159 148A	16.2	42.06	64.3	184.92	0	0.	.00000	.00	.00	0.	4	8	A35	.22
159 149A	.0	.00	64.3	184.92	1	1180.	.05100	.00	.00	0.	4	99	A35	.00
159 150B	13.9	38.92	13.9	38.92	0	0.	.00000	.00	.00	0.	4	7	A35	.26
159 151B	.0	.00	13.9	38.92	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159 152A	12.5	34.51	76.8	187.36	0	0.	.00000	.00	.00	0.	4	7	A35	.18

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*                                                        CONFLUENCE Q'S                                                        *
*   159  153A  TA 1158 QA   187.36 QAB   209.34 QB    21.97     159  153B  TB 1154 QB    38.92 QBA   175.71 QA   136.78   *
*                                  159  153AB TAB 1158 QAB   209.34 QA   187.36 QB    21.97                                *
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LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 153AB	13.9	38.92	90.7	209.34	1	990.	.06100	.00	.00	0.	4	0	A35	.00
159 154B	.0	.00	.0	38.92	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159 155B	21.3	54.36	21.3	54.36	4	1470.	.03400	3.00	.00	0.	4	8	A35	.13
159 156B	.0	.00	21.3	52.98	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 157B	.0	.00	21.3	52.98	4	1760.	.04100	2.25	.00	0.	2	99	A35	.00
159 158B	33.8	70.11	55.1	115.35	0	0.	.00000	.00	.00	0.	4	12	A35	.16

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*                                                        CONFLUENCE Q'S                                                        *
*   159  159A  TA 1160 QA   203.66 QAB   314.29 QB   110.62     159  159B  TB 1158 QB   115.35 QBA   306.26 QA   190.91   *
*                                  159  159AB TAB 1160 QAB   314.29 QA   203.66 QB   110.62                                *
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LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 159AB	55.1	115.35	145.8	314.29	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159 160A	.0	.00	145.8	314.29	0	0.	.00000	.00	.00	0.	4	99	A35	.00

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE:

HYDROGRAPH AT 159 160A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	6.63	200	6.94	300	7.44	400	7.99
500	8.66	600	9.48	700	10.54	800	12.01	900	14.16
1000	17.68	1050	22.04	1100	36.00	1110	44.44	1120	55.61
1130	69.30	1131	70.95	1132	72.59	1133	74.12	1134	75.69
1135	77.33	1136	79.20	1137	81.29	1138	83.66	1139	86.09
1140	88.86	1141	92.18	1142	95.65	1143	99.12	1144	102.95
1145	107.89	1146	113.03	1147	118.59	1148	124.67	1149	136.73
1150	149.54	1151	165.01	1152	184.35	1153	206.88	1154	227.10
1155	249.19	1156	271.86	1157	291.52	1158	306.26	1159	314.18
1160	314.29	1161	299.66	1162	278.11	1163	252.90	1164	225.77
1165	197.90	1166	175.99	1167	156.22	1168	139.05	1169	123.95
1170	110.97	1171	100.03	1172	90.73	1173	82.81	1174	76.13
1175	70.49	1176	65.47	1177	61.24	1178	57.51	1179	54.26
1180	51.18	1181	48.66	1182	46.19	1183	44.14	1184	41.90
1185	40.10	1186	38.33	1187	36.70	1188	35.29	1189	33.94
1190	32.65	1191	31.60	1192	30.66	1193	29.74	1194	28.94
1195	28.12	1196	27.38	1197	26.70	1198	26.10	1199	25.50
1200	24.93	1201	24.41	1202	23.90	1203	23.48	1204	23.06
1205	22.68	1206	22.29	1207	21.93	1208	21.62	1209	21.31
1210	21.01	1211	20.72	1212	20.47	1213	20.20	1214	19.97
1215	19.74	1216	19.48	1217	19.22	1218	18.97	1219	18.78
1220	18.54	1221	18.39	1222	18.17	1223	17.99	1224	17.74
1225	17.59	1226	17.44	1227	17.25	1228	17.10	1229	16.96
1230	16.83	1231	16.65	1232	16.51	1233	16.33	1234	16.17
1235	16.05	1236	15.97	1237	15.81	1238	15.69	1239	15.53
1240	15.41	1241	15.26	1242	15.15	1243	15.04	1244	14.93
1245	14.79	1246	14.69	1247	14.60	1248	14.47	1249	14.37
1250	14.28	1251	14.19	1252	14.06	1253	13.97	1254	13.89
1255	13.81	1256	13.68	1257	13.61	1258	13.53	1259	13.42
1260	13.34	1261	13.30	1262	13.18	1263	13.10	1264	13.03
1265	12.96	1266	12.85	1267	12.78	1268	12.72	1269	12.66
1270	12.56	1271	12.50	1272	12.43	1273	12.32	1274	12.24
1275	12.17	1276	12.11	1277	12.05	1278	11.95	1279	11.90
1280	11.85	1281	11.81	1282	11.77	1283	11.71	1284	11.66
1285	11.60	1286	11.50	1287	11.42	1288	11.36	1289	11.26
1290	11.25	1291	11.19	1292	11.10	1293	11.05	1294	11.01
1295	10.96	1296	10.92	1297	10.83	1298	10.82	1299	10.73
1300	10.69	1310	10.23	1320	9.83	1330	9.48	1340	9.17
1350	8.88	1360	8.56	1370	8.30	1380	8.03	1390	7.78
1400	7.57	1420	7.24	1440	6.92	1460	5.41	1500	5.41

TOTAL VOLUME THIS HYDROGRAPH = 33.22(Ac.Ft)

Post-development

(Project Site)

2-YEAR

```
 Program Package Serial Number:  2061
03/31/11   FILE: HPBP     INPUT DATA: English Units  RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units     PAGE     1
                                        LOS ANGELES COUNTY FLOOD CONTROL DISTRICT                                  PROG F0601M

                     MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR =  2  SOIL DATA FILE: C:\civild\cst_soilx_83.dat
                                                                                                             STORM DAY 4
                         SUBAREA  SUBAREA     TOTAL    TOTAL  CONV   CONV      CONV    CONV   CONV   CONTROL SOIL     RAIN  PCT
      LOCATION           AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z      Q(CFS) NAME  TC  ZONE  IMPV
       159  139A           .0        .00          .0       .00   0        0.  .00000      .00   .00        0.    4  99   A35   .00
       159  140B         16.5      10.82        16.5     10.82   0        0.  .00000      .00   .00        0.    2  20   A35   .40
       159  141C           .0        .00          .0       .00   0        0.  .00000      .00   .00        0.    2  99   A35   .00
       159  142C           .0        .00          .0       .00   0        0.  .00000      .00   .00        0.    2  99   A35   .00
       159  143C           .0        .00          .0       .00   0        0.  .00000      .00   .00        0.    2  99   A35   .00
       159  144C           .0        .00          .0       .00   0        0.  .00000      .00   .00        0.    2  99   A35   .00
       159  145B           .0        .00        16.5     10.82   0        0.  .00000      .00   .00        0.    2  99   A35   .00
       159  146A         31.6      22.50        31.6     22.50   0        0.  .00000      .00   .00        0.    2  16   A35   .23
*******************************************************************************************************************************
*                                                    CONFLUENCE Q'S                                                           *
*      159  147A  TA 1155 QA    22.50 QAB    33.31 QB    10.80     159  147B  TB 1156 QB    10.82 QBA    33.28 QA    22.46   *
*                                159  147AB TAB 1155 QAB    33.31 QA    22.50 QB    10.80                                     *
*******************************************************************************************************************************
                         SUBAREA  SUBAREA     TOTAL    TOTAL  CONV   CONV      CONV    CONV   CONV   CONTROL SOIL     RAIN  PCT
      LOCATION           AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z      Q(CFS) NAME  TC  ZONE  IMPV
       159  147AB        16.5      10.82        48.1     33.31   1      590.  .08500      .00   .00        0.    2   0   A35   .00
       159  148A         16.2       8.01        64.3     40.91   0        0.  .00000      .00   .00        0.    4  22   A35   .40
       159  149A           .0        .00        64.3     40.91   1     1180.  .05100      .00   .00        0.    4  99   A35   .00
       159  150B         13.9       8.72        13.9      8.72   0        0.  .00000      .00   .00        0.    4  15   A35   .40
       159  151B           .0        .00        13.9      8.72   0        0.  .00000      .00   .00        0.    4  99   A35   .00
       159  152A         12.5       7.25        76.8     44.42   0        0.  .00000      .00   .00        0.    4  17   A35   .40
*******************************************************************************************************************************
*                                                    CONFLUENCE Q'S                                                           *
*      159  153A  TA 1165 QA    44.42 QAB    49.35 QB     4.93     159  153B  TB 1155 QB     8.72 QBA    35.57 QA    26.85   *
*                                159  153AB TAB 1163 QAB    50.87 QA    43.88 QB     6.99                                     *
*******************************************************************************************************************************
                         SUBAREA  SUBAREA     TOTAL    TOTAL  CONV   CONV      CONV    CONV   CONV   CONTROL SOIL     RAIN  PCT
      LOCATION           AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z      Q(CFS) NAME  TC  ZONE  IMPV
       159  153AB        13.9       8.72        90.7     50.87   1      990.  .06100      .00   .00        0.    4   0   A35   .00
       159  154B           .0        .00          .0      8.72   0        0.  .00000      .00   .00        0.    4  99   A35   .00
       159  155B         21.3      12.35        21.3     12.35   4     1470.  .03400     3.00   .00        0.    4  17   A35   .40
       159  156B           .0        .00        21.3     12.12   0        0.  .00000      .00   .00        0.    2  99   A35   .00
       159  157B           .0        .00        21.3     12.12   4     1760.  .04100     2.00   .00        0.    2  99   A35   .00
       159  158B         33.8      11.16        55.1     22.75   0        0.  .00000      .00   .00        0.    4  30   A35   .20
*******************************************************************************************************************************
*                                                    CONFLUENCE Q'S                                                           *
*      159  159A  TA 1167 QA    49.16 QAB    70.75 QB    21.59     159  159B  TB 1162 QB    22.75 QBA    64.01 QA    41.27   *
*                                159  159AB TAB 1167 QAB    70.75 QA    49.16 QB    21.59                                     *
*******************************************************************************************************************************
                         SUBAREA  SUBAREA     TOTAL    TOTAL  CONV   CONV      CONV    CONV   CONV   CONTROL SOIL     RAIN  PCT
      LOCATION           AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z      Q(CFS) NAME  TC  ZONE  IMPV
       159  159AB        55.1      22.75       145.8     70.75   0        0.  .00000      .00   .00        0.    4   0   A35   .00
       159  160A           .0        .00       145.8     70.75   0        0.  .00000      .00   .00        0.    4  99   A35   .00
```

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 2 SOIL DATA FILE:

HYDROGRAPH AT 159 160A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	3.15	200	3.25	300	3.43	400	3.62
500	3.84	600	4.13	700	4.49	800	4.97	900	5.67
1000	7.02	1050	8.80	1100	11.85	1110	12.79	1120	14.34
1130	16.76	1131	17.04	1132	17.33	1133	17.62	1134	17.91
1135	18.22	1136	18.55	1137	18.90	1138	19.27	1139	19.65
1140	20.05	1141	20.46	1142	20.89	1143	21.33	1144	21.78
1145	22.31	1146	22.88	1147	23.50	1148	24.59	1149	26.81
1150	28.90	1151	31.02	1152	33.48	1153	36.41	1154	39.06
1155	42.08	1156	45.40	1157	48.78	1158	52.04	1159	55.17
1160	58.25	1161	61.20	1162	64.01	1163	66.48	1164	68.49
1165	69.96	1166	70.74	1167	70.75	1168	70.07	1169	68.67
1170	66.73	1171	64.34	1172	61.79	1173	59.13	1174	56.48
1175	53.68	1176	50.88	1177	48.09	1178	45.33	1179	41.57
1180	38.11	1181	35.48	1182	32.94	1183	30.55	1184	28.55
1185	26.75	1186	25.10	1187	23.61	1188	22.26	1189	21.05
1190	19.94	1191	18.95	1192	18.06	1193	17.25	1194	16.52
1195	15.87	1196	15.26	1197	14.71	1198	14.20	1199	13.73
1200	13.30	1201	12.91	1202	12.53	1203	12.19	1204	11.88
1205	11.59	1206	11.32	1207	11.07	1208	10.83	1209	10.60
1210	10.39	1211	10.18	1212	9.99	1213	9.80	1214	9.62
1215	9.45	1216	9.29	1217	9.13	1218	8.98	1219	8.83
1220	8.69	1221	8.57	1222	8.44	1223	8.33	1224	8.21
1225	8.10	1226	8.00	1227	7.90	1228	7.79	1229	7.70
1230	7.60	1231	7.50	1232	7.42	1233	7.33	1234	7.24
1235	7.16	1236	7.08	1237	7.00	1238	6.92	1239	6.85
1240	6.77	1241	6.71	1242	6.64	1243	6.58	1244	6.52
1245	6.45	1246	6.39	1247	6.34	1248	6.28	1249	6.22
1250	6.17	1251	6.11	1252	6.06	1253	6.01	1254	5.97
1255	5.93	1256	5.88	1257	5.83	1258	5.79	1259	5.75
1260	5.71	1261	5.68	1262	5.64	1263	5.60	1264	5.57
1265	5.53	1266	5.50	1267	5.47	1268	5.44	1269	5.41
1270	5.38	1271	5.35	1272	5.32	1273	5.30	1274	5.27
1275	5.25	1276	5.22	1277	5.19	1278	5.16	1279	5.14
1280	5.11	1281	5.09	1282	5.07	1283	5.05	1284	5.02
1285	5.00	1286	4.97	1287	4.95	1288	4.93	1289	4.91
1290	4.89	1291	4.86	1292	4.84	1293	4.82	1294	4.80
1295	4.78	1296	4.77	1297	4.75	1298	4.73	1299	4.71
1300	4.70	1310	4.51	1320	4.36	1330	4.22	1340	4.11
1350	3.99	1360	3.88	1370	3.78	1380	3.69	1390	3.60
1400	3.52	1420	3.40	1440	3.28	1460	2.79	1500	2.61

TOTAL VOLUME THIS HYDROGRAPH = 12.69(Ac.Ft)

5-YEAR

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 5 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	139A	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	140B	16.5	19.42	16.5	19.42	0	0.	.00000	.00	.00	0.	2	16	A35	.40
159	141C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159	142C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159	143C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159	144C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159	145B	.0	.00	16.5	19.42	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159	146A	31.6	42.27	31.6	42.27	0	0.	.00000	.00	.00	0.	2	12	A35	.23

CONFLUENCE Q'S

159 147A TA 1155 QA 42.27 QAB 61.69 QB 19.42 159 147B TB 1155 QB 19.42 QBA 61.69 QA 42.27

159 147AB TAB 1155 QAB 61.69 QA 42.27 QB 19.42

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	147AB	16.5	19.42	48.1	61.69	1	590.	.08500	.00	.00	0.	2	0	A35	.00
159	148A	16.2	16.94	64.3	77.78	0	0.	.00000	.00	.00	0.	4	15	A35	.40
159	149A	.0	.00	64.3	77.78	1	1180.	.05100	.00	.00	0.	4	99	A35	.00
159	150B	13.9	16.38	13.9	16.38	0	0.	.00000	.00	.00	0.	4	12	A35	.40
159	151B	.0	.00	13.9	16.38	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	152A	12.5	14.73	76.8	83.37	0	0.	.00000	.00	.00	0.	4	12	A35	.40

CONFLUENCE Q'S

159 153A TA 1161 QA 83.37 QAB 95.60 QB 12.23 159 153B TB 1155 QB 16.38 QBA 74.00 QA 57.62

159 153AB TAB 1160 QAB 97.00 QA 82.83 QB 14.17

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	153AB	13.9	16.38	90.7	97.00	1	990.	.06100	.00	.00	0.	4	0	A35	.00
159	154B	.0	.00	.0	16.38	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159	155B	21.3	24.01	21.3	24.01	4	1470.	.03400	3.00	.00	0.	4	13	A35	.40
159	156B	.0	.00	21.3	23.60	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159	157B	.0	.00	21.3	23.60	4	1760.	.04100	2.00	.00	0.	2	99	A35	.00
159	158B	33.8	24.34	55.1	46.97	0	0.	.00000	.00	.00	0.	4	26	A35	.30

CONFLUENCE Q'S

159 159A TA 1164 QA 93.14 QAB 138.34 QB 45.20 159 159B TB 1161 QB 46.97 QBA 133.33 QA 86.35

159 159AB TAB 1163 QAB 138.91 QA 92.83 QB 46.09

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159	159AB	55.1	46.97	145.8	138.91	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159	160A	.0	.00	145.8	138.91	0	0.	.00000	.00	.00	0.	4	99	A35	.00

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 5 SOIL DATA FILE:

HYDROGRAPH AT 159 160A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	5.00	200	5.18	300	5.45	400	5.75
500	6.12	600	6.60	700	7.34	800	8.39	900	9.88
1000	12.35	1050	15.36	1100	20.40	1110	22.23	1120	25.45
1130	31.50	1131	32.33	1132	33.16	1133	34.05	1134	34.95
1135	35.88	1136	36.88	1137	37.89	1138	38.96	1139	40.02
1140	41.15	1141	42.46	1142	43.82	1143	45.27	1144	46.83
1145	48.75	1146	50.75	1147	52.79	1148	55.02	1149	58.88
1150	62.98	1151	67.56	1152	73.14	1153	79.85	1154	86.14
1155	93.23	1156	100.62	1157	107.82	1158	114.92	1159	121.73
1160	128.01	1161	133.33	1162	137.21	1163	138.91	1164	138.34
1165	135.93	1166	131.89	1167	126.39	1168	120.34	1169	114.02
1170	107.49	1171	100.50	1172	93.59	1173	86.84	1174	80.44
1175	72.95	1176	65.88	1177	59.27	1178	53.08	1179	46.97
1180	43.44	1181	40.45	1182	37.82	1183	35.52	1184	33.48
1185	31.71	1186	30.14	1187	28.77	1188	27.52	1189	26.40
1190	25.38	1191	24.45	1192	23.64	1193	22.90	1194	22.22
1195	21.59	1196	21.00	1197	20.47	1198	19.98	1199	19.53
1200	19.10	1201	18.70	1202	18.31	1203	17.96	1204	17.63
1205	17.30	1206	16.98	1207	16.67	1208	16.39	1209	16.10
1210	15.85	1211	15.59	1212	15.36	1213	15.13	1214	14.90
1215	14.71	1216	14.51	1217	14.33	1218	14.13	1219	13.97
1220	13.78	1221	13.63	1222	13.47	1223	13.32	1224	13.14
1225	12.99	1226	12.85	1227	12.71	1228	12.59	1229	12.46
1230	12.33	1231	12.19	1232	12.06	1233	11.96	1234	11.84
1235	11.75	1236	11.65	1237	11.54	1238	11.44	1239	11.33
1240	11.25	1241	11.14	1242	11.06	1243	10.96	1244	10.88
1245	10.79	1246	10.69	1247	10.60	1248	10.52	1249	10.43
1250	10.37	1251	10.29	1252	10.20	1253	10.12	1254	10.05
1255	9.98	1256	9.90	1257	9.84	1258	9.76	1259	9.69
1260	9.63	1261	9.58	1262	9.51	1263	9.46	1264	9.39
1265	9.33	1266	9.27	1267	9.22	1268	9.16	1269	9.11
1270	9.04	1271	8.99	1272	8.94	1273	8.88	1274	8.84
1275	8.79	1276	8.73	1277	8.68	1278	8.62	1279	8.57
1280	8.51	1281	8.47	1282	8.42	1283	8.37	1284	8.33
1285	8.29	1286	8.24	1287	8.19	1288	8.15	1289	8.10
1290	8.07	1291	8.03	1292	7.98	1293	7.95	1294	7.89
1295	7.86	1296	7.84	1297	7.79	1298	7.75	1299	7.70
1300	7.67	1310	7.29	1320	6.98	1330	6.71	1340	6.48
1350	6.27	1360	6.08	1370	5.92	1380	5.79	1390	5.65
1400	5.52	1420	5.34	1440	5.15	1460	4.18	1500	3.94

TOTAL VOLUME THIS HYDROGRAPH = 21.36(Ac.Ft)

10-YEAR

```
  Program Package Serial Number:  2061
03/31/11   FILE: HPBP     INPUT DATA: English Units  RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units     PAGE     1
                                        LOS ANGELES COUNTY FLOOD CONTROL DISTRICT                                   PROG F0601M

               MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 10  SOIL DATA FILE: C:\civild\cst_soilx_83.dat
                                                                                                  STORM DAY 4
                    SUBAREA  SUBAREA     TOTAL   TOTAL  CONV   CONV     CONV     CONV   CONV   CONTROL SOIL      RAIN  PCT
       LOCATION     AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z      Q(CFS) NAME  TC  ZONE  IMPV
        159  139A      .0       .00        .0       .00   0        0.  .00000      .00   .00         0.    4  99   A35   .00
        159  140B    16.5     27.99      16.5     27.99   0        0.  .00000      .00   .00         0.    2  12   A35   .40
        159  141C      .0       .00        .0       .00   0        0.  .00000      .00   .00         0.    2  99   A35   .00
        159  142C      .0       .00        .0       .00   0        0.  .00000      .00   .00         0.    2  99   A35   .00
        159  143C      .0       .00        .0       .00   0        0.  .00000      .00   .00         0.    2  99   A35   .00
        159  144C      .0       .00        .0       .00   0        0.  .00000      .00   .00         0.    2  99   A35   .00
        159  145B      .0       .00      16.5     27.99   0        0.  .00000      .00   .00         0.    2  99   A35   .00
        159  146A    31.6     61.37      31.6     61.37   0        0.  .00000      .00   .00         0.    2   9   A35   .23
    ********************************************************************************************************************************
    *                                                    CONFLUENCE Q'S                                                            *
    *   159  147A  TA 1154 QA    61.37 QAB    89.36 QB    27.99     159  147B  TB 1154 QB    27.99 QBA    89.36 QA    61.37   *
    *                                  159  147AB TAB 1154 QAB    89.36 QA    61.37 QB    27.99                                  *
    ********************************************************************************************************************************
                    SUBAREA  SUBAREA     TOTAL   TOTAL  CONV   CONV     CONV     CONV   CONV   CONTROL SOIL      RAIN  PCT
       LOCATION     AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z      Q(CFS) NAME  TC  ZONE  IMPV
        159  147AB   16.5     27.99      48.1     89.36   1      590.  .08500      .00   .00         0.    2   0   A35   .00
        159  148A    16.2     25.38      64.3    112.85   0        0.  .00000      .00   .00         0.    4  11   A35   .40
        159  149A      .0       .00      64.3    112.85   1     1180.  .05100      .00   .00         0.    4  99   A35   .00
        159  150B    13.9     24.16      13.9     24.16   0        0.  .00000      .00   .00         0.    4   9   A35   .40
        159  151B      .0       .00      13.9     24.16   0        0.  .00000      .00   .00         0.    4  99   A35   .00
        159  152A    12.5     20.71      76.8    118.60   0        0.  .00000      .00   .00         0.    4  10   A35   .40
    ********************************************************************************************************************************
    *                                                    CONFLUENCE Q'S                                                            *
    *   159  153A  TA 1160 QA   118.60 QAB   131.68 QB    13.08     159  153B  TB 1154 QB    24.16 QBA   102.45 QA    78.29   *
    *                                  159  153AB TAB 1159 QAB   134.18 QA   118.03 QB    16.15                                  *
    ********************************************************************************************************************************
                    SUBAREA  SUBAREA     TOTAL   TOTAL  CONV   CONV     CONV     CONV   CONV   CONTROL SOIL      RAIN  PCT
       LOCATION     AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z      Q(CFS) NAME  TC  ZONE  IMPV
        159  153AB   13.9     24.16      90.7    134.18   1      990.  .06100      .00   .00         0.    4   0   A35   .00
        159  154B      .0       .00        .0     24.16   0        0.  .00000      .00   .00         0.    4  99   A35   .00
        159  155B    21.3     35.30      21.3     35.30   4     1470.  .03400     3.00   .00         0.    4  10   A35   .40
        159  156B      .0       .00      21.3     34.20   0        0.  .00000      .00   .00         0.    2  99   A35   .00
        159  157B      .0       .00      21.3     34.20   4     1760.  .04100     2.00   .00         0.    2  99   A35   .00
        159  158B    33.8     37.43      55.1     68.96   0        0.  .00000      .00   .00         0.    4  18   A35   .20
    ********************************************************************************************************************************
    *                                                    CONFLUENCE Q'S                                                            *
    *   159  159A  TA 1162 QA   129.99 QAB   196.12 QB    66.13     159  159B  TB 1159 QB    68.96 QBA   185.92 QA   116.96   *
    *                                  159  159AB TAB 1161 QAB   196.69 QA   128.79 QB    67.90                                  *
    ********************************************************************************************************************************
                    SUBAREA  SUBAREA     TOTAL   TOTAL  CONV   CONV     CONV     CONV   CONV   CONTROL SOIL      RAIN  PCT
       LOCATION     AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z      Q(CFS) NAME  TC  ZONE  IMPV
        159  159AB   55.1     68.96     145.8    196.69   0        0.  .00000      .00   .00         0.    4   0   A35   .00
        159  160A      .0       .00     145.8    196.69   0        0.  .00000      .00   .00         0.    4  99   A35   .00
```

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 10 SOIL DATA FILE:

HYDROGRAPH AT 159 160A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	5.81	200	6.01	300	6.38	400	6.85
500	7.43	600	8.14	700	9.06	800	10.29	900	12.06
1000	15.02	1050	18.65	1100	24.67	1110	28.25	1120	36.10
1130	45.39	1131	46.43	1132	47.47	1133	48.59	1134	49.72
1135	50.87	1136	52.12	1137	53.46	1138	54.93	1139	56.27
1140	57.77	1141	59.60	1142	61.53	1143	63.57	1144	65.75
1145	68.52	1146	71.42	1147	74.56	1148	78.05	1149	84.28
1150	90.89	1151	98.48	1152	108.01	1153	119.37	1154	129.78
1155	141.28	1156	153.11	1157	164.76	1158	176.04	1159	185.92
1160	193.25	1161	196.69	1162	196.12	1163	191.28	1164	183.26
1165	173.12	1166	161.90	1167	147.59	1168	133.20	1169	119.08
1170	105.52	1171	92.70	1172	83.34	1173	75.26	1174	68.32
1175	62.23	1176	56.76	1177	52.09	1178	48.23	1179	45.05
1180	42.26	1181	39.87	1182	37.75	1183	35.90	1184	34.21
1185	32.71	1186	31.40	1187	30.26	1188	29.17	1189	28.21
1190	27.31	1191	26.53	1192	25.81	1193	25.12	1194	24.51
1195	23.93	1196	23.40	1197	22.91	1198	22.47	1199	22.02
1200	21.61	1201	21.20	1202	20.81	1203	20.46	1204	20.12
1205	19.79	1206	19.47	1207	19.14	1208	18.85	1209	18.58
1210	18.31	1211	18.06	1212	17.83	1213	17.60	1214	17.37
1215	17.17	1216	16.94	1217	16.73	1218	16.53	1219	16.33
1220	16.16	1221	15.99	1222	15.80	1223	15.62	1224	15.42
1225	15.27	1226	15.11	1227	14.97	1228	14.81	1229	14.67
1230	14.53	1231	14.39	1232	14.27	1233	14.14	1234	14.01
1235	13.89	1236	13.78	1237	13.65	1238	13.55	1239	13.40
1240	13.31	1241	13.19	1242	13.11	1243	12.99	1244	12.90
1245	12.79	1246	12.68	1247	12.59	1248	12.49	1249	12.41
1250	12.33	1251	12.23	1252	12.15	1253	12.05	1254	11.98
1255	11.91	1256	11.82	1257	11.75	1258	11.66	1259	11.60
1260	11.51	1261	11.47	1262	11.38	1263	11.32	1264	11.25
1265	11.17	1266	11.12	1267	11.06	1268	10.98	1269	10.92
1270	10.85	1271	10.80	1272	10.73	1273	10.68	1274	10.62
1275	10.56	1276	10.50	1277	10.44	1278	10.37	1279	10.29
1280	10.24	1281	10.20	1282	10.13	1283	10.08	1284	10.05
1285	10.01	1286	9.94	1287	9.90	1288	9.87	1289	9.81
1290	9.76	1291	9.71	1292	9.64	1293	9.60	1294	9.53
1295	9.49	1296	9.47	1297	9.41	1298	9.37	1299	9.31
1300	9.29	1310	8.87	1320	8.49	1330	8.19	1340	7.92
1350	7.65	1360	7.38	1370	7.14	1380	6.93	1390	6.70
1400	6.51	1420	6.23	1440	5.97	1460	4.82	1500	4.82

TOTAL VOLUME THIS HYDROGRAPH = 26.22(Ac.Ft)

25-YEAR

```
       Program Package Serial Number:  2061
03/31/11   FILE: HPBP     INPUT DATA: English Units  RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units     PAGE     1
                                                LOS ANGELES COUNTY FLOOD CONTROL DISTRICT                          PROG F0601M

                  MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25  SOIL DATA FILE: C:\civild\cst_soilx_83.dat
                                                                                                          STORM DAY 4
                     SUBAREA   SUBAREA     TOTAL    TOTAL  CONV   CONV     CONV     CONV   CONV    CONTROL SOIL      RAIN  PCT
   LOCATION    AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z      Q(CFS) NAME  TC  ZONE  IMPV
    159  139A       .0       .00       .0       .00   0       0.  .00000      .00   .00          0.     4  99   A35   .00
    159  140B     16.5     38.62     16.5     38.62   0       0.  .00000      .00   .00          0.     2  10   A35   .40
    159  141C       .0       .00       .0       .00   0       0.  .00000      .00   .00          0.     2  99   A35   .00
    159  142C       .0       .00       .0       .00   0       0.  .00000      .00   .00          0.     2  99   A35   .00
    159  143C       .0       .00       .0       .00   0       0.  .00000      .00   .00          0.     2  99   A35   .00
    159  144C       .0       .00       .0       .00   0       0.  .00000      .00   .00          0.     2  99   A35   .00
    159  145B       .0       .00     16.5     38.62   0       0.  .00000      .00   .00          0.     2  99   A35   .00
    159  146A     31.6     86.75     31.6     86.75   0       0.  .00000      .00   .00          0.     2   7   A35   .23
*****************************************************************************************************************************
*                                                    CONFLUENCE Q'S                                                          *
*   159  147A  TA 1154 QA    86.75 QAB   125.37 QB    38.62     159  147B  TB 1154 QB    38.62 QBA   125.37 QA    86.75   *
*                                159  147AB TAB 1154 QAB   125.37 QA    86.75 QB    38.62                                   *
*****************************************************************************************************************************
                     SUBAREA   SUBAREA     TOTAL    TOTAL  CONV   CONV     CONV     CONV   CONV    CONTROL SOIL      RAIN  PCT
   LOCATION    AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z      Q(CFS) NAME  TC  ZONE  IMPV
    159  147AB    16.5     38.62     48.1    125.37   1     590.  .08500      .00   .00          0.     2   0   A35   .00
    159  148A     16.2     35.59     64.3    157.56   0       0.  .00000      .00   .00          0.     4   9   A35   .40
    159  149A       .0       .00     64.3    157.56   1    1180.  .05100      .00   .00          0.     4  99   A35   .00
    159  150B     13.9     34.55     13.9     34.55   0       0.  .00000      .00   .00          0.     4   7   A35   .40
    159  151B       .0       .00     13.9     34.55   0       0.  .00000      .00   .00          0.     4  99   A35   .00
    159  152A     12.5     29.04     76.8    162.16   0       0.  .00000      .00   .00          0.     4   8   A35   .40
*****************************************************************************************************************************
*                                                    CONFLUENCE Q'S                                                          *
*   159  153A  TA 1159 QA   162.16 QAB   176.84 QB    14.68     159  153B  TB 1154 QB    34.55 QBA   148.25 QA   113.70   *
*                                159  153AB TAB 1158 QAB   181.10 QA   161.40 QB    19.69                                   *
*****************************************************************************************************************************
                     SUBAREA   SUBAREA     TOTAL    TOTAL  CONV   CONV     CONV     CONV   CONV    CONTROL SOIL      RAIN  PCT
   LOCATION    AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z      Q(CFS) NAME  TC  ZONE  IMPV
    159  153AB    13.9     34.55     90.7    181.10   1     990.  .06100      .00   .00          0.     4   0   A35   .00
    159  154B       .0       .00       .0     34.55   0       0.  .00000      .00   .00          0.     4  99   A35   .00
    159  155B     21.3     49.48     21.3     49.48   4    1470.  .03400     3.00   .00          0.     4   8   A35   .40
    159  156B       .0       .00     21.3     48.17   0       0.  .00000      .00   .00          0.     2  99   A35   .00
    159  157B       .0       .00     21.3     48.17   4    1760.  .04100     2.00   .00          0.     2  99   A35   .00
    159  158B     33.8     55.77     55.1     98.09   0       0.  .00000      .00   .00          0.     4  14   A35   .20
*****************************************************************************************************************************
*                                                    CONFLUENCE Q'S                                                          *
*   159  159A  TA 1161 QA   174.80 QAB   267.21 QB    92.41     159  159B  TB 1158 QB    98.09 QBA   258.45 QA   160.36   *
*                                159  159AB TAB 1160 QAB   271.05 QA   174.79 QB    96.25                                   *
*****************************************************************************************************************************
                     SUBAREA   SUBAREA     TOTAL    TOTAL  CONV   CONV     CONV     CONV   CONV    CONTROL SOIL      RAIN  PCT
   LOCATION    AREA(Ac)  Q(CFS)    AREA(Ac)  Q(CFS) TYPE  LNGTH(Ft) SLOPE  SIZE(Ft)   Z      Q(CFS) NAME  TC  ZONE  IMPV
    159  159AB    55.1     98.09    145.8    271.05   0       0.  .00000      .00   .00          0.     4   0   A35   .00
    159  160A       .0       .00    145.8    271.05   0       0.  .00000      .00   .00          0.     4  99   A35   .00
```

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 25 SOIL DATA FILE:

HYDROGRAPH AT 159 160A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	7.49	200	7.83	300	8.37	400	8.96
500	9.68	600	10.55	700	11.69	800	13.21	900	15.44
1000	19.17	1050	23.74	1100	34.03	1110	40.86	1120	50.91
1130	62.83	1131	64.21	1132	65.60	1133	67.11	1134	68.65
1135	70.03	1136	71.57	1137	73.29	1138	75.20	1139	77.17
1140	79.41	1141	82.08	1142	84.86	1143	87.86	1144	91.16
1145	95.26	1146	99.54	1147	104.06	1148	109.12	1149	118.68
1150	128.96	1151	141.00	1152	156.16	1153	174.33	1154	190.88
1155	208.48	1156	226.41	1157	243.65	1158	258.45	1159	267.63
1160	271.05	1161	267.21	1162	256.53	1163	237.16	1164	215.48
1165	193.14	1166	170.78	1167	149.27	1168	133.17	1169	119.14
1170	107.19	1171	96.72	1172	87.87	1173	80.19	1174	73.62
1175	68.10	1176	63.19	1177	58.99	1178	55.24	1179	51.97
1180	48.98	1181	46.37	1182	43.77	1183	41.83	1184	39.98
1185	38.42	1186	36.97	1187	35.76	1188	34.61	1189	33.55
1190	32.60	1191	31.70	1192	30.93	1193	30.20	1194	29.54
1195	28.87	1196	28.28	1197	27.69	1198	27.18	1199	26.66
1200	26.16	1201	25.70	1202	25.23	1203	24.82	1204	24.42
1205	24.07	1206	23.70	1207	23.35	1208	23.03	1209	22.73
1210	22.46	1211	22.17	1212	21.89	1213	21.62	1214	21.35
1215	21.12	1216	20.90	1217	20.65	1218	20.40	1219	20.17
1220	19.94	1221	19.78	1222	19.55	1223	19.36	1224	19.12
1225	18.96	1226	18.77	1227	18.62	1228	18.46	1229	18.28
1230	18.14	1231	17.96	1232	17.81	1233	17.67	1234	17.50
1235	17.34	1236	17.21	1237	17.06	1238	16.97	1239	16.81
1240	16.69	1241	16.53	1242	16.41	1243	16.27	1244	16.16
1245	16.05	1246	15.91	1247	15.81	1248	15.71	1249	15.58
1250	15.48	1251	15.38	1252	15.25	1253	15.16	1254	15.07
1255	14.99	1256	14.87	1257	14.78	1258	14.67	1259	14.59
1260	14.51	1261	14.43	1262	14.34	1263	14.26	1264	14.15
1265	14.07	1266	14.00	1267	13.93	1268	13.83	1269	13.77
1270	13.68	1271	13.62	1272	13.56	1273	13.49	1274	13.41
1275	13.30	1276	13.23	1277	13.16	1278	13.06	1279	13.00
1280	12.95	1281	12.91	1282	12.83	1283	12.78	1284	12.76
1285	12.71	1286	12.61	1287	12.54	1288	12.48	1289	12.38
1290	12.33	1291	12.27	1292	12.22	1293	12.17	1294	12.09
1295	12.05	1296	12.04	1297	11.95	1298	11.91	1299	11.82
1300	11.81	1310	11.29	1320	10.87	1330	10.50	1340	10.19
1350	9.87	1360	9.53	1370	9.24	1380	8.97	1390	8.70
1400	8.47	1420	8.13	1440	7.79	1460	6.27	1500	6.28

TOTAL VOLUME THIS HYDROGRAPH = 33.93(Ac.Ft)

50-YEAR

Program Package Serial Number: 2061

03/31/11 FILE: HPBP INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 1

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\cst_soilx_83.dat

STORM DAY 4

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 139A	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159 140B	16.5	46.37	16.5	46.37	0	0.	.00000	.00	.00	0.	2	9	A35	.40
159 141C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 142C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 143C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 144C	.0	.00	.0	.00	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 145B	.0	.00	16.5	46.37	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 146A	31.6	99.78	31.6	99.78	0	0.	.00000	.00	.00	0.	2	7	A35	.23

CONFLUENCE Q'S

159 147A TA 1154 QA 99.78 QAB 146.15 QB 46.37 159 147B TB 1153 QB 46.37 QBA 146.15 QA 99.78

159 147AB TAB 1154 QAB 146.15 QA 99.78 QB 46.37

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 147AB	16.5	46.37	48.1	146.15	1	590.	.08500	.00	.00	0.	2	0	A35	.00
159 148A	16.2	43.48	64.3	186.39	0	0.	.00000	.00	.00	0.	4	8	A35	.40
159 149A	.0	.00	64.3	186.39	1	1180.	.05100	.00	.00	0.	4	99	A35	.00
159 150B	13.9	39.88	13.9	39.88	0	0.	.00000	.00	.00	0.	4	7	A35	.40
159 151B	.0	.00	13.9	39.88	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159 152A	12.5	35.86	76.8	190.39	0	0.	.00000	.00	.00	0.	4	7	A35	.40

CONFLUENCE Q'S

159 153A TA 1158 QA 190.39 QAB 213.28 QB 22.89 159 153B TB 1154 QB 39.88 QBA 180.22 QA 140.34

159 153AB TAB 1157 QAB 213.43 QA 185.06 QB 28.37

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 153AB	13.9	39.88	90.7	213.43	1	990.	.06100	.00	.00	0.	4	0	A35	.00
159 154B	.0	.00	.0	39.88	0	0.	.00000	.00	.00	0.	4	99	A35	.00
159 155B	21.3	61.11	21.3	61.11	4	1470.	.03400	3.00	.00	0.	4	7	A35	.40
159 156B	.0	.00	21.3	59.68	0	0.	.00000	.00	.00	0.	2	99	A35	.00
159 157B	.0	.00	21.3	59.68	4	1760.	.04100	2.25	.00	0.	2	99	A35	.00
159 158B	33.8	70.76	55.1	122.06	0	0.	.00000	.00	.00	0.	4	12	A35	.20

CONFLUENCE Q'S

159 159A TA 1160 QA 207.81 QAB 322.52 QB 114.70 159 159B TB 1158 QB 122.06 QBA 317.66 QA 195.60

159 159AB TAB 1159 QAB 324.45 QA 204.56 QB 119.89

LOCATION	SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
159 159AB	55.1	122.06	145.8	324.45	0	0.	.00000	.00	.00	0.	4	0	A35	.00
159 160A	.0	.00	145.8	324.45	0	0.	.00000	.00	.00	0.	4	99	A35	.00

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE:

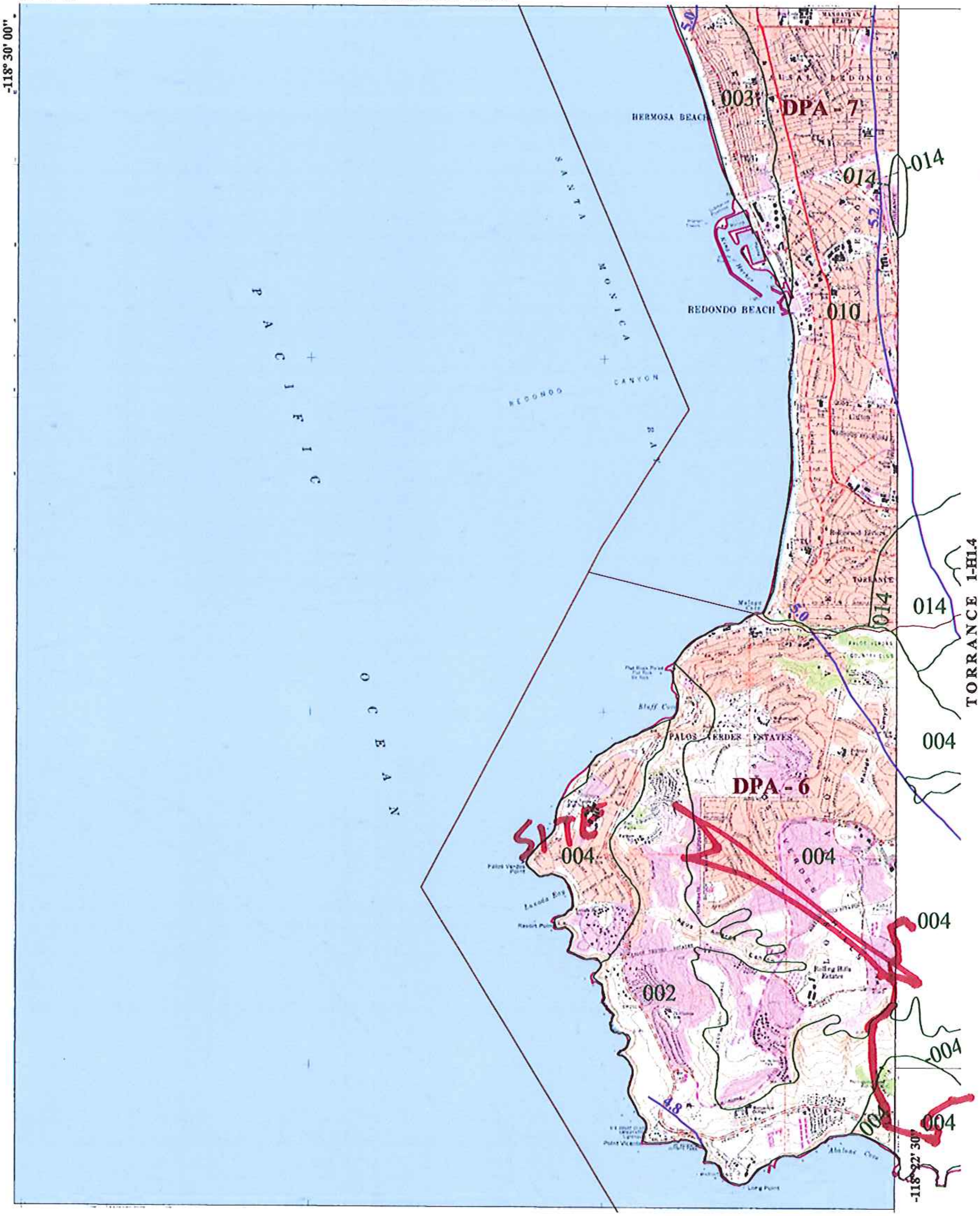
HYDROGRAPH AT 159 160A STORM DAY 4 REDUCTION FACTOR = 1.000

TIME	Q	TIME	Q	TIME	Q	TIME	Q	TIME	Q
0	.00	100	8.85	200	9.25	300	9.86	400	10.53
500	11.35	600	12.35	700	13.64	800	15.42	900	18.02
1000	22.29	1050	27.59	1100	41.93	1110	50.51	1120	62.00
1130	75.80	1131	77.45	1132	79.11	1133	80.66	1134	82.26
1135	83.94	1136	85.85	1137	88.01	1138	90.48	1139	93.03
1140	95.93	1141	99.38	1142	102.94	1143	106.48	1144	110.39
1145	115.41	1146	120.65	1147	126.32	1148	132.50	1149	144.71
1150	157.76	1151	173.57	1152	193.38	1153	216.59	1154	237.60
1155	260.33	1156	283.35	1157	303.16	1158	317.66	1159	324.45
1160	322.52	1161	305.69	1162	282.28	1163	255.78	1164	228.05
1165	200.19	1166	178.75	1167	159.50	1168	142.74	1169	127.94
1170	115.22	1171	104.42	1172	95.29	1173	87.44	1174	80.82
1175	75.24	1176	70.25	1177	66.05	1178	62.34	1179	59.11
1180	56.07	1181	53.61	1182	51.15	1183	49.11	1184	46.88
1185	45.12	1186	43.38	1187	41.72	1188	40.30	1189	38.94
1190	37.69	1191	36.63	1192	35.68	1193	34.75	1194	33.96
1195	33.14	1196	32.41	1197	31.72	1198	31.12	1199	30.51
1200	29.92	1201	29.38	1202	28.83	1203	28.39	1204	27.93
1205	27.52	1206	27.10	1207	26.72	1208	26.39	1209	26.03
1210	25.68	1211	25.34	1212	25.06	1213	24.74	1214	24.48
1215	24.22	1216	23.92	1217	23.62	1218	23.34	1219	23.11
1220	22.84	1221	22.67	1222	22.41	1223	22.20	1224	21.92
1225	21.75	1226	21.58	1227	21.36	1228	21.19	1229	21.02
1230	20.86	1231	20.65	1232	20.48	1233	20.28	1234	20.09
1235	19.95	1236	19.86	1237	19.67	1238	19.53	1239	19.35
1240	19.21	1241	19.04	1242	18.91	1243	18.78	1244	18.66
1245	18.50	1246	18.39	1247	18.28	1248	18.12	1249	18.01
1250	17.90	1251	17.80	1252	17.65	1253	17.55	1254	17.45
1255	17.35	1256	17.21	1257	17.11	1258	17.02	1259	16.89
1260	16.80	1261	16.75	1262	16.61	1263	16.52	1264	16.43
1265	16.34	1266	16.22	1267	16.14	1268	16.07	1269	16.00
1270	15.89	1271	15.82	1272	15.74	1273	15.61	1274	15.52
1275	15.43	1276	15.35	1277	15.27	1278	15.16	1279	15.10
1280	15.04	1281	14.99	1282	14.94	1283	14.88	1284	14.81
1285	14.74	1286	14.62	1287	14.53	1288	14.45	1289	14.34
1290	14.32	1291	14.26	1292	14.16	1293	14.11	1294	14.06
1295	14.00	1296	13.94	1297	13.85	1298	13.83	1299	13.73
1300	13.68	1310	13.12	1320	12.64	1330	12.24	1340	11.88
1350	11.51	1360	11.12	1370	10.80	1380	10.50	1390	10.19
1400	9.93	1420	9.56	1440	9.17	1460	7.46	1500	7.47

TOTAL VOLUME THIS HYDROGRAPH = 39.81(Ac.Ft)

9.B. Hydrologic Reference Graphs & Table

1. 50-Year, 24-Hour Isohyet (LACDPW)
2. Runoff Coefficient Curves for Soil Types 2 and 4
3. Los Angeles County Proportion Impervious Data Table
4. Los Angeles County Debris Production Rates for Los Angeles Basin
5. Los Angeles County Peak Bulking Factors for Los Angeles Basin



016 SOIL CLASSIFICATION AREA

7.2 INCHES OF RAINFALL

DPA - 6 DEBRIS POTENTIAL AREA

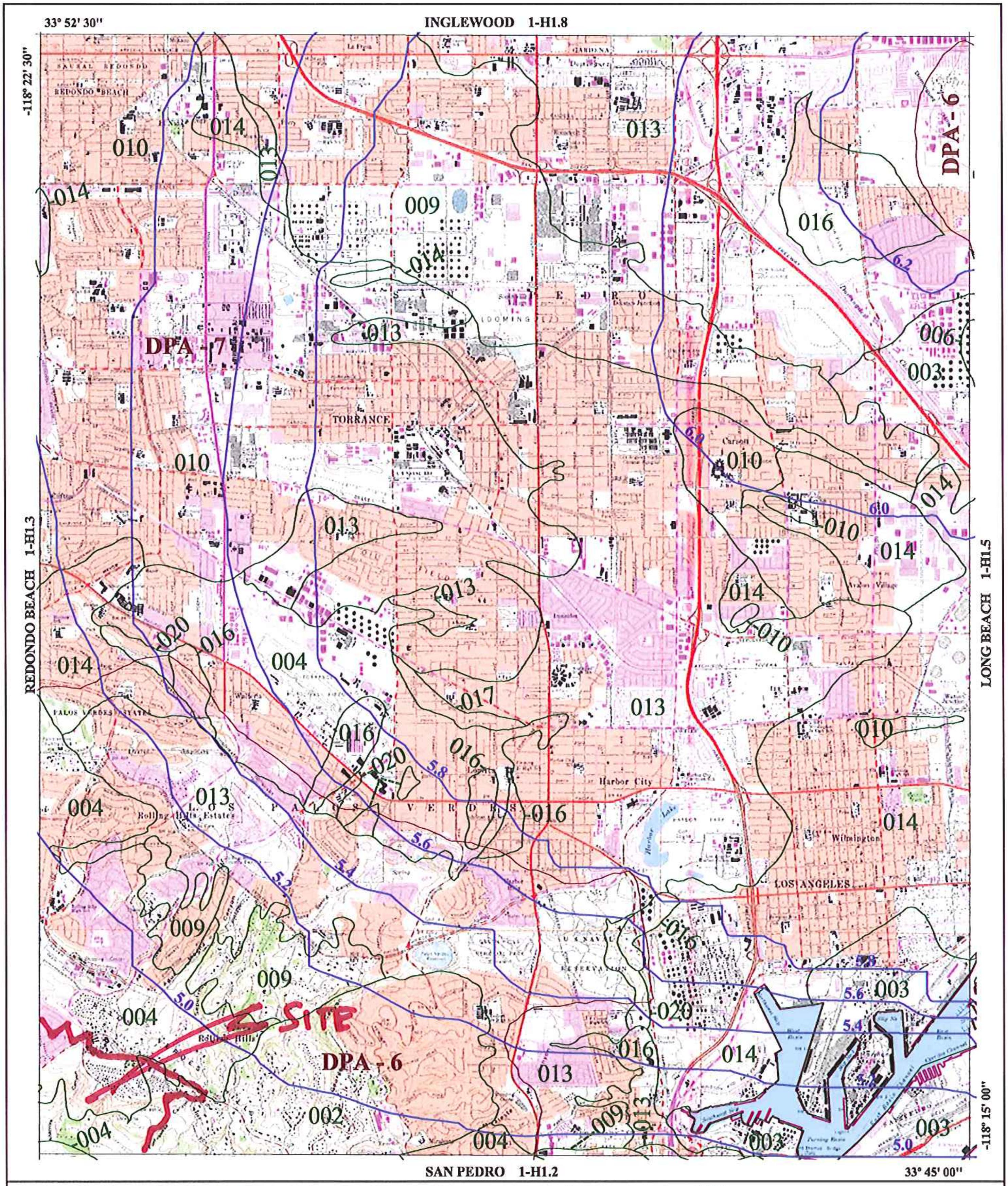
1 0 1 2 Miles

25-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.878
10-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.714

REDONDO BEACH
50-YEAR 24-HOUR ISOHYET

1-H1.3

LOS ANGELES COUNTY PUBLIC WORKS Public Service That Works



016 SOIL CLASSIFICATION AREA

7.2 INCHES OF RAINFALL

DPA - 6 DEBRIS POTENTIAL AREA

1 0 1 2 Miles

25-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.878
10-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.714

TORRANCE

1-H1.4

50-YEAR 24-HOUR ISOHYET

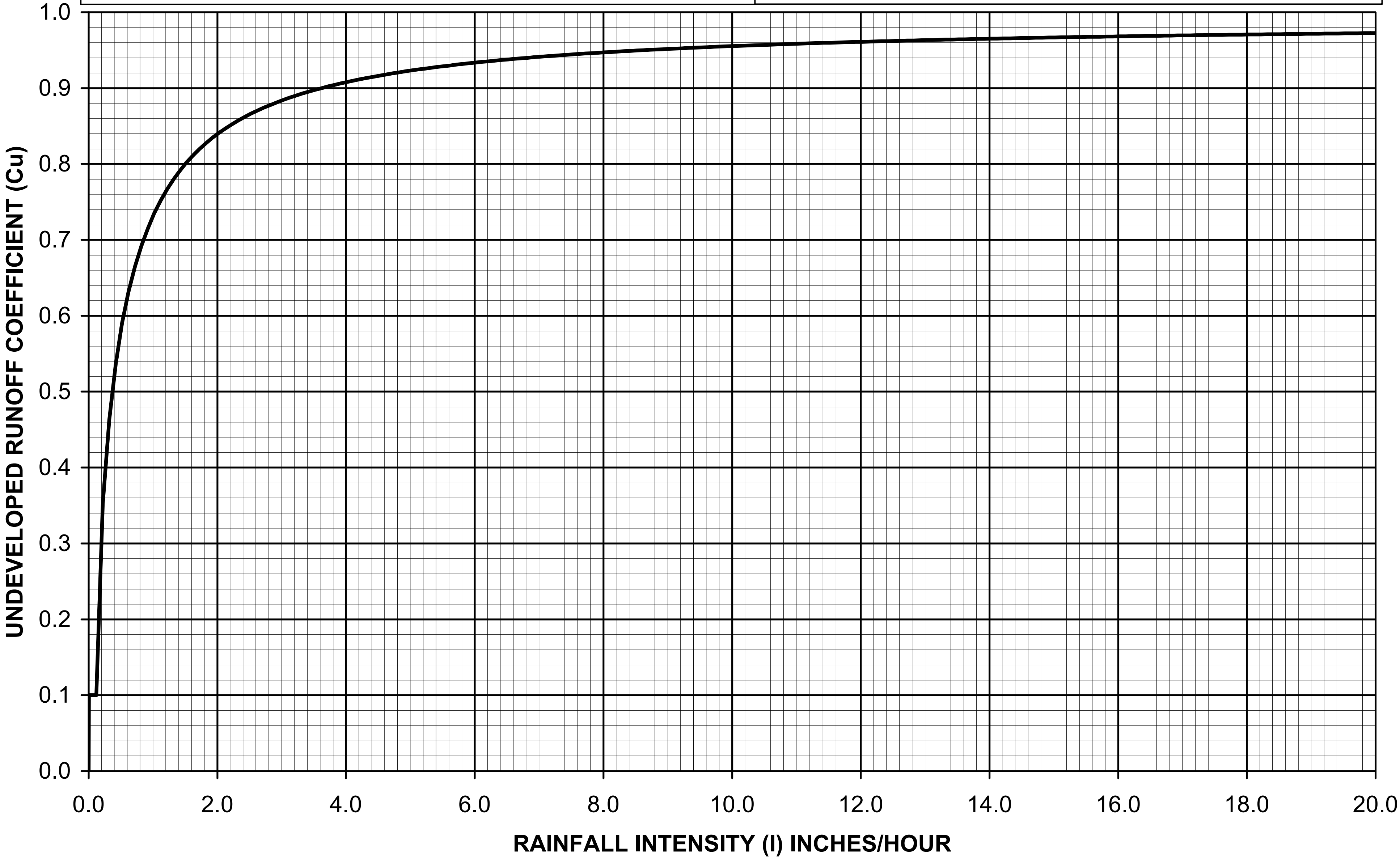
LOS ANGELES COUNTY PUBLIC WORKS Public Service That Works

$C_D = (0.9 * IMP) + (1.0 - IMP) * C_U$

Where: C_D = Developed Runoff Coefficient
IMP = Proportion Impervious
C_U = Undeveloped runoff coefficient

Los Angeles County Department of Public Works

RUNOFF COEFFICIENT CURVE
SOIL TYPE NO. 002



$C_D = (0.9 * IMP) + (1.0 - IMP) * C_U$

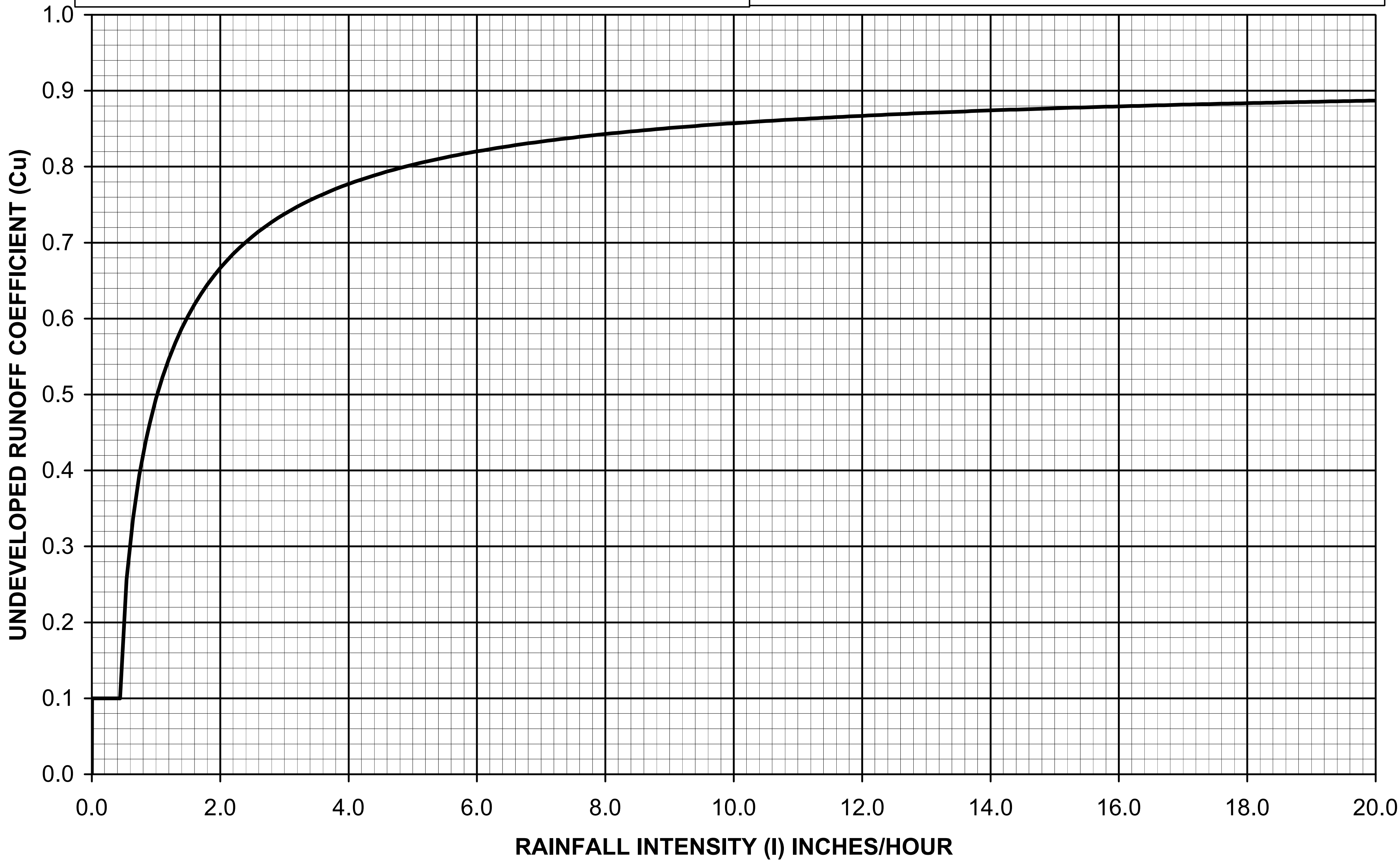
Where: C_D = Developed Runoff Coefficient

IMP = Proportion Impervious

C_U = Undeveloped runoff coefficient

Los Angeles County Department of Public Works

RUNOFF COEFFICIENT CURVE
SOIL TYPE NO. 004



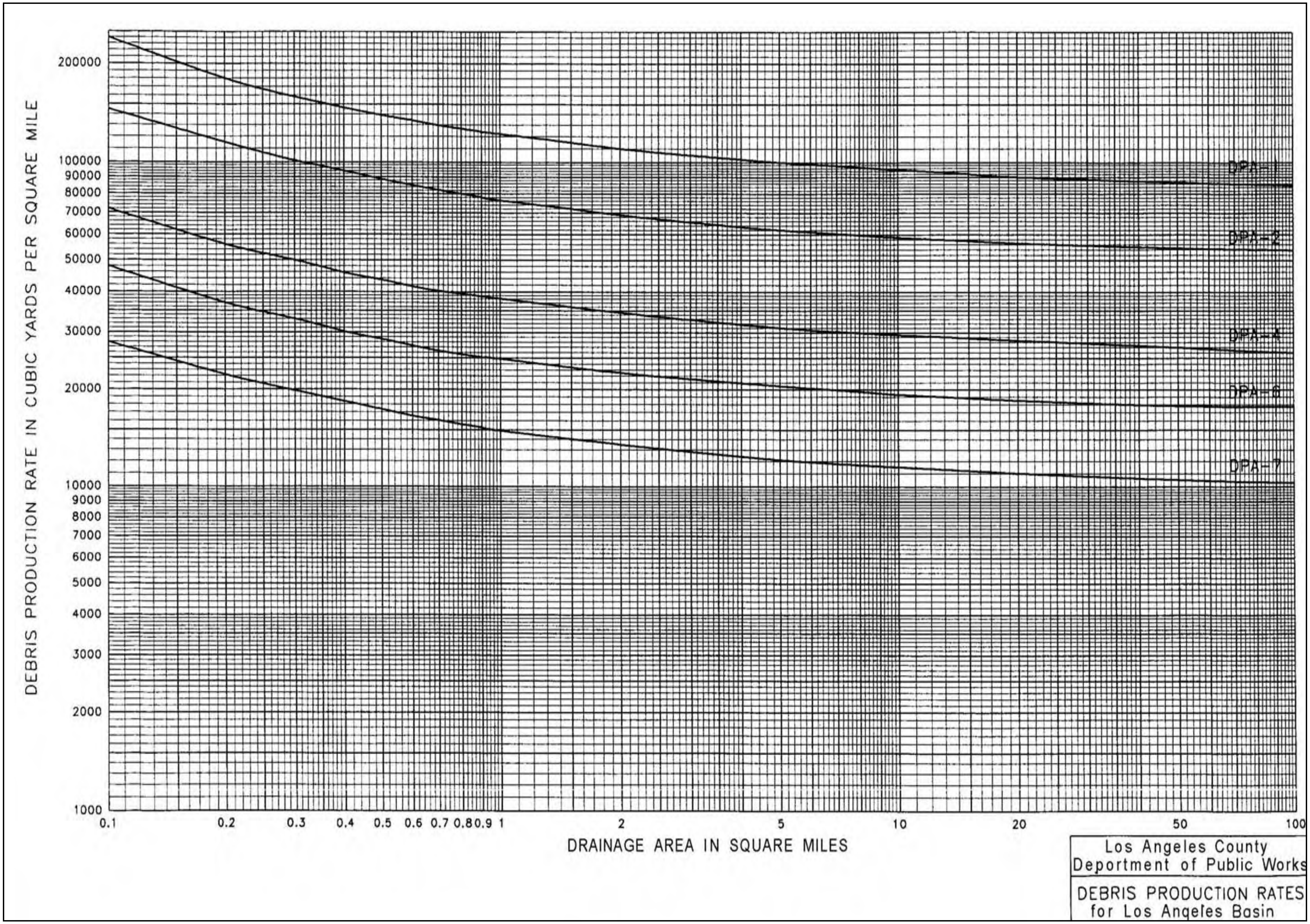
Proportion Impervious Data

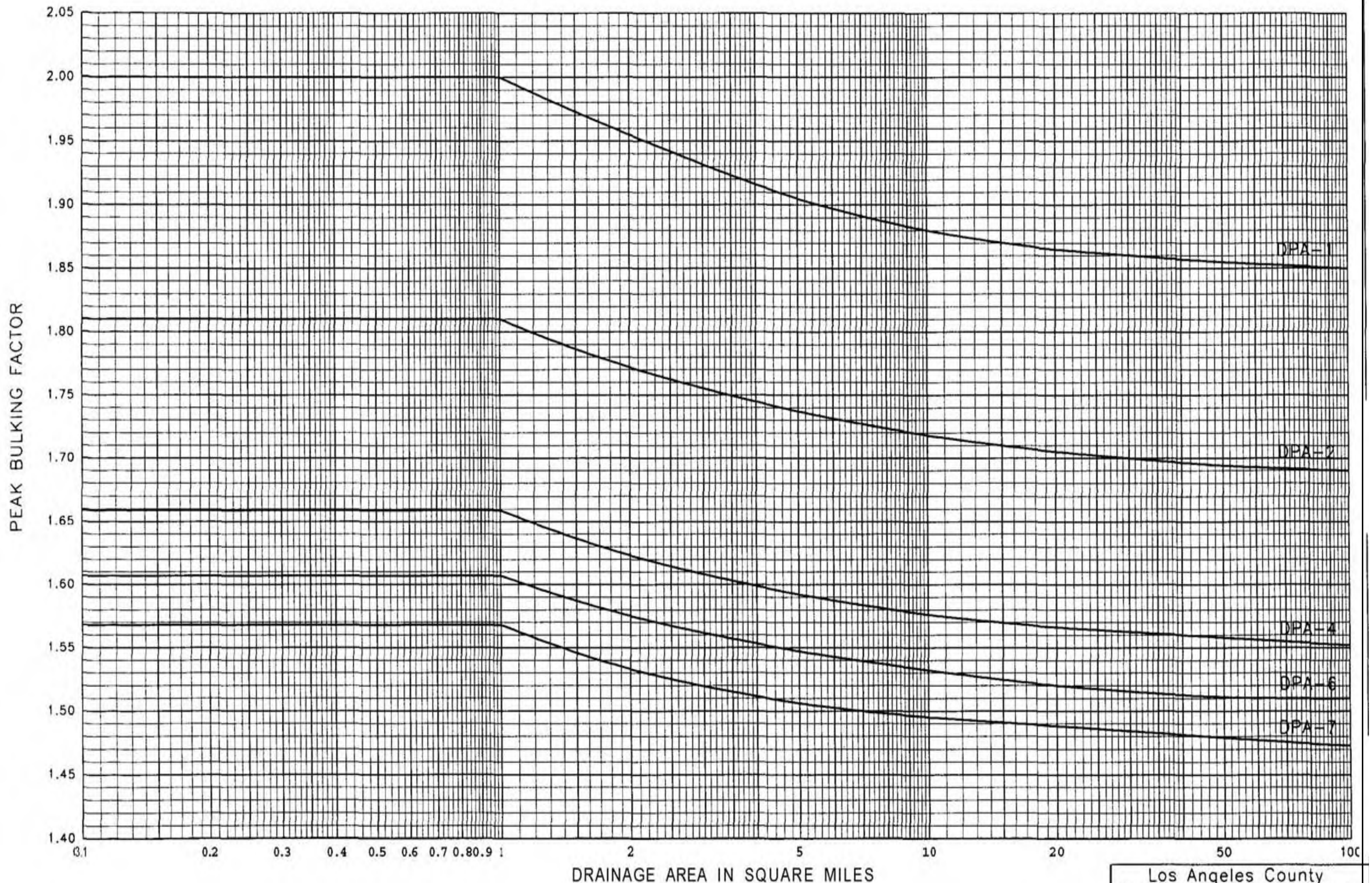
Code	Land Use Description	% Impervious
1111	High-Density Single Family Residential	42
1112	Low-Density Single Family Residential	21
1121	Mixed Multi-Family Residential	74
1122	Duplexes, Triplexes and 2-or 3-Unit Condominiums and Townhouses	55
1123	Low-Rise Apartments, Condominiums, and Townhouses	86
1124	Medium-Rise Apartments and Condominiums	86
1125	High-Rise Apartments and Condominiums	90
1131	Trailer Parks and Mobile Home Courts, High-Density	91
1132	Mobile Home Courts and Subdivisions, Low-Density	42
1140	Mixed Residential	59
1151	Rural Residential, High-Density	15
1152	Rural Residential, Low-Density	10
1211	Low- and Medium-Rise Major Office Use	91
1212	High-Rise Major Office Use	91
1213	Skyscrapers	91
1221	Regional Shopping Center	95
1222	Retail Centers (Non-Strip With Contiguous Interconnected Off-Street	96
1223	Modern Strip Development	96
1224	Older Strip Development	97
1231	Commercial Storage	90
1232	Commercial Recreation	90
1233	Hotels and Motels	96
1234	Attended Pay Public Parking Facilities	91
1241	Government Offices	91
1242	Police and Sheriff Stations	91
1243	Fire Stations	91
1244	Major Medical Health Care Facilities	74
1245	Religious Facilities	82
1246	Other Public Facilities	91
1247	Non-Attended Public Parking Facilities	91
1251	Correctional Facilities	91
1252	Special Care Facilities	74
1253	Other Special Use Facilities	86
1261	Pre-Schools/Day Care Centers	68
1262	Elementary Schools	82
1263	Junior or Intermediate High Schools	82
1264	Senior High Schools	82
1265	Colleges and Universities	47
1266	Trade Schools and Professional Training Facilities	91
1271	Base (Built-up Area)	65
1271.01	Base High-Density Single Family Residential	42
1271.02	Base Duplexes, Triplexes and 2-or 3-Unit Condominiums and T	55

Code	Land Use Description	% Impervious
1271.03	Base Government Offices	91
1271.04	Base Fire Stations	91
1271.05	Base Non-Attended Public Parking Facilities	91
1271.06	Base Air Field	45
1271.07	Base Petroleum Refining and Processing	91
1271.08	Base Mineral Extraction - Oil and Gas	10
1271.09	Base Harbor Facilities	91
1271.10	Base Navigation Aids	47
1271.11	Base Developed Local Parks and Recreation	10
1271.12	Base Vacant Undifferentiated	1
1272	Vacant Area	2
1273	Air Field	45
1274	Former Base (Built-up Area)	65
1275	Former Base Vacant Area	2
1276	Former Base Air Field	91
1311	Manufacturing, Assembly, and Industrial Services	91
1312	Motion Picture and Television Studio Lots	82
1313	Packing Houses and Grain Elevators	96
1314	Research and Development	91
1321	Manufacturing	91
1322	Petroleum Refining and Processing	91
1323	Open Storage	66
1324	Major Metal Processing	91
1325	Chemical Processing	91
1331	Mineral Extraction - Other Than Oil and Gas	10
1332	Mineral Extraction - Oil and Gas	10
1340	Wholesaling and Warehousing	91
1411	Airports	91
1411.01	Airstrip	10
1412	Railroads	15
1412.01	Railroads-Attended Pay Public Parking Facilities	91
1412.02	Railroads-Non-Attended Public Parking Facilities	91
1412.03	Railroads-Manufacturing, Assembly, and Industrial Services	91
1412.04	Railroads-Petroleum Refining and Processing	91
1412.05	Railroads-Open Storage	66
1412.06	Railroads-Truck Terminals	91
1413	Freeways and Major Roads	91
1414	Park-and-Ride Lots	91
1415	Bus Terminals and Yards	91
1416	Truck Terminals	91
1417	Harbor Facilities	91
1418	Navigation Aids	47
1420	Communication Facilities	82
1420.01	Communication Facilities-Antenna	2

Code	Land Use Description	% Impervious
1431	Electrical Power Facilities	47
1431.01	Electrical Power Facilities-Powerlines (Urban)	2
1431.02	Electrical Power Facilities-Powerlines (Rural)	1
1432	Solid Waste Disposal Facilities	15
1433	Liquid Waste Disposal Facilities	96
1434	Water Storage Facilities	91
1435	Natural Gas and Petroleum Facilities	91
1435.01	Natural Gas and Petroleum Facilities-Manufacturing, Assembly, and In	91
1435.02	Natural Gas and Petroleum Facilities-Petroleum Refining and Processing	91
1435.03	Natural Gas and Petroleum Facilities-Mineral Extraction – Oil and Gas	10
1435.04	Natural Gas and Petroleum Facilities-Vacant Undifferentiated	1
1436	Water Transfer Facilities	96
1437	Improved Flood Waterways and Structures	100
1440	Maintenance Yards	91
1450	Mixed Transportation	90
1460	Mixed Transportation and Utility	91
1460.01	Mixed Utility and Transportation-Improved Flood Waterways and Structures	100
1460.02	Mixed Utility and Transportation-Railroads	15
1460.03	Mixed Utility and Transportation-Freeways and Major Roads	91
1500	Mixed Commercial and Industrial	91
1600	Mixed Urban	89
1700	Under Construction (Use appropriate value)	91
1810	Golf Courses	3
1821	Developed Local Parks and Recreation	10
1822	Undeveloped Local Parks and Recreation	2
1831	Developed Regional Parks and Recreation	2
1832	Undeveloped Regional Parks and Recreation	1
1840	Cemeteries	10
1850	Wildlife Preserves and Sanctuaries	2
1850.01	Wildlife-Commercial Recreation	90
1850.02	Wildlife-Other Special Use Facilities	86
1850.03	Wildlife-Developed Local Parks and Recreation	10
1860	Specimen Gardens and Arboreta	15
1870	Beach Parks	10
1880	Other Open Space and Recreation	10
2110	Irrigated Cropland and Improved Pasture Land	2
2120	Non-Irrigated Cropland and Improved Pasture Land	2
2200	Orchards and Vineyards	2
2300	Nurseries	15
2400	Dairy, Intensive Livestock, and Associated Facilities	42
2500	Poultry Operations	62
2600	Other Agriculture	42
2700	Horse Ranches	42

Code	Land Use Description	% Impervious
3100	Vacant Undifferentiated	1
3200	Abandoned Orchards and Vineyards	2
3300	Vacant With Limited Improvements (Use appropriate value)	42
3400	Beaches (Vacant)	1
4100	Water, Undifferentiated	100
4200	Harbor Water Facilities	100
4300	Marina Water Facilities	100
4400	Water Within a Military Installation	100


DEBRIS PRODUCTION RATE IN CUBIC YARDS PER SQUARE MILE
200000
100000
90000
80000
70000
60000
50000
40000
30000
20000
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
2
5
10
20
50
100
DRAINAGE AREA IN SQUARE MILES
DPA-1
DPA-2
DPA-4
DPA-6
DPA-7
Los Angeles County
Deportment of Public Works
DEBRIS PRODUCTION RATES
for Los Angeles Basin



Los Angeles County
Department of Public Works

PEAK BULKING FACTORS
for Los Angeles Basin

9.C. Reference Plans:

1. FEMA FIRM Panel 06037C2025F, Effective September 26, 2008
2. FEMA FIRM Panel 06037C2026F, Effective September 26, 2008
3. PD 407
4. PD 1382
5. PD 1403
6. PD 1703
7. State RWQCB Clarification Letter to LACDPW

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures.** Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 11. The **horizontal datum** was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum.** For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, MD 20910-3282

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242,** or visit its website at http://www.ngs.noaa.gov/.

Base map information shown on this FIRM was derived from U.S. Geological Survey Digital Orthophoto Quadrangles produced at a scale of 1:12,000 from photography dated 1994 or later and from National Geospatial Intelligence Agency imagery produced at a scale of 1:4,000 from photography dated 2003 or later.

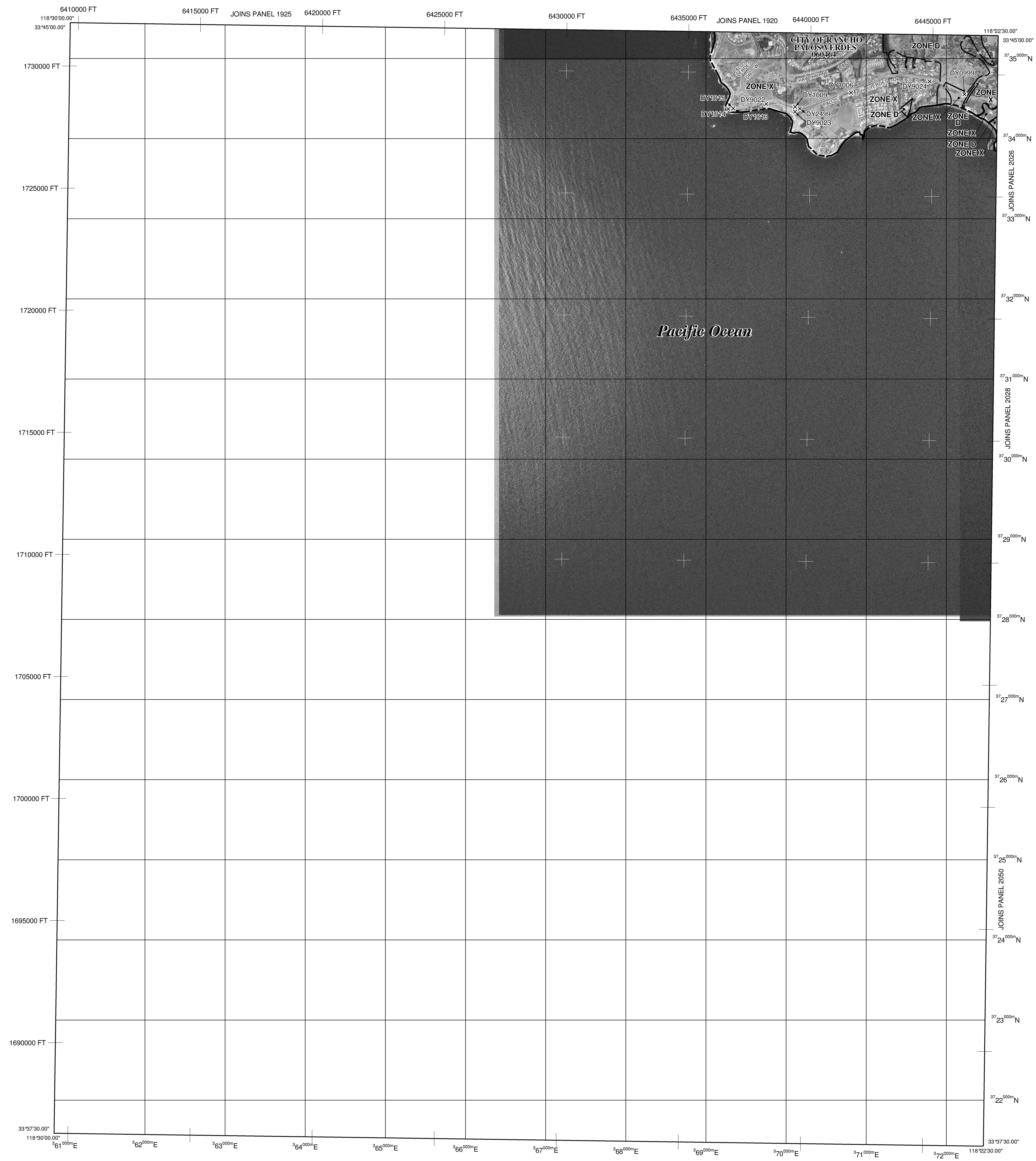
This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables *in the Flood Insurance Study report (which contains authoritative hydraulic data*) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, *a Flood Insurance Study report*, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at http://www.msc.fema.gov/.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary
0.2% annual chance floodplain boundary
Floodway boundary
Zone D boundary
CBRS and OPA boundary
Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.

~~ 513 ~~~~	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

A — A	Cross section line
23 - - - - 23	Transect line
97°07'30", 32°22'30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
$^{42}75^{000m}$N	1000-meter Universal Transverse Mercator grid values, zone 11
6000000 FT	5000-foot grid ticks: California State Plane coordinate system, V zone (FIPSZONE 0405), Lambert Conformal Conic
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
• M1.5	River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
September 26, 2008
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

N

MAP SCALE 1" = 2000'

1000 0 2000 4000 FEET
600 0 600 1200 METERS

NFIP

PANEL 2025F

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP
LOS ANGELES COUNTY, CALIFORNIA
AND INCORPORATED AREAS

PANEL 2025 OF 2350
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
RANCHO PALOS VERDES, CITY OF	060464	2025	F

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
06037C2025F

EFFECTIVE DATE
SEPTEMBER 26, 2008

Federal Emergency Management Agency

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures.** Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 11. The **horizontal datum** was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum.** For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, MD 20910-3282

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242,** or visit its website at http://www.ngs.noaa.gov/.

Base map information shown on this FIRM was derived from U.S. Geological Survey Digital Orthophoto Quadrangles produced at a scale of 1:12,000 from photography dated 1994 or later and from National Geospatial Intelligence Agency imagery produced at a scale of 1:4,000 from photography dated 2003 or later.

This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables *in the Flood Insurance Study report (which contains authoritative hydraulic data*) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, *a Flood Insurance Study report*, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at http://www.msc.fema.gov/.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/.

LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A No Base Flood Elevations determined.

ZONE AE Base Flood Elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

ZONE A99 Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary

0.2% annual chance floodplain boundary

Floodway boundary

Zone D boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.

~~~~ 513 ~~~~ Base Flood Elevation line and value; elevation in feet*

(EL 987) Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

(A)———(A) Cross section line

(23)- - - - -(23) Transect line

97°07'30", 32°22'30" Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)

$^{42}75^{000m}$N 1000-meter Universal Transverse Mercator grid values, zone 11

6000000 FT 5000-foot grid ticks: California State Plane coordinate system, V zone (FIPSZONE 0405), Lambert Conformal Conic

DX5510 × Bench mark (see explanation in Notes to Users section of this FIRM panel)

• M1.5 River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
September 26, 2008
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 0 500 1000 FEET

150 0 150 300 METERS

NFIP

PANEL 2026F

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

LOS ANGELES COUNTY, CALIFORNIA
AND INCORPORATED AREAS

PANEL 2026 OF 2350

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

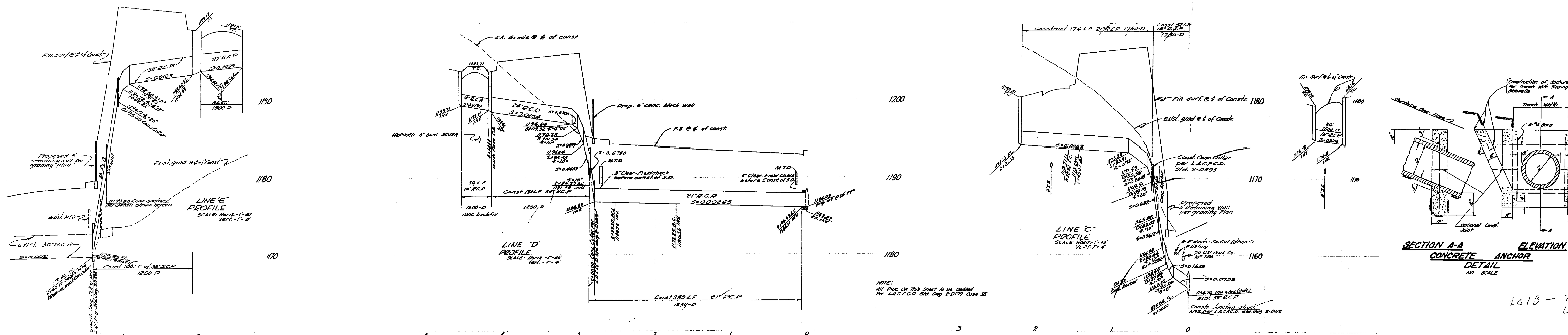
COMMUNITY	NUMBER	PANEL	SUFFIX
RANCHO PALOS VERDES, CITY OF	060464	2026	F
ROLLING HILLS, CITY OF	060151	2026	F

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
06037C2026F

EFFECTIVE DATE
SEPTEMBER 26, 2008

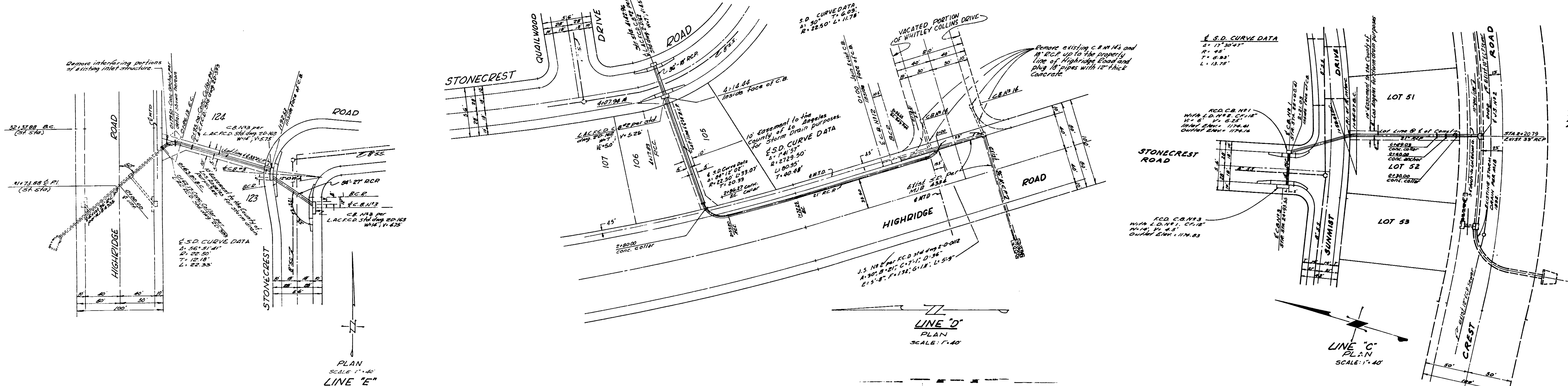
Federal Emergency Management Agency
~~~~



407B – 27789
Lines C, D, E

P.D. Nº 407
TRACT 27789
SHEET 2 OF ~~3~~ 2 SHEETS

HYDRAULIC ELEMENTS							
LINE	REACH STA.	TO STA.	Q c.f.s.	n	S ft./ft.	Dia. inches	V f.p.s.
"C"	0+02.58	2+21.03	Q_{25}=16	0.013	0.0095	18"ø	5.6
"D"	0+06.63	2+94.50	Q_{50}=27	0.013	0.030	21"ø	11.2
	2+94.50	4+14.44			0.0140	24"ø	8.6
"E"	0+62.17	1+92.53	Q_{50}=60	0.013	0.0128	33"ø	10.1



A 1 OF A 2

PF513038

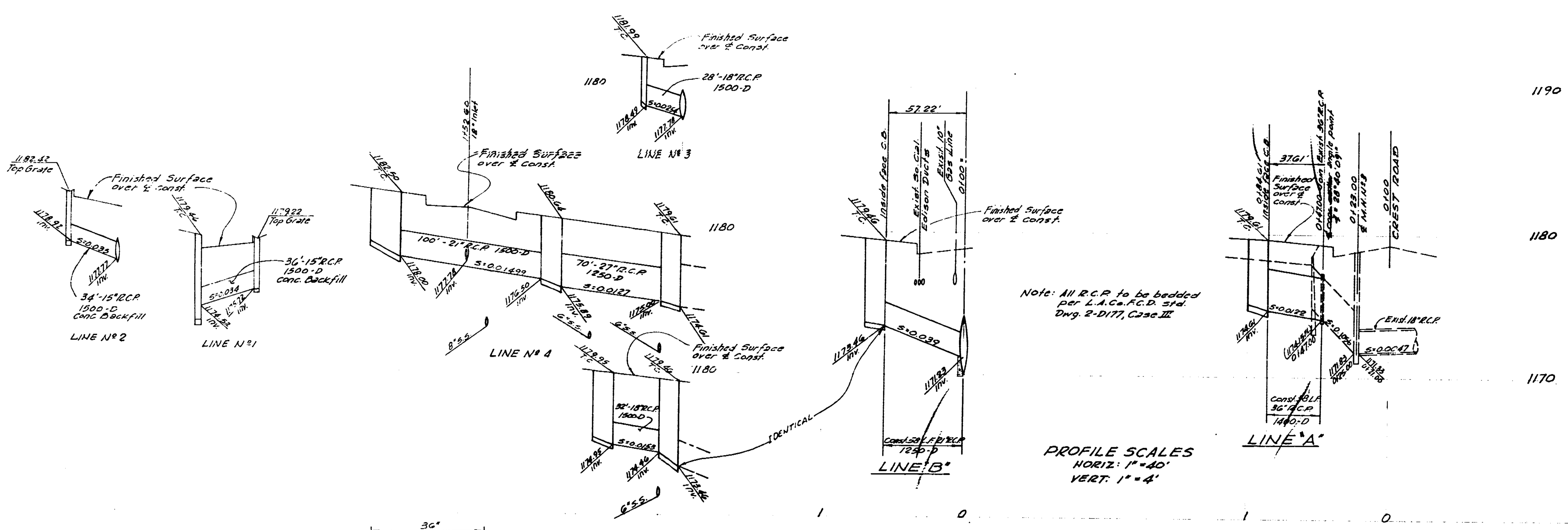
COUNTY OF LOS ANGELES, CALIFORNIA
JOHN A. LAMBIE COUNTY ENGINEER

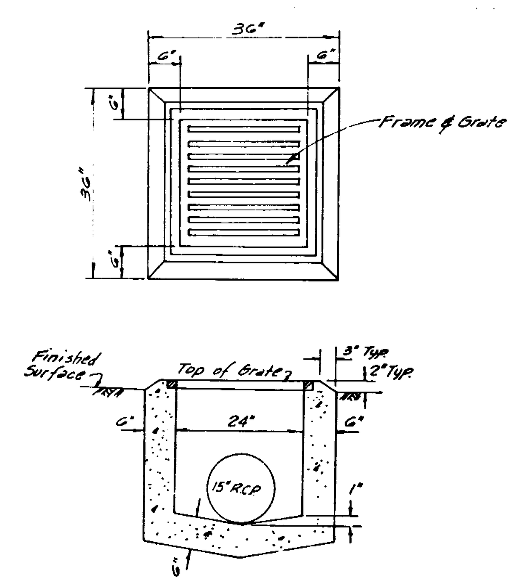
APPROVED BY: C. H. Green DATE: 5-9-63
DESIGN DIVISION ENGINEER

CHECKED BY: S. Iguchi DATE: 5-9-63
OFFICE OF THE COUNTY ENGINEER R.C.E. Nº 11786

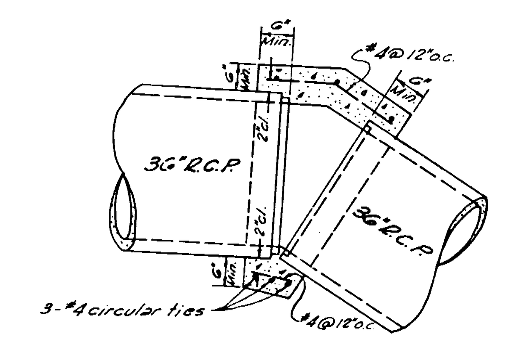
REVIEWED BY THE LOS ANGELES COUNTY ROAD DEPARTMENT
BY: Richard [illegible] DATE: 5-7-63

A 2 OF A 2

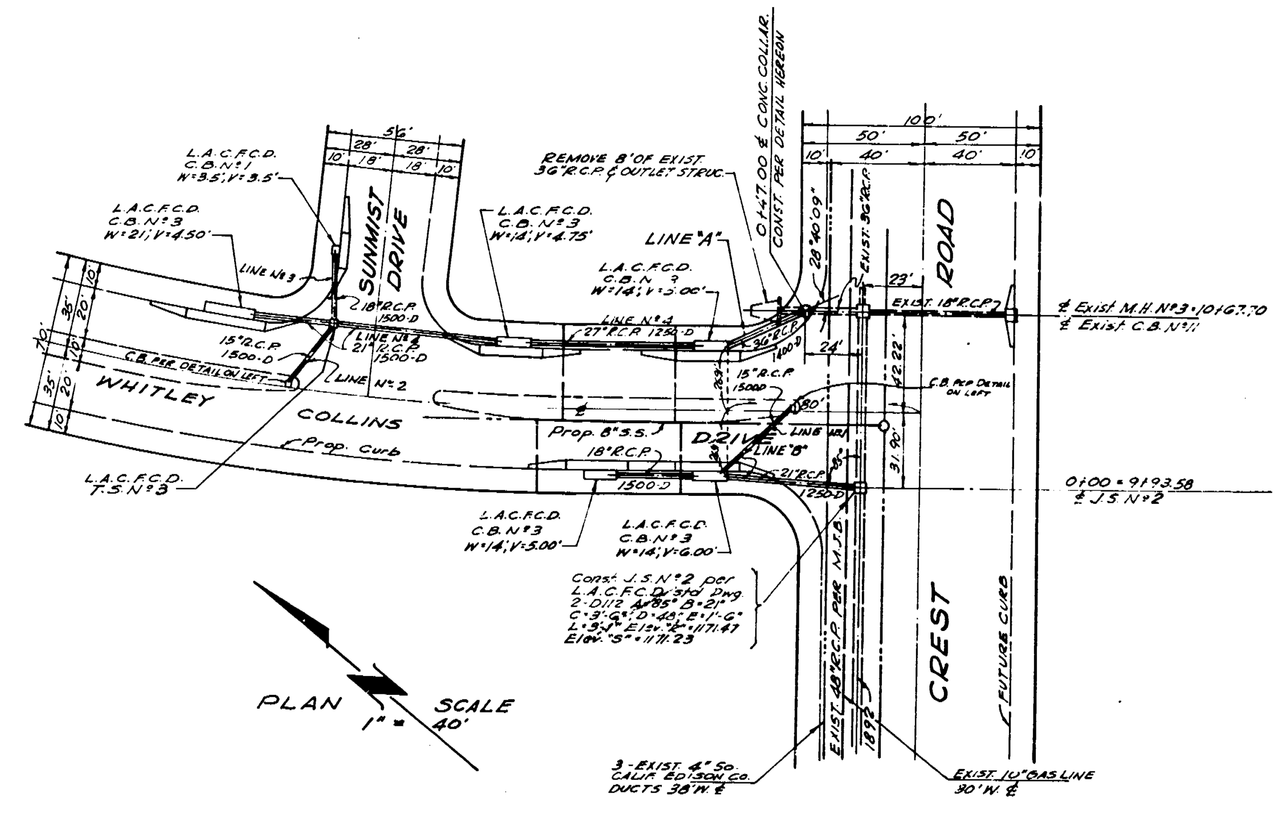




CATCH BASIN DETAIL
No Scale



CONCRETE COLLAR DETAIL
NO SCALE



A 1 OF A 2

GENERAL NOTES

1. All concrete shall be Portland Cement Concrete with an ultimate 28 days compressive strength of 3000 p.s.i.
2. All exposed edges shall be finished with a 3/4" chamfer.
3. All steel shall have 2" clearance unless otherwise specified.
4. Reinforcement shall be deformed bars of intermediate grade steel as per A.S.T.M. A-305-50T.
5. All bars bends and hooks shall conform to the American Concrete Institute 'Manual of Standard Practice.
6. Dimensions from face of concrete to steel are to centerline of steel unless otherwise noted.
7. All backfills and fills to be used as subgrade shall be compacted to a relative density of 90% unless otherwise specified.
8. All steel to be continuous around corners with a minimum lap of 30 diameters or 18", whichever is greater.
9. A permit shall be obtained from the Road Dept. and shall be submitted to the inspector prior to commencing construction within their rights of way.
10. All catch basin and connector pipes between catch basins to be inspected by County Road Dept.
11. All standard Drawings are L.A. County Engineer's standards (D_c) unless otherwise noted.
12. All backfill and fill around closed conduits in street rights of way shall be brought up to the subgrade of the road or to 2 feet above the top of the conduit, whichever is less. The Road Dept. shall inspect all backfill and fill above the aforementioned limits. Application for an engineer or inspector in connection with the work shall be made by the contractor at least 24 hours before his service is required. Call CApitol 5-16[illegible] Extension 75004.
13. All State and local trench safety orders will be rigidly enforced.

LIST OF STANDARD PLANS

Los Angeles County Flood Control District

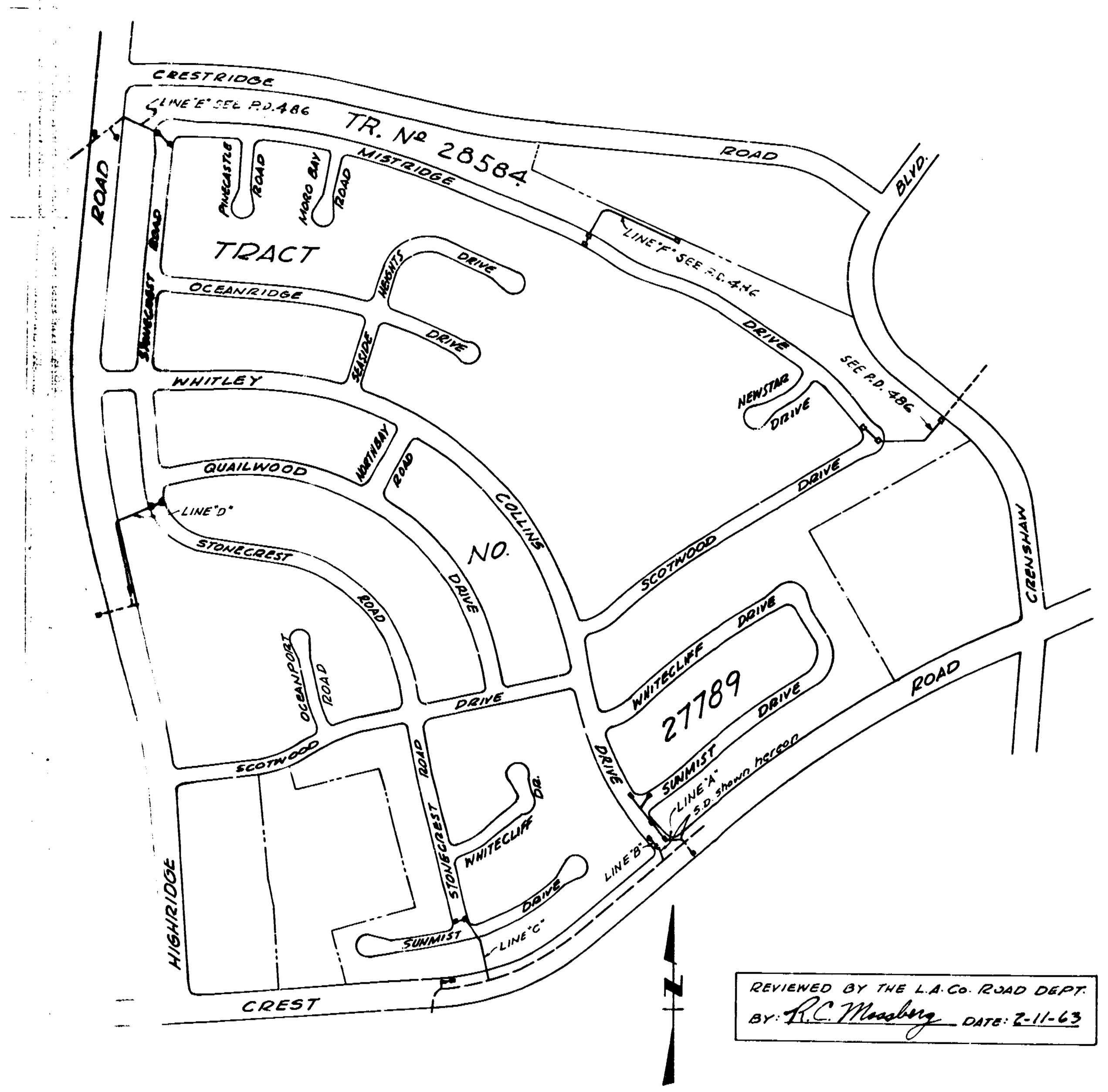
Junction Structure Nº 2	2-D112
C.B. Nº 3	2-D163
Pipe Bedding	2-D177
C.B. Nº 1	2-D160
T.S. Nº 3	2-D188

BENCH MARK

BM-4402

Los Angeles County Sur. Mon. Mkd. "BM 50-71956 RE 5869" in 12" conc. Post 4" above ground @ N.E. cor. CREST ROAD & CRENSHAW BLVD. 92.5 Feet E'ly from c/r. pvmt & 40 Feet N'ly from c/r. pvmt 55.3 Feet East of P.P. 1036438 E under guy cable.

Elev. 1201.398



KEY MAP
SCALE: 1" = 300'

REVIEWED BY THE L.A. Co. ROAD DEPT.
BY: R.C. Mossberg DATE: 2-11-63

STORM DRAIN DETAILS

Prepared in the offices of
M^c INTIRE & QUIROS, INC.
By George J. Scher R.C.E. 12161

NOTE: Elevations are in feet above U.S.G.S. mean sea datum of 1929.

All work shall be in accordance with the standards and specifications of storm drain construction of the County Engineer and shall be prosecuted only in the presence of the County Engineer.

Approval of this plan by the County of Los Angeles does not constitute a representation as to the accuracy of the location or the existence or non-existence of any underground utility pipe or structure within the limits of this project. This note applies to all sheets.

The contractor shall notify the Construction Division by telephone MAdison 9-4747, Ext. 81661, at least 24 hours before starting any work under this contract. The contractor shall submit a deposit for construction inspection to the County Engineer, Rm. 1033, 108 W. 2nd St., L.A., at least 24 hours before starting any work under this contract.

PRIVATE ENGINEER'S NOTICE TO CONTRACTOR

The existence and location of any underground utility pipes or structures shown on these plans are obtained by a search of the available records. To the best of our knowledge there are no existing utilities except as shown on this map.

The contractor is required to take due precautionary measures to protect the utility lines shown and any other lines not of records or not shown on this drawing.

George J. Scher
R.C.E. 12161

P.D. Nº 407
TRACT Nº 27789
SHEET 1 OF 2 SHEETS

STORM FREQUENCY 10 YR.

HYDRAULIC ELEMENTS

REACH STA	TO STA	Q c.f.s.	n	ft/ft	d feet	V f.p.s.
(LINE "B") 0+00.00	0+57.22	23	0.013	0.0215	21"φ	9.54
(LINE "A") 0+23.00	0+85.92	43	0.013	0.0042	36"φ	6.08

PF513037

COUNTY OF LOS ANGELES, CALIFORNIA
JOHN A. LAMBIE COUNTY ENGINEER

APPROVED BY: C. H. Green DATE: 2-18-63
DESIGN DIVISION ENGINEER

CHECKED BY: S. Iguchi DATE: 2-18-63
OFFICE OF THE COUNTY ENGINEER R.C.E. 11786

A 2 OF A 2

PD 407

PLANS FOR STORM DRAIN
TRACT NO. 31617
PRIVATE DRAIN NO. 1382

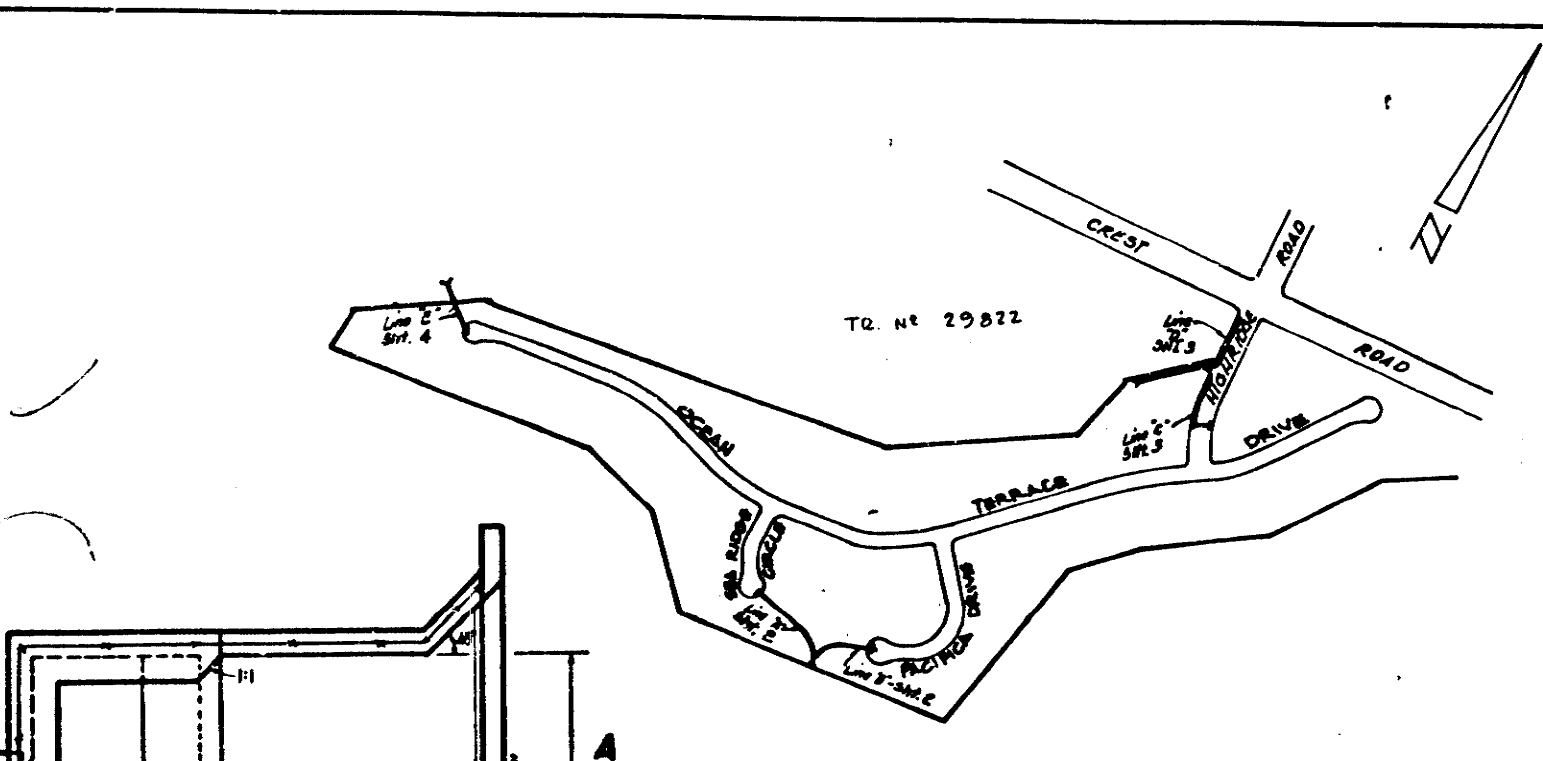
PREPARED IN THE OFFICES OF
LANCO ENGINEERING
BY C M Leonard R.C.E 13167

LIST OF STANDARD DRAWING OF LOS ANGELES COUNTY FLOOD CONTROL DISTRICT

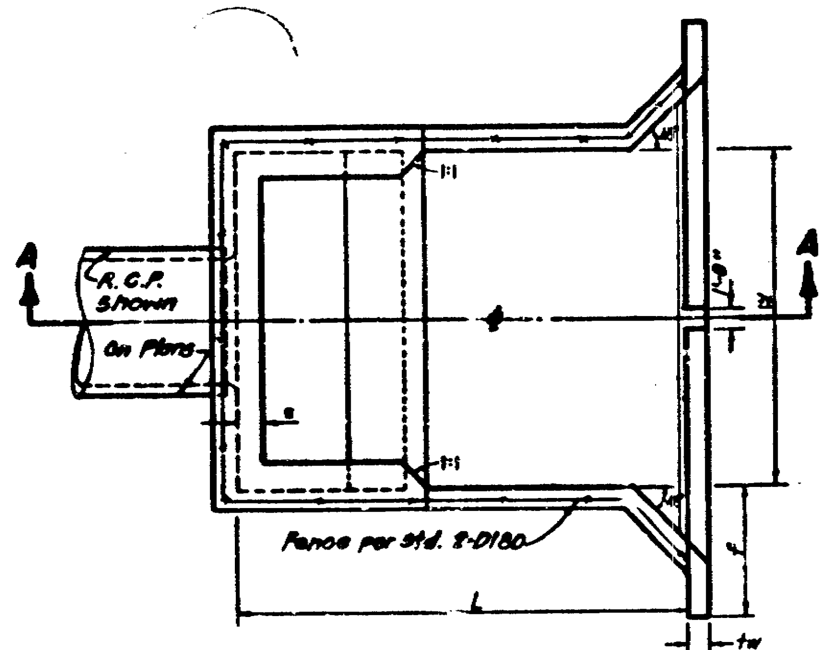
DESCRIPTION	DWG NO.
JUNCTION STRUCTURE NO 2	2-D112
MANHOLE NO. 2	2-D164
CATCH BASIN NO. 2	2-D102
CATCH BASIN NO. 8	2-D163
MANHOLE FRAME AND COVER	2-D472
PROTECTION BARS FOR CATCH BASIN	2-D175
CATCH BASIN REINFORCEMENT	2-D172
CONNECTION TO C.B. FOR PIPE	2-D224
CATCH BASIN OPENING	2-D292
MANHOLE FRAME & COVER FOR CATCH BASIN	2-D156
CATCH BASIN REINFORCEMENT FOR ROUND C.B.	2-D157
STANDARD DROP STEP	2-D36
SPECIAL MANHOLE FRAME AND COVER	2-D487
TRANSITION STRUCTURE NO 3	2-D188
CATCH BASIN NO 1	2-D100
FENCE	2-D180

LOS ANGELES COUNTY ENGINEER

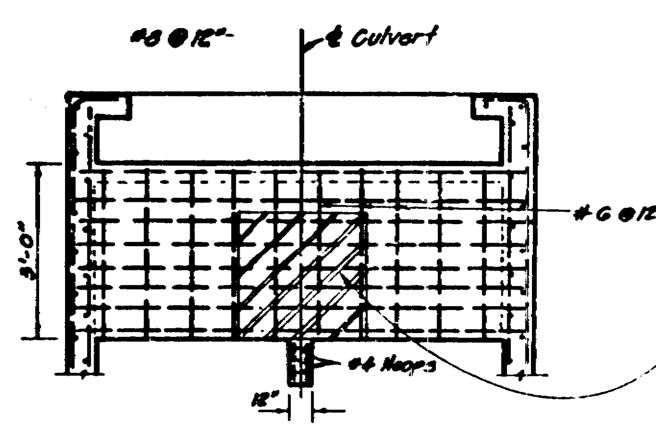
PIPE BEDDING	D-54
CONCRETE ANCHORS	D-72



INDEX MAP
SCALE 1" = 400'



Plan



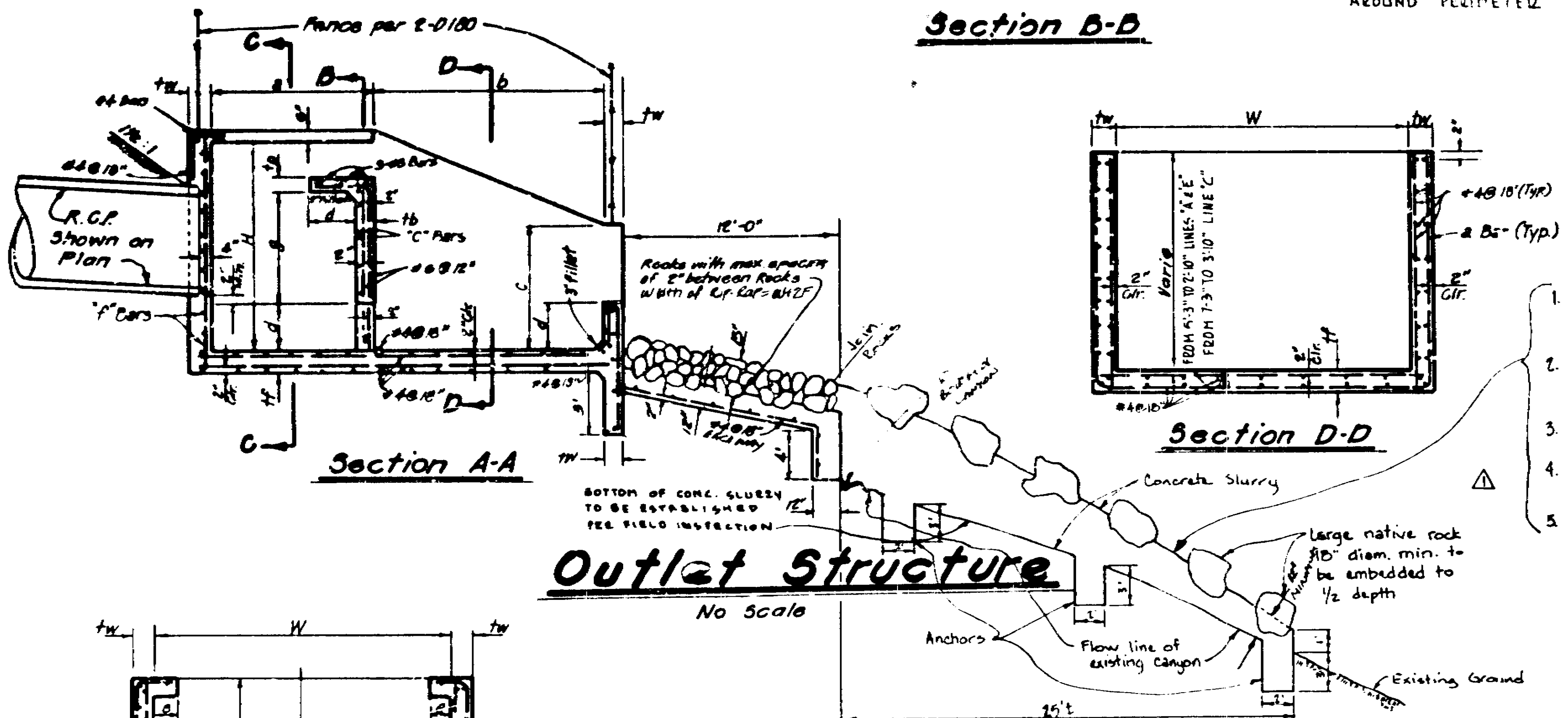
Section B-B

OUTLET STRUCTURE DIMENSIONS

	W	H	L	a	b	c	d	e	f	g	tw	tf	tb	tp	a Bars	C BARS
LINES "A" & "E"	6'-9"	5'-3"	9'-0"	3'-11"	5'-1"	2'-10"	1'-2"	6"	2'-0	2'-6"	6"	6½"	8"	6"	#4 @ 12"	#8 @ 12
LINE "C"	9'-3"	7'-3"	12'-4"	5'-3"	7'-1"	3'-10"	1'-7"	8"	3'-0"	3'-6"	7"	7½"	8"	8"	#6 @ 12"	#8 @ 12

	F BARS
LINES "A" & "E"	#5 @ 12
LINE "C"	#7 @ 12

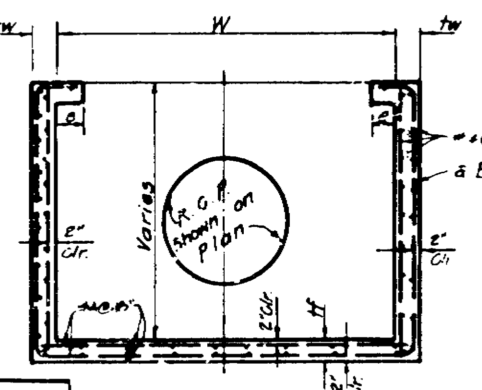
FOR LINES "A" AND "E" PROVIDE 1/2" THICK STAINLESS STEEL PLATE ON UPSTREAM SIDE OF BAFFLEWALL, SAME WIDTH AS PIPE DIA. AND AS HIGH AS PIPE SOFFITT. SECURE WITH 1/2" DIA. STAINLESS STEEL BOLTS 12" O.C. AROUND PERIMETER.



Section A-A

Outlet Structure
No Scale

Section D-D



Section C-C

HYDRAULIC ELEMENT TABLE

Station From	Station To	Q_{25}	Ø	Sf.	V
Line "A"					
1+00	1+16	38.9	24" R.C.P.	NOT FULL	27.6
1+16	1+48	38.9	24" R.C.P.	" "	39.2
1+48	2+11	38.9	24" "	" "	38.1
2+20	2+86	38.9	24" "	" "	24.4
2+86	3+97.30	38.9	24" "	" "	5.4
Line "B"					
1+20.50	2+20	31.1	27" R.C.P.	NOT FULL	27.3
2+20	2+28	31.1	" "	" "	26.1
2+28	2+36	31.1	" "	" "	23.2
2+36	2+44	31.1	" "	" "	19.7
2+44	2+52	31.1	" "	" "	13.6
2+52	3+42.67	31.1	" "	0.0101	7.8
Line "C"					
0+35	1+20	73.8	36" R.C.P.	NOT FULL	24.0
1+20	2+52.50	73.8	36" R.C.P.	NOT FULL	15.3
2+52.60	3+28.23	59.0	" "	" "	14.5
3+32.89	5+42.98	59.0	" "	" "	20.9
Line "D"					
2+58.50	4+32.45	14.8	24" R.C.P.	NOT FULL	5.8
4+37.45	4+99.45	12.0	21" R.C.P.	" "	6.9
Line "E"					
0-80	0+96	23.3	24" R.C.P.	NOT FULL	23.8
0+96	1+48	23.3	24" R.C.P.	NOT FULL	35.8
1+48	1+80	23.3	" "	" "	38.0
1+80	1+96	23.3	" "	" "	26.8
1+96	2+00	23.3	" "	" "	14.5

WHERE VELOCITY EXCEEDS 20'/SEC. PROVIDE AN EXTRA 1/2" OF CONCRETE OVER THE INVERT OF THE R.C.P.

GENERAL NOTES

1. ELEVATIONS ARE IN FEET ABOVE U.S.G.S. MEAN SEA LEVEL DATUM OF 1929.
2. ALL WORK SHALL BE DONE IN ACCORDANCE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, 1976 EDITION, INCLUDING ALL SUPPLEMENTS AND SHALL BE PROSECUTED ONLY IN THE PRESENCE OF THE CITY ENGINEER.
3. APPROVAL OF THIS PLAN BY THE COUNTY OF LOS ANGELES DOES NOT CONSTITUTE A REPRESENTATION AS TO THE ACCURACY OF THE LOCATION OR EXISTENCE OR NONEXISTENCE OF ANY UNDERGROUND UTILITY, PIPE OR STRUCTURE WITHIN THE LIMITS OF THIS PROJECT.
4. THE CONTRACTOR SHALL NOTIFY THE CONSTRUCTION SECTION BY TELEPHONE 374-7285 AT LEAST 24 HOURS BEFORE STARTING ANY WORK UNDER THIS CONTRACT.
5. THIS STORM DRAIN WILL NOT BE ACCEPTED FOR MAINTENANCE UNTIL THE STREETS HAVE BEEN PAVED, MANHOLES BROUGHT UP TO GRADE, AND THE SYSTEM IS CLEANED TO THE SATISFACTION OF THE CITY ENGINEER.
6. ALL REINFORCED CONC. PIPE SHALL BE BEDDED IN ACCORDANCE WITH CASE A4 BEDDING PER D-54, UNLESS OTHERWISE SPECIFIED.
7. PERMITS SHALL BE OBTAINED FROM THE ROAD DEPARTMENT AND L.A.C.F.C.D. AND SHALL BE SUBMITTED TO THE INSPECTOR PRIOR TO COMMENCING CONSTRUCTION WITHIN THEIR RIGHT OF WAY.
8. ALL BACKFILL AND FILL AROUND CLOSED CONDUITS IN STREET RIGHTS OF WAY SHALL BE BROUGHT UP TO THE SUBGRADE OF THE ROAD OR TO 2 FEET ABOVE THE TOP OF CONDUIT, WHICHEVER IS LESS. THE ROAD DEPARTMENT SHALL INSPECT ALL BACKFILL AND FILL ABOVE THE AFOREMENTIONED LIMITS. APPLICATION FOR AN ENGINEER OR INSPECTOR IN CONNECTION WITH THE WORK SHALL BE MADE BY THE CONTRACTOR AT LEAST 24 HOURS BEFORE HIS SERVICE IS REQUIRED. CALL 226-5108
9. ALL STATE AND LOCAL TRENCH SAFETY ORDERS WILL BE RIGIDLY ENFORCED.
10. ALL CATCH BASINS (& CONNECTOR PIPES BETWEEN BASINS) TO BE INSPECTED BY THE COUNTY ROAD DEPARTMENT.
11. ALL MANHOLE COVERS NOT IN STREET PAVING SHALL BE PROVIDED WITH ALLEN SOCKET SET SCREW LOCKING DEVICES. THE CONTRACTOR SHALL DRILL AND TAP TWO HOLES TO A DEPTH OF 1 INCH AT 90 DEGREES TO PICK HOLE AND INSTALL 3/4 INCH BY 3/4 ALLEN SOCKET SET SCREWS.
12. A SOIL ENGINEER SHALL CERTIFY THAT ALL FILLS AND BACKFILLS OVER UNDERGROUND STORM DRAINS OUTSIDE OF STREET R/W HAVE BEEN COMPACTED OR CONSOLIDATED TO A 90% DENSITY. THIS CERTIFICATION SHALL BE SUBMITTED TO THE CITY ENGINEER PRIOR TO ACCEPTANCE OF THE WORK BY THE CITY.

CONCRETE NOTES

1. ALL STEEL SHOWN ADJACENT TO A FACE OF CONCRETE, SHALL END OR BE PLACED 2½" FROM THE CONCRETE FACE UNLESS OTHERWISE SHOWN.
2. AT THE BEGINNING AND END OF ALL POURS A LAYER OF REINFORCEMENT SHALL BE PLACED WITHIN 3" OF THE TRAVERSE CONSTRUCTION JOINTS.
3. UNLESS OTHERWISE SHOWN CONCRETE DIMENSIONS SHALL BE MEASURED VERTICALLY OR HORIZONTALLY AND PARALLEL OR AT RIGHT ANGLES (OR RADIAL) TO THE CENTERLINE OF CONSTRUCTION.
4. ALL CONCRETE WILL BE DESIGNED TO DEVELOP A 28 DAY STRENGTH OF AT LEAST 3,000 LBS. PER SQUARE INCH IN COMPRESSION, AND SHALL BE PORTLAND CEMENT CONCRETE.
5. CHAMFER ALL EXPOSED EDGES WITH 3/4" CHAMFER.
6. DIMENSIONS ARE FROM FACE OF CONCRETE TO CENTER OF REINFORCING BARS UNLESS OTHERWISE SPECIFIED.
7. ALL STEEL THAT IS TO BE CONTINUOUS SHALL BE LAPPED A MINIMUM OF 30 BAR DIAMETERS.
8. ALL PIPES SHALL BE EMBEDDED A MINIMUM OF 5 INCHES INTO HEADWALLS OR OTHER STRUCTURES.
9. REINFORCEMENT SHALL BE DEFORMED BARS OF INTERMEDIATE GRADE STEEL AS PER A.S.T.M. A-615.

RIP-RAP NOTES

1. ROCKS FOR GROUTED RIP-RAP SHALL BE OF GOOD QUALITY BROKEN CONCRETE AND/OR RIVER RUN ROCK. THE SMALLEST DIMENSION SHALL EXCEED 3" AND THE LARGEST DIMENSION SHALL NOT EXCEED 18". THE LARGEST DIMENSION SHALL NOT EXCEED 4 TIMES THE SMALLEST DIMENSION.
2. THERE SHALL BE A GROUT BED OF AT LEAST 2" BENEATH THE FIRST LAYER OF ROCK. ALL THE VOIDS BETWEEN THE ROCKS SHALL BE FILLED WITH GROUT. MAXIMUM SPACING BETWEEN ROCKS SHALL BE 2"
3. SURFACE ROCKS SHALL BE IMBEDDED AT LEAST ONE-HALF TO TWO-THIRDS THEIR MAXIMUM DIMENSION.

12. A SOILS ENGINEER SHALL CERTIFY THAT ALL FILLS AND BACKFILLS OVER UNDERGROUND STORM DRAINS OUTSIDE OF STREET R/W HAVE BEEN COMPACTED OR CONSOLIDATED TO A 90% DENSITY. THIS CERTIFICATION SHALL BE SUBMITTED TO THE CITY ENGINEER PRIOR TO ACCEPTANCE OF THE THE WORK BY THE COUNTY.
13. LONGITUDINAL STEEL SHALL BE CONTINUOUS AND EXTEND THROUGH ALL CONSTRUCTION JOINTS EXCEPT TRANSVERSE JOINTS IN RECTANGULAR CHANNELS AND AROUND ALL CORNERS UNLESS OTHERWISE SHOWN.
14. TRANSVERSE REINFORCEMENT AND TRANSVERSE JOINTS SHALL BE PLACE AT RIGHT ANGLES OR RADIAL TO CONDUIT CENTER LINE UNLESS OTHERWISE SHOWN
15. UNLESS OTHERWISE SHOWN, TRANSVERSE JOINT KEYWAYS IN BOTH SLABS AND WALLS SHALL BE PLACED AT THE END OF EACH POUR BUT THE SPACING THEREOF SHALL NOT EXCEED 50 FEET NO BE LESS THAN 10 FEET.
16. TRANSVERSE CONSTRUCTION JOINTS SHALL NOT BE PLACED WITHIN 30 INCHES OF MANHOLE OR JUNCTION STRUCTURE OPENINGS.

Special Notes for Concrete Slurry

1. All loose material to be removed to rock and Soils Engineer and County Inspector to approve subgrade prior to pouring.
2. County Storm Drain Inspector to approve subgrade prior to pouring.
3. Anchors to be poured into rock at 12'± intervals.
4. Sides of Slurry to slope up canyon sidewalls 2' min.
5. Bottom of Slurry to be established per field inspection, per note #1 of these notes.

PF515505

BENCH MARK: BY-4336 ELEV. = 1123.863
POBM TAG N.C.B. CREST RD. 2 FT. ± E. CATCH BASIN OPENING 40 FT. ± N. CREST RD. & 800 FT. W. OF HIGHRIDGE
PALOS VERDES QUAD 1970 ADJ.

NOTICE TO CONTRACTOR
The existence and location of any underground utility pipes or structures shown on these plans are obtained by a search of the available records. To the best of my knowledge there are no existing utilities except as shown on these plans.
The contractor is required to take due precautionary measures to protect the utility lines shown and any other lines not of record or not shown on these plans
C M Leonard 11/1/77 R.C.E. 13160

PREPARED FOR
TRACT Nº 31617
P.D. Nº 1382

PREPARED BY
C M Leonard
CLARK M. LEONARD R.C.E. 13137

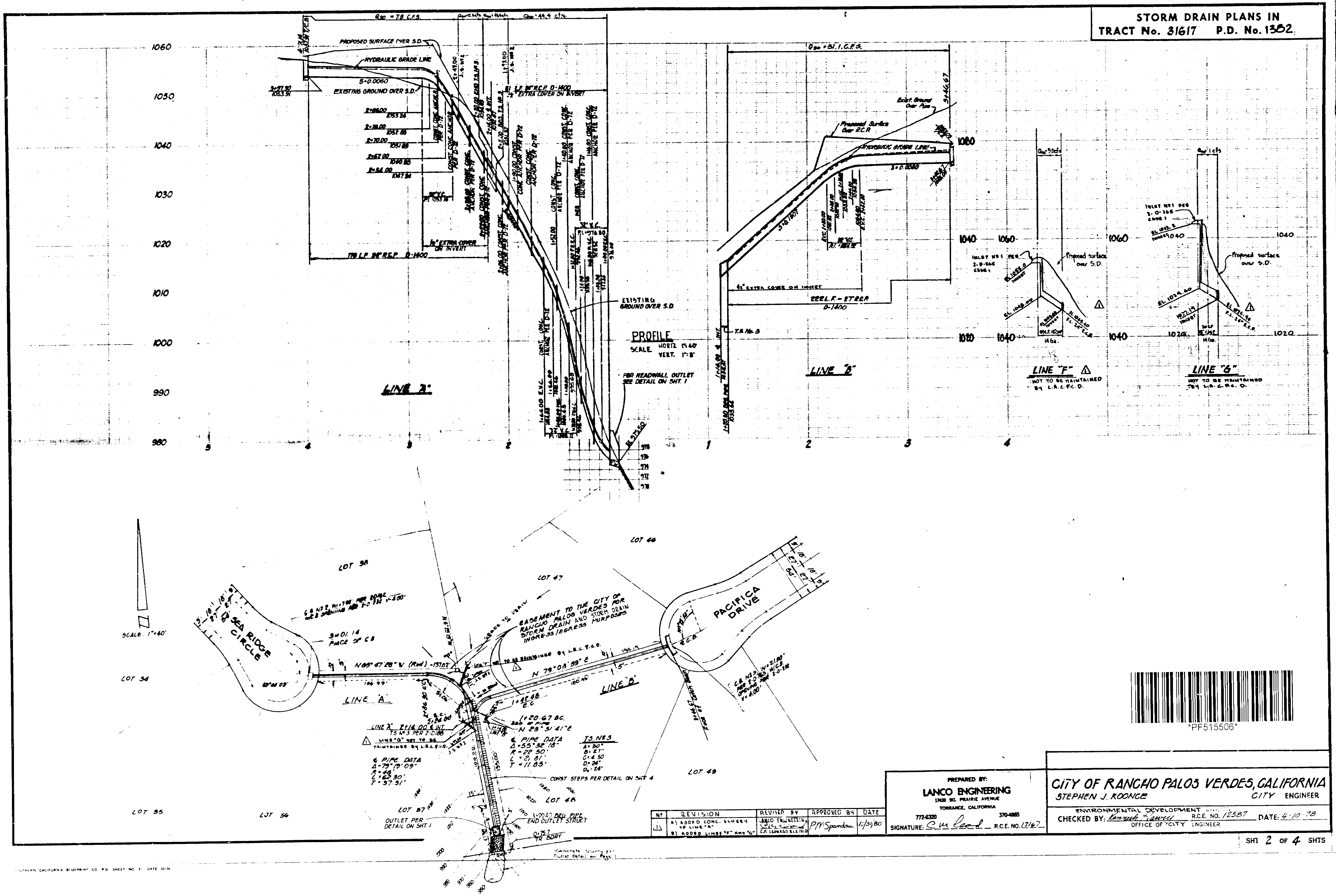
Reviewed By The Los Angeles County Road Department
By: Van R. Keener Date: 11-29-77

Nº	REVISION	REVISED BY	APPROVED BY	DATE
△	a) ADDED CONCRETE SLURRY TO LINE "A" b) ADDED LINES "F" AND "G"	Lanco Engineering C M Leonard C.M. Leonard RCE 13167	PM Spandau	10/31/80

APPROVED:
CITY OF RANCHO PALOS VERDES

CITY OF RANCHO PALOS VERDES, CALIFORNIA
STEPHEN J. KOONCE CITY ENGINEER
ENVIRONMENTAL DEVELOPMENT DIVISION
APPROVED BY Carl D. Smith DIVISION ENGINEER DATE 4-10-78
CHECKED BY Kenneth Harvey RCE 12557 OFFICE OF THE CITY ENGINEER DATE 4-10-78
DRAWN / TRACED / CHECKED DATE
SHEET 1 OF 4 SHEETS

ARCH ENG. SUPPLY CO. CI-62942



Nº	REVISION	REVISED BY	APPROVED BY	DATE
1	A) ADDED CONC. SLURRY TO LINE "A" B) ADDED LINES "F" AND "G"	LANCO ENGINEERING C.M. LEONARD R.C.E. 13167	P M Spandau	10/31/80

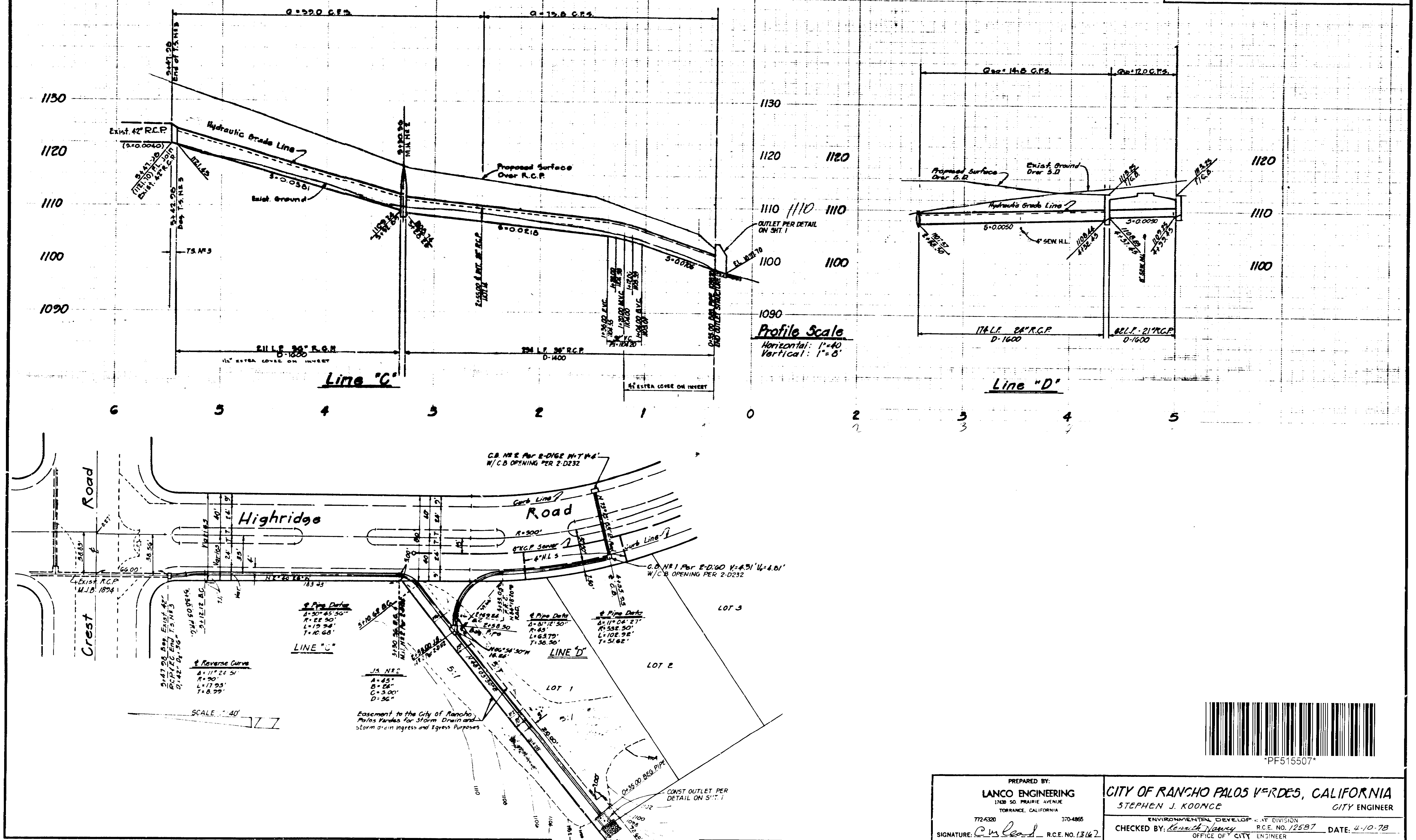
PREPARED BY:
LANCO ENGINEERING
17430 SO. PRAIRIE AVENUE
TORRANCE, CALIFORNIA
772-6320 370-4865
SIGNATURE: C M Leonard R.C.E. NO. 13167

CITY OF RANCHO PALOS VERDES, CALIFORNIA
STEPHEN J. KOONCE CITY ENGINEER
ENVIRONMENTAL DEVELOPMENT
CHECKED BY: Kenneth Lowry R.C.E. NO. 12587 DATE: 4-10-78
OFFICE OF CITY ENGINEER

PF515506

SHT 2 OF 4 SHTS

STORM DRAIN PLANS IN
TRACT No. 31617 P.D. No. 1382

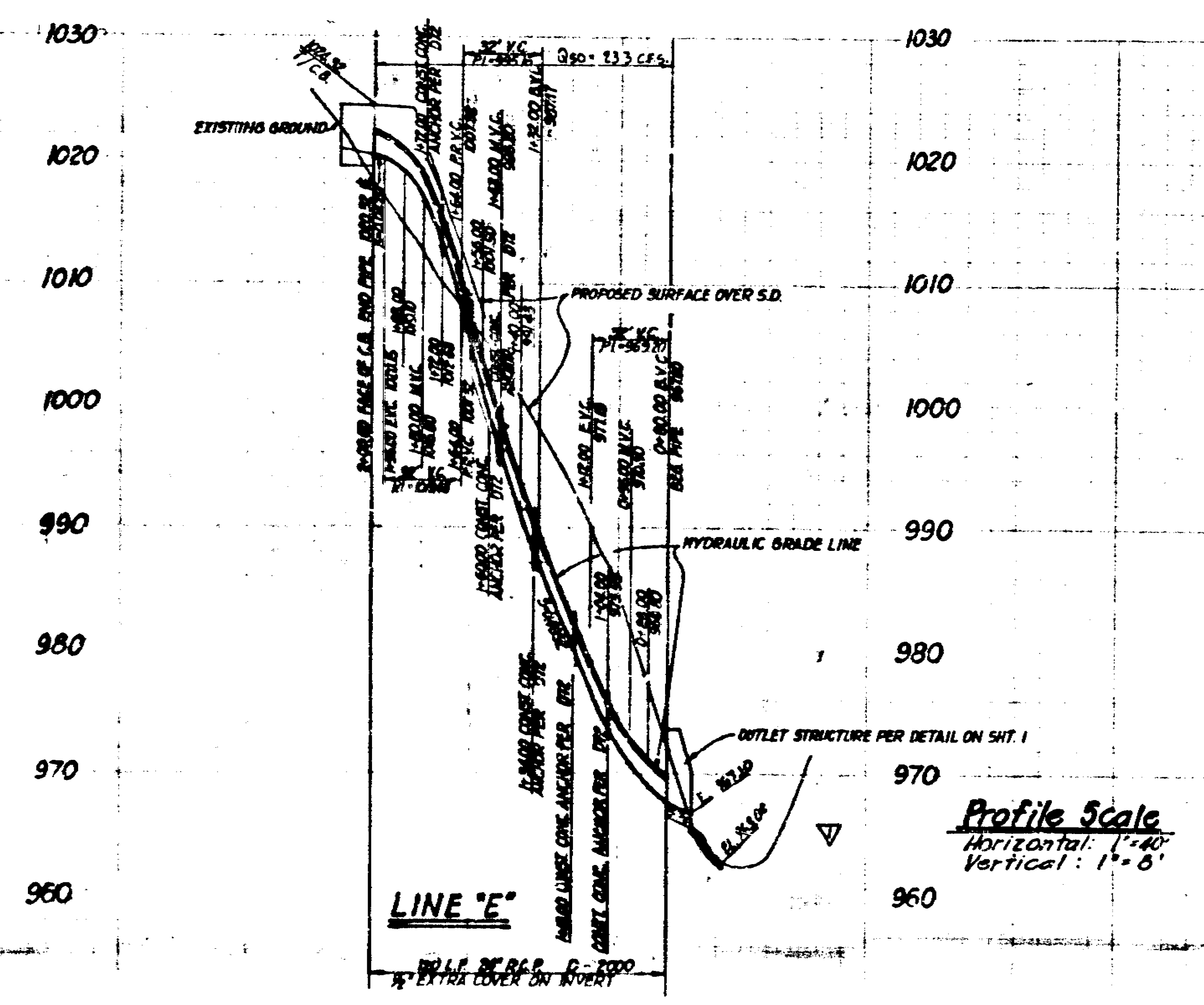


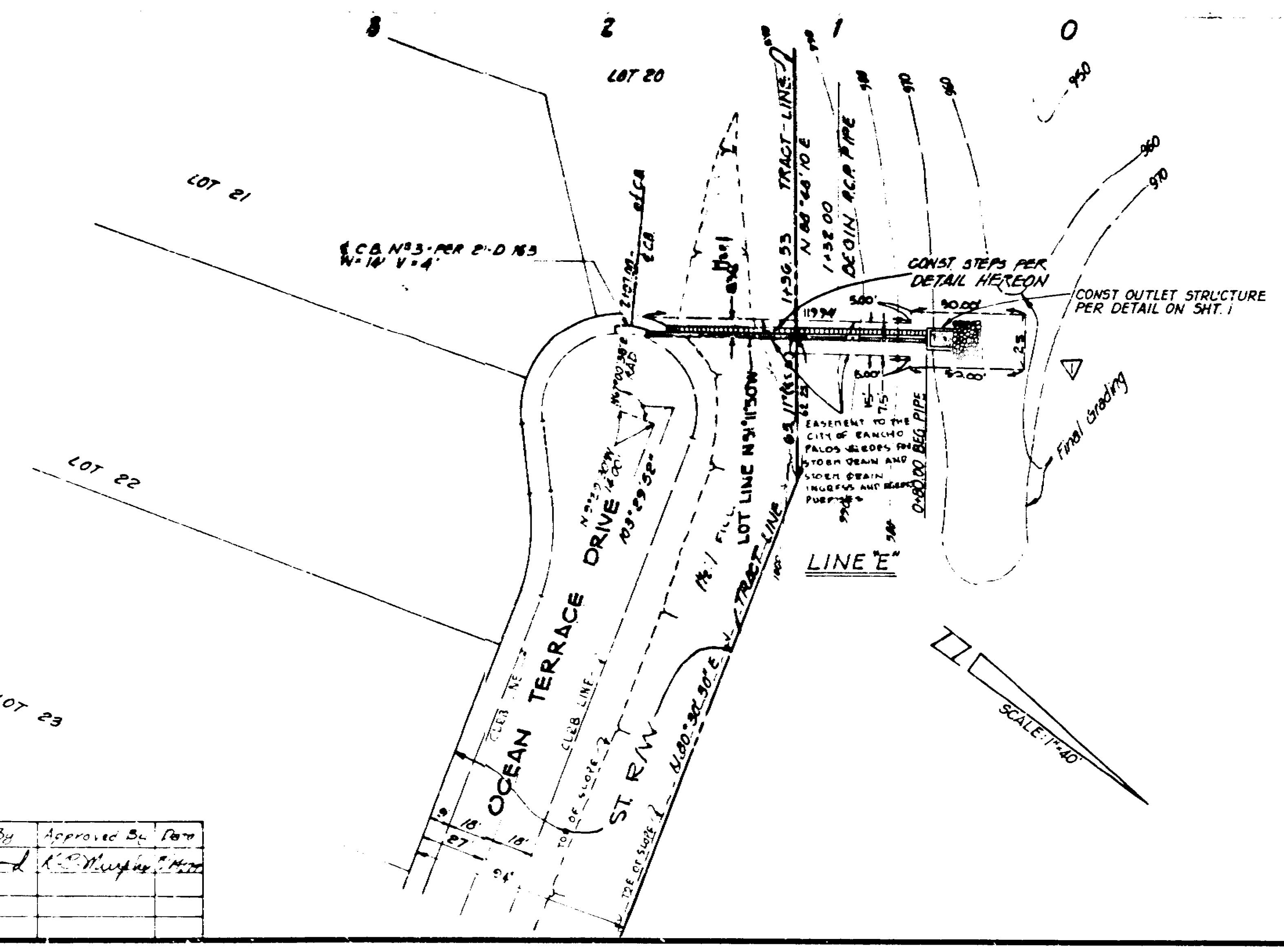
PREPARED BY:
LANCO ENGINEERING
1700 SO. PRAIRIE AVENUE
TORRANCE, CALIFORNIA
SIGNATURE: R.C.E. NO. 13162

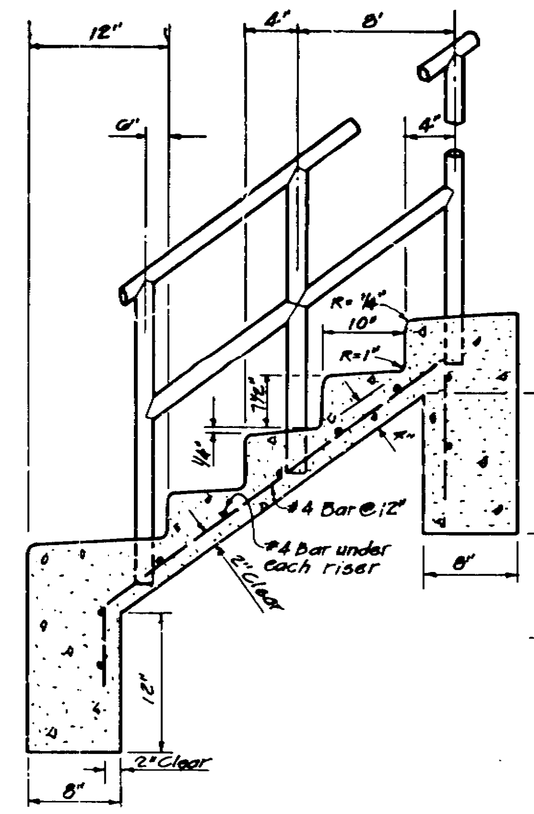
CITY OF RANCHO PALOS VERDES, CALIFORNIA
STEPHEN J. KOONCE CITY ENGINEER
ENVIRONMENTAL DEVELOPMENT DIVISION
CHECKED BY: R.C.E. NO. 12587 DATE: 4-10-78
OFFICE OF CITY ENGINEER

SHT 3 OF 4 SHTS

STORM DRAIN PLANS IN
TRACT No. 31617 P.D. No. 1382







Concrete Steps And Handrail Detail
No Scale

Notes:

1. The Width of Stairway = 42"
2. Riser = 7½" Tread = 10"
3. Use handrails per L.A.C.Rd. Dept. Std. Plan 88-02
4. Handrail shall not reduce stairway width by more than 3-¾"

PF515508

PREPARED BY:
LANCO ENGINEERING
17430 SO. PRAIRIE AVENUE
TORRANCE, CALIFORNIA
772-6320 370-4865
SIGNATURE: C M Leal R.C.E. NO. 17167

CITY OF RANCHO PALOS VERDES, CALIFORNIA
STEPHEN J. KOONCE CITY ENGINEER
ENVIRONMENTAL DEVELOPMENT DIVISION
CHECKED BY: Kenneth Haney R.C.E. 12587 DATE: 4-10-78
OFFICE OF CITY ENGINEER

SHT 4 OF 4 SHTS

Storm Drain Plans In Tract No. 31714 P.D. No. 1403

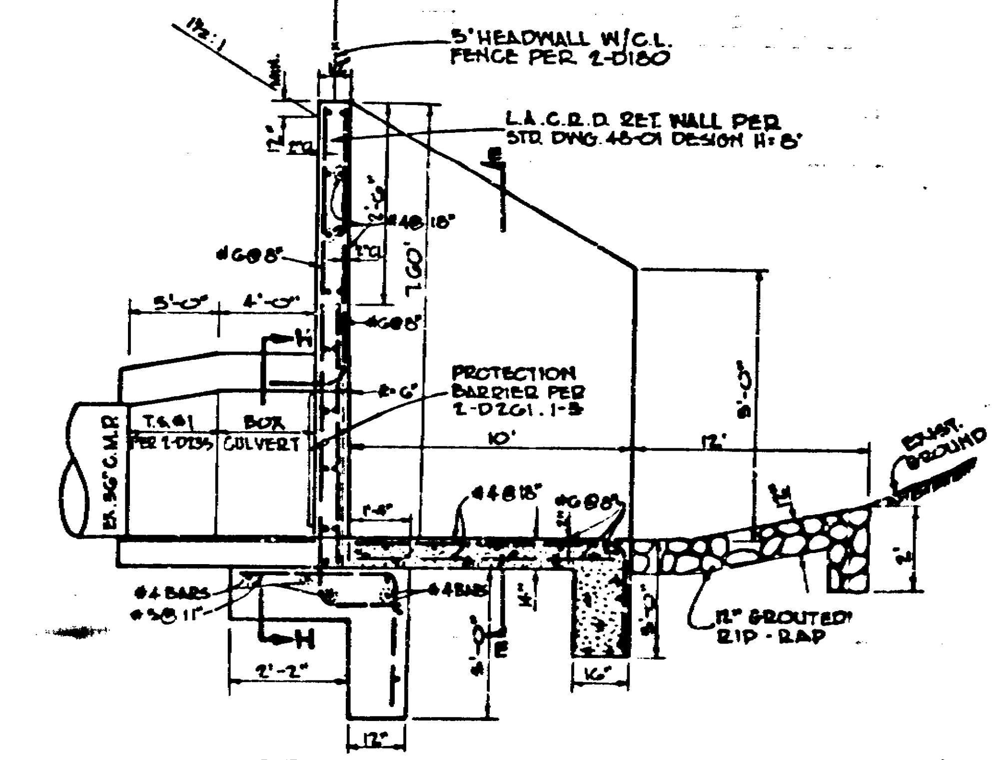
BENCH MARK: BY 4402

C.S. Mon. in 12 in. conc. post 4 in. above ground at N.E. cor. Crest Rd. & Crenshaw Blvd. 93 ft.± & 40 ft.± N. ℄ Int. mkd.

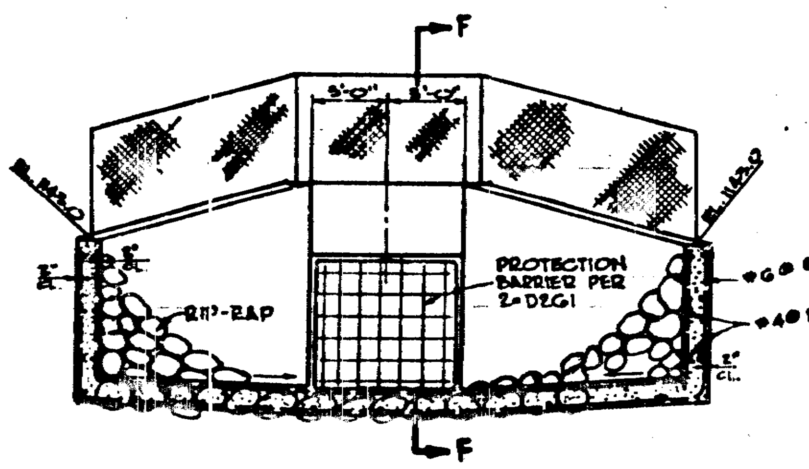
Palos Verdes Quad. 1970 Elev. 1201.455

List of Standard Drawings of Los Angeles County Flood Control District

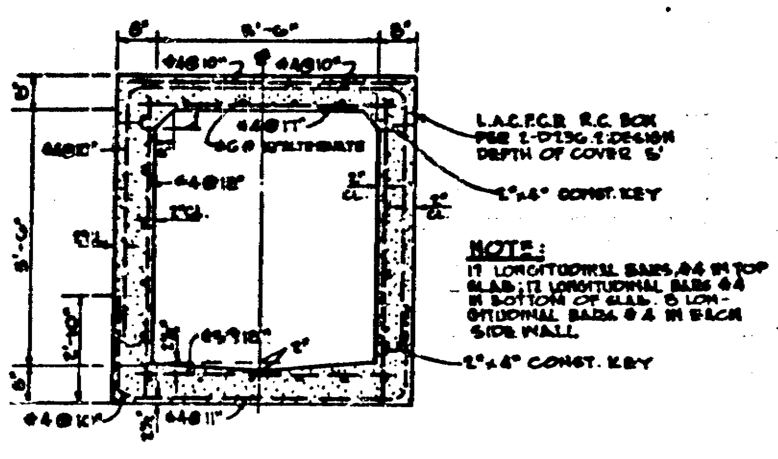
Description	Dwg. No.
Catch Basin No. 3	2-D165
Protection Bars for Catch Basin	2-D175
Catch Basin Reinforcement	2-D172
Catch Basin Opening	2-D232
Manhole Frame & Cover for Catch Basin	2-D156
Standard Drop Step	2-D96
Connection to Catch Basin	2-D224
Headwall Fence	2-D180
Protection Barrier	2-D261.1 to .3
Transition Structure No. 1	2-D235
Catch Basin Reinforcement for Round M.H.	2-D157
Junction Structure No. 1	2-D189



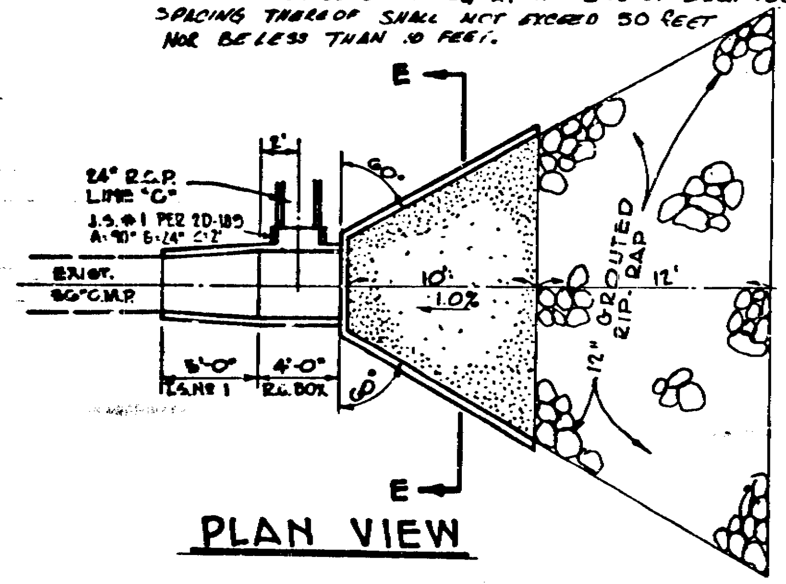
SECTION F-F



SECTION E-E



SECTION H-H



PLAN VIEW

INLET STRUCTURE DETAILS

NO SCALE

GENERAL NOTES:

1. ELEVATIONS ARE IN FEET ABOVE U.S.C. & G.S. MEAN SEA LEVEL DATUM OF 1929. ALL WORK SHALL BE IN ACCORDANCE WITH THE "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION 1976 EDITION," AND SHALL BE PROSECUTED ONLY IN THE PRESENCE OF THE CITY ENGINEER.
2. APPROVAL OF THIS PLAN BY THE CITY OF RANCHO PALOS VERDES DOES NOT CONSTITUTE A REPRESENTATION AS TO THE ACCURACY OF THE LOCATION, OR THE EXISTENCE OR NON-EXISTENCE OF ANY UNDERGROUND UTILITY, PIPE OR STRUCTURE WITHIN THE LIMITS OF THIS PROJECT. THIS NOTE APPLIES TO ALL SHEETS.
3. THE CONTRATOR SHALL NOTIFY THE ENVIRONMENTAL DEVELOPMENT DIV. BY TELEPHONE, 974-7283 AT LEAST 24 HOURS BEFORE STARTING ANY WORK UNDER THIS CONTRACT. THE CONTRACTOR SHALL SUBMIT A DEPOSIT FOR CONSTRUCTION INSPECTION TO THE COUNTY ENGINEER, 550 S. VERMONT AVE. LOS ANGELES, AT LEAST 24 HOURS BEFORE STARTING ANY WORK UNDER THIS CONTRACT.
4. ALL CONSTRUCTION JOINT'S IN THE FOOTING OF SLABS AND WALLS SHALL BE IN THE SAME PLANE. NO STAGGERING OF JOINTS WILL BE PERMITTED.
5. NO CONCRETE SHALL BE PLACED UNTIL THE FORMS AND REINFORCING STEEL HAS BEEN PLACED, INSPECTED AND APPROVED.
6. TRANSVERSE REINFORCEMENT AND TRANSVERSE JOINTS SHALL BE PLACED AT RIGHT ANGLES (OR RADIAL) TO CONDUIT CENTERLINE EXCEPT AS OTHERWISE SHOWN ON THE DRAWINGS.
7. ALL CONCRETE SHALL BE PORTLAND CEMENT CONCRETE WITH AN ULTIMATE 28 DAYS COMPRESSIVE STRENGTH OF 3000 p.s.i.
8. ALL EXPOSED EDGES SHALL BE FINISHED WITH A 3/4" CHAMFER.
9. ALL STEEL ADJACENT TO FACE OF CONCRETE SHALL HAVE 2½" CLEARANCE UNLESS OTHERWISE SPECIFIED.
10. REINFORCEMENT SHALL BE DEFORMED BARS OF INTERMEDIATE GRADE STEEL AS PER A.S.T.M. A-615.
11. ALL BAR BENDS AND HOOKS SHALL CONFORM TO THE AMERICAN CONCRETE INSTITUTE "MANUAL OF STANDARD PRACTICE".
12. DIMENSIONS FROM FACE OF CONCRETE TO STEEL ARE TO CENTERLINE OF STEEL UNLESS OTHERWISE NOTED.
13. ALL BACKFILLS AND FILLS TO BE USED AS SUBGRADE SHALL BE COMPACTED TO A RELATIVE DENSITY OF 90% UNLESS OTHERWISE SPECIFIED.
14. ALL STEEL THAT IS TO BE CONTINUOUS SHALL HAVE A MINIMUM LAP OF 30 BAR DIAMETERS OR 18", WHICHEVER IS GREATER.
15. ALL CATCH BASINS AND CONNECTOR PIPES BETWEEN CATCH BASINS TO BE INSPECTED BY THE COUNTY ROAD DEPARTMENT.
16. PIPE SHALL BE EMBEDDED 5 INCHES INTO ALL STRUCTURES INCLUDING INLET & HEADWALLS, UNLESS OTHERWISE SPECIFIED.
17. WHERE PIPE IS TO BE PLACED IN FILL, THE FILL SHALL BE COMPACTED TO A MINIMUM DEPTH OF 3 FEET ABOVE THE TOP OF PIPE PRIOR TO TRENCHING.
18. ALL BACKFILL AND FILL AROUND CLOSED CONDUIT IN STREET RIGHTS OF WAY SHALL BE BROUGHT UP TO SUBGRADE OF THE ROAD (OR TO 2 FEET ABOVE THE TOP OF THE CONDUIT, WHICHEVER IS LESS. THE ROAD DEPARTMENT SHALL INSPECT ALL BACKFILL AND FILL ABOVE AFOREMENTIONED LIMITS. APPLICATION FOR AN ENGINEER OR INSPECTOR IN CONNECTION WITH THE WORK, SHALL BE MADE BY THE CONTRACTOR AT LEAST 24 HOURS BEFORE HIS SERVICE IS REQUIRED. CALL 226-8188.
19. A PERMIT SHALL BE OBTAINED FROM THE ROAD DEPARTMENT AND SHALL BE SUBMITTED TO THE INSPECTOR PRIOR TO COMMENCING CONSTRUCTION WITHIN THEIR RIGHTS OF WAY.
20. ALL REINFORCED CONCRETE PIPE SHALL BE BEDDED IN ACCORDANCE WITH LOS ANGELES COUNTY ENGINEER CASE Ad BEDDING PER STANDARD DRAWING D-54, UNLESS OTHERWISE NOTED.
21. UNLESS OTHERWISE SHOWN, CONCRETE DIMENSIONS SHALL BE MEASURED VERTICALLY OR HORIZONTALLY AND PARALLEL OR AT RIGHT ANGLES (OR RADIAL) TO THE CENTER LINE OF CONSTRUCTION.
22. THIS STORM DRAIN WILL NOT BE ACCEPTED FOR MAINTENANCE UNTIL THE STREETS HAVE BEEN PAVED, MANHOLES BROUGHT TO GRADE, AND THE SYSTEM IS CLEANED TO THE SATISFACTION OF THE CITY ENGINEER.

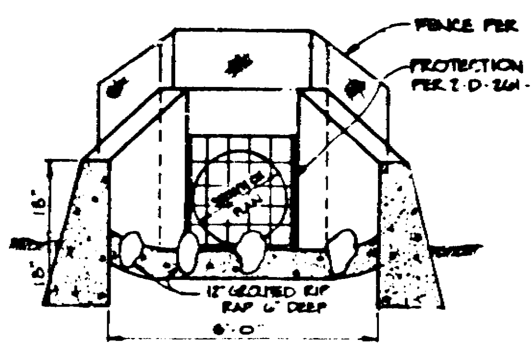
GENERAL NOTES (Cont'd)

23. A SOILS ENGINEER SHALL CERTIFY THAT ALL FILLS AND BACKFILLS OVER UNDERGROUND STORM DRAINS OUTSIDE OF ST. R/W HAVE BEEN COMPACTED OR CONSOLIDATED TO A 90% DENSITY. THIS CERTIFICATION SHALL BE SUBMITTED TO THE COUNTY ENGINEER PRIOR TO ACCEPTANCE OF THE WORK BY THE CITY.
24. THE CONTRACTOR'S ATTENTION IS DIRECTED TO SECTION 7-10. 4.1 OF THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION IN REGARD TO SAFETY ORDERS.
25. THE CONTRACTOR SHALL CONFORM TO THE "MINIMUM PUBLIC SAFETY REQUIREMENTS" AS SHOWN ON LOS ANGELES COUNTY ENGINEER STANDARD S-2.
26. ALL PIPE SHALL BE PLACED IN A TRENCH IN NATURAL GROUND AND/OR COMPACTED FILL. THE GROUND LEVEL BEFORE THE TRENCHING SHALL BE AT LEAST 3 FEET ABOVE TOP OF PIPE ELEVATION, OR AT FINISH SURFACE ELEVATION, WHICHEVER IS LESS. ALL BACKFILL IN EASEMENTS SHALL BE COMPACTED TO THE DENSITY REQUIRED BY THE GRADING PLAN.
27. THE INSPECTOR MAY HAVE THE OPTION TO REQUIRE CONCRETE BACKFILL DURING CONSTRUCTION WHEN THE PIPE HAS LESS THAN ONE FOOT OF COVER AND IS SUBJECTED TO HEAVY EQUIPMENT TRAFFIC. THE CONCRETE BACKFILL SHALL CONSIST OF 1:3.5 MIX CEMENT CONCRETE POURED FROM WALL TO WALL OF TRENCH AND FROM BOTTOM OF TRENCH TO A MINIMUM DEPTH OF 4 INCHES OVER TOP OF PIPE.
28. TRANSVERSE CONSTRUCTION JOINTS SHALL NOT BE PLACED WITHIN 30 INCHES OF MANHOLE OR JUNCTION STRUCTURE OPENINGS.
29. AT THE BEGINNING AND END OF ALL POURS 1 LAYER OF REINFORCEMENT SHALL BE PLACED WITHIN 3 INCHES OF THE TRANSVERSE CONSTRUCTION JOINTS.
30. UNLESS OTHERWISE SHOWN, TRANSVERSE JOINT KEYWAYS IN BOTH SLABS AND WALLS SHALL BE PLACED AT THE END OF EACH POUR BUT THE SPACING THEREOF SHALL NOT EXCEED 50 FEET NOR BE LESS THAN 10 FEET.

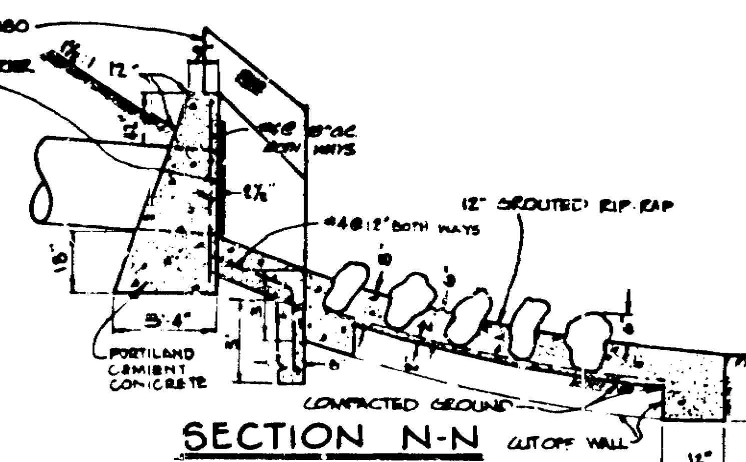
RIPRAP NOTES

1. ROCKS FOR GROUTED RIPRAP SHALL BE GOOD QUALITY BROKEN CONCRETE AND/OR RIVER RUN ROCK. THE SMALLEST DIMENSION SHALL EXCEED 12 INCHES AND THE LARGEST DIMENSION SHALL NOT EXCEED 18 INCHES. ~~THE LARGEST DIMENSION SHALL NOT EXCEED 4 TIMES THE SMALLEST DIMENSION.~~
2. THERE SHALL BE A GROUT BED OF AT LEAST 2 INCHES BENEATH THE FIRST LAYER OF ROCK. ALL THE VOIDS BETWEEN THE ROCKS SHALL BE FILLED WITH GROUT. MAXIMUM SPACING BETWEEN ROCKS SHALL BE 2 INCHES.
3. SURFACE ROCKS SHALL BE IMBEDDED FROM 1/2 TO 2/3 OF THEIR MAXIMUM DIMENSION.

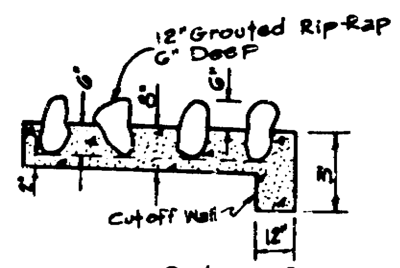
NOTE: CONCRETE MAY BE SUBSTITUTED FOR THE GROUT.



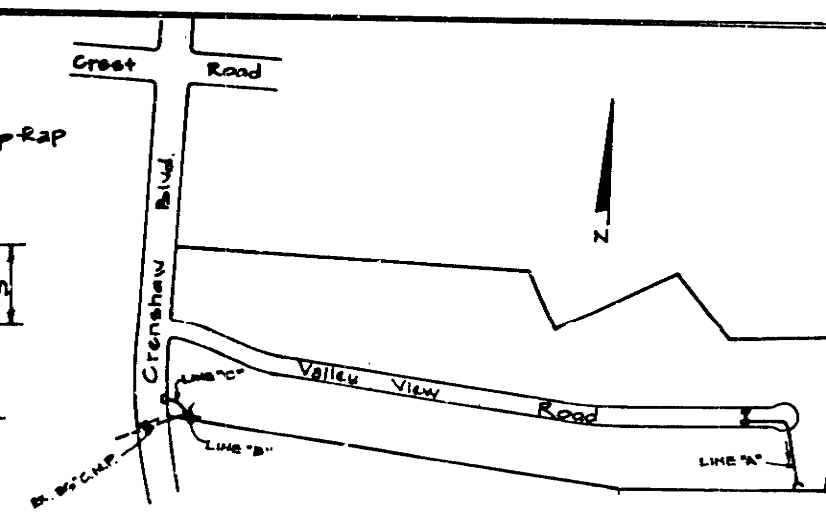
SECTION M-M



SECTION N-N



SECTION P-P

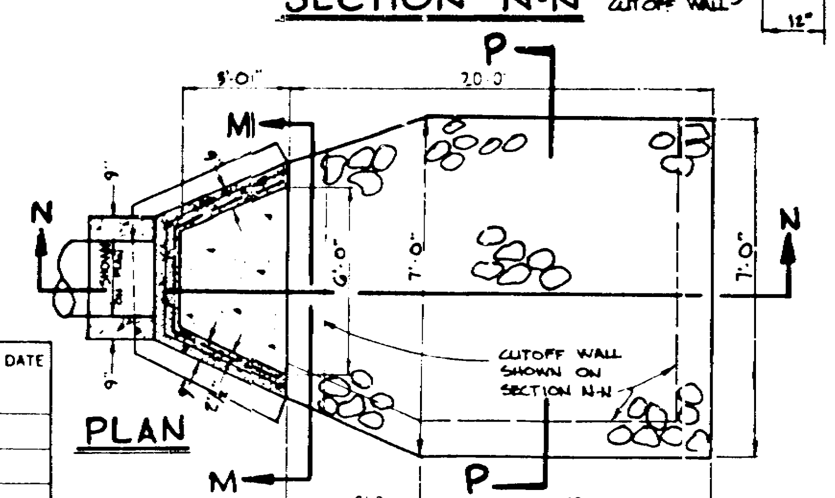


Index Map

Scale: 1"=300'

OUTLET DETAIL "A"

NO SCALE



PLAN

HYDRAULIC ELEMENT TABLE					
STATION FROM	STATION TO	Q_{50}	Ø	Sf	V
LINE "A"					
0+93.00	3+15.68	37.0	33" R.C.P.	0.0048	6.2
LINE "A-1"					
ALL	ALL	18.5	24" R.C.P.	NOT FULL	8.0'
LINE "C"					
ALL	ALL	50.0	24" R.C.P.	NOT FULL	32.0

PRIVATE ENGINEERS NOTICE TO CONTRACTORS

THE EXISTENCE AND LOCATION OF ANY UNDERGROUND UTILITY PIPES OR STRUCTURES SHOWN ON THESE PLANS ARE OBTAINED BY A SEARCH OF THE AVAILABLE RECORDS. TO THE BEST OF OUR KNOWLEDGE THERE ARE NO EXISTING UTILITIES EXCEPT AS SHOWN ON THIS MAP.

THE CONTRACTOR IS REQUIRED TO TAKE DUE PRECAUTIONARY MEASURES TO PROTECT THE UTILITY LINES SHOWN AND ANY OTHER LINES NOT OF RECORD OR NOT SHOWN ON THIS DRAWING.

C M Leard — REGISTERED CIVIL ENGINEER No. — DATE: 5/ /78

PF515529

NO.	REVISION	REVISED BY	APPROVED BY	DATE

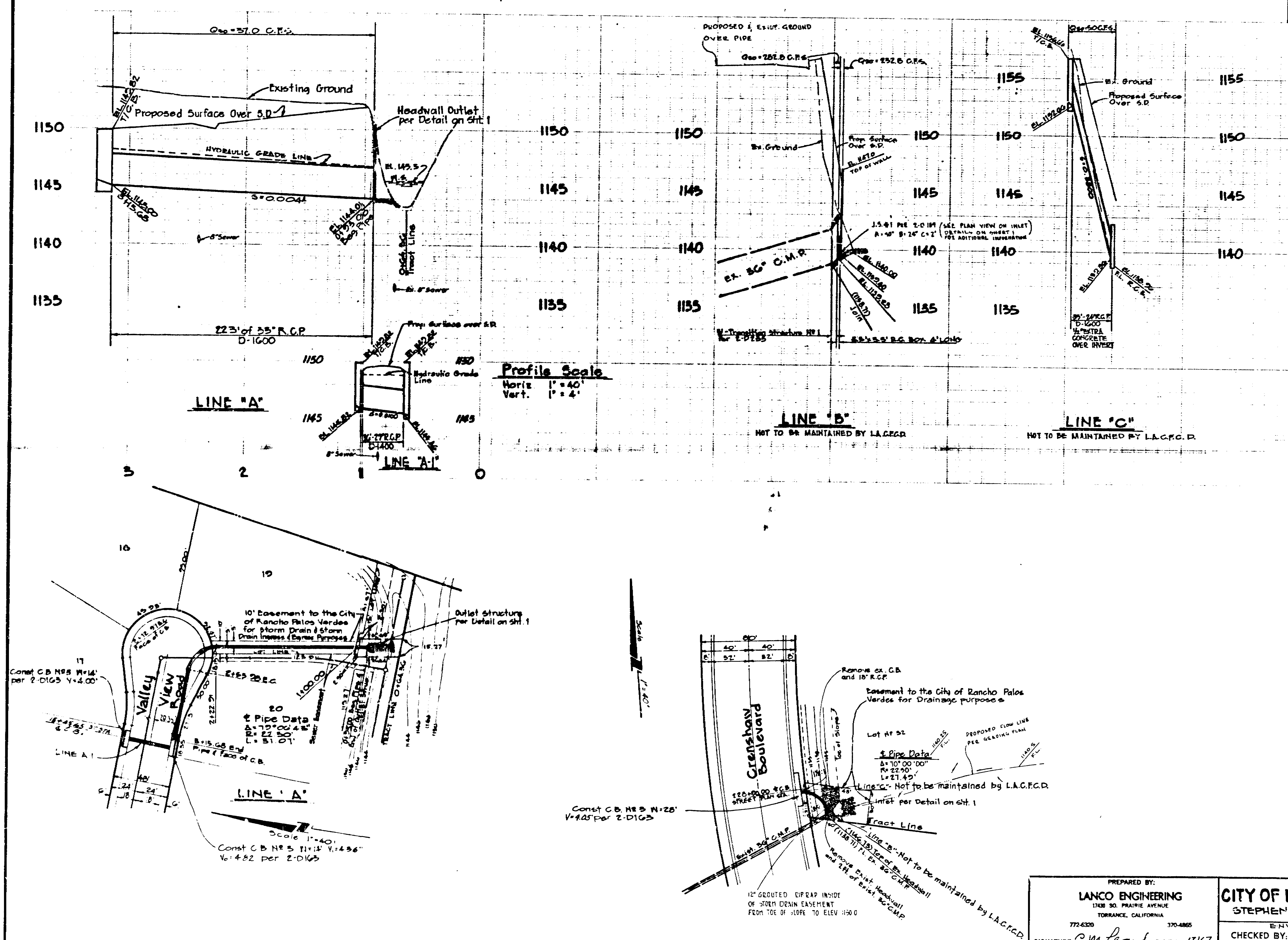
REVIEWED BY THE LOS ANGELES COUNTY ROAD DEPT.
BY: Van R. Keener DATE: 5-28-78

PREPARED BY:
LANCO ENGINEERING
17430 SO. PRAIRIE AVENUE
TORRANCE, CALIFORNIA
772-6320 370-4865
SIGNATURE: C M Leard R.C.E. NO. 13167

CITY OF RANCHO PALOS VERDES, CALIF.
STEPHEN J. KOONCE CITY ENGINEER

ENVIRONMENTAL DEVELOPMENT DIVISION
APPROVED BY: Carroll Smith, DIVISION ENGINEER DATE: 6/2/78
CHECKED BY: K Harvey, OFFICE OF COUNTY ENGINEER R.C.E. NO. 12587 DATE: 6/2/78

STORM DRAIN PLANS IN TRACT No. 31714 P.D. No. 1403

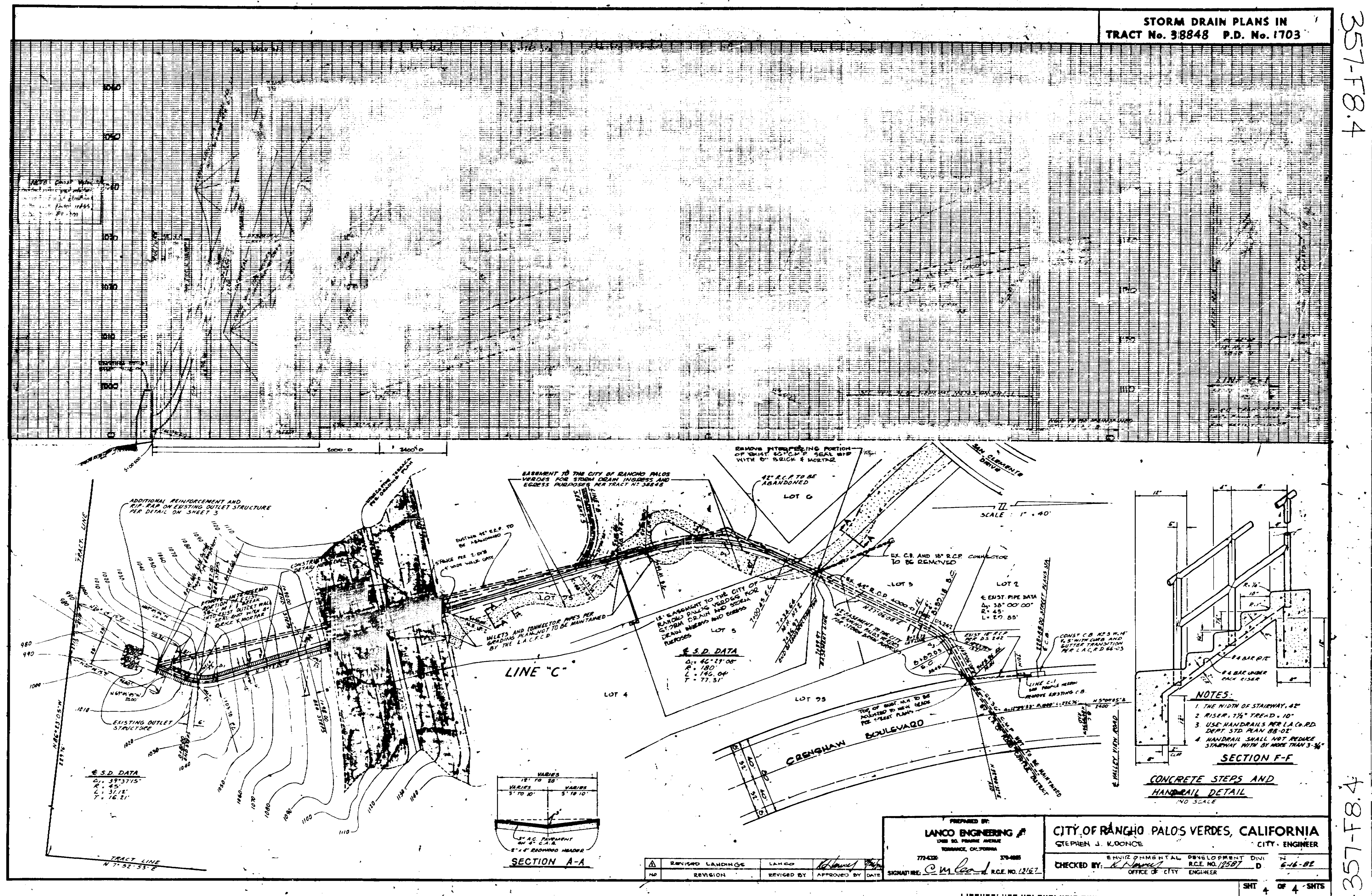


PF515530

PREPARED BY:
LANCO ENGINEERING
17438 SO. PRAIRIE AVENUE
TORRANCE, CALIFORNIA
772-6320 370-4865
SIGNATURE: C M Leard R.C.E. NO. 13167

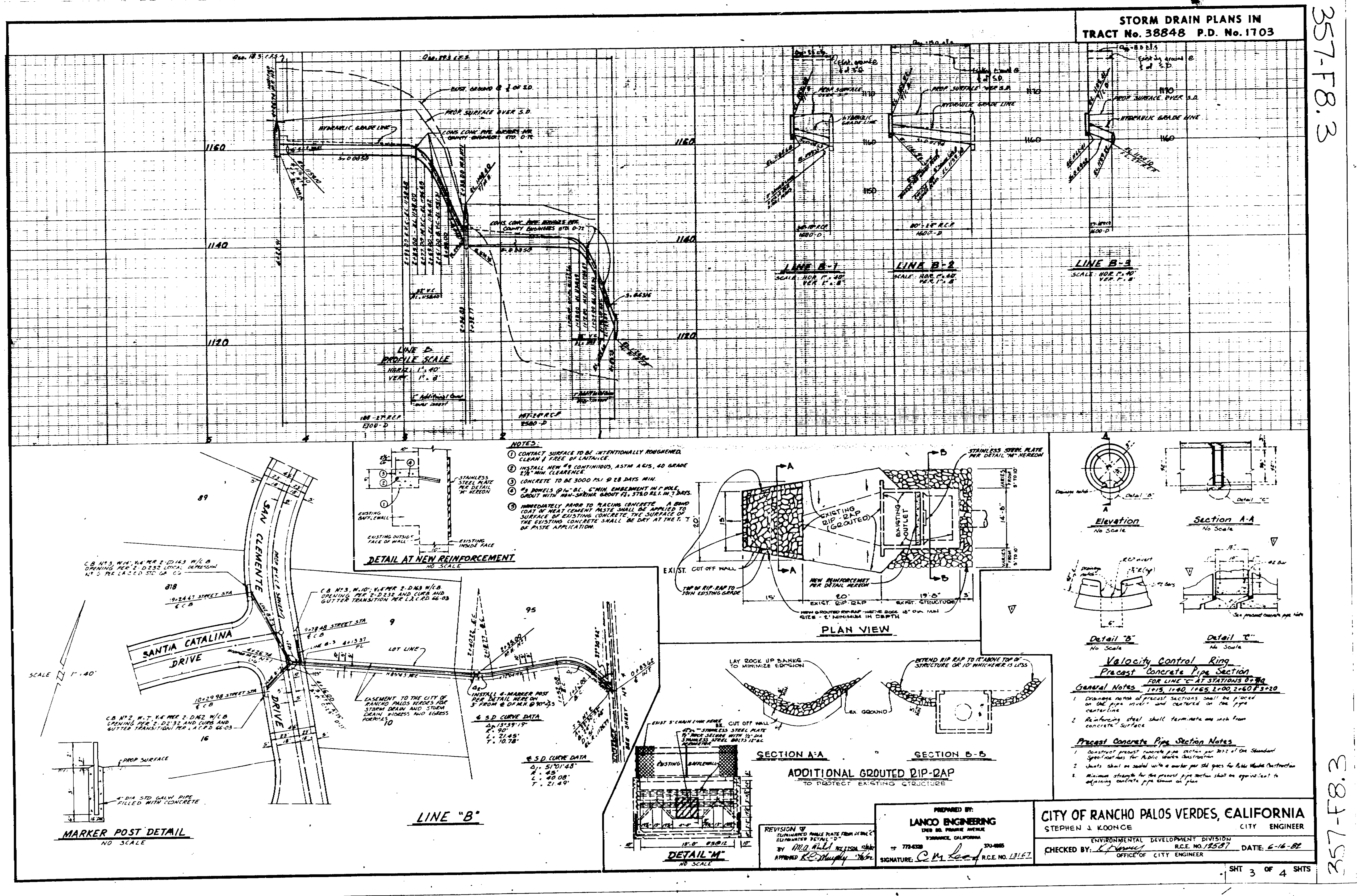
CITY OF RANCHO PALOS VERDES, CALIF.
STEPHEN J. KOONCE CITY ENGINEER
ENVIRONMENTAL DEVELOPMENT DIVISION
CHECKED BY: K. Dawes R.C.E. NO. 17597 DATE: 4/3/79
OFFICE OF COUNTY ENGINEER

SHT 2 OF 2 SHTS


357-F8.4
STORM DRAIN PLANS IN
TRACT No. 38848 P.D. No. 1703
LINE "C"
LOT 4
LOT 5
LOT 6
SECTION A-A
NOTES:
1. THE WIDTH OF STAIRWAY, 42"
2. RISER: 7½" TREAD = 10"
3. USE HANDRAILS PER L.A.Co.RD. DEPT. STD. PLAN 88-02'
4. HANDRAIL SHALL NOT REDUCE STAIRWAY WITH BY MORE THAN 3-½"
SECTION F-F
CONCRETE STEPS AND HANDRAIL DETAIL
NO SCALE
PREPARED BY:
LANCO ENGINEERING
TORRANCE, CALIFORNIA
SIGNATURE: RCE NO. 13167
CITY OF RANCHO PALOS VERDES, CALIFORNIA
STEPHEN J. KOONCE CITY ENGINEER
CHECKED BY: ENVIRONMENTAL DEVELOPMENT DIVISION RCE NO. 19587 D 6-16-82
OFFICE OF CITY ENGINEER
SHT 4 OF 4 SHTS
357-F8.4

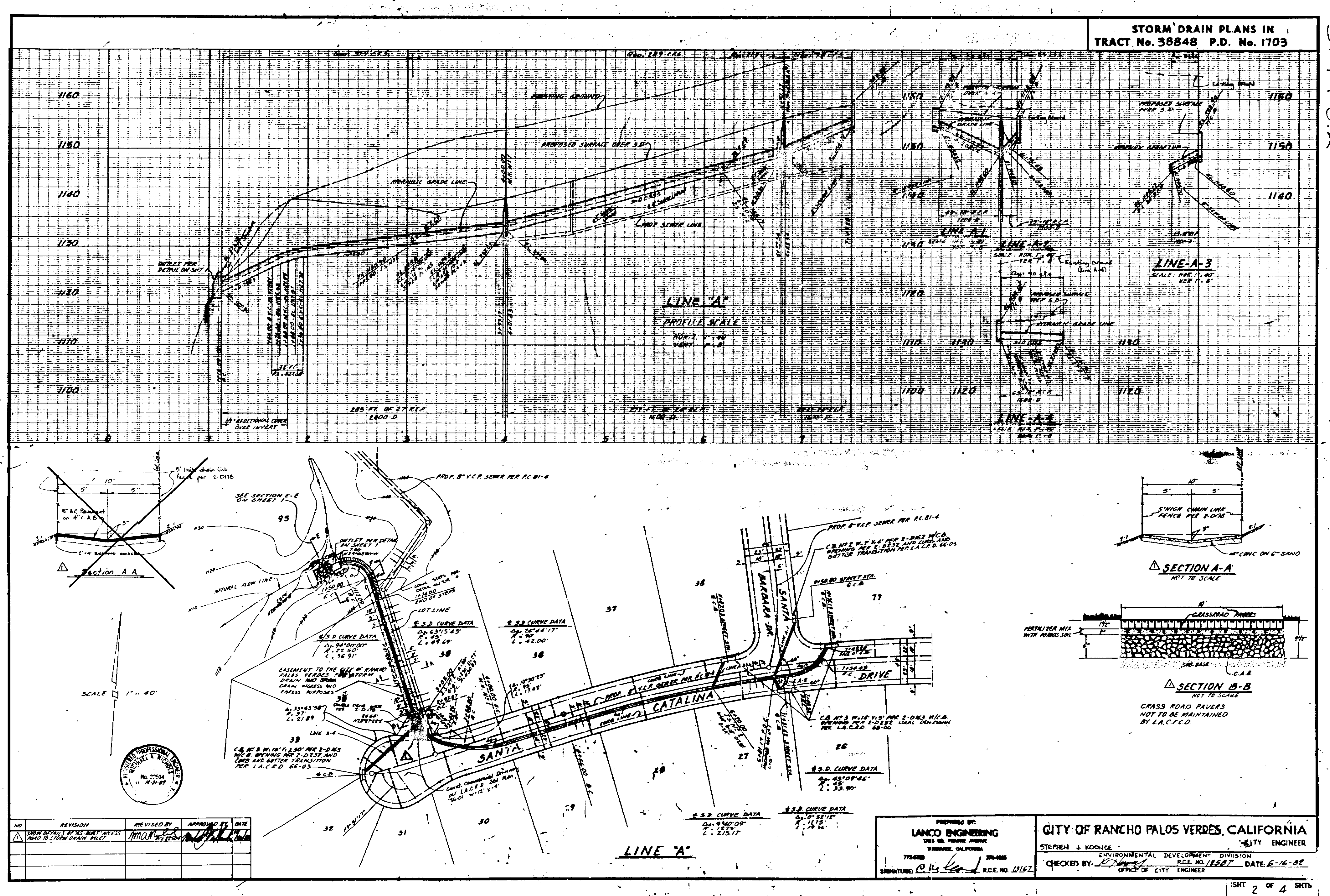
PF516053

357-F8.3



357-F8.3

"PF516052"



357-F8.2

PF516051

LIST OF STANDARD DRAWINGS FOR LOS ANGELES COUNTY FLOOD CONTROL DISTRICT

DESCRIPTION	DWG. NO.
JUNCTION STRUCTURE NO. 2	2-D112
CATCH BASIN NO 2	2-D162
CATCH BASIN NO 3	2-D163
MANHOLE NO 2	2-D184
MANHOLE FRAME AND COVER	2-D472
PROTECTION BARS FOR CATCH BASIN	2-D178
CATCH BASIN REINFORCEMENT	2-D172
CONNECTION TO CATCH BASIN FOR PIPE	2-D224
CATCH BASIN OPENING	2-D232
MANHOLE FRAME AND COVER FOR C.B.	2-D156
FENCE	2-D180
CATCH BASIN REINFORCEMENT FOR ROUND C.B.	2-D157
STANDARD DROP STEP	2-D 96
SPECIAL MANHOLE FRAME AND COVER	2-D427
TRANSITION STRUCTURE Nº 3	2-D188
JUNCTION STRUCTURE Nº 4	2-D195
SHAFT SAFETY LEDGE	2-D450
CONCRETE COLLAR	2-D193
TYPICAL FENCE FOR CHANNEL RIGHTS OF WAY	2-D118

LOS ANGELES COUNTY ENGINEER

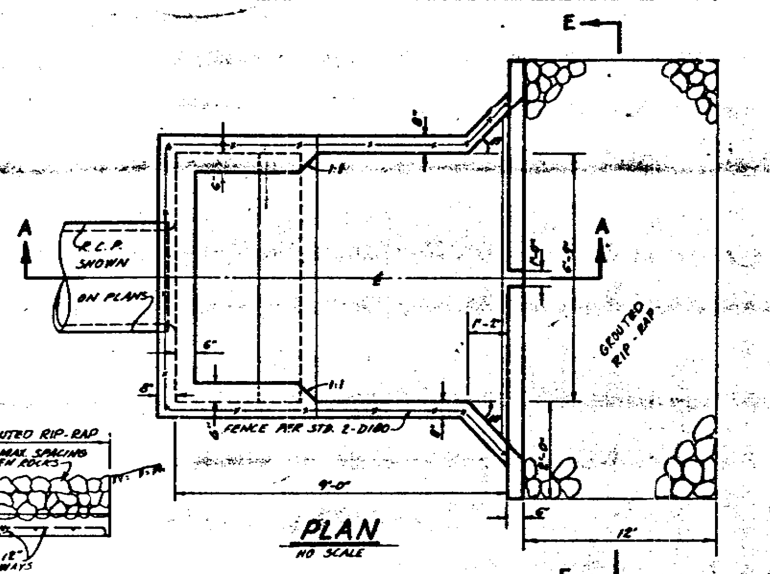
PIPE BEDDING	D-54
CONCRETE ANCHORS	D-72

HYDRAULIC ELEMENT TABLE

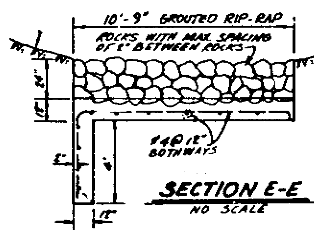
STATION FROM	STATION TO	Q_{50}	Ø	S_f	V	
			LINE "A"			
1+13.09	1+80.00	37.9	27" R.C.P.	NOT FULL	22.6	*
1+80.00	3+05.00	37.9	27" "	" "	13.6	
3+05.00	4+00.00	28.9	27" "	" "	12.9	
4+00.00	6+20.00	28.9	24" "	" "	17.1	
6+20.00	6+81.17	21.9	24" "	" "	16.1	
6+81.17	7+49.28	9.8	24" "	" "	14.4	
LINE	A-1	3.8	18" RCP	NOT FULL	11.9	
LINE	A-2	8.3	" "	" "	19.3	
LINE	A-3	7.0	" "	" "	15.6	
LINE	A-4	9.0	" "	" "	5.9	
			LINE "B"			
0+83.42	0+90.00	29.8	24" R.C.P.	0.0168	9.33	**
0+90.00	1+12.00	29.3	24" "	NOT FULL	39.9	**
1+12.00	1+28.00	29.3	24" "	NOT FULL	34.4	**
1+28.00	2+35.00	29.3	24" "	0.0168	9.3	
2+35.00	2+45.00	29.3	27" "	0.0089	7.4	**
2+45.00	2+72.00	29.3	27" "	NOT FULL	34.0	**
2+72.00	2+73.00	29.3	27" "	NOT FULL	22.2	**
2+73.00	4+16.00	29.3	27" "	0.0087	7.4	
4+16.00	4+26.74	18.3	27" "	0.0035	4.6	
LINE	B-1	3.8	18" R.C.P.	0.0010	1.9	
LINE	B-2	15.0	24" "	0.0044	4.8	
LINE	B-3	11.0	18" "	0.0110	6.2	
			LINE "C"			
[illegible]	11+78.00	340.6	42" R.C.P.	NOT FULL	40.0	**
[illegible]	[illegible]	318.8	42" "	NOT FULL	40.0	**
[illegible]	4+77.21	334.5	51" "	0.0373	23.6	*
4+77.21	5+30.00	305.2	51" "	0.0326	21.5	*
5+30.00	5+50.00	301.7	51" "	0.0319	21.3	*
5+50.00	7+34.64	299.9	51" "	0.0316	21.1	*
7+34.64	11+25.96	299.9	(42" ")	(0.0888)	(31.2)	EXISTING
LINE	C-1	19.1	18" R.C.P.	0.0331	10.8	

* THIS PIPE REACH IS TO BE MANUFACTURED WITH ½ INCH ADDITIONAL CONCRETE THICKNESS OVER THE INVERT STEEL.

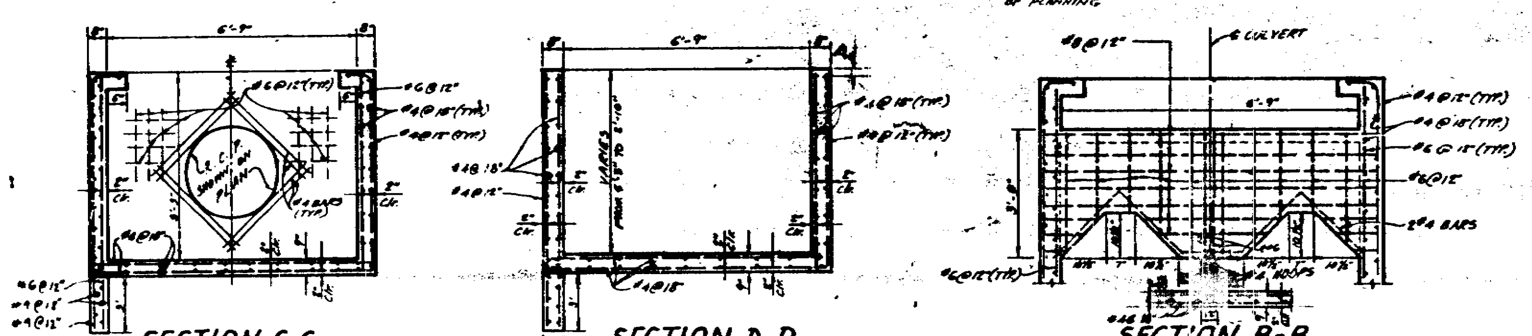
** THIS PIPE REACH IS TO BE MANUFACTURED WITH 1 INCH ADDITIONAL CONCRETE THICKNESS OVER THE INVERT STEEL.



PLAN
NO SCALE



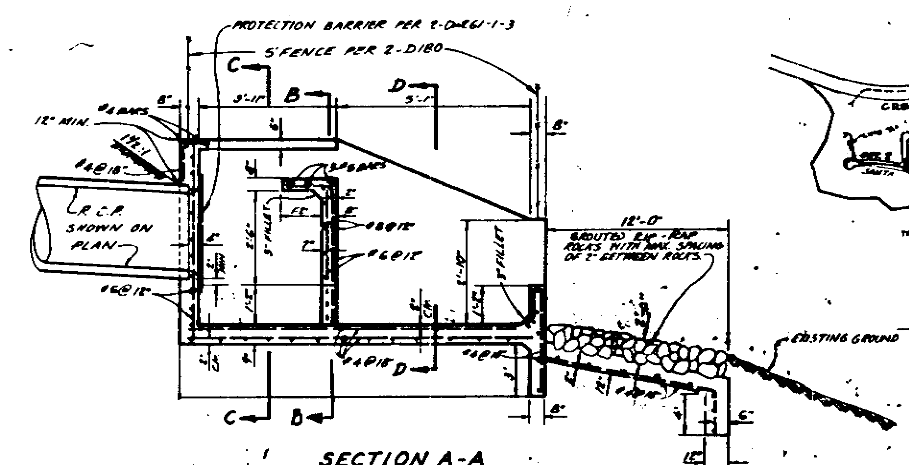
SECTION E-E
NO SCALE



SECTION C-C
NO SCALE

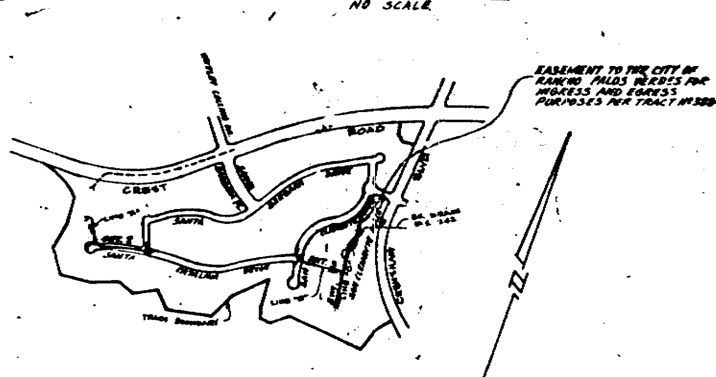
SECTION D-D
NO SCALE

SECTION B-B
NO SCALE



SECTION A-A

OUTLET STRUCTURE FOR LINE A
NO SCALE



KEY MAP
SCALE 1" = 600'

BENCH MARK: BY 4402
C.S. MON. IN 12 IN. CONC. POST 4 IN ABOVE GROUND AT N.E. COR. CREST RD. & CRENSHAW BLVD. 9.3 FT. E. & 40 FT. N. & INT. MKD. (O.M. 50-7 1956 R.E. 5869)

PALOS VERDES 1970 ELEV. 1201.355

STORM DRAIN PLANS IN TRACT No. 38848 P.D. No. 1703

GENERAL NOTES

[illegible]

GENERAL NOTES (Cont'd)

23. A SOILS ENGINEER SHALL CERTIFY THAT ALL FILLS AND BACKFILLS OVER UNDERGROUND STORM DRAINS OUTSIDE OF ST. R/W HAVE BEEN COMPACTED OR CONSOLIDATED TO A 90% DENSITY. THIS CERTIFICATION SHALL BE SUBMITTED TO THE CITY ENGINEER PRIOR TO ACCEPTANCE OF THE WORK BY THE CITY.
24. THE CONTRACTOR'S ATTENTION IS DIRECTED TO SECTION 7-10.4.1 OF THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION IN REGARD TO SAFETY ORDERS.
25. THE CONTRACTOR SHALL CONFORM TO THE "MINIMUM PUBLIC SAFETY REQUIREMENTS" AS SHOWN ON LOS ANGELES COUNTY ENGINEER STANDARD S-2.
26. ALL PIPE SHALL BE PLACED IN A TRENCH IN NATURAL GROUND AND/OR COMPACTED FILL. THE GROUND LEVEL BEFORE THE TRENCHING SHALL BE AT LEAST 3 FEET ABOVE TOP OF PIPE ELEVATION, OR AT FINISH SURFACE ELEVATION, WHICHEVER IS LESS. ALL BACKFILL IN EASEMENTS SHALL BE COMPACTED TO THE DENSITY REQUIRED BY THE GRADING PLAN.
27. THE INSPECTOR MAY HAVE THE OPTION TO REQUIRE CONCRETE BACKFILL DURING CONSTRUCTION WHEN THE PIPE HAS LESS THAN ONE FOOT OF COVER AND IS SUBJECTED TO HEAVY EQUIPMENT TRAFFIC. THE CONCRETE BACKFILL SHALL CONSIST OF 1.5 SACK CEMENT CONCRETE POURED FROM WALL TO WALL OF TRENCH AND FROM BOTTOM OF TRENCH TO A MINIMUM DEPTH OF 4 INCHES OVER TOP OF PIPE.
28. A PERMIT SHALL BE OBTAINED FROM THE LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PRIOR TO COMMENCING ANY CONSTRUCTION WORK. CONTACT THE DISTRICT BY TELEPHONE AT 226-4163 TO OBTAIN AN INSPECTION AND CONSTRUCTION PERMIT AND TO MAKE A DEPOSIT FOR CONSTRUCTION INSPECTION BY THE DISTRICT. THE CONTRACTOR SHALL ALSO NOTIFY THE DISTRICT'S CONTRACT ADMINISTRATION DIVISION AT 226-4206 AT LEAST 24 HOURS BEFORE BEGINNING WORK.
29. ALL MANHOLE COVERS NOT IN STREET AREAS SHALL BE PROVIDED WITH ALLEN SOCKET SET SCREW LOCKING DEVICES. THE CONTRACTOR SHALL DRILL AND TAP TWO HOLES TO A DEPTH OF ONE INCH AT 90 DEGREES TO AXLE HOLE AND INSTALL ¾ INCH BY 3/4 ALLEN SOCKET SET SCREWS.
30. THE CONTRACTOR SHALL PROVIDE FOR CONTRIBUTORY DRAINAGE AT ALL TIMES UNTIL THIS STORM DRAIN SYSTEM IS OPERABLE.
31. ALL DEFICIENCIES IN THE EXISTING DRAIN LINE "C" BETWEEN STATIONS 7+34.64 AND 9+25.96 SHALL BE CORRECTED TO THE SATISFACTION OF THE COUNTY ENGINEER AND THE FLOOD CONTROL DISTRICT INSPECTORS.
32. ALL MAN-MADE DRAINAGE STRUCTURES SHALL BE CONSTRUCTED OF EARTH TONE COLORS (BROWN, BEIGE, OR SIMILAR), AS APPROVED BY THE DIRECTOR OF PLANNING.

RIPRAP NOTES

[illegible]

PRIVATE ENGINEERS NOTICE TO CONTRACTORS

[illegible]

REGISTERED CIVIL ENGINEER No. 15167 — DATE

NO.	REVISION	REVISED BY	APPROVED BY	DATE

REVIEWED BY THE LOS ANGELES COUNTY ROAD DEPT.
BY: DATE: 5-19-82

PREPARED BY:
LANCO ENGINEERING
TORRANCE, CALIFORNIA
SIGNATURE: R.C.E. NO. 15167

CITY OF RANCHO PALOS VERDES, CALIFORNIA
STEPHEN J. KOONCE — CITY ENGINEER
ENVIRONMENTAL DEVELOPMENT DIVISION
APPROVED BY: DIVISION ENGINEER DATE: 6-18-82
CHECKED BY: OFFICE OF CITY ENGINEER R.C.E. NO. 16507 DATE: 6-1

SHT 1 OF 4 SHTS

357-F8.1-4

357-F8.1-4

PF516050

California Regional Water Quality Control Board

Los Angeles Region

Recipient of the 2001 *Environmental Leadership Award* from Keep California Beautiful

Linda S. Adams
Agency Secretary

320 W. 4th Street, Suite 200, Los Angeles, California 90013
Phone (213) 576-6600 FAX (213) 576-6640 - Internet Address: http://www.waterboards.ca.gov/losangeles

Arnold Schwarzenegger
Governor

December 15, 2006

Mark Pestrella, Assistant Deputy Director
Department of Public Works
County of Los Angeles
700 South Fremont Ave.
Alhambra, CA 91803

Directors, Department of Public Works and
Directors, Department of Planning
Municipal Permittees within County of Los Angeles

CLARIFICATION TO PART 4.D. DEVELOPMENT PLANNING PROGRAM, THE LOS ANGELES COUNTY MUNICIPAL STORM WATER PERMIT, ORDER No. 01-182, NPDES PERMIT No. CAS004001

Dear Mr. Pestrella and Municipal Directors:

Thank you for requesting clarification on the Development Planning requirements of the Los Angeles County Municipal Storm Water Permit (L.A. County MS4 Permit).

This letter restates the compliance expectation of the California Regional Water Quality Control Board, Los Angeles Region (L.A. Water Board), when it adopted the requirements in 'Part 4 §D, Development Planning' of the L.A. County MS4 Permit. Part 4.D contains specific provisions that are fully enforceable, and which were also contained in the Development Planning Model Program submitted by the L.A. County Permitees, and which was approved in 2000.

Our evaluation of the implementation of the Development Planning and Standard Urban Stormwater Mitigation Plan (SUSMP) requirements on land development projects in Los Angeles County has revealed that many Permittees' planning and public works departments and their associated staff, including architects, planners and engineers have failed to integrate SUSMP implementation adequately with other storm water quality management strategies required in the L.A. County MS4 permit. The L.A. Water Board has identified several instances of inadequate or uncoordinated implementation by Permitttes for 'Part 4.D Development Planning'.

U.S. EPA Guidance

In areas undergoing new development or redevelopment, the most effective method of controlling impacts from storm water discharges is to limit the amount of rainfall that is converted to runoff. By utilizing design techniques that incorporate on-site storage and infiltration, and minimizing the amount of directly connected impervious surfaces, the amount of runoff generated from the site can be significantly reduced (*Preliminary Data Summary of Urban Storm Water Best Management Practices*, EPA 821-R-99-012, August 1999).

The three provisions in Part 4.D are consistent with guidance in Chapter 5 of *Preliminary Data Summary of Urban Storm Water Best Management Practices*. The U.S. EPA guidance states that in order to meet the goals of post-development peak discharge rate, volume and pollutant loading to receiving waters being the same as pre-development values, BMPs should be implemented to achieve three main objectives: flow control, pollutant removal and pollutant source reduction.

California BMP Manual

Similarly, Section 2.4 of the California Stormwater Quality Association (CASQA) BMP Handbook for Development and Redevelopment (2003), in its discussion on planning and design principles, reiterates the provisions in Part 4.D. These principles promote three basic strategies in the following order of preference based on effectiveness and costs: (1) reduce or eliminate post-project runoff; (2) control sources of pollutants; and (3) treat contaminated storm water runoff before discharging it to natural water bodies.

Groundwater Quality Protection Concern

Some Permittees have expressed a concern that infiltration of storm water may present risks to groundwater aquifers. Generally, the common pollutants in storm water are filtered or adsorbed by soil, and unlike hydrophobic solvents and salts, do not cause groundwater contamination. In any case, infiltration of 1-2 inches of rainfall in semi-arid areas like Southern California where there is a high rate of evapo-transpiration, presents minimal risks.

The Water Augmentation Study conducted by the Los Angeles and San Gabriel Rivers Watershed Council, in partnership with several agencies including water districts, municipalities, and the U.S. Bureau of Reclamation, indicates that the infiltration of storm water, with appropriate pretreatment, does not adversely impact groundwater quality (*Los Angeles Basin Water Augmentation Study, August 2005*). You may view the study at www.lasgrwc.org/WAS.htm

Infiltration of storm water discharges from heavy industrial areas is seldom appropriate. Where there is a real concern on the risk of groundwater contamination from preexisting soil contamination or heavy vehicular traffic when installing infiltration systems such as extended detention basins, the L.A. Water Board and the California Department of Transportation (Caltrans) developed guidance to ensure an adequate analysis for proper siting. See, *Infiltration Basin -Site Selection Study, Volumes I, II, and III* June 2003, CTSW-RT-03-025**,** http://www.dot.ca.gov/hq/env/stormwater/special/newsetup/index.htm

Caltrans research indicates that infiltration basins and biofiltration BMPs are technically feasible if site site-specific considerations are taken into account (Caltrans CTSW-RT-01-050, *BMP Retrofit Pilot Program, January 2004*).

Background of MS4 Development Planning Requirements

Standard Urban Storm Water Mitigation Plan

On March 8, 2000, the L.A. Water Board adopted the SUSMP, and required that municipalities incorporate into the planning and design phases post-construction storm water mitigation controls for specified development and redevelopment projects. Although the SUSMP action was petitioned by some municipalities to the State Water Resources Control Board (State Water Board), the State Water Board directed in Water Quality Order 2000-11 that, *"the Permittees shall amend codes, if necessary, not later than **January 15, 2001**, to give legal effect to the SUSMP requirements. The SUSMP requirements shall take effect not later than **February 15, 2001**."*

On November 7, 2003, the L.A. Water Board transmitted the Development Planning Program Review Report after auditing four Permittee Programs (the Planning Review Report). The Planning Review Report presented and described discernible permit violations, deficiencies, and notable elements observed during the audit. Notably, the MS4 Development Planning program contained in Board Order No. 01-182 is built upon programs already established in previous Board Orders (90-079 and 96-054), after undergoing a very long process of public hearings and meetings before permit adoption.

Nearly six years later after the SUSMP was adopted, most Permittees' implementation of SUSMPs is deficient, because Permittees have not focused nor emphasized water quality pollution mitigation to protect the beneficial uses of receiving waters.

Consequently, the L.A. Water Board provides the following clarification consistent with the L.A. Water Board's mission of protecting water quality and preserving water resources:

A. Essential Post Construction Control Requirements

1. The three provisions in Part 4.D are the essential requirements for compliance with the Development Planning requirements of the L.A. County MS4 Permit. The three provisions are to: (1) maximize the percentage of pervious surfaces to allow percolation of storm water into the ground; (2) minimize the quantity of storm water directed to impervious surfaces and the MS4; and (3) minimize pollution emanating from parking lots through the use of appropriate treatment control BMPs and good housekeeping practices.

The basic site design planning considerations for post-construction storm water BMP implementation are to:

a. Preserve the natural drainage system, protect slopes and provide controls for stream protection. These controls are achieved through the basic control measures that include infiltration, retention/detention, bioretention and biofilters;

b. Integrate fully the opportunities to maximize the percentage of pervious surfaces and minimize the volume of storm water runoff;

c. Utilize a BMP treatment-train that (i) captures and infiltrates using infiltration basins, infiltration trenches, retention and/or detention BMPs; and/or (ii) provide flow through treatment in the order of preference for the prescribed storm water quality runoff volume **(Q_{wv})** based on the numerical mitigation criteria in Part 4.D;

d. Identify the combination of BMP treatment trains that are to be sized, designed and constructed based on **Q_{wv}** required for water quality. Using **Q_P** from 10, 20, or 50-year return-period for flood management is inappropriate for water quality purposes and not cost effective. Capturing and treating a larger percentage of the annual storm water runoff volume greater than **Q_{wv}** provides only a small increase in additional removal of pollutants and considerably increases the sizing and cost of the structural and treatment storm water controls; and

e. Establish in addition, for downstream channel protection, instead of **Q_P** a flow control criteria (Q_{HMC}) which takes into consideration flow volume, duration, and frequency to maintain the predevelopment distribution of in-stream flows above the critical flow for streambed erosion, thus preserving the pre-development capacity to transport sediment, while not accelerating down stream erosion. An appropriate hydromodification flow duration control criteria might be to set the Q_{HMC} such that the post-construction discharge rates and duration match the ranges from 10 percent of the pre-development 2-year 24 hour peak flow up to the pre-development 10 year 24 hour peak flow, unless an alternative criterion can be demonstrated as equally protective using hydrodynamic modeling.

2. Measures and Approaches for Minimizing Impervious Surface Area

a. Permittees must minimize the percentage of impervious surfaces to support the percolation and infiltration of storm water into the ground and/or minimize pollutants emanating from impervious surfaces by reducing the percentage of effective impervious area to a generally accepted standard of 5 percent or less of total project area.

The U.S. EPA storm water technology fact sheet for bioretention recommends that sizing criterion should be 5 to 7 percent of the drainage area multiplied by the rational method runoff coefficient “C” determined for the site (*Storm Water Technology Fact Sheet, Bioretention*, U.S. EPA Document No. EPA 832-F-99-012, September 1999). However, a lower sizing criterion may be more appropriate for

Southern California. A recent study determined that physical degradation of stream channels in semi-arid climates such as in Southern California may be detectable with watershed impervious cover between 3 and 5 percent (*Effects of Increases in Peak Flows and Imperviousness on the Morphology of Southern California Stream,* SCCWRP, April 2005).

b. Permittees must also control pollution emanating from impervious surfaces such as roof-tops, parking lots, and roadways through the use of appropriate source controls such as the use of low impact development (LID) and integrated water resources management strategies that:

1. Emphasize conservation and the use of on-site natural features;
2. Integrate engineered small-scale hydrologic controls to more closely reflect pre-development hydrologic functions. Small-scale hydrologic controls are BMPs that create green infrastructure and spaces such as park-like open space, rainwater collection barrels, planter boxes, and garden-like areas that promote community awareness and improve storm water quality; and
3. Implement primarily a source control and minimize the need for large sub-regional and regional treatment control BMPs.

B. <u>Plan Preparation/ Review Procedures and Guidelines</u>

1. Permittees must possess clear and adequate legal authority in municipal storm water ordinances to address post-construction requirements in the L.A. County MS4 Permit. The legal authority must direct land developers to review and mitigate the adverse storm water quality impacts in the Environmental Impact Report (EIR), and to ensure that adequate post-construction control measures are incorporated during the development project's site planning and design phases. In addition, clear instructions should be provided on how to illustrate on plans the BMPs selected, adequate sizing, and BMP siting;

2. The selection of the treatment train of BMPs must be conducted through a methodical selection process that matches the type of BMP with the type and nature of pollutants that are expected to be generated from the site. For example, vortex separation devices installed in high commerce areas for removing trash and gross solids are not suitable for removing pollutants in dissolved state or smaller size/lighter weight fractions from vehicular traffic areas;

3. Permittees should also prescribe guidelines for the submittal of standard final SUSMP plans so that relevant storm water BMP locations and specifications in design sheets are clearly identified. Separate SUSMP detail plan sheets will facilitate technical review.

   Delineation of drainage area and/or sub-areas, natural drainage systems, storm drains, and other relevant parameters at pre-development and post-development water flow paths, outfall (drainage) locations, BMP detail plans, and other relevant information should be presented. Simply inserting post-development plans within the grading plans, storm drain plans, or civil plans with unrelated detail drawings, numbers, and construction notes makes it difficult to review and evaluate. Small-scale controls may be combined with the landscaping plans;

4. Plan view and sectional plans for small-scale hydrologic controls for a lot size and sub-drainage area of the sites should be prescribed; and

5. BMP design specifications must be incorporated in the SUSMP report together with hydrologic calculations for sizing BMPs. This report should support and show how criteria were adequately utilized in sizing BMPs (e.g., infiltration, retention/detention BMPs, bioretention facilities, etc.);

If you have any questions, please call Dr. Xavier Swamikannu at (213) 620-2094 or Carlos D. Santos at (213) 620-2093.

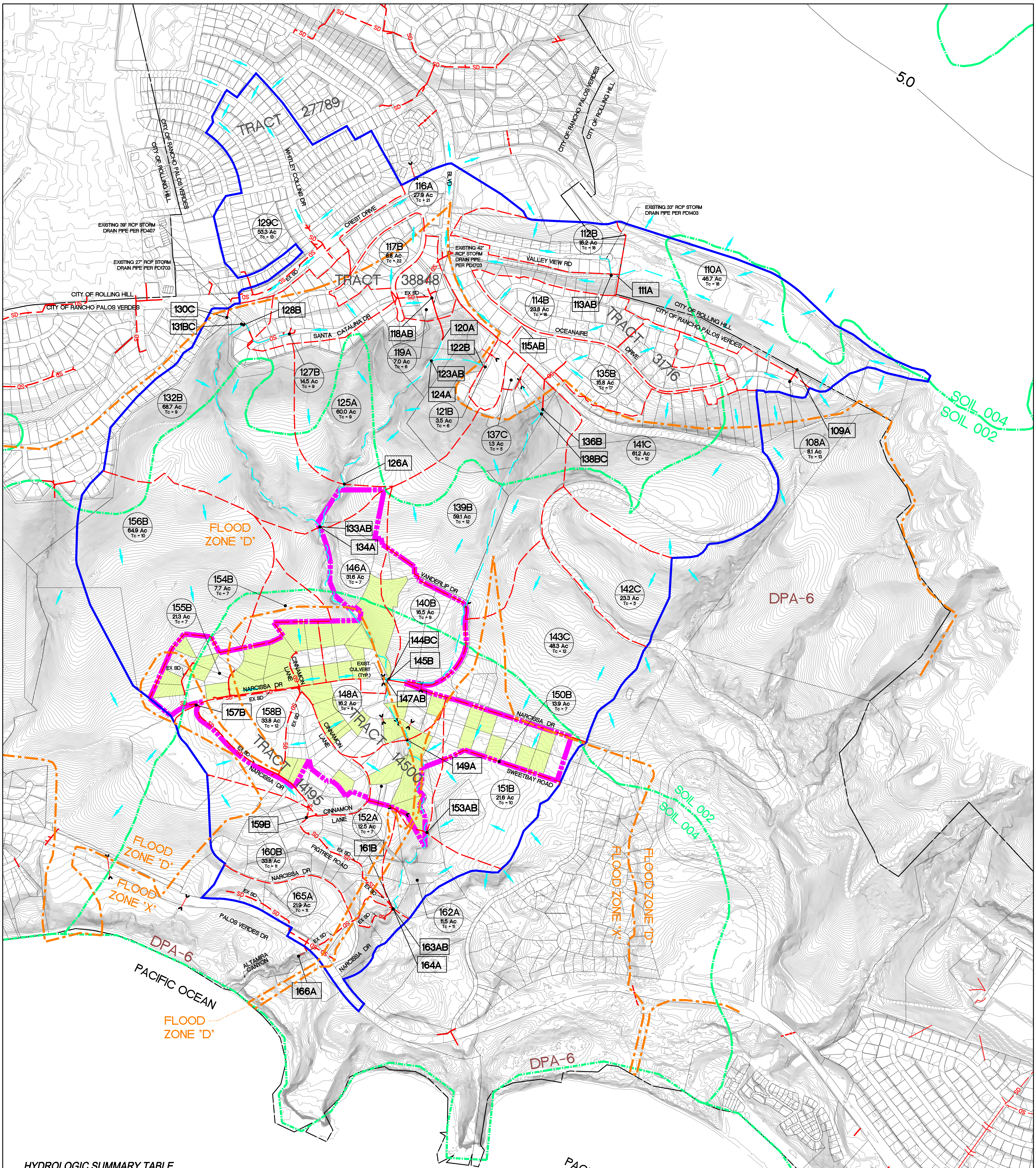
Sincerely,

Original Signed

Jonathan Bishop, P.E.
Executive Officer

cc: Michael Levy, Office of the Chief Counsel, State Water Board
Darrin Polhemus, Division of Water Quality, State Water Board
Bruce Fujimoto, Division of Water Quality, State Water Board

Conceptual Drainage and
SUSMP (Water Quality) Map



HYDROLOGIC SUMMARY TABLE

SUB AREA	NODE	AREA (Ac)	Sub-total Area (Ac)	% IMPERVIOUSNESS (Existing Condition)	% IMPERVIOUSNESS (Proposed Condition)	SOIL TYPE	ISOHYET	50-YR TC (min)	QB (cfs) (Pre-development)	Capital (cfs) (Pre-development)	QB (cfs) (Post-development)	Capital (cfs) (Post-development)	DEBRIS (CY)
108A		8.1		21	21	002	4.9	13		18.9		18.9	
	109A												
110A		46.7		2	2	002	4.9	18		91.3		91.3	
	111A												
112B		16.2		21	21	004	4.9	18		28.1		28.1	
	113AB												
114B		23.8		42	42	004	4.9	18		43.6		43.6	
	115AB												
116A		27.9		21	21	004	4.9	21		44.2		44.2	
117B		8.8		42	42	004	4.9	22		14.1		14.1	
	118AB												
119A		7.0		21	21	004	4.9	6		21.2		21.2	
	120A												
121B		3.5		21	21	004	4.9	6		10.6		10.6	
	122B												
	123AB		**142.0**							**170.0**		**170.0**	
	124A												
125A		60.0		1	1	004	4.9	9	156.8	252.4	156.8	252.4	4500.0
	126A												
127B		14.5		42	42	004	4.9	9		37.0		37.0	
	128B												
129C		53.3		42	42	004	4.9	13		112.4		112.4	
	130C												
	131BC		**67.8**							**147.5**		**147.5**	
132B		68.7		1	1	002	4.9	9	200.0	321.9	200.0	321.9	5152.5
	133AB		**338.5**						**598.8**	**737.7**	**598.8**	**737.7**	
	134A												
135B		15.8		42	42	004	4.9	17		29.0		29.0	
	136B												
137C		1.3		21	21	004	4.9	5		4.4		4.4	
	138BC		**17.1**							**32.7**		**32.7**	
139B		59.1		2	2	004	4.9	12	132.8	213.8	132.8	213.8	4432.5
140B		16.5		38	40	002	4.9	9					
141C		61.2		1	1	002	4.9	12	154.4	248.6	154.4	248.6	4590.0
142C		23.3		1	1	002	4.9	5	91.6	147.4	91.6	147.4	1747.5
143C		48.3		5	5	002	4.9	12	121.8	196.1	121.8	196.1	3622.5
	144BC		**225.5**						**499.2**	**723.9**	**499.2**	**723.9**	
	145B												
146A		31.6		13	23	002	4.9	7					
	147AB		**595.6**						**1076.0**	**1464.0**	**1076.3**	**1464.4**	
148A		16.2		22	40	004	4.9	8					
	149A												
150B		13.9		26	40	004	4.9	7					
151B		21.6		2	2	005	4.9	10	53.9	84.5	53.9	84.5	1587.6
152A		12.5		18	40	004	4.9	7					
	153AB		**659.8**						**1102.7**	**1483.7**	**1165.7**	**1568.4**	
154B		7.7		2	2	004	4.9	7	22.8	36.7	51.9	47.9	566.0
155B		21.3		13	40	005	4.9	7					
156B		64.9		2	2	002	4.9	10	180.6	283.2	180.6	283.2	4770.2
	157B												
158B		33.8		16	20	004	4.9	12					
	159B												
160B		33.8		36	36	004	4.9	11					
	161B												
162A		11.5		2	2	004	4.9	11	27.1	43.7	27.1	43.7	862.5
	163AB		932.8						1541.5	**2025.2**	1585.9	**2083.5**	
	164A												
165A		21.9		42	42	004	4.9	11					
	166A		854.6						1577.2	**2092.5**	1586.3	**2128.4**	

LEGEND:

150B / 35.5 Ac / Tc = 16 — SUBAREA NODE / ACREAGE / TIME OF CONCENTRATION

153A — CONFLUENCE NODE

VACANT OR DEVELOPED WITH STRUCTURES OTHER THAN RESIDENCES, POTENTIALLY DEVELOPMENT UNDER PROPOSED ORDINANCE REVISIONS

DPA-6 — DEBRIS POTENTIAL AREA (DPA)

SOIL 004 / SOIL 002 — SOIL CLASSIFICATION BOUNDARY

FLOOD ZONE AREA

5.0 — ISOHYET

CITY BOUNDARY

PROJECT BOUNDARY

WATERSHED BOUNDARY

FLOW PATH

EXISTING CULVERT

SD — SD — EXISTING STORM DRAIN

SUBAREA BOUNDARY

MAIN CHANNEL

DRAINAGE DESIGN CRITERIA:

1. 50-YR, 24-HR ISOHYET: 4.9
2. SOIL TYPES: 2 & 4
3. DESIGN STORMS: 50-YR, 24-HR
4. PERCENT IMPERVIOUS VALUES:
   EXISTING RESIDENTIAL – 42%
   ONSITE UNDEVELOPED LOTS – 2%
   OFFSITE VACANT AREA – 1%
   PROPOSED RESIDENTIAL – 40%
5. DPA = 6, 48,000 CY PER SQ MI
6. BULK FACTOR = 1.61

300' 0 150' 300' 600' 1200'
1" ½" 0" 1" 2" 4"

REGISTERED PROFESSIONAL ENGINEER JASON H. FUKUMITSU No. 40695 Exp. 3-31-13 CIVIL STATE OF CALIFORNIA

PLANS PREPARED BY:
HUNSAKER & ASSOCIATES LOS ANGELES, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
26074 Avenue Hall, Ste 22 ▪ Valencia, CA 91355
PH: (661) 294-2211 ▪ FX: (661) 294-9890

PREPARED UNDER THE SUPERVISION OF:

JASON H. FUKUMITSU, DATE

CITY OF RANCHO PALOS VERDES

ZONE 2 LANDSLIDE MORATORIUM ORDINANCE REVISION EIR
CONCEPTUAL DRAINAGE AND SUSMP (WATER QUALITY) MAP

IN THE CITY OF RANCHO PALOS VERDES, COUNTY OF LOS ANGELES, STATE OF CALIFORNIA

DATE 03/09/2011
SCALE 1"=300'
PROJECT NO. 0159-001-001
SHEET 1 OF 1 SHEET

G:\Portuguese Bend EIR 0159-001-001\Storm\Hydrology\HPB02-01.dwg Plotted on Dec 01, 2011-10:20am by wailani

Appendix F

Noise Data/Worksheets

- Freq Weight : A
- Time Weight : FAST
- Level Range : 40-100
- Max dB : 86.2 - 2018/11/28 07:34:34
- Level Range : 40-100
- SEL : 97.7
- Leq : 70.0
-

No.s	Date Time	(dB)
1	2018/11/28 07:24:53	73.8
2	2018/11/28 07:24:54	74.3
3	2018/11/28 07:24:55	74.1
4	2018/11/28 07:24:56	71.8
5	2018/11/28 07:24:57	69.3
6	2018/11/28 07:24:58	70.9
7	2018/11/28 07:24:59	73.0
8	2018/11/28 07:25:00	68.1
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464	2018/11/28	07:32:36	70.4
465	2018/11/28	07:32:37	70.7
466	2018/11/28	07:32:38	74.0
467	2018/11/28	07:32:39	71.8
468	2018/11/28	07:32:40	72.4
469	2018/11/28	07:32:41	70.1
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474	2018/11/28	07:32:46	71.0
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477	2018/11/28	07:32:49	70.3
478	2018/11/28	07:32:50	74.7
479	2018/11/28	07:32:51	74.0
480	2018/11/28	07:32:52	73.3
481	2018/11/28	07:32:53	72.5

482	2018/11/28	07:32:54	69.8
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485	2018/11/28	07:32:57	65.6
486	2018/11/28	07:32:58	67.4
487	2018/11/28	07:32:59	70.0
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489	2018/11/28	07:33:01	78.0
490	2018/11/28	07:33:02	72.7
491	2018/11/28	07:33:03	71.8
492	2018/11/28	07:33:04	75.5
493	2018/11/28	07:33:05	71.7
494	2018/11/28	07:33:06	71.6
495	2018/11/28	07:33:07	74.6
496	2018/11/28	07:33:08	72.8
497	2018/11/28	07:33:09	75.0
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564	2018/11/28	07:34:16	56.6
565	2018/11/28	07:34:17	57.1
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575	2018/11/28	07:34:27	71.8
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578	2018/11/28	07:34:30	63.8
579	2018/11/28	07:34:31	67.8
580	2018/11/28	07:34:32	72.3

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583	2018/11/28 07:34:35	79.6
584	2018/11/28 07:34:36	73.2
585	2018/11/28 07:34:37	73.4
586	2018/11/28 07:34:38	70.8
587	2018/11/28 07:34:39	72.2
588	2018/11/28 07:34:40	72.9
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598	2018/11/28 07:34:50	71.5
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600	2018/11/28 07:34:52	71.4

- Freq Weight : A
- Time Weight : FAST
- Level Range : 40-100
- Max dB : 83.5 - 2018/11/28 07:53:17
- Level Range : 40-100
- SEL : 96.1
- Leq : 68.4
-

No.s	Date Time	(dB)
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2	2018/11/28 07:44:58	70.4
3	2018/11/28 07:44:59	69.5
4	2018/11/28 07:45:00	67.7
5	2018/11/28 07:45:01	66.9
6	2018/11/28 07:45:02	67.0
7	2018/11/28 07:45:03	67.8
8	2018/11/28 07:45:04	68.0
9	2018/11/28 07:45:05	67.4
10	2018/11/28 07:45:06	65.0
11	2018/11/28 07:45:07	67.2
12	2018/11/28 07:45:08	66.8
13	2018/11/28 07:45:09	67.4
14	2018/11/28 07:45:10	65.2
15	2018/11/28 07:45:11	62.0
16	2018/11/28 07:45:12	56.9
17	2018/11/28 07:45:13	55.1
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24	2018/11/28 07:45:20	74.9
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40	2018/11/28 07:45:36	63.7
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42	2018/11/28 07:45:38	58.2
43	2018/11/28 07:45:39	59.7
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45	2018/11/28 07:45:41	70.2
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271	2018/11/28	07:49:27	68.8
272	2018/11/28	07:49:28	66.4
273	2018/11/28	07:49:29	64.9
274	2018/11/28	07:49:30	68.0
275	2018/11/28	07:49:31	70.1
276	2018/11/28	07:49:32	73.0
277	2018/11/28	07:49:33	76.9
278	2018/11/28	07:49:34	75.1
279	2018/11/28	07:49:35	72.2
280	2018/11/28	07:49:36	72.5
281	2018/11/28	07:49:37	71.7
282	2018/11/28	07:49:38	71.7
283	2018/11/28	07:49:39	73.0

284	2018/11/28 07:49:40	71.9
285	2018/11/28 07:49:41	70.1
286	2018/11/28 07:49:42	69.8
287	2018/11/28 07:49:43	68.6
288	2018/11/28 07:49:44	68.4
289	2018/11/28 07:49:45	68.6
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291	2018/11/28 07:49:47	71.1
292	2018/11/28 07:49:48	66.8
293	2018/11/28 07:49:49	67.5
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295	2018/11/28 07:49:51	70.0
296	2018/11/28 07:49:52	66.0
297	2018/11/28 07:49:53	65.4
298	2018/11/28 07:49:54	64.7
299	2018/11/28 07:49:55	63.3
300	2018/11/28 07:49:56	60.8
301	2018/11/28 07:49:57	58.7
302	2018/11/28 07:49:58	53.7
303	2018/11/28 07:49:59	51.0
304	2018/11/28 07:50:00	47.7
305	2018/11/28 07:50:01	46.6
306	2018/11/28 07:50:02	45.6
307	2018/11/28 07:50:03	44.8
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309	2018/11/28 07:50:05	46.6
310	2018/11/28 07:50:06	49.5
311	2018/11/28 07:50:07	54.3
312	2018/11/28 07:50:08	60.8
313	2018/11/28 07:50:09	67.4
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315	2018/11/28 07:50:11	70.0
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326	2018/11/28 07:50:22	68.3
327	2018/11/28 07:50:23	71.7
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334	2018/11/28 07:50:30	46.6
335	2018/11/28 07:50:31	44.7
336	2018/11/28 07:50:32	45.5
337	2018/11/28 07:50:33	45.7
338	2018/11/28 07:50:34	44.3
339	2018/11/28 07:50:35	43.1
340	2018/11/28 07:50:36	42.3
341	2018/11/28 07:50:37	42.0
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343	2018/11/28 07:50:39	41.4
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364	2018/11/28 07:51:00	68.3
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366	2018/11/28 07:51:02	64.2
367	2018/11/28 07:51:03	62.0
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392	2018/11/28 07:51:28	51.9
393	2018/11/28 07:51:29	53.1
394	2018/11/28 07:51:30	56.1
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396	2018/11/28 07:51:32	65.4
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398	2018/11/28 07:51:34	74.5
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404	2018/11/28 07:51:40	58.6
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416	2018/11/28 07:51:52	42.5
417	2018/11/28 07:51:53	43.1
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422	2018/11/28 07:51:58	48.3
423	2018/11/28 07:51:59	52.2
424	2018/11/28 07:52:00	58.0
425	2018/11/28 07:52:01	62.2
426	2018/11/28 07:52:02	66.2
427	2018/11/28 07:52:03	73.9
428	2018/11/28 07:52:04	75.5
429	2018/11/28 07:52:05	69.8
430	2018/11/28 07:52:06	69.6
431	2018/11/28 07:52:07	69.7
432	2018/11/28 07:52:08	70.6
433	2018/11/28 07:52:09	73.5
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435	2018/11/28 07:52:11	71.8
436	2018/11/28 07:52:12	72.0
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438	2018/11/28 07:52:14	67.4
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441	2018/11/28 07:52:17	70.2
442	2018/11/28 07:52:18	74.6
443	2018/11/28 07:52:19	75.9
444	2018/11/28 07:52:20	73.0
445	2018/11/28 07:52:21	75.0
446	2018/11/28 07:52:22	73.1
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455	2018/11/28 07:52:31	74.9
456	2018/11/28 07:52:32	75.1
457	2018/11/28 07:52:33	72.1
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460	2018/11/28 07:52:36	60.6
461	2018/11/28 07:52:37	59.6
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463	2018/11/28 07:52:39	60.8
464	2018/11/28 07:52:40	64.1
465	2018/11/28 07:52:41	62.8
466	2018/11/28 07:52:42	62.8
467	2018/11/28 07:52:43	64.8
468	2018/11/28 07:52:44	69.8
469	2018/11/28 07:52:45	72.3
470	2018/11/28 07:52:46	72.4
471	2018/11/28 07:52:47	66.3
472	2018/11/28 07:52:48	70.1
473	2018/11/28 07:52:49	69.4
474	2018/11/28 07:52:50	68.4
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479	2018/11/28 07:52:55	68.0
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483	2018/11/28	07:52:59	69.7
484	2018/11/28	07:53:00	72.7
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486	2018/11/28	07:53:02	69.3
487	2018/11/28	07:53:03	66.4
488	2018/11/28	07:53:04	65.3
489	2018/11/28	07:53:05	60.9
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491	2018/11/28	07:53:07	56.5
492	2018/11/28	07:53:08	60.0
493	2018/11/28	07:53:09	64.7
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495	2018/11/28	07:53:11	70.2
496	2018/11/28	07:53:12	65.5
497	2018/11/28	07:53:13	61.9
498	2018/11/28	07:53:14	64.4
499	2018/11/28	07:53:15	70.1
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501	2018/11/28	07:53:17	77.0
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504	2018/11/28	07:53:20	75.8
505	2018/11/28	07:53:21	73.9
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511	2018/11/28	07:53:27	74.7
512	2018/11/28	07:53:28	74.8
513	2018/11/28	07:53:29	74.3
514	2018/11/28	07:53:30	70.4
515	2018/11/28	07:53:31	69.7
516	2018/11/28	07:53:32	67.4
517	2018/11/28	07:53:33	61.7
518	2018/11/28	07:53:34	57.2
519	2018/11/28	07:53:35	57.3
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522	2018/11/28	07:53:38	65.1
523	2018/11/28	07:53:39	66.2
524	2018/11/28	07:53:40	64.6
525	2018/11/28	07:53:41	67.5
526	2018/11/28	07:53:42	65.5
527	2018/11/28	07:53:43	65.6
528	2018/11/28	07:53:44	66.5
529	2018/11/28	07:53:45	71.2
530	2018/11/28	07:53:46	71.4
531	2018/11/28	07:53:47	70.7
532	2018/11/28	07:53:48	67.6
533	2018/11/28	07:53:49	67.6
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536	2018/11/28	07:53:52	58.5
537	2018/11/28	07:53:53	54.4
538	2018/11/28	07:53:54	51.5
539	2018/11/28	07:53:55	52.1
540	2018/11/28	07:53:56	54.5
541	2018/11/28	07:53:57	56.4
542	2018/11/28	07:53:58	63.0
543	2018/11/28	07:53:59	65.0
544	2018/11/28	07:54:00	66.6
545	2018/11/28	07:54:01	66.0
546	2018/11/28	07:54:02	66.6
547	2018/11/28	07:54:03	67.8
548	2018/11/28	07:54:04	65.3
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551	2018/11/28	07:54:07	58.7
552	2018/11/28	07:54:08	61.4
553	2018/11/28	07:54:09	65.5
554	2018/11/28	07:54:10	63.2
555	2018/11/28	07:54:11	64.0
556	2018/11/28	07:54:12	62.5
557	2018/11/28	07:54:13	56.0
558	2018/11/28	07:54:14	53.2
559	2018/11/28	07:54:15	50.9
560	2018/11/28	07:54:16	51.4
561	2018/11/28	07:54:17	53.9
562	2018/11/28	07:54:18	57.1
563	2018/11/28	07:54:19	65.1
564	2018/11/28	07:54:20	67.4
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566	2018/11/28	07:54:22	62.7
567	2018/11/28	07:54:23	57.2
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569	2018/11/28	07:54:25	58.9
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571	2018/11/28	07:54:27	68.8
572	2018/11/28	07:54:28	70.5
573	2018/11/28	07:54:29	69.9
574	2018/11/28	07:54:30	67.3
575	2018/11/28	07:54:31	67.9
576	2018/11/28	07:54:32	70.0
577	2018/11/28	07:54:33	71.6
578	2018/11/28	07:54:34	71.7
579	2018/11/28	07:54:35	73.5
580	2018/11/28	07:54:36	73.0

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583	2018/11/28 07:54:39	68.8
584	2018/11/28 07:54:40	69.1
585	2018/11/28 07:54:41	67.1
586	2018/11/28 07:54:42	67.1
587	2018/11/28 07:54:43	68.2
588	2018/11/28 07:54:44	70.8
589	2018/11/28 07:54:45	71.3
590	2018/11/28 07:54:46	72.8
591	2018/11/28 07:54:47	72.8
592	2018/11/28 07:54:48	70.4
593	2018/11/28 07:54:49	67.0
594	2018/11/28 07:54:50	68.5
595	2018/11/28 07:54:51	72.1
596	2018/11/28 07:54:52	73.5
597	2018/11/28 07:54:53	71.5
598	2018/11/28 07:54:54	73.4
599	2018/11/28 07:54:55	70.8
600	2018/11/28 07:54:56	66.7

- Freq Weight : A
- Time Weight : FAST
- Level Range : 40-100
- Max dB : 74.3 - 2018/11/28 08:38:37
- Level Range : 40-100
- SEL : 81.7
- Leq : 54.0
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No.s	Date Time	(dB)
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3	2018/11/28 08:31:43	45.1
4	2018/11/28 08:31:44	49.0
5	2018/11/28 08:31:45	43.3
6	2018/11/28 08:31:46	46.5
7	2018/11/28 08:31:47	47.4
8	2018/11/28 08:31:48	50.4
9	2018/11/28 08:31:49	64.3
10	2018/11/28 08:31:50	49.5
11	2018/11/28 08:31:51	41.8
12	2018/11/28 08:31:52	43.1
13	2018/11/28 08:31:53	46.3
14	2018/11/28 08:31:54	42.8
15	2018/11/28 08:31:55	46.7
16	2018/11/28 08:31:56	42.9
17	2018/11/28 08:31:57	40.1
18	2018/11/28 08:31:58	46.2
19	2018/11/28 08:31:59	42.9
20	2018/11/28 08:32:00	49.1
21	2018/11/28 08:32:01	39.2
22	2018/11/28 08:32:02	42.0
23	2018/11/28 08:32:03	41.6
24	2018/11/28 08:32:04	42.4
25	2018/11/28 08:32:05	52.0
26	2018/11/28 08:32:06	48.0
27	2018/11/28 08:32:07	45.3
28	2018/11/28 08:32:08	43.8
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32	2018/11/28 08:32:12	40.9
33	2018/11/28 08:32:13	46.4
34	2018/11/28 08:32:14	46.7
35	2018/11/28 08:32:15	41.7
36	2018/11/28 08:32:16	48.9
37	2018/11/28 08:32:17	43.5
38	2018/11/28 08:32:18	43.7
39	2018/11/28 08:32:19	41.4
40	2018/11/28 08:32:20	40.7
41	2018/11/28 08:32:21	43.9
42	2018/11/28 08:32:22	45.3
43	2018/11/28 08:32:23	45.7
44	2018/11/28 08:32:24	41.5
45	2018/11/28 08:32:25	46.2
46	2018/11/28 08:32:26	48.5
47	2018/11/28 08:32:27	43.8
48	2018/11/28 08:32:28	47.3
49	2018/11/28 08:32:29	41.5
50	2018/11/28 08:32:30	40.1
51	2018/11/28 08:32:31	45.1
52	2018/11/28 08:32:32	42.3
53	2018/11/28 08:32:33	46.5
54	2018/11/28 08:32:34	43.1
55	2018/11/28 08:32:35	54.1
56	2018/11/28 08:32:36	54.1
57	2018/11/28 08:32:37	41.2
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69	2018/11/28 08:32:49	36.8
70	2018/11/28 08:32:50	36.8
71	2018/11/28 08:32:51	35.8
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74	2018/11/28 08:32:54	38.4
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76	2018/11/28 08:32:56	48.1
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79	2018/11/28 08:32:59	37.3
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81	2018/11/28 08:33:01	43.4
82	2018/11/28 08:33:02	40.5
83	2018/11/28 08:33:03	42.3
84	2018/11/28 08:33:04	38.8
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92	2018/11/28	08:33:12	47.0
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96	2018/11/28	08:33:16	41.4
97	2018/11/28	08:33:17	42.9
98	2018/11/28	08:33:18	40.1
99	2018/11/28	08:33:19	44.5
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101	2018/11/28	08:33:21	40.5
102	2018/11/28	08:33:22	48.9
103	2018/11/28	08:33:23	51.4
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105	2018/11/28	08:33:25	47.8
106	2018/11/28	08:33:26	41.9
107	2018/11/28	08:33:27	53.8
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547	2018/11/28 08:40:47	44.0
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549	2018/11/28 08:40:49	45.7
550	2018/11/28 08:40:50	45.6
551	2018/11/28 08:40:51	50.2
552	2018/11/28 08:40:52	47.2
553	2018/11/28 08:40:53	46.1
554	2018/11/28 08:40:54	42.6
555	2018/11/28 08:40:55	41.7
556	2018/11/28 08:40:56	47.4
557	2018/11/28 08:40:57	43.7
558	2018/11/28 08:40:58	46.1
559	2018/11/28 08:40:59	45.4
560	2018/11/28 08:41:00	52.5
561	2018/11/28 08:41:01	44.8
562	2018/11/28 08:41:02	44.9
563	2018/11/28 08:41:03	46.9
564	2018/11/28 08:41:04	48.6
565	2018/11/28 08:41:05	52.5
566	2018/11/28 08:41:06	45.3
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573	2018/11/28 08:41:13	47.0
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575	2018/11/28 08:41:15	44.4
576	2018/11/28 08:41:16	46.0
577	2018/11/28 08:41:17	49.0
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593	2018/11/28 08:41:33	43.1
594	2018/11/28 08:41:34	41.1
595	2018/11/28 08:41:35	45.6
596	2018/11/28 08:41:36	39.6
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598	2018/11/28 08:41:38	43.3
599	2018/11/28 08:41:39	43.4
600	2018/11/28 08:41:40	53.2

- Freq Weight : A
- Time Weight : FAST
- Level Range : 40-100
- Max dB : 61.7 - 2018/11/28 08:51:47
- Level Range : 40-100
- SEL : 75.6
- Leq : 47.9
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4	2018/11/28 08:48:01	56.4
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12	2018/11/28 08:48:09	52.3
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17	2018/11/28 08:48:14	52.3
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42	2018/11/28 08:48:39	41.4
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45	2018/11/28 08:48:42	42.5
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63	2018/11/28 08:49:00	43.7
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83	2018/11/28 08:49:20	41.8
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283	2018/11/28 08:52:40	47.2

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381	2018/11/28	08:54:18	50.6
382	2018/11/28	08:54:19	49.5

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401	2018/11/28 08:54:38	49.9
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552	2018/11/28 08:57:09	50.0
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554	2018/11/28 08:57:11	50.7
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560	2018/11/28 08:57:17	49.2
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563	2018/11/28 08:57:20	52.1
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565	2018/11/28 08:57:22	50.8
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- Time Weight : FAST
- Level Range : 40-100
- Max dB : 72.3 - 2018/11/28 09:11:38
- Level Range : 40-100
- SEL : 75.7
- Leq : 48.0
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229	2018/11/28 09:06:06	37.1
230	2018/11/28 09:06:07	40.2
231	2018/11/28 09:06:08	41.3
232	2018/11/28 09:06:09	44.2
233	2018/11/28 09:06:10	40.8
234	2018/11/28 09:06:11	41.4
235	2018/11/28 09:06:12	39.4
236	2018/11/28 09:06:13	42.6
237	2018/11/28 09:06:14	39.0
238	2018/11/28 09:06:15	41.0
239	2018/11/28 09:06:16	43.7
240	2018/11/28 09:06:17	40.0
241	2018/11/28 09:06:18	41.8
242	2018/11/28 09:06:19	43.0
243	2018/11/28 09:06:20	46.1
244	2018/11/28 09:06:21	41.4
245	2018/11/28 09:06:22	41.5
246	2018/11/28 09:06:23	37.9
247	2018/11/28 09:06:24	40.7
248	2018/11/28 09:06:25	46.4
249	2018/11/28 09:06:26	38.2
250	2018/11/28 09:06:27	40.4
251	2018/11/28 09:06:28	37.0
252	2018/11/28 09:06:29	48.7
253	2018/11/28 09:06:30	44.9
254	2018/11/28 09:06:31	46.2
255	2018/11/28 09:06:32	43.4
256	2018/11/28 09:06:33	38.9
257	2018/11/28 09:06:34	50.4
258	2018/11/28 09:06:35	49.9
259	2018/11/28 09:06:36	44.8
260	2018/11/28 09:06:37	39.8
261	2018/11/28 09:06:38	39.4
262	2018/11/28 09:06:39	38.9
263	2018/11/28 09:06:40	39.2
264	2018/11/28 09:06:41	37.1
265	2018/11/28 09:06:42	37.6
266	2018/11/28 09:06:43	47.0
267	2018/11/28 09:06:44	45.3
268	2018/11/28 09:06:45	37.3
269	2018/11/28 09:06:46	50.5
270	2018/11/28 09:06:47	39.0
271	2018/11/28 09:06:48	44.6
272	2018/11/28 09:06:49	46.2
273	2018/11/28 09:06:50	41.9
274	2018/11/28 09:06:51	39.0
275	2018/11/28 09:06:52	40.7
276	2018/11/28 09:06:53	39.6
277	2018/11/28 09:06:54	40.1
278	2018/11/28 09:06:55	38.3
279	2018/11/28 09:06:56	39.7
280	2018/11/28 09:06:57	39.3
281	2018/11/28 09:06:58	45.4
282	2018/11/28 09:06:59	40.2
283	2018/11/28 09:07:00	41.4

284	2018/11/28	09:07:01	41.0
285	2018/11/28	09:07:02	40.7
286	2018/11/28	09:07:03	40.0
287	2018/11/28	09:07:04	38.3
288	2018/11/28	09:07:05	37.4
289	2018/11/28	09:07:06	40.8
290	2018/11/28	09:07:07	40.6
291	2018/11/28	09:07:08	41.8
292	2018/11/28	09:07:09	44.3
293	2018/11/28	09:07:10	38.8
294	2018/11/28	09:07:11	37.8
295	2018/11/28	09:07:12	38.5
296	2018/11/28	09:07:13	39.6
297	2018/11/28	09:07:14	39.6
298	2018/11/28	09:07:15	39.5
299	2018/11/28	09:07:16	39.5
300	2018/11/28	09:07:17	39.8
301	2018/11/28	09:07:18	37.6
302	2018/11/28	09:07:19	37.5
303	2018/11/28	09:07:20	38.4
304	2018/11/28	09:07:21	37.4
305	2018/11/28	09:07:22	37.0
306	2018/11/28	09:07:23	37.9
307	2018/11/28	09:07:24	36.9
308	2018/11/28	09:07:25	37.4
309	2018/11/28	09:07:26	41.3
310	2018/11/28	09:07:27	38.3
311	2018/11/28	09:07:28	38.8
312	2018/11/28	09:07:29	37.1
313	2018/11/28	09:07:30	43.6
314	2018/11/28	09:07:31	45.2
315	2018/11/28	09:07:32	47.4
316	2018/11/28	09:07:33	46.2
317	2018/11/28	09:07:34	49.3
318	2018/11/28	09:07:35	45.3
319	2018/11/28	09:07:36	41.1
320	2018/11/28	09:07:37	48.9
321	2018/11/28	09:07:38	48.4
322	2018/11/28	09:07:39	45.0
323	2018/11/28	09:07:40	45.5
324	2018/11/28	09:07:41	47.1
325	2018/11/28	09:07:42	39.9
326	2018/11/28	09:07:43	41.5
327	2018/11/28	09:07:44	44.3
328	2018/11/28	09:07:45	48.1
329	2018/11/28	09:07:46	43.7
330	2018/11/28	09:07:47	41.4
331	2018/11/28	09:07:48	37.8
332	2018/11/28	09:07:49	39.3
333	2018/11/28	09:07:50	47.3
334	2018/11/28	09:07:51	48.9
335	2018/11/28	09:07:52	48.6
336	2018/11/28	09:07:53	48.0
337	2018/11/28	09:07:54	39.3
338	2018/11/28	09:07:55	38.6
339	2018/11/28	09:07:56	47.0
340	2018/11/28	09:07:57	51.5
341	2018/11/28	09:07:58	37.6
342	2018/11/28	09:07:59	40.6
343	2018/11/28	09:08:00	40.2
344	2018/11/28	09:08:01	47.6
345	2018/11/28	09:08:02	38.3
346	2018/11/28	09:08:03	37.0
347	2018/11/28	09:08:04	38.5
348	2018/11/28	09:08:05	44.4
349	2018/11/28	09:08:06	47.5
350	2018/11/28	09:08:07	46.8
351	2018/11/28	09:08:08	47.6
352	2018/11/28	09:08:09	39.1
353	2018/11/28	09:08:10	38.5
354	2018/11/28	09:08:11	42.2
355	2018/11/28	09:08:12	44.1
356	2018/11/28	09:08:13	49.5
357	2018/11/28	09:08:14	49.6
358	2018/11/28	09:08:15	46.5
359	2018/11/28	09:08:16	43.0
360	2018/11/28	09:08:17	36.1
361	2018/11/28	09:08:18	42.7
362	2018/11/28	09:08:19	37.1
363	2018/11/28	09:08:20	37.3
364	2018/11/28	09:08:21	44.2
365	2018/11/28	09:08:22	41.4
366	2018/11/28	09:08:23	48.2
367	2018/11/28	09:08:24	47.6
368	2018/11/28	09:08:25	49.5
369	2018/11/28	09:08:26	36.4
370	2018/11/28	09:08:27	43.0
371	2018/11/28	09:08:28	36.1
372	2018/11/28	09:08:29	37.5
373	2018/11/28	09:08:30	45.0
374	2018/11/28	09:08:31	46.6
375	2018/11/28	09:08:32	41.5
376	2018/11/28	09:08:33	45.7
377	2018/11/28	09:08:34	37.8
378	2018/11/28	09:08:35	37.5
379	2018/11/28	09:08:36	38.8
380	2018/11/28	09:08:37	41.2
381	2018/11/28	09:08:38	39.6
382	2018/11/28	09:08:39	45.9

383	2018/11/28 09:08:40	37.4
384	2018/11/28 09:08:41	49.4
385	2018/11/28 09:08:42	51.5
386	2018/11/28 09:08:43	47.0
387	2018/11/28 09:08:44	38.0
388	2018/11/28 09:08:45	53.4
389	2018/11/28 09:08:46	55.4
390	2018/11/28 09:08:47	53.8
391	2018/11/28 09:08:48	38.0
392	2018/11/28 09:08:49	38.9
393	2018/11/28 09:08:50	36.7
394	2018/11/28 09:08:51	39.9
395	2018/11/28 09:08:52	36.1
396	2018/11/28 09:08:53	35.9
397	2018/11/28 09:08:54	37.8
398	2018/11/28 09:08:55	41.6
399	2018/11/28 09:08:56	38.6
400	2018/11/28 09:08:57	39.6
401	2018/11/28 09:08:58	36.2
402	2018/11/28 09:08:59	46.5
403	2018/11/28 09:09:00	46.1
404	2018/11/28 09:09:01	47.2
405	2018/11/28 09:09:02	50.2
406	2018/11/28 09:09:03	46.6
407	2018/11/28 09:09:04	48.5
408	2018/11/28 09:09:05	37.5
409	2018/11/28 09:09:06	38.3
410	2018/11/28 09:09:07	46.2
411	2018/11/28 09:09:08	44.7
412	2018/11/28 09:09:09	36.6
413	2018/11/28 09:09:10	41.6
414	2018/11/28 09:09:11	53.5
415	2018/11/28 09:09:12	51.4
416	2018/11/28 09:09:13	52.9
417	2018/11/28 09:09:14	53.0
418	2018/11/28 09:09:15	48.2
419	2018/11/28 09:09:16	49.9
420	2018/11/28 09:09:17	39.8
421	2018/11/28 09:09:18	43.4
422	2018/11/28 09:09:19	41.7
423	2018/11/28 09:09:20	44.4
424	2018/11/28 09:09:21	41.9
425	2018/11/28 09:09:22	47.9
426	2018/11/28 09:09:23	47.5
427	2018/11/28 09:09:24	47.0
428	2018/11/28 09:09:25	48.1
429	2018/11/28 09:09:26	43.5
430	2018/11/28 09:09:27	45.3
431	2018/11/28 09:09:28	43.4
432	2018/11/28 09:09:29	44.0
433	2018/11/28 09:09:30	43.8
434	2018/11/28 09:09:31	46.9
435	2018/11/28 09:09:32	46.0
436	2018/11/28 09:09:33	44.5
437	2018/11/28 09:09:34	43.2
438	2018/11/28 09:09:35	44.1
439	2018/11/28 09:09:36	44.4
440	2018/11/28 09:09:37	43.3
441	2018/11/28 09:09:38	41.8
442	2018/11/28 09:09:39	48.8
443	2018/11/28 09:09:40	50.1
444	2018/11/28 09:09:41	52.0
445	2018/11/28 09:09:42	53.1
446	2018/11/28 09:09:43	49.6
447	2018/11/28 09:09:44	52.7
448	2018/11/28 09:09:45	49.9
449	2018/11/28 09:09:46	49.0
450	2018/11/28 09:09:47	47.9
451	2018/11/28 09:09:48	48.5
452	2018/11/28 09:09:49	49.1
453	2018/11/28 09:09:50	46.5
454	2018/11/28 09:09:51	45.3
455	2018/11/28 09:09:52	44.9
456	2018/11/28 09:09:53	44.6
457	2018/11/28 09:09:54	44.4
458	2018/11/28 09:09:55	45.7
459	2018/11/28 09:09:56	44.1
460	2018/11/28 09:09:57	47.2
461	2018/11/28 09:09:58	47.0
462	2018/11/28 09:09:59	49.3
463	2018/11/28 09:10:00	52.6
464	2018/11/28 09:10:01	49.2
465	2018/11/28 09:10:02	46.0
466	2018/11/28 09:10:03	47.3
467	2018/11/28 09:10:04	51.6
468	2018/11/28 09:10:05	57.5
469	2018/11/28 09:10:06	57.3
470	2018/11/28 09:10:07	53.1
471	2018/11/28 09:10:08	53.8
472	2018/11/28 09:10:09	44.3
473	2018/11/28 09:10:10	43.7
474	2018/11/28 09:10:11	46.6
475	2018/11/28 09:10:12	46.1
476	2018/11/28 09:10:13	47.8
477	2018/11/28 09:10:14	51.1
478	2018/11/28 09:10:15	53.7
479	2018/11/28 09:10:16	49.0
480	2018/11/28 09:10:17	46.1
481	2018/11/28 09:10:18	47.7

482	2018/11/28	09:10:19	50.7
483	2018/11/28	09:10:20	53.0
484	2018/11/28	09:10:21	51.2
485	2018/11/28	09:10:22	45.7
486	2018/11/28	09:10:23	51.0
487	2018/11/28	09:10:24	47.3
488	2018/11/28	09:10:25	46.8
489	2018/11/28	09:10:26	47.6
490	2018/11/28	09:10:27	51.8
491	2018/11/28	09:10:28	48.2
492	2018/11/28	09:10:29	51.4
493	2018/11/28	09:10:30	52.5
494	2018/11/28	09:10:31	49.7
495	2018/11/28	09:10:32	48.8
496	2018/11/28	09:10:33	48.5
497	2018/11/28	09:10:34	48.0
498	2018/11/28	09:10:35	49.4
499	2018/11/28	09:10:36	45.7
500	2018/11/28	09:10:37	47.5
501	2018/11/28	09:10:38	46.9
502	2018/11/28	09:10:39	46.5
503	2018/11/28	09:10:40	49.0
504	2018/11/28	09:10:41	46.4
505	2018/11/28	09:10:42	44.6
506	2018/11/28	09:10:43	44.6
507	2018/11/28	09:10:44	44.5
508	2018/11/28	09:10:45	43.1
509	2018/11/28	09:10:46	48.9
510	2018/11/28	09:10:47	45.3
511	2018/11/28	09:10:48	46.2
512	2018/11/28	09:10:49	45.1
513	2018/11/28	09:10:50	44.9
514	2018/11/28	09:10:51	43.4
515	2018/11/28	09:10:52	44.9
516	2018/11/28	09:10:53	45.5
517	2018/11/28	09:10:54	43.9
518	2018/11/28	09:10:55	46.7
519	2018/11/28	09:10:56	47.6
520	2018/11/28	09:10:57	44.4
521	2018/11/28	09:10:58	48.7
522	2018/11/28	09:10:59	48.5
523	2018/11/28	09:11:00	46.7
524	2018/11/28	09:11:01	49.3
525	2018/11/28	09:11:02	47.8
526	2018/11/28	09:11:03	47.5
527	2018/11/28	09:11:04	44.5
528	2018/11/28	09:11:05	44.0
529	2018/11/28	09:11:06	50.7
530	2018/11/28	09:11:07	54.2
531	2018/11/28	09:11:08	51.9
532	2018/11/28	09:11:09	53.1
533	2018/11/28	09:11:10	51.6
534	2018/11/28	09:11:11	50.3
535	2018/11/28	09:11:12	48.1
536	2018/11/28	09:11:13	49.7
537	2018/11/28	09:11:14	52.5
538	2018/11/28	09:11:15	49.3
539	2018/11/28	09:11:16	48.7
540	2018/11/28	09:11:17	47.1
541	2018/11/28	09:11:18	46.7
542	2018/11/28	09:11:19	46.0
543	2018/11/28	09:11:20	46.9
544	2018/11/28	09:11:21	44.6
545	2018/11/28	09:11:22	43.6
546	2018/11/28	09:11:23	42.3
547	2018/11/28	09:11:24	42.7
548	2018/11/28	09:11:25	46.6
549	2018/11/28	09:11:26	42.1
550	2018/11/28	09:11:27	42.5
551	2018/11/28	09:11:28	45.5
552	2018/11/28	09:11:29	42.5
553	2018/11/28	09:11:30	44.6
554	2018/11/28	09:11:31	46.5
555	2018/11/28	09:11:32	44.2
556	2018/11/28	09:11:33	45.4
557	2018/11/28	09:11:34	55.5
558	2018/11/28	09:11:35	50.8
559	2018/11/28	09:11:36	50.2
560	2018/11/28	09:11:37	66.9
561	2018/11/28	09:11:38	50.5
562	2018/11/28	09:11:39	45.5
563	2018/11/28	09:11:40	50.9
564	2018/11/28	09:11:41	41.9
565	2018/11/28	09:11:42	42.4
566	2018/11/28	09:11:43	44.4
567	2018/11/28	09:11:44	51.4
568	2018/11/28	09:11:45	52.4
569	2018/11/28	09:11:46	51.9
570	2018/11/28	09:11:47	46.3
571	2018/11/28	09:11:48	53.6
572	2018/11/28	09:11:49	44.5
573	2018/11/28	09:11:50	40.9
574	2018/11/28	09:11:51	41.7
575	2018/11/28	09:11:52	46.6
576	2018/11/28	09:11:53	47.1
577	2018/11/28	09:11:54	48.3
578	2018/11/28	09:11:55	44.0
579	2018/11/28	09:11:56	44.6
580	2018/11/28	09:11:57	47.8

581	2018/11/28 09:11:58	51.7
582	2018/11/28 09:11:59	46.9
583	2018/11/28 09:12:00	47.8
584	2018/11/28 09:12:01	48.3
585	2018/11/28 09:12:02	48.5
586	2018/11/28 09:12:03	48.4
587	2018/11/28 09:12:04	48.9
588	2018/11/28 09:12:05	46.2
589	2018/11/28 09:12:06	46.0
590	2018/11/28 09:12:07	45.4
591	2018/11/28 09:12:08	43.8
592	2018/11/28 09:12:09	43.3
593	2018/11/28 09:12:10	42.5
594	2018/11/28 09:12:11	42.0
595	2018/11/28 09:12:12	41.4
596	2018/11/28 09:12:13	42.4
597	2018/11/28 09:12:14	48.6
598	2018/11/28 09:12:15	53.1
599	2018/11/28 09:12:16	49.8
600	2018/11/28 09:12:17	48.1

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DNL Calculator

WARNING: HUD recommends the use of Microsoft Internet Explorer for performing noise calculations. The HUD Noise Calculator has an error when using Google Chrome unless the cache is cleared before each use of the calculator. HUD is aware of the problem and working to fix it in the programming of the calculator.

The Day/Night Noise Level Calculator is an electronic assessment tool that calculates the Day/Night Noise Level (DNL) from roadway and railway traffic. For more information on using the DNL calculator, view the **Day/Night Noise Level Calculator Electronic Assessment Tool Overview (/programs/environmental-review/daynight-noise-level-electronic-assessment-tool/)**.

Guidelines

- To display the Road and/or Rail DNL calculator(s), click on the "Add Road Source" and/or "Add Rail Source" button(s) below.
- All Road and Rail input values must be positive non-decimal numbers.
- All Road and/or Rail DNL value(s) must be calculated separately before calculating the Site DNL.
- All checkboxes that apply must be checked for vehicles and trains in the tables' headers.
- **Note #1:** Tooltips, containing field specific information, have been added in this tool and may be accessed by hovering over all the respective data fields (site identification, roadway and railway assessment, DNL calculation results, roadway and railway input variables) with the mouse.
- **Note #2:** DNL Calculator assumes roadway data is always entered.

DNL Calculator

Site ID	RPV Zone 2 - Existing Traffic
Record Date	1/31/2019
User's Name	Rincon Consultants, Inc.

Road # 1 Name:	**Palos Verdes Drive South west of Narcissa Drive**

Road #1

Vehicle Type	**Cars** ☑	**Medium Trucks** ☑	**Heavy Trucks** ☑
Effective Distance	40	40	40
Distance to Stop Sign			
Average Speed	35	35	35
Average Daily Trips (ADT)	13689	282	141
Night Fraction of ADT	15	15	15
Road Gradient (%)			2
Vehicle DNL	67.1249	60.2636	67.6862
Calculate Road #1 DNL	70.8194	Reset	

Road # 2 Name:	**Palos Verdes Drive South east of Narcissa Drive**

Road #2

Vehicle Type	**Cars** ☑	**Medium Trucks** ☑	**Heavy Trucks** ☑

Effective Distance	50	50	50
Distance to Stop Sign			
Average Speed	35	35	35
Average Daily Trips (ADT)	14899	307	154
Night Fraction of ADT	15	15	15
Road Gradient (%)			2
Vehicle DNL	69.3668	62.5066	69.9433
Calculate Road #2 DNL	73.069	Reset	

Add Road Source Add Rail Source

Airport Noise Level	
Loud Impulse Sounds?	○Yes ○No

Combined DNL for all Road and Rail sources	**0**
Combined DNL including Airport	
Site DNL with Loud Impulse Sound	

Calculate

DNL Calculator

WARNING: HUD recommends the use of Microsoft Internet Explorer for performing noise calculations. The HUD Noise Calculator has an error when using Google Chrome unless the cache is cleared before each use of the calculator. HUD is aware of the problem and working to fix it in the programming of the calculator.

The Day/Night Noise Level Calculator is an electronic assessment tool that calculates the Day/Night Noise Level (DNL) from roadway and railway traffic. For more information on using the DNL calculator, view the **Day/Night Noise Level Calculator Electronic Assessment Tool Overview (/programs/environmental-review/daynight-noise-level-electronic-assessment-tool/)**.

Guidelines

- To display the Road and/or Rail DNL calculator(s), click on the "Add Road Source" and/or "Add Rail Source" button(s) below.
- All Road and Rail input values must be positive non-decimal numbers.
- All Road and/or Rail DNL value(s) must be calculated separately before calculating the Site DNL.
- All checkboxes that apply must be checked for vehicles and trains in the tables' headers.
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- **Note #2:** DNL Calculator assumes roadway data is always entered.

DNL Calculator

Site ID	RPV Zone 2 - Year 2030 with Related Projects Traffic
Record Date	1/31/2019
User's Name	Rincon Consultants, Inc.

Road # 1 Name:	**Palos Verdes Drive South west of Narcissa Drive**

Road #1

Vehicle Type	**Cars** ☑	**Medium Trucks** ☑	**Heavy Trucks** ☑
Effective Distance	40	40	40
Distance to Stop Sign			
Average Speed	35	35	35
Average Daily Trips (ADT)	15650	323	161
Night Fraction of ADT	15	15	15
Road Gradient (%)			2
Vehicle DNL	67.7063	60.8532	68.2623
Calculate Road #1 DNL	71.399	Reset	

Road # 2 Name:	**Palos Verdes Drive South east of Narcissa Drive**

Road #2

Vehicle Type	**Cars** ☑	**Medium Trucks** ☑	**Heavy Trucks** ☑

Effective Distance	[illegible]	[illegible]	[illegible]
Distance to Stop Sign			
Average Speed	35	35	35
Average Daily Trips (ADT)	16700	344	172
Night Fraction of ADT	15	15	15
Road Gradient (%)			2
Vehicle DNL	69.8624	63.0008	70.4234
Calculate Road #2 DNL	73.5567	Reset	

Add Road Source Add Rail Source

Airport Noise Level	
Loud Impulse Sounds?	○Yes ○No
Combined DNL for all Road and Rail sources	**0**
Combined DNL including Airport	
Site DNL with Loud Impulse Sound	

Calculate

DNL Calculator

WARNING: HUD recommends the use of Microsoft Internet Explorer for performing noise calculations. The HUD Noise Calculator has an error when using Google Chrome unless the cache is cleared before each use of the calculator. HUD is aware of the problem and working to fix it in the programming of the calculator.

The Day/Night Noise Level Calculator is an electronic assessment tool that calculates the Day/Night Noise Level (DNL) from roadway and railway traffic. For more information on using the DNL calculator, view the **Day/Night Noise Level Calculator Electronic Assessment Tool Overview (/programs/environmental-review/daynight-noise-level-electronic-assessment-tool/)**.

Guidelines

- To display the Road and/or Rail DNL calculator(s), click on the "Add Road Source" and/or "Add Rail Source" button(s) below.
- All Road and Rail input values must be positive non-decimal numbers.
- All Road and/or Rail DNL value(s) must be calculated separately before calculating the Site DNL.
- All checkboxes that apply must be checked for vehicles and trains in the tables' headers.
- **Note #1:** Tooltips, containing field specific information, have been added in this tool and may be accessed by hovering over all the respective data fields (site identification, roadway and railway assessment, DNL calculation results, roadway and railway input variables) with the mouse.
- **Note #2:** DNL Calculator assumes roadway data is always entered.

DNL Calculator

Site ID	RPV Zone 2 - Year 2030 with Related Projects and Proposed Project Tr
Record Date	1/31/2019
User's Name	Rincon Consultants, Inc.

Road # 1 Name: **Palos Verdes Drive South west of Narcissa Drive**

Road #1

Vehicle Type	**Cars** ☑	**Medium Trucks** ☑	**Heavy Trucks** ☑
Effective Distance	40	40	40
Distance to Stop Sign			
Average Speed	35	35	35
Average Daily Trips (ADT)	15844	323	161
Night Fraction of ADT	15	15	15
Road Gradient (%)			2
Vehicle DNL	67.7598	60.8532	68.2623
Calculate Road #1 DNL	71.4204	Reset	

Road # 2 Name: **Palos Verdes Drive South east of Narcissa Drive**

Road #2

Vehicle Type	**Cars** ☑	**Medium Trucks** ☑	**Heavy Trucks** ☑

Effective Distance	50	50	50
Distance to Stop Sign			
Average Speed	35	35	35
Average Daily Trips (ADT)	16800	344	172
Night Fraction of ADT	15	15	15
Road Gradient (%)			2
Vehicle DNL	69.8883	63.0008	70.4234
Calculate Road #2 DNL	73.5671	Reset	

Add Road Source Add Rail Source

Airport Noise Level	
Loud Impulse Sounds?	◯Yes ◯No
Combined DNL for all Road and Rail sources	**0**
Combined DNL including Airport	
Site DNL with Loud Impulse Sound	

Calculate

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Demolition	Excavators	3	8.00	158	0.38
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Grading	Excavators	2	8.00	158	0.38
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Paving	Pavers	2	8.00	130	0.42
Paving	Rollers	2	8.00	80	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Grading	Graders	1	8.00	187	0.41
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Paving	Paving Equipment	2	8.00	132	0.36
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Building Construction	Welders	1	8.00	46	0.45

Trips and VMT

Demo.txt

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 02/13/2019

Case Description: Demolition

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Single-Family Residences	Residential	60.0	60.0	45.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	50.0	0.0
Dozer	No	40		81.7	50.0	0.0
Concrete Saw	No	20		89.6	50.0	0.0
Excavator	No	40		80.7	50.0	0.0
Excavator	No	40		80.7	50.0	0.0
Excavator	No	40		80.7	50.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer	81.7	77.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	81.7	77.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Saw	89.6	82.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	80.7	76.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	80.7	76.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	80.7	76.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	89.6	86.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 02/13/2019
Case Description: Site Preparation

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Single-Family Residences	Residential	60.0	60.0	45.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tractor	No	40	84.0		50.0	0.0
Tractor	No	40	84.0		50.0	0.0
Tractor	No	40	84.0		50.0	0.0
Tractor	No	40	84.0		50.0	0.0
Dozer	No	40		81.7	50.0	0.0
Dozer	No	40		81.7	50.0	0.0
Dozer	No	40		81.7	50.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Tractor	84.0	80.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	84.0	80.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	84.0	80.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	84.0	80.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	81.7	77.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	81.7	77.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	81.7	77.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	84.0	87.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 02/13/2019
Case Description: Grading

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Single-Family Residences	Residential	60.0	60.0	45.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tractor	No	40	84.0		50.0	0.0
Tractor	No	40	84.0		50.0	0.0
Grader	No	40	85.0		50.0	0.0
Excavator	No	40		80.7	50.0	0.0
Excavator	No	40		80.7	50.0	0.0
Scraper	No	40		83.6	50.0	0.0
Scraper	No	40		83.6	50.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Tractor	84.0	80.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	84.0	80.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	85.0	81.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	80.7	76.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	80.7	76.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	83.6	79.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	83.6	79.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	85.0	87.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 02/13/2019
Case Description: Building Construction

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Single-Family Residences	Residential	60.0	60.0	45.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	50.0	0.0
All Other Equipment > 5 HP	No	50	85.0		50.0	0.0
All Other Equipment > 5 HP	No	50	85.0		50.0	0.0
All Other Equipment > 5 HP	No	50	85.0		50.0	0.0
Generator	No	50		80.6	50.0	0.0
Tractor	No	40	84.0		50.0	0.0
Tractor	No	40	84.0		50.0	0.0
Tractor	No	40	84.0		50.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane	80.6	72.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	85.0	82.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	85.0	82.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	85.0	82.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Generator	80.6	77.6	N/A	N/A	N/A	N/A								

N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
Tractor			84.0	80.0		N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
Tractor			84.0	80.0		N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
Tractor			84.0	80.0		N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
		Total	85.0	89.3		N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		

Pave.txt
Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 02/13/2019
Case Description: Paving

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Single-Family Residences	Residential	60.0	60.0	45.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Paver	No	50		77.2	50.0	0.0
Paver	No	50		77.2	50.0	0.0
Roller	No	20		80.0	50.0	0.0
Roller	No	20		80.0	50.0	0.0
Pavement Scarafier	No	20		89.5	50.0	0.0
Pavement Scarafier	No	20		89.5	50.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Paver	77.2	74.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver	77.2	74.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller	80.0	73.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller	80.0	73.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pavement Scarafier	89.5	82.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pavement Scarafier	89.5	82.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	89.5	86.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

AC.txt
Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 02/13/2019
Case Description: Architectural Coating

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Single-Family Residences	Residential	60.0	60.0	45.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Compressor (air)	No	40		77.7	50.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Compressor (air)	77.7	73.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	77.7	73.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Vibration Analysis - RPV Zone 2 Landslide Ordinance EIR

PPV (in/sec) = PPV {ref} * (25/D)^1.5
Where PPV = Peak Particle Velocity
{ref} = PPV at the reference distance of 25 feet
D = distance to the receptor

Equipment =	**Vibratory Roller**			
PPV{ref} =	0.21	in/sec		
D =	25	feet		
PPV at receptor =	***0.210***	***in/sec***		
PPV is 1.7x to 6x larger than RMS velocity				
Assume typical conversion factor of			4	PPV:RMS
Therefore estimated RMS velocity =			***0.053***	***in/sec***
Receptor Lv =			***94***	***VdB***

Equipment =	**Bulldozer - Small**			
PPV{ref} =	0.003	in/sec		
D =	25	feet		
PPV at receptor =	***0.003***	***in/sec***		
PPV is 1.7x to 6x larger than RMS velocity				
Assume typical conversion factor of			4	PPV:RMS
Therefore estimated RMS velocity =			***0.001***	***in/sec***
Receptor Lv =			***58***	***VdB***

Equipment =	**Loaded Trucks**			
PPV{ref} =	0.076	in/sec		
D =	25	feet		
PPV at receptor =	***0.076***	***in/sec***		
PPV is 1.7x to 6x larger than RMS velocity				
Assume typical conversion factor of			4	PPV:RMS
Therefore estimated RMS velocity =			***0.019***	***in/sec***
Receptor Lv =			***86***	***VdB***

Equipment =	**Bulldozer - Large**			
PPV{ref} =	0.089	in/sec		
D =	25	feet		
PPV at receptor =	***0.089***	***in/sec***		
PPV is 1.7x to 6x larger than RMS velocity				
Assume typical conversion factor of			4	PPV:RMS
Therefore estimated RMS velocity =			***0.022***	***in/sec***
Receptor Lv =			***87***	***VdB***

Source: Section 5 Transit Vibration
Section 6 Vibration Impact Analysis
Section 7 Noise and Vibration during Construction
Transit Noise and Vibration Assessment , September 2018
John A. Volpe National Transportation Systems Center
Prepared For: USDOT Federal Transit Administration

* RMS Velocity in decibels VdB with Vref of 1E-6 in/sec and PPV:RMS of ~4

Criterion

Building Damage Type	VdB
Extremely susceptible to vibration damage	90
Non-engineered timber and masonry buildings	94
Engineered concrete and masonry buildings	98
Typical buildings	100
Reinforced concrete, steel, or timber buildings	102

Canmet, Bauer, and Calder, 1977		
Equipment	PPV Threshold, in/sec	Type of Damage
Rigid Mercury Switches	0.5	Trip Out
House	2	Cracked Plaster
Concrete Block	8	Crack in Block
Cased Drill Holes	15	Horizontol Offset
Pumps, Compressors	40	Shaft Misalignment

Human Response Criteria

Level, Lv in VdB	Equivalent Noise Level, dBA Low Freq (30 Hz)	Equivalent Noise Level, dBA Mid Freq (60 Hz	Human Response
65	25	40	Approximate threshold of perception, low-freq inaudible, but mid-freq excessive for sleeping
75	35	50	Approx. dividing line between barely perceptible and distinctly perceptible. Annoying vibration for most people. Low-freq acceptable for sleeping areas. Mid-freq excessive in most quiet occupied space.
85	45	60	Vibration tolerable only if infrequent number of events/day. Low-freq excessive for sleeping areas; mid-freq excessive even for infrequent events for some activities.

Impact Criteria

Land Use	Lv in VdB Frequent Events (70+/day)	Occasional Events (30-70/day)	Infrequent (<30 events/day)
Category 1: Vibration Sensitive	65	65	65
Concert Halls	65	65	65
TV Studios	65	65	65
Recording Studios	65	65	65
Category 2: Residences, hotels, sleeping areas	72	75	80
Auditoriums	72	80	80
Theaters	72	80	80
Category 3: Institutional with primarily daytime use only (i.e. schools and churches)	75	78	83

Vibration Source Levels For Construction Equipment

Equipment	PPV at 25 ft (in/sec)	Approximate Lv at 25 feet *
Impact Pile Driver - Upper Range	1.518	112
Impact Pile Driver - Typical	0.644	104
Sonic Pile Driver - Upper Range	0.734	105
Sonic Pile Driver - Typical	0.17	93
Clam Shovel Drop (slurry wall construction)	0.202	94
Hydromill (slurry wall construction) - in Soil	0.008	66
Hydromill (slurry wall construction) - in Rock	0.017	75
Vibratory Roller	0.21	94
Hoe Ram	0.089	87
Bulldozer - Large	0.089	87
Bulldozer - Small	0.003	58
Caisson Drilling	0.089	87
Loaded Trucks	0.076	86
Jackhammer	0.035	79

Vibration Analysis - RPV Zone 2 Landslide Ordinance EIR

PPV (in/sec) = PPV {ref} * (25/D)^1.5
Where PPV = Peak Particle Velocity
{ref} = PPV at the reference distance of 25 feet
D = distance to the receptor

Equipment =	**Vibratory Roller**		
PPV{ref} =	0.21 in/sec		
D =	50 feet		
PPV at receptor =	***0.074 in/sec***		
PPV is 1.7x to 6x larger than RMS velocity			
Assume typical conversion factor of		4	PPV:RMS
Therefore estimated RMS velocity =		***0.019***	***in/sec***
Receptor Lv =		***85***	***VdB***

Equipment =	**Bulldozer - Small**		
PPV{ref} =	0.003 in/sec		
D =	50 feet		
PPV at receptor =	***0.001 in/sec***		
PPV is 1.7x to 6x larger than RMS velocity			
Assume typical conversion factor of		4	PPV:RMS
Therefore estimated RMS velocity =		***0.000***	***in/sec***
Receptor Lv =		***48***	***VdB***

Equipment =	**Loaded Trucks**		
PPV{ref} =	0.076 in/sec		
D =	50 feet		
PPV at receptor =	***0.027 in/sec***		
PPV is 1.7x to 6x larger than RMS velocity			
Assume typical conversion factor of		4	PPV:RMS
Therefore estimated RMS velocity =		***0.007***	***in/sec***
Receptor Lv =		***77***	***VdB***

Equipment =	**Bulldozer - Large**		
PPV{ref} =	0.089 in/sec		
D =	50 feet		
PPV at receptor =	***0.031 in/sec***		
PPV is 1.7x to 6x larger than RMS velocity			
Assume typical conversion factor of		4	PPV:RMS
Therefore estimated RMS velocity =		***0.008***	***in/sec***
Receptor Lv =		***78***	***VdB***

Source: Section 5 Transit Vibration
Section 6 Vibration Impact Analysis
Section 7 Noise and Vibration during Construction
Transit Noise and Vibration Assessment , September 2018
John A. Volpe National Transportation Systems Center
Prepared For: USDOT Federal Transit Administration

* RMS Velocity in decibels VdB with Vref of 1E-6 in/sec and PPV:RMS of ~4

Criterion

Building Damage	
Type	VdB
Extremely susceptible to vibration damage	90
Non-engineered timber and masonry buildings	94
Engineered concrete and masonry buildings	98
Typical buildings	100
Reinforced concrete, steel, or timber buildings	102

Canmet, Bauer, and Calder, 1977		
Equipment	PPV Threshold, in/sec	Type of Damage
Rigid Mercury Switches	0.5	Trip Out
House	2	Cracked Plaster
Concrete Block	8	Crack in Block
Cased Drill Holes	15	Horizontol Offset
Pumps, Compressors	40	Shaft Misalignment

Human Response Criteria

Level, Lv in VdB	Equivalent Noise Level, dBA Low Freq (30 Hz)	Equivalent Noise Level, dBA Mid Freq (60 Hz)	Human Response
65	25	40	Approximate threshold of perception, low-freq inaudible, but mid-freq excessive for sleeping
75	35	50	Approx. dividing line between barely perceptible and distinctly perceptible. Annoying vibration for most people. Low-freq acceptable for sleeping areas. Mid-freq excessive in most quiet occupied space.
85	45	60	Vibration tolerable only if infrequent number of events/day. Low-freq excessive for sleeping areas; mid-freq excessive even for infrequent events for some activities.

Impact Criteria

Land Use	Lv in VdB: Frequent Events (70+/day)	Occasional Events (30-70/day)	Infrequent (<30 events/day)
Category 1: Vibration Sensitive	65	65	65
Concert Halls	65	65	65
TV Studios	65	65	65
Recording Studios	65	65	65
Category 2: Residences, hotels, sleeping areas	72	75	80
Auditoriums	72	80	80
Theaters	72	80	80
Category 3: Institutional with primarily daytime use only (i.e. schools and churches)	75	78	83

Vibration Source Levels For Construction Equipment

Equipment	PPV at 25 ft (in/sec)	Approximate Lv at 25 feet *
Impact Pile Driver - Upper Range	1.518	112
Impact Pile Driver - Typical	0.644	104
Sonic Pile Driver - Upper Range	0.734	105
Sonic Pile Driver - Typical	0.17	93
Clam Shovel Drop (slurry wall construction)	0.202	94
Hydromill (slurry wall construction) - in Soil	0.008	66
Hydromill (slurry wall construction) - in Rock	0.017	75
Vibratory Roller	0.21	94
Hoe Ram	0.089	87
Bulldozer - Large	0.089	87
Bulldozer - Small	0.003	58
Caisson Drilling	0.089	87
Loaded Trucks	0.076	86
Jackhammer	0.035	79

Vibration Analysis - RPV Zone 2 Landslide Ordinance EIR

PPV (in/sec) = PPV {ref} * (25/D)^1.5
Where PPV = Peak Particle Velocity
{ref} = PPV at the reference distance of 25 feet
D = distance to the receptor

Equipment =	**Vibratory Roller**		
PPV{ref} =	0.21	in/sec	
D =	75	feet	
PPV at receptor =	***0.040***	***in/sec***	
PPV is 1.7x to 6x larger than RMS velocity			
Assume typical conversion factor of		4	PPV:RMS
Therefore estimated RMS velocity =		***0.010***	***in/sec***
Receptor Lv =		***80***	***VdB***

Equipment =	**Bulldozer - Small**		
PPV{ref} =	0.003	in/sec	
D =	75	feet	
PPV at receptor =	***0.001***	***in/sec***	
PPV is 1.7x to 6x larger than RMS velocity			
Assume typical conversion factor of		4	PPV:RMS
Therefore estimated RMS velocity =		***0.000***	***in/sec***
Receptor Lv =		***43***	***VdB***

Equipment =	**Loaded Trucks**		
PPV{ref} =	0.076	in/sec	
D =	75	feet	
PPV at receptor =	***0.015***	***in/sec***	
PPV is 1.7x to 6x larger than RMS velocity			
Assume typical conversion factor of		4	PPV:RMS
Therefore estimated RMS velocity =		***0.004***	***in/sec***
Receptor Lv =		***71***	***VdB***

Equipment =	**Bulldozer - Large**		
PPV{ref} =	0.089	in/sec	
D =	75	feet	
PPV at receptor =	***0.017***	***in/sec***	
PPV is 1.7x to 6x larger than RMS velocity			
Assume typical conversion factor of		4	PPV:RMS
Therefore estimated RMS velocity =		***0.004***	***in/sec***
Receptor Lv =		***73***	***VdB***

Source: Section 5 Transit Vibration
Section 6 Vibration Impact Analysis
Section 7 Noise and Vibration during Construction
Transit Noise and Vibration Assessment , September 2018
John A. Volpe National Transportation Systems Center
Prepared For: USDOT Federal Transit Administration

* RMS Velocity in decibels VdB with Vref of 1E-6 in/sec and PPV:RMS of ~4

Criterion

Building Damage	
Type	VdB
Extremely susceptible to vibration damage	90
Non-engineered timber and masonry buildings	94
Engineered concrete and masonry buildings	98
Typical buildings	100
Reinforced concrete, steel, or timber buildings	102

Canmet, Bauer, and Calder, 1977		
Equipment	PPV Threshold, in/sec	Type of Damage
Rigid Mercury Switches	0.5	Trip Out
House	2	Cracked Plaster
Concrete Block	8	Crack in Block
Cased Drill Holes	15	Horizontol Offset
Pumps, Compressors	40	Shaft Misalignment

Human Response Criteria

Level, Lv in VdB	Equivalent Noise Level, dBA		Human Response
	Low Freq (30 Hz)	Mid Freq (60 Hz	
65	25	40	Approximate threshold of perception, low-freq inaudible, but mid-freq excessive for sleeping
75	35	50	Approx. dividing line between barely perceptible and distinctly perceptible. Annoying vibration for most people. Low-freq acceptable for sleeping areas. Mid-freq excessive in most quiet occupied space.
85	45	60	Vibration tolerable only if infrequent number of events/day. Low-freq excessive for sleeping areas; mid-freq excessive even for infrequent events for some activities.

Impact Criteria

Land Use	Lv in VdB		
	Frequent Events (70+/day)	Occasional Events (30-70/day)	Infrequent (<30 events/day)
Category 1: Vibration Sensitive	65	65	65
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TV Studios	65	65	65
Recording Studios	65	65	65
Category 2: Residences, hotels, sleeping areas	72	75	80
Auditoriums	72	80	80
Theaters	72	80	80
Category 3: Institutional with primarily daytime use only (i.e. schools and churches)	75	78	83

Vibration Source Levels For Construction Equipment

Equipment	PPV at 25 ft (in/sec)	Approximate Lv at 25 feet *
Impact Pile Driver - Upper Range	1.518	112
Impact Pile Driver - Typical	0.644	104
Sonic Pile Driver - Upper Range	0.734	105
Sonic Pile Driver - Typical	0.17	93
Clam Shovel Drop (slurry wall construction)	0.202	94
Hydromill (slurry wall construction) - in Soil	0.008	66
Hydromill (slurry wall construction) - in Rock	0.017	75
Vibratory Roller	0.21	94
Hoe Ram	0.089	87
Bulldozer - Large	0.089	87
Bulldozer - Small	0.003	58
Caisson Drilling	0.089	87
Loaded Trucks	0.076	86
Jackhammer	0.035	79

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PPV (in/sec) = PPV {ref} * (25/D)^1.5
Where PPV = Peak Particle Velocity
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D = distance to the receptor

Equipment =	**Vibratory Roller**	
PPV{ref} =	0.21	in/sec
D =	100	feet
PPV at receptor =	***0.026***	***in/sec***
PPV is 1.7x to 6x larger than RMS velocity		
Assume typical conversion factor of	4	PPV:RMS
Therefore estimated RMS velocity =	***0.007***	***in/sec***
Receptor Lv =	***76***	***VdB***

Equipment =	**Bulldozer - Small**	
PPV{ref} =	0.003	in/sec
D =	100	feet
PPV at receptor =	***0.000***	***in/sec***
PPV is 1.7x to 6x larger than RMS velocity		
Assume typical conversion factor of	4	PPV:RMS
Therefore estimated RMS velocity =	***0.000***	***in/sec***
Receptor Lv =	***39***	***VdB***

Equipment =	**Loaded Trucks**	
PPV{ref} =	0.076	in/sec
D =	100	feet
PPV at receptor =	***0.010***	***in/sec***
PPV is 1.7x to 6x larger than RMS velocity		
Assume typical conversion factor of	4	PPV:RMS
Therefore estimated RMS velocity =	***0.002***	***in/sec***
Receptor Lv =	***68***	***VdB***

Equipment =	**Bulldozer - Large**	
PPV{ref} =	0.089	in/sec
D =	100	feet
PPV at receptor =	***0.011***	***in/sec***
PPV is 1.7x to 6x larger than RMS velocity		
Assume typical conversion factor of	4	PPV:RMS
Therefore estimated RMS velocity =	***0.003***	***in/sec***
Receptor Lv =	***69***	***VdB***

Source: Section 5 Transit Vibration
Section 6 Vibration Impact Analysis
Section 7 Noise and Vibration during Construction
Transit Noise and Vibration Assessment , September 2018
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Prepared For: USDOT Federal Transit Administration

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Building Damage Type	VdB
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Bulldozer - Large	0.089	87
Bulldozer - Small	0.003	58
Caisson Drilling	0.089	87
Loaded Trucks	0.076	86
Jackhammer	0.035	79

Appendix G

Traffic Impact Study

LINSCOTT
LAW &
GREENSPAN
engineers

TRANSPORTATION IMPACT STUDY

ZONE 2 LANDSLIDE MORATORIUM – PORTUGUESE BEND PROJECT

City of Rancho Palos Verdes, California
January 18, 2019

Prepared for:

Rincon Consultants, Inc.
180 North Ashwood Avenue
Ventura, California 93003

LLG Ref. 1-10-3845-2

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EXP. 06/30/19
TRAFFIC
STATE OF CALIFORNIA

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Senior Transportation Engineer

Under the Supervision of:

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APPENDICES

TRANSPORTATION IMPACT STUDY

ZONE 2 LANDSLIDE MORATORIUM - PORTUGUESE BEND PROJECT

City of Rancho Palos Verdes, California
January 18, 2019

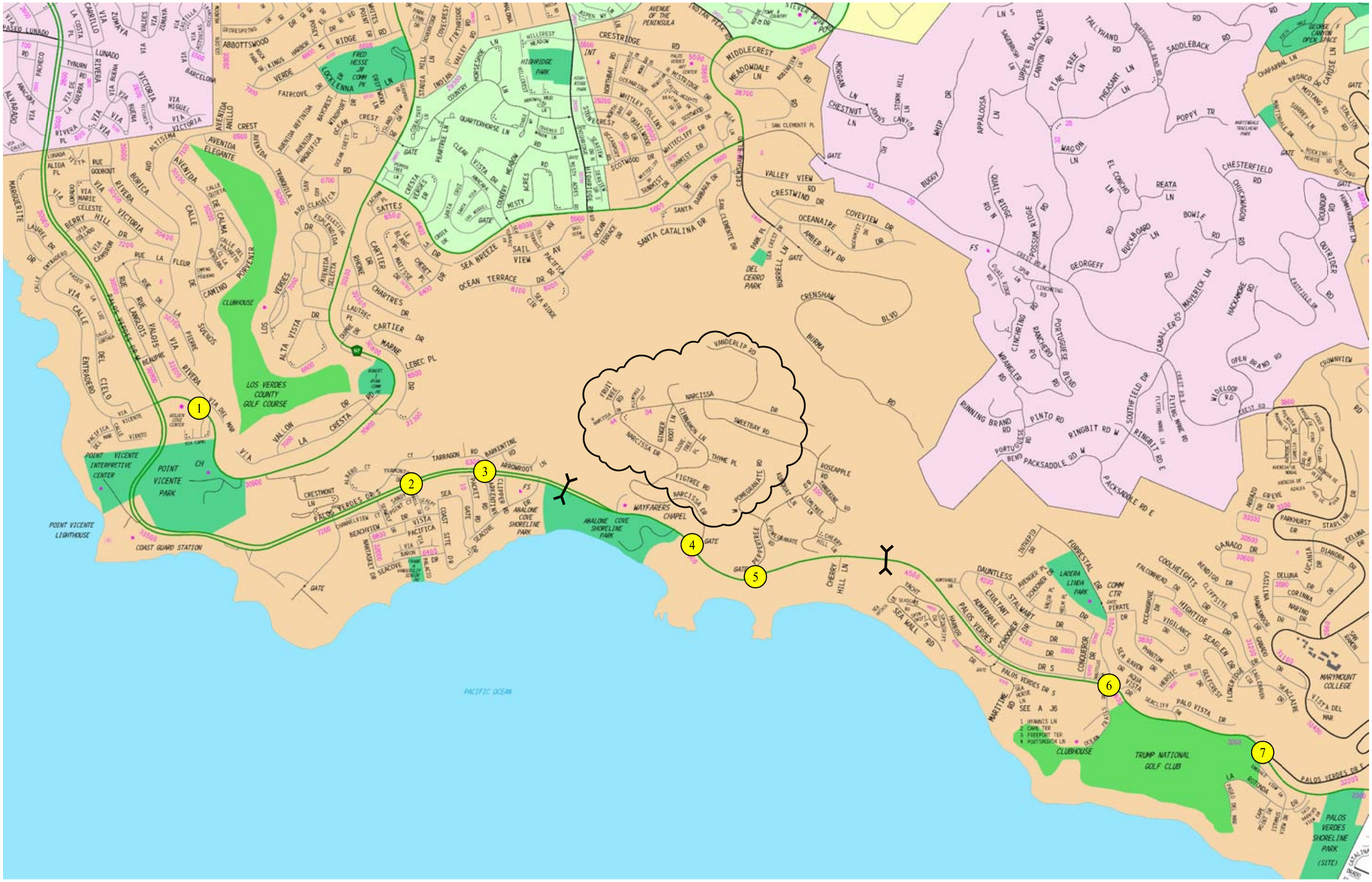
1.0 INTRODUCTION

This transportation impact study addresses the potential traffic impacts associated with the proposed Zone 2 Landslide Moratorium project. The proposed project is located in the Portuguese Bend area of the City of Rancho Palos Verdes, California. The City of Rancho Palos Verdes is considering revisions to its Landslide Moratorium Ordinance that would facilitate the future development of single-family residences on undeveloped lots within a portion of the City's Portuguese Bend community (i.e., Zone 2). The proposed Zone 2 Landslide Moratorium - Portuguese Bend project site area and general vicinity are shown in ***Figure 1-1***.

This report documents the findings and recommendations of a transportation impact analysis prepared by Linscott, Law & Greenspan, Engineers and summarizes the potential traffic impacts associated with the proposed project. The traffic analysis evaluates the existing operating conditions at seven key study intersections within the project vicinity, estimates the trip generation potential of the proposed project, and forecasts future operating conditions without and with the proposed project. Where necessary, intersection improvements and/or mitigation measures are identified. This report has been prepared in consultation with City of Rancho Palos Verdes staff and presents findings for future year operating conditions (Year 2030) pursuant to the requirements of City staff.

This transportation report satisfies the traffic impact study requirements of the City of Rancho Palos Verdes and is consistent with the *2010 Congestion Management Program for Los Angeles County*[1]. The specific parameters for this traffic study were developed in conjunction with City of Rancho Palos Verdes staff. The project site has been visited and observed and the adjacent area roadways, intersections, and existing parking conditions have been inventoried. Existing peak hour traffic information has been collected at the seven study intersections on a typical weekday (i.e., Tuesday, Wednesday, or Thursday) for use in the preparation of intersection Level of Service calculations. Information concerning cumulative projects (planned and/or approved) in the vicinity of the proposed project has been researched at the Cities of Rancho Palos Verdes, Palos Verdes Estates, Rolling Hills, Rolling Hills Estates, and Los Angeles, as well as other traffic studies prepared for projects in the vicinity. Based on this research, 22 related projects are planned in the project study area. These 22 planned and/or approved related projects were therefore considered in the cumulative traffic analysis for this project.

[1] *2010 Congestion Management Program for Los Angeles County*, Los Angeles County Metropolitan Transportation Authority, October 2010.



MAP SOURCE: RAND MCNALLY & COMPANY

N

NOT TO SCALE

XX STUDY INTERSECTION

STUDY STREET SEGMENT

PROJECT AREA

LINSCOTT, LAW & GREENSPAN, engineers

FIGURE 1-1
VICINITY MAP

ZONE 2 LANDSLIDE MORATORIUM - PORTUGUESE BEND PROJECT

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This transportation report analyzes existing and future weekday AM, School PM and PM peak hour traffic operations for future-term (Year 2030) traffic conditions upon completion of the proposed Zone 2 Landslide Moratorium - Portuguese Bend project. Peak hour traffic forecasts for the future horizon years have been projected by increasing existing traffic volumes by an annual growth rate of 0.6 percent (0.6%) per year and adding traffic volumes expected to be generated by the 22 related projects.

1.1 Study Area

Seven study intersections have been identified for evaluation during the weekday morning, School PM and PM commuter peak hour conditions based upon coordination with City of Rancho Palos Verdes staff. The seven study intersections provide local access to the study area and define the extent of the boundaries for this traffic impact analysis. Further discussion of the existing street system and study area is provided in Section 4.1 herein.

The general location of the project in relation to the study locations and surrounding street system is presented in *Figure 1-1*. The traffic analysis study area is generally comprised of those locations which have the greatest potential to experience significant traffic impacts due to the proposed project as defined by the Lead Agency. In the traffic engineering practice, the study area generally includes those intersections that are:

a. Immediately adjacent or in close proximity to the project site;

b. In the vicinity of the project site that are documented to have current or projected future adverse operational issues; and

c. In the vicinity of the project site that are forecast to experience a relatively greater percentage of project-related vehicular turning movements (e.g., at freeway ramp intersections).

The locations selected for analysis were based on the above criteria, forecast project peak hour vehicle trip generation, anticipated distribution of project vehicle trips and existing intersection/corridor operations. The seven intersections listed below provide local access to the study area and define the extent of the boundaries for this traffic impact investigation.

1. Hawthorne Boulevard/Via Rivera

2. Tramonto Drive-Seahill Drive/Palos Verdes Drive South

3. Barkentine Road/Palos Verdes Drive South

4. Narcissa Drive/Palos Verdes Drive South

5. Peppertree Drive/Palos Verdes Drive South

6. Forrestal Drive/Palos Verdes Drive South

7. Palos Verdes Drive East/Palos Verdes Drive South

The Volume-Capacity and Level of Service calculations for these key locations were used to evaluate the potential traffic-related impacts associated with area growth, cumulative projects and the proposed Zone 2 Landslide Moratorium - Portuguese Bend project. When necessary, this report recommends intersection improvements that may be required to accommodate future traffic volumes and restore/maintain an acceptable Level of Service, and/or to reduce a significant project impact to less than significant levels.

The following components are included as part of this traffic analysis:

- Existing traffic counts,
- Estimated project traffic generation/distribution/assignment,
- Estimated cumulative project traffic generation/distribution/assignment,
- Weekday AM, School PM and PM peak hour capacity analyses for existing conditions,
- Weekday AM, School PM and PM peak hour capacity analyses for existing with project conditions,
- Weekday AM, School PM and PM peak hour capacity analyses for future (Year 2030) conditions without and with project traffic,
- Project-specific improvements, where necessary, and
- Congestion management program traffic impact assessment.

2.0 PROJECT DESCRIPTION

2.1 Project Location

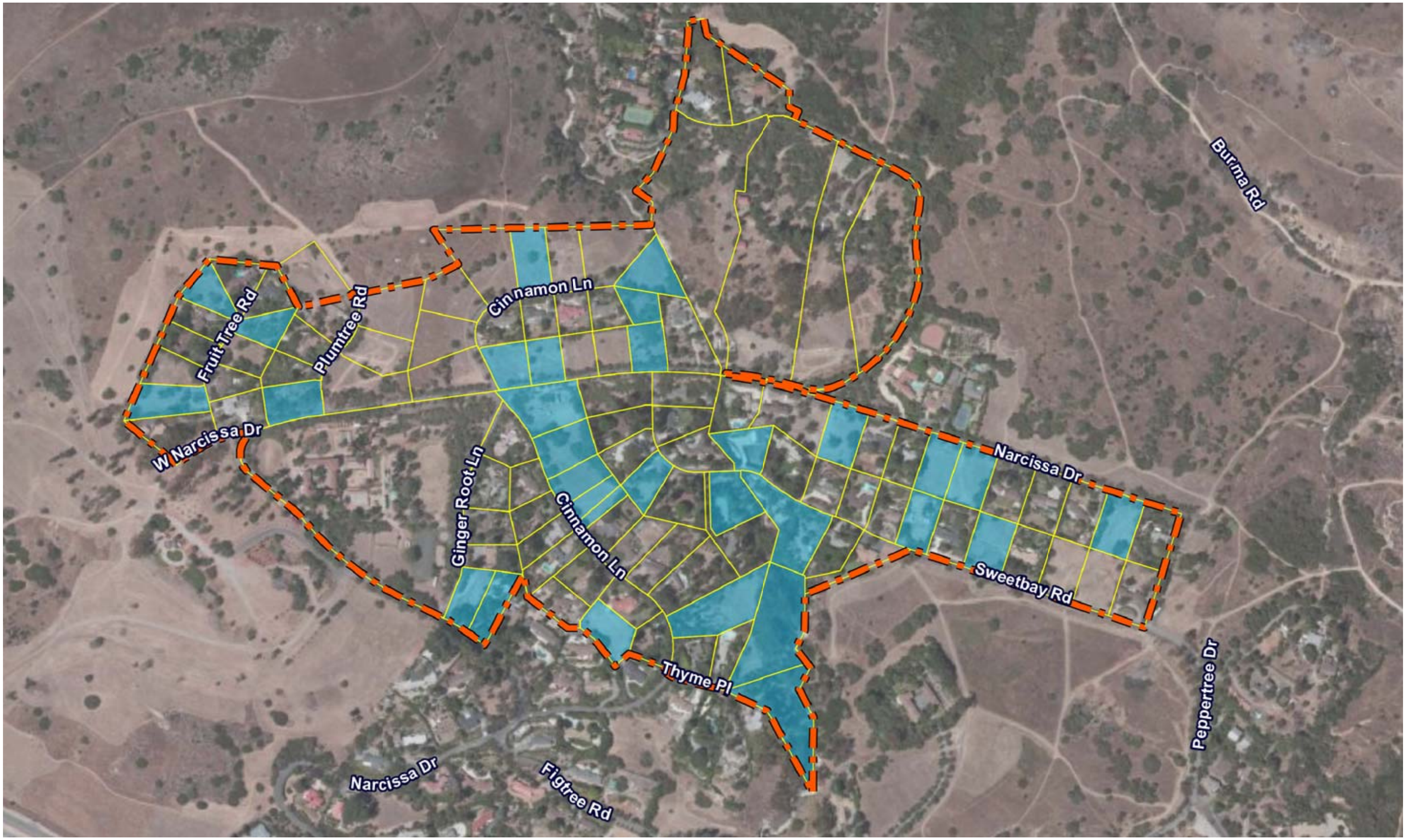
The proposed ordinance revisions would apply to the approximately 112-acre "Zone 2 Landslide Moratorium Ordinance" area, located north of the Narcissa Drive/Palos Verdes Drive South intersection in the Portuguese Bend area of the Palos Verdes Peninsula, within the City of Rancho Palos Verdes, County of Los Angeles, California. This area, located on the hills above the south-central coastline of the City, is within the City's larger (approximately 1,200-acre) Landslide Moratorium Area (LMA). Zone 2 consists of 111 individual lots. Of these, 69 have been developed with residences and accessory structures (including the 5 Monks Plaintiffs' Lots), 11 have obtained Planning entitlements for development (via Exception "P") and 31 lots remain undeveloped. These latter 31 lots are the focus of this transportation impact study and the project's environmental impact report. The proposed Zone 2 Landslide Moratorium - Portuguese Bend project site area and general vicinity are shown in *Figure 1-1*. The locations of the 31 undeveloped lots within the Portuguese Bend community under consideration by the City is displayed in ***Figure 2-1***.

2.2 Current Land Use

Of the approximately 111 lots on the 112-acre project area (the Zone 2 area), the vast majority of the developed lots are improved with single-family residences, most dating from the 1950s, and related accessory structures and uses. The largest developed lot in Zone 2 is occupied by the Portuguese Bend Riding Club, a nonconforming commercial stable that was established prior to the City's incorporation in 1973. Private streets within Zone 2 are maintained by the Portuguese Bend Community Association. The majority of the undeveloped lots contain non-native vegetation, and some have small, non-habitable structures (e.g., sheds, stables, fences, etc.) for equestrian or horticultural uses. The lots are generally between one-quarter acre and one acre or more in size.

2.3 Surrounding Land Uses

The approximately 112-acre Zone 2 area is primarily surrounded by open space and semi-rural residential development. To the northeast of the project area are developed residential lots in the Portuguese Bend community as well as City-owned open space in the Portuguese Bend Reserve of the Palos Verdes Nature Preserve, both of which are within Zone 1 of the Landslide Moratorium Area. To the northwest and west of the project area are developed residential lots in the Portuguese Bend community and vacant, residentially-zoned land (Upper and Lower Filiorum) which are located in Zone 1 of the Landslide Moratorium Area. To the south, southeast and east of the project area are developed and undeveloped residential lots in the Portuguese Bend community and located in Zone 5 (the area affected by the 1978 Abalone Cove landslide), Zone 6 (the active Portuguese Bend landslide area) and Zone 3 (located between Altamira Canyon and the westerly edge of the Portuguese Bend landslide area). Individual lots that would gain development potential as a result of the proposed project are located throughout Zone 2, and are therefore surrounded by the uses described above as well as other lots, both developed and undeveloped, in Zone 2.



SOURCE: RINCON CONSULTANTS, INC.

N
NOT TO SCALE

LEGEND:
Project Boundary
Vacant or Underdeveloped, Potentially Developable under Proposed Ordinance Revisions

LINSCOTT, LAW & GREENSPAN, engineers

FIGURE 2-1
LOCATION OF PROJECT UNDEVELOPED LOTS

ZONE 2 LANDSLIDE MORATORIUM - PORTUGUESE BEND PROJECT

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2.4 Project Characteristics

2.4.1 *Project Background*

In 2002, a group of Portuguese Bend property owners filed a ME application to exclude their undeveloped lots within the area known as Zone 2 from the LMA. Shortly after this application was deemed incomplete for processing, the applicants filed suit against the City. As part of the decision on the case (*Monks v. City of Rancho Palos Verdes*), the City has been ordered to remove regulatory impediments in its Municipal Code that prevent the development of the 16 *Monks* plaintiffs' lots. The City began this process with an Ordinance to allow the *Monks* plaintiffs to apply for Landslide Moratorium Exceptions (LMEs) for their lots. As of November 2018, five (5) *Monks* plaintiffs lots have been developed and the remaining eleven (11) *Monks* plaintiffs have obtained Planning entitlements to develop their lots. The City now desires to consider broader revisions to the Landslide Moratorium Ordinance that could also permit the owners of the other 31 undeveloped lots in Zone 2 to be developed with new residences. This would result in the possible future development of up to 31 new residences on existing legal lots in Zone 2 within the Portuguese Bend community.

2.4.2 *Project Description*

Landslide Moratorium Ordinance Revisions. Section 15.20.040 of the Rancho Palos Verdes Municipal Code establishes the process for requesting exceptions from the City's landslide moratorium regulations. The current (amended in 2009) Municipal Code Section 15.20.040(P) includes the following category of exception to the moratorium on "the filing, processing, approval or issuance of building, grading or other permits" within the existing landslide moratorium area:

> *The moratorium shall not be applicable to any of the following…*
>
> *…P. The construction of residential buildings, accessory structures, and grading totaling less than one thousand cubic yards of combined cut and fill and including no more than fifty cubic yards of imported fill material on the sixteen undeveloped lots in Zone 2 of the "Landslide Moratorium Area" as outlined in green on the landslide moratorium map on file in the Director's office, identified as belonging to the plaintiffs in the case "Monks v. City of Rancho Palos Verdes, 167 Cal. App. 4th 263, 84 Cal. Rptr. 3d 75 (Cal. App. 2 Dist., 2008)"; provided, that a landslide moratorium exception permit is approved by the Director, and provided that the project complies with the criteria set forth in Section 15.20.050 of this Chapter. Such projects shall qualify for a landslide moratorium exception permit only if all applicable requirements of this Code are satisfied, and the parcel is served by a sanitary sewer system. Prior to the issuance of a landslide moratorium exception permit, the applicant shall submit to the Director any geological or geotechnical studies reasonably required by the City to demonstrate to the satisfaction of the City geotechnical staff that the proposed project will not aggravate the existing situation.*

The proposed landslide moratorium ordinance revisions would revise the language of this section to encompass all 31 undeveloped lots in Zone 2, rather than restricting it to only the *Monks* plaintiffs' lots. This would allow for the future submittal of LMEs for all of these undeveloped lots. It should be noted, however, that the granting of an LME does not constitute approval of a specific project request, but simply grants the property owner the ability to submit the appropriate application(s) for consideration of a specific project request.

Future Development Potential. The potential granting of up to 31 LME requests under the proposed ordinance revisions would permit individual property owners to then apply for individual entitlements to develop their lots. The undeveloped lots within Zone 2 are held in multiple private ownerships so the timing and scope of future development is not known. For the purposes of the Environmental Impact Report (EIR), it is assumed that development would occur over a period of at least 10 years from adoption of the ordinance revisions in a manner consistent with the private architectural standards adopted by the Portuguese Bend Community Association and the City's underlying RS-1 and RS-2 zoning regulations. Therefore, the future development assumptions for Zone 2 include the following:

- Thirty-one single-story, ranch-style residences with attached or detached three-car garages, with minimum living area of 1,500 square feet and maximum living area of 4,000 square feet or 15% of gross lot area, whichever is less;

- Less than 1,000 cubic yards of grading (cut and fill combined) per lot, with no more than 50 cubic yards of imported fill and up to 1,000 cubic yards of export per lot;

- Maximum 25% (RS-1) or 40% (RS-2) net lot coverage;

- Maximum building height of 16 feet for residences and 12 feet for detached accessory structures;

- Minimum front setbacks of 20 feet, minimum rear setbacks of 15 feet, minimum street-side setbacks of 10 feet, and minimum interior side setbacks of five feet, with setbacks along private street rights-of-way measured from the easement line rather than the property line; and,

- No subdivision of existing lots within Zone 2.

As noted above, the City has been ordered to remove regulatory impediments in its Municipal Code that prevent the development of the 16 *Monks* plaintiffs' lots. This was accomplished by the 2009 addition to the moratorium exceptions, cited above. As of November 2018, five *Monks* plaintiffs' lots have been developed, and the remaining 11 *Monks* plaintiffs' lots have obtained planning entitlements. Therefore, this transportation impact study considers the potential environmental impacts of build-out of the 31 undeveloped lots under the parameters listed above.

3.0 PROJECT SITE ACCESS AND CIRCULATION

Access to the existing Portuguese Bend community of Rancho Palos Verdes is provided via Narcissa Drive and Peppertree Drive. All streets in the Portuguese Bend community are private, and the community itself is gated. The gates restricting access to the community on Narcissa Drive and Peppertree Drive are set back approximately 190 and 90 feet from Palos Verdes Drive South, respectively. The following lane configurations are provided at the existing access locations for the community:

- Narcissa Drive/Palos Verdes Drive South
  - Eastbound Approach: One left-turn lane and one shared through/right-turn lane
  - Westbound Approach: One left-turn lane, one through lane and one right-turn lane
  - Southbound Approach: One shared left-turn/through lane and one right-turn lane
- Peppertree Drive/Palos Verdes Drive South
  - Eastbound Approach: One left-turn lane and one through lane
  - Westbound Approach: One through lane and one right-turn lane
  - Southbound Approach: One left-turn lane and one right-turn lane

No changes to the existing Portuguese Bend community site access and circulation scheme are planned as part of the proposed project. Aerial photographs of the two subject Portuguese Bend community access intersections are displayed in ***Figure 3-1***.

Palos Verdes Drive South and Narcissa Drive

Palos Verdes Drive South and Peppertree Drive

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SOURCE: GOOGLE EARTH

FIGURE 3-1
PORTUGUESE BEND COMMUNITY ACCESS INTERSECTIONS

LINSCOTT, LAW & GREENSPAN, engineers

ZONE 2 LANDSLIDE MORATORIUM - PORTUGUESE BEND PROJECT

4.0 EXISTING CONDITIONS

4.1 Existing Street System

The local network of streets serving the proposed project study area includes Palos Verdes Drive West, Palos Verdes Drive South and Hawthorne Boulevard. All of the seven study intersections selected for analysis are controlled by stop signs with the stop signs facing the minor street approaches. The existing roadway configurations and intersection controls at the seven study intersections are displayed in ***Figure 4-1***.

4.1.1 *Roadway Classifications*

The City of Rancho Palos Verdes utilizes the roadway categories recognized by regional, state and federal transportation agencies. There are four categories in the roadway hierarchy, ranging from freeways with the highest capacity to two-lane undivided roadways with the lowest capacity. The roadway categories are summarized as follows:

- *Freeways* are limited-access and high-speed travel ways included in the state and federal highway systems. Their purpose is to carry regional through-traffic. Access is provided by interchanges with typical spacing of one mile or greater. No local access is provided to adjacent land uses.

- *Arterial* roadways are major streets that primarily serve through-traffic and provide access to abutting properties as a secondary function. Arterials are generally designed with two to six travel lanes and their major intersections are signalized. This roadway type is divided into two categories: principal and minor arterials. Principal arterials are typically four-or-more lane roadways and serve both local and regional through-traffic. Minor arterials are typically two-to-four lane streets that service local and commute traffic.

- *Collector* roadways are streets that provide access and traffic circulation within residential and non-residential (e.g., commercial and industrial) areas. Collector roadways connect local streets to arterials and are typically designed with two through travel lanes (i.e., one through travel lane in each direction) that may accommodate on-street parking. They may also provide access to abutting properties.

- *Local* roadways distribute traffic within a neighborhood, or similar adjacent neighborhoods, and are not intended for use as a through-street or a link between higher capacity facilities such as collector or arterial roadways. Local streets are fronted by residential uses and do not typically serve commercial uses.

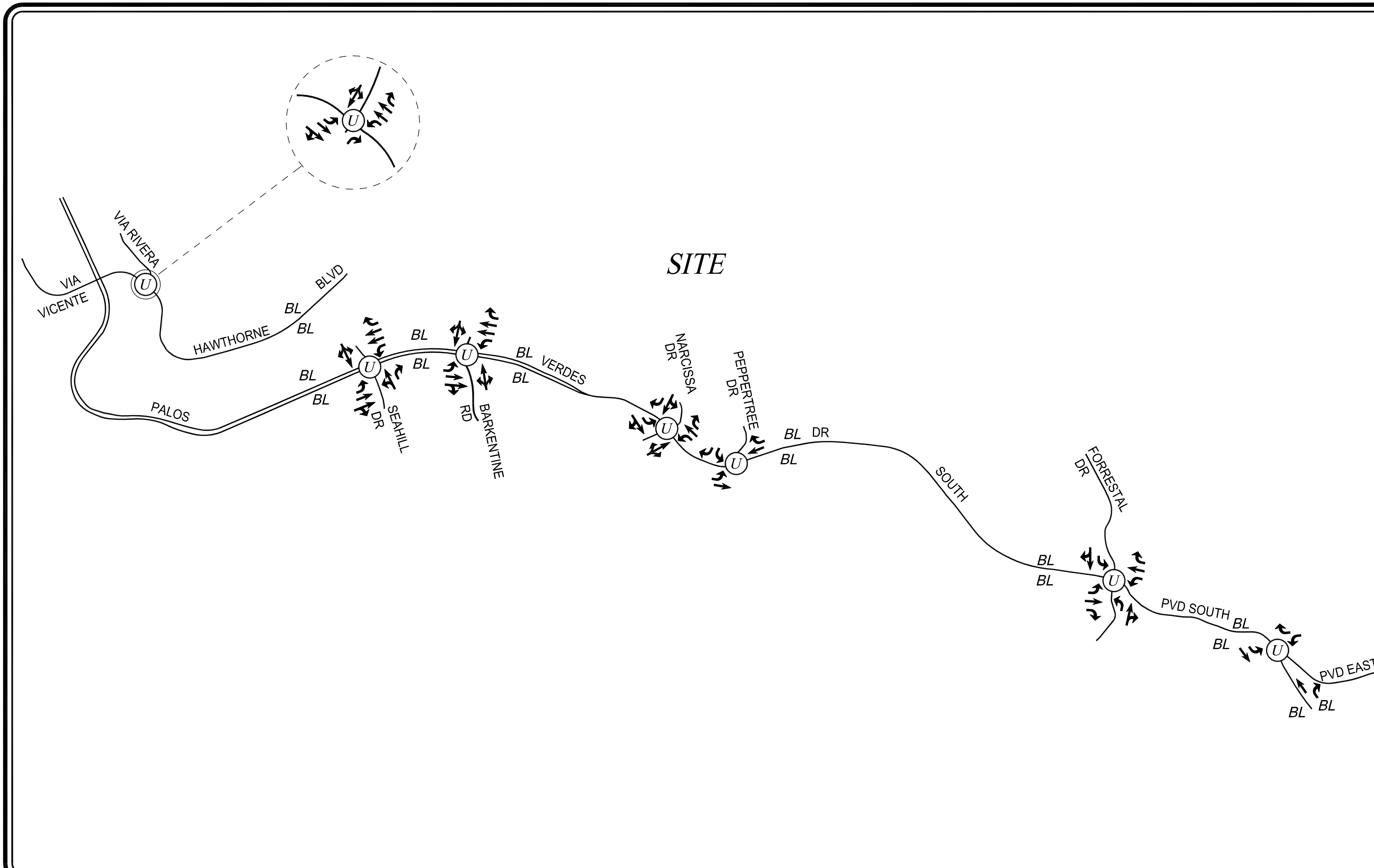

FIGURE 4-1
EXISTING ROADWAY CONFIGURATIONS AND INTERSECTION CONTROLS

ZONE 2 LANDSLIDE MORATORIUM - PORTUGUESE BEND PROJECT

LINSCOTT, LAW & GREENSPAN, engineers

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4.1.2 *Roadway Descriptions*

A review of the important roadways in the project site vicinity and study area is summarized in ***Table 4-1***. As indicated in *Table 4-1,* the important roadways within the project study area were reviewed in terms of the number of lanes provided, parking restrictions, posted speed limits, etc. Additionally, the roadway classifications of key roads in the project study area also are presented in *Table 4-1*.

4.1.3 *Portuguese Bend Community Association*

The Portuguese Bend Community Association (PBCA) is a private development. All roadways, including the two main access roadways of Peppertree Drive and Narcissa Drive, are private streets. The PBCA has the responsibility and authority to impose fees and assessments in order to maintain facilities, including the private roadway system. It is important to note that the roadway system was originally engineered for full development and buildout of the residential tract as originally reviewed and approved by the County of Los Angeles. As such, the City of Rancho Palos Verdes does not have the responsibility nor the authority to maintain the roadways.

4.2 Existing Public Bus Transit Service

Public bus transit service within the Zone 2 Landslide Moratorium - Portuguese Bend project study area is currently provided by the Los Angeles County Metropolitan Transportation Authority (Metro) and the Palos Verdes Peninsula Transit Authority (PVPTA). A summary of the existing transit service, including the transit route, destinations and peak hour headways is presented in ***Table 4-2***. The existing public transit routes in the Zone 2 Landslide Moratorium - Portuguese Bend project site vicinity are illustrated in ***Figure 4-2***.

4.3 Bicycle Facilities

Bicycle access to the project site is facilitated by the City's bicycle roadway network. Existing Class II bicycle facilities are provided along Palos Verdes Drive South in the immediate vicinity of the project. Visual observations were conducted at the project entrances on Palos Verdes Drive South and no conflicts between existing bicycle traffic and entering and/or existing residents at both gateways were noted.

4.4 Existing Traffic Volumes

Weekday AM and PM traffic count data for four of the seven study intersections were obtained from the City of Rancho Palos Verdes General Plan Update Traffic Impact Analysis[2]. For those locations where no data were available, new manual counts of vehicular turning movements were conducted during the weekday AM, School PM and commuter PM periods to determine the peak hour traffic volumes. All of the manual counts were conducted by independent traffic count subconsultants from 7:00 to 9:00 AM to determine the AM peak commute hour, 2:00 to 4:00 PM to determine the School PM peak hour, and from 4:00 to 6:00 PM to determine the PM peak commute hour. Additionally,

[2] City of Rancho Palos Verdes General Plan Update Traffic Impact Analysis, August 15, 2017.

Table 4-1
EXISTING ROADWAY DESCRIPTIONS

Roadway	Classification [1]	Travel Lanes		Median Types [4]	Speed Limit
		Direction [2]	No. Lanes [3]		
Via Rivera	Local Street	NB-SB	2	N/A	25
Tramonto Drive	Local Street	NB-SB	2	RMI/N/A	25
Seahill Drive	Local Street	NB-SB	2	N/A	25
Barkentine Road	Local Street	NB-SB	2	N/A	25
Palos Verdes Drive South	Aterial	NB-SB	2 [5]	RMI/N/A	35
Pepper Tree Drive	Private Road	NB-SB	2	N/A	25
Forrestal Drive	Local Street	NB-SB	2	N/A	25
Trump National Drive	Local Street	NB-SB	2	N/A	25
Palos Verdes Drive East	Arterial	NB-SB	2	N/A	40
Hawthorne Boulevard	Arterial	EB-WB	4 [5]	RMI	45
Palos Verdes Drive South	Arterial	EB-WB	4 [5]	RMI	45
Narcissa Drive	Private Road	EB-WB	2	N/A	25

Notes:
[1] Roadway classifications obtained from the *City of Rancho Palos Verdes (Circulation Element)* , adopted September 2018.
[2] Direction of roadways in the project area: NB-SB = northbound and southbound; and EB-WB = eastbound and westbound.
[3] Number of lanes in both directions on the roadway.
[4] Median type of the road: RMI = Raised Median Island; 2WLT = 2-Way Left-Turn Lane; and N/A = Not Applicable.
[5] Class II (Bike Lane)

Table 4-2
EXISTING TRANSIT ROUTES [1]

ROUTE	DESTINATIONS	ROADWAY(S) NEAR SITE	NO. OF BUSES DURING PEAK HOUR DIR	AM	PM
Metro 344	Ranchos Palos Verdes to Harbor Gateway via Torrance	Via Rivera, Tramonto Drive, Seahill Drive, Barkentine Road, Hawthorne Boulevard, Palos Verdes Drive South	NB SB	2 4	3 2
PVPTA 226	Palos Verdes Estates	Palos Verdes Drive West, Hawthorne Boulevard	NB SB	0 2	1 0
PVPTA Blue Line	Palos Verdes Estates to Rancho Palos Verdes (School Days)	Palos Verdes Drive West, Hawthorne Boulevard	Inbound Outbound	1 1	1 1
PVPTA Gold Line	Rancho Palos Verdes to Rolling Hills (School Days)	Tramonto Drive, Seahill Drive, Narcissa Drive Pepper Tree Drive, Trump National Drive, Palos Verdes Drive South	Inbound Outbound	1 1	1 1
PVPTA Orange Line	Palos Verdes Estates to Rolling Hills via Rancho Palos Verdes (School Days)	Tramonto Drive, Seahill Drive, Narcissa Drive Pepper Tree Drive, Trump National Drive, Palos Verdes Drive South	Inbound Outbound	0 1	1 0
			Total	**13**	**11**

[1] Sources: Los Angeles County Metropolitan Transportation Authority (Metro) and Palos Verdes Peninsula Transit Authority (PVPTA) websites, 2018.

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MAP SOURCE: METROPOLITAN TRANSPORTATION AUTHORITY (METRO) WEBSITE

★ PROJECT SITE

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FIGURE 4-2

EXISTING PUBLIC TRANSIT ROUTES

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the available manual traffic count data were adjusted by 0.6 percent (0.6%) per year to reflect existing conditions and, where necessary, manually adjusted to provide balance between study locations.

The existing weekday AM, School PM and PM peak hour manual counts of turning vehicles at the seven study intersections are summarized in ***Table 4-3***. The existing traffic volumes at the study intersections during the weekday AM, School PM and PM peak hours are shown in ***Figures 4-3, 4-4*** and ***4-5***, respectively. Summary data worksheets of the manual traffic counts of the study intersections are contained in ***Appendix A***.

4.5 Existing Intersection Operating Conditions

Existing AM, School PM and PM peak hour operating conditions for the seven study intersections were evaluated using the methodology outlined in Chapter 20 of the *Highway Capacity Manual 6th Edition*[3] (HCM) for unsignalized intersections.

4.5.1 *Highway Capacity Manual Method of Analysis*

The HCM method determines the average control delay experienced at the intersections. The TWSC methodology estimates the average control delay for each minor-street movement (or shared movement) as well as major-street left-turns and determines the LOS for each constrained movement. Average control delay for any particular movement is a function of the capacity of the approach and the degree of saturation. The average control delay is measured in seconds per vehicle, and includes delay due to deceleration to a stop at the back of the queue from free-flow speed, move-up time within the queue, stopped delay at the front of the queue, and delay due to acceleration back to free-flow speed. The six qualitative categories of Level of Service have been defined along with the corresponding HCM control delay value range, as shown in ***Table 4-4***.

TABLE 4-4

LEVEL OF SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS

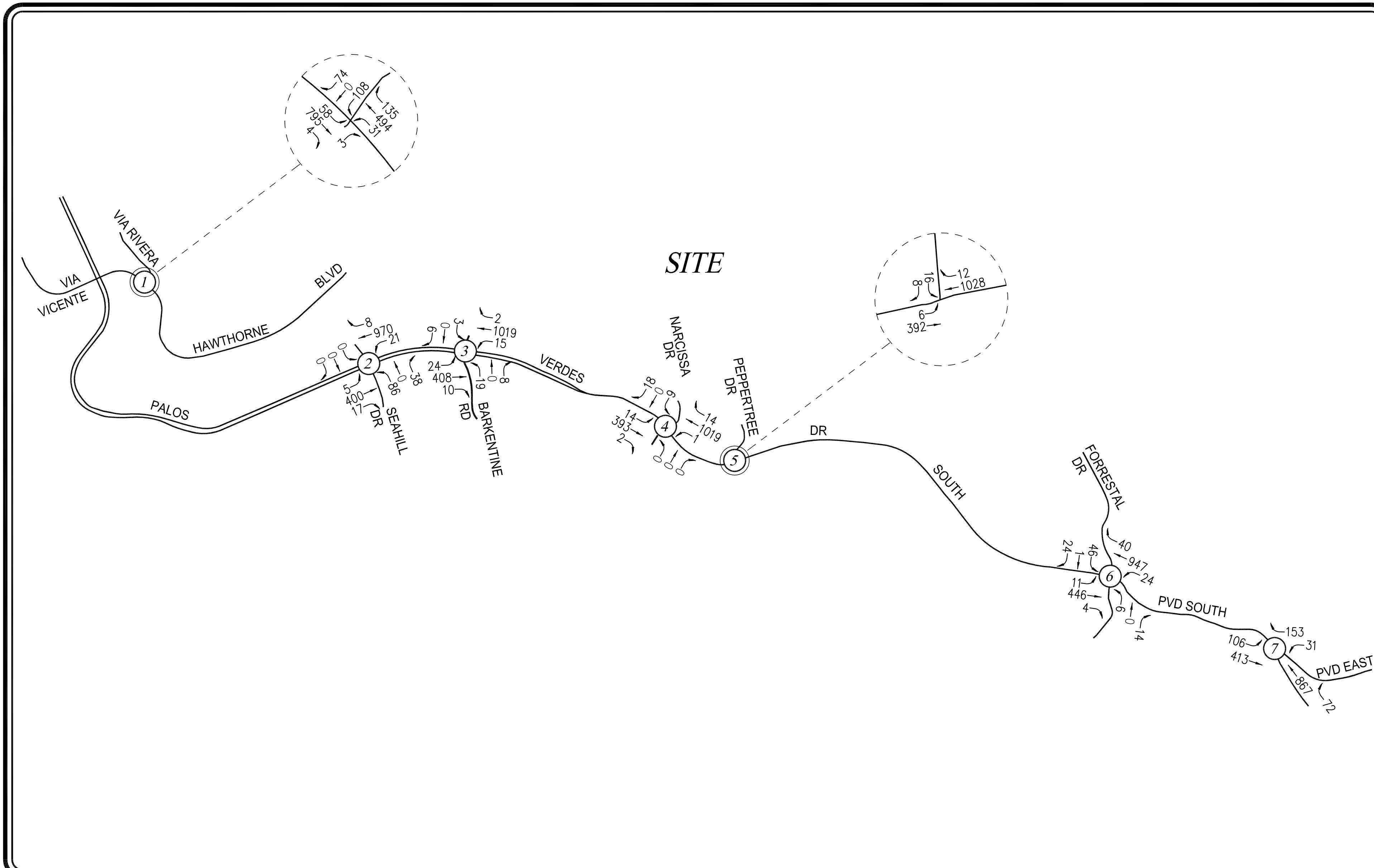
Level of Service (LOS)	Highway Capacity Manual Delay Value (sec/veh)	Level of Service Description
A	≤ 10.0	Little or no delay
B	> 10.0 and ≤ 15.0	Short traffic delays
C	> 15.0 and ≤ 25.0	Average traffic delays
D	> 25.0 and ≤ 35.0	Long traffic delays
E	> 35.0 and ≤ 50.0	Very long traffic delays
F	> 50.0	Severe congestion

[3] Source: *Highway Capacity Manual 6th Edition,* Transportation Research Board, 2016.

Table 4-3
EXISTING TRAFFIC VOLUMES [1]
WEEKDAY AM, PM AND SCHOOL PM PEAK HOURS

				AM PEAK HOUR		PM PEAK HOUR		SCHOOL PM PK HR	
NO.	**INTERSECTION**	**DATE**	**DIR**	**BEGAN**	**VOLUME**	**BEGAN**	**VOLUME**	**BEGAN**	**VOLUME**
1	Via Rivera/	11/29/2016	NB	7:45	3	4:30	9	2:45	10
	Hawthorne Boulevard	11/14/2018	SB		182		95		156
			EB		857		596		799
			WB		660		728		927
2	Tramonto Drive-Seahill Drive/	11/29/2016	NB	7:15	124	5:00	68	3:00	76
	Palos Verdes Drive South	11/14/2018	SB		0		10		6
			EB		422		726		991
			WB		999		547		547
3	Barkentine Road/	11/14/2018	NB	8:00	27	4:30	12	3:00	12
	Palos Verdes Drive South		SB		9		12		12
			EB		442		952		952
			WB		1,036		541		541
4	Narcissa Drive/	11/14/2018	NB	8:00	0	4:30	0	3:00	0
	Palos Verdes Drive South		SB		27		34		34
			EB		409		933		933
			WB		1,034		528		528
5	Peppertree Drive/	11/14/2018	NB	8:00	0	4:30	0	3:00	0
	Palos Verdes Drive South		SB		24		17		17
			EB		398		920		920
			WB		1,040		535		535
6	Forrestal Drive/	11/29/2016	NB	7:30	20	4:30	50	3:00	49
	Palos Verdes Drive South	11/14/2018	SB		71		72		64
			EB		461		823		942
			WB		1,011		521		607
7	Palos Verdes Drive East/	11/29/2016	NB	7:30	0	4:30	0	3:00	0
	Palos Verdes Drive South	11/14/2018	SB		184		111		164
			EB		519		865		959
			WB		939		506		535

[1] Counts conducted by NDS, City Traffic Counters and Counts Unlimited



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(X) = INTERSECTION NUMBER

FIGURE 4-3
EXISTING TRAFFIC VOLUMES

WEEKDAY AM PEAK HOUR

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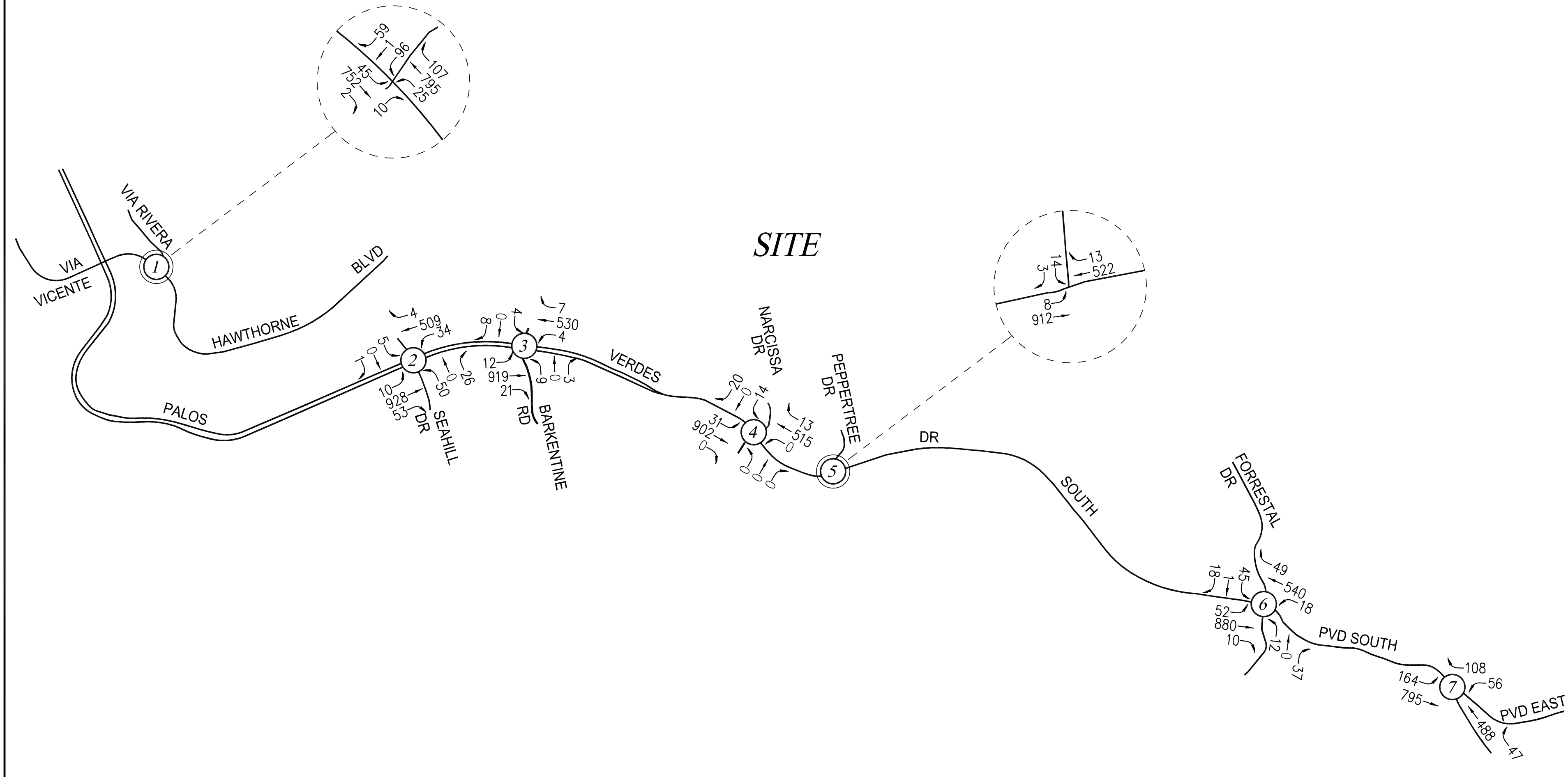

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FIGURE 4-4
EXISTING TRAFFIC VOLUMES
WEEKDAY SCHOOL PM PEAK HOUR

ZONE 2 LANDSLIDE MORATORIUM - PORTUGUESE BEND PROJECT

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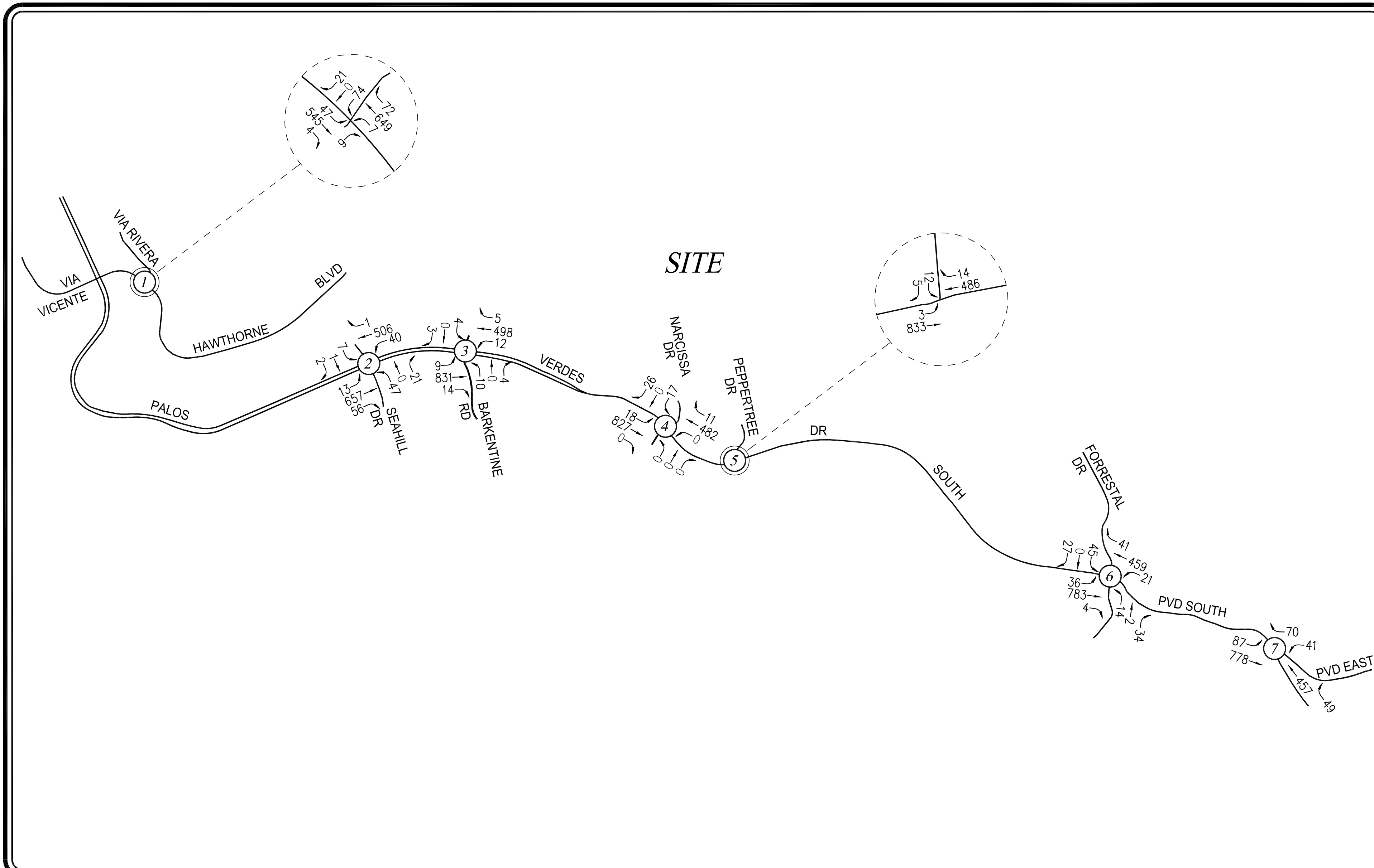

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FIGURE 4-5
EXISTING TRAFFIC VOLUMES

WEEKDAY PM PEAK HOUR

ZONE 2 LANDSLIDE MORATORIUM - PORTUGUESE BEND PROJECT

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4.5.2 *Existing Level of Service Results*

The existing peak hour service level calculations for the seven study intersections based on existing traffic volumes and current street geometry is summarized in ***Table 4-5***. Review of *Table 4-5* indicates that two of the seven study intersections are currently operating at acceptable Levels of Service (i.e., LOS D or better) during the weekday AM, School PM and PM peak hours. The HCM data worksheets for the analyzed intersections for the weekday AM and PM peak hours are contained in ***Appendix B***.

Table 4-5
SUMMARY OF EXISTING INTERSECTION DELAYS AND LEVELS OF SERVICE
WEEKDAY AM, PM, AND SCHOOL PM PEAK HOURS

NO.	INTERSECTION	TRAFFIC CONTROL	PEAK HOUR	YEAR 2018 EXISTING CONDITIONS DELAY [a]	LOS [b]
1	Via Rivera/ Hawthorne Boulevard	Two-Way Stop	AM School PM PM	77.5 189.0 40.7	F F E
2	Tramonto Drive-Seahill Drive/ Palos Verdes Drive South	Two-Way Stop	AM School PM PM	32.6 58.9 31.1	D F D
3	Barkentine Road/ Palos Verdes Drive South	Two-Way Stop	AM School PM PM	23.3 31.4 26.5	C D D
4	Narcissa Drive/ Palos Verdes Drive South	Two-Way Stop	AM School PM PM	46.6 52.1 42.4	E F E
5	Peppertree Drive/ Palos Verdes Drive South	Two-Way Stop	AM School PM PM	30.3 31.9 24.5	D D C
6	Forrestal Drive/ Palos Verdes Drive South	Two-Way Stop	AM School PM PM	62.3 107.7 52.5	F F F
7	Palos Verdes Drive East/ Palos Verdes Drive South	Two-Way Stop	AM School PM PM	30.3 47.0 25.0	D E C

[a] Reported control delay values in seconds per vehicle. For two-way stop controlled intersections, reported control delay values represent the delays associated with the most constrained approach of the intersection.

[b] Unsignalized Intersection Levels of Service are based on the following criteria:

Control Delay (s/veh)	LOS
<= 10	A
> 10-15	B
> 15-25	C
> 25-35	D
> 35-50	E
> 50	F

5.0 TRAFFIC FORECASTING METHODOLOGY

In order to estimate the traffic impact characteristics of the Zone 2 Landslide Moratorium - Portuguese Bend project, a multi-step process has been utilized. The first step is trip generation, which estimates the total arriving and departing traffic volumes on a peak hour and daily basis. The traffic generation potential is forecast by applying the appropriate vehicle trip generation equations or rates to the project development tabulation.

The second step of the forecasting process is trip distribution, which identifies the origins and destinations of inbound and outbound project traffic volumes. These origins and destinations are typically based on demographics and existing/anticipated travel patterns in the study area.

The third step is traffic assignment, which involves the allocation of project traffic to study area streets and intersections. Traffic assignment is typically based on minimization of travel time, which may or may not involve the shortest route, depending on prevailing operating conditions and travel speeds. Traffic distribution patterns are indicated by general percentage orientation, while traffic assignment allocates specific volume forecasts to individual roadway links and intersection turning movements throughout the study area.

With the forecasting process complete and project traffic assignments developed, the impact of the proposed project is isolated by comparing operational (i.e., LOS) conditions at selected key intersections using existing and expected future traffic volumes without and with forecast project traffic. The need for site-specific and/or cumulative local area traffic improvements can then be evaluated and the significance of the project's impacts identified.

5.1 Project Traffic Generation Characteristics

Traffic generation is expressed in vehicle trip ends, defined as one-way vehicular movements, either entering or exiting the generating land use. Traffic volumes to be generated by the proposed project were forecast for the weekday AM and PM peak hours, and over a 24-hour period. The resource typically used by traffic engineers (including the City of Rancho Palos Verdes) to forecast trip generation for development projects is the Institute of Transportation Engineers' (ITE) *Trip Generation* manual[4]. ITE Land Use Code 210 (Single-Family Detached Housing) trip generation average rates were used to forecast traffic volumes for the proposed project.

The trip generation rates and forecast of the vehicular trips anticipated to be generated by the proposed project are presented in ***Table 5-1***. As summarized in *Table 5-1*, the proposed project is expected to generate 23 vehicle trips (6 inbound trips and 17 outbound trips) during the AM peak hour. During the PM peak hour, the proposed project is expected to generate 31 vehicle trips (20 inbound trips and 11 outbound trips). Over a 24-hour period, the proposed project is forecast to generate 293 daily trip ends during a typical weekday (approximately 147 inbound trips and 147 outbound trips). For purposes of this analysis, the weekday PM peak hour project traffic generation

[4] Institute of Transportation Engineers *Trip Generation Manual*, 10th Edition, 2017.

Table 5-1
PROJECT TRIP GENERATION [1]

LAND USE	SIZE	DAILY TRIP ENDS [2] VOLUMES	AM PEAK HOUR VOLUMES [2]			SCHOOL PM PEAK HOUR VOLUMES [2]			PM PEAK HOUR VOLUMES [2]		
			IN	OUT	TOTAL	IN	OUT	TOTAL	IN	OUT	TOTAL
Single Family Housing [3]	31 DU	293	6	17	23	20	11	31	20	11	31
TOTAL		**293**	**6**	**17**	**23**	**20**	**11**	**31**	**20**	**11**	**31**

[1] Source: ITE "Trip Generation Manual", 10th Edition, 2017.
[2] Trips are one-way traffic movements, entering or leaving.
[3] ITE Land Use Code 210 (Single-Family Detached Housing) trip generation average rates.
- Daily Trip Rate: 9.44 trips/dwelling unit; 50% inbound/50% outbound
- AM Peak Hour Trip Rate: 0.74 trips/dwelling units; 25% inbound/75% outbound
- PM Peak Hour Trip Rate: 0.99 trips/dwelling units; 63% inbound/37% outbound

was assumed to also comprise the School PM peak hour project traffic generation in order to provide a conservative forecast of potential traffic impacts.

5.2 Project Traffic Distribution and Assignment

The general, directional traffic distribution pattern for the proposed Zone 2 Landslide Moratorium - Portuguese Bend project is presented in ***Figure 5-1.*** Project traffic volumes both entering and exiting the site have been distributed and assigned to the adjacent street system based on the following considerations:

- The site's proximity to major traffic corridors (i.e., Palos Verdes Drive South),
- Expected localized traffic flow patterns based on adjacent roadway channelization and presence of traffic signals,
- Existing intersection traffic volumes,
- Ingress/egress availability at the project site, and
- Input from City staff.

The forecast weekday AM, School PM and PM peak hour project traffic volumes associated with the proposed project are presented in ***Figures 5-2, 5-3*** and ***5-4***, respectively. The traffic volume assignments presented in *Figures 5-2, 5-3* and *5-4* reflect the traffic distribution characteristics shown in *Figure 5-1* and the project traffic generation forecasts presented in *Table 5-1*.

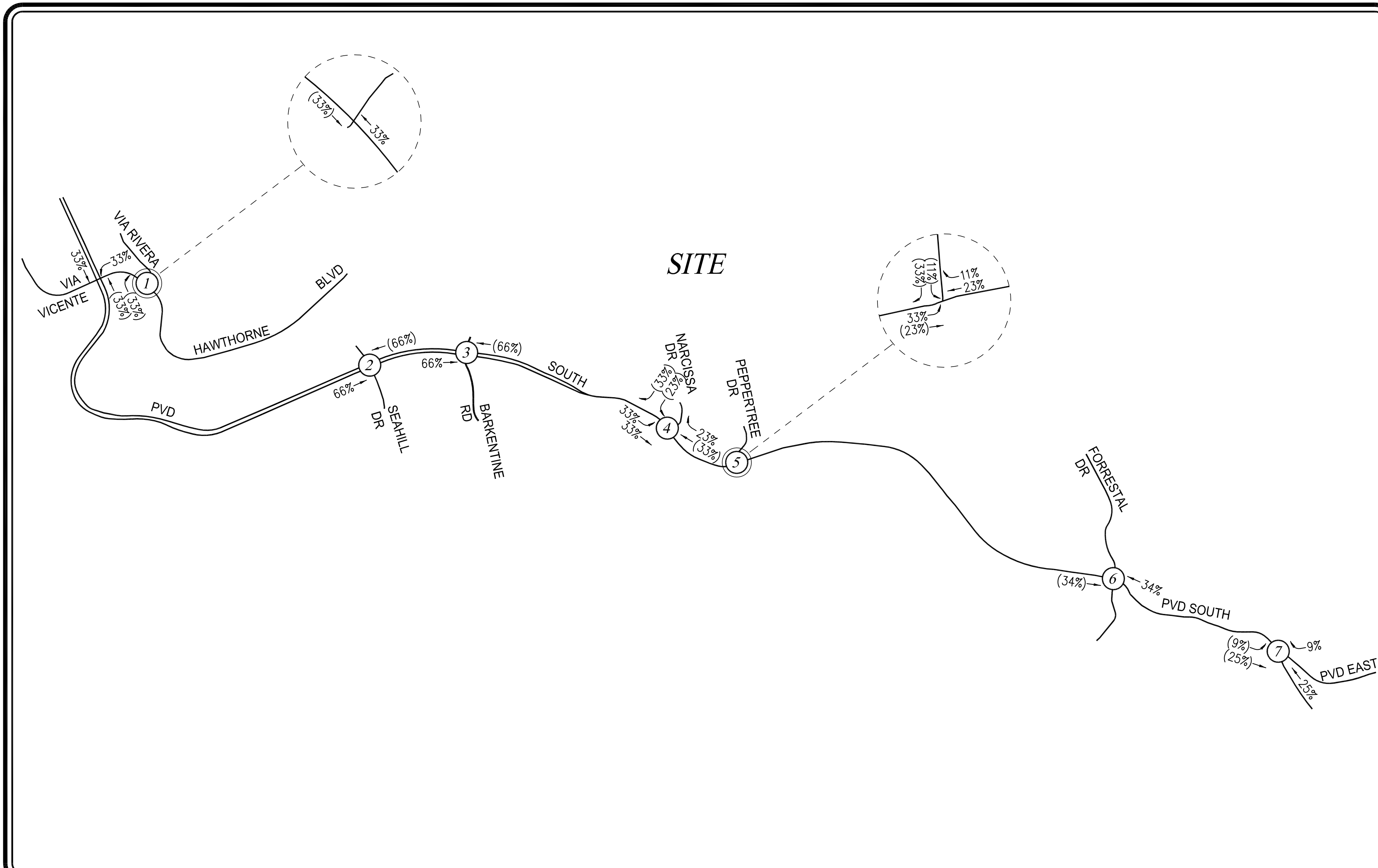

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FIGURE 5-1
PROJECT TRAFFIC DISTRIBUTION PATTERN

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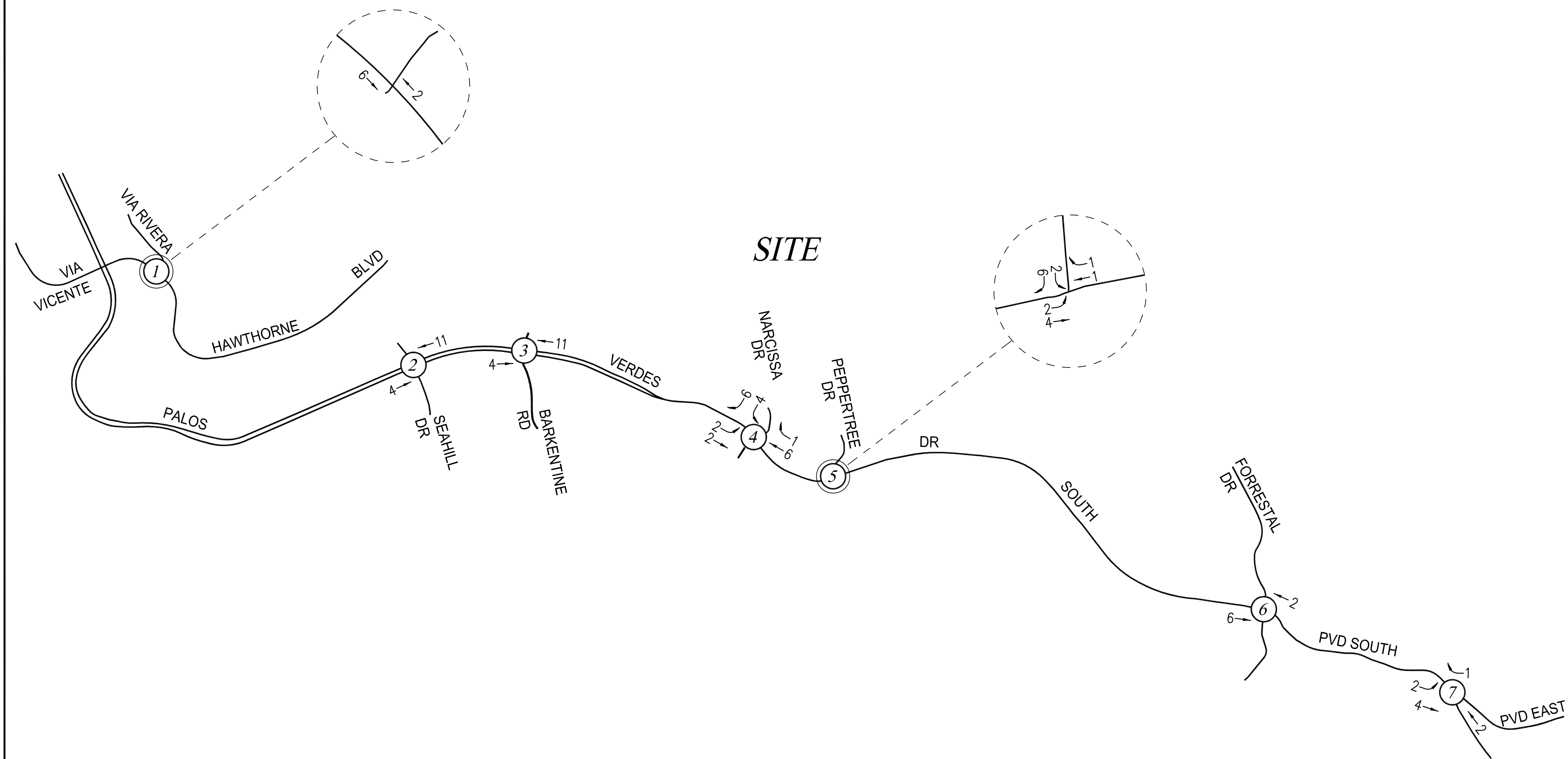

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FIGURE 5-2
PROJECT TRAFFIC VOLUMES
WEEKDAY AM PEAK HOUR

ZONE 2 LANDSLIDE MORATORIUM - PORTUGUESE BEND PROJECT

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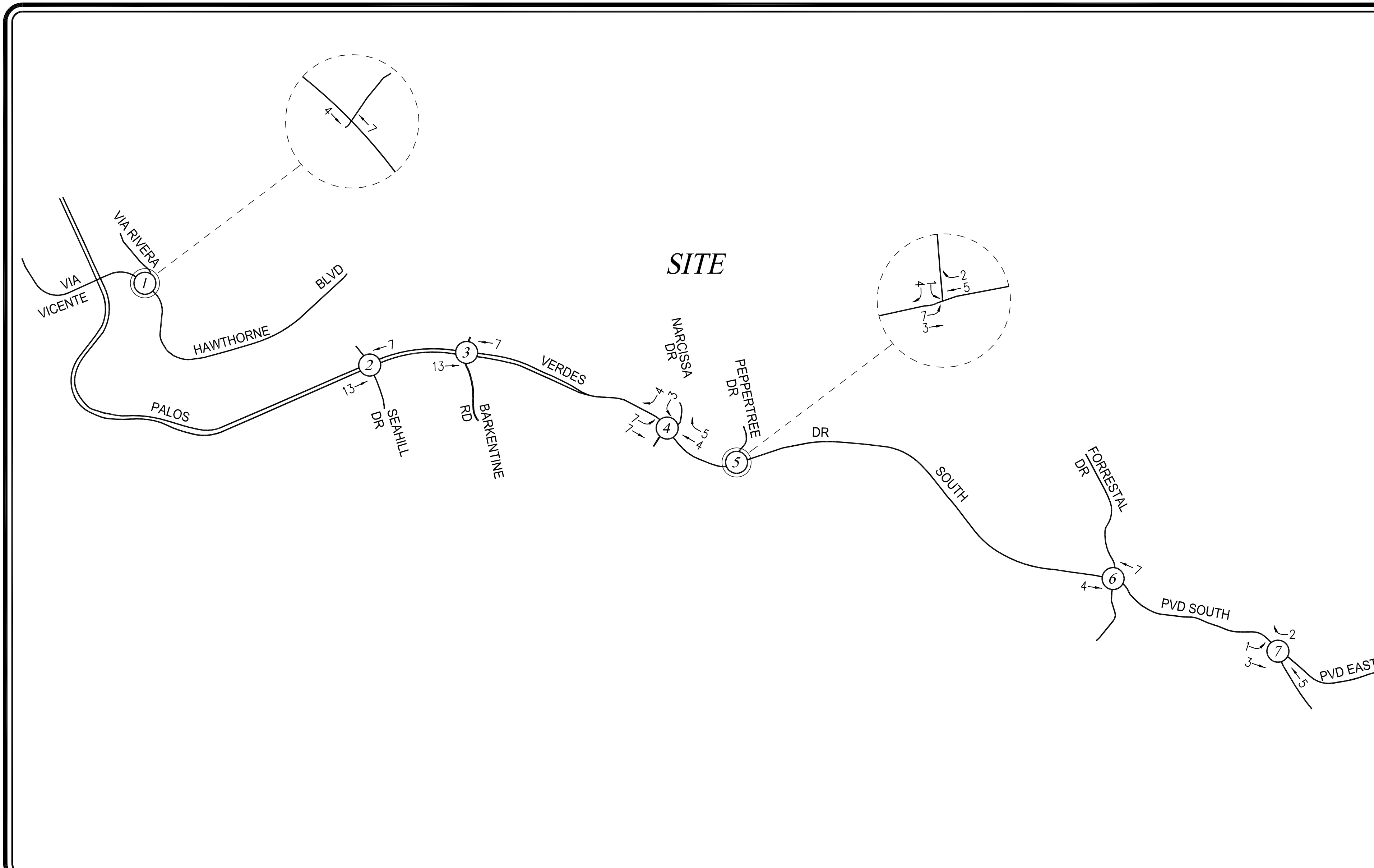

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FIGURE 5-3
PROJECT TRAFFIC VOLUMES
WEEKDAY SCHOOL PM PEAK HOUR

ZONE 2 LANDSLIDE MORATORIUM - PORTUGUESE BEND PROJECT

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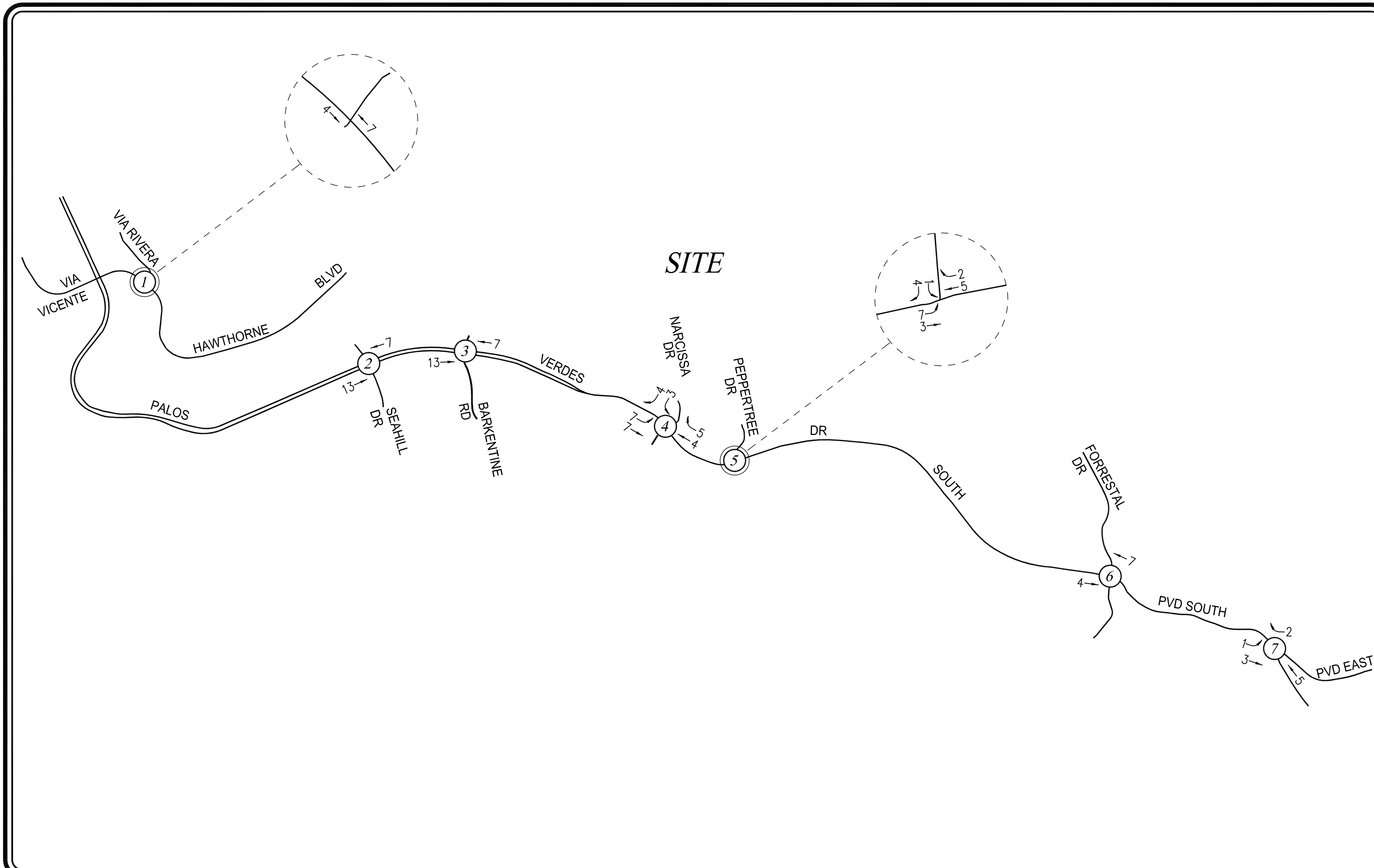

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FIGURE 5-4
PROJECT TRAFFIC VOLUMES
WEEKDAY PM PEAK HOUR

ZONE 2 LANDSLIDE MORATORIUM - PORTUGUESE BEND PROJECT

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6.0 FUTURE TRAFFIC CONDITIONS

The forecast of future pre-project conditions was prepared in accordance with procedures outlined in Section 15130 of the California Environmental Quality Act (CEQA) Guidelines. Specifically, the CEQA Guidelines provides two options for developing the future traffic volume forecast:

> "(A) A list of past, present, and probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the [lead] agency, or
>
> (B) A summary of projections contained in an adopted local, regional or statewide plan, or related planning document, that describes or evaluates conditions contributing to the cumulative effect. Such plans may include: a general plan, regional transportation plan, or plans for the reduction of greenhouse gas emissions. A summary of projections may also be contained in an adopted or certified prior environmental document for such a plan. Such projections may be supplemented with additional information such as a regional modeling program. Any such document shall be referenced and made available to the public at a location specified by the lead agency."

The traffic analysis is conservative in that for the future year 2030 pre-project condition, both option "A" and "B" have been incorporated into the analysis as outlined the CEQA Guidelines for purposes of developing the future year 2030 forecasts.

6.1 Ambient Traffic Growth

Horizon year, background traffic growth estimates have been calculated by using an ambient traffic growth factor. The ambient traffic growth factor is intended to include unknown related projects in the study area, as well as account for typical growth in traffic volumes due to the development of projects outside the study area. The future growth in traffic volumes has been calculated at 0.6 percent (0.6%) per year. The ambient growth factor was based on review of the background traffic growth estimates for the Palos Verdes area published in the *2010 Congestion Management Program for Los Angeles County*, which indicate that existing traffic volumes would be expected to increase at an annual rate of approximately 0.51 percent (0.51% per year) between years 2010 and 2030. However, in order to provide a conservative analysis, the higher ambient growth factor of 0.60 percent (0.60% per year) contained in the *2004 Congestion Management Program for Los Angeles County* was utilized in this analysis. Application of the ambient traffic growth factor to existing traffic volumes results in a 6.0 percent (6.0%) increase in existing traffic volumes to horizon Year 2030.

6.2 Related Projects Traffic Characteristics

In order to make a realistic estimate of future on-street conditions prior to implementation of the Zone 2 Landslide Moratorium - Portuguese Bend project, the status of other known development projects (related projects) in the area has been researched at the City of Rancho Palos Verdes, City of Rolling Hills Estates, City of Torrance, and City of Los Angeles. With this information, the potential impact of the proposed project can be evaluated within the context of the cumulative impact of all ongoing development. Based on current research, 22 related projects are located in the project vicinity that have either been built, but not yet fully occupied, or are being processed for approval. These 22 related projects have been included as part of the cumulative background setting in Year 2030.

The location of the related projects and a brief description for each of the 22 related projects are described in ***Table 6-1***. The location of the related projects is graphically illustrated in ***Figure 6-1***. These related projects are expected to generate vehicular traffic, which may affect the operating conditions of the key study intersections.

Traffic volumes expected to be generated by the related projects were calculated using rates provided in the ITE *Trip Generation Manual*. The related projects respective traffic generation for the weekday AM and PM peak hours, as well as on a daily basis for a typical weekday, is summarized in *Table 6-1*. The assignment of the related projects traffic volumes to the study intersections during the weekday AM and PM peak hours are displayed in ***Figures 6-2*** and ***6-3***, respectively. It should be noted that the weekday PM peak hour trip generation for related projects were utilized for the School PM peak hour period.

6.3 Existing With Project Traffic Volumes

The forecast weekday AM, School PM and PM peak hour with project traffic volumes (i.e., existing traffic volumes and proposed project traffic volumes) at the seven study intersections are illustrated in ***Figures 6-4, 6-5*** and ***6-6***, respectively.

6.4 Year 2030 Traffic Volumes

6.4.1 *Year 2030 Future Pre-Project Traffic Volumes*

The Year 2030 future forecast weekday AM, School PM and PM peak hour pre-project traffic volumes (i.e., existing traffic volumes, ambient traffic growth to Year 2030 and related projects traffic volumes) at the seven study intersections are presented in ***Figures 6-7, 6-8*** and ***6-9***, respectively.

6.4.2 *Year 2030 Future With Project Traffic Volumes*

The Year 2030 future forecast weekday AM, School PM and PM peak hour with project traffic volumes (i.e., existing traffic volumes, ambient traffic growth to Year 2030, related projects and proposed project traffic volumes) at the seven study intersections are illustrated in ***Figures 6-10, 6-11*** and ***6-12***, respectively.

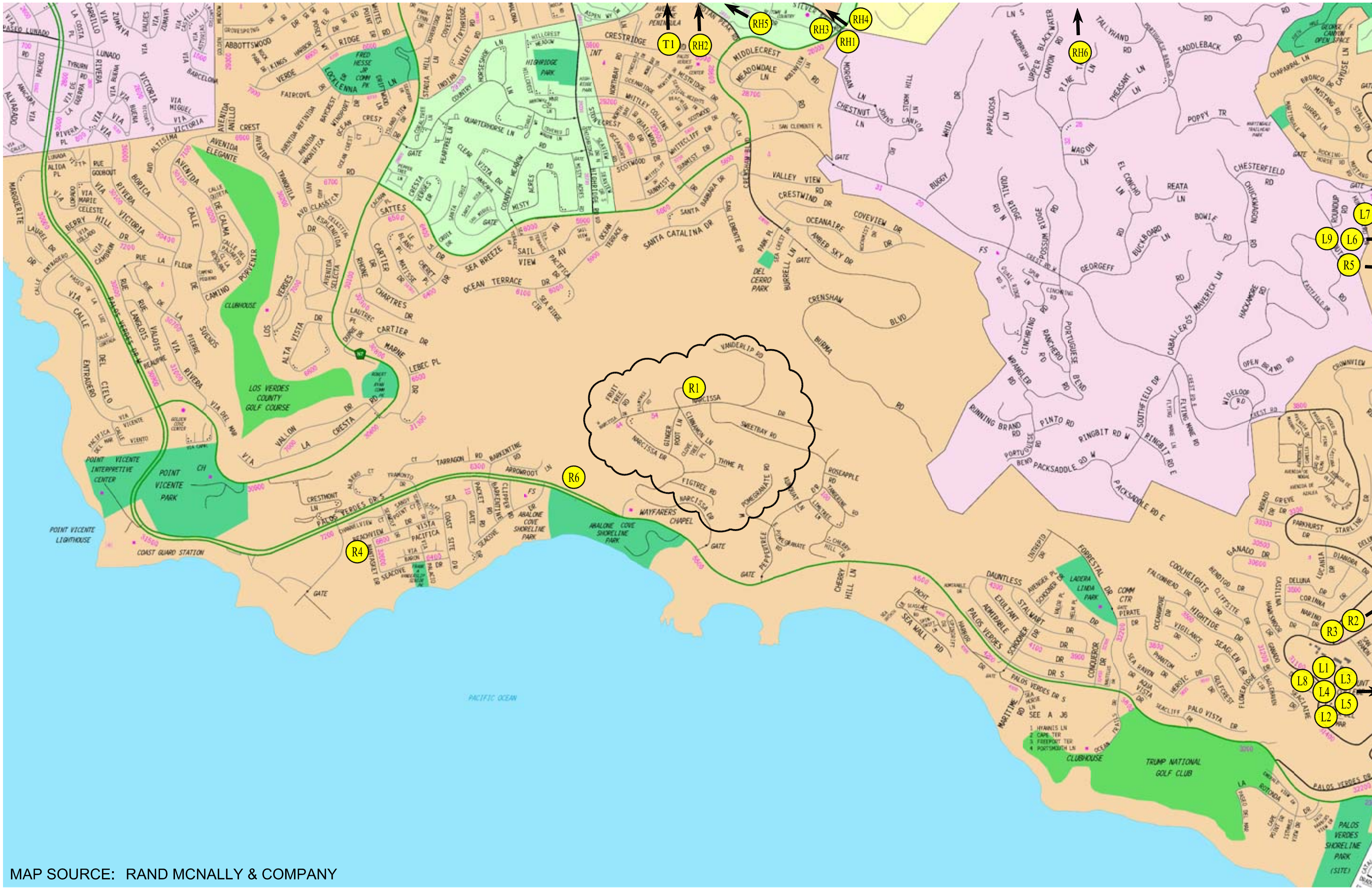
Table 6-1
RELATED PROJECTS LIST AND TRIP GENERATION [1]

MAP NO.	PROJECT STATUS	PROJECT NAME/NUMBER ADDRESS/LOCATION	LAND USE DATA: LAND-USE	LAND USE DATA: SIZE	PROJECT DATA SOURCE	DAILY TRIP ENDS [2] VOLUMES	AM PEAK HOUR VOLUMES [2] IN	AM OUT	AM TOTAL	PM PEAK HOUR VOLUMES [2] IN	PM OUT	PM TOTAL
City of Rancho Palos Verdes												
R1	Under Construction	Monks Plaintiffs' Lots Zone 2 of the Landslide Moratorium Area	Single Family Residential	16 DU	[3]	151	3	9	12	10	6	16
R2	Proposed	Patel Subdivision 27581 Palos Verdes Drive East	Single Family Residential	2 DU	[3]	19	0	1	1	1	1	2
R3	Proposed	Maupin Subdivision 30389 & 30399 Palos Verdes Drive East	Single Family Residential	2 DU	[3]	19	0	1	1	1	1	2
R4	Proposed	Nantasket Subdivision 11-41 Nantasket Drive	Single Family Residential	4 DU	[3]	38	1	2	3	3	1	4
R5	Proposed	Chase Bank 28300 S. Western Avenue	Bank	4,131 GSF	[4]	413	23	16	39	42	42	84
R6	Proposed	Point View 6001 Palos Verdes Drive South	Single Family Residential	38 DU	[3]	359	7	21	28	24	14	38
City of Rolling Hills Estates												
RH1	Under Construction	601-627 Silver Spur Road 600 Deep Valley Drive	Residential Care Facility	114 DU	[5]	230	5	3	8	11	10	21
RH2	Approved	27520 Hawthorne Boulevard	Residential Care Facility	91 DU	[5]	184	4	2	6	8	8	16
RH3	Approved	927 Deep Valley Drive	Condominium Commercial	75 DU 2,000 GLSF	[6] [7]	549 76	8 1	27 1	35 2	26 4	16 4	42 8
RH4	Under Construction	Peninsula Center Southwest corner of Hawthorne Blvd and Silver Spur Road	Commercial	16,000 GLSF	[7]	604	9	6	15	29	32	61
RH5	Under Construction	627 Deep Valley Drive	Condominium Commercial	58 DU 5,810 GLSF	[6] [7]	425 219	6 3	21 2	27 5	20 11	12 11	32 22
RH6	Approved	26311-27000 Palos Verdes Drive East	Single Family Residential Country Club	114 DU 61,411 GSF	[3] [8]	1,076 1,770	21 71	63 37	84 108	71 67	42 75	113 142
City of Los Angeles												
L1	Proposed	319 N. Harbor Boulevard	Condominiums	94 DU	[9]	551	7	34	41	33	16	49
L2	Proposed	1046 S. Seaside Avenue	Dry Dock Facility	7 Acres	[9]	362	30	0	30	0	30	30

Table 6-1 (Continued)
RELATED PROJECTS LIST AND TRIP GENERATION [1]

MAP NO.	PROJECT STATUS	PROJECT NAME/NUMBER ADDRESS/LOCATION	LAND USE DATA: LAND-USE	LAND USE DATA: SIZE	PROJECT DATA SOURCE	DAILY TRIP ENDS [2] VOLUMES	AM PEAK HOUR VOLUMES [2] IN	AM OUT	AM TOTAL	PM PEAK HOUR VOLUMES [2] IN	PM OUT	PM TOTAL
L3	Under Construction	550 S. Palos Verdes Street	Apartment Retail Office	412 DU 3,800 GLSF 14,875 GSF	[9]	5,478	66	335	401	331	163	494
L4	Under Construction	Del Taco 670 W. 4th Street	High-Turnover Restaurant	2,619 GSF	[10]	630	29	28	57	21	20	41
L5	Proposed	Harbor View Mixed-Use 921 S. Beacon Street	Mixed-Use	107,000 GSF	[9]	1,114	43	55	98	64	32	96
L6	Proposed	2175 W. John S Gibson Boulevard	Affordable Housing	165 DU	[9]	30	2	2	4	2	2	4
L7	Under Construction	Ponte Vista at San Pedro 26900 S. Western Avenue	Single-Family Residential Condominiums	208 DU 492 DU	[11]	4,850	76	296	372	304	162	466
L8	Proposed	437-439 West 4th Street	Apartment Affordable Housing Retail	91 DU 8 DU 2,000 GLSF	[12]	566	11	27	38	28	19	47
L9	Proposed	515 N. Beacon Street	Temporary Shelters	102 Beds	[9]	130	6	8	14	8	6	14
City of Torrance												
T1	Proposed	Southwest corner of Hawthorne Boulevard and Via Valmonte	Apartment	248 DU	[13]	1,650	23	51	74	56	41	97
TOTAL						**21,493**	**455**	**1,048**	**1,503**	**1,175**	**766**	**1,941**

[1] Sources: City of Rancho Palos Verdes Planning Department, City of Rolling Hills Estates Planning Department and the City of Los Angeles Department of Transportation (LADOT) and Planning. Trip generation for the related projects are base on ITE "Trip Generation Manual", 10th Edition, 2017 (as referenced in the Project Data Source column) unless otherwise noted.
[2] Trips are one-way traffic movements, entering or leaving.
[3] ITE Land Use Code 210 (Single Family Detached Housing) trip generation average rates.
[4] ITE Land Use Code 912 (Drive-in Bank) trip generation average rates.
[5] ITE Land Use Code 253 (Congregate Care Facility) trip generation average rates.
[6] ITE Land Use Code 220 (Multifamily Housing (Low-Rise) trip generation average rates.
[7] ITE Land Use Code 820 (Shopping Center) trip generation average rates.
[8] ITE Land Use Code 495 (Recreational Community Center) trip generation average rates.
[9] City of Los Angeles Departments of Transportation (LADOT) and Planning, except as noted below. The peak hour traffic volumes were forecast based on trip data provided by LADOT and by applying trip rates as provided in the ITE "Trip Generation Manual", 9th Edition, 2012. For those related projects that LADOT provided trip data, the peak hour directional distribution data provided in the ITE "Trip Generation Manual" were utilized.
[10] Source: "Del Taco Restaurant Project Traffic Impact Study," prepared by LLG Engineers, dated February 28, 2017.
[11] Source: "Ponte Vista at San Pedro Traffic Assessment" prepared by LLG Engineers, dated September 13, 2013.
[12] Source: "Ponte Vista Mixed-Use Transportation Impact Study" prepared by LLG Engineers, dated November 19, 2018.
[13] Source: "Solana Torrance Traffic Impact Study" prepared by KHR Associates, dated April 20, 2017.



PROJECT AREA

(R) CITY OF RANCHO PALOS VERDES RELATED PROJECT

(RH) CITY OF ROLLING HILLS ESTATES RELATED PROJECT

(L) CITY OF LOS ANGELES RELATED PROJECT

(T) CITY OF TORRANCE RELATED PROJECT

N

NOT TO SCALE

LINSCOTT, LAW & GREENSPAN, engineers

FIGURE 6-1
LOCATION OF RELATED PROJECTS

ZONE 2 LANDSLIDE MORATORIUM - PORTUGUESE BEND PROJECT

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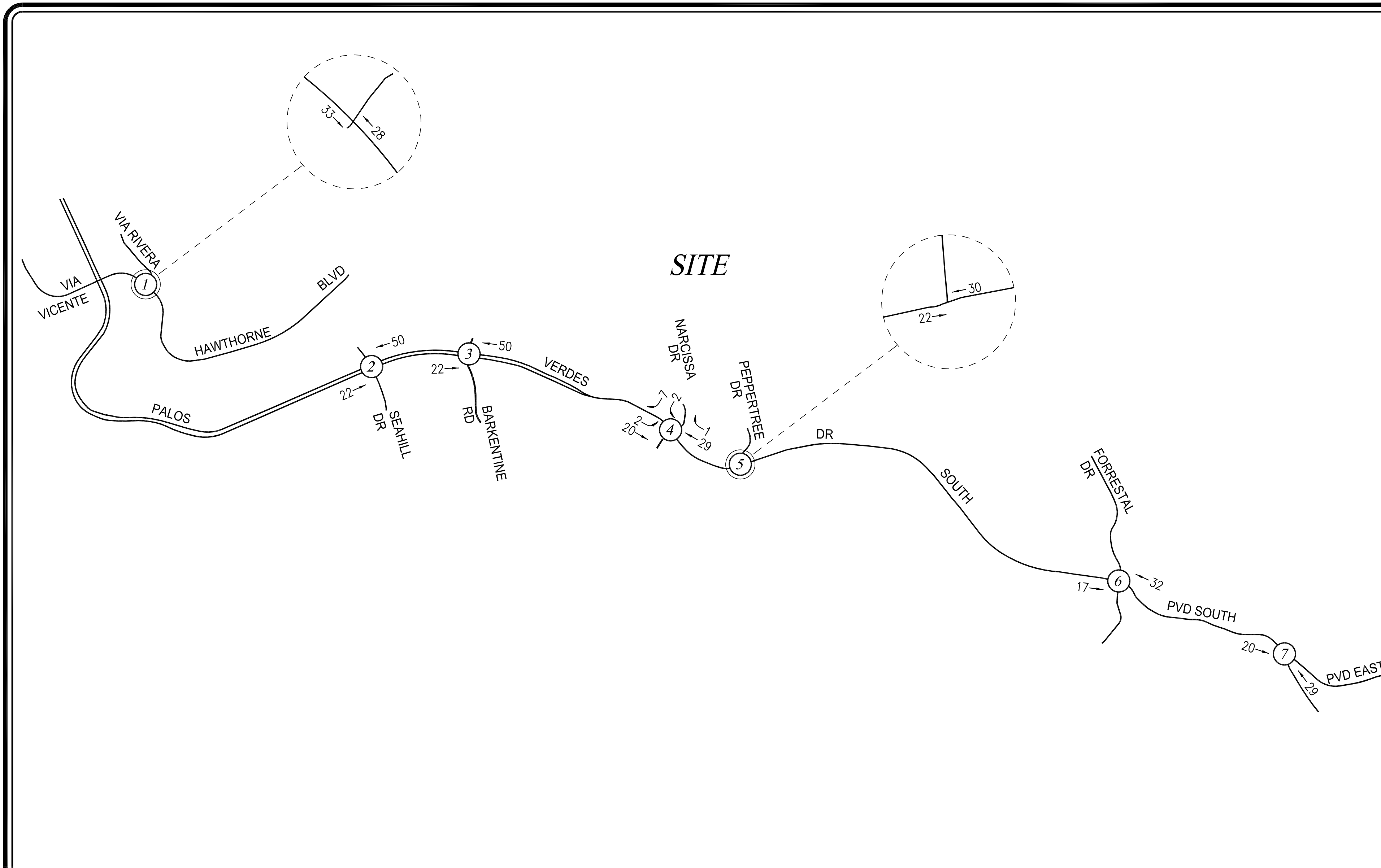

FIGURE 6-2
RELATED PROJECTS TRAFFIC VOLUMES
WEEKDAY AM PEAK HOUR
ZONE 2 LANDSLIDE MORATORIUM - PORTUGUESE BEND PROJECT

LINSCOTT, LAW & GREENSPAN, engineers

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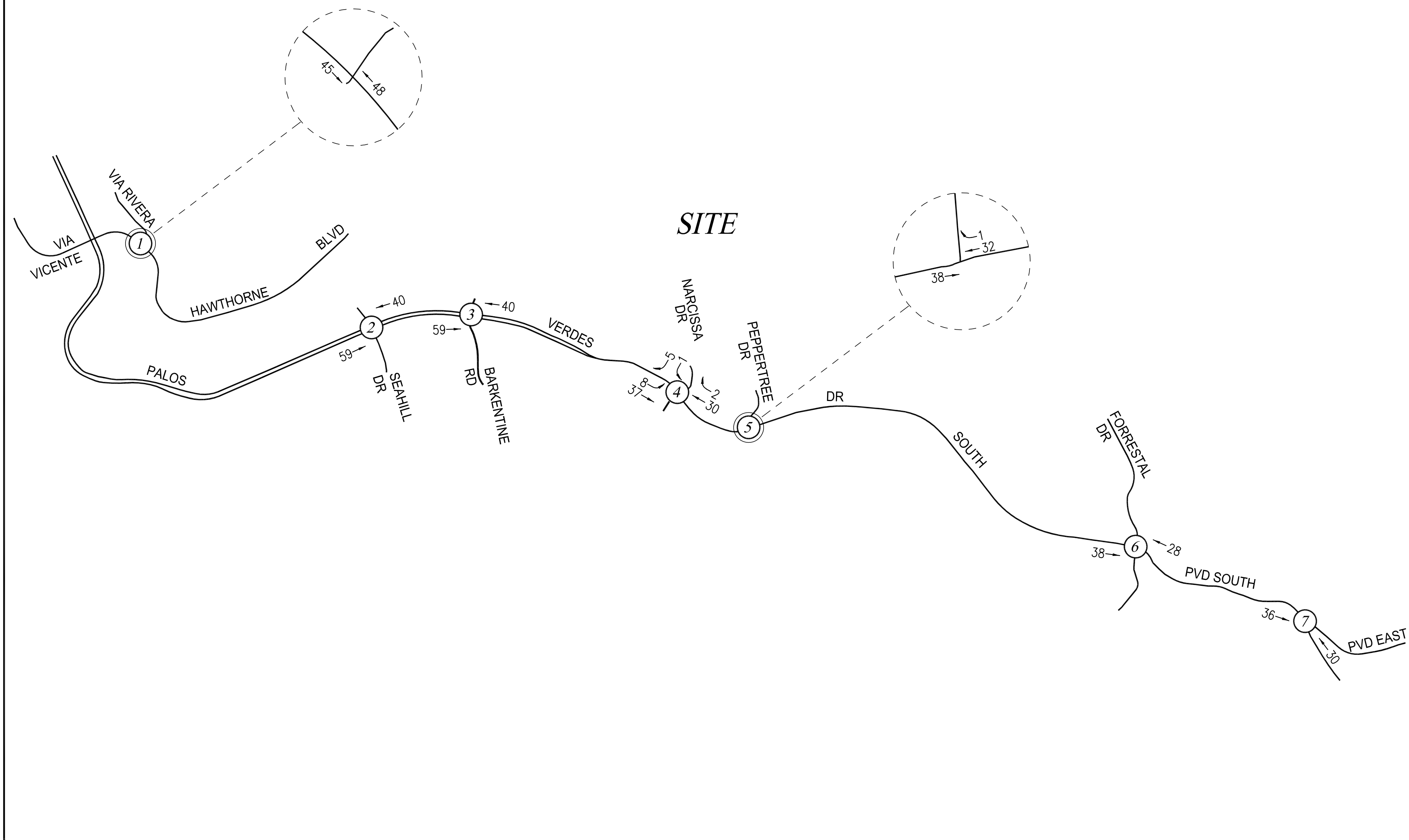

NOT TO SCALE

(X) = INTERSECTION NUMBER

LINSCOTT, LAW & GREENSPAN, engineers

FIGURE 6-3
RELATED PROJECTS TRAFFIC VOLUMES
WEEKDAY PM PEAK HOUR
ZONE 2 LANDSLIDE MORATORIUM - PORTUGUESE BEND PROJECT

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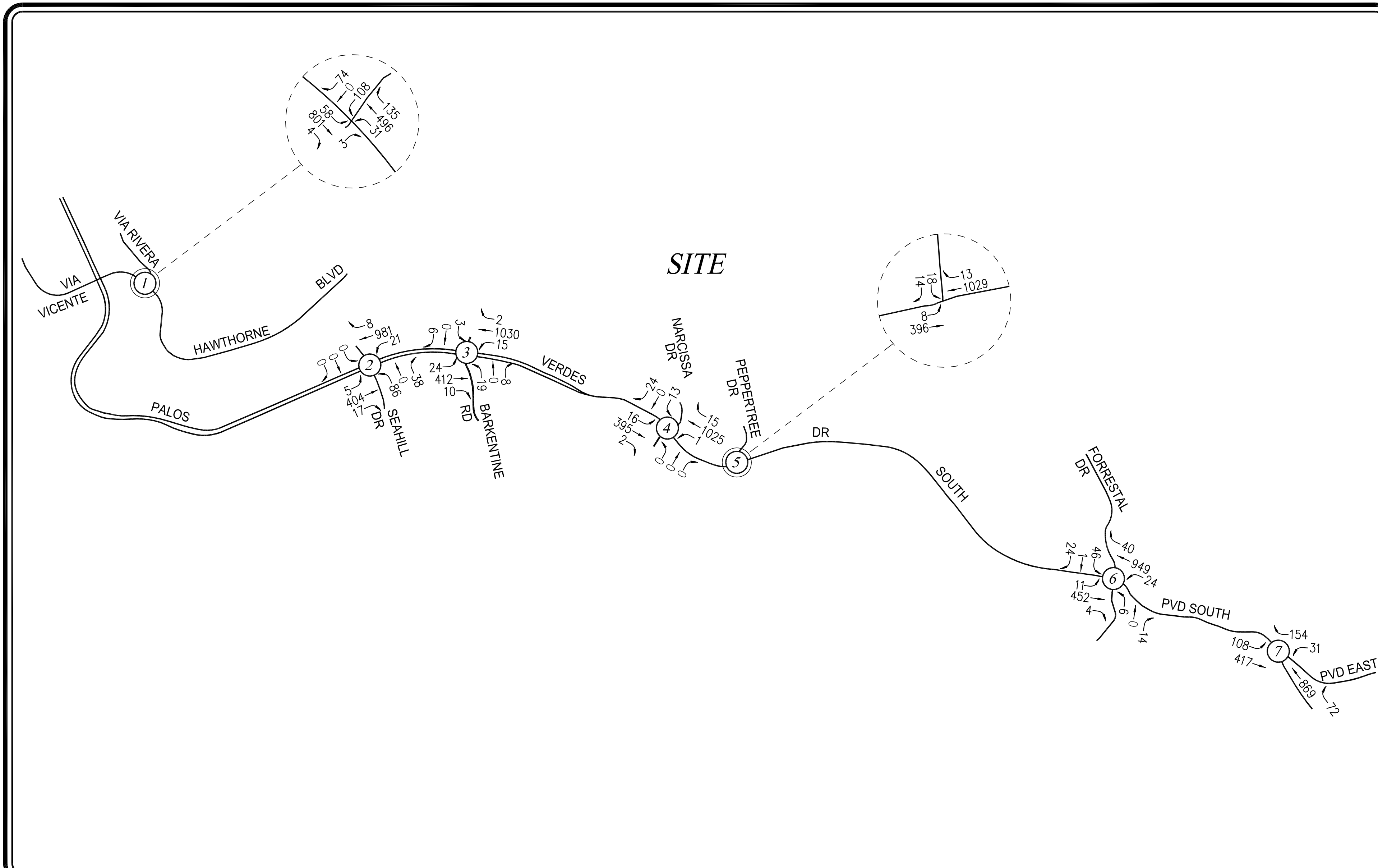

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FIGURE 6-4
EXISTING WITH PROJECT TRAFFIC VOLUMES
WEEKDAY AM PEAK HOUR
ZONE 2 LANDSLIDE MORATORIUM - PORTUGUESE BEND PROJECT

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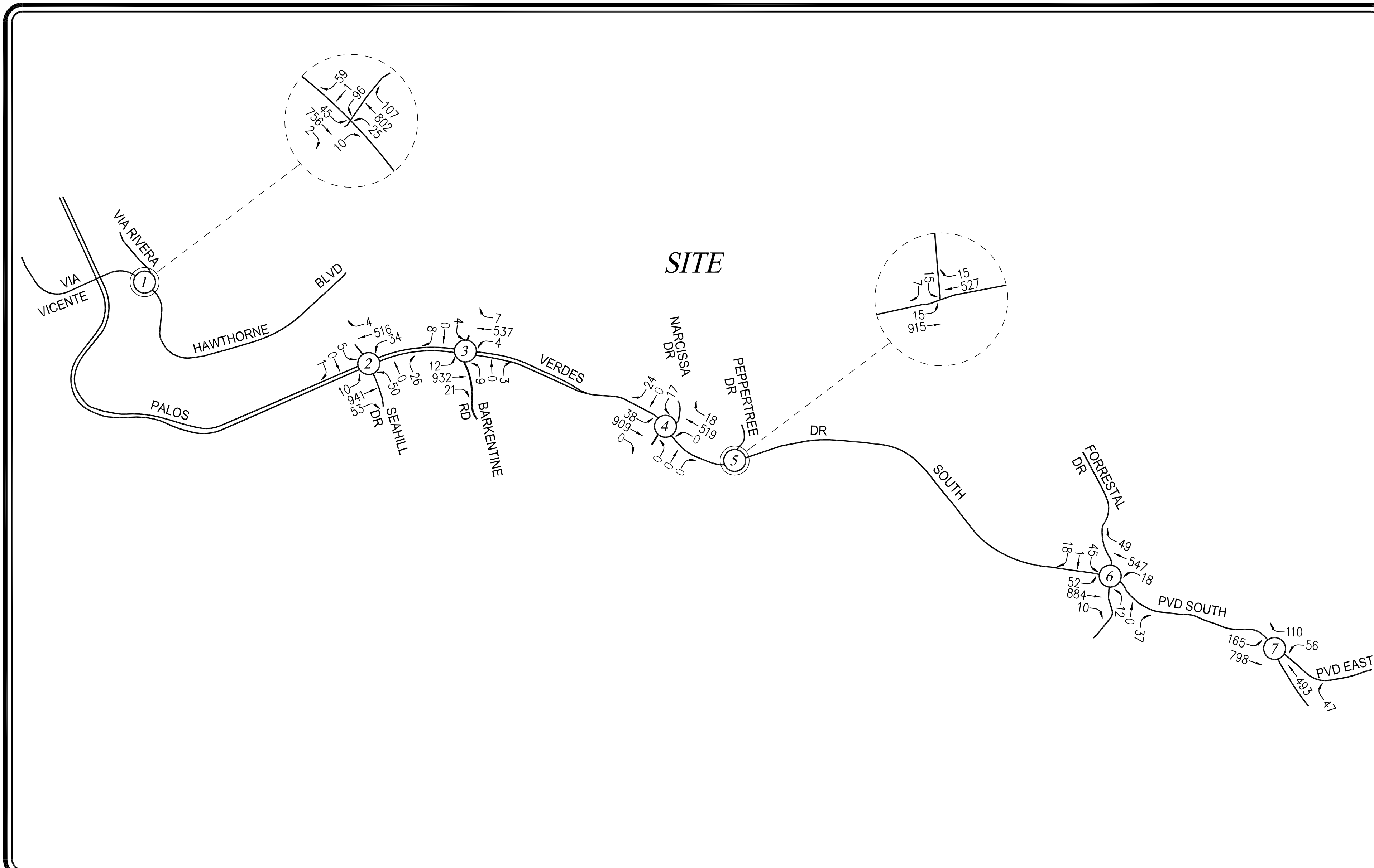

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(X) = INTERSECTION NUMBER

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FIGURE 6-5
EXISTING WITH PROJECT TRAFFIC VOLUMES
WEEKDAY SCHOOL PM PEAK HOUR

ZONE 2 LANDSLIDE MORATORIUM - PORTUGUESE BEND PROJECT

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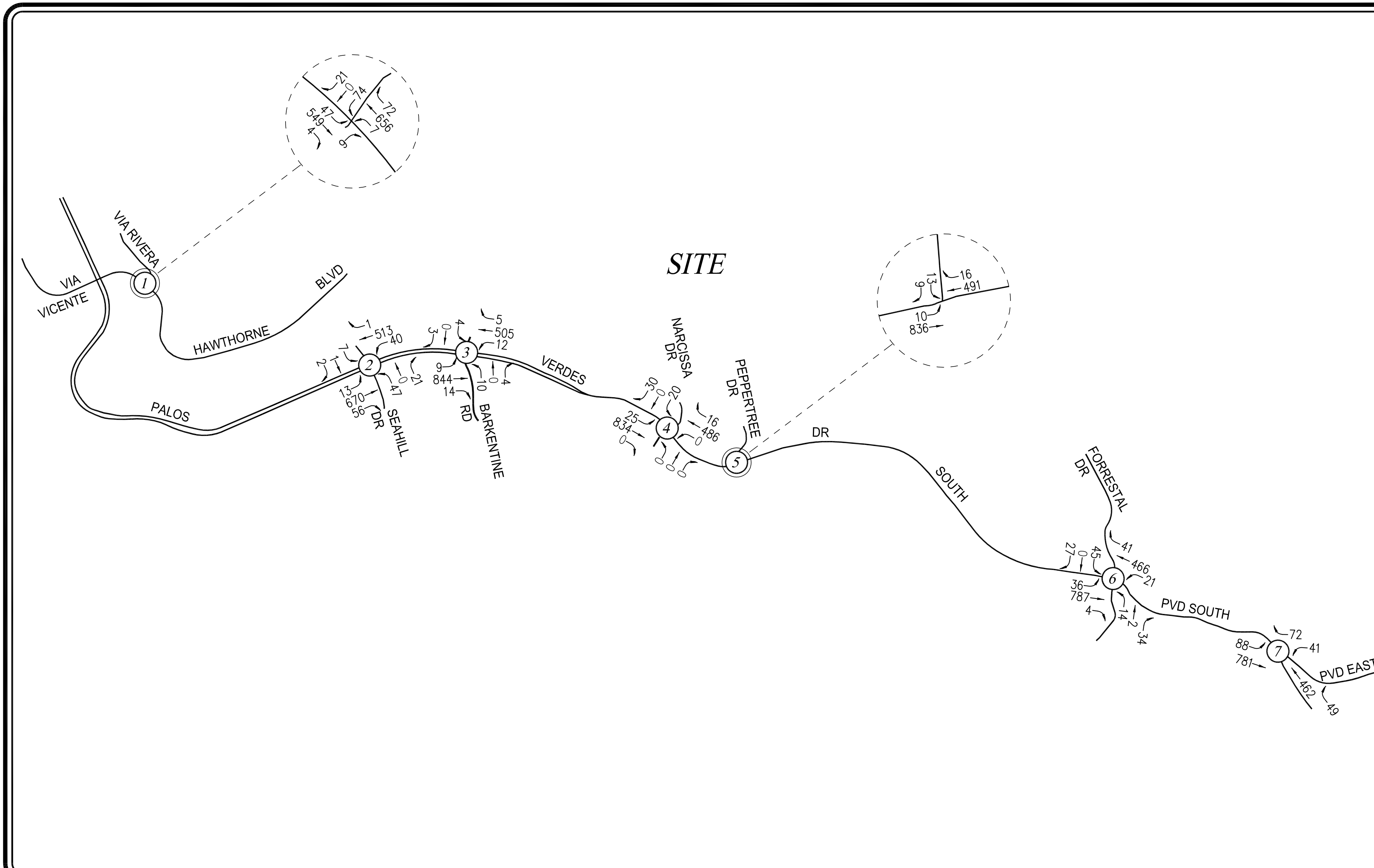

FIGURE 6-6
EXISTING WITH PROJECT TRAFFIC VOLUMES
WEEKDAY PM PEAK HOUR

ZONE 2 LANDSLIDE MORATORIUM - PORTUGUESE BEND PROJECT

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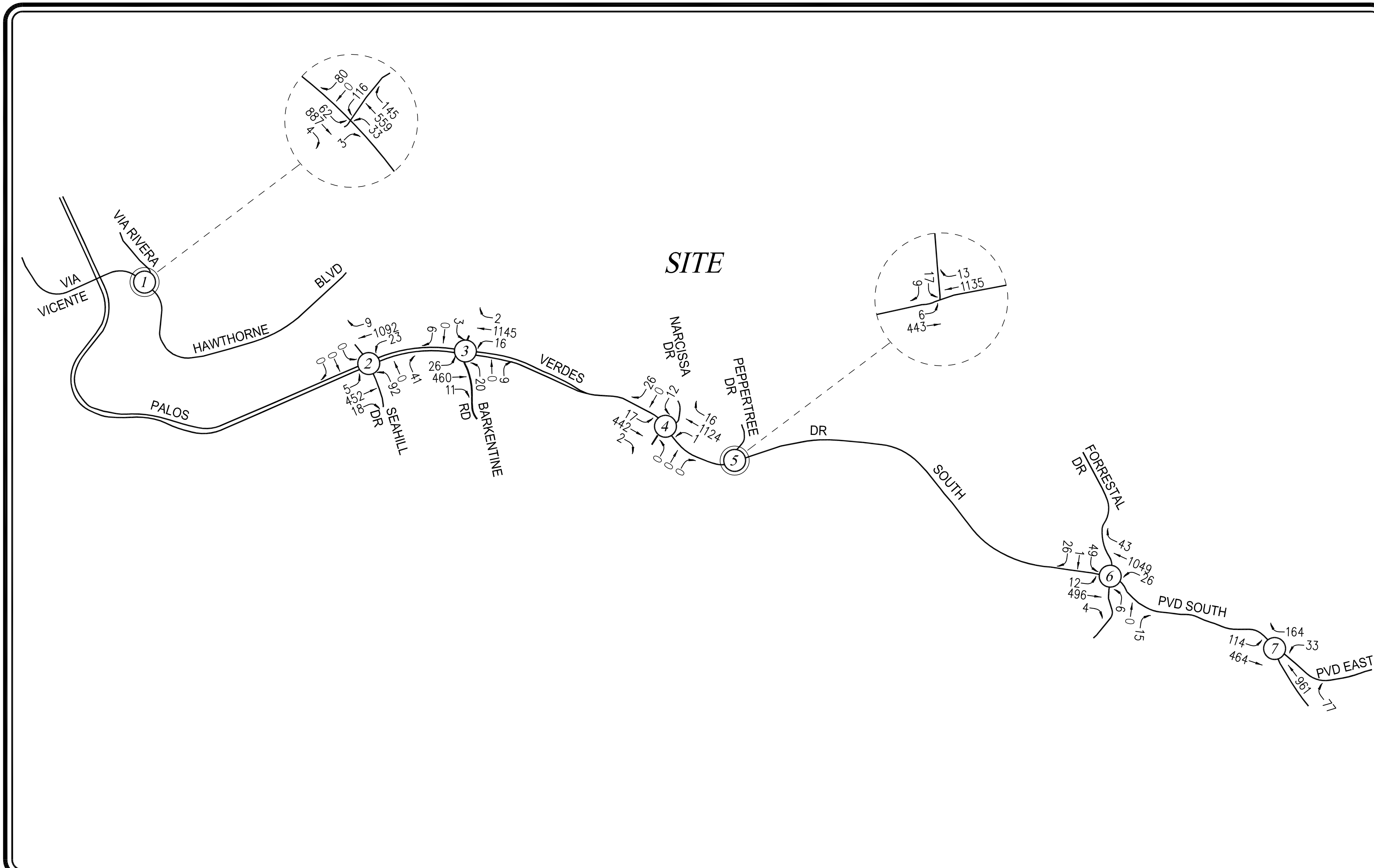

X = INTERSECTION NUMBER

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FIGURE 6-7
YEAR 2030 FUTURE PRE-PROJECT TRAFFIC VOLUMES
WEEKDAY AM PEAK HOUR

ZONE 2 LANDSLIDE MORATORIUM - PORTUGUESE BEND PROJECT

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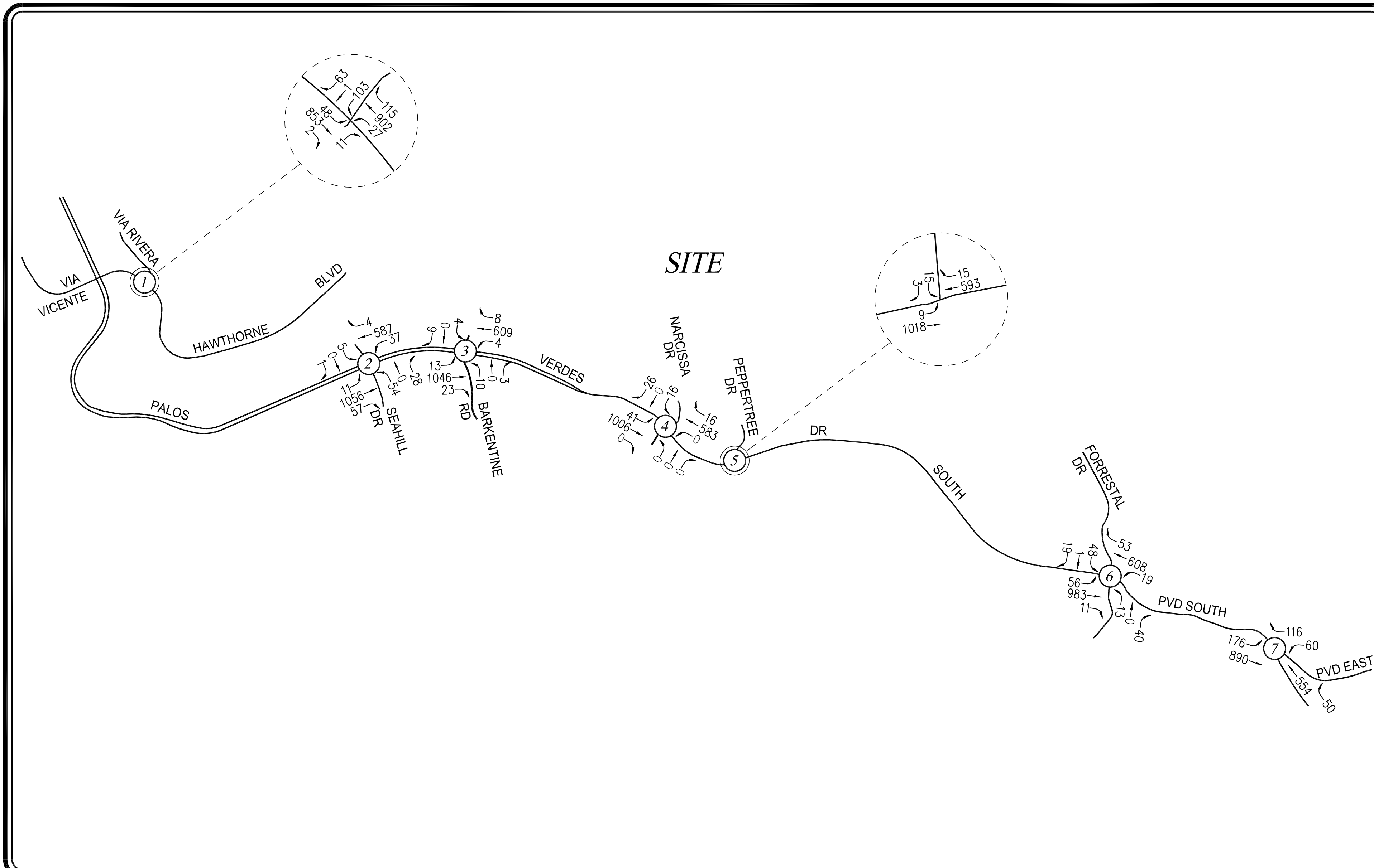

(X) = INTERSECTION NUMBER

FIGURE 6-8

YEAR 2030 FUTURE PRE-PROJECT TRAFFIC VOLUMES

WEEKDAY SCHOOL PM PEAK HOUR

ZONE 2 LANDSLIDE MORATORIUM - PORTUGUESE BEND PROJECT

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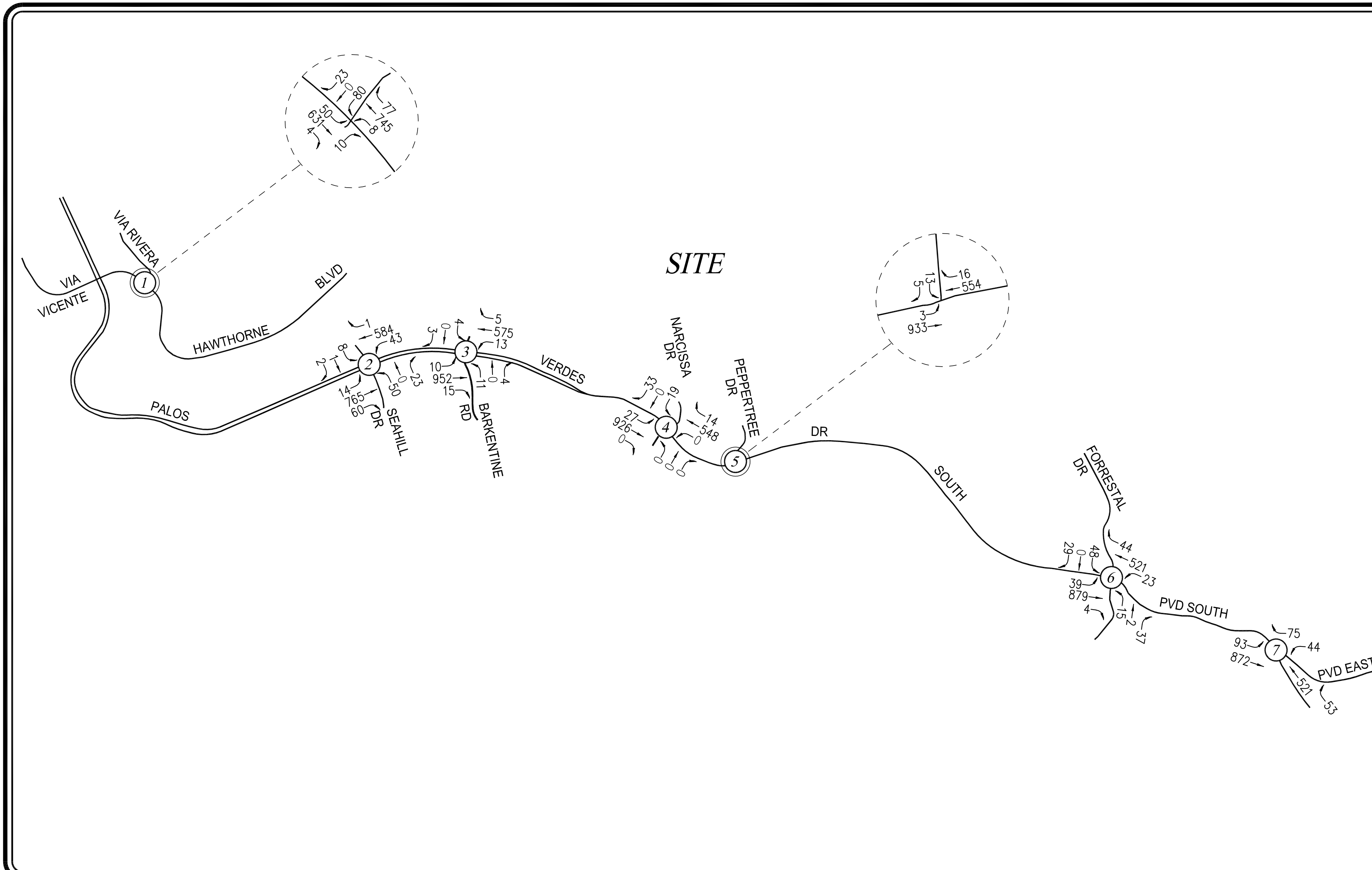

X = INTERSECTION NUMBER

NOT TO SCALE

LINSCOTT, LAW & GREENSPAN, engineers

FIGURE 6-9
YEAR 2030 FUTURE PRE-PROJECT TRAFFIC VOLUMES

WEEKDAY PM PEAK HOUR

ZONE 2 LANDSLIDE MORATORIUM - PORTUGUESE BEND PROJECT

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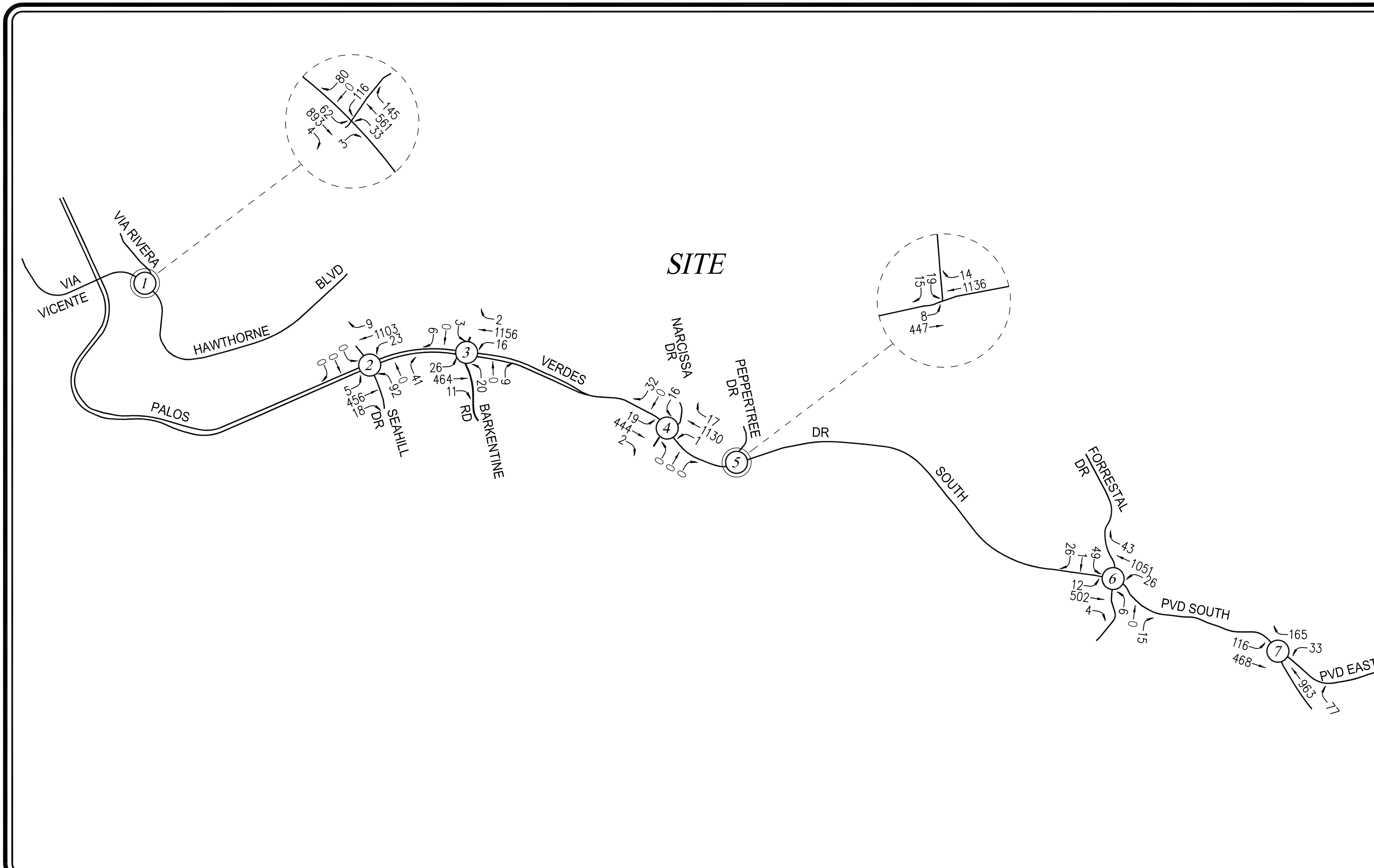

(X) = INTERSECTION NUMBER

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FIGURE 6-10
YEAR 2030 FUTURE WITH PROJECT TRAFFIC VOLUMES

WEEKDAY AM PEAK HOUR

ZONE 2 LANDSLIDE MORATORIUM - PORTUGUESE BEND PROJECT

LINSCOTT, LAW & GREENSPAN, engineers

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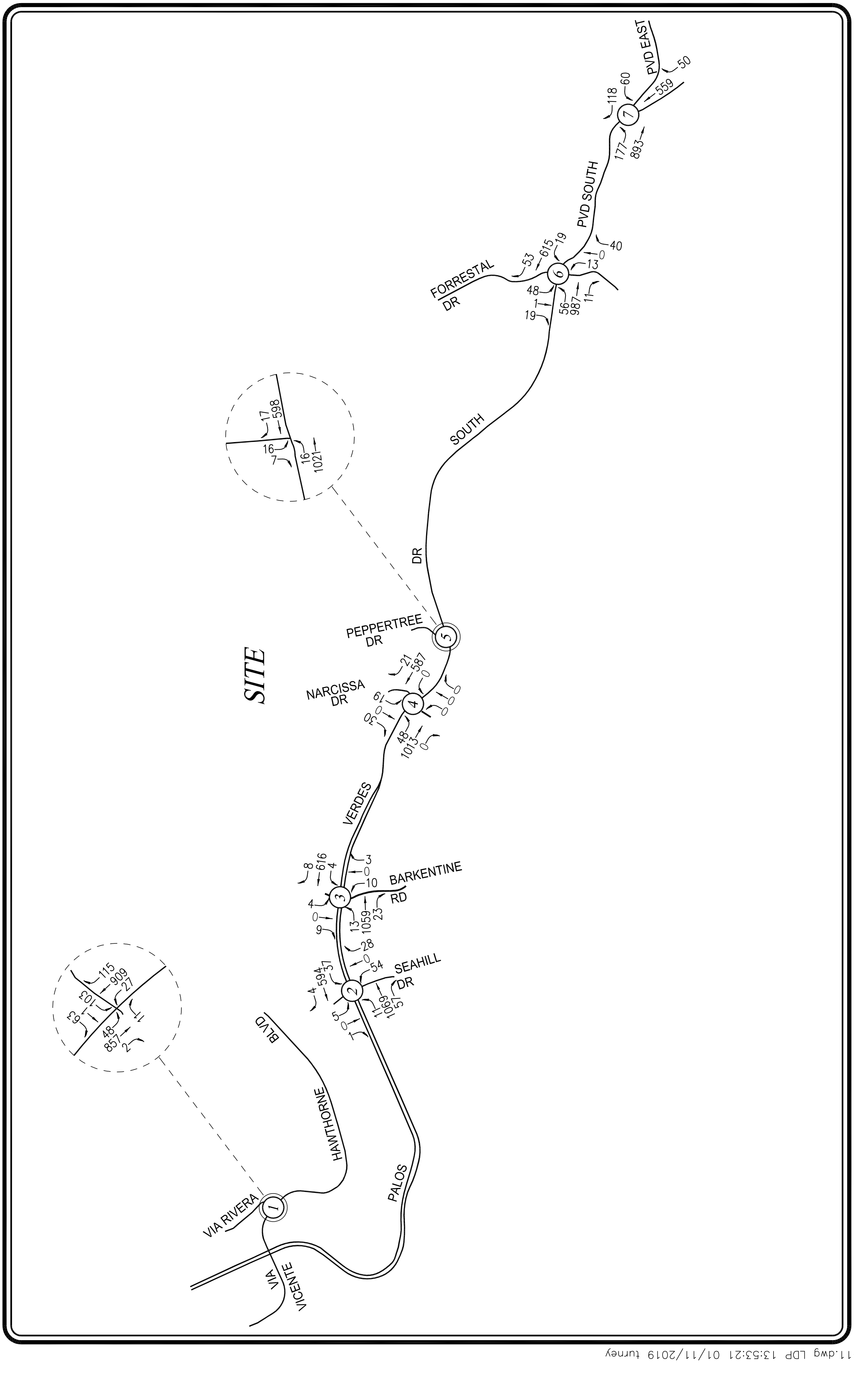

FIGURE 6-11

YEAR 2030 FUTURE WITH PROJECT TRAFFIC VOLUMES

WEEKDAY SCHOOL PM PEAK HOUR

ZONE 2 LANDSLIDE MORATORIUM - PORTUGUESE BEND PROJECT

NOT TO SCALE

(X) = INTERSECTION NUMBER

LINSCOTT, LAW & GREENSPAN, engineers

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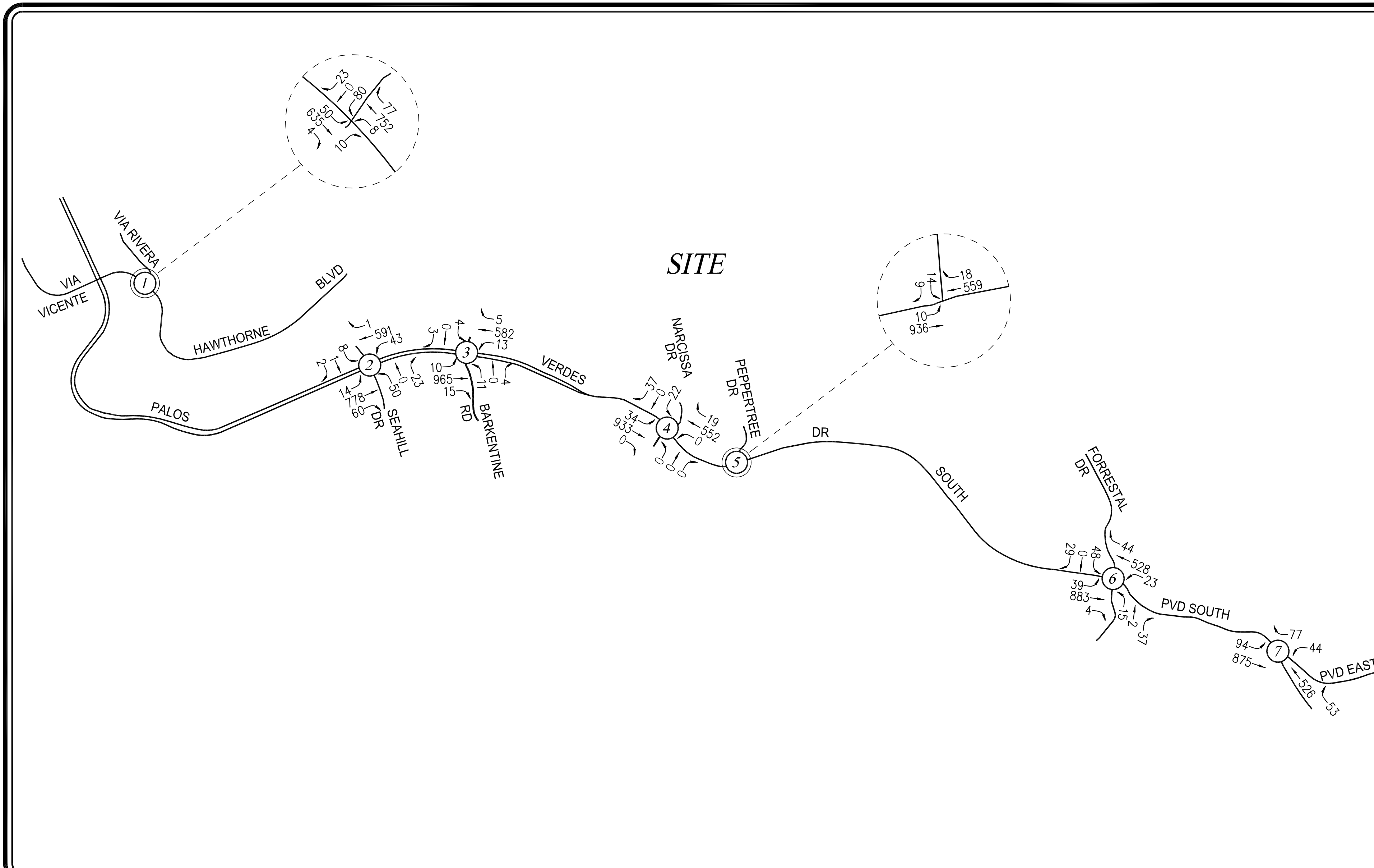

FIGURE 6-12
YEAR 2030 FUTURE WITH PROJECT TRAFFIC VOLUMES

WEEKDAY PM PEAK HOUR

ZONE 2 LANDSLIDE MORATORIUM - PORTUGUESE BEND PROJECT

LINSCOTT, LAW & GREENSPAN, engineers

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7.0 TRANSPORTATION IMPACT ANALYSIS METHODOLOGY

7.1 Impact Criteria and Thresholds

The relative impact of the added project traffic volumes generated by the proposed Zone 2 Landslide Moratorium - Portuguese Bend project during the AM, School PM and PM peak hours was evaluated based on analysis of future operating conditions at the seven study intersections, without, then with the proposed project. The previously discussed capacity analysis procedures were utilized to investigate the future volume-to-capacity relationships and service level characteristics at each study intersection. The significance of the potential project impacts at each key intersection was then evaluated using the traffic impact criteria employed for projects in the City of Rancho Palos Verdes. The City of Rancho Palos Verdes' target for peak hour intersection operation is LOS D or better.

The City of Rancho Palos Verdes has established the following thresholds of significance for unsignalized intersections:

- A significant impact would occur at an unsignalized intersection when the addition of project-generated trips causes the peak hour level of service of the intersection to change from acceptable operation (LOS D or better) to deficient operation (LOS E or F); or

- A significant impact would occur at an unsignalized intersection if the peak hour level of service of the intersection is LOS E or F and the addition of project-generated trips changes the delay by 2.0 seconds or more.

7.2 Transportation Impact Analysis Scenarios

Volume/capacity calculations have been performed for the key study intersections for the following traffic conditions:

(a) Existing traffic conditions;

(b) Scenario (a) with project traffic;

(c) Scenario (b) with mitigation, if necessary.

(d) Scenario (a) with ambient growth traffic to the Year 2030 at 0.6% per year plus related projects traffic;

(e) Scenario (d) with project traffic to the Year 2030; and

(g) Scenario (e) with mitigation, if necessary.

8.0 PEAK HOUR INTERSECTION CAPACITY ANALYSIS

8.1 Existing Conditions

The peak hour Level of Service results at the seven study intersections for the existing conditions are summarized in ***Table 8-1***. The first column [1] of HCM/LOS values in *Table 8-1* presents a summary of the existing AM, School PM and PM peak hour traffic conditions (which were also presented in *Table 4-5*). The second column [2] presents projected existing with project traffic conditions based on the addition of the proposed project traffic. The third column [3] shows the change in delay value due to the added peak hour project trips and indicates whether the traffic associated with the project will have a significant impact based on the City of Rancho Palos Verdes LOS standards and the significance impact threshold criteria defined in this report. The HCM data worksheets for the seven analyzed intersections for the weekday AM and PM peak hours are contained in *Appendix B*.

8.1.1 *Existing Traffic Conditions*

As shown in column [1] of *Table 8-1* (previously presented in *Table 4-5*), two of the seven study intersections are currently operating at acceptable Levels of Service (i.e., LOS D or better) during the weekday AM, School PM and PM peak hours. The following study intersections currently operate at LOS E or F during the peak hours shown below under existing conditions based on the calculated intersection delay (in seconds):

- Int. No. 1: Via Rivera/Hawthorne Blvd. — AM Peak Hour: *Delay* = 77.5, LOS F; School PM Peak: *Delay* = 189.0, LOS F; PM Peak Hour: *Delay* = 40.7, LOS E
- Int. No. 2: Tramonto Dr.-Seahill Dr./PV Dr. South — School PM Peak: *Delay* = 58.9, LOS F
- Int. No. 4: Narcissa Drive/Palos Verdes Dr. South. — AM Peak Hour: *Delay* = 46.6, LOS E; School PM Peak: *Delay* = 52.1, LOS F; PM Peak Hour: *Delay* = 42.4, LOS E
- Int. No. 6. Forrestal Dr./Palos Verdes Dr. South — AM Peak Hour: *Delay* = 62.3, LOS F; School PM Peak: *Delay* = 107.7, LOS F; PM Peak Hour: *Delay* = 52.5, LOS F
- Int. No. 7: PV Dr. East./PV Dr. South — School PM Peak: *Delay* = 47.0, LOS E

The existing traffic volumes at the study intersections during the weekday AM, School PM and PM peak hours are shown in *Figures 4-3, 4-4* and *4-5*, respectively.

Table 8-1
SUMMARY OF DELAYS AND LEVELS OF SERVICE
WEEKDAY AM, PM, AND SCHOOL PM PEAK HOURS

				[1]		[2]				[3]				[4]		[5]				[6]			
NO.	INTERSECTION	TRAFFIC CONTROL	PEAK HOUR	YEAR 2018 EXISTING DELAY [a]	LOS [b]	YEAR 2018 EXISTING W/ PROJECT DELAY [a]	LOS [b]	CHANGE IN DELAY [(2)-(1)]	IMPACT [c]	YEAR 2018 EXISTING W/ PROJECT MITIGATION DELAY [a]	LOS [b]	CHANGE IN DELAY [(3)-(1)]	MITI-GATED?	YEAR 2030 FUTURE PRE-PROJECT W/ AM. GROW. & REL. PROJ. DELAY [a]	LOS [b]	YEAR 2030 FUTURE W/ PROJECT DELAY [a]	LOS [b]	CHANGE IN DELAY [(5)-(4)]	IMPACT [c]	YEAR 2030 FUTURE W/ PROJECT MITIGATION DELAY [a]	LOS [b]	CHANGE IN DELAY [(6)-(4)]	MITI-GATED?
1	Via Rivera/	Two-Way	AM	77.5	F	79.5	F	2.0	Yes	8.0	A	-69.5	Yes	167.2	F	172.4	F	5.2	Yes	8.3	A	-158.9	Yes
	Hawthorne Boulevard	Stop	School PM	189.0	F	195.9	F	6.9	Yes	7.0	A	-182.0	Yes	419.5	F	427.3	F	7.8	Yes	7.3	A	-412.2	Yes
			PM	40.7	E	41.8	E	1.1	No	---	---	---	---	73.7	F	75.9	F	2.2	Yes	5.4	A	-68.3	Yes
2	Tramonto Drive-Seahill Drive/	Two-Way	AM	32.6	D	33.5	D	0.9	No	---	---	---	---	50.4	F	52.0	F	1.6	No	---	---	---	---
	Palos Verdes Drive South	Stop	School PM	58.9	F	62.0	F	3.1	Yes	26.8	D	-32.1	Yes	126.7	F	132.4	F	5.7	Yes	36.0	E	-90.7	Yes
			PM	31.1	D	32.3	D	1.2	No	---	---	---	---	46.7	E	49.1	E	2.4	Yes	23.2	C	-23.5	Yes
3	Barkentine Road/	Two-Way	AM	23.3	C	23.5	C	0.2	No	---	---	---	---	28.1	D	28.7	D	0.6	No	---	---	---	---
	Palos Verdes Drive South	Stop	School PM	31.4	D	32.4	D	1.0	No	---	---	---	---	43.5	E	44.4	E	0.9	No	---	---	---	---
			PM	26.5	D	27.2	D	0.7	No	---	---	---	---	35.4	E	36.5	E	1.1	No	---	---	---	---
4	Narcissa Drive/	Two-Way	AM	46.6	E	49.7	E	3.1	Yes	24.5	C	-22.1	Yes	64.4	F	69.6	F	5.2	Yes	28.6	D	-35.8	Yes
	Palos Verdes Drive South	Stop	School PM	52.1	F	57.5	F	5.4	Yes	25.2	D	-26.9	Yes	78.7	F	90.5	F	11.8	Yes	30.3	D	-48.4	Yes
			PM	42.4	E	45.8	E	3.4	Yes	22.6	C	-19.8	Yes	61.6	F	67.4	F	5.8	Yes	26.7	D	-34.9	Yes
5	Peppertree Drive/	Two-Way	AM	30.3	D	29.3	D	0.0	No	---	---	---	---	37.6	E	36.3	E	0.0	No	---	---	---	---
	Palos Verdes Drive South	Stop	School PM	31.9	D	29.6	D	0.0	No	---	---	---	---	42.2	E	39.2	E	0.0	No	---	---	---	---
			PM	24.5	C	23.3	C	0.0	No	---	---	---	---	30.7	D	29.0	D	0.0	No	---	---	---	---
6	Forrestal Drive/	Two-Way	AM	62.3	F	64.5	F	2.2	Yes	25.7	D	-36.6	Yes	106.3	F	106.4	F	0.1	No	---	---	---	---
	Palos Verdes Drive South	Stop	School PM	107.7	F	114.0	F	6.3	Yes	33.7	D	-74.0	Yes	227.3	F	236.4	F	9.1	Yes	48.5	E	-178.8	Yes
			PM	52.5	F	54.2	F	1.7	No	---	---	---	---	95.1	F	100.4	F	5.3	Yes	29.8	D	-65.3	Yes
7	Palos Verdes Drive East/	Two-Way	AM	30.3	D	30.7	D	0.4	No	---	---	---	---	41.7	E	42.5	E	0.8	No	---	---	---	---
	Palos Verdes Drive South	Stop	School PM	47.0	E	47.5	E	0.5	No	---	---	---	---	85.4	F	87.1	F	1.7	No	---	---	---	---
			PM	25.0	C	25.2	D	0.2	No	---	---	---	---	34.8	D	35.3	E	0.5	Yes	20.3	C	-14.5	Yes

[a] Reported control delay values in seconds per vehicle. For two-way stop controlled intersections, reported control delay values represent the delays associated with the most constrained approach of the intersection.

[b] Unsignalized Intersection Levels of Service are based on the following criteria:

Control Delay (s/veh`	LOS
<= 10	A
> 10-15	B
> 15-25	C
> 25-35	D
> 35-50	E
> 50	F

Signalized Intersection Levels of Service are based on the following criteria:

Control Delay (s/veh)	LOS
<= 10	A
> 10-20	B
> 20-35	C
> 35-55	D
> 55-80	E
> 80	F

[c] For unsignalized intersections, the City of Rancho Palos Verdes has established the following thresholds of signficance:
- A significant impact would occur at an unsignalized intersection when the addition of project-generated trips causes the peak hour level of service of the intersection to change from acceptable operation (LOS D or better) to deficient operation (LOS E or F); or
- A significant impact would occur at an unsignalized intersection if the peak hour level of service of the intersection is LOS E or F and the addition of project-generated trips changes the delay by 2.0 seconds or more.

8.1.2 *Existing With Project Conditions*

As shown in column [2] of *Table 8–1*, application of the City's threshold criteria to the "Existing With Project Conditions" scenario indicates that the proposed project is expected to result in significant impacts at four (4) study intersections. According to the City's impact criteria, the following locations are anticipated to be significantly impacted during the peak hours shown below with the addition of project-related traffic:

- <u>Int. No. 1: Via Rivera/Hawthorne Boulevard</u>

  AM peak hour *delay* increase of 2.0 seconds [to 79.5 (LOS F) from 77.5 (LOS F)]

  School PM peak hour *delay* increase of 6.9 seconds [to 195.9 (LOS F) from 189.0 (LOS F)]

- <u>Int. No. 2: Seahill Drive-Tramonto Drive/Palos Verdes Drive South</u>

  School PM peak hour *delay* increase of 3.1 seconds [to 62.0 (LOS F) from 58.9 (LOS F)]

- <u>Int. No. 4: Narcissa Drive/Palos Verdes Dr. South</u>

  AM peak hour *delay* increase of 3.1 seconds [to 49.7 (LOS E) from 46.6 (LOS E)]

  School PM peak hour *delay* increase of 5.4 seconds [to 57.5 (LOS F) from 52.1 (LOS F)]

  PM peak hour *delay* increase of 3.4 seconds [to 45.8 (LOS E) from 42.4 (LOS E)]

- <u>Int. No. 6: Forrestal Drive/Palos Verdes Drive South</u>

  AM peak hour *delay* increase of 2.2 seconds [to 64.5 (LOS F) from 62.3 (LOS F)]

  School PM peak hour *delay* increase of 6.3 seconds [to 114.0 (LOS F) from 107.7 (LOS F)]

Incremental, but not significant, impacts are noted at the remaining three (3) study intersections. The existing with project traffic volumes at the study intersections during the weekday AM, School PM and PM peak hours are shown in *Figures 6-4*, *6-5* and *6-6*, respectively.

8.2 Year 2030 Future Traffic Conditions

The peak hour Level of Service results at the seven study intersections for the Year 2030 horizon year are summarized in *Table 8-1*. Column [4] of HCM/LOS values in *Table 8-1* presents a summary of the projected Year 2030 future pre-project traffic conditions based on future intersection geometry, where applicable, existing traffic volumes with the addition of ambient growth, and related projects traffic volumes. Column [5] presents projected Year 2030 future with project traffic conditions based on the addition of the proposed project traffic. Column [5] shows the change in delay value due to the added peak hour project trips and indicates whether the traffic associated with the project will have a significant impact based on the City of Rancho Palos Verdes LOS standards and the significance impact threshold criteria defined in this report. The HCM data worksheets for the seven analyzed intersections for the weekday AM and PM peak hours are contained in *Appendix B*.

8.2.1 *Year 2030 Future Pre-Project Traffic Conditions*

The analysis of Year 2030 future pre-project traffic conditions (i.e., existing traffic volumes, ambient growth to Year 2030, and related projects traffic volumes) presented in column [4] of *Table 8-1* indicates that the following study intersections are expected to operate at LOS E or F during the peak hours shown below under Year 2030 future pre-project traffic conditions:

- Int. No. 1: Via Rivera/Hawthorne Blvd. — AM Peak Hour: *Delay* = 167.2, LOS F
School PM Peak: *Delay* = 419.5, LOS F
PM Peak Hour: *Delay* = 73.7, LOS E
- Int. No. 2: Tramonto Dr.-Seahill Dr./PV Dr. South — AM Peak Hour: *Delay* = 50.4, LOS F
School PM Peak: *Delay* = 126.7, LOS F
PM Peak Hour: *Delay* = 46.7, LOS E
- Int. No. 3: Barkentine Road/PV Dr. South — School PM Peak: *Delay* = 43.5, LOS E
PM Peak: *Delay* = 35.4, LOS E
- Int. No. 4: Narcissa Drive/Palos Verdes Dr. South. — AM Peak Hour: *Delay* = 64.4, LOS F
School PM Peak: *Delay* = 78.7, LOS F
PM Peak Hour: *Delay* = 61.6, LOS F
- Int. No. 5: Peppertree Drive/PV Dr. South. — AM Peak Hour: *Delay* = 37.6, LOS E
School PM Peak: *Delay* = 42.2, LOS E
- Int. No. 6. Forrestal Dr./Palos Verdes Dr. South — AM Peak Hour: *Delay* = 106.3, LOS F
School PM Peak: *Delay* = 227.3, LOS F
PM Peak Hour: *Delay* = 95.1, LOS F
- Int. No. 7: PV Dr. East./PV Dr. South — AM Peak: *Delay* = 41.7, LOS E
School PM Peak: *Delay* = 85.4, LOS F

The Year 2030 future pre-project traffic volumes at the study intersections during the weekday AM, School PM and PM peak hours are shown in *Figures 6-7, 6-8* and *6-9*, respectively.

8.2.2 *Year 2030 Future With Project Conditions*

As shown in column [5] of *Table 8–1*, application of the City's threshold criteria to the "Year 2030 Future With Project Traffic Conditions" scenario indicates that the proposed project is expected to contribute on a cumulative basis to significant impacts at five study intersections. According to the City's impact criteria, the following locations are anticipated to be significantly impacted by cumulative growth during the peak hours shown below with the addition of ambient growth, related projects and project-related traffic:

- Int. No. 1: Via Rivera/Hawthorne Boulevard

  AM peak hour *delay* increase of 5.2 seconds [to 172.4 (LOS F) from 167.2 (LOS F)]
  School PM peak hour *delay* increase of 7.8 seconds [to 427.3 (LOS F) from 419.5 (LOS F)]
  PM peak hour *delay* increase of 2.2 seconds [to 75.9 (LOS F) from 73.7 (LOS F)]

- Int. No. 2: Seahill Drive-Tramonto Drive/Palos Verdes Drive South

  School PM peak hour *delay* increase of 5.7 seconds [to 132.4 (LOS F) from 126.7 (LOS F)]
  PM peak hour *delay* increase of 2.4 seconds [to 49.1 (LOS E) from 46.7 (LOS E)]

- Int. No. 4: Narcissa Drive/Palos Verdes Dr. South

  AM peak hour *delay* increase of 5.2 seconds [to 69.6 (LOS F) from 64.4 (LOS F)]
  School PM peak hour *delay* increase of 11.8 seconds [to 90.5 (LOS F) from 78.7 (LOS F)]
  PM peak hour *delay* increase of 5.8 seconds [to 67.4 (LOS F) from 61.6 (LOS F)]

- Int. No. 6: Forrestal Drive/Palos Verdes Drive South

  School PM peak hour *delay* increase of 9.1 seconds [to 236.4 (LOS F) from 227.3 (LOS F)]
  PM peak hour *delay* increase of 5.3 seconds [to 100.4 (LOS F) from 95.1 (LOS F)]

- Int. No. 7: Palos Verdes Drive East/Palos Verdes Drive South

  PM peak hour *delay* increase of 0.5 seconds [to 35.3 (LOS E) from 34.8 (LOS D)]

Incremental but not significant cumulative traffic impacts are noted at the remaining two (2) study intersections under Year 2030 future with project conditions. The Year 2030 future with project traffic volumes at the study intersections during the weekday AM, School PM and PM peak hours are shown in *Figures 6-10*, *6-11* and *6-12*, respectively.

9.0 ROADWAY STREET SEGMENT ANALYSIS

Roadway level of service analyses were prepared for two roadway segments located in the project study area. The following two roadway street segments were selected in consultation with City of Rancho Palos Verdes staff for analysis of potential impacts due to the proposed project:

1. Palos Verdes Drive South west of Narcissa Drive

2. Palos Verdes Drive South east of Narcissa Drive

Automatic 24-hour machine traffic counts were obtained from the City of Rancho Palos Verdes General Plan Update Traffic Impact Analysis. The traffic count data were adjusted by 0.6 percent (0.6%) per year to reflect existing conditions. Copies of the 24-hour machine counts are contained in *Appendix A*.

Consistent with the City of Rancho Palos Verdes General Plan, the analysis of traffic operations on roadway segments was conducted by comparing the daily traffic volumes to the maximum roadway capacity of each facility type. The roadway daily capacities were developed consistent with the HCM *Chapter 16, Urban Street Facilities,* which provides a methodology for developing generalized daily service volumes. The maximum daily capacity values for each roadway type is shown in ***Table 9-1***. As noted previously, the acceptable level of service for the City of Rancho Palos Verdes is LOS D.

TABLE 9-1

ROADWAY SEGMENT CAPACITIES BY FACILITY TYPE

Classification	Maximum Two-Way Daily Traffic Volume (LOS E)
4-Lane Divided Arterial	36,100
2-Lane Divided Arterial	17,900
2-Lane Undivided Arterial	17,000
4-Lane Undivided Collector	34,300
2-Lane Divided Collector	17,900

9.1 Year 2030 Future Traffic Conditions

The forecast traffic conditions at the analyzed street segments for existing, year 2030 future pre-project (i.e., existing traffic volumes, ambient traffic growth and related projects traffic volumes) and Year 2030 future with project analysis scenarios are summarized in ***Table 9-2***. As presented in Column [3] of *Table 9-2*, one of the roadway segments, Palos Verdes Drive South east of Narcissa Drive segment, will not meet the City's minimum level of service standard. The following improvement is recommended for the Palos Verdes Drive South east of Narcissa Drive segment to reduce the potentially significant impact to less than significant levels.

Table 9-2
ROADWAY SEGMENT LEVELS OF SERVICE SUMMARY

				(1) EXISTING TRAFFIC CONDITIONS			(2) YEAR 2030 W/ RELATED PROJECTS TRAFFIC CONDITIONS				(3) YEAR 2030 WITH PROJECT TRAFFIC CONDITIONS			
NO.	ROADWAY SEGMENT	FACILITY TYPE	TOTAL CAPACITY [a]	DAILY VOL [b]	V/C	LOS	REL. PROJ. VOL [c]	DAILY VOL [d]	V/C	LOS	PROJ VOL [e]	DAILY VOL [f]	V/C	LOS
1	Palos Verdes Drive South west of Narcissa Drive	4-Lane Divided Arterial	36,100	14,112	0.391	A	1,006	16,134	0.447	A	194	16,328	0.452	A
2	Palos Verdes Drive South east of Narcissa Drive	2-Lane Divided Arterial	17,900	15,360	0.858	D	750	17,216	0.962	E	100	17,316	0.967	E

[a] Roadway capacity based on roadway classification and capacities outlined in the City of Rancho Palos Verdes General Plan Update Traffic Impact Analysis, August 2017.
[b] Average Daily Traffic Volumes obtained from the City of Rancho Palos Verdes General Plan Update Traffic Impact Analysis, August 2017. An ambient growth rate of 0.60% per year was assumed to derive the year 2018 existing conditions.
[c] Represents related projects trips based on Table 6-1.
[d] Derived by combining the existing with ambient traffic volumes and the related projects traffic volumes. An ambient growth rate of 0.60% per year was assumed to derive the year 2030 (i.e., future pre-project) traffic volumes based on the 2010 CMP for Los Angeles County document.
[e] Represents net new project trips based on the project trip generation and trip distribution for the proposed Zone 2 Landslide Moratorium - Portuguese Bend project.
[f] Derived by combining the future pre-project traffic volumes and the proposed project volumes.
[g] According to the City of Rancho Palos Verdes General Plan Update, the City of Rancho Palos Verdes considers LOS D as the minimum level of service standard for roadway segments.

- Palos Verdes Drive South east of Narcissa Drive
  The recommended mitigation consists of the conversion of Palos Verdes Drive South from a 2-Lane Divided Arterial to a 4-Lane Divided Arterial. It should be noted that this measure is consistent with the improvement proposed in the City of Rancho Palos Verdes General Plan Update. This measure is anticipated to reduce the potentially significant impact to less than significant levels. However, this improvement would require elimination of the existing bicycle lanes along Palos Verdes Drive South, which may not be feasible. Therefore, a significant and unavoidable traffic impact would remain at this location.

10.0 TRANSPORTATION IMPROVEMENT MEASURES

As summarized in Section 8.0, Peak Hour Intersection Analysis, the proposed project is forecast to result in significant traffic impacts at the following study intersections:

- Int. No.1: Via Rivera/Hawthorne Boulevard
- Int. No. 2: Seahill Drive-Tramonto Drive/Palos Verdes Drive South
- Int. No. 4: Narcissa Drive/Palos Verdes Dr. South
- Int. No. 6: Forrestal Drive/Palos Verdes Drive South
- Int. No. 7: Palos Verdes Drive East/Palos Verdes Drive South

The following section provides an overview of transportation improvement measures that are anticipated to address the forecast significant traffic impacts to the local roadway network associated with the proposed project. The following transportation mitigation measures have been considered and if approved and implemented would reduce the project's contribution to the significant transportation impacts at the subject study intersections to less than significant levels.

- Int. No. 1: Via Rivera/Hawthorne Boulevard
  The recommended mitigation consists of the funding for the design and installation of a traffic signal at this intersection in order to improve overall operations and assignment of motorist right-of-way. It should be noted that this improvement is listed in the City of Rancho Palos Verdes General Plan Update. As indicated in *Table 8-1*, this measure is anticipated to reduce the potentially significant impact to less than significant levels. If for any reason the City decides against the installation of the traffic signal, the project impact would remain significant and unavoidable.

- Int. No. 2: Seahill Drive-Tramonto Drive/Palos Verdes Drive South
  The recommended mitigation consists of providing a two-way left-turn lane on Palos Verdes Drive to better facilitate the northbound left-turn movement (i.e., from Seahill Drive) onto westbound Palos Verdes Drive South. It should be noted that this improvement is listed in the City of Rancho Palos Verdes General Plan Update. By modifying the existing median west of Seahill Drive-Tramonto Drive and restriping the west leg of the intersection, the improvement would provide the necessary area for vehicles to accelerate prior to merging with the westbound Palos Verdes Drive South traffic flow. In addition, the improvement allows northbound left-turns to occur via a sufficient gap in only the eastbound traffic flow versus in both the eastbound and westbound traffic flows as occurs today. As indicated in *Table 8-1*, this measure is anticipated to reduce the potentially significant cumulative impact to less than significant levels.

- Int. No. 4: Narcissa Drive/Palos Verdes Drive South

The recommended mitigation consists of providing a two-way left-turn lane on Palos Verdes Drive, east of Narcissa Drive, to better facilitate the southbound left-turn movement (i.e., exiting from Narcissa Drive) onto eastbound Palos Verdes Drive South. This measure involves converting the existing westbound left-turn lane at Narcissa Drive (i.e., which serves one single-family home) to a two-way left-turn lane in order to provide a refuge area for exiting Narcissa Drive motorists to turn into and wait prior to accelerating to merge with the eastbound Palos Verdes Drive South traffic flow. In addition, the improvement allows southbound left-turns to occur via a sufficient gap in only the westbound traffic flow (i.e., versus requiring a gap in both the eastbound and westbound traffic flows as occurs today). The proposed two-way left-turn lane would also continue to serve any westbound entering left-turns into the single-family home driveway. As indicated in *Table 8-1*, this measure is anticipated to reduce the potentially significant impacts to less than significant levels.

- Int. No. 6: Forrestal Drive/Palos Verdes Drive South

The recommended mitigation consists of providing a two-way left-turn lane on Palos Verdes Drive to provide a deceleration and storage area for left-turn vehicles traveling in either direction. It should be noted that this improvement is listed in the City of Rancho Palos Verdes General Plan Update. As indicated in *Table 8-1*, this measure is anticipated to reduce the potentially significant impact to less than significant levels.

- Int. No. 7: Palos Verdes Drive East/Palos Verdes Drive South

The recommended mitigation consists of providing a two-way left-turn lane on Palos Verdes Drive to provide a deceleration and storage area for left-turn vehicles traveling in either direction. It should be noted that this improvement is listed in the City of Rancho Palos Verdes General Plan Update. As indicated in *Table 8-1*, this measure is anticipated to reduce the potentially significant cumulative traffic impact to less than significant levels.

11.0 CONSTRUCTION ANALYSIS

Project construction would generate traffic from construction worker travel, the arrival and departure of trucks delivering construction materials to the site, and the removal of debris generated by on-site demolition activities. Both the number of construction workers and trucks would vary throughout the construction process. It is important to note that the following construction summary and corresponding analyses assume that *all* 31 homes within the project site would be under construction simultaneously, which is a highly unlikely scenario and extremely conservative. This conservative assumption has been employed for illustrative purposes only so as to identify the maximum potential impact of construction activities in the vicinity.

11.1 Overview of Construction Phases

The construction of the project is anticipated to consist of several main construction work efforts: Demolition/Site Preparation/Grading, Building Construction, and Paving/Architectural Coating. The total construction period is anticipated to last approximately 48 months within the above six general periods or phases of construction. The following provides a general overview of the various phases of construction, based on information provided by the environmental consultant: Phase 1 (two months) consists of demolition; Phase 2 (roughly one and one-half months) consists of site preparation, Phase 3 (almost four months) consists of grading, Phase 4 (36 months) consists of building construction activities, Phase 5 (two and one-half months) consists of paving, and Phase 6 (two and one-half months) consists of architectural coating.

11.1.1 *Demolition/Site Preparation/Grading*

Construction would initially begin with the demolition and removal of any existing on-site secondary structure/s and landscaping. It is anticipated that equipment needs would include heavy machinery such as a concrete/industrial saw, rubber-tired dozers and excavators, and other miscellaneous machinery. During the peak period of this phase, a work force of seven construction workers per lot or a total of 217 construction workers for the entire project would be necessary and workers would occur in two general shifts. This phase is anticipated to take two months to complete and assumes all 31 homes are under construction simultaneously (a highly unlikely scenario).

The site preparation phase includes heavy construction equipment which would be located on-site during site preparation activities and would not travel to and from the project site on a daily basis. It is anticipated that equipment needs associated with site preparation activities would include rubber-tired dozers, tractors/loaders/backhoes, and other miscellaneous machinery. During the peak period of this phase, a work force of a nine construction workers per lot or a total of 279 construction workers for the entire project would be necessary. This work is estimated to take roughly one and one-half months to complete, after completion of the building demolition and assumes all 31 homes are under construction simultaneously (a highly unlikely scenario).

The grading phase includes heavy construction equipment which would be located on-site during site grading activities and would not travel to and from the project site on a daily basis. It is anticipated that equipment needs associated with grading activities would include an excavator, a grader, rubber-tired dozer, scraper, a tractor/loader/backhoe and other miscellaneous machinery. In addition, ten-wheel dump trucks (i.e., the smaller 10 cubic yard capacity dump trucks) would be utilized in this area for any import of fill material. It is assumed that no more than 50 cubic yards of fill per lot would need to be imported. During the peak period of this phase, a work force of six construction workers per lot or a total of 186 construction workers for the entire project would be necessary. This work is estimated to take roughly four months to complete, after completion of the site preparation phase and assumes all 31 homes are under construction simultaneously (a highly unlikely scenario).

11.1.2 *Building Construction*

Building construction of the project consists of all aspects of building construction with the exception of paving and architectural coatings. It is anticipated that equipment needs associated with these building construction activities would include a crane, fork-lifts, generator sets, concrete pump, cement and mortar mixers and air compressors, skill saws and power drills, tractor/loader/backhoes, welders, as well as miscellaneous machinery. During the peak period of this building construction phase, a work force of eight construction workers per lot or a total of 248 construction workers for the entire project would be necessary. Based on a similar residential project, it is estimated that two trucks per day per home is anticipated to be generated to/from the project site during building construction activities. Thus, a total of 62 material delivery trucks per day are anticipated during this phase of construction. Building construction is anticipated to take approximately 34 months to complete and assumes all 31 homes are under construction simultaneously (a highly unlikely scenario).

11.1.3 *Paving/Architectural Coating*

The paving phase includes heavy construction equipment which would be located on-site during site preparation activities and would not travel to and from the project site on a daily basis. It is anticipated that equipment needs associated with paving activities would include pavers, paving equipment, and rollers. During the peak period of this phase, a work force of seven construction workers per lot or a total of 217 construction workers for the entire project would be necessary. This work is estimated to take roughly two and one-half months to complete, after completion of the building construction and assumes all 31 homes are under construction simultaneously (a highly unlikely scenario).

The architectural coating phase includes some heavy construction equipment which would be located on-site during site grading activities and would not travel to and from the project site on a daily basis. It is anticipated that equipment needs associated with architectural coating activities would include air compressors and miscellaneous machinery. During the peak period of this phase, a work force of two construction workers per lot or a total of 62 construction workers for the entire project would be necessary. This work is estimated to take roughly two and one-half months to complete, after completion of the paving phase and assumes all 31 homes are under construction simultaneously (a highly unlikely scenario).

11.2 Construction Traffic Trip Generation

It is assumed that the homesites would be cleared and that after completion of the first three phases of short-term construction activities (i.e., demolition, site preparation and grading) building construction would commence. The equipment staging area during the construction period would occur on-site. Building construction activities are anticipated to occur between the hours of 7:00 AM and 7:00 PM, with two shifts of construction workers.

Activities related to the building construction (Phase 4) have been determined to generate the greatest number of vehicle trips compared to the other phases of construction. Thus, the greatest potential for impact on the adjacent street system would occur during the building construction phase when the peak construction workforce is present and truck trip generation is also at its highest level. As stated previously, it is important to note that the following construction summary and corresponding analyses assume that *all* 31 homes within the project site would be under construction simultaneously, which is a highly unlikely scenario and extremely conservative. This conservative assumption has been employed for illustrative purposes only so as to identify the maximum potential impact of construction activities in the vicinity.

11.2.1 *Peak Construction Worker Demand*

During the peak period of construction activities (Phase 4), a work force of 248 construction workers would be required assuming eight workers per lot and the highly unlikely scenario of *all* 31 homes under construction at the same time. Based on information provided by the environmental consultant, the construction workers would work in two shifts, with the first shift beginning at 7:00 AM and ending at 3:00 PM, and the second shift beginning at 11:00 AM and ending at 7:00 PM. Therefore, these particular construction workers would arrive and depart the project site during off-peak hours (the peak hour of traffic at the study intersections in the vicinity of the site primarily occurs between approximately 7:45 AM and 8:45 AM during the morning commuter period and between approximately 5:00 and 6:00 PM during the afternoon commuter period). It is anticipated that construction workers would remain on-site throughout their shift.

The number of construction worker vehicles is estimated using an average vehicle ridership (AVR) of 1.135 persons per vehicle (as provided in the South Coast Air Quality Management District in its CEQA Air Quality Handbook). Therefore, it is estimated that up to 220 vehicles (220 inbound trips and 220 outbound trips) on a daily basis would be generated by the construction workers during the peak construction phase (i.e., building construction) of the project area. For the first shift, the inbound construction worker trips (i.e., 110 inbound trips) would occur outside/before the AM commuter peak hour and the outbound worker trips (i.e., 110 outbound trips) would occur outside/before the PM commuter peak hour, however would experience some overlap during the School PM peak hour. It is assumed that 50% of the outbound first shift workers would overlap with the School PM peak hour (i.e., 55 vehicle trips). For the second shift, the inbound construction worker trips (i.e., 110 inbound trips) would occur outside/before the PM commuter peak hour and the outbound worker trips (i.e., 110 outbound trips) would occur outside/after the PM commuter peak. Thus, the first shift worker arrivals and second shift worker arrivals and departures would occur outside of the morning and afternoon peak commuter hours of the local street system.

11.2.2 *Peak Construction Truck Demand*

In addition to construction worker vehicles, additional trips may be generated by miscellaneous trucks traveling to and from the project area. These trucks may consist of larger vehicles delivering equipment and/or construction materials to the project area, or smaller pick-up trucks or four-wheel drive vehicles used by construction supervisors and/or City inspectors. Heavy construction equipment would be located on-site during the building construction activities and would not travel to and from the project site on a daily basis.

Based on a similar residential project, it is estimated that two trucks per day per home is anticipated to be generated to/from the project site during peak building construction activities. Thus, based on 31 proposed dwelling units, a maximum of 62 material delivery trucks per day are anticipated to be generated to/from the project site during construction activities. Therefore, peak truck trip generation would total up to 124 truck round-trips per day (62 inbound trucks and 62 outbound trucks) are anticipated. Assuming a material delivery period of 12 hours per day (beginning at 7:00 AM, with the last delivery at 7:00 PM), this corresponds to a total of six (6) trucks per hour (i.e., 6 inbound trucks and 6 outbound trucks per hour). Since construction trucks are larger in size than passenger vehicles, a passenger car equivalency (PCE) factor has been applied to the forecast truck trip generation in order to account for their effect on intersection operations. Thus, with incorporation of the PCE factor of two (2.0) the PCE truck trip generation is estimated at 12 inbound and 12 outbound truck trips per hour.

It is anticipated that delivery trucks/construction equipment would be brought onto the project site and be stored within the perimeter fence of each construction site, thus, no staging is expected to occur on the perimeter public streets. Therefore, detours around the construction sites would not be required. Flagmen, however, would be used to control traffic movement during the ingress or egress of trucks and heavy equipment from each construction site. As noted below in Section 11.5, a Construction Traffic Control Plan may be required by the City to be developed to minimize potential conflicts between construction activity and through traffic.

Construction worker parking is anticipated to occur primarily within each lot. As noted in the emergency access and evacuation section, current roadway widths (as measured in the field from edge of pavement to edge of pavement) within the Portuguese Bend area typically vary between 20 and 24 feet in width. Several of the internal private roadways also have areas off road that might provide sufficient width for several construction worker vehicles, although not recommended. Refer to the emergency access and evacuation section for further discussion of the traffic analysis during times of an emergency and subsequent evacuation.

11.2.3 *Peak Construction Traffic Generation Summary*

During peak building construction activities (assuming conservatively that *all 31* lots are under construction concurrently which is highly unlikely), construction worker vehicles and trucks are forecast to generate 468 PCE vehicle trips per day (220 daily worker vehicle trips and 248 PCE daily truck trips). As summarized in Sections 11.2.1 and 11.2.2, this corresponds to a total of 24 PCE trips during the AM peak hour (i.e., 12 inbound and 12 outbound PCE vehicle trips), 79 PCE trips during the School PM peak hour (i.e., 12 inbound and 67 outbound PCE vehicle trips), and 24 PCE trips during the PM peak hour (i.e., 12 inbound and 12 outbound PCE vehicle trips). Given that the proposed project upon operation is expected to generate 23 and 31 vehicle trips during the weekday AM and PM peak hours, respectively resulting in five significant traffic impacts, it can be concluded based on the comparative review of trip generation that on a temporary basis construction activities will also result in significant traffic impacts during this peak phase. Since construction activities are temporary in nature, it is conservatively concluded that construction traffic impacts would be significant and unavoidable.

11.3 Haul Routes

Approvals by the City of Rancho Palos Verdes may be required for the implementation of a Truck Haul Route program for the project and would be subject to review by the City of Rancho Palos Verdes Department of Public Works. Based on current plans, haul trucks and delivery trucks would access the site via Palos Verdes Drive South. Haul routes to and from the project area would therefore require approval from the City of Rancho Palos Verdes Department of Public Works.

11.4 Construction Effects on Existing Roads

A review was conducted of the potential effects of project-related construction vehicles on the existing pavement integrity for roads within the Portuguese Bend Community. Based on review of the Portuguese Bend Community Association publications, it is noted that all roads behind the Portuguese Bend gates on Narcissa Drive and Peppertree Drive (i.e., located north of Palos Verdes Drive South) are private, including land (whether vacant or developed). As such, the design and maintenance of private streets is not the responsibility of the City of Rancho Palos Verdes, and therefore these streets may or may not meet accepted design standards, and in some cases are not in keeping with customary maintenance standards.

Further research was conducted of the Covenants, Conditions and Restrictions (CC&Rs) for the Portuguese Bend Community Association as it relates to the purposes, memberships and maintenance charges. The Association has the right and power to purchase, construct, improve, repair, maintain, among others, and hold easements for or the fee to improve, light and maintain streets, roads, alleys, trails, bridle paths, walks, gateways, among others. The owners of lots within the Portuguese Bend Community Association must therefore pay and fund the appropriate general charges, assessments and liens in this regard. Damage caused to any private roadways within the community as a result of construction activities within the community is therefore the responsibility of the Association to repair.

11.5 Construction Traffic Impacts

Based on the comparative review of trip generation between the project's operational trip generation and temporary construction trip generation, construction impacts are conservatively forecast to be significant and unavoidable. With the required haul route approval, the off-peak arrival and departure of construction workers and the other construction management practices, impacts would be reduced to the extent feasible with the implementation of the following design features:

- Maintain existing access for land uses in proximity of the project site;
- Limit any potential lane closures to off-peak travel periods;
- Schedule receipt of construction materials during non-peak travel periods, to the extent possible;
- Coordinate deliveries to reduce the potential of trucks waiting to unload for extended periods of time; and
- Prohibit parking by construction workers on adjacent streets and direct construction workers to available parking as determined in conjunction with City staff.

In order to minimize potential conflicts between construction activity and through traffic, a Construction Traffic Control Plan may be required by the City to be developed for use during project construction. The Construction Traffic Control Plan would identify all traffic control measures, signs, and delineators to be implemented by the construction contractor through the duration of demolition and construction activity. In addition, the City of Rancho Palos Verdes would review and be responsible for approval of any proposed Truck Haul Route program.

12.0 EMERGENCY ACCESS AND EVACUATION REVIEW

An emergency access and evacuation review has been prepared to determine the estimated amount of time (i.e., clearing time) needed for area residents to evacuate the area in the event of a major incident (e.g., wildland fire). This analysis has been performed assuming existing and full development of the proposed project (i.e., a total of approximately 165 homes planned within the Portuguese Bend community/association).

The City utilizes Los Angeles County for both fire and public safety services and emergency "first responder" responsibilities are implemented by the County without the requirement or need of City staff involvement. In the case of the August 27, 2009 brush fire in the Portuguese Bend area of the City, while the County was the primary responding agency, the City did play an important and supporting role during the incident to disseminate information to the residents, City Council and City staff. A summary report following the incident was prepared and presented to the City Council (report dated October 20, 2009). That report provided an overview of lessons learned as well as details regarding the Los Angeles County Emergency Mass Notification System, emergency communications procedures, the management and coordination of recovery operations, among others.

Research has been conducted with respect to existing emergency evacuation procedures. Residents are directed to several preparedness documents and procedures, such as those contained in the *Ready! Set! Go! Your Personal Wildfire Action Plan*, published by the County of Los Angeles Fire Department, and *Emergency Survival Guide,* published by the County of Los Angeles Office of Emergency Management. Several fire protection plans for various communities have also been researched as part of this section. In addition, an evacuation study entitled *Modeling Small Area Evacuation: Can Existing Transportation Infrastructure Impede Public Safety?*, April 2002 prepared by Vehicle Intelligence and Transportation Analysis Laboratory, University of California, Santa Barbara and a paper entitled *Public Safety in the Urban-Wildland Interface: Should Fire-Prone Communities Have a Maximum Occupancy?*, contained in the National Hazards Review, August 2005, were reviewed in detail as part of this analysis.

12.1 Emergency Access Summary

The Portuguese Bend area of Rancho Palos Verdes is a private community that is served by two primary access points; one access point via Narcissa Drive (on the west end) and one access point via Peppertree Drive (on the east end). Both of these access points are gated north of Palos Verdes Drive South and are used by residents to access other local private roadways and their respective homes. A total of approximately 165 homes are planned within the Portuguese Bend community/association, including 111 homes in the project area (i.e., which includes the 31 additional single-family homes analyzed as part of the proposed project, the 11 entitled lots, as well as 69 developed lots within the project area).

Field observations have been conducted in order to verify existing signage, traffic control and pavement widths associated with the private roadways within the Portuguese Bend area. Narcissa

Drive has a pavement width of roughly 23 feet north of the existing gate (north of Palos Verdes Drive South) and the pavement width generally varies between 22 feet and 24 feet in width along its length. Peppertree Drive has a pavement width of roughly 22 feet north of the existing gate (north of Palos Verdes Drive South) and the pavement width generally varies between 22 feet and 24 feet in width along its length. Based on field observations conducted along the private roadways it is recommended that these access roads be posted with "No Parking – Fire Lane" signs. The roadways are of sufficient width to allow large vehicles (i.e., fire engine type trucks) to access the Portuguese Bend area. It should also be noted that the majority of the roadways are not fully improved (e.g., with formal curb and gutter) thus, the above widths and measurements reflect the edge of pavement widths. Additional (i.e., unimproved) width is available along many portions of the roadways, however.

Two fire stations are located within the project study area: Fire Station #53 (located at 6124 Palos Verdes Drive South, Rancho Palos Verdes, CA 90275) and Fire Station #83 (located at 83 Miraleste Plaza, Rancho Palos Verdes, CA 90275). In addition, it is important to note that the County's Division I Battalion 14 Headquarters is located at Fire Station #106 in Rolling Hills Estates. These first response teams will utilize Palos Verdes Drive South to access either Narcissa Drive or Peppertree Drive in order to respond to a fire incident as well as other fire access roads. Further, it is expected that the gates located at both public gateways will be set/controlled to remain open during an evacuation period.

As part of controlling access to and from an evacuation area for a wildland fire within the Portuguese Bend area, nearby roadways will be closed by law enforcement agencies to inbound traffic with the exception for public safety vehicles. Therefore, a minimum of one travel lane will remain open at all times. Any closed roads or traffic closure points would be identified by County emergency personnel and fire staging areas would be set up for public safety officials and equipment. These staging areas would be located where resources can be placed while waiting for tactical assignment to combat wildland fires.

Further, as required by the California Vehicle Code (Section 21806, authorized Emergency Vehicles), motorists are required to pull to the right side of the highway and stop to allow an emergency vehicle to pass. If required, drivers of emergency vehicles are trained to utilize center turn lanes, or travel in opposing through lanes to pass through and traverse crowded or tight areas. Thus, the respect entitled to emergency vehicles and driver training allow emergency vehicles to negotiate typical as well as atypical street conditions in urban and rural areas.

12.2 Evacuation Summary

Evacuation from a wildfire should be the number one priority that the public can exercise to protect themselves. The law enforcement agencies' primary responsibility during a wildland fire is to assist in evacuation of an area. Residents are expected to follow the evacuation routes as communicated and directed by Los Angeles County fire personnel via local roads and onto either Narcissa Drive or Peppertree Drive to exit the area via Palos Verdes Drive South.

12.3 Evacuation Evaluation

An evaluation was prepared to determine the estimated amount of time (i.e., clearing time) needed for area residents to evacuate the Portuguese Bend area in the event of a nearby wildland fire.

12.3.1 *Number of Residential Units in the Portuguese Bend Area to be Evacuated*

A study documenting the number of existing residential units and potential future residential units for the Portuguese Bend area that would utilize either Narcissa Drive or Peppertree Drive to evacuate has been prepared. The existing and future residential units were separated by street segment first and then combined and the results area presented in ***Table 12-1***. As stated above, the number of existing and potential units for the entire Portuguese Bend community is forecast to total approximately 165 units. Based on field observations and use of aerial photography, a total of roughly 54 homes exist outside of the project area, with roughly 26 expected to predominantly utilize Narcissa Drive and 28 expected to predominantly utilize Peppertree Drive during an evacuation. The project area consists of approximately 64 developed lots as well as the potential development of up to 31 additional lots. Given an overall gateway distribution of 56 percent via Narcissa Drive and 44 percent via Peppertree Drive associated with the future potential homes (i.e., 18 via Narcissa Drive and 13 via Peppertree Drive) the total number of existing and future homes expected to evacuate via Narcissa Drive totals 86 homes (i.e., 68 existing and entitled and up to 18 future homes) and via Peppertree Drive totals 79 homes (i.e., 66 existing and entitled and up to 13 future homes).

12.3.2 *Forecast Trip Generation and Evacuation Clearing Times – Future Conditions*

Based on the above referenced technical documents, it is conservatively estimated that during an evacuation, two vehicles per residential unit will be evacuated. It should be noted that this can be considered a conservative assumption, as not every residential unit would be occupied during an evacuation nor would every home have two drivers present in order to evacuate two vehicles. The total forecast trip generation for the existing and future homes within the Portuguese Bend area by gateway is presented in ***Table 12-2***. As shown in *Table 12-2*, approximately 172 vehicles are forecast to exit via Narcissa Drive and 158 vehicles are forecast to exit via Peppertree Drive.

An evacuation study, *Modeling Small Area Evacuation: Can Existing Transportation Infrastructure Impede Public Safety?*, April 2002 was prepared by Vehicle Intelligence and Transportation Analysis Laboratory, University of California, Santa Barbara to document the modeled clearing times for a neighborhood similar in nature to the Portuguese Bend community in Rancho Palos Verdes. That neighborhood contained a total of two access points and the internal roadways comprised of one lane in each direction. As part of the study, three five-minute intervals were used to separate the forecast trip generation in which 30 percent of the total number of vehicles evacuate within the first five minutes, 50 percent evacuated in the next five minutes, and 20 percent evacuate in the next five minutes.

The *Modeling Small Area Evacuation: Can Existing Transportation Infrastructure Impede Public Safety?* study modeled the evacuation clearing times for several scenarios. For the purposes of this

Table 12-1
POTENTIAL BUILDOUT OF SINGLE-FAMILY DWELLING UNITS
IN THE PORTUGUESE BEND AREA - EVACUATION ROUTE SCENARIO [1]

Location	**Existing Units Outside of Project Area**	**Developed Lots Within Project Area**	**Potential Units (Proposed Project)**	**Total Units**
Narcissa Drive north of Palos Verdes Drive South	26	42	18	86
Peppertree Drive north of Palos Verdes Drive South	28	38	13	79
Total	54	80	31	165

[1] Source: Based on field observations, existing aerial photography, and the project description.

Table 12-2
FORECAST OF TRIP GENERATION AND CLEARING TIMES
PORTUGUESE BEND AREA - BUILDOUT
EVACUATION ROUTE SCENARIO

	[1]	[2] First Five Minutes of Evacuation [b]		[3] Second Five Minutes of Evacuation [b]		[4] Third Five Minutes of Evacuation [b]	
Location	**Total Evacuation Forecast Trips [a]**	**Forecast Trips [a]**	**Clearing Time [c] (Minutes)**	**Forecast Trips [a]**	**Clearing Time [c] (Minutes)**	**Forecast Trips [a]**	**Clearing Time [c] (Minutes)**
Narcissa Drive north of Palos Verdes Drive South	172	52	0.7	86	1.1	34	0.5
Peppertree Drive north of Palos Verdes Drive South	158	47	0.6	79	1.1	32	0.4

[a] It is estimated that two vehicles per residential unit would be used during evacuation. Note that this is a conservative assumption as not every residential unit would be occupied during evacuation. A total of 86 and 79 homes are expected to evacuate via the Narcissa Drive and Peppertree Drive gateways, respectively.

[b] The forecast trips were separated into three five-minute intervals in which 30% of the total number of vehicles evacuate in the first five minutes, 50% evacuate in the next five minutes, and 20% evacuate in the next five minutes. The five-minute intervals were based on information documented in the "Modeling Small Area Evacuation: Can Existing Transportation Infrastructure Impede Public Safety", by Vehicle Intelligence & Transportation Analysis Laboratory, University of California, Santa Barbara, April 2002.

[c] An average of 74.9 cars per minute was used to determine the clearing time during evacuation. This average was based on the clearing times documented in the "Modeling Small Area Evacuation: Can Existing Transportation Infrastructure Impede Public Safety", by Vehicle Intelligence & Transportation Analysis Laboratory, University of California, Santa Barbara, April 2002. It should be noted that the 74.9 cars per minute rate assumes traffic control and inbound traffic closures in the area.

evaluation, it was assumed that some traffic closures and traffic control officers would be posted at the critical intersections to quickly process vehicles evacuating the area. The referenced study modeled an evacuation clearing time for residential units, with two vehicles evacuating per unit, traffic closures, and traffic control at 74.9 vehicles per minute. The average 74.9 vehicles per minute evacuation clearing time was therefore used to determine the evacuation clearing time for the Portuguese Bend area.

As shown in column [3] of *Table 12-2*, which is the condition with highest amount of vehicles evacuating (i.e., 50 percent evacuated in the second five minutes), it is estimated that the clearing time to evacuate the vehicles traveling south on Narcissa Drive is approximately 1.1 minutes and the time to evacuate the vehicles traveling south on Peppertree Drive is approximately 1.1 minutes. It should be noted that this analysis assumes traffic control will be present during the time of a potential emergency evacuation and it is likely that motorists will not need to stop at every posted stop sign. While the vehicles exiting via Narcissa Drive and Peppertree Drive will likely overlap with the beginning of the next five minutes of evacuation, it is conservative as emergency responders typically will order evacuations more in advance than the 15-minute time period. As stated above, it is recommended within the industry that a total evacuation time of 20 minutes or less is ideal, but in no case should exceed 30 minutes. Therefore, the clearance time interval findings summarized in *Table 12–2* are found to be within an acceptable range for evacuation purposes.

With intervention (i.e., traffic control) and education, evacuation problems can be avoided. First, education is important so that neighborhood residents know to park their vehicles facing the street during high fire risk periods. Second, education is needed to convince residents that taking all of their vehicles, while it would save personal property, would add additional time beyond what is absolutely needed to clear the neighborhood during an emergency. Third, residents in high fire risk areas should be prepared with pre-packed emergency supplies and critical documents such that a quick departure from home can be obtained when the order to evacuate is given by City/County emergency response team/s. Finally, residents can take action (e.g., clearing brush) that may mitigate the extreme conditions of a wildfire near their homes.

12.3.3 *Proposed Minimum Exits – For Evacuations*

The *Public Safety in the Urban-Wildland Interface: Should Fire-Prone Communities Have a Maximum Occupancy?,* National Hazards Review, August 2005 article, was also reviewed in detail in order to verify the validity of the number of exiting roadways to adequately serve the Portuguese Bend community during times of an emergency evacuation. The article notes the proposed minimum exits for interface communities as contained in Table 4 (Proposed Minimum Exits Table for Interface Communities).

As indicated in the above referenced table, for a total number of households of between 51 and 300 homes, the minimum number of exiting roads is two (2) and the maximum number of households per exit totals 150 homes. As the community has been constructed with two exiting roads and a total of 86 and 79 total households are forecast to exit the Narcissa Drive and Peppertree Drive gateways, respectively, the design of the roadway system with respect to number of exiting roadways and number of households per exit is concluded to be adequate for emergency evacuation purposes.

12.4 Equestrian Evacuation

Several preparedness documents and procedures are available for horse owners, such as those contained in the *Are You and Your Horses Prepared for an Emergency Event?*, published by the County of Los Angeles Department of Animal Care and Control. Owners are urged to evacuate early, as soon as an Evacuation Warning is issued rather than wait for an Evacuation Order. It is vital for horses to be evacuated early as the roads can become too crowded to safely move a horse trailer from threatened areas and to prevent horse trailers from interfering with emergency response vehicles. Horse owners are encouraged to teach/train horses to load into a trailer and have a working trailer available during the fire season. It is important to note that the above evacuation clearing times assume that equestrian owners and the Los Angeles County Equine Response Team have voluntarily evacuated their horses and that the owners return to evacuate via their personal vehicle/s.

The Los Angeles County Equine Response Team (ERT) has previously addressed the City of Rancho Palos Verdes Equestrian Committee regarding the Fire Department's coordination and request regarding preplans for equine evacuation in case of a wildland fire. ERT is a team of specially trained volunteers that provide emergency evacuation and temporary sheltering for horses and livestock in need of evacuation care. ERT has sites that can be used for emergency equine evacuation pick-up, thus allowing the ERT to pick-up the horse/s and transport them to emergency shelters. Given that one inbound travel lane will be maintained during an evacuation period to allow for entry of emergency vehicles, equestrian evacuation will be possible.

12.5 Construction Traffic Implications During an Evacuation

As summarized in *Table 12-2*, and concluded above, it is estimated that the clearing time to evacuate resident vehicles traveling south on Narcissa Drive and Peppertree Drive can occur within an acceptable range for evacuation purposes. These estimates assume that all 31 homes proposed as part of the project have been completed and occupied.

Based on the construction analysis contained herein, it was conservatively determined that the maximum construction activity in terms of construction trip generation would occur during the building construction phase given the highly unlikely scenario of all 31 homes being under construction at the same time. Accounting for the addition of the construction worker and construction truck trip generation/vehicles (while subtracting the future resident vehicles from the evacuation analysis), the above evacuation clearance times would increase slightly to 1.4 minutes for Narcissa Drive and 1.3 minutes for Peppertree Drive, respectively. It should also be noted that the provisions for resident evacuation would also apply to construction-related vehicles and personnel. Therefore, it can be concluded that these clearance times would increase by 0.3 minutes (18 seconds) and 0.2 minutes (12 seconds) for the Narcissa Drive and Peppertree Drive access points, respectively.

13.0 CONGESTION MANAGEMENT PROGRAM TRAFFIC IMPACT ASSESSMENT

The Congestion Management Program (CMP) is a state-mandated program that was enacted by the State Legislature with the passage of Proposition 111 in 1990. The program is intended to address the impact of local growth on the regional transportation system.

As required by the *2010 Congestion Management Program for Los Angeles County*, a Traffic Impact Assessment (TIA) has been prepared to determine the potential impacts on designated monitoring locations on the CMP highway system. The analysis has been prepared in accordance with procedures outlined in the *2010 Congestion Management Program for Los Angeles County,* County of Los Angeles Metropolitan Transportation Authority, October 2010.

13.1 Freeways

No CMP freeway monitoring locations are located in the project vicinity. Further, the CMP TIA guidelines require that freeway monitoring locations must be examined if the proposed project will add 150 or more trips (in either direction) during either the AM or PM weekday peak hours. The proposed project will not add 150 or more trips (in either direction), during either the AM or PM weekday peak hours to the CMP freeway monitoring location, which is the threshold for preparing a traffic impact assessment, as stated in the CMP manual. Therefore, no further review of potential impacts to freeway monitoring locations that are part of the CMP highway system is required.

13.2 Intersections

The following CMP intersection monitoring locations in the project vicinity have been identified:

- <u>CMP Station</u> <u>Intersection</u>
  - Int. No. 58 Pacific Coast Highway at Western Avenue
  - Int. No. 84 Western Avenue at 9th Street
  - Int. No. 128 Western Avenue at Toscanini Drive
  - Int. No. 151 Pacific Coast Highway at Crenshaw Boulevard
  - Int. No. 152 Pacific Coast Highway at Hawthorne Boulevard
  - Int. No. 153 Pacific Coast Highway at Palos Verdes Boulevard

The CMP TIA guidelines require that intersection monitoring locations must be examined if the proposed project will add 50 or more trips during either the AM or PM weekday peak hours. The proposed project will not add 50 or more trips, during the AM or PM peak hours at the CMP monitoring intersections, which is the threshold for preparing a traffic impact assessment, as stated in the CMP manual. As such, no further review of potential impacts to intersection monitoring locations that are part of the CMP highway system is required.

13.3 Transit Impact Review

As required by the *2010 Congestion Management Program for Los Angeles County*, a review has been made of the CMP transit service. Existing transit service is provided in the vicinity of the proposed project.

The project trip generation, as shown in *Table 5-1*, was adjusted by values set forth in the CMP (i.e., person trips equal 1.4 times vehicle trips, and transit trips equal 3.5 percent of the total person trips) to estimate transit trip generation. Pursuant to the CMP guidelines, the proposed project is forecast to generate demand for two (2) transit trip during the weekday AM peak hour, two (2) transit trips during the weekday PM peak hour, and 15 daily transit trips during the weekday. The calculations are as follows:

- Weekday AM Peak Hour = 23 × 1.4 × 0.035 = 2 Transit Trips
- Weekday PM Peak Hour = 31 × 1.4 × 0.035 = 2 Transit Trips
- Weekday Daily Trips = 293 × 1.4 × 0.035 = 15 Transit Trips

As shown in *Table 4-2*, five bus transit lines and routes are provided adjacent to or in close proximity to the project site, with two of these transit lines and routes directly serving the Portuguese Bend community. A total of two different bus transit providers provide service within the study area. As outlined in *Table 4-2* under the "No. of Buses During Peak Hour" column, these five transit lines provide service for an average (i.e., an average of the directional number of buses during the peak hours) of approximately 13 buses during the AM peak hour and roughly 11 buses during the PM peak hour. Therefore, based on the above calculated peak hour transit trips, this would correspond to less than one transit rider per bus. Thus, given the low number of generated transit trips per bus, no impacts on existing or future transit services in the project area are expected to occur as a result of the proposed project.

14.0 SUMMARY AND CONCLUSIONS

- ***Project Description* –** The City of Rancho Palos Verdes is considering revisions to its Landslide Moratorium Ordinance that would facilitate the future development of 31 additional single-family residences on undeveloped lots within a portion of the City's Portuguese Bend community.

- ***Vehicular Site Access* –** Access to the existing Portuguese Bend community of Rancho Palos Verdes and the proposed project is provided via Narcissa Drive and Peppertree Drive on Palos Verdes Drive South.

- ***Study Scope* –** A total of seven study intersections and two street segments were selected for analysis in consultation with City of Rancho Palos Verdes staff in order to determine potential traffic impacts related to the proposed project.

- ***Project Trip Generation* –** The proposed project is expected to generate 23 vehicle trips (6 inbound trips and 17 outbound trips) during the AM peak hour. During the PM peak hour, the proposed project is expected to generate 31 vehicle trips (20 inbound trips and 11 outbound trips). Over a 24-hour period, the proposed project is forecast to generate 293 daily trip ends during a typical weekday (approximately 147 inbound trips and 147 outbound trips). For purposes of this analysis, the weekday PM peak hour project traffic generation was assumed to also comprise the School PM peak hour project traffic generation in order to provide a conservative forecast of potential traffic impacts.

- ***Related Projects* –** The City of Rancho Palos Verdes, City of Rolling Hills Estates, and City of Los Angeles Departments of Transportation and Planning were consulted to obtain the list of development projects (related projects) in the area. A total of 22 related projects was identified and considered as part of the cumulative traffic analysis.

- ***Intersection Traffic Impact Analysis* –** Application of the City's threshold criteria to the "With Project" scenario indicates that the proposed project is forecast to result in significant traffic impacts at five of the seven intersections. Transportation mitigation measures have been considered and if approved and implemented would reduce the project's contribution to the significant transportation impacts at the subject study intersections to less than significant levels. If for any reason the City decides against the installation of the traffic signal at the Via Rivera/Hawthorne Boulevard intersection, the project impact would remain significant and unavoidable.

- ***Roadway Street Segment Analysis* –** It is concluded that one of the roadway segments will not meet the City's minimum level of service standard. A measure is recommended consistent with the City's General Plan to reduce the potentially significant impact to less than significant levels. However, the improvement would require elimination of the existing bicycle lanes along Palos Verdes Drive South, which may not be feasible. Therefore, a significant and unavoidable traffic impact would remain at this location.

- ***Construction Traffic Analysis*** **–** It can be concluded that based on the comparative review of project's forecast peak construction-related traffic generation with the forecast operational traffic generation significant traffic impacts could occur during the peak construction phase. Since construction activities are temporary in nature, it is conservatively concluded that construction traffic impacts would be significant and unavoidable.

- ***Emergency Access and Evacuation Review*** **–** It is estimated that the clearing times to evacuate the vehicles traveling south on Narcissa Drive and Peppertree Drive are found to be within an acceptable range for evacuation purposes.

- ***CMP Traffic Assessment*** **–** The results of the Los Angeles CMP traffic assessment indicate that the proposed project will not adversely affect any CMP arterial monitoring intersections or freeway monitoring locations. Therefore, no improvements/mitigation measures at CMP monitoring locations are required.

APPENDIX A

TRAFFIC COUNT DATA

ITM Peak Hour Summary

Prepared by:

NDS

National Data & Surveying Services

Via Rivera and Hawthorne Blvd , Rancho Palos Verdes

Date: 11/29/2016
Day: Tuesday

Project #: 16-5764-003
City: Rancho Palos Verdes

N

AM Peak Hour	745 AM
NOON Peak Hour	
PM Peak Hour	430 PM

Peak Hour Summary

Via Rivera / **Hawthorne Blvd**

CONTROL: 1-Way Stop (SB)

Southbound Approach

	Right	Thru	Left	Out
Lanes	0	1	0	
AM	73	0	107	184
NOON	0	0	0	0
PM	21	0	73	109

Eastbound Approach

	AM	NOON	PM
Out	542	0	651

Lanes	Movement	AM	NOON	PM
1	Left	54	0	40
2	Thru	769	0	525
0	Right	4	0	4

Westbound Approach

Movement	AM	NOON	PM	Lanes
Right	130	0	69	1
Thru	468	0	630	2
Left	31	0	7	1
Out	879	0	607	

Northbound Approach

	Out	Left	Thru	Right
AM	35	1	0	3
NOON	0	0	0	0
PM	11	0	0	9
Lanes		0	1	0

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON	NONE	NONE
PM	4:00 PM	6:00 PM

Total Ins & Outs

Leg	Period	In	Out
North Leg	AM	180	184
North Leg	NOON	0	0
North Leg	PM	94	109
East Leg	AM	629	879
East Leg	NOON	0	0
East Leg	PM	706	607
West Leg	AM	827	542
West Leg	NOON	0	0
West Leg	PM	569	651
South Leg	AM	4	35
South Leg	NOON	0	0
South Leg	PM	9	11

Total Volume Per Leg

Leg	AM	NOON	PM
North Leg	364	0	203
East Leg	1508	0	1313
West Leg	1369	0	1220
South Leg	39	0	20

CITY TRAFFIC COUNTERS
WWW.CTCOUNTERS.COM

File Name : Hawthorne_ViaRivera
Site Code : 00000000
Start Date : 11/14/2018
Page No : 1

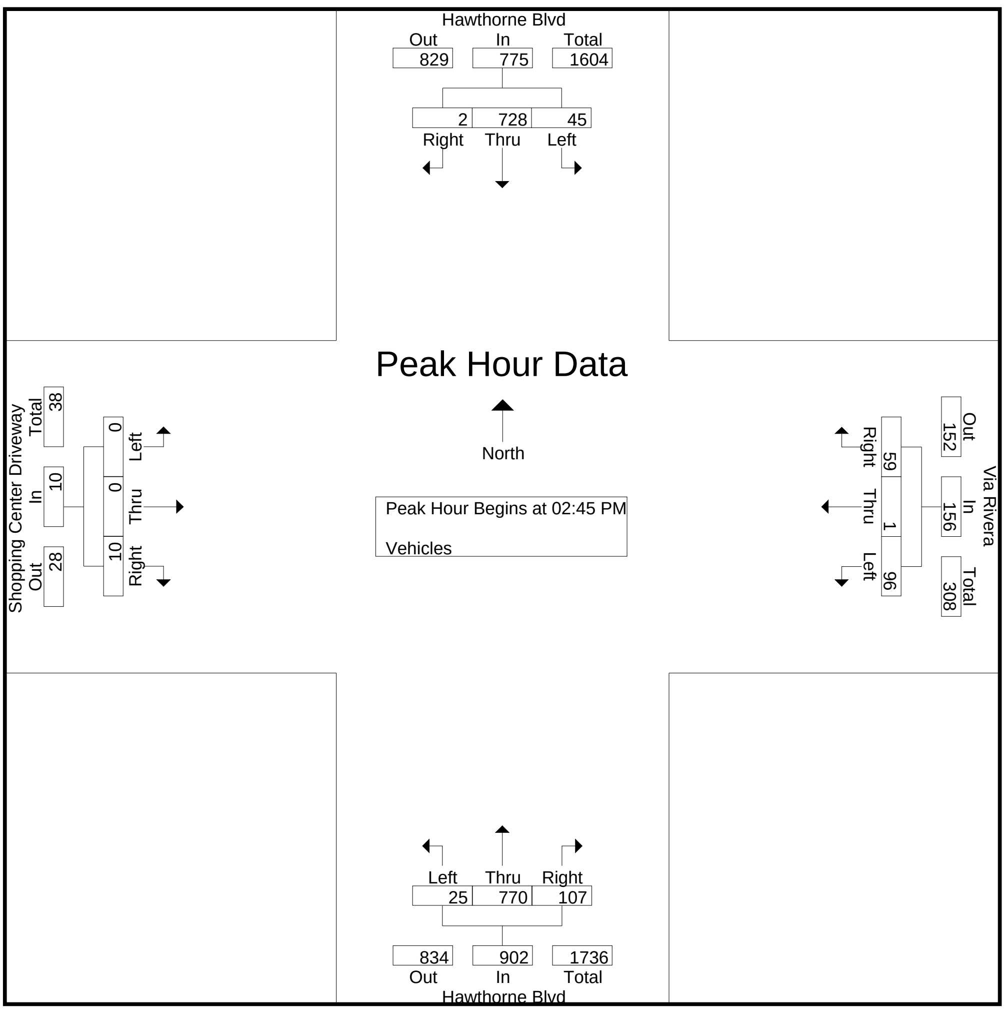
Groups Printed- Vehicles

	Hawthorne Blvd Southbound			Via Rivera Westbound			Hawthorne Blvd Northbound			Shopping Center Driveway Eastbound			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
02:00 PM	7	100	1	11	1	7	2	120	19	0	0	3	271
02:15 PM	6	129	2	18	0	9	3	128	24	0	0	4	323
02:30 PM	17	127	0	7	0	7	2	145	33	0	0	0	338
02:45 PM	8	165	1	14	0	15	6	182	42	0	0	3	436
Total	38	521	4	50	1	38	13	575	118	0	0	10	1368
03:00 PM	18	207	0	32	1	19	5	202	29	0	0	1	514
03:15 PM	7	204	0	29	0	14	9	186	20	0	0	1	470
03:30 PM	12	152	1	21	0	11	5	200	16	0	0	5	423
03:45 PM	10	116	2	9	0	5	10	184	16	0	0	1	353
Total	47	679	3	91	1	49	29	772	81	0	0	8	1760
Grand Total	85	1200	7	141	2	87	42	1347	199	0	0	18	3128
Apprch %	6.6	92.9	0.5	61.3	0.9	37.8	2.6	84.8	12.5	0	0	100	
Total %	2.7	38.4	0.2	4.5	0.1	2.8	1.3	43.1	6.4	0	0	0.6	

CITY TRAFFIC COUNTERS
WWW.CTCOUNTERS.COM

File Name : Hawthorne_ViaRivera
Site Code : 00000000
Start Date : 11/14/2018
Page No : 2

	Hawthorne Blvd Southbound				Via Rivera Westbound				Hawthorne Blvd Northbound				Shopping Center Driveway Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 02:00 PM to 03:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 02:45 PM																	
02:45 PM	8	165	**1**	174	14	0	15	29	6	182	**42**	230	0	0	3	3	436
03:00 PM	**18**	**207**	0	**225**	**32**	**1**	**19**	**52**	5	**202**	29	**236**	0	0	1	1	**514**
03:15 PM	7	204	0	211	29	0	14	43	**9**	186	20	215	0	0	1	1	470
03:30 PM	12	152	1	165	21	0	11	32	5	200	16	221	0	0	**5**	**5**	423
Total Volume	45	728	2	775	96	1	59	156	25	770	107	902	0	0	10	10	1843
% App. Total	5.8	93.9	0.3		61.5	0.6	37.8		2.8	85.4	11.9		0	0	100		
PHF	.625	.879	.500	.861	.750	.250	.776	.750	.694	.953	.637	.956	.000	.000	.500	.500	.896



CITY TRAFFIC COUNTERS
WWW.CTCOUNTERS.COM

File Name : Tramonto-Seahill_PalosVerdesDrSouth
Site Code : 00000000
Start Date : 11/14/2018
Page No : 1

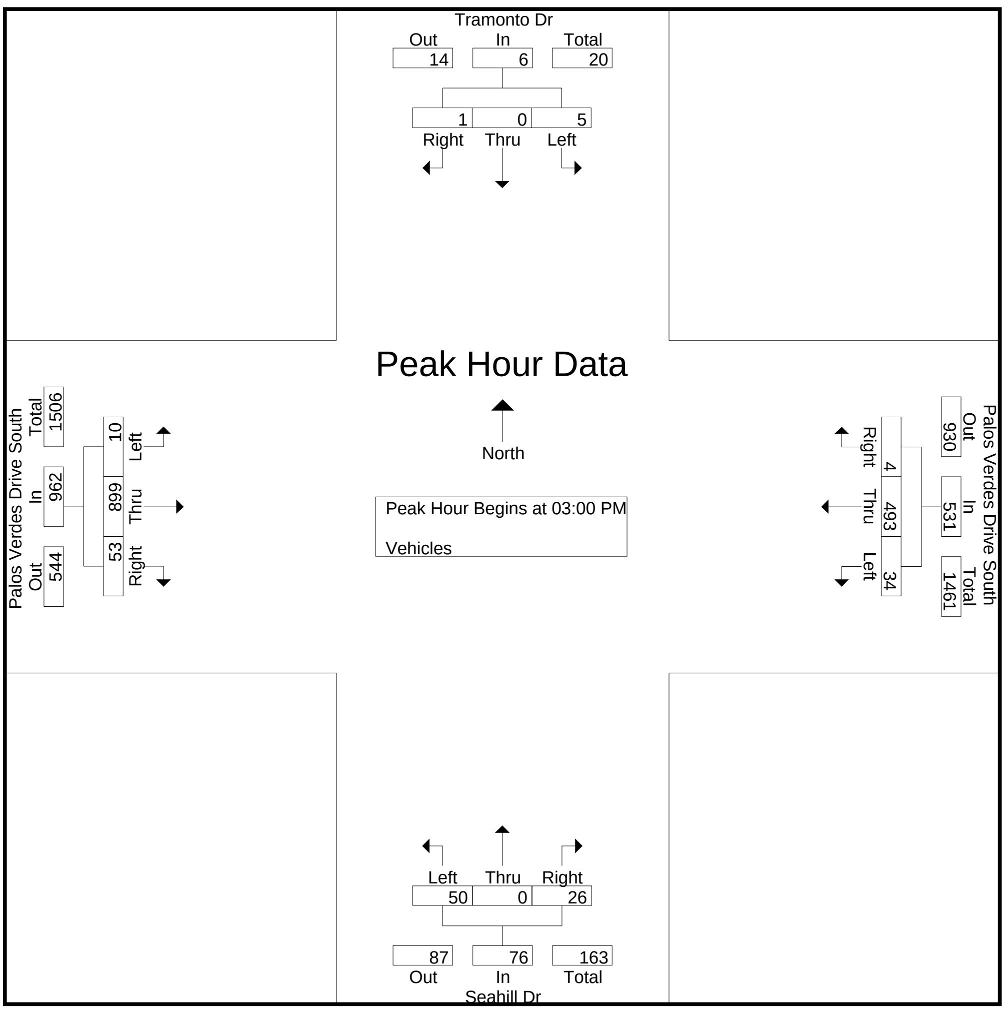
Groups Printed- Vehicles

	Tramonto Dr Southbound			**Palos Verdes Drive South Westbound**			**Seahill Dr Northbound**			**Palos Verdes Drive South Eastbound**			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
02:00 PM	0	0	0	6	97	0	16	1	8	2	118	8	256
02:15 PM	0	0	0	4	99	1	6	0	4	2	131	7	254
02:30 PM	6	0	1	6	143	0	9	0	2	1	145	7	320
02:45 PM	0	0	0	3	124	1	11	0	4	4	186	12	345
Total	6	0	1	19	463	2	42	1	18	9	580	34	1175
03:00 PM	1	0	0	7	126	1	16	0	5	4	228	13	401
03:15 PM	0	0	0	9	114	3	12	0	8	4	246	17	413
03:30 PM	2	0	0	9	122	0	10	0	7	2	220	10	382
03:45 PM	2	0	1	9	131	0	12	0	6	0	205	13	379
Total	5	0	1	34	493	4	50	0	26	10	899	53	1575
Grand Total	11	0	2	53	956	6	92	1	44	19	1479	87	2750
Apprch %	84.6	0	15.4	5.2	94.2	0.6	67.2	0.7	32.1	1.2	93.3	5.5	
Total %	0.4	0	0.1	1.9	34.8	0.2	3.3	0	1.6	0.7	53.8	3.2	

CITY TRAFFIC COUNTERS
WWW.CTCOUNTERS.COM

File Name : Tramonto-Seahill_PalosVerdesDrSouth
Site Code : 00000000
Start Date : 11/14/2018

	Tramonto Dr Southbound				Palos Verdes Drive South Westbound				Seahill Dr Northbound				Palos Verdes Drive South Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 02:00 PM to 03:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:00 PM																	
03:00 PM	1	0	0	1	7	126	1	134	**16**	0	5	**21**	**4**	228	13	245	401
03:15 PM	0	0	0	0	**9**	114	**3**	126	12	0	**8**	20	4	**246**	**17**	**267**	**413**
03:30 PM	**2**	0	0	2	9	122	0	131	10	0	7	17	2	220	10	232	382
03:45 PM	2	0	**1**	**3**	9	**131**	0	**140**	12	0	6	18	0	205	13	218	379
Total Volume	5	0	1	6	34	493	4	531	50	0	26	76	10	899	53	962	1575
% App. Total	83.3	0	16.7		6.4	92.8	0.8		65.8	0	34.2		1	93.5	5.5		
PHF	.625	.000	.250	.500	.944	.941	.333	.948	.781	.000	.813	.905	.625	.914	.779	.901	.953



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City of Rancho Palos Verdes
N/S: Barkentine Road
E/W: Palos Verdes Drive South
Weather: Clear

File Name : 01_RPV_Barkentine_Palos Verdes Dr S AM
Site Code : 05718832
Start Date : 11/14/2018
Page No : 1

Groups Printed- Total Volume

	Barkentine Road Southbound				Palos Verdes Drive South Westbound				Barkentine Road Northbound				Palos Verdes Drive South Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	1	0	1	2	2	113	1	116	3	0	2	5	2	53	1	56	179
07:15 AM	0	0	3	3	2	181	0	183	8	0	1	9	0	56	1	57	252
07:30 AM	2	0	6	8	1	185	1	187	3	0	2	5	1	73	2	76	276
07:45 AM	0	1	1	2	0	238	1	239	8	0	1	9	0	90	2	92	342
Total	3	1	11	15	5	717	3	725	22	0	6	28	3	272	6	281	1049
08:00 AM	0	0	1	1	2	244	0	246	5	0	2	7	1	75	1	77	331
08:15 AM	0	0	2	2	4	271	0	275	5	0	1	6	5	78	0	83	366
08:30 AM	0	0	2	2	5	238	1	244	5	0	4	9	12	122	5	139	394
08:45 AM	3	0	1	4	4	222	1	227	4	0	1	5	6	115	4	125	361
Total	3	0	6	9	15	975	2	992	19	0	8	27	24	390	10	424	1452
Grand Total	6	1	17	24	20	1692	5	1717	41	0	14	55	27	662	16	705	2501
Apprch %	25	4.2	70.8		1.2	98.5	0.3		74.5	0	25.5		3.8	93.9	2.3		
Total %	0.2	0	0.7	1	0.8	67.7	0.2	68.7	1.6	0	0.6	2.2	1.1	26.5	0.6	28.2	

	Barkentine Road Southbound				Palos Verdes Drive South Westbound				Barkentine Road Northbound				Palos Verdes Drive South Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	0	0	1	1	2	244	0	246	**5**	0	2	7	1	75	1	77	331
08:15 AM	0	0	**2**	2	4	**271**	0	**275**	5	0	1	6	5	78	0	83	366
08:30 AM	0	0	2	2	**5**	238	**1**	244	5	0	**4**	**9**	**12**	**122**	**5**	**139**	**394**
08:45 AM	**3**	0	1	**4**	4	222	1	227	4	0	1	5	6	115	4	125	361
Total Volume	3	0	6	9	15	975	2	992	19	0	8	27	24	390	10	424	1452
% App. Total	33.3	0	66.7		1.5	98.3	0.2		70.4	0	29.6		5.7	92	2.4		
PHF	.250	.000	.750	.563	.750	.899	.500	.902	.950	.000	.500	.750	.500	.799	.500	.763	.921

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City of Rancho Palos Verdes
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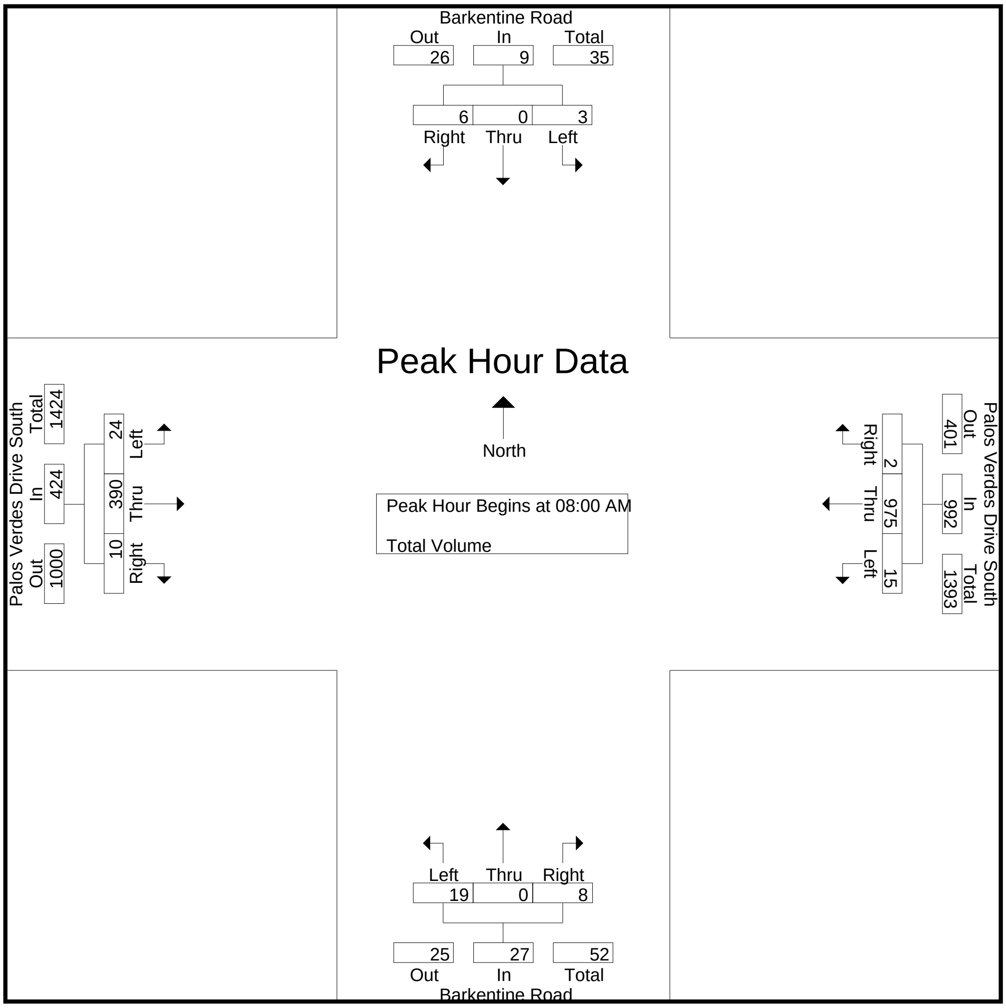
File Name : 01_RPV_Barkentine_Palos Verdes Dr S AM
Site Code : 05718832
Start Date : 11/14/2018
Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:00 AM				07:45 AM				07:45 AM				08:00 AM			
+0 mins.	1	0	1	2	0	238	**1**	239	**8**	0	1	**9**	1	75	1	77
+15 mins.	0	0	3	3	2	244	0	246	5	0	2	7	5	78	0	83
+30 mins.	**2**	0	**6**	**8**	4	**271**	0	**275**	5	0	1	6	**12**	**122**	**5**	**139**
+45 mins.	0	**1**	1	2	**5**	238	1	244	5	0	**4**	9	6	115	4	125
Total Volume	3	1	11	15	11	991	2	1004	23	0	8	31	24	390	10	424
% App. Total	20	6.7	73.3		1.1	98.7	0.2		74.2	0	25.8		5.7	92	2.4	
PHF	.375	.250	.458	.469	.550	.914	.500	.913	.719	.000	.500	.861	.500	.799	.500	.763

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City of Rancho Palos Verdes
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Weather: Clear

File Name : 01_RPV_Barkentine_Palos Verdes Dr S PM 1
Site Code : 05718832
Start Date : 11/14/2018
Page No : 1

Groups Printed- Total Volume

	Barkentine Road Southbound				Palos Verdes Drive South Westbound				Barkentine Road Northbound				Palos Verdes Drive South Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
02:00 PM	0	0	3	3	1	93	3	97	3	0	1	4	5	124	0	129	233
02:15 PM	0	0	1	1	1	100	2	103	2	0	0	2	3	137	3	143	249
02:30 PM	0	0	1	1	0	140	0	140	4	0	3	7	6	146	0	152	300
02:45 PM	2	0	6	8	1	114	0	115	4	0	0	4	5	192	2	199	326
Total	2	0	11	13	3	447	5	455	13	0	4	17	19	599	5	623	1108
03:00 PM	1	0	2	3	0	130	3	133	3	0	1	4	2	223	3	228	368
03:15 PM	0	0	2	2	0	120	2	122	3	0	0	3	2	245	9	256	383
03:30 PM	1	0	3	4	2	133	2	137	1	0	1	2	4	221	6	231	374
03:45 PM	2	0	1	3	2	130	0	132	2	0	1	3	4	201	3	208	346
Total	4	0	8	12	4	513	7	524	9	0	3	12	12	890	21	923	1471
Grand Total	6	0	19	25	7	960	12	979	22	0	7	29	31	1489	26	1546	2579
Apprch %	24	0	76		0.7	98.1	1.2		75.9	0	24.1		2	96.3	1.7		
Total %	0.2	0	0.7	1	0.3	37.2	0.5	38	0.9	0	0.3	1.1	1.2	57.7	1	59.9	

	Barkentine Road Southbound				Palos Verdes Drive South Westbound				Barkentine Road Northbound				Palos Verdes Drive South Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 02:00 PM to 03:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:00 PM																	
03:00 PM	1	0	2	3	0	130	**3**	133	**3**	0	**1**	**4**	2	223	3	228	368
03:15 PM	0	0	2	2	0	120	2	122	3	0	0	3	2	**245**	**9**	**256**	**383**
03:30 PM	1	0	**3**	**4**	**2**	**133**	2	**137**	1	0	1	2	**4**	221	6	231	374
03:45 PM	**2**	0	1	3	2	130	0	132	2	0	1	3	4	201	3	208	346
Total Volume	4	0	8	12	4	513	7	524	9	0	3	12	12	890	21	923	1471
% App. Total	33.3	0	66.7		0.8	97.9	1.3		75	0	25		1.3	96.4	2.3		
PHF	.500	.000	.667	.750	.500	.964	.583	.956	.750	.000	.750	.750	.750	.908	.583	.901	.960

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City of Rancho Palos Verdes
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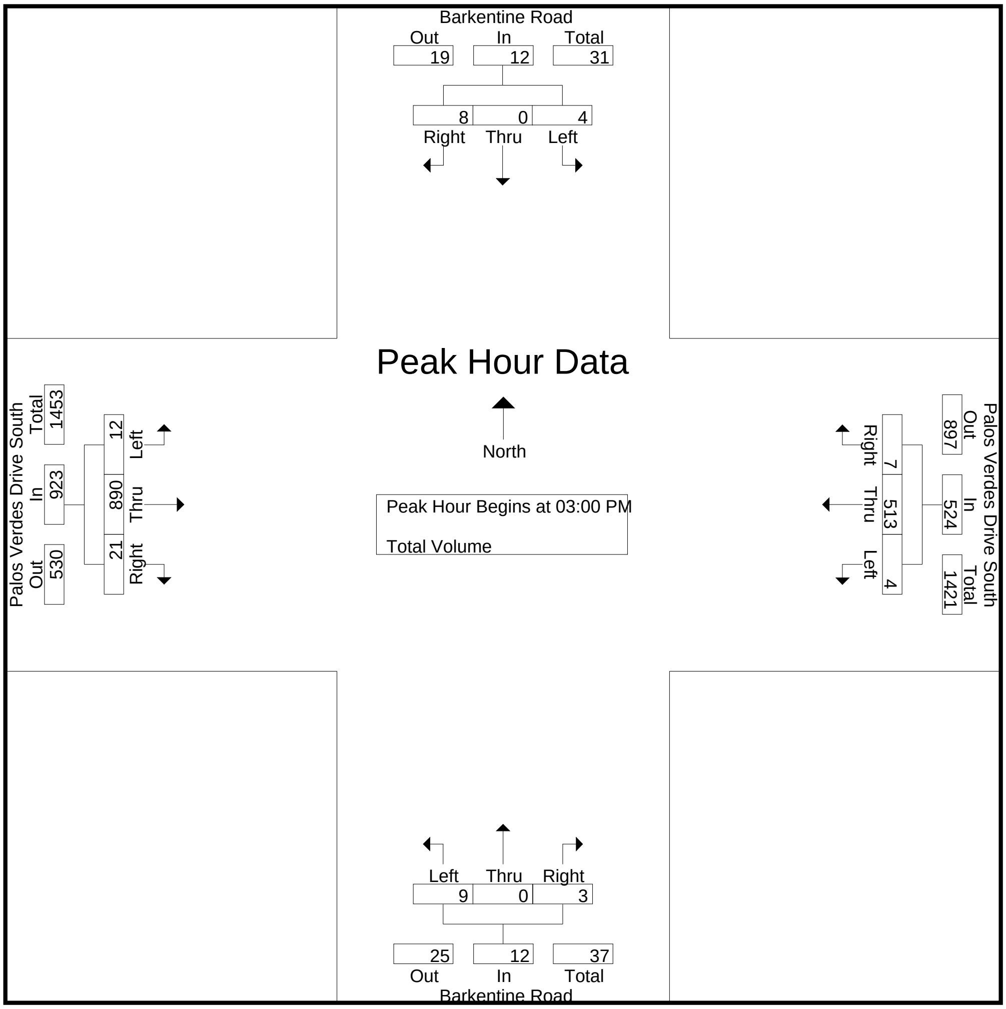
File Name : 01_RPV_Barkentine_Palos Verdes Dr S PM 1
Site Code : 05718832
Start Date : 11/14/2018
Page No : 2



Peak Hour Analysis From 02:00 PM to 03:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	02:45 PM				03:00 PM				02:30 PM				03:00 PM			
+0 mins.	**2**	0	**6**	**8**	0	130	**3**	133	**4**	0	**3**	**7**	2	223	3	228
+15 mins.	1	0	2	3	0	120	2	122	4	0	0	4	2	**245**	**9**	**256**
+30 mins.	0	0	2	2	**2**	**133**	2	**137**	3	0	1	4	**4**	221	6	231
+45 mins.	1	0	3	4	2	130	0	132	3	0	0	3	4	201	3	208
Total Volume	4	0	13	17	4	513	7	524	14	0	4	18	12	890	21	923
% App. Total	23.5	0	76.5		0.8	97.9	1.3		77.8	0	22.2		1.3	96.4	2.3	
PHF	.500	.000	.542	.531	.500	.964	.583	.956	.875	.000	.333	.643	.750	.908	.583	.901

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City of Rancho Palos Verdes
N/S: Barkentine Road
E/W: Palos Verdes Drive South
Weather: Clear

File Name : 01_RPV_Barkentine_Palos Verdes Dr S PM 2
Site Code : 05718832
Start Date : 11/14/2018
Page No : 1

Groups Printed- Total Volume

	Barkentine Road Southbound				Palos Verdes Drive South Westbound				Barkentine Road Northbound				Palos Verdes Drive South Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	0	0	0	0	2	131	1	134	2	0	1	3	2	200	2	204	341
04:15 PM	1	0	3	4	1	121	0	122	1	0	0	1	4	182	4	190	317
04:30 PM	1	0	1	2	3	101	0	104	1	0	1	2	0	188	3	191	299
04:45 PM	0	0	0	0	3	130	3	136	3	0	0	3	1	207	2	210	349
Total	2	0	4	6	9	483	4	496	7	0	2	9	7	777	11	795	1306
05:00 PM	0	0	0	0	3	113	0	116	3	0	2	5	5	190	3	198	319
05:15 PM	3	0	2	5	3	138	2	143	3	0	1	4	3	220	6	229	381
05:30 PM	0	0	0	0	1	99	0	100	1	0	1	2	3	180	3	186	288
05:45 PM	3	0	2	5	0	81	0	81	1	0	5	6	2	156	2	160	252
Total	6	0	4	10	7	431	2	440	8	0	9	17	13	746	14	773	1240
Grand Total	8	0	8	16	16	914	6	936	15	0	11	26	20	1523	25	1568	2546
Apprch %	50	0	50		1.7	97.6	0.6		57.7	0	42.3		1.3	97.1	1.6		
Total %	0.3	0	0.3	0.6	0.6	35.9	0.2	36.8	0.6	0	0.4	1	0.8	59.8	1	61.6	

	Barkentine Road Southbound				Palos Verdes Drive South Westbound				Barkentine Road Northbound				Palos Verdes Drive South Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	1	0	1	2	**3**	101	0	104	1	0	1	2	0	188	3	191	299
04:45 PM	0	0	0	0	3	130	**3**	136	**3**	0	0	3	1	207	2	210	349
05:00 PM	0	0	0	0	3	113	0	116	3	0	**2**	**5**	**5**	190	3	198	319
05:15 PM	**3**	0	**2**	**5**	3	**138**	2	**143**	3	0	1	4	3	**220**	**6**	**229**	**381**
Total Volume	4	0	3	7	12	482	5	499	10	0	4	14	9	805	14	828	1348
% App. Total	57.1	0	42.9		2.4	96.6	1		71.4	0	28.6		1.1	97.2	1.7		
PHF	.333	.000	.375	.350	1.00	.873	.417	.872	.833	.000	.500	.700	.450	.915	.583	.904	.885

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City of Rancho Palos Verdes
N/S: Barkentine Road
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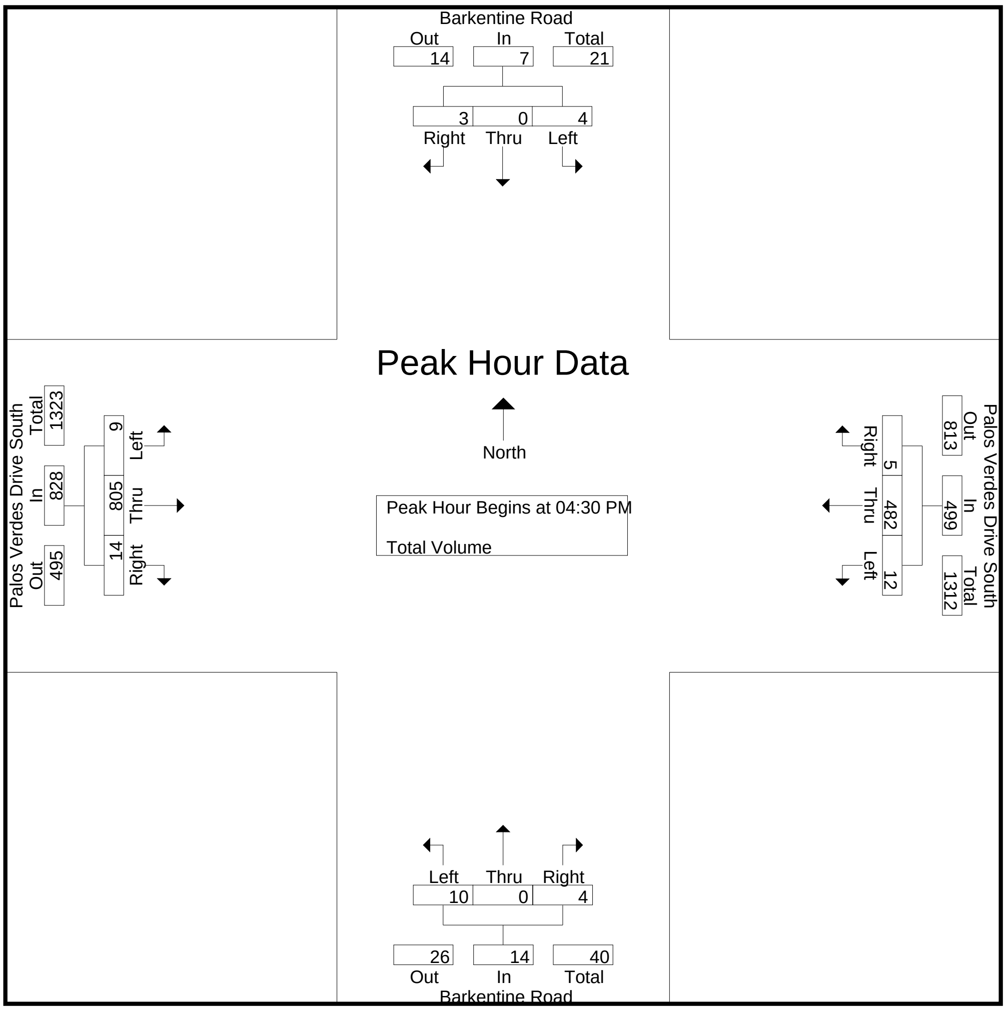
Weather: Clear

File Name : 01_RPV_Barkentine_Palos Verdes Dr S PM 2
Site Code : 05718832
Start Date : 11/14/2018
Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	05:00 PM				04:30 PM				05:00 PM				04:30 PM			
+0 mins.	0	0	0	0	**3**	101	0	104	**3**	0	2	5	0	188	3	191
+15 mins.	**3**	0	**2**	**5**	3	130	**3**	136	3	0	1	4	1	207	2	210
+30 mins.	0	0	0	0	3	113	0	116	1	0	1	2	**5**	190	3	198
+45 mins.	3	0	2	5	3	**138**	2	**143**	1	0	**5**	**6**	3	**220**	**6**	**229**
Total Volume	6	0	4	10	12	482	5	499	8	0	9	17	9	805	14	828
% App. Total	60	0	40		2.4	96.6	1		47.1	0	52.9		1.1	97.2	1.7	
PHF	.500	.000	.500	.500	1.000	.873	.417	.872	.667	.000	.450	.708	.450	.915	.583	.904

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City of Rancho Palos Verdes
N/S: Narcissa Drive
E/W: Palos Verdes Drive South
Weather: Clear

File Name : 02_RPV_Narcissa_Palos Verdes Dr S AM
Site Code : 05718832
Start Date : 11/14/2018
Page No : 1

Groups Printed- Total Volume

	Narcissa Drive Southbound				Palos Verdes Drive South Westbound				PV Heritage Castle Museum Driveway Northbound				Palos Verdes Drive South Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	1	0	4	5	0	115	2	117	0	0	0	0	1	57	2	60	182
07:15 AM	4	0	5	9	2	170	5	177	0	0	0	0	0	56	0	56	242
07:30 AM	3	0	3	6	0	196	6	202	0	0	0	0	1	73	0	74	282
07:45 AM	4	0	5	9	0	237	4	241	2	0	0	2	4	88	0	92	344
Total	12	0	17	29	2	718	17	737	2	0	0	2	6	274	2	282	1050
08:00 AM	3	0	6	9	0	243	5	248	0	0	0	0	5	68	0	73	330
08:15 AM	3	0	3	6	0	264	5	269	0	0	0	0	2	79	0	81	356
08:30 AM	2	0	5	7	0	251	1	252	0	0	0	0	6	104	1	111	370
08:45 AM	1	0	4	5	1	217	3	221	0	0	0	0	1	125	1	127	353
Total	9	0	18	27	1	975	14	990	0	0	0	0	14	376	2	392	1409
Grand Total	21	0	35	56	3	1693	31	1727	2	0	0	2	20	650	4	674	2459
Apprch %	37.5	0	62.5		0.2	98	1.8		100	0	0		3	96.4	0.6		
Total %	0.9	0	1.4	2.3	0.1	68.8	1.3	70.2	0.1	0	0	0.1	0.8	26.4	0.2	27.4	

	Narcissa Drive Southbound				Palos Verdes Drive South Westbound				PV Heritage Castle Museum Driveway Northbound				Palos Verdes Drive South Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	**3**	0	**6**	**9**	0	243	**5**	248	0	0	0	0	5	68	0	73	330
08:15 AM	3	0	3	6	0	**264**	5	**269**	0	0	0	0	2	79	0	81	356
08:30 AM	2	0	5	7	0	251	1	252	0	0	0	0	**6**	104	**1**	111	**370**
08:45 AM	1	0	4	5	**1**	217	3	221	0	0	0	0	1	**125**	1	**127**	353
Total Volume	9	0	18	27	1	975	14	990	0	0	0	0	14	376	2	392	1409
% App. Total	33.3	0	66.7		0.1	98.5	1.4		0	0	0		3.6	95.9	0.5		
PHF	.750	.000	.750	.750	.250	.923	.700	.920	.000	.000	.000	.000	.583	.752	.500	.772	.952

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City of Rancho Palos Verdes
N/S: Narcissa Drive
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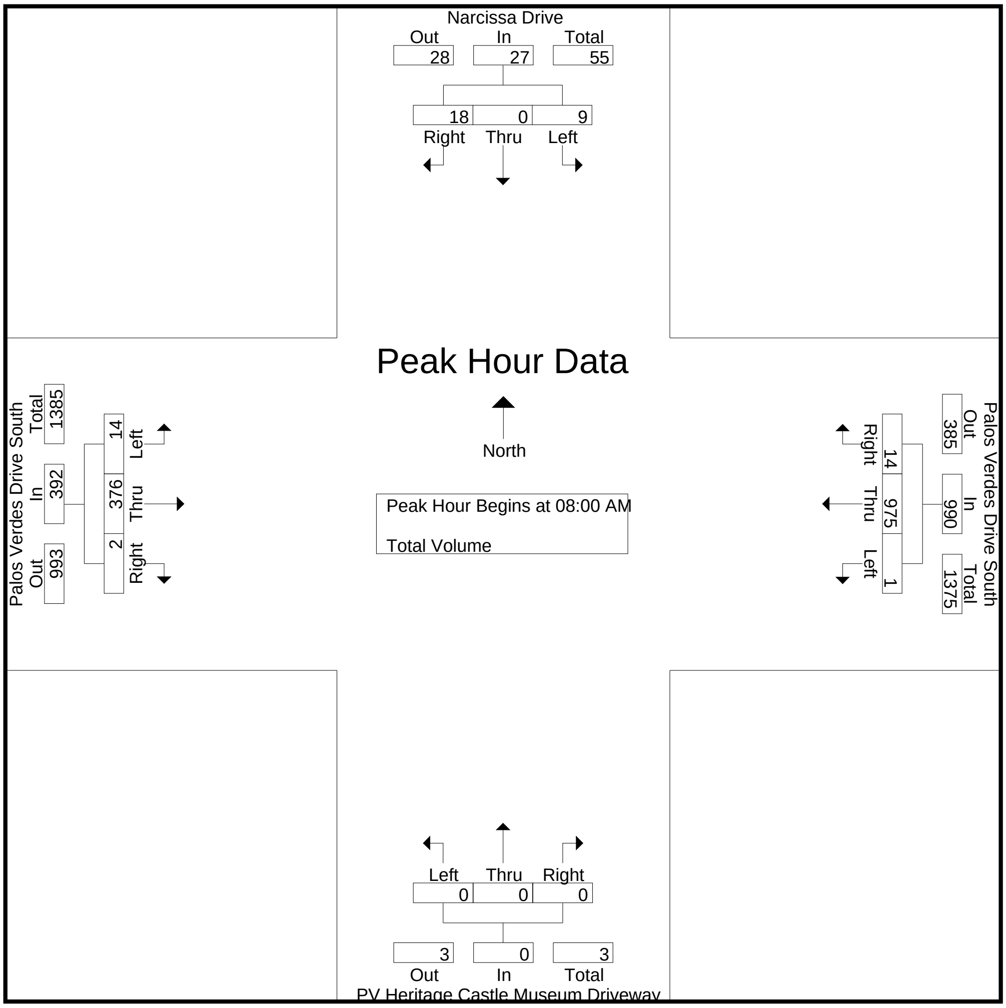
File Name : 02_RPV_Narcissa_Palos Verdes Dr S AM
Site Code : 05718832
Start Date : 11/14/2018



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:15 AM				07:45 AM				07:00 AM				08:00 AM			
+0 mins.	**4**	0	5	**9**	0	237	4	241	0	0	0	0	5	68	0	73
+15 mins.	3	0	3	6	0	243	**5**	248	0	0	0	0	2	79	0	81
+30 mins.	4	0	5	9	0	**264**	5	**269**	0	0	0	0	**6**	104	**1**	111
+45 mins.	3	0	**6**	9	0	251	1	252	**2**	0	0	**2**	1	**125**	1	**127**
Total Volume	14	0	19	33	0	995	15	1010	2	0	0	2	14	376	2	392
% App. Total	42.4	0	57.6		0	98.5	1.5		100	0	0		3.6	95.9	0.5	
PHF	.875	.000	.792	.917	.000	.942	.750	.939	.250	.000	.000	.250	.583	.752	.500	.772

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City of Rancho Palos Verdes
N/S: Narcissa Drive
E/W: Palos Verdes Drive South
Weather: Clear

File Name : 02_RPV_Narcissa_Palos Verdes Dr S PM 1
Site Code : 05718832
Start Date : 11/14/2018
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Groups Printed- Total Volume

	Narcissa Drive Southbound				Palos Verdes Drive South Westbound				PV Heritage Castle Museum Driveway Northbound				Palos Verdes Drive South Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
02:00 PM	2	0	5	7	1	84	3	88	0	0	0	0	7	118	0	125	220
02:15 PM	4	0	5	9	0	105	1	106	0	0	0	0	6	135	0	141	256
02:30 PM	4	0	8	12	0	120	1	121	1	0	1	2	13	136	0	149	284
02:45 PM	3	0	4	7	0	114	0	114	0	0	0	0	2	188	0	190	311
Total	13	0	22	35	1	423	5	429	1	0	1	2	28	577	0	605	1071
03:00 PM	2	0	10	12	0	129	4	133	0	0	0	0	7	220	0	227	372
03:15 PM	5	0	3	8	0	115	2	117	0	0	0	0	11	237	0	248	373
03:30 PM	4	0	3	7	0	121	4	125	0	0	0	0	8	207	0	215	347
03:45 PM	3	0	4	7	0	134	3	137	0	0	0	0	5	210	0	215	359
Total	14	0	20	34	0	499	13	512	0	0	0	0	31	874	0	905	1451
Grand Total	27	0	42	69	1	922	18	941	1	0	1	2	59	1451	0	1510	2522
Apprch %	39.1	0	60.9		0.1	98	1.9		50	0	50		3.9	96.1	0		
Total %	1.1	0	1.7	2.7	0	36.6	0.7	37.3	0	0	0	0.1	2.3	57.5	0	59.9	

	Narcissa Drive Southbound				Palos Verdes Drive South Westbound				PV Heritage Castle Museum Driveway Northbound				Palos Verdes Drive South Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 02:00 PM to 03:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:00 PM																	
03:00 PM	2	0	**10**	**12**	0	129	**4**	133	0	0	0	0	7	220	0	227	372
03:15 PM	**5**	0	3	8	0	115	2	117	0	0	0	0	**11**	**237**	0	**248**	**373**
03:30 PM	4	0	3	7	0	121	4	125	0	0	0	0	8	207	0	215	347
03:45 PM	3	0	4	7	0	**134**	3	**137**	0	0	0	0	5	210	0	215	359
Total Volume	14	0	20	34	0	499	13	512	0	0	0	0	31	874	0	905	1451
% App. Total	41.2	0	58.8		0	97.5	2.5		0	0	0		3.4	96.6	0		
PHF	.700	.000	.500	.708	.000	.931	.813	.934	.000	.000	.000	.000	.705	.922	.000	.912	.973

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City of Rancho Palos Verdes
N/S: Narcissa Drive
E/W: Palos Verdes Drive South
Weather: Clear

File Name : 02_RPV_Narcissa_Palos Verdes Dr S PM 1
Site Code : 05718832
Start Date : 11/14/2018
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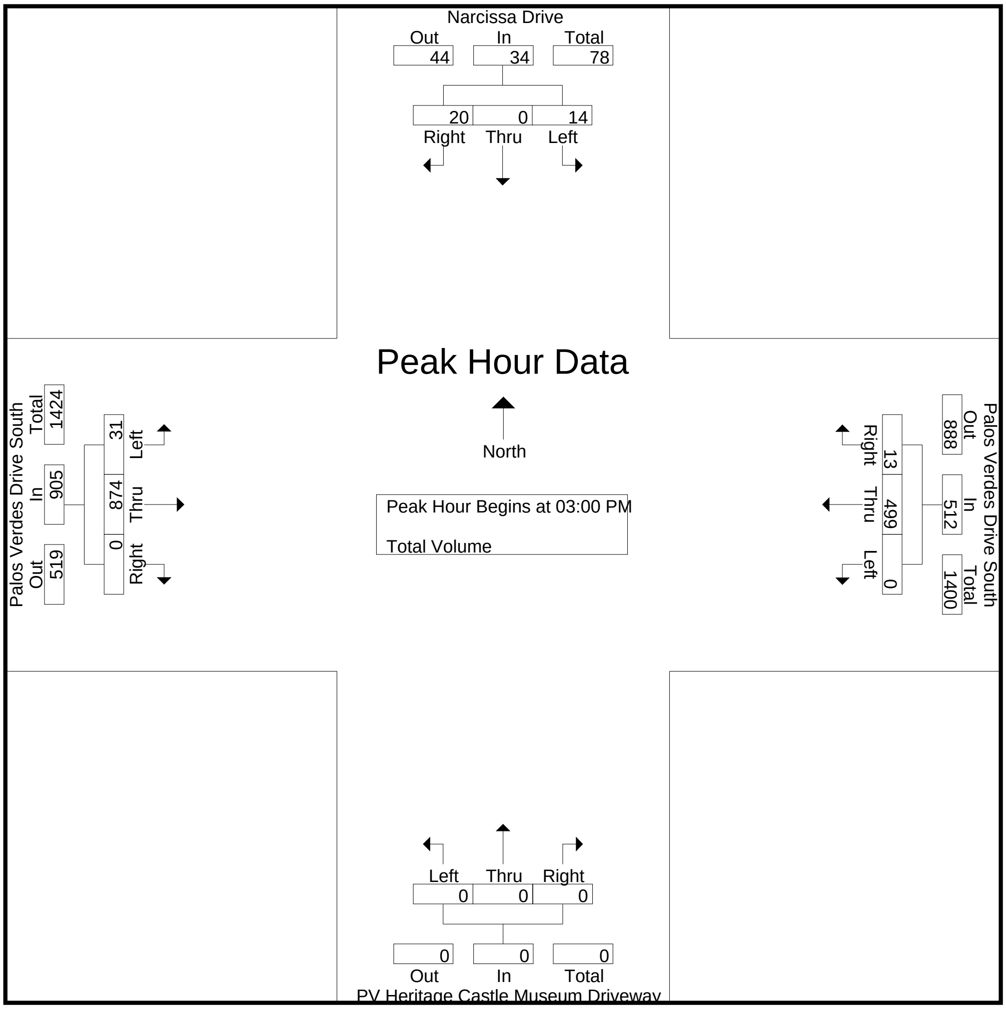

Peak Hour Analysis From 02:00 PM to 03:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	02:15 PM				03:00 PM				02:00 PM				03:00 PM			
+0 mins.	**4**	0	5	9	0	129	**4**	133	0	0	0	0	7	220	0	227
+15 mins.	4	0	8	**12**	0	115	2	117	0	0	0	0	**11**	**237**	0	**248**
+30 mins.	3	0	4	7	0	121	4	125	**1**	0	**1**	**2**	8	207	0	215
+45 mins.	2	0	**10**	12	0	**134**	3	**137**	0	0	0	0	5	210	0	215
Total Volume	13	0	27	40	0	499	13	512	1	0	1	2	31	874	0	905
% App. Total	32.5	0	67.5		0	97.5	2.5		50	0	50		3.4	96.6	0	
PHF	.813	.000	.675	.833	.000	.931	.813	.934	.250	.000	.250	.250	.705	.922	.000	.912

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City of Rancho Palos Verdes
N/S: Narcissa Drive
E/W: Palos Verdes Drive South
Weather: Clear

File Name : 02_RPV_Narcissa_Palos Verdes Dr S PM 2
Site Code : 05718832
Start Date : 11/14/2018
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Groups Printed- Total Volume

	Narcissa Drive Southbound				Palos Verdes Drive South Westbound				PV Heritage Castle Museum Driveway Northbound				Palos Verdes Drive South Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	3	0	6	9	1	123	2	126	0	0	0	0	7	192	0	199	334
04:15 PM	5	0	5	10	0	119	2	121	0	0	0	0	10	184	0	194	325
04:30 PM	7	0	7	14	0	102	2	104	0	0	0	0	5	191	0	196	314
04:45 PM	4	0	4	8	0	118	2	120	0	0	0	0	5	195	0	200	328
Total	19	0	22	41	1	462	8	471	0	0	0	0	27	762	0	789	1301
05:00 PM	3	0	6	9	0	119	5	124	0	0	0	0	1	197	0	198	331
05:15 PM	3	0	9	12	0	128	2	130	0	0	0	0	7	218	0	225	367
05:30 PM	4	0	7	11	0	97	5	102	0	0	0	0	9	171	0	180	293
05:45 PM	0	0	3	3	0	65	1	66	0	0	0	0	5	174	0	179	248
Total	10	0	25	35	0	409	13	422	0	0	0	0	22	760	0	782	1239
Grand Total	29	0	47	76	1	871	21	893	0	0	0	0	49	1522	0	1571	2540
Apprch %	38.2	0	61.8		0.1	97.5	2.4		0	0	0		3.1	96.9	0		
Total %	1.1	0	1.9	3	0	34.3	0.8	35.2	0	0	0	0	1.9	59.9	0	61.9	

	Narcissa Drive Southbound				Palos Verdes Drive South Westbound				PV Heritage Castle Museum Driveway Northbound				Palos Verdes Drive South Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	**7**	0	7	**14**	0	102	2	104	0	0	0	0	5	191	0	196	314
04:45 PM	4	0	4	8	0	118	2	120	0	0	0	0	5	195	0	200	328
05:00 PM	3	0	6	9	0	119	**5**	124	0	0	0	0	1	197	0	198	331
05:15 PM	3	0	**9**	12	0	**128**	2	**130**	0	0	0	0	**7**	**218**	0	**225**	**367**
Total Volume	17	0	26	43	0	467	11	478	0	0	0	0	18	801	0	819	1340
% App. Total	39.5	0	60.5		0	97.7	2.3		0	0	0		2.2	97.8	0		
PHF	.607	.000	.722	.768	.000	.912	.550	.919	.000	.000	.000	.000	.643	.919	.000	.910	.913

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File Name : 02_RPV_Narcissa_Palos Verdes Dr S PM 2
Site Code : 05718832
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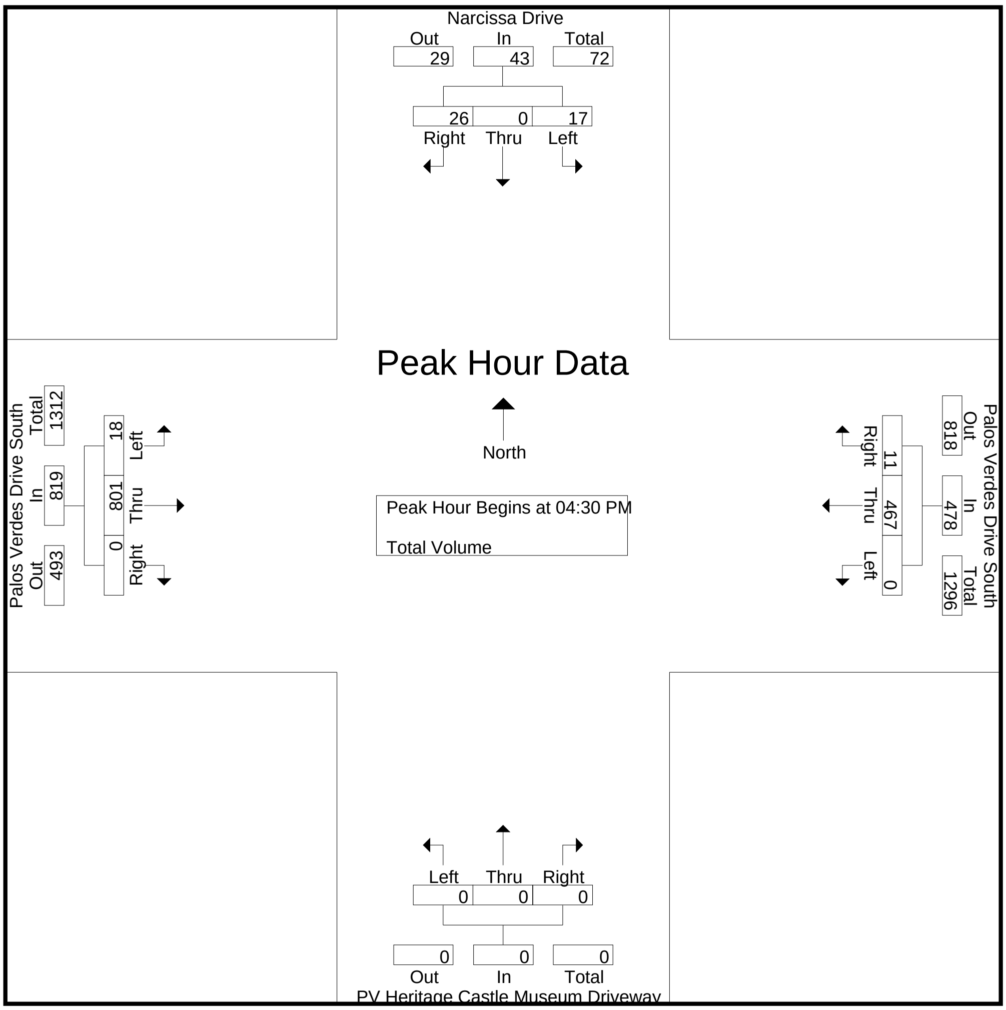

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				04:30 PM				04:00 PM				04:30 PM			
+0 mins.	**7**	0	7	**14**	0	102	2	104	0	0	0	0	5	191	0	196
+15 mins.	4	0	4	8	0	118	2	120	0	0	0	0	5	195	0	200
+30 mins.	3	0	6	9	0	119	**5**	124	0	0	0	0	1	197	0	198
+45 mins.	3	0	**9**	12	0	**128**	2	**130**	0	0	0	0	**7**	**218**	0	**225**
Total Volume	17	0	26	43	0	467	11	478	0	0	0	0	18	801	0	819
% App. Total	39.5	0	60.5		0	97.7	2.3		0	0	0		2.2	97.8	0	
PHF	.607	.000	.722	.768	.000	.912	.550	.919	.000	.000	.000	.000	.643	.919	.000	.910

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City of Rancho Palos Verdes
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Weather: Clear

File Name : 03_RPV_Peppertree_Palos Verdes Dr S AM
Site Code : 05718832
Start Date : 11/14/2018
Page No : 1

Groups Printed- Total Volume

	Peppertree Drive Southbound			Palos Verdes Drive South Westbound			Palos Verdes Drive South Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
07:00 AM	1	0	1	115	1	116	0	55	55	172
07:15 AM	2	0	2	181	3	184	0	62	62	248
07:30 AM	1	2	3	204	4	208	1	73	74	285
07:45 AM	1	0	1	237	7	244	1	89	90	335
Total	5	2	7	737	15	752	2	279	281	1040
08:00 AM	4	2	6	260	2	262	1	74	75	343
08:15 AM	4	2	6	257	3	260	2	77	79	345
08:30 AM	4	1	5	251	5	256	1	103	104	365
08:45 AM	4	3	7	216	2	218	2	121	123	348
Total	16	8	24	984	12	996	6	375	381	1401
Grand Total	21	10	31	1721	27	1748	8	654	662	2441
Apprch %	67.7	32.3		98.5	1.5		1.2	98.8		
Total %	0.9	0.4	1.3	70.5	1.1	71.6	0.3	26.8	27.1	

	Peppertree Drive Southbound			Palos Verdes Drive South Westbound			Palos Verdes Drive South Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 08:00 AM										
08:00 AM	**4**	2	6	**260**	2	**262**	1	74	75	343
08:15 AM	4	2	6	257	3	260	**2**	77	79	345
08:30 AM	4	1	5	251	**5**	256	1	103	104	**365**
08:45 AM	4	**3**	**7**	216	2	218	2	**121**	**123**	348
Total Volume	16	8	24	984	12	996	6	375	381	1401
% App. Total	66.7	33.3		98.8	1.2		1.6	98.4		
PHF	1.00	.667	.857	.946	.600	.950	.750	.775	.774	.960

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City of Rancho Palos Verdes
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E/W: Palos Verdes Drive South
Weather: Clear

File Name : 03_RPV_Peppertree_Palos Verdes Dr S AM
Site Code : 05718832
Start Date : 11/14/2018
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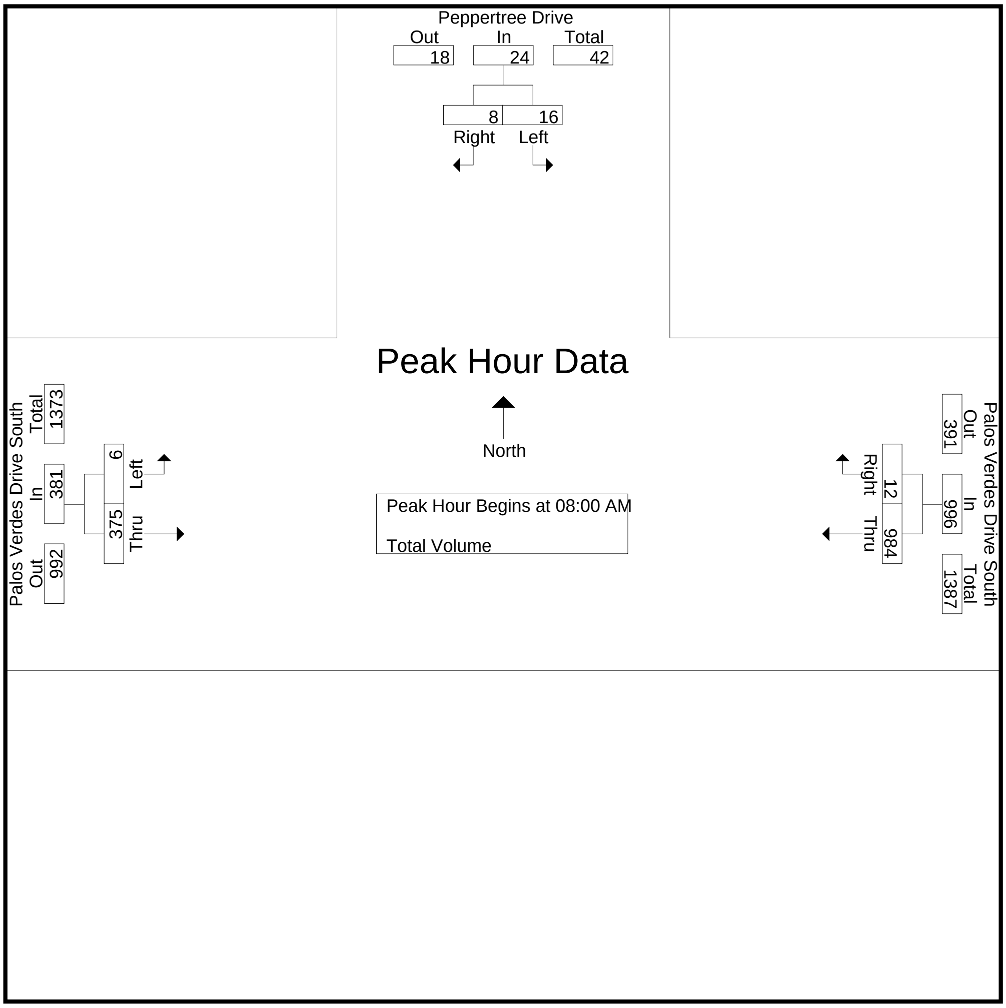

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	08:00 AM			07:45 AM			08:00 AM		
+0 mins.	**4**	2	6	237	**7**	244	1	74	75
+15 mins.	4	2	6	**260**	2	**262**	**2**	77	79
+30 mins.	4	1	5	257	3	260	1	103	104
+45 mins.	4	**3**	**7**	251	5	256	2	**121**	**123**
Total Volume	16	8	24	1005	17	1022	6	375	381
% App. Total	66.7	33.3		98.3	1.7		1.6	98.4	
PHF	1.000	.667	.857	.966	.607	.975	.750	.775	.774

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City of Rancho Palos Verdes
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E/W: Palos Verdes Drive South
Weather: Clear

File Name : 03_RPV_Peppertree_Palos Verdes Dr S PM 1
Site Code : 05718832
Start Date : 11/14/2018
Page No : 1

Groups Printed- Total Volume

	Peppertree Drive Southbound				Palos Verdes Drive South Westbound				Dead End Northbound				Palos Verdes Drive South Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
02:00 PM	2	0	2	4	0	88	3	91	0	0	0	0	1	118	0	119	214
02:15 PM	6	0	2	8	0	106	3	109	0	0	0	0	0	142	0	142	259
02:30 PM	1	0	0	1	0	123	3	126	0	0	0	0	1	135	0	136	263
02:45 PM	3	0	0	3	0	113	5	118	0	0	0	0	2	187	0	189	310
Total	12	0	4	16	0	430	14	444	0	0	0	0	4	582	0	586	1046
03:00 PM	8	0	1	9	0	128	4	132	0	0	0	0	1	230	0	231	372
03:15 PM	3	0	1	4	0	118	6	124	0	0	0	0	2	241	0	243	371
03:30 PM	2	0	1	3	0	129	2	131	0	0	0	0	0	211	0	211	345
03:45 PM	1	0	0	1	0	131	1	132	0	0	0	0	5	201	0	206	339
Total	14	0	3	17	0	506	13	519	0	0	0	0	8	883	0	891	1427
Grand Total	26	0	7	33	0	936	27	963	0	0	0	0	12	1465	0	1477	2473
Apprch %	78.8	0	21.2		0	97.2	2.8		0	0	0		0.8	99.2	0		
Total %	1.1	0	0.3	1.3	0	37.8	1.1	38.9	0	0	0	0	0.5	59.2	0	59.7	

	Peppertree Drive Southbound				Palos Verdes Drive South Westbound				Dead End Northbound				Palos Verdes Drive South Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 02:00 PM to 03:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:00 PM																	
03:00 PM	**8**	0	**1**	**9**	0	128	4	**132**	0	0	0	0	1	230	0	231	**372**
03:15 PM	3	0	1	4	0	118	**6**	124	0	0	0	0	2	**241**	0	**243**	371
03:30 PM	2	0	1	3	0	129	2	131	0	0	0	0	0	211	0	211	345
03:45 PM	1	0	0	1	0	**131**	1	132	0	0	0	0	**5**	201	0	206	339
Total Volume	14	0	3	17	0	506	13	519	0	0	0	0	8	883	0	891	1427
% App. Total	82.4	0	17.6		0	97.5	2.5		0	0	0		0.9	99.1	0		
PHF	.438	.000	.750	.472	.000	.966	.542	.983	.000	.000	.000	.000	.400	.916	.000	.917	.959

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City of Rancho Palos Verdes
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File Name : 03_RPV_Peppertree_Palos Verdes Dr S PM 1
Site Code : 05718832
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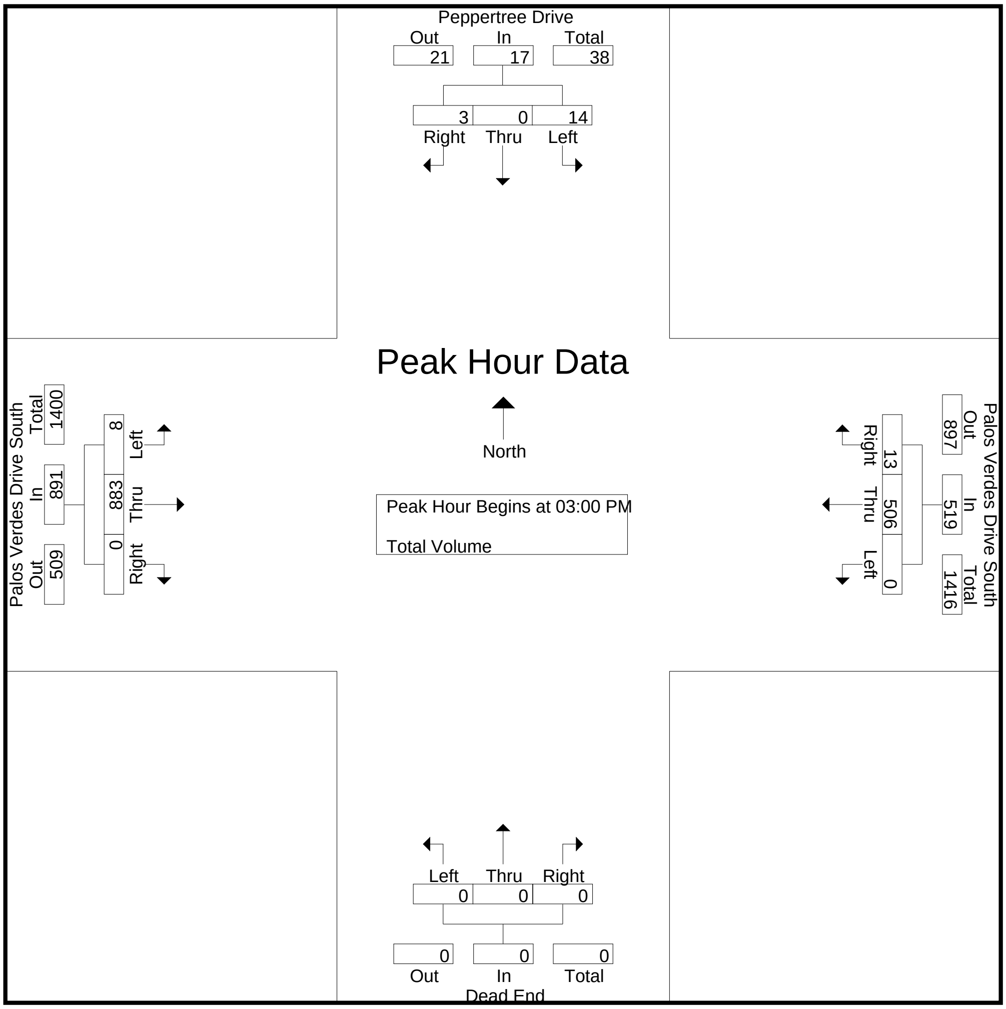

Peak Hour Analysis From 02:00 PM to 03:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	02:15 PM				03:00 PM				02:00 PM				03:00 PM			
+0 mins.	6	0	**2**	8	0	128	4	**132**	0	0	0	0	1	230	0	231
+15 mins.	1	0	0	1	0	118	**6**	124	0	0	0	0	2	**241**	0	**243**
+30 mins.	3	0	0	3	0	129	2	131	0	0	0	0	0	211	0	211
+45 mins.	**8**	0	1	**9**	0	**131**	1	132	0	0	0	0	**5**	201	0	206
Total Volume	18	0	3	21	0	506	13	519	0	0	0	0	8	883	0	891
% App. Total	85.7	0	14.3		0	97.5	2.5		0	0	0		0.9	99.1	0	
PHF	.563	.000	.375	.583	.000	.966	.542	.983	.000	.000	.000	.000	.400	.916	.000	.917

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City of Rancho Palos Verdes
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Weather: Clear

File Name : 03_RPV_Peppertree_Palos Verdes Dr S PM 2
Site Code : 05718832
Start Date : 11/14/2018
Page No : 1

Groups Printed- Total Volume

	Peppertree Drive Southbound				Palos Verdes Drive South Westbound				Dead End Northbound				Palos Verdes Drive South Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	4	0	2	6	0	133	4	137	0	0	0	0	1	203	0	204	347
04:15 PM	2	0	1	3	0	119	2	121	0	0	0	0	2	188	0	190	314
04:30 PM	7	0	2	9	0	101	5	106	0	0	0	0	0	194	0	194	309
04:45 PM	1	0	1	2	0	119	5	124	0	0	0	0	1	199	0	200	326
Total	14	0	6	20	0	472	16	488	0	0	0	0	4	784	0	788	1296
05:00 PM	2	0	0	2	0	123	2	125	0	0	0	0	1	196	0	197	324
05:15 PM	2	0	2	4	0	128	2	130	0	0	0	0	1	218	0	219	353
05:30 PM	3	0	1	4	0	97	2	99	0	0	0	0	3	182	0	185	288
05:45 PM	1	0	1	2	0	71	2	73	0	0	0	0	2	171	0	173	248
Total	8	0	4	12	0	419	8	427	0	0	0	0	7	767	0	774	1213
Grand Total	22	0	10	32	0	891	24	915	0	0	0	0	11	1551	0	1562	2509
Apprch %	68.8	0	31.2		0	97.4	2.6		0	0	0		0.7	99.3	0		
Total %	0.9	0	0.4	1.3	0	35.5	1	36.5	0	0	0	0	0.4	61.8	0	62.3	

	Peppertree Drive Southbound				Palos Verdes Drive South Westbound				Dead End Northbound				Palos Verdes Drive South Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	**7**	0	**2**	**9**	0	101	**5**	106	0	0	0	0	0	194	0	194	309
04:45 PM	1	0	1	2	0	119	5	124	0	0	0	0	**1**	199	0	200	326
05:00 PM	2	0	0	2	0	123	2	125	0	0	0	0	1	196	0	197	324
05:15 PM	2	0	2	4	0	**128**	2	**130**	0	0	0	0	1	**218**	0	**219**	**353**
Total Volume	12	0	5	17	0	471	14	485	0	0	0	0	3	807	0	810	1312
% App. Total	70.6	0	29.4		0	97.1	2.9		0	0	0		0.4	99.6	0		
PHF	.429	.000	.625	.472	.000	.920	.700	.933	.000	.000	.000	.000	.750	.925	.000	.925	.929

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City of Rancho Palos Verdes
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File Name : 03_RPV_Peppertree_Palos Verdes Dr S PM 2
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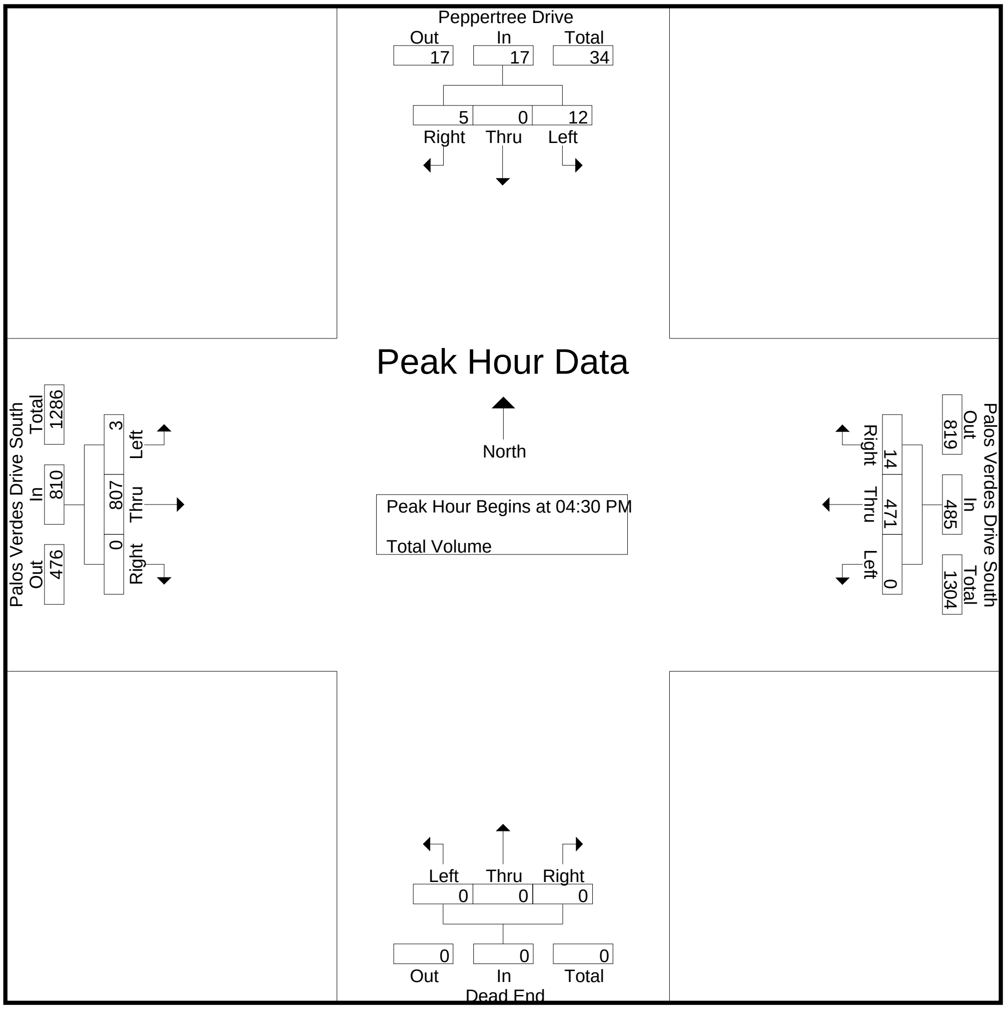


Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:00 PM				04:00 PM				04:00 PM				04:30 PM			
+0 mins.	4	0	**2**	6	0	**133**	4	**137**	0	0	0	0	0	194	0	194
+15 mins.	2	0	1	3	0	119	2	121	0	0	0	0	**1**	199	0	200
+30 mins.	**7**	0	2	**9**	0	101	**5**	106	0	0	0	0	1	196	0	197
+45 mins.	1	0	1	2	0	119	5	124	0	0	0	0	1	**218**	0	**219**
Total Volume	14	0	6	20	0	472	16	488	0	0	0	0	3	807	0	810
% App. Total	70	0	30		0	96.7	3.3		0	0	0		0.4	99.6	0	
PHF	.500	.000	.750	.556	.000	.887	.800	.891	.000	.000	.000	.000	.750	.925	.000	.925

ITM Peak Hour Summary

Prepared by:

NDS

National Data & Surveying Services

Forrestal Dr_Trump National Dr and Palos Verdes Dr S , Rancho Palos Verdes

Date: 11/29/2016

Day: Tuesday

Project #: 16-5764-017

City: Rancho Palos Verdes

AM Peak Hour	730 AM
NOON Peak Hour	
PM Peak Hour	430 PM

N

Forrestal Dr_Trump National Dr

Palos Verdes Dr S

Peak Hour Summary

CONTROL: 2-Way Stop (NB/SB)

Southbound Approach

	Lanes 0.5	0.5	1	Exit
AM	24	1	42	48
NOON	0	0	0	0
PM	27	0	44	77

Eastbound Approach

Lanes		AM	NOON	PM
	Exit	939	0	484
1	Left	11	0	36
1	Through	424	0	753
1	Right	4	0	4

Westbound Approach

	AM	NOON	PM	Lanes
Right	37	0	39	1
Through	909	0	443	1
Left	21	0	21	1
Exit	477	0	831	

Northbound Approach

	Exit	Left	Through	Right
AM	26	6	0	11
NOON	0	0	0	0
PM	25	14	2	34
Lanes		1	1	0

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON	NONE	NONE
PM	4:00 PM	6:00 PM

Total Ins & Outs

North Leg

	In	Out
AM	67	48
NOON	0	0
PM	71	77

East Leg

	AM	NOON	PM
In	967	0	503
Out	477	0	831

West Leg

	AM	NOON	PM
Out	939	0	484
In	439	0	793

South Leg

	Out	In
AM	26	17
NOON	0	0
PM	25	50

Total Volume Per Leg

Leg	AM	NOON	PM
North Leg	115	0	148
East Leg	1444	0	1334
West Leg	1378	0	1277
South Leg	43	0	75

CITY TRAFFIC COUNTERS
WWW.CTCOUNTERS.COM

File Name : Forrestal-TrumpNational_PalosVerdesDrSouth
Site Code : 00000000
Start Date : 11/14/2018
Page No : 1

Groups Printed- Vehicles

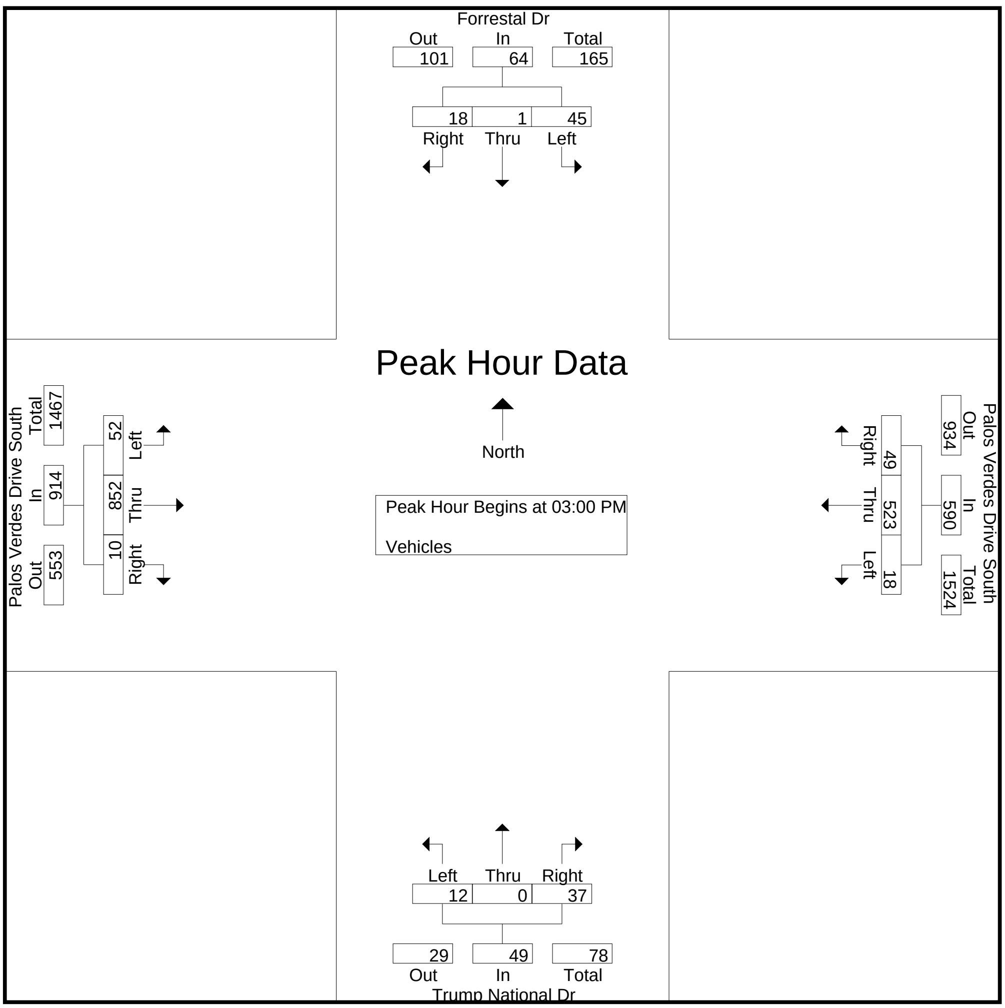
	Forrestal Dr Southbound			**Palos Verdes Drive South Westbound**			**Trump National Dr Northbound**			**Palos Verdes Drive South Eastbound**			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
02:00 PM	7	0	2	6	94	12	4	0	11	3	128	1	268
02:15 PM	6	0	6	6	99	6	1	0	4	1	142	5	276
02:30 PM	4	0	3	6	125	6	5	0	7	4	134	3	297
02:45 PM	9	1	3	1	115	11	7	0	6	9	163	4	329
Total	26	1	14	19	433	35	17	0	28	17	567	13	1170
03:00 PM	14	1	7	3	135	12	4	0	3	2	218	2	401
03:15 PM	12	0	2	6	143	12	4	0	11	8	239	3	440
03:30 PM	9	0	2	3	116	14	1	0	14	16	214	1	390
03:45 PM	10	0	7	6	129	11	3	0	9	26	181	4	386
Total	45	1	18	18	523	49	12	0	37	52	852	10	1617
Grand Total	71	2	32	37	956	84	29	0	65	69	1419	23	2787
Apprch %	67.6	1.9	30.5	3.4	88.8	7.8	30.9	0	69.1	4.6	93.9	1.5	
Total %	2.5	0.1	1.1	1.3	34.3	3	1	0	2.3	2.5	50.9	0.8	

CITY TRAFFIC COUNTERS

WWW.CTCOUNTERS.COM

File Name : Forrestal-TrumpNational_PalosVerdesDrSouth
Site Code : 00000000
Start Date : 11/14/2018
Page No : 2

	Forrestal Dr Southbound				Palos Verdes Drive South Westbound				Trump National Dr Northbound				Palos Verdes Drive South Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 02:00 PM to 03:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:00 PM																	
03:00 PM	**14**	**1**	**7**	**22**	3	135	12	150	**4**	0	3	7	2	218	2	222	401
03:15 PM	12	0	2	14	**6**	**143**	12	**161**	4	0	11	**15**	8	**239**	3	**250**	**440**
03:30 PM	9	0	2	11	3	116	**14**	133	1	0	**14**	15	16	214	1	231	390
03:45 PM	10	0	7	17	6	129	11	146	3	0	9	12	**26**	181	**4**	211	386
Total Volume	45	1	18	64	18	523	49	590	12	0	37	49	52	852	10	914	1617
% App. Total	70.3	1.6	28.1		3.1	88.6	8.3		24.5	0	75.5		5.7	93.2	1.1		
PHF	.804	.250	.643	.727	.750	.914	.875	.916	.750	.000	.661	.817	.500	.891	.625	.914	.919



ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

Palos Verdes Dr E and Palos Verdes Dr S , Rancho Palos Verdes

Date: 11/29/2016
Day: Tuesday

Project #: 16-5764-020
City: Rancho Palos Verdes

AM Peak Hour	730 AM
NOON Peak Hour	
PM Peak Hour	430 PM

Peak Hour Summary

CONTROL: 1-Way Stop (WB)

Southbound Approach (Palos Verdes Dr E)

	Right	Thru	Left	Out
Lanes	0	1	1	
AM	140	0	31	168
NOON	0	0	0	0
PM	66	0	41	131

Eastbound Approach (Palos Verdes Dr S)

	Lanes	AM	NOON	PM
Out		971	0	513
Left	0	99	0	83
Thru	0	391	0	748
Right	0	0	0	0

Westbound Approach

	AM	NOON	PM	Lanes
Left	69	0	48	1
Thru	831	0	447	0
Right	0	0	0	1
In	422	0	789	

Northbound Approach

	Out	Left	Thru	Right
AM	0	0	0	0
NOON	0	0	0	0
PM	0	0	0	0
Lanes		0	1	1

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON	NONE	NONE
PM	4:00 PM	6:00 PM

Total Ins & Outs

Leg	Period	In	Out
North Leg	AM	171	168
North Leg	NOON	0	0
North Leg	PM	107	131
West Leg	AM	971	490
West Leg	NOON	0	0
West Leg	PM	513	831
East Leg	AM	900	422
East Leg	NOON	0	0
East Leg	PM	495	789
South Leg	AM	0	0
South Leg	NOON	0	0
South Leg	PM	0	0

Total Volume Per Leg

Leg	AM	NOON	PM
North Leg	339	0	238
West Leg	1461	0	1344
East Leg	1322	0	1284
South Leg	0	0	0

CITY TRAFFIC COUNTERS
WWW.CTCOUNTERS.COM

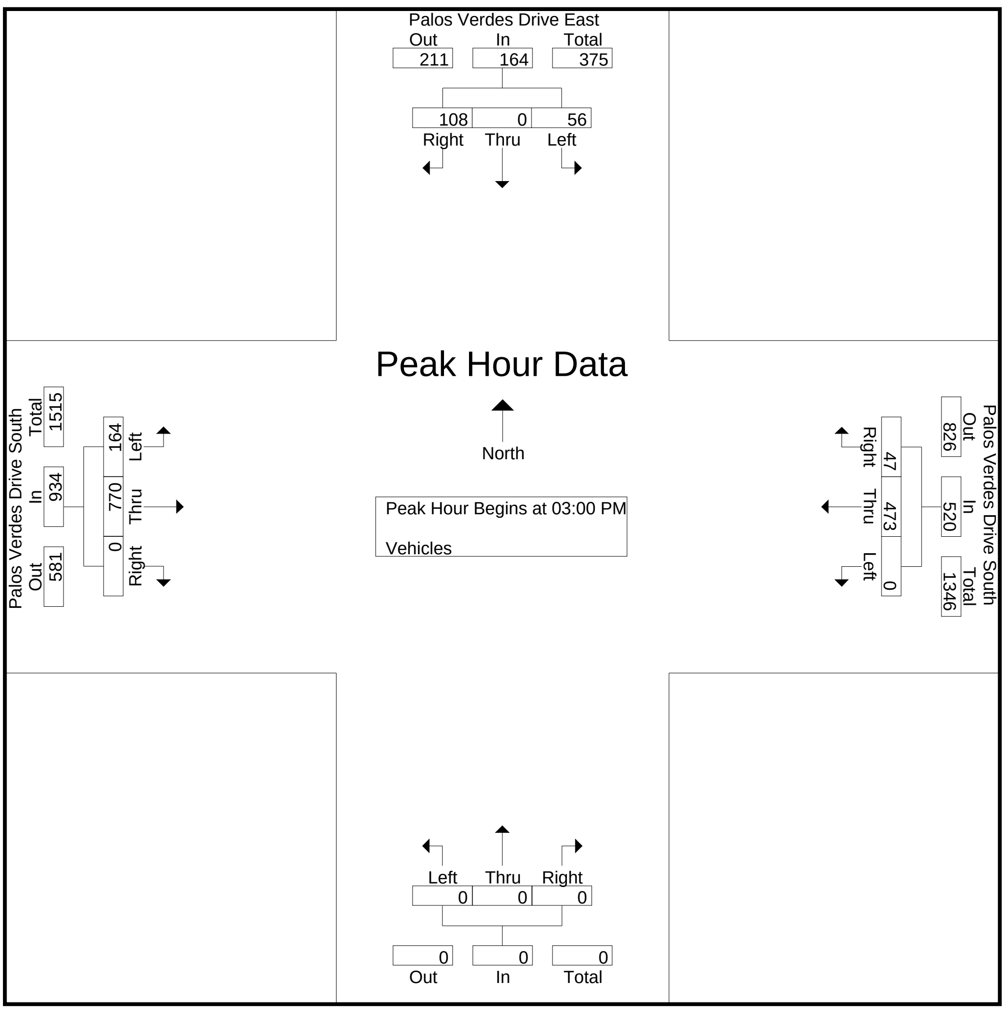
File Name : PalosVerdesDrEast_PalosVerdesDrSouth
Site Code : 00000000
Start Date : 11/14/2018
Page No : 1

Groups Printed- Vehicles

	Palos Verdes Drive East Southbound			Palos Verdes Drive South Westbound			Northbound			Palos Verdes Drive South Eastbound			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
02:00 PM	5	0	11	0	96	9	0	0	0	17	132	0	270
02:15 PM	13	0	19	0	96	4	0	0	0	19	134	0	285
02:30 PM	9	0	23	0	117	10	0	0	0	16	128	0	303
02:45 PM	8	0	22	0	108	13	0	0	0	26	138	0	315
Total	35	0	75	0	417	36	0	0	0	78	532	0	1173
03:00 PM	12	0	20	0	125	13	0	0	0	51	172	0	393
03:15 PM	18	0	46	0	107	11	0	0	0	50	220	0	452
03:30 PM	17	0	20	0	115	6	0	0	0	29	205	0	392
03:45 PM	9	0	22	0	126	17	0	0	0	34	173	0	381
Total	56	0	108	0	473	47	0	0	0	164	770	0	1618
Grand Total	91	0	183	0	890	83	0	0	0	242	1302	0	2791
Apprch %	33.2	0	66.8	0	91.5	8.5	0	0	0	15.7	84.3	0	
Total %	3.3	0	6.6	0	31.9	3	0	0	0	8.7	46.6	0	

File Name : PalosVerdesDrEast_PalosVerdesDrSouth
Site Code : 00000000
Start Date : 11/14/2018

	Palos Verdes Drive East Southbound				Palos Verdes Drive South Westbound				Northbound				Palos Verdes Drive South Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 02:00 PM to 03:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:00 PM																	
03:00 PM	12	0	20	32	0	125	13	138	0	0	0	0	**51**	172	0	223	393
03:15 PM	**18**	0	**46**	**64**	0	107	11	118	0	0	0	0	50	**220**	0	**270**	**452**
03:30 PM	17	0	20	37	0	115	6	121	0	0	0	0	29	205	0	234	392
03:45 PM	9	0	22	31	0	**126**	**17**	**143**	0	0	0	0	34	173	0	207	381
Total Volume	56	0	108	164	0	473	47	520	0	0	0	0	164	770	0	934	1618
% App. Total	34.1	0	65.9		0	91	9		0	0	0		17.6	82.4	0		
PHF	.778	.000	.587	.641	.000	.938	.691	.909	.000	.000	.000	.000	.804	.875	.000	.865	.895



Prepared by National Data & Surveying Services

CLASSIFICATION

Palos Verdes Dr S Bet. Crestmont Ln/Terranea Way & Narcissa Dr

Day: Tuesday
Date: 11/29/2016

City: Rancho Palos Verdes
Project #: CA16_5763_026

Summary

Time	# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9	# 10	# 11	# 12	# 13	Total
0:00 AM	0	26	5	0	0	0	0	0	0	0	0	0	0	31
1:00	0	20	1	0	0	0	0	0	0	0	0	0	0	21
2:00	0	9	3	0	0	0	0	0	0	0	0	0	0	12
3:00	0	10	0	0	0	0	0	0	0	0	0	0	0	10
4:00	0	36	1	0	3	0	0	0	0	0	0	0	0	40
5:00	1	135	15	0	5	0	0	0	1	0	0	0	0	157
6:00	0	417	51	0	18	0	0	0	0	0	0	0	0	486
7:00	1	959	111	0	44	0	0	0	0	0	0	0	0	1115
8:00	0	932	130	3	64	0	0	0	0	0	0	0	0	1129
9:00	2	633	88	1	48	0	0	0	0	0	0	0	0	772
10:00	0	534	69	1	41	0	0	0	0	0	0	0	0	645
11:00	6	551	80	0	46	0	0	0	0	0	0	0	0	683
12:00 PM	6	634	96	2	43	0	0	0	1	0	0	0	0	782
13:00	2	597	84	1	55	0	0	0	0	0	0	0	0	739
14:00	2	762	93	1	71	1	0	0	0	0	0	0	0	930
15:00	2	911	122	0	69	0	0	0	0	0	0	0	0	1104
16:00	3	882	138	0	72	0	0	0	0	0	0	0	0	1095
17:00	0	878	113	6	79	0	0	0	0	0	0	0	0	1076
18:00	1	601	64	0	29	0	0	0	0	0	0	0	0	695
19:00	0	345	41	0	17	0	0	0	0	0	0	0	0	403
20:00	0	304	32	0	12	0	0	0	0	0	0	0	0	348
21:00	0	220	27	0	12	0	0	0	0	0	0	0	0	259
22:00	0	152	18	0	3	0	0	0	0	0	0	0	0	173
23:00	0	87	9	0	8	0	0	0	0	0	0	0	0	104
Totals	26	10635	1391	15	739	1			2					12809
% of Totals	0%	83%	11%	0%	6%	0%			0%					100%

	# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9	# 10	# 11	# 12	# 13	Total
AM Volumes	10	4262	554	5	269	0	0	0	1	0	0	0	0	5101
% AM	0%	33%	4%	0%	2%				0%					40%
AM Peak Hour	11:00	7:00	8:00	8:00	8:00				5:00					8:00
Volume	6	959	130	3	64				1					1129
PM Volumes	16	6373	837	10	470	1	0	0	1	0	0	0	0	7708
% PM	0%	50%	7%	0%	4%	0%			0%					60%
PM Peak Hour	12:00	15:00	16:00	17:00	17:00	14:00			12:00					15:00
Volume	6	911	138	6	79	1			1					1104

Directional Peak Periods All Classes	AM 7-9		NOON 12-2		PM 4-6		Off Peak Volumes	
	Volume	%	Volume	%	Volume	%	Volume	%
	2244	18%	1521	12%	2171	17%	6873	54%

Classification Definitions

1 Motorcycles
2 Passenger Cars
3 2-Axle, 4-Tire Single Units
4 Buses
5 2-Axle, 6-Tire Single Units
6 3-Axle Single Units
7 > =4-Axle Single Units
8 <=4-Axle Single Trailers
9 5-Axle Single Trailers
10 >=6-Axle Single Trailers
11 <=5-Axle Multi-Trailers
12 6-Axle Multi-Trailers
13 >=7-Axle Multi-Trailers

Prepared by National Data & Surveying Services

CLASSIFICATION

Palos Verdes Dr S Bet. 1500' W/O Schooner and Palos Verdes Dr E

Day: Tuesday
Date: 11/29/2016

City: Rancho Palos Verdes
Project #: CA16_5763_027

Summary

Time	# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9	# 10	# 11	# 12	# 13	Total
0:00 AM	0	55	0	0	0	0	0	0	0	0	0	0	0	55
1:00	0	21	2	0	1	0	0	0	0	0	0	0	0	24
2:00	0	29	1	0	0	0	0	0	0	0	0	0	0	30
3:00	0	18	5	0	0	0	0	0	0	0	0	0	0	23
4:00	0	40	4	0	0	0	0	0	0	0	0	0	0	44
5:00	0	203	13	0	9	0	0	0	0	0	0	0	0	225
6:00	0	502	52	0	9	1	0	0	0	0	0	0	0	564
7:00	0	1098	111	3	34	0	0	2	0	0	0	0	0	1248
8:00	0	1102	109	6	23	2	0	0	0	0	0	0	0	1242
9:00	0	793	85	2	21	4	0	0	0	0	0	0	0	905
10:00	0	632	60	0	26	2	0	0	0	0	0	0	0	720
11:00	1	701	80	2	19	3	0	0	0	0	0	0	0	806
12:00 PM	0	776	72	1	22	6	0	0	0	0	0	0	0	877
13:00	0	730	79	1	25	1	0	1	0	0	0	0	0	837
14:00	1	956	77	2	22	3	0	0	0	0	0	0	0	1061
15:00	0	1094	88	1	24	1	0	0	0	0	0	0	0	1208
16:00	0	1108	101	2	33	3	0	1	0	0	0	0	0	1248
17:00	1	1092	102	2	32	0	0	0	0	0	0	0	0	1229
18:00	1	721	41	2	13	0	0	0	0	0	0	0	0	778
19:00	0	451	23	0	2	0	0	0	0	0	0	0	0	476
20:00	0	362	13	0	3	0	0	0	0	0	0	0	0	378
21:00	0	289	16	1	1	0	0	0	0	0	0	0	0	307
22:00	0	206	5	0	1	0	0	0	0	0	0	0	0	212
23:00	1	106	6	0	2	0	0	0	0	0	0	0	0	115
Totals	5	13085	1145	25	322	26		4						14612
% of Totals	0%	90%	8%	0%	2%	0%		0%						100%

	# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9	# 10	# 11	# 12	# 13	Total
AM Volumes	1	5194	522	13	142	12	0	2	0	0	0	0	0	5886
% AM	0%	36%	4%	0%	1%	0%		0%						40%
AM Peak Hour	11:00	8:00	7:00	8:00	7:00	9:00		7:00						7:00
Volume	1	1102	111	6	34	4		2						1248
PM Volumes	4	7891	623	12	180	14	0	2	0	0	0	0	0	8726
% PM	0%	54%	4%	0%	1%	0%		0%						60%
PM Peak Hour	14:00	16:00	17:00	14:00	16:00	12:00		13:00						16:00
Volume	1	1108	102	2	33	6		1						1248

Directional Peak Periods All Classes	AM 7-9		NOON 12-2		PM 4-6		Off Peak Volumes	
	Volume	%	Volume	%	Volume	%	Volume	%
	2490 ⟷	17%	1714 ⟷	12%	2477 ⟷	17%	7931 ⟷	54%

Classification Definitions

1 Motorcycles	**4** Buses	**7** > =4-Axle Single Units	**10** >=6-Axle Single Trailers	**13** >=7-Axle Multi-Trailers
2 Passenger Cars	**5** 2-Axle, 6-Tire Single Units	**8** <=4-Axle Single Trailers	**11** <=5-Axle Multi-Trailers	
3 2-Axle, 4-Tire Single Units	**6** 3-Axle Single Units	**9** 5-Axle Single Trailers	**12** 6-Axle Multi-Trailers	

APPENDIX B

INTERSECTION LEVELS OF SERVICE DATA WORKSHEETS
HCM AND LEVELS OF SERVICE EXPLANATION

LEVEL OF SERVICE FOR UNSIGNALIZED INTERSECTIONS

In the *Highway Capacity Manual (HCM)*, published by the Transportation Research Board, level of service for unsignalized intersections is defined in terms of delay, which is a measure of driver discomfort, frustration, fuel consumption, and lost travel time. The delay experienced by a motorist is made up of a number of factors that relate to control, geometrics, traffic, and incidents. Total delay is the difference between the travel time actually experienced and the reference travel time that would result during base conditions, in the absence of incidents, control, traffic, or geometric delay. Only the portion of total delay attributed to the traffic control measures, either traffic signals or stop signs, is quantified. This delay is called *control delay*. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay.

Level of Service criteria for unsignalized intersections are stated in terms of the average control delay per vehicle. The level of service is determined by the computed or measured control delay and is defined for each minor movement. Average control delay for any particular minor movement is a function of the service time for the approach and the degree of utilization. (Level of service is not defined for the intersection as a whole for two-way stop controlled intersections.)

Level of Service Criteria for TWSC/AWSC Intersections

Level of Service	Average Control Delay (Sec/Veh)
A	≤ 10
B	> 10 and ≤ 15
C	> 15 and ≤ 25
D	> 25 and ≤ 35
E	> 35 and ≤ 50
F	> 50

Level of Service (LOS) values are used to describe intersection operations with service levels varying from LOS A (free flow) to LOS F (jammed condition). The following descriptions summarize *HCM* criteria for each level of service:

LOS A describes operations with very low control delay, up to 10 seconds per vehicle.

LOS B describes operations with control delay greater than 10 and up to 15 seconds per vehicle.

LOS C describes operations with control delay greater than 15 and up to 25 seconds per vehicle.

LOS D describes operations with control delay greater than 25 and up to 35 seconds per vehicle.

LOS E describes operations with control delay greater than 35 and up to 50 seconds per vehicle.

LOS F describes operations with control delay in excess of 50 seconds per vehicle. For two-way stop controlled intersections, LOS F exists when there are insufficient gaps of suitable size to allow side-street demand to safely cross through a major-street traffic stream. This level of service is generally evident from extremely long control delays experienced by side-street traffic and by queuing on the minor-street approaches.

APPENDIX B-1

EXISTING CONDITIONS

Intersection	
Int Delay, s/veh	8.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	58	795	4	31	494	135	0	0	3	108	0	74
Future Vol, veh/h	58	795	4	31	494	135	0	0	3	108	0	74
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	110	-	-	105	-	75	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	61	837	4	33	520	142	0	0	3	114	0	78

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	662	0	0	841	0	0	-	-	421	1127	1549	260
Stage 1	-	-	-	-	-	-	-	-	-	586	586	-
Stage 2	-	-	-	-	-	-	-	-	-	541	963	-
Critical Hdwy	4.1	-	-	4.1	-	-	-	-	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	-	-	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	936	-	-	803	-	-	0	0	587	162	115	745
Stage 1	-	-	-	-	-	-	0	0	-	468	500	-
Stage 2	-	-	-	-	-	-	0	0	-	498	337	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	936	-	-	803	-	-	-	-	587	148	103	745
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	148	103	-
Stage 1	-	-	-	-	-	-	-	-	-	438	480	-
Stage 2	-	-	-	-	-	-	-	-	-	463	315	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.5	11.2	77.5
HCM LOS			B	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	587	936	-	-	803	-	-	220
HCM Lane V/C Ratio	0.005	0.065	-	-	0.041	-	-	0.871
HCM Control Delay (s)	11.2	9.1	-	-	9.7	-	-	77.5
HCM Lane LOS	B	A	-	-	A	-	-	F
HCM 95th %tile Q(veh)	0	0.2	-	-	0.1	-	-	6.9

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	400	17	21	970	8	86	0	38	0	0	0
Future Vol, veh/h	5	400	17	21	970	8	86	0	38	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	101	-	-	198	-	45	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	5	421	18	22	1021	8	91	0	40	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1029	0	0	439	0	0	995	1513	220	1286	1514	511
Stage 1	-	-	-	-	-	-	440	440	-	1065	1065	-
Stage 2	-	-	-	-	-	-	555	1073	-	221	449	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.5	6.5	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	683	-	-	1132	-	-	202	121	790	124	121	513
Stage 1	-	-	-	-	-	-	571	581	-	241	302	-
Stage 2	-	-	-	-	-	-	489	299	-	767	576	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	683	-	-	1132	-	-	198	118	790	115	118	513
Mov Cap-2 Maneuver	-	-	-	-	-	-	198	118	-	115	118	-
Stage 1	-	-	-	-	-	-	567	577	-	239	296	-
Stage 2	-	-	-	-	-	-	479	293	-	723	572	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.2	32.6	0
HCM LOS			D	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	257	683	-	-	1132	-	-	-
HCM Lane V/C Ratio	0.508	0.008	-	-	0.02	-	-	-
HCM Control Delay (s)	32.6	10.3	-	-	8.2	-	-	0
HCM Lane LOS	D	B	-	-	A	-	-	A
HCM 95th %tile Q(veh)	2.7	0	-	-	0.1	-	-	-

Intersection												
Int Delay, s/veh	0.8											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	24	408	10	15	1019	2	19	0	8	3	0	6
Future Vol, veh/h	24	408	10	15	1019	2	19	0	8	3	0	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	105	-	-	199	-	215	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	25	429	11	16	1073	2	20	0	8	3	0	6

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1075	0	0	440	0	0	1054	1592	220	1370	1595	537
Stage 1	-	-	-	-	-	-	485	485	-	1105	1105	-
Stage 2	-	-	-	-	-	-	569	1107	-	265	490	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.5	6.5	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	656	-	-	1131	-	-	183	108	790	107	108	494
Stage 1	-	-	-	-	-	-	537	555	-	228	289	-
Stage 2	-	-	-	-	-	-	479	288	-	723	552	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	656	-	-	1131	-	-	173	102	790	102	102	494
Mov Cap-2 Maneuver	-	-	-	-	-	-	173	102	-	102	102	-
Stage 1	-	-	-	-	-	-	517	534	-	219	285	-
Stage 2	-	-	-	-	-	-	466	284	-	688	531	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.1	23.3	22.3
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	225	656	-	-	1131	-	-	217
HCM Lane V/C Ratio	0.126	0.039	-	-	0.014	-	-	0.044
HCM Control Delay (s)	23.3	10.7	-	-	8.2	-	-	22.3
HCM Lane LOS	C	B	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.4	0.1	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	14	393	2	1	1019	14	0	0	0	9	0	18
Future Vol, veh/h	14	393	2	1	1019	14	0	0	0	9	0	18
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Free	-	-	None	-	-	Free
Storage Length	60	-	-	64	-	98	-	-	-	-	-	25
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	15	414	2	1	1073	15	0	0	0	9	0	19

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1073	0	0	416	0	0	1520	1520	415	1520	1521	-
Stage 1	-	-	-	-	-	-	445	445	-	1075	1075	-
Stage 2	-	-	-	-	-	-	1075	1075	-	445	446	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	-
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	-
Pot Cap-1 Maneuver	657	-	-	1154	-	0	98	120	642	98	120	0
Stage 1	-	-	-	-	-	0	596	578	-	268	298	0
Stage 2	-	-	-	-	-	0	268	298	-	596	577	0
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	657	-	-	1154	-	-	96	117	642	96	117	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	96	117	-	96	117	-
Stage 1	-	-	-	-	-	-	582	565	-	262	298	-
Stage 2	-	-	-	-	-	-	268	298	-	582	564	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0	0	46.6
HCM LOS			A	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	657	-	-	1154	-	96	-
HCM Lane V/C Ratio	-	0.022	-	-	0.001	-	0.099	-
HCM Control Delay (s)	0	10.6	-	-	8.1	-	46.6	0
HCM Lane LOS	A	B	-	-	A	-	E	A
HCM 95th %tile Q(veh)	-	0.1	-	-	0	-	0.3	-

Intersection						
Int Delay, s/veh	0.6					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	6	392	1028	12	16	8
Future Vol, veh/h	6	392	1028	12	16	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	45	-	-	58	0	38
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	6	413	1082	13	17	8

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1095	0	-	0	1507	1082
Stage 1	-	-	-	-	1082	-
Stage 2	-	-	-	-	425	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	645	-	-	-	134	267
Stage 1	-	-	-	-	328	-
Stage 2	-	-	-	-	664	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	645	-	-	-	133	267
Mov Cap-2 Maneuver	-	-	-	-	133	-
Stage 1	-	-	-	-	325	-
Stage 2	-	-	-	-	664	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	30.3
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	645	-	-	-	133	267
HCM Lane V/C Ratio	0.01	-	-	-	0.127	0.032
HCM Control Delay (s)	10.6	-	-	-	36	18.9
HCM Lane LOS	B	-	-	-	E	C
HCM 95th %tile Q(veh)	0	-	-	-	0.4	0.1

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	11	446	4	24	947	40	6	0	14	46	1	24
Future Vol, veh/h	11	446	4	24	947	40	6	0	14	46	1	24
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	145	-	145	215	-	225	58	-	-	95	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	12	469	4	25	997	42	6	0	15	48	1	25

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1039	0	0	473	0	0	1574	1582	469	1550	1544	997
Stage 1	-	-	-	-	-	-	493	493	-	1047	1047	-
Stage 2	-	-	-	-	-	-	1081	1089	-	503	497	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	677	-	-	1099	-	-	90	110	598	94	116	299
Stage 1	-	-	-	-	-	-	562	550	-	278	308	-
Stage 2	-	-	-	-	-	-	266	294	-	555	548	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	677	-	-	1099	-	-	79	105	598	89	111	299
Mov Cap-2 Maneuver	-	-	-	-	-	-	79	105	-	89	111	-
Stage 1	-	-	-	-	-	-	552	540	-	273	301	-
Stage 2	-	-	-	-	-	-	237	287	-	532	538	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.2			0.2			24.2			62.3		
HCM LOS							C			F		

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	79	598	677	-	-	1099	-	-	89	280
HCM Lane V/C Ratio	0.08	0.025	0.017	-	-	0.023	-	-	0.544	0.094
HCM Control Delay (s)	54.5	11.2	10.4	-	-	8.4	-	-	85.8	19.2
HCM Lane LOS	F	B	B	-	-	A	-	-	F	C
HCM 95th %tile Q(veh)	0.3	0.1	0.1	-	-	0.1	-	-	2.4	0.3

Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	106	413	867	72	31	153
Future Vol, veh/h	106	413	867	72	31	153
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	135	-	-	110	110	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	112	435	913	76	33	161

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	989	0	-	0	1572	913
Stage 1	-	-	-	-	913	-
Stage 2	-	-	-	-	659	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	707	-	-	-	123	334
Stage 1	-	-	-	-	395	-
Stage 2	-	-	-	-	518	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	707	-	-	-	104	334
Mov Cap-2 Maneuver	-	-	-	-	104	-
Stage 1	-	-	-	-	333	-
Stage 2	-	-	-	-	518	-

Approach	EB	WB	SB
HCM Control Delay, s	2.3	0	30.3
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	707	-	-	-	104	334
HCM Lane V/C Ratio	0.158	-	-	-	0.314	0.482
HCM Control Delay (s)	11	-	-	-	54.7	25.4
HCM Lane LOS	B	-	-	-	F	D
HCM 95th %tile Q(veh)	0.6	-	-	-	1.2	2.5

Intersection	
Int Delay, s/veh	16

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	45	752	2	25	795	107	0	0	10	96	1	59
Future Vol, veh/h	45	752	2	25	795	107	0	0	10	96	1	59
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	110	-	-	105	-	75	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	47	792	2	26	837	113	0	0	11	101	1	62

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	950	0	0	794	0	0	-	-	397	1379	1777	419
Stage 1	-	-	-	-	-	-	-	-	-	889	889	-
Stage 2	-	-	-	-	-	-	-	-	-	490	888	-
Critical Hdwy	4.1	-	-	4.1	-	-	-	-	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	-	-	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	731	-	-	836	-	-	0	0	608	106	83	589
Stage 1	-	-	-	-	-	-	0	0	-	309	364	-
Stage 2	-	-	-	-	-	-	0	0	-	534	365	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	731	-	-	836	-	-	-	-	608	~ 97	75	589
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	~ 97	75	-
Stage 1	-	-	-	-	-	-	-	-	-	289	353	-
Stage 2	-	-	-	-	-	-	-	-	-	491	342	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.3	11	189
HCM LOS			B	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	608	731	-	-	836	-	-	141
HCM Lane V/C Ratio	0.017	0.065	-	-	0.031	-	-	1.165
HCM Control Delay (s)	11	10.3	-	-	9.4	-	-	189
HCM Lane LOS	B	B	-	-	A	-	-	F
HCM 95th %tile Q(veh)	0.1	0.2	-	-	0.1	-	-	9.4

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	928	53	34	509	4	50	0	26	5	0	1
Future Vol, veh/h	10	928	53	34	509	4	50	0	26	5	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	101	-	-	198	-	45	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	11	977	56	36	536	4	53	0	27	5	0	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	540	0	0	1033	0	0	1367	1639	517	1119	1663	268
Stage 1	-	-	-	-	-	-	1027	1027	-	608	608	-
Stage 2	-	-	-	-	-	-	340	612	-	511	1055	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.5	6.5	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1039	-	-	681	-	-	108	101	509	164	98	736
Stage 1	-	-	-	-	-	-	255	314	-	454	489	-
Stage 2	-	-	-	-	-	-	654	487	-	519	305	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1039	-	-	681	-	-	103	95	509	148	92	736
Mov Cap-2 Maneuver	-	-	-	-	-	-	103	95	-	148	92	-
Stage 1	-	-	-	-	-	-	252	311	-	449	463	-
Stage 2	-	-	-	-	-	-	619	461	-	486	302	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.7	58.9	26.9
HCM LOS			F	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	142	1039	-	-	681	-	-	171
HCM Lane V/C Ratio	0.563	0.01	-	-	0.053	-	-	0.037
HCM Control Delay (s)	58.9	8.5	-	-	10.6	-	-	26.9
HCM Lane LOS	F	A	-	-	B	-	-	D
HCM 95th %tile Q(veh)	2.8	0	-	-	0.2	-	-	0.1

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	12	919	21	4	530	7	9	0	3	4	0	8
Future Vol, veh/h	12	919	21	4	530	7	9	0	3	4	0	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	105	-	-	199	-	215	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	13	967	22	4	558	7	9	0	3	4	0	8

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	565	0	0	989	0	0	1291	1577	495	1076	1581	279
Stage 1	-	-	-	-	-	-	1004	1004	-	566	566	-
Stage 2	-	-	-	-	-	-	287	573	-	510	1015	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.5	6.5	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1017	-	-	707	-	-	123	111	525	176	110	724
Stage 1	-	-	-	-	-	-	263	322	-	481	511	-
Stage 2	-	-	-	-	-	-	702	507	-	519	318	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1017	-	-	707	-	-	120	109	525	172	108	724
Mov Cap-2 Maneuver	-	-	-	-	-	-	120	109	-	172	108	-
Stage 1	-	-	-	-	-	-	260	318	-	475	508	-
Stage 2	-	-	-	-	-	-	690	504	-	509	314	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.1	31.4	15.7
HCM LOS			D	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	149	1017	-	-	707	-	-	350
HCM Lane V/C Ratio	0.085	0.012	-	-	0.006	-	-	0.036
HCM Control Delay (s)	31.4	8.6	-	-	10.1	-	-	15.7
HCM Lane LOS	D	A	-	-	B	-	-	C
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	31	902	0	0	515	13	0	0	0	14	0	20
Future Vol, veh/h	31	902	0	0	515	13	0	0	0	14	0	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Free	-	-	None	-	-	Free
Storage Length	60	-	-	64	-	98	-	-	-	-	-	25
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	33	949	0	0	542	14	0	0	0	15	0	21

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	542	0	0	949	0	0	1557	1557	949	1557	1557	-
Stage 1	-	-	-	-	-	-	1015	1015	-	542	542	-
Stage 2	-	-	-	-	-	-	542	542	-	1015	1015	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	-
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	-
Pot Cap-1 Maneuver	1037	-	-	732	-	0	93	114	319	93	114	0
Stage 1	-	-	-	-	-	0	290	318	-	528	523	0
Stage 2	-	-	-	-	-	0	528	523	-	290	318	0
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	1037	-	-	732	-	-	91	110	319	91	110	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	91	110	-	91	110	-
Stage 1	-	-	-	-	-	-	281	308	-	511	523	-
Stage 2	-	-	-	-	-	-	528	523	-	281	308	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0	0	52.1
HCM LOS			A	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	1037	-	-	732	-	91	-
HCM Lane V/C Ratio	-	0.031	-	-	-	-	0.162	-
HCM Control Delay (s)	0	8.6	-	-	0	-	52.1	0
HCM Lane LOS	A	A	-	-	A	-	F	A
HCM 95th %tile Q(veh)	-	0.1	-	-	0	-	0.5	-

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	8	912	522	13	14	3
Future Vol, veh/h	8	912	522	13	14	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	45	-	-	58	0	38
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	8	960	549	14	15	3

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	563	0	-	0	1525	549
Stage 1	-	-	-	-	549	-
Stage 2	-	-	-	-	976	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1019	-	-	-	131	539
Stage 1	-	-	-	-	583	-
Stage 2	-	-	-	-	368	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1019	-	-	-	130	539
Mov Cap-2 Maneuver	-	-	-	-	130	-
Stage 1	-	-	-	-	578	-
Stage 2	-	-	-	-	368	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	31.9
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1019	-	-	-	130	539
HCM Lane V/C Ratio	0.008	-	-	-	0.113	0.006
HCM Control Delay (s)	8.6	-	-	-	36.2	11.7
HCM Lane LOS	A	-	-	-	E	B
HCM 95th %tile Q(veh)	0	-	-	-	0.4	0

Intersection	
Int Delay, s/veh	5.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	52	880	10	18	540	49	12	0	37	45	1	18
Future Vol, veh/h	52	880	10	18	540	49	12	0	37	45	1	18
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	145	-	145	215	-	225	58	-	-	95	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	55	926	11	19	568	52	13	0	39	47	1	19

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	620	0	0	937	0	0	1678	1694	926	1667	1653	568
Stage 1	-	-	-	-	-	-	1036	1036	-	606	606	-
Stage 2	-	-	-	-	-	-	642	658	-	1061	1047	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	970	-	-	739	-	-	76	94	329	78	99	526
Stage 1	-	-	-	-	-	-	282	311	-	487	490	-
Stage 2	-	-	-	-	-	-	466	464	-	273	308	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	970	-	-	739	-	-	68	86	329	65	91	526
Mov Cap-2 Maneuver	-	-	-	-	-	-	68	86	-	65	91	-
Stage 1	-	-	-	-	-	-	266	293	-	459	477	-
Stage 2	-	-	-	-	-	-	437	452	-	227	290	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0.3	30.2	107.7
HCM LOS			D	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	68	329	970	-	-	739	-	-	65	420
HCM Lane V/C Ratio	0.186	0.118	0.056	-	-	0.026	-	-	0.729	0.048
HCM Control Delay (s)	69.6	17.4	8.9	-	-	10	-	-	147.3	14
HCM Lane LOS	F	C	A	-	-	B	-	-	F	B
HCM 95th %tile Q(veh)	0.6	0.4	0.2	-	-	0.1	-	-	3.3	0.1

Intersection	
Int Delay, s/veh	5.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	164	795	488	47	56	108
Future Vol, veh/h	164	795	488	47	56	108
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	135	-	-	110	110	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	173	837	514	49	59	114

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	563	0	-	0	1697	514
Stage 1	-	-	-	-	514	-
Stage 2	-	-	-	-	1183	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1019	-	-	-	103	564
Stage 1	-	-	-	-	605	-
Stage 2	-	-	-	-	294	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1019	-	-	-	85	564
Mov Cap-2 Maneuver	-	-	-	-	85	-
Stage 1	-	-	-	-	502	-
Stage 2	-	-	-	-	294	-

Approach	EB	WB	SB
HCM Control Delay, s	1.6	0	47
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1019	-	-	-	85	564
HCM Lane V/C Ratio	0.169	-	-	-	0.693	0.202
HCM Control Delay (s)	9.3	-	-	-	112.5	13
HCM Lane LOS	A	-	-	-	F	B
HCM 95th %tile Q(veh)	0.6	-	-	-	3.3	0.7

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	47	545	4	7	649	72	0	0	9	74	0	21
Future Vol, veh/h	47	545	4	7	649	72	0	0	9	74	0	21
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	110	-	-	105	-	75	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	49	574	4	7	683	76	0	0	9	78	0	22

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	759	0	0	578	0	0	-	-	289	1082	1373	342
Stage 1	-	-	-	-	-	-	-	-	-	697	697	-
Stage 2	-	-	-	-	-	-	-	-	-	385	676	-
Critical Hdwy	4.1	-	-	4.1	-	-	-	-	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	-	-	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	862	-	-	1006	-	-	0	0	714	175	147	660
Stage 1	-	-	-	-	-	-	0	0	-	402	446	-
Stage 2	-	-	-	-	-	-	0	0	-	615	456	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	862	-	-	1006	-	-	-	-	714	164	138	660
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	164	138	-
Stage 1	-	-	-	-	-	-	-	-	-	379	443	-
Stage 2	-	-	-	-	-	-	-	-	-	572	430	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	0.1	10.1	40.7
HCM LOS			B	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	714	862	-	-	1006	-	-	197
HCM Lane V/C Ratio	0.013	0.057	-	-	0.007	-	-	0.508
HCM Control Delay (s)	10.1	9.4	-	-	8.6	-	-	40.7
HCM Lane LOS	B	A	-	-	A	-	-	E
HCM 95th %tile Q(veh)	0	0.2	-	-	0	-	-	2.6

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	13	657	56	40	506	1	47	0	21	7	1	2
Future Vol, veh/h	13	657	56	40	506	1	47	0	21	7	1	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	101	-	-	198	-	45	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	14	692	59	42	533	1	49	0	22	7	1	2

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	534	0	0	751	0	0	1101	1368	376	991	1396	267
Stage 1	-	-	-	-	-	-	750	750	-	617	617	-
Stage 2	-	-	-	-	-	-	351	618	-	374	779	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.5	6.5	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1044	-	-	868	-	-	169	148	627	203	142	737
Stage 1	-	-	-	-	-	-	374	422	-	449	484	-
Stage 2	-	-	-	-	-	-	644	484	-	624	409	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1044	-	-	868	-	-	160	139	627	187	133	737
Mov Cap-2 Maneuver	-	-	-	-	-	-	160	139	-	187	133	-
Stage 1	-	-	-	-	-	-	369	417	-	443	461	-
Stage 2	-	-	-	-	-	-	610	461	-	594	404	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.7	31.1	23
HCM LOS			D	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	208	1044	-	-	868	-	-	210
HCM Lane V/C Ratio	0.344	0.013	-	-	0.049	-	-	0.05
HCM Control Delay (s)	31.1	8.5	-	-	9.4	-	-	23
HCM Lane LOS	D	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	1.5	0	-	-	0.2	-	-	0.2

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	831	14	12	498	5	10	0	4	4	0	3
Future Vol, veh/h	9	831	14	12	498	5	10	0	4	4	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	105	-	-	199	-	215	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	9	875	15	13	524	5	11	0	4	4	0	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	529	0	0	890	0	0	1189	1456	445	1006	1458	262
Stage 1	-	-	-	-	-	-	901	901	-	550	550	-
Stage 2	-	-	-	-	-	-	288	555	-	456	908	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.5	6.5	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1048	-	-	770	-	-	146	131	566	198	131	743
Stage 1	-	-	-	-	-	-	303	360	-	492	519	-
Stage 2	-	-	-	-	-	-	701	516	-	559	357	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1048	-	-	770	-	-	143	128	566	193	128	743
Mov Cap-2 Maneuver	-	-	-	-	-	-	143	128	-	193	128	-
Stage 1	-	-	-	-	-	-	300	357	-	488	510	-
Stage 2	-	-	-	-	-	-	686	507	-	550	354	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.2	26.5	18.1
HCM LOS			D	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	182	1048	-	-	770	-	-	283
HCM Lane V/C Ratio	0.081	0.009	-	-	0.016	-	-	0.026
HCM Control Delay (s)	26.5	8.5	-	-	9.8	-	-	18.1
HCM Lane LOS	D	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.3	0	-	-	0.1	-	-	0.1

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	18	827	0	0	482	11	0	0	0	17	0	26
Future Vol, veh/h	18	827	0	0	482	11	0	0	0	17	0	26
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Free	-	-	None	-	-	Free
Storage Length	60	-	-	64	-	98	-	-	-	-	-	25
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	19	871	0	0	507	12	0	0	0	18	0	27

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	507	0	0	871	0	0	1416	1416	871	1416	1416	-
Stage 1	-	-	-	-	-	-	909	909	-	507	507	-
Stage 2	-	-	-	-	-	-	507	507	-	909	909	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	-
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	-
Pot Cap-1 Maneuver	1068	-	-	783	-	0	116	139	353	116	139	0
Stage 1	-	-	-	-	-	0	332	357	-	552	543	0
Stage 2	-	-	-	-	-	0	552	543	-	332	357	0
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	1068	-	-	783	-	-	114	136	353	114	136	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	114	136	-	114	136	-
Stage 1	-	-	-	-	-	-	326	351	-	542	543	-
Stage 2	-	-	-	-	-	-	552	543	-	326	351	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0	0	42.4
HCM LOS			A	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	1068	-	-	783	-	114	-
HCM Lane V/C Ratio	-	0.018	-	-	-	-	0.157	-
HCM Control Delay (s)	0	8.4	-	-	0	-	42.4	0
HCM Lane LOS	A	A	-	-	A	-	E	A
HCM 95th %tile Q(veh)	-	0.1	-	-	0	-	0.5	-

Intersection						
Int Delay, s/veh	0.3					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	3	833	486	14	12	5
Future Vol, veh/h	3	833	486	14	12	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	45	-	-	58	0	38
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	3	877	512	15	13	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	527	0	-	0	1395	512
Stage 1	-	-	-	-	512	-
Stage 2	-	-	-	-	883	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1050	-	-	-	157	566
Stage 1	-	-	-	-	606	-
Stage 2	-	-	-	-	408	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1050	-	-	-	157	566
Mov Cap-2 Maneuver	-	-	-	-	157	-
Stage 1	-	-	-	-	604	-
Stage 2	-	-	-	-	408	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	24.5
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1050	-	-	-	157	566
HCM Lane V/C Ratio	0.003	-	-	-	0.08	0.009
HCM Control Delay (s)	8.4	-	-	-	29.9	11.4
HCM Lane LOS	A	-	-	-	D	B
HCM 95th %tile Q(veh)	0	-	-	-	0.3	0

Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	36	783	4	21	459	41	14	2	34	45	0	27
Future Vol, veh/h	36	783	4	21	459	41	14	2	34	45	0	27
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	145	-	145	215	-	225	58	-	-	95	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	38	824	4	22	483	43	15	2	36	47	0	28

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	526	0	0	828	0	0	1463	1470	824	1448	1431	483
Stage 1	-	-	-	-	-	-	900	900	-	527	527	-
Stage 2	-	-	-	-	-	-	563	570	-	921	904	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1051	-	-	812	-	-	108	129	376	110	136	588
Stage 1	-	-	-	-	-	-	336	360	-	538	532	-
Stage 2	-	-	-	-	-	-	514	509	-	327	358	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1051	-	-	812	-	-	98	121	376	94	128	588
Mov Cap-2 Maneuver	-	-	-	-	-	-	98	121	-	94	128	-
Stage 1	-	-	-	-	-	-	324	347	-	519	518	-
Stage 2	-	-	-	-	-	-	476	495	-	283	345	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.4	25.7	52.5
HCM LOS			D	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	98	337	1051	-	-	812	-	-	94	588
HCM Lane V/C Ratio	0.15	0.112	0.036	-	-	0.027	-	-	0.504	0.048
HCM Control Delay (s)	48.1	17	8.6	-	-	9.6	-	-	77.1	11.4
HCM Lane LOS	E	C	A	-	-	A	-	-	F	B
HCM 95th %tile Q(veh)	0.5	0.4	0.1	-	-	0.1	-	-	2.2	0.2

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	87	778	457	49	41	70
Future Vol, veh/h	87	778	457	49	41	70
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	135	-	-	110	110	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	92	819	481	52	43	74

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	533	0	-	0	1484	481
Stage 1	-	-	-	-	481	-
Stage 2	-	-	-	-	1003	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1045	-	-	-	139	589
Stage 1	-	-	-	-	626	-
Stage 2	-	-	-	-	358	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1045	-	-	-	127	589
Mov Cap-2 Maneuver	-	-	-	-	127	-
Stage 1	-	-	-	-	571	-
Stage 2	-	-	-	-	358	-

Approach	EB	WB	SB
HCM Control Delay, s	0.9	0	25
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1045	-	-	-	127	589
HCM Lane V/C Ratio	0.088	-	-	-	0.34	0.125
HCM Control Delay (s)	8.8	-	-	-	47.3	12
HCM Lane LOS	A	-	-	-	E	B
HCM 95th %tile Q(veh)	0.3	-	-	-	1.4	0.4

APPENDIX B-2

EXISTING WITH PROJECT CONDITIONS

Intersection	
Int Delay, s/veh	9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	58	801	4	31	496	135	0	0	3	108	0	74
Future Vol, veh/h	58	801	4	31	496	135	0	0	3	108	0	74
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	110	-	-	105	-	75	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	61	843	4	33	522	142	0	0	3	114	0	78

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	664	0	0	847	0	0	-	-	424	1132	1557	261
Stage 1	-	-	-	-	-	-	-	-	-	588	588	-
Stage 2	-	-	-	-	-	-	-	-	-	544	969	-
Critical Hdwy	4.1	-	-	4.1	-	-	-	-	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	-	-	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	935	-	-	799	-	-	0	0	584	160	114	744
Stage 1	-	-	-	-	-	-	0	0	-	467	499	-
Stage 2	-	-	-	-	-	-	0	0	-	496	334	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	935	-	-	799	-	-	-	-	584	147	102	744
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	147	102	-
Stage 1	-	-	-	-	-	-	-	-	-	437	479	-
Stage 2	-	-	-	-	-	-	-	-	-	461	312	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.5	11.2	79.5
HCM LOS			B	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	584	935	-	-	799	-	-	218
HCM Lane V/C Ratio	0.005	0.065	-	-	0.041	-	-	0.879
HCM Control Delay (s)	11.2	9.1	-	-	9.7	-	-	79.5
HCM Lane LOS	B	A	-	-	A	-	-	F
HCM 95th %tile Q(veh)	0	0.2	-	-	0.1	-	-	7

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	404	17	21	981	8	86	0	38	0	0	0
Future Vol, veh/h	5	404	17	21	981	8	86	0	38	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	101	-	-	198	-	45	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	5	425	18	22	1033	8	91	0	40	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1041	0	0	443	0	0	1005	1529	222	1300	1530	517
Stage 1	-	-	-	-	-	-	444	444	-	1077	1077	-
Stage 2	-	-	-	-	-	-	561	1085	-	223	453	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.5	6.5	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	676	-	-	1128	-	-	199	118	788	121	118	509
Stage 1	-	-	-	-	-	-	568	579	-	237	298	-
Stage 2	-	-	-	-	-	-	485	295	-	765	573	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	676	-	-	1128	-	-	195	115	788	113	115	509
Mov Cap-2 Maneuver	-	-	-	-	-	-	195	115	-	113	115	-
Stage 1	-	-	-	-	-	-	564	575	-	235	292	-
Stage 2	-	-	-	-	-	-	476	289	-	721	569	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.2	33.5	0
HCM LOS			D	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	253	676	-	-	1128	-	-	-
HCM Lane V/C Ratio	0.516	0.008	-	-	0.02	-	-	-
HCM Control Delay (s)	33.5	10.4	-	-	8.3	-	-	0
HCM Lane LOS	D	B	-	-	A	-	-	A
HCM 95th %tile Q(veh)	2.7	0	-	-	0.1	-	-	-

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	24	412	10	15	1030	2	19	0	8	3	0	6
Future Vol, veh/h	24	412	10	15	1030	2	19	0	8	3	0	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	105	-	-	199	-	215	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	25	434	11	16	1084	2	20	0	8	3	0	6

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1086	0	0	445	0	0	1064	1608	223	1383	1611	542
Stage 1	-	-	-	-	-	-	490	490	-	1116	1116	-
Stage 2	-	-	-	-	-	-	574	1118	-	267	495	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.5	6.5	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	650	-	-	1126	-	-	180	106	787	105	105	490
Stage 1	-	-	-	-	-	-	534	552	-	225	285	-
Stage 2	-	-	-	-	-	-	476	285	-	721	549	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	650	-	-	1126	-	-	171	101	787	100	100	490
Mov Cap-2 Maneuver	-	-	-	-	-	-	171	101	-	100	100	-
Stage 1	-	-	-	-	-	-	514	531	-	216	281	-
Stage 2	-	-	-	-	-	-	463	281	-	686	528	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.1	23.5	22.7
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	223	650	-	-	1126	-	-	213
HCM Lane V/C Ratio	0.127	0.039	-	-	0.014	-	-	0.044
HCM Control Delay (s)	23.5	10.8	-	-	8.2	-	-	22.7
HCM Lane LOS	C	B	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.4	0.1	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	16	395	2	1	1025	15	0	0	0	13	0	24
Future Vol, veh/h	16	395	2	1	1025	15	0	0	0	13	0	24
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Free	-	-	None	-	-	Free
Storage Length	60	-	-	64	-	98	-	-	-	-	-	25
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	17	416	2	1	1079	16	0	0	0	14	0	25

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1079	0	0	418	0	0	1532	1532	417	1532	1533	-
Stage 1	-	-	-	-	-	-	451	451	-	1081	1081	-
Stage 2	-	-	-	-	-	-	1081	1081	-	451	452	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	-
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	-
Pot Cap-1 Maneuver	654	-	-	1152	-	0	96	118	640	96	118	0
Stage 1	-	-	-	-	-	0	592	574	-	266	296	0
Stage 2	-	-	-	-	-	0	266	296	-	592	574	0
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	654	-	-	1152	-	-	94	115	640	94	115	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	94	115	-	94	115	-
Stage 1	-	-	-	-	-	-	577	559	-	259	296	-
Stage 2	-	-	-	-	-	-	266	296	-	577	559	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0	0	49.7
HCM LOS			A	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	654	-	-	1152	-	94	-
HCM Lane V/C Ratio	-	0.026	-	-	0.001	-	0.146	-
HCM Control Delay (s)	0	10.7	-	-	8.1	-	49.7	0
HCM Lane LOS	A	B	-	-	A	-	E	A
HCM 95th %tile Q(veh)	-	0.1	-	-	0	-	0.5	-

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	8	396	1029	13	18	14
Future Vol, veh/h	8	396	1029	13	18	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	45	-	-	58	0	38
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	8	417	1083	14	19	15

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1097	0	-	0	1516	1083
Stage 1	-	-	-	-	1083	-
Stage 2	-	-	-	-	433	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	644	-	-	-	133	266
Stage 1	-	-	-	-	328	-
Stage 2	-	-	-	-	658	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	644	-	-	-	131	266
Mov Cap-2 Maneuver	-	-	-	-	131	-
Stage 1	-	-	-	-	324	-
Stage 2	-	-	-	-	658	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	29.3
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	644	-	-	-	131	266
HCM Lane V/C Ratio	0.013	-	-	-	0.145	0.055
HCM Control Delay (s)	10.7	-	-	-	37.1	19.3
HCM Lane LOS	B	-	-	-	E	C
HCM 95th %tile Q(veh)	0	-	-	-	0.5	0.2

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	11	452	4	24	949	40	6	0	14	46	1	24
Future Vol, veh/h	11	452	4	24	949	40	6	0	14	46	1	24
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	145	-	145	215	-	225	58	-	-	95	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	12	476	4	25	999	42	6	0	15	48	1	25

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1041	0	0	480	0	0	1583	1591	476	1559	1553	999
Stage 1	-	-	-	-	-	-	500	500	-	1049	1049	-
Stage 2	-	-	-	-	-	-	1083	1091	-	510	504	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	676	-	-	1093	-	-	89	108	593	92	114	298
Stage 1	-	-	-	-	-	-	557	546	-	277	307	-
Stage 2	-	-	-	-	-	-	265	293	-	550	544	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	676	-	-	1093	-	-	78	104	593	87	109	298
Mov Cap-2 Maneuver	-	-	-	-	-	-	78	104	-	87	109	-
Stage 1	-	-	-	-	-	-	547	536	-	272	300	-
Stage 2	-	-	-	-	-	-	236	286	-	527	534	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.2	24.4	64.5
HCM LOS			C	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	78	593	676	-	-	1093	-	-	87	279
HCM Lane V/C Ratio	0.081	0.025	0.017	-	-	0.023	-	-	0.557	0.094
HCM Control Delay (s)	55.2	11.2	10.4	-	-	8.4	-	-	89.1	19.2
HCM Lane LOS	F	B	B	-	-	A	-	-	F	C
HCM 95th %tile Q(veh)	0.3	0.1	0.1	-	-	0.1	-	-	2.5	0.3

Intersection	
Int Delay, s/veh	4.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	108	417	869	72	31	154
Future Vol, veh/h	108	417	869	72	31	154
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	135	-	-	110	110	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	114	439	915	76	33	162

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	991	0	-	0	1582	915
Stage 1	-	-	-	-	915	-
Stage 2	-	-	-	-	667	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	706	-	-	-	121	333
Stage 1	-	-	-	-	394	-
Stage 2	-	-	-	-	514	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	706	-	-	-	102	333
Mov Cap-2 Maneuver	-	-	-	-	102	-
Stage 1	-	-	-	-	331	-
Stage 2	-	-	-	-	514	-

Approach	EB	WB	SB
HCM Control Delay, s	2.3	0	30.7
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	706	-	-	-	102	333
HCM Lane V/C Ratio	0.161	-	-	-	0.32	0.487
HCM Control Delay (s)	11.1	-	-	-	56.1	25.6
HCM Lane LOS	B	-	-	-	F	D
HCM 95th %tile Q(veh)	0.6	-	-	-	1.2	2.5

Intersection	
Int Delay, s/veh	16.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	45	756	2	25	802	107	0	0	10	96	1	59
Future Vol, veh/h	45	756	2	25	802	107	0	0	10	96	1	59
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	110	-	-	105	-	75	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	47	796	2	26	844	113	0	0	11	101	1	62

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	957	0	0	798	0	0	-	-	399	1388	1788	422
Stage 1	-	-	-	-	-	-	-	-	-	896	896	-
Stage 2	-	-	-	-	-	-	-	-	-	492	892	-
Critical Hdwy	4.1	-	-	4.1	-	-	-	-	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	-	-	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	727	-	-	833	-	-	0	0	606	104	82	586
Stage 1	-	-	-	-	-	-	0	0	-	306	362	-
Stage 2	-	-	-	-	-	-	0	0	-	532	363	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	727	-	-	833	-	-	-	-	606	~ 95	74	586
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	~ 95	74	-
Stage 1	-	-	-	-	-	-	-	-	-	286	351	-
Stage 2	-	-	-	-	-	-	-	-	-	489	339	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.3	11	195.9
HCM LOS			B	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	606	727	-	-	833	-	-	139
HCM Lane V/C Ratio	0.017	0.065	-	-	0.032	-	-	1.181
HCM Control Delay (s)	11	10.3	-	-	9.5	-	-	195.9
HCM Lane LOS	B	B	-	-	A	-	-	F
HCM 95th %tile Q(veh)	0.1	0.2	-	-	0.1	-	-	9.6

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	941	53	34	516	4	50	0	26	5	0	1
Future Vol, veh/h	10	941	53	34	516	4	50	0	26	5	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	101	-	-	198	-	45	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	11	991	56	36	543	4	53	0	27	5	0	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	547	0	0	1047	0	0	1385	1660	524	1133	1684	272
Stage 1	-	-	-	-	-	-	1041	1041	-	615	615	-
Stage 2	-	-	-	-	-	-	344	619	-	518	1069	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.5	6.5	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1033	-	-	672	-	-	105	98	503	160	95	732
Stage 1	-	-	-	-	-	-	250	310	-	450	485	-
Stage 2	-	-	-	-	-	-	650	483	-	514	300	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1033	-	-	672	-	-	100	92	503	144	89	732
Mov Cap-2 Maneuver	-	-	-	-	-	-	100	92	-	144	89	-
Stage 1	-	-	-	-	-	-	247	307	-	445	459	-
Stage 2	-	-	-	-	-	-	614	457	-	481	297	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.7	62	27.5
HCM LOS			F	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	138	1033	-	-	672	-	-	166
HCM Lane V/C Ratio	0.58	0.01	-	-	0.053	-	-	0.038
HCM Control Delay (s)	62	8.5	-	-	10.7	-	-	27.5
HCM Lane LOS	F	A	-	-	B	-	-	D
HCM 95th %tile Q(veh)	2.9	0	-	-	0.2	-	-	0.1

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	12	932	21	4	537	7	9	0	3	4	0	8
Future Vol, veh/h	12	932	21	4	537	7	9	0	3	4	0	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	105	-	-	199	-	215	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	13	981	22	4	565	7	9	0	3	4	0	8

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	572	0	0	1003	0	0	1309	1598	502	1090	1602	283
Stage 1	-	-	-	-	-	-	1018	1018	-	573	573	-
Stage 2	-	-	-	-	-	-	291	580	-	517	1029	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.5	6.5	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1011	-	-	698	-	-	119	107	520	172	107	720
Stage 1	-	-	-	-	-	-	258	317	-	477	507	-
Stage 2	-	-	-	-	-	-	698	503	-	515	314	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1011	-	-	698	-	-	116	105	520	169	105	720
Mov Cap-2 Maneuver	-	-	-	-	-	-	116	105	-	169	105	-
Stage 1	-	-	-	-	-	-	255	313	-	471	504	-
Stage 2	-	-	-	-	-	-	686	500	-	505	310	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.1	32.4	15.8
HCM LOS			D	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	144	1011	-	-	698	-	-	345
HCM Lane V/C Ratio	0.088	0.012	-	-	0.006	-	-	0.037
HCM Control Delay (s)	32.4	8.6	-	-	10.2	-	-	15.8
HCM Lane LOS	D	A	-	-	B	-	-	C
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	38	909	0	0	519	18	0	0	0	17	0	24
Future Vol, veh/h	38	909	0	0	519	18	0	0	0	17	0	24
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Free	-	-	None	-	-	Free
Storage Length	60	-	-	64	-	98	-	-	-	-	-	25
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	40	957	0	0	546	19	0	0	0	18	0	25

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	546	0	0	957	0	0	1583	1583	957	1583	1583	-
Stage 1	-	-	-	-	-	-	1037	1037	-	546	546	-
Stage 2	-	-	-	-	-	-	546	546	-	1037	1037	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	-
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	-
Pot Cap-1 Maneuver	1033	-	-	727	-	0	89	110	315	89	110	0
Stage 1	-	-	-	-	-	0	282	311	-	526	521	0
Stage 2	-	-	-	-	-	0	526	521	-	282	311	0
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	1033	-	-	727	-	-	86	106	315	86	106	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	86	106	-	86	106	-
Stage 1	-	-	-	-	-	-	271	299	-	505	521	-
Stage 2	-	-	-	-	-	-	526	521	-	271	299	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0	0	57.5
HCM LOS			A	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	1033	-	-	727	-	86	-
HCM Lane V/C Ratio	-	0.039	-	-	-	-	0.208	-
HCM Control Delay (s)	0	8.6	-	-	0	-	57.5	0
HCM Lane LOS	A	A	-	-	A	-	F	A
HCM 95th %tile Q(veh)	-	0.1	-	-	0	-	0.7	-

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	15	915	527	15	15	7
Future Vol, veh/h	15	915	527	15	15	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	45	-	-	58	0	38
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	16	963	555	16	16	7

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	571	0	-	0	1550	555
Stage 1	-	-	-	-	555	-
Stage 2	-	-	-	-	995	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1012	-	-	-	127	535
Stage 1	-	-	-	-	579	-
Stage 2	-	-	-	-	361	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1012	-	-	-	125	535
Mov Cap-2 Maneuver	-	-	-	-	125	-
Stage 1	-	-	-	-	570	-
Stage 2	-	-	-	-	361	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	29.6
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1012	-	-	-	125	535
HCM Lane V/C Ratio	0.016	-	-	-	0.126	0.014
HCM Control Delay (s)	8.6	-	-	-	37.9	11.8
HCM Lane LOS	A	-	-	-	E	B
HCM 95th %tile Q(veh)	0	-	-	-	0.4	0

Intersection	
Int Delay, s/veh	5.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	52	884	10	18	547	49	12	0	37	45	1	18
Future Vol, veh/h	52	884	10	18	547	49	12	0	37	45	1	18
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	145	-	145	215	-	225	58	-	-	95	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	55	931	11	19	576	52	13	0	39	47	1	19

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	628	0	0	942	0	0	1691	1707	931	1680	1666	576
Stage 1	-	-	-	-	-	-	1041	1041	-	614	614	-
Stage 2	-	-	-	-	-	-	650	666	-	1066	1052	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	964	-	-	736	-	-	75	92	326	76	98	521
Stage 1	-	-	-	-	-	-	280	310	-	483	486	-
Stage 2	-	-	-	-	-	-	461	460	-	271	306	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	964	-	-	736	-	-	67	84	326	63	90	521
Mov Cap-2 Maneuver	-	-	-	-	-	-	67	84	-	63	90	-
Stage 1	-	-	-	-	-	-	264	292	-	455	473	-
Stage 2	-	-	-	-	-	-	432	448	-	225	289	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0.3	30.6	114
HCM LOS			D	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	67	326	964	-	-	736	-	-	63	416
HCM Lane V/C Ratio	0.189	0.119	0.057	-	-	0.026	-	-	0.752	0.048
HCM Control Delay (s)	70.8	17.5	9	-	-	10	-	-	156.2	14.1
HCM Lane LOS	F	C	A	-	-	B	-	-	F	B
HCM 95th %tile Q(veh)	0.6	0.4	0.2	-	-	0.1	-	-	3.3	0.2

Intersection	
Int Delay, s/veh	5.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	165	798	493	47	56	110
Future Vol, veh/h	165	798	493	47	56	110
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	135	-	-	110	110	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	174	840	519	49	59	116

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	568	0	-	0	1707	519
Stage 1	-	-	-	-	519	-
Stage 2	-	-	-	-	1188	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1014	-	-	-	101	561
Stage 1	-	-	-	-	601	-
Stage 2	-	-	-	-	292	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1014	-	-	-	84	561
Mov Cap-2 Maneuver	-	-	-	-	84	-
Stage 1	-	-	-	-	498	-
Stage 2	-	-	-	-	292	-

Approach	EB	WB	SB
HCM Control Delay, s	1.6	0	47.5
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1014	-	-	-	84	561
HCM Lane V/C Ratio	0.171	-	-	-	0.702	0.206
HCM Control Delay (s)	9.3	-	-	-	115.1	13.1
HCM Lane LOS	A	-	-	-	F	B
HCM 95th %tile Q(veh)	0.6	-	-	-	3.4	0.8

Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	47	549	4	7	656	72	0	0	9	74	0	21
Future Vol, veh/h	47	549	4	7	656	72	0	0	9	74	0	21
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	110	-	-	105	-	75	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	49	578	4	7	691	76	0	0	9	78	0	22

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	767	0	0	582	0	0	-	-	291	1092	1385	346
Stage 1	-	-	-	-	-	-	-	-	-	705	705	-
Stage 2	-	-	-	-	-	-	-	-	-	387	680	-
Critical Hdwy	4.1	-	-	4.1	-	-	-	-	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	-	-	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	856	-	-	1002	-	-	0	0	712	172	145	656
Stage 1	-	-	-	-	-	-	0	0	-	398	442	-
Stage 2	-	-	-	-	-	-	0	0	-	614	454	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	856	-	-	1002	-	-	-	-	712	162	136	656
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	162	136	-
Stage 1	-	-	-	-	-	-	-	-	-	375	439	-
Stage 2	-	-	-	-	-	-	-	-	-	571	428	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	0.1	10.1	41.8
HCM LOS			B	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	712	856	-	-	1002	-	-	194
HCM Lane V/C Ratio	0.013	0.058	-	-	0.007	-	-	0.515
HCM Control Delay (s)	10.1	9.5	-	-	8.6	-	-	41.8
HCM Lane LOS	B	A	-	-	A	-	-	E
HCM 95th %tile Q(veh)	0	0.2	-	-	0	-	-	2.6

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	13	670	56	40	513	1	47	0	21	7	1	2
Future Vol, veh/h	13	670	56	40	513	1	47	0	21	7	1	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	101	-	-	198	-	45	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	14	705	59	42	540	1	49	0	22	7	1	2

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	541	0	0	764	0	0	1118	1388	382	1005	1416	270
Stage 1	-	-	-	-	-	-	763	763	-	624	624	-
Stage 2	-	-	-	-	-	-	355	625	-	381	792	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.5	6.5	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1038	-	-	858	-	-	164	144	622	199	139	734
Stage 1	-	-	-	-	-	-	367	416	-	445	481	-
Stage 2	-	-	-	-	-	-	641	480	-	619	404	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1038	-	-	858	-	-	155	135	622	183	131	734
Mov Cap-2 Maneuver	-	-	-	-	-	-	155	135	-	183	131	-
Stage 1	-	-	-	-	-	-	362	411	-	439	457	-
Stage 2	-	-	-	-	-	-	606	456	-	589	399	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.7	32.3	23.4
HCM LOS			D	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	202	1038	-	-	858	-	-	206
HCM Lane V/C Ratio	0.354	0.013	-	-	0.049	-	-	0.051
HCM Control Delay (s)	32.3	8.5	-	-	9.4	-	-	23.4
HCM Lane LOS	D	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	1.5	0	-	-	0.2	-	-	0.2

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	844	14	12	505	5	10	0	4	4	0	3
Future Vol, veh/h	9	844	14	12	505	5	10	0	4	4	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	105	-	-	199	-	215	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	9	888	15	13	532	5	11	0	4	4	0	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	537	0	0	903	0	0	1206	1477	452	1020	1479	266
Stage 1	-	-	-	-	-	-	914	914	-	558	558	-
Stage 2	-	-	-	-	-	-	292	563	-	462	921	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.5	6.5	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1041	-	-	761	-	-	142	127	560	194	127	738
Stage 1	-	-	-	-	-	-	298	355	-	487	515	-
Stage 2	-	-	-	-	-	-	697	512	-	554	352	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1041	-	-	761	-	-	139	124	560	189	124	738
Mov Cap-2 Maneuver	-	-	-	-	-	-	139	124	-	189	124	-
Stage 1	-	-	-	-	-	-	295	352	-	483	506	-
Stage 2	-	-	-	-	-	-	682	503	-	545	349	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.2	27.2	18.4
HCM LOS			D	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	177	1041	-	-	761	-	-	277
HCM Lane V/C Ratio	0.083	0.009	-	-	0.017	-	-	0.027
HCM Control Delay (s)	27.2	8.5	-	-	9.8	-	-	18.4
HCM Lane LOS	D	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.3	0	-	-	0.1	-	-	0.1

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	25	834	0	0	486	16	0	0	0	20	0	30
Future Vol, veh/h	25	834	0	0	486	16	0	0	0	20	0	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Free	-	-	None	-	-	Free
Storage Length	60	-	-	64	-	98	-	-	-	-	-	25
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	26	878	0	0	512	17	0	0	0	21	0	32

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	512	0	0	878	0	0	1442	1442	878	1442	1442	-
Stage 1	-	-	-	-	-	-	930	930	-	512	512	-
Stage 2	-	-	-	-	-	-	512	512	-	930	930	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	-
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	-
Pot Cap-1 Maneuver	1064	-	-	778	-	0	111	134	350	111	134	0
Stage 1	-	-	-	-	-	0	323	349	-	548	540	0
Stage 2	-	-	-	-	-	0	548	540	-	323	349	0
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	1064	-	-	778	-	-	109	131	350	109	131	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	109	131	-	109	131	-
Stage 1	-	-	-	-	-	-	315	341	-	535	540	-
Stage 2	-	-	-	-	-	-	548	540	-	315	341	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0	0	45.8
HCM LOS			A	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	1064	-	-	778	-	109	-
HCM Lane V/C Ratio	-	0.025	-	-	-	-	0.193	-
HCM Control Delay (s)	0	8.5	-	-	0	-	45.8	0
HCM Lane LOS	A	A	-	-	A	-	E	A
HCM 95th %tile Q(veh)	-	0.1	-	-	0	-	0.7	-

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	10	836	491	16	13	9
Future Vol, veh/h	10	836	491	16	13	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	45	-	-	58	0	38
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	11	880	517	17	14	9

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	534	0	-	0	1419	517
Stage 1	-	-	-	-	517	-
Stage 2	-	-	-	-	902	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1044	-	-	-	152	562
Stage 1	-	-	-	-	603	-
Stage 2	-	-	-	-	399	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1044	-	-	-	150	562
Mov Cap-2 Maneuver	-	-	-	-	150	-
Stage 1	-	-	-	-	596	-
Stage 2	-	-	-	-	399	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	23.3
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1044	-	-	-	150	562
HCM Lane V/C Ratio	0.01	-	-	-	0.091	0.017
HCM Control Delay (s)	8.5	-	-	-	31.4	11.5
HCM Lane LOS	A	-	-	-	D	B
HCM 95th %tile Q(veh)	0	-	-	-	0.3	0.1

Intersection	
Int Delay, s/veh	3.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	36	787	4	21	466	41	14	2	34	45	0	27
Future Vol, veh/h	36	787	4	21	466	41	14	2	34	45	0	27
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	145	-	145	215	-	225	58	-	-	95	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	38	828	4	22	491	43	15	2	36	47	0	28

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	534	0	0	832	0	0	1475	1482	828	1460	1443	491
Stage 1	-	-	-	-	-	-	904	904	-	535	535	-
Stage 2	-	-	-	-	-	-	571	578	-	925	908	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1044	-	-	809	-	-	106	126	374	108	133	582
Stage 1	-	-	-	-	-	-	334	358	-	533	527	-
Stage 2	-	-	-	-	-	-	509	504	-	325	357	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1044	-	-	809	-	-	96	118	374	92	125	582
Mov Cap-2 Maneuver	-	-	-	-	-	-	96	118	-	92	125	-
Stage 1	-	-	-	-	-	-	322	345	-	514	513	-
Stage 2	-	-	-	-	-	-	471	490	-	281	344	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.4	26.2	54.2
HCM LOS			D	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	96	334	1044	-	-	809	-	-	92	582
HCM Lane V/C Ratio	0.154	0.113	0.036	-	-	0.027	-	-	0.515	0.049
HCM Control Delay (s)	49.2	17.2	8.6	-	-	9.6	-	-	79.8	11.5
HCM Lane LOS	E	C	A	-	-	A	-	-	F	B
HCM 95th %tile Q(veh)	0.5	0.4	0.1	-	-	0.1	-	-	2.3	0.2

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	88	781	462	49	41	72
Future Vol, veh/h	88	781	462	49	41	72
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	135	-	-	110	110	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	93	822	486	52	43	76

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	538	0	-	0	1494	486
Stage 1	-	-	-	-	486	-
Stage 2	-	-	-	-	1008	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1040	-	-	-	137	585
Stage 1	-	-	-	-	623	-
Stage 2	-	-	-	-	356	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1040	-	-	-	125	585
Mov Cap-2 Maneuver	-	-	-	-	125	-
Stage 1	-	-	-	-	568	-
Stage 2	-	-	-	-	356	-

Approach	EB	WB	SB
HCM Control Delay, s	0.9	0	25.2
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1040	-	-	-	125	585
HCM Lane V/C Ratio	0.089	-	-	-	0.345	0.13
HCM Control Delay (s)	8.8	-	-	-	48.3	12.1
HCM Lane LOS	A	-	-	-	E	B
HCM 95th %tile Q(veh)	0.3	-	-	-	1.4	0.4

APPENDIX B-3

EXISTING WITH PROJECT WITH MITIGATION CONDITIONS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	58	801	4	31	496	135	0	0	3	108	0	74
Future Volume (veh/h)	58	801	4	31	496	135	0	0	3	108	0	74
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	61	843	4	33	522	142	0	0	3	114	0	78
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	622	2712	13	515	2657	1185	0	0	237	190	6	90
Arrive On Green	0.74	0.74	0.74	0.74	0.74	0.74	0.00	0.00	0.15	0.15	0.00	0.15
Sat Flow, veh/h	784	3684	17	661	3610	1610	0	0	1610	857	41	614
Grp Volume(v), veh/h	61	413	434	33	522	142	0	0	3	192	0	0
Grp Sat Flow(s),veh/h/ln	784	1805	1897	661	1805	1610	0	0	1610	1513	0	0
Q Serve(g_s), s	2.3	7.0	7.0	1.6	4.0	2.3	0.0	0.0	0.1	10.6	0.0	0.0
Cycle Q Clear(g_c), s	6.4	7.0	7.0	8.7	4.0	2.3	0.0	0.0	0.1	11.1	0.0	0.0
Prop In Lane	1.00		0.01	1.00		1.00	0.00		1.00	0.59		0.41
Lane Grp Cap(c), veh/h	622	1329	1396	515	2657	1185	0	0	237	286	0	0
V/C Ratio(X)	0.10	0.31	0.31	0.06	0.20	0.12	0.00	0.00	0.01	0.67	0.00	0.00
Avail Cap(c_a), veh/h	622	1329	1396	515	2657	1185	0	0	519	549	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	4.6	4.1	4.1	5.5	3.7	3.4	0.0	0.0	32.8	37.4	0.0	0.0
Incr Delay (d2), s/veh	0.3	0.6	0.6	0.2	0.2	0.2	0.0	0.0	0.0	1.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.6	3.3	3.5	0.4	1.8	1.0	0.0	0.0	0.1	7.5	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	5.0	4.7	4.6	5.8	3.8	3.6	0.0	0.0	32.8	38.4	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	A	A	C	D	A	A
Approach Vol, veh/h		908			697			3			192	
Approach Delay, s/veh		4.7			3.9			32.8			38.4	
Approach LOS		A			A			C			D	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		72.2		17.8		72.2		17.8				
Change Period (Y+Rc), s		6.0		4.5		6.0		4.5				
Max Green Setting (Gmax), s		50.5		29.0		50.5		29.0				
Max Q Clear Time (g_c+I1), s		9.0		13.1		10.7		2.1				
Green Ext Time (p_c), s		0.7		0.2		0.6		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			8.0									
HCM 6th LOS			A									

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	404	17	21	981	8	86	0	38	0	0	0
Future Vol, veh/h	5	404	17	21	981	8	86	0	38	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	45	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	5	425	18	22	1033	8	91	0	40	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1041	0	0	443	0	0	1005	1529	222	1300	1530	517
Stage 1	-	-	-	-	-	-	444	444	-	1077	1077	-
Stage 2	-	-	-	-	-	-	561	1085	-	223	453	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.5	6.5	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	676	-	-	1128	-	-	199	118	788	121	118	509
Stage 1	-	-	-	-	-	-	568	579	-	237	298	-
Stage 2	-	-	-	-	-	-	485	295	-	765	573	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	676	-	-	1128	-	-	191	111	788	110	111	509
Mov Cap-2 Maneuver	-	-	-	-	-	-	316	212	-	195	214	-
Stage 1	-	-	-	-	-	-	562	573	-	235	284	-
Stage 2	-	-	-	-	-	-	463	281	-	719	567	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.4	19	0
HCM LOS			C	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	387	676	-	-	1128	-	-	-
HCM Lane V/C Ratio	0.337	0.008	-	-	0.02	-	-	-
HCM Control Delay (s)	19	10.4	0.1	-	8.3	0.2	-	0
HCM Lane LOS	C	B	A	-	A	A	-	A
HCM 95th %tile Q(veh)	1.5	0	-	-	0.1	-	-	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	16	395	2	1	1025	15	0	0	0	13	0	24
Future Vol, veh/h	16	395	2	1	1025	15	0	0	0	13	0	24
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Free	-	-	None	-	-	Free
Storage Length	60	-	-	-	-	98	-	-	-	-	-	25
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	17	416	2	1	1079	16	0	0	0	14	0	25

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1079	0	0	418	0	0	1532	1532	417	1532	1533	-
Stage 1	-	-	-	-	-	-	451	451	-	1081	1081	-
Stage 2	-	-	-	-	-	-	1081	1081	-	451	452	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	-
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	-
Pot Cap-1 Maneuver	654	-	-	1152	-	0	96	118	640	96	118	0
Stage 1	-	-	-	-	-	0	592	574	-	266	296	0
Stage 2	-	-	-	-	-	0	266	296	-	592	574	0
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	654	-	-	1152	-	-	94	115	640	94	115	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	94	115	-	198	222	-
Stage 1	-	-	-	-	-	-	577	559	-	259	295	-
Stage 2	-	-	-	-	-	-	265	295	-	577	559	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0	0	24.5
HCM LOS			A	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	654	-	-	1152	-	198	-
HCM Lane V/C Ratio	-	0.026	-	-	0.001	-	0.069	-
HCM Control Delay (s)	0	10.7	-	-	8.1	0	24.5	0
HCM Lane LOS	A	B	-	-	A	A	C	A
HCM 95th %tile Q(veh)	-	0.1	-	-	0	-	0.2	-

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	11	452	4	24	949	40	6	0	14	46	1	24
Future Vol, veh/h	11	452	4	24	949	40	6	0	14	46	1	24
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	145	-	-	225	58	-	-	95	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	12	476	4	25	999	42	6	0	15	48	1	25

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1041	0	0	480	0	0	1583	1591	476	1559	1553	999
Stage 1	-	-	-	-	-	-	500	500	-	1049	1049	-
Stage 2	-	-	-	-	-	-	1083	1091	-	510	504	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	676	-	-	1093	-	-	89	108	593	92	114	298
Stage 1	-	-	-	-	-	-	557	546	-	277	307	-
Stage 2	-	-	-	-	-	-	265	293	-	550	544	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	676	-	-	1093	-	-	76	100	593	84	105	298
Mov Cap-2 Maneuver	-	-	-	-	-	-	168	200	-	194	211	-
Stage 1	-	-	-	-	-	-	544	533	-	270	290	-
Stage 2	-	-	-	-	-	-	228	277	-	523	531	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.2	16	25.7
HCM LOS			C	D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	168	593	676	-	-	1093	-	-	194	293
HCM Lane V/C Ratio	0.038	0.025	0.017	-	-	0.023	-	-	0.25	0.09
HCM Control Delay (s)	27.3	11.2	10.4	0	-	8.4	0	-	29.6	18.5
HCM Lane LOS	D	B	B	A	-	A	A	-	D	C
HCM 95th %tile Q(veh)	0.1	0.1	0.1	-	-	0.1	-	-	0.9	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	756	2	25	802	107	0	0	10	96	1	59
Future Volume (veh/h)	45	756	2	25	802	107	0	0	10	96	1	59
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	47	796	2	26	844	113	0	0	11	101	1	62
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	485	2785	7	555	2722	1214	0	0	208	178	7	73
Arrive On Green	0.75	0.75	0.75	0.75	0.75	0.75	0.00	0.00	0.13	0.13	0.13	0.13
Sat Flow, veh/h	596	3694	9	692	3610	1610	0	0	1610	877	56	567
Grp Volume(v), veh/h	47	389	409	26	844	113	0	0	11	164	0	0
Grp Sat Flow(s),veh/h/ln	596	1805	1898	692	1805	1610	0	0	1610	1499	0	0
Q Serve(g_s), s	2.5	6.1	6.1	1.1	6.8	1.7	0.0	0.0	0.5	9.1	0.0	0.0
Cycle Q Clear(g_c), s	9.2	6.1	6.1	7.2	6.8	1.7	0.0	0.0	0.5	9.6	0.0	0.0
Prop In Lane	1.00		0.00	1.00		1.00	0.00		1.00	0.62		0.38
Lane Grp Cap(c), veh/h	485	1361	1431	555	2722	1214	0	0	208	259	0	0
V/C Ratio(X)	0.10	0.29	0.29	0.05	0.31	0.09	0.00	0.00	0.05	0.63	0.00	0.00
Avail Cap(c_a), veh/h	485	1361	1431	555	2722	1214	0	0	519	546	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	5.0	3.5	3.5	4.6	3.6	2.9	0.0	0.0	34.3	38.3	0.0	0.0
Incr Delay (d2), s/veh	0.4	0.5	0.5	0.2	0.3	0.2	0.0	0.0	0.0	1.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.5	2.7	2.8	0.3	2.8	0.7	0.0	0.0	0.4	6.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	5.4	4.0	4.0	4.8	3.9	3.1	0.0	0.0	34.4	39.2	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	A	A	C	D	A	A
Approach Vol, veh/h		845			983			11			164	
Approach Delay, s/veh		4.1			3.8			34.4			39.2	
Approach LOS		A			A			C			D	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		73.9		16.1		73.9		16.1				
Change Period (Y+Rc), s		6.0		4.5		6.0		4.5				
Max Green Setting (Gmax), s		50.5		29.0		50.5		29.0				
Max Q Clear Time (g_c+I1), s		11.2		11.6		9.2		2.5				
Green Ext Time (p_c), s		0.7		0.2		0.9		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			7.0									
HCM 6th LOS			A									

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	941	53	34	516	4	50	0	26	5	0	1
Future Vol, veh/h	10	941	53	34	516	4	50	0	26	5	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	45	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	11	991	56	36	543	4	53	0	27	5	0	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	547	0	0	1047	0	0	1385	1660	524	1133	1684	272
Stage 1	-	-	-	-	-	-	1041	1041	-	615	615	-
Stage 2	-	-	-	-	-	-	344	619	-	518	1069	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.5	6.5	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1033	-	-	672	-	-	105	98	503	160	95	732
Stage 1	-	-	-	-	-	-	250	310	-	450	485	-
Stage 2	-	-	-	-	-	-	650	483	-	514	300	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1033	-	-	672	-	-	97	88	503	140	85	732
Mov Cap-2 Maneuver	-	-	-	-	-	-	192	201	-	264	184	-
Stage 1	-	-	-	-	-	-	244	302	-	438	448	-
Stage 2	-	-	-	-	-	-	599	446	-	473	292	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	1	26.8	17.5
HCM LOS			D	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	244	1033	-	-	672	-	-	295
HCM Lane V/C Ratio	0.328	0.01	-	-	0.053	-	-	0.021
HCM Control Delay (s)	26.8	8.5	0.1	-	10.7	0.4	-	17.5
HCM Lane LOS	D	A	A	-	B	A	-	C
HCM 95th %tile Q(veh)	1.4	0	-	-	0.2	-	-	0.1

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	38	909	0	0	519	18	0	0	0	17	0	24
Future Vol, veh/h	38	909	0	0	519	18	0	0	0	17	0	24
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Free	-	-	None	-	-	Free
Storage Length	60	-	-	-	-	98	-	-	-	-	-	25
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	40	957	0	0	546	19	0	0	0	18	0	25

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	546	0	0	957	0	0	1583	1583	957	1583	1583	-
Stage 1	-	-	-	-	-	-	1037	1037	-	546	546	-
Stage 2	-	-	-	-	-	-	546	546	-	1037	1037	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	-
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	-
Pot Cap-1 Maneuver	1033	-	-	727	-	0	89	110	315	89	110	0
Stage 1	-	-	-	-	-	0	282	311	-	526	521	0
Stage 2	-	-	-	-	-	0	526	521	-	282	311	0
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	1033	-	-	727	-	-	86	106	315	86	106	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	86	106	-	196	217	-
Stage 1	-	-	-	-	-	-	271	299	-	505	521	-
Stage 2	-	-	-	-	-	-	526	521	-	271	299	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0	0	25.2
HCM LOS			A	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	1033	-	-	727	-	196	-
HCM Lane V/C Ratio	-	0.039	-	-	-	-	0.091	-
HCM Control Delay (s)	0	8.6	-	-	0	-	25.2	0
HCM Lane LOS	A	A	-	-	A	-	D	A
HCM 95th %tile Q(veh)	-	0.1	-	-	0	-	0.3	-

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	52	884	10	18	547	49	12	0	37	45	1	18
Future Vol, veh/h	52	884	10	18	547	49	12	0	37	45	1	18
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	145	-	-	225	58	-	-	95	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	55	931	11	19	576	52	13	0	39	47	1	19

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	628	0	0	942	0	0	1691	1707	931	1680	1666	576
Stage 1	-	-	-	-	-	-	1041	1041	-	614	614	-
Stage 2	-	-	-	-	-	-	650	666	-	1066	1052	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	964	-	-	736	-	-	75	92	326	76	98	521
Stage 1	-	-	-	-	-	-	280	310	-	483	486	-
Stage 2	-	-	-	-	-	-	461	460	-	271	306	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	964	-	-	736	-	-	63	78	326	59	83	521
Mov Cap-2 Maneuver	-	-	-	-	-	-	162	180	-	142	182	-
Stage 1	-	-	-	-	-	-	246	273	-	425	467	-
Stage 2	-	-	-	-	-	-	426	442	-	210	269	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0.3	20.3	33.7
HCM LOS			C	D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	162	326	964	-	-	736	-	-	142	474
HCM Lane V/C Ratio	0.078	0.119	0.057	-	-	0.026	-	-	0.334	0.042
HCM Control Delay (s)	29.1	17.5	9	0	-	10	0	-	42.5	12.9
HCM Lane LOS	D	C	A	A	-	B	A	-	E	B
HCM 95th %tile Q(veh)	0.2	0.4	0.2	-	-	0.1	-	-	1.3	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	47	549	4	7	656	72	0	0	9	74	0	21
Future Volume (veh/h)	47	549	4	7	656	72	0	0	9	74	0	21
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	49	578	4	7	691	76	0	0	9	78	0	22
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	612	2924	20	721	2873	1281	0	0	141	165	2	27
Arrive On Green	0.80	0.80	0.80	0.80	0.80	0.80	0.00	0.00	0.09	0.09	0.00	0.09
Sat Flow, veh/h	712	3675	25	846	3610	1610	0	0	1610	1076	23	310
Grp Volume(v), veh/h	49	284	298	7	691	76	0	0	9	100	0	0
Grp Sat Flow(s),veh/h/ln	712	1805	1895	846	1805	1610	0	0	1610	1409	0	0
Q Serve(g_s), s	1.7	3.4	3.4	0.2	4.4	0.9	0.0	0.0	0.5	5.9	0.0	0.0
Cycle Q Clear(g_c), s	6.0	3.4	3.4	3.6	4.4	0.9	0.0	0.0	0.5	6.3	0.0	0.0
Prop In Lane	1.00		0.01	1.00		1.00	0.00		1.00	0.78		0.22
Lane Grp Cap(c), veh/h	612	1436	1508	721	2873	1281	0	0	141	195	0	0
V/C Ratio(X)	0.08	0.20	0.20	0.01	0.24	0.06	0.00	0.00	0.06	0.51	0.00	0.00
Avail Cap(c_a), veh/h	612	1436	1508	721	2873	1281	0	0	519	538	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	3.1	2.2	2.2	2.7	2.3	2.0	0.0	0.0	37.7	40.5	0.0	0.0
Incr Delay (d2), s/veh	0.3	0.3	0.3	0.0	0.2	0.1	0.0	0.0	0.1	0.8	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.3	1.1	1.2	0.0	1.3	0.3	0.0	0.0	0.3	4.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	3.3	2.5	2.5	2.7	2.5	2.1	0.0	0.0	37.7	41.3	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	A	A	D	D	A	A
Approach Vol, veh/h		631			774			9			100	
Approach Delay, s/veh		2.6			2.5			37.7			41.3	
Approach LOS		A			A			D			D	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		77.6		12.4		77.6		12.4				
Change Period (Y+Rc), s		6.0		4.5		6.0		4.5				
Max Green Setting (Gmax), s		50.5		29.0		50.5		29.0				
Max Q Clear Time (g_c+I1), s		8.0		8.3		6.4		2.5				
Green Ext Time (p_c), s		0.5		0.1		0.7		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			5.3									
HCM 6th LOS			A									

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	13	670	56	40	513	1	47	0	21	7	1	2
Future Vol, veh/h	13	670	56	40	513	1	47	0	21	7	1	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	45	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	14	705	59	42	540	1	49	0	22	7	1	2

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	541	0	0	764	0	0	1118	1388	382	1005	1416	270
Stage 1	-	-	-	-	-	-	763	763	-	624	624	-
Stage 2	-	-	-	-	-	-	355	625	-	381	792	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.5	6.5	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1038	-	-	858	-	-	164	144	622	199	139	734
Stage 1	-	-	-	-	-	-	367	416	-	445	481	-
Stage 2	-	-	-	-	-	-	641	480	-	619	404	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1038	-	-	858	-	-	152	131	622	178	126	734
Mov Cap-2 Maneuver	-	-	-	-	-	-	266	251	-	300	236	-
Stage 1	-	-	-	-	-	-	358	406	-	434	447	-
Stage 2	-	-	-	-	-	-	593	446	-	583	394	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	1	19.3	16.3
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	323	1038	-	-	858	-	-	330
HCM Lane V/C Ratio	0.222	0.013	-	-	0.049	-	-	0.032
HCM Control Delay (s)	19.3	8.5	0.1	-	9.4	0.3	-	16.3
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.8	0	-	-	0.2	-	-	0.1

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	25	834	0	0	486	16	0	0	0	20	0	30
Future Vol, veh/h	25	834	0	0	486	16	0	0	0	20	0	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Free	-	-	None	-	-	Free
Storage Length	60	-	-	-	-	98	-	-	-	-	-	25
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	26	878	0	0	512	17	0	0	0	21	0	32

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	512	0	0	878	0	0	1442	1442	878	1442	1442	-
Stage 1	-	-	-	-	-	-	930	930	-	512	512	-
Stage 2	-	-	-	-	-	-	512	512	-	930	930	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	-
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	-
Pot Cap-1 Maneuver	1064	-	-	778	-	0	111	134	350	111	134	0
Stage 1	-	-	-	-	-	0	323	349	-	548	540	0
Stage 2	-	-	-	-	-	0	548	540	-	323	349	0
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	1064	-	-	778	-	-	109	131	350	109	131	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	109	131	-	226	246	-
Stage 1	-	-	-	-	-	-	315	341	-	535	540	-
Stage 2	-	-	-	-	-	-	548	540	-	315	341	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0	0	22.6
HCM LOS			A	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	1064	-	-	778	-	226	-
HCM Lane V/C Ratio	-	0.025	-	-	-	-	0.093	-
HCM Control Delay (s)	0	8.5	-	-	0	-	22.6	0
HCM Lane LOS	A	A	-	-	A	-	C	A
HCM 95th %tile Q(veh)	-	0.1	-	-	0	-	0.3	-

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	36	787	4	21	466	41	14	2	34	45	0	27
Future Vol, veh/h	36	787	4	21	466	41	14	2	34	45	0	27
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	145	-	-	225	58	-	-	95	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	38	828	4	22	491	43	15	2	36	47	0	28

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	534	0	0	832	0	0	1475	1482	828	1460	1443	491
Stage 1	-	-	-	-	-	-	904	904	-	535	535	-
Stage 2	-	-	-	-	-	-	571	578	-	925	908	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1044	-	-	809	-	-	106	126	374	108	133	582
Stage 1	-	-	-	-	-	-	334	358	-	533	527	-
Stage 2	-	-	-	-	-	-	509	504	-	325	357	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1044	-	-	809	-	-	93	113	374	89	119	582
Mov Cap-2 Maneuver	-	-	-	-	-	-	205	224	-	187	226	-
Stage 1	-	-	-	-	-	-	311	334	-	497	506	-
Stage 2	-	-	-	-	-	-	465	484	-	272	333	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.4	18.3	23.5
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	205	361	1044	-	-	809	-	-	187	582
HCM Lane V/C Ratio	0.072	0.105	0.036	-	-	0.027	-	-	0.253	0.049
HCM Control Delay (s)	23.9	16.1	8.6	0	-	9.6	0	-	30.7	11.5
HCM Lane LOS	C	C	A	A	-	A	A	-	D	B
HCM 95th %tile Q(veh)	0.2	0.3	0.1	-	-	0.1	-	-	1	0.2

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	88	781	462	49	41	72
Future Vol, veh/h	88	781	462	49	41	72
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	135	-	-	110	110	0
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	93	822	486	52	43	76

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	538	0	-	0	1494	486
Stage 1	-	-	-	-	486	-
Stage 2	-	-	-	-	1008	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1040	-	-	-	137	585
Stage 1	-	-	-	-	623	-
Stage 2	-	-	-	-	356	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1040	-	-	-	125	585
Mov Cap-2 Maneuver	-	-	-	-	210	-
Stage 1	-	-	-	-	568	-
Stage 2	-	-	-	-	356	-

Approach	EB	WB	SB
HCM Control Delay, s	0.9	0	17.3
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1040	-	-	-	210	585
HCM Lane V/C Ratio	0.089	-	-	-	0.206	0.13
HCM Control Delay (s)	8.8	-	-	-	26.5	12.1
HCM Lane LOS	A	-	-	-	D	B
HCM 95th %tile Q(veh)	0.3	-	-	-	0.7	0.4

APPENDIX B-4

YEAR 2030 FUTURE PRE-PROJECT CONDITIONS

Intersection	
Int Delay, s/veh	17.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	62	887	4	33	559	145	0	0	3	116	0	80
Future Vol, veh/h	62	887	4	33	559	145	0	0	3	116	0	80
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	110	-	-	105	-	75	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	65	934	4	35	588	153	0	0	3	122	0	84

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	741	0	0	938	0	0	-	-	469	1255	1726	294
Stage 1	-	-	-	-	-	-	-	-	-	658	658	-
Stage 2	-	-	-	-	-	-	-	-	-	597	1068	-
Critical Hdwy	4.1	-	-	4.1	-	-	-	-	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	-	-	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	875	-	-	739	-	-	0	0	546	130	90	708
Stage 1	-	-	-	-	-	-	0	0	-	424	464	-
Stage 2	-	-	-	-	-	-	0	0	-	461	301	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	875	-	-	739	-	-	-	-	546	~ 118	79	708
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	~ 118	79	-
Stage 1	-	-	-	-	-	-	-	-	-	393	442	-
Stage 2	-	-	-	-	-	-	-	-	-	424	279	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.5	11.6	167.2
HCM LOS			B	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	546	875	-	-	739	-	-	179
HCM Lane V/C Ratio	0.006	0.075	-	-	0.047	-	-	1.153
HCM Control Delay (s)	11.6	9.4	-	-	10.1	-	-	167.2
HCM Lane LOS	B	A	-	-	B	-	-	F
HCM 95th %tile Q(veh)	0	0.2	-	-	0.1	-	-	10.7

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	452	18	23	1092	9	92	0	41	0	0	0
Future Vol, veh/h	5	452	18	23	1092	9	92	0	41	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	101	-	-	198	-	45	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	5	476	19	24	1149	9	97	0	43	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1158	0	0	495	0	0	1119	1702	248	1445	1702	575
Stage 1	-	-	-	-	-	-	496	496	-	1197	1197	-
Stage 2	-	-	-	-	-	-	623	1206	-	248	505	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.5	6.5	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	611	-	-	1079	-	-	164	93	758	94	93	466
Stage 1	-	-	-	-	-	-	529	549	-	200	261	-
Stage 2	-	-	-	-	-	-	445	259	-	740	544	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	611	-	-	1079	-	-	160	90	758	87	90	466
Mov Cap-2 Maneuver	-	-	-	-	-	-	160	90	-	87	90	-
Stage 1	-	-	-	-	-	-	525	545	-	198	255	-
Stage 2	-	-	-	-	-	-	435	253	-	692	540	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.2	50.4	0
HCM LOS			F	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	211	611	-	-	1079	-	-	-
HCM Lane V/C Ratio	0.664	0.009	-	-	0.022	-	-	-
HCM Control Delay (s)	50.4	10.9	-	-	8.4	-	-	0
HCM Lane LOS	F	B	-	-	A	-	-	A
HCM 95th %tile Q(veh)	4.1	0	-	-	0.1	-	-	-

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	26	460	11	16	1145	2	20	0	9	3	0	6
Future Vol, veh/h	26	460	11	16	1145	2	20	0	9	3	0	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	105	-	-	199	-	215	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	27	484	12	17	1205	2	21	0	9	3	0	6

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1207	0	0	496	0	0	1181	1785	248	1535	1789	603
Stage 1	-	-	-	-	-	-	544	544	-	1239	1239	-
Stage 2	-	-	-	-	-	-	637	1241	-	296	550	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.5	6.5	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	585	-	-	1078	-	-	148	82	758	81	82	447
Stage 1	-	-	-	-	-	-	496	522	-	189	250	-
Stage 2	-	-	-	-	-	-	437	249	-	694	519	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	585	-	-	1078	-	-	139	77	758	76	77	447
Mov Cap-2 Maneuver	-	-	-	-	-	-	139	77	-	76	77	-
Stage 1	-	-	-	-	-	-	473	498	-	180	246	-
Stage 2	-	-	-	-	-	-	424	245	-	654	495	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.1	28.1	27.4
HCM LOS			D	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	186	585	-	-	1078	-	-	170
HCM Lane V/C Ratio	0.164	0.047	-	-	0.016	-	-	0.056
HCM Control Delay (s)	28.1	11.5	-	-	8.4	-	-	27.4
HCM Lane LOS	D	B	-	-	A	-	-	D
HCM 95th %tile Q(veh)	0.6	0.1	-	-	0	-	-	0.2

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	17	442	2	1	1124	16	0	0	0	12	0	26
Future Vol, veh/h	17	442	2	1	1124	16	0	0	0	12	0	26
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Free	-	-	None	-	-	Free
Storage Length	60	-	-	64	-	98	-	-	-	-	-	25
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	18	465	2	1	1183	17	0	0	0	13	0	27

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1183	0	0	467	0	0	1687	1687	466	1687	1688	-
Stage 1	-	-	-	-	-	-	502	502	-	1185	1185	-
Stage 2	-	-	-	-	-	-	1185	1185	-	502	503	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	-
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	-
Pot Cap-1 Maneuver	597	-	-	1105	-	0	75	95	601	75	95	0
Stage 1	-	-	-	-	-	0	555	545	-	233	265	0
Stage 2	-	-	-	-	-	0	233	265	-	555	545	0
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	597	-	-	1105	-	-	73	92	601	73	92	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	73	92	-	73	92	-
Stage 1	-	-	-	-	-	-	538	529	-	226	265	-
Stage 2	-	-	-	-	-	-	233	265	-	538	529	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0	0	64.4
HCM LOS			A	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	597	-	-	1105	-	73	-
HCM Lane V/C Ratio	-	0.03	-	-	0.001	-	0.173	-
HCM Control Delay (s)	0	11.2	-	-	8.3	-	64.4	0
HCM Lane LOS	A	B	-	-	A	-	F	A
HCM 95th %tile Q(veh)	-	0.1	-	-	0	-	0.6	-

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	6	443	1135	13	17	9
Future Vol, veh/h	6	443	1135	13	17	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	45	-	-	58	0	38
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	6	466	1195	14	18	9

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1209	0	-	0	1673	1195
Stage 1	-	-	-	-	1195	-
Stage 2	-	-	-	-	478	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	584	-	-	-	106	229
Stage 1	-	-	-	-	290	-
Stage 2	-	-	-	-	628	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	584	-	-	-	105	229
Mov Cap-2 Maneuver	-	-	-	-	105	-
Stage 1	-	-	-	-	287	-
Stage 2	-	-	-	-	628	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	37.6
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	584	-	-	-	105	229
HCM Lane V/C Ratio	0.011	-	-	-	0.17	0.041
HCM Control Delay (s)	11.2	-	-	-	46.2	21.4
HCM Lane LOS	B	-	-	-	E	C
HCM 95th %tile Q(veh)	0	-	-	-	0.6	0.1

Intersection	
Int Delay, s/veh	5.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	12	496	4	26	1049	43	6	0	15	49	1	26
Future Vol, veh/h	12	496	4	26	1049	43	6	0	15	49	1	26
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	145	-	145	215	-	225	58	-	-	95	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	13	522	4	27	1104	45	6	0	16	52	1	27

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1149	0	0	526	0	0	1743	1751	522	1716	1710	1104
Stage 1	-	-	-	-	-	-	548	548	-	1158	1158	-
Stage 2	-	-	-	-	-	-	1195	1203	-	558	552	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	615	-	-	1051	-	-	69	87	559	72	92	259
Stage 1	-	-	-	-	-	-	524	520	-	241	273	-
Stage 2	-	-	-	-	-	-	230	260	-	518	518	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	615	-	-	1051	-	-	59	83	559	67	88	259
Mov Cap-2 Maneuver	-	-	-	-	-	-	59	83	-	67	88	-
Stage 1	-	-	-	-	-	-	513	509	-	236	266	-
Stage 2	-	-	-	-	-	-	200	253	-	493	507	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.2	29.2	106.3
HCM LOS			D	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	59	559	615	-	-	1051	-	-	67	242
HCM Lane V/C Ratio	0.107	0.028	0.021	-	-	0.026	-	-	0.77	0.117
HCM Control Delay (s)	73.2	11.6	11	-	-	8.5	-	-	152.9	21.8
HCM Lane LOS	F	B	B	-	-	A	-	-	F	C
HCM 95th %tile Q(veh)	0.3	0.1	0.1	-	-	0.1	-	-	3.5	0.4

Intersection	
Int Delay, s/veh	5.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	114	464	961	77	33	164
Future Vol, veh/h	114	464	961	77	33	164
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	135	-	-	110	110	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	120	488	1012	81	35	173

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1093	0	-	0	1740	1012
Stage 1	-	-	-	-	1012	-
Stage 2	-	-	-	-	728	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	646	-	-	-	97	293
Stage 1	-	-	-	-	354	-
Stage 2	-	-	-	-	482	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	646	-	-	-	79	293
Mov Cap-2 Maneuver	-	-	-	-	79	-
Stage 1	-	-	-	-	288	-
Stage 2	-	-	-	-	482	-

Approach	EB		WB		SB	
HCM Control Delay, s	2.3		0		41.7	
HCM LOS					E	

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	646	-	-	-	79	293
HCM Lane V/C Ratio	0.186	-	-	-	0.44	0.589
HCM Control Delay (s)	11.8	-	-	-	82.3	33.5
HCM Lane LOS	B	-	-	-	F	D
HCM 95th %tile Q(veh)	0.7	-	-	-	1.8	3.5

Intersection	
Int Delay, s/veh	33.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	48	853	2	27	902	115	0	0	11	103	1	63
Future Vol, veh/h	48	853	2	27	902	115	0	0	11	103	1	63
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	110	-	-	105	-	75	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	51	898	2	28	949	121	0	0	12	108	1	66

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1070	0	0	900	0	0	-	-	450	1556	2007	475
Stage 1	-	-	-	-	-	-	-	-	-	1005	1005	-
Stage 2	-	-	-	-	-	-	-	-	-	551	1002	-
Critical Hdwy	4.1	-	-	4.1	-	-	-	-	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	-	-	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	659	-	-	763	-	-	0	0	562	~ 78	60	541
Stage 1	-	-	-	-	-	-	0	0	-	263	322	-
Stage 2	-	-	-	-	-	-	0	0	-	491	323	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	659	-	-	763	-	-	-	-	562	~ 70	53	541
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	~ 70	53	-
Stage 1	-	-	-	-	-	-	-	-	-	243	310	-
Stage 2	-	-	-	-	-	-	-	-	-	444	298	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.3	11.5	$ 419.5
HCM LOS			B	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	562	659	-	-	763	-	-	104
HCM Lane V/C Ratio	0.021	0.077	-	-	0.037	-	-	1.69
HCM Control Delay (s)	11.5	10.9	-	-	9.9	-	-	$ 419.5
HCM Lane LOS	B	B	-	-	A	-	-	F
HCM 95th %tile Q(veh)	0.1	0.2	-	-	0.1	-	-	13.8

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	6.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	11	1056	57	37	587	4	54	0	28	5	0	1
Future Vol, veh/h	11	1056	57	37	587	4	54	0	28	5	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	101	-	-	198	-	45	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	12	1112	60	39	618	4	57	0	29	5	0	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	622	0	0	1172	0	0	1553	1866	586	1276	1892	309
Stage 1	-	-	-	-	-	-	1166	1166	-	696	696	-
Stage 2	-	-	-	-	-	-	387	700	-	580	1196	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.5	6.5	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	969	-	-	603	-	-	78	73	459	126	71	693
Stage 1	-	-	-	-	-	-	209	270	-	403	446	-
Stage 2	-	-	-	-	-	-	614	444	-	472	262	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	969	-	-	603	-	-	73	67	459	111	66	693
Mov Cap-2 Maneuver	-	-	-	-	-	-	73	67	-	111	66	-
Stage 1	-	-	-	-	-	-	206	267	-	398	417	-
Stage 2	-	-	-	-	-	-	573	415	-	436	259	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.7	126.7	34.3
HCM LOS			F	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	102	969	-	-	603	-	-	129
HCM Lane V/C Ratio	0.846	0.012	-	-	0.065	-	-	0.049
HCM Control Delay (s)	126.7	8.8	-	-	11.4	-	-	34.3
HCM Lane LOS	F	A	-	-	B	-	-	D
HCM 95th %tile Q(veh)	4.8	0	-	-	0.2	-	-	0.2

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	13	1046	23	4	609	8	10	0	3	4	0	9
Future Vol, veh/h	13	1046	23	4	609	8	10	0	3	4	0	9
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	105	-	-	199	-	215	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	14	1101	24	4	641	8	11	0	3	4	0	9

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	649	0	0	1125	0	0	1470	1798	563	1228	1802	321
Stage 1	-	-	-	-	-	-	1141	1141	-	649	649	-
Stage 2	-	-	-	-	-	-	329	657	-	579	1153	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.5	6.5	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	947	-	-	628	-	-	90	81	475	136	80	681
Stage 1	-	-	-	-	-	-	217	278	-	430	469	-
Stage 2	-	-	-	-	-	-	664	465	-	473	274	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	947	-	-	628	-	-	87	79	475	133	78	681
Mov Cap-2 Maneuver	-	-	-	-	-	-	87	79	-	133	78	-
Stage 1	-	-	-	-	-	-	214	274	-	424	466	-
Stage 2	-	-	-	-	-	-	651	462	-	463	270	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.1	43.5	17.6
HCM LOS			E	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	107	947	-	-	628	-	-	300
HCM Lane V/C Ratio	0.128	0.014	-	-	0.007	-	-	0.046
HCM Control Delay (s)	43.5	8.9	-	-	10.8	-	-	17.6
HCM Lane LOS	E	A	-	-	B	-	-	C
HCM 95th %tile Q(veh)	0.4	0	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	41	1006	0	0	583	16	0	0	0	16	0	26
Future Vol, veh/h	41	1006	0	0	583	16	0	0	0	16	0	26
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Free	-	-	None	-	-	Free
Storage Length	60	-	-	64	-	98	-	-	-	-	-	25
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	43	1059	0	0	614	17	0	0	0	17	0	27

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	614	0	0	1059	0	0	1759	1759	1059	1759	1759	-
Stage 1	-	-	-	-	-	-	1145	1145	-	614	614	-
Stage 2	-	-	-	-	-	-	614	614	-	1145	1145	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	-
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	-
Pot Cap-1 Maneuver	975	-	-	665	-	0	67	86	275	67	86	0
Stage 1	-	-	-	-	-	0	245	277	-	483	486	0
Stage 2	-	-	-	-	-	0	483	486	-	245	277	0
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	975	-	-	665	-	-	65	82	275	65	82	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	65	82	-	65	82	-
Stage 1	-	-	-	-	-	-	234	265	-	462	486	-
Stage 2	-	-	-	-	-	-	483	486	-	234	265	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0	0	78.7
HCM LOS			A	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	975	-	-	665	-	65	-
HCM Lane V/C Ratio	-	0.044	-	-	-	-	0.259	-
HCM Control Delay (s)	0	8.9	-	-	0	-	78.7	0
HCM Lane LOS	A	A	-	-	A	-	F	A
HCM 95th %tile Q(veh)	-	0.1	-	-	0	-	0.9	-

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	9	1018	593	15	15	3
Future Vol, veh/h	9	1018	593	15	15	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	45	-	-	58	0	38
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	9	1072	624	16	16	3

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	640	0	-	0	1714	624
Stage 1	-	-	-	-	624	-
Stage 2	-	-	-	-	1090	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	954	-	-	-	100	489
Stage 1	-	-	-	-	538	-
Stage 2	-	-	-	-	325	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	954	-	-	-	99	489
Mov Cap-2 Maneuver	-	-	-	-	99	-
Stage 1	-	-	-	-	533	-
Stage 2	-	-	-	-	325	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	42.2
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	954	-	-	-	99	489
HCM Lane V/C Ratio	0.01	-	-	-	0.159	0.006
HCM Control Delay (s)	8.8	-	-	-	48.1	12.4
HCM Lane LOS	A	-	-	-	E	B
HCM 95th %tile Q(veh)	0	-	-	-	0.5	0

Intersection	
Int Delay, s/veh	9.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	56	983	11	19	608	53	13	0	40	48	1	19
Future Vol, veh/h	56	983	11	19	608	53	13	0	40	48	1	19
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	145	-	145	215	-	225	58	-	-	95	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	59	1035	12	20	640	56	14	0	42	51	1	20

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	696	0	0	1047	0	0	1872	1889	1035	1860	1845	640
Stage 1	-	-	-	-	-	-	1153	1153	-	680	680	-
Stage 2	-	-	-	-	-	-	719	736	-	1180	1165	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	909	-	-	672	-	-	56	71	284	57	76	479
Stage 1	-	-	-	-	-	-	242	274	-	444	454	-
Stage 2	-	-	-	-	-	-	423	428	-	234	271	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	909	-	-	672	-	-	49	64	284	~ 45	69	479
Mov Cap-2 Maneuver	-	-	-	-	-	-	49	64	-	~ 45	69	-
Stage 1	-	-	-	-	-	-	226	256	-	415	440	-
Stage 2	-	-	-	-	-	-	392	415	-	186	253	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0.3	40.7	227.3
HCM LOS			E	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	49	284	909	-	-	672	-	-	45	369
HCM Lane V/C Ratio	0.279	0.148	0.065	-	-	0.03	-	-	1.123	0.057
HCM Control Delay (s)	104.8	19.9	9.2	-	-	10.5	-	-	$ 315.6	15.3
HCM Lane LOS	F	C	A	-	-	B	-	-	F	C
HCM 95th %tile Q(veh)	1	0.5	0.2	-	-	0.1	-	-	4.7	0.2

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	9.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↑	↑	↱	↰	↱
Traffic Vol, veh/h	176	890	554	50	60	116
Future Vol, veh/h	176	890	554	50	60	116
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	135	-	-	110	110	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	185	937	583	53	63	122

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	636	0	-	0	1890	583
Stage 1	-	-	-	-	583	-
Stage 2	-	-	-	-	1307	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	957	-	-	-	78	516
Stage 1	-	-	-	-	562	-
Stage 2	-	-	-	-	256	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	957	-	-	-	~ 63	516
Mov Cap-2 Maneuver	-	-	-	-	~ 63	-
Stage 1	-	-	-	-	454	-
Stage 2	-	-	-	-	256	-

Approach	EB		WB		SB
HCM Control Delay, s	1.6		0		85.4
HCM LOS					F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	957	-	-	-	63	516
HCM Lane V/C Ratio	0.194	-	-	-	1.003	0.237
HCM Control Delay (s)	9.7	-	-	-	223.3	14.1
HCM Lane LOS	A	-	-	-	F	B
HCM 95th %tile Q(veh)	0.7	-	-	-	4.9	0.9

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	5.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	50	631	4	8	745	77	0	0	10	80	0	23
Future Vol, veh/h	50	631	4	8	745	77	0	0	10	80	0	23
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	110	-	-	105	-	75	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	53	664	4	8	784	81	0	0	11	84	0	24

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	865	0	0	668	0	0	-	-	334	1238	1574	392
Stage 1	-	-	-	-	-	-	-	-	-	800	800	-
Stage 2	-	-	-	-	-	-	-	-	-	438	774	-
Critical Hdwy	4.1	-	-	4.1	-	-	-	-	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	-	-	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	787	-	-	931	-	-	0	0	668	134	111	613
Stage 1	-	-	-	-	-	-	0	0	-	349	400	-
Stage 2	-	-	-	-	-	-	0	0	-	573	411	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	787	-	-	931	-	-	-	-	668	124	103	613
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	124	103	-
Stage 1	-	-	-	-	-	-	-	-	-	326	396	-
Stage 2	-	-	-	-	-	-	-	-	-	526	383	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	0.1	10.5	73.7
HCM LOS			B	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	668	787	-	-	931	-	-	151
HCM Lane V/C Ratio	0.016	0.067	-	-	0.009	-	-	0.718
HCM Control Delay (s)	10.5	9.9	-	-	8.9	-	-	73.7
HCM Lane LOS	B	A	-	-	A	-	-	F
HCM 95th %tile Q(veh)	0	0.2	-	-	0	-	-	4.2

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	14	765	60	43	584	1	50	0	23	8	1	2
Future Vol, veh/h	14	765	60	43	584	1	50	0	23	8	1	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	101	-	-	198	-	45	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	15	805	63	45	615	1	53	0	24	8	1	2

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	616	0	0	868	0	0	1265	1573	434	1138	1603	308
Stage 1	-	-	-	-	-	-	867	867	-	705	705	-
Stage 2	-	-	-	-	-	-	398	706	-	433	898	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.5	6.5	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	974	-	-	785	-	-	128	111	576	159	107	694
Stage 1	-	-	-	-	-	-	318	373	-	398	442	-
Stage 2	-	-	-	-	-	-	605	442	-	577	361	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	974	-	-	785	-	-	120	103	576	144	99	694
Mov Cap-2 Maneuver	-	-	-	-	-	-	120	103	-	144	99	-
Stage 1	-	-	-	-	-	-	313	367	-	392	417	-
Stage 2	-	-	-	-	-	-	567	417	-	544	356	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.7	46.7	29.2
HCM LOS			E	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	160	974	-	-	785	-	-	160
HCM Lane V/C Ratio	0.48	0.015	-	-	0.058	-	-	0.072
HCM Control Delay (s)	46.7	8.8	-	-	9.9	-	-	29.2
HCM Lane LOS	E	A	-	-	A	-	-	D
HCM 95th %tile Q(veh)	2.3	0	-	-	0.2	-	-	0.2

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	952	15	13	575	5	11	0	4	4	0	3
Future Vol, veh/h	10	952	15	13	575	5	11	0	4	4	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	105	-	-	199	-	215	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	11	1002	16	14	605	5	12	0	4	4	0	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	610	0	0	1018	0	0	1363	1670	509	1156	1673	303
Stage 1	-	-	-	-	-	-	1032	1032	-	633	633	-
Stage 2	-	-	-	-	-	-	331	638	-	523	1040	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.5	6.5	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	979	-	-	689	-	-	109	97	515	154	97	699
Stage 1	-	-	-	-	-	-	253	313	-	439	476	-
Stage 2	-	-	-	-	-	-	662	474	-	510	310	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	979	-	-	689	-	-	106	94	515	149	94	699
Mov Cap-2 Maneuver	-	-	-	-	-	-	106	94	-	149	94	-
Stage 1	-	-	-	-	-	-	250	310	-	434	466	-
Stage 2	-	-	-	-	-	-	646	465	-	500	307	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.2	35.4	21.5
HCM LOS			E	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	134	979	-	-	689	-	-	225
HCM Lane V/C Ratio	0.118	0.011	-	-	0.02	-	-	0.033
HCM Control Delay (s)	35.4	8.7	-	-	10.3	-	-	21.5
HCM Lane LOS	E	A	-	-	B	-	-	C
HCM 95th %tile Q(veh)	0.4	0	-	-	0.1	-	-	0.1

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	27	926	0	0	548	14	0	0	0	19	0	33
Future Vol, veh/h	27	926	0	0	548	14	0	0	0	19	0	33
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Free	-	-	None	-	-	Free
Storage Length	60	-	-	64	-	98	-	-	-	-	-	25
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	28	975	0	0	577	15	0	0	0	20	0	35

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	577	0	0	975	0	0	1608	1608	975	1608	1608	-
Stage 1	-	-	-	-	-	-	1031	1031	-	577	577	-
Stage 2	-	-	-	-	-	-	577	577	-	1031	1031	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	-
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	-
Pot Cap-1 Maneuver	1006	-	-	716	-	0	85	106	308	85	106	0
Stage 1	-	-	-	-	-	0	284	313	-	506	505	0
Stage 2	-	-	-	-	-	0	506	505	-	284	313	0
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	1006	-	-	716	-	-	83	103	308	83	103	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	83	103	-	83	103	-
Stage 1	-	-	-	-	-	-	276	304	-	492	505	-
Stage 2	-	-	-	-	-	-	506	505	-	276	304	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0	0	61.6
HCM LOS			A	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	1006	-	-	716	-	83	-
HCM Lane V/C Ratio	-	0.028	-	-	-	-	0.241	-
HCM Control Delay (s)	0	8.7	-	-	0	-	61.6	0
HCM Lane LOS	A	A	-	-	A	-	F	A
HCM 95th %tile Q(veh)	-	0.1	-	-	0	-	0.9	-

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	3	933	554	16	13	5
Future Vol, veh/h	3	933	554	16	13	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	45	-	-	58	0	38
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	3	982	583	17	14	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	600	0	-	0	1571	583
Stage 1	-	-	-	-	583	-
Stage 2	-	-	-	-	988	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	987	-	-	-	123	516
Stage 1	-	-	-	-	562	-
Stage 2	-	-	-	-	364	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	987	-	-	-	123	516
Mov Cap-2 Maneuver	-	-	-	-	123	-
Stage 1	-	-	-	-	560	-
Stage 2	-	-	-	-	364	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	30.7
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	987	-	-	-	123	516
HCM Lane V/C Ratio	0.003	-	-	-	0.111	0.01
HCM Control Delay (s)	8.7	-	-	-	37.9	12
HCM Lane LOS	A	-	-	-	E	B
HCM 95th %tile Q(veh)	0	-	-	-	0.4	0

Intersection	
Int Delay, s/veh	5.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	39	879	4	23	521	44	15	2	37	48	0	29
Future Vol, veh/h	39	879	4	23	521	44	15	2	37	48	0	29
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	145	-	145	215	-	225	58	-	-	95	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	41	925	4	24	548	46	16	2	39	51	0	31

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	594	0	0	929	0	0	1642	1649	925	1626	1607	548
Stage 1	-	-	-	-	-	-	1007	1007	-	596	596	-
Stage 2	-	-	-	-	-	-	635	642	-	1030	1011	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	992	-	-	744	-	-	81	100	329	83	106	540
Stage 1	-	-	-	-	-	-	293	321	-	494	495	-
Stage 2	-	-	-	-	-	-	470	472	-	284	320	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	992	-	-	744	-	-	72	93	329	68	98	540
Mov Cap-2 Maneuver	-	-	-	-	-	-	72	93	-	68	98	-
Stage 1	-	-	-	-	-	-	281	308	-	474	479	-
Stage 2	-	-	-	-	-	-	429	457	-	238	307	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.4	33	95.1
HCM LOS			D	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	72	291	992	-	-	744	-	-	68	540
HCM Lane V/C Ratio	0.219	0.141	0.041	-	-	0.033	-	-	0.743	0.057
HCM Control Delay (s)	68.5	19.4	8.8	-	-	10	-	-	145.2	12.1
HCM Lane LOS	F	C	A	-	-	B	-	-	F	B
HCM 95th %tile Q(veh)	0.8	0.5	0.1	-	-	0.1	-	-	3.4	0.2

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	93	872	521	53	44	75
Future Vol, veh/h	93	872	521	53	44	75
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	135	-	-	110	110	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	98	918	548	56	46	79

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	604	0	-	0	1662	548
Stage 1	-	-	-	-	548	-
Stage 2	-	-	-	-	1114	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	984	-	-	-	108	540
Stage 1	-	-	-	-	583	-
Stage 2	-	-	-	-	317	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	984	-	-	-	97	540
Mov Cap-2 Maneuver	-	-	-	-	97	-
Stage 1	-	-	-	-	525	-
Stage 2	-	-	-	-	317	-

Approach	EB	WB	SB
HCM Control Delay, s	0.9	0	34.8
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	984	-	-	-	97	540
HCM Lane V/C Ratio	0.099	-	-	-	0.477	0.146
HCM Control Delay (s)	9.1	-	-	-	72.2	12.8
HCM Lane LOS	A	-	-	-	F	B
HCM 95th %tile Q(veh)	0.3	-	-	-	2.1	0.5

APPENDIX B-5

YEAR 2030 FUTURE WITH PROJECT CONDITIONS

Intersection	
Int Delay, s/veh	18.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	62	893	4	33	561	145	0	0	3	116	0	80
Future Vol, veh/h	62	893	4	33	561	145	0	0	3	116	0	80
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	110	-	-	105	-	75	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	65	940	4	35	591	153	0	0	3	122	0	84

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	744	0	0	944	0	0	-	-	472	1261	1735	296
Stage 1	-	-	-	-	-	-	-	-	-	661	661	-
Stage 2	-	-	-	-	-	-	-	-	-	600	1074	-
Critical Hdwy	4.1	-	-	4.1	-	-	-	-	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	-	-	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	873	-	-	735	-	-	0	0	544	129	89	706
Stage 1	-	-	-	-	-	-	0	0	-	423	463	-
Stage 2	-	-	-	-	-	-	0	0	-	459	299	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	873	-	-	735	-	-	-	-	544	~ 117	78	706
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	~ 117	78	-
Stage 1	-	-	-	-	-	-	-	-	-	392	441	-
Stage 2	-	-	-	-	-	-	-	-	-	422	277	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.5	11.7	172.4
HCM LOS			B	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	544	873	-	-	735	-	-	177
HCM Lane V/C Ratio	0.006	0.075	-	-	0.047	-	-	1.166
HCM Control Delay (s)	11.7	9.5	-	-	10.1	-	-	172.4
HCM Lane LOS	B	A	-	-	B	-	-	F
HCM 95th %tile Q(veh)	0	0.2	-	-	0.1	-	-	10.8

Notes

~: Volume exceeds capacity $: Delay exceeds 300s   +: Computation Not Defined   *: All major volume in platoon

Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	456	18	23	1103	9	92	0	41	0	0	0
Future Vol, veh/h	5	456	18	23	1103	9	92	0	41	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	101	-	-	198	-	45	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	5	480	19	24	1161	9	97	0	43	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1170	0	0	499	0	0	1129	1718	250	1459	1718	581
Stage 1	-	-	-	-	-	-	500	500	-	1209	1209	-
Stage 2	-	-	-	-	-	-	629	1218	-	250	509	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.5	6.5	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	604	-	-	1075	-	-	161	91	756	92	91	462
Stage 1	-	-	-	-	-	-	527	546	-	197	258	-
Stage 2	-	-	-	-	-	-	442	255	-	738	541	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	604	-	-	1075	-	-	157	88	756	85	88	462
Mov Cap-2 Maneuver	-	-	-	-	-	-	157	88	-	85	88	-
Stage 1	-	-	-	-	-	-	523	542	-	195	252	-
Stage 2	-	-	-	-	-	-	432	249	-	690	537	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.2	52	0
HCM LOS			F	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	208	604	-	-	1075	-	-	-
HCM Lane V/C Ratio	0.673	0.009	-	-	0.023	-	-	-
HCM Control Delay (s)	52	11	-	-	8.4	-	-	0
HCM Lane LOS	F	B	-	-	A	-	-	A
HCM 95th %tile Q(veh)	4.2	0	-	-	0.1	-	-	-

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	26	464	11	16	1156	2	20	0	9	3	0	6
Future Vol, veh/h	26	464	11	16	1156	2	20	0	9	3	0	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	105	-	-	199	-	215	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	27	488	12	17	1217	2	21	0	9	3	0	6

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1219	0	0	500	0	0	1191	1801	250	1549	1805	609
Stage 1	-	-	-	-	-	-	548	548	-	1251	1251	-
Stage 2	-	-	-	-	-	-	643	1253	-	298	554	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.5	6.5	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	579	-	-	1075	-	-	145	81	756	79	80	443
Stage 1	-	-	-	-	-	-	493	520	-	186	246	-
Stage 2	-	-	-	-	-	-	433	246	-	692	517	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	579	-	-	1075	-	-	136	76	756	74	75	443
Mov Cap-2 Maneuver	-	-	-	-	-	-	136	76	-	74	75	-
Stage 1	-	-	-	-	-	-	470	496	-	177	242	-
Stage 2	-	-	-	-	-	-	420	242	-	651	493	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.1	28.7	28
HCM LOS			D	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	182	579	-	-	1075	-	-	166
HCM Lane V/C Ratio	0.168	0.047	-	-	0.016	-	-	0.057
HCM Control Delay (s)	28.7	11.5	-	-	8.4	-	-	28
HCM Lane LOS	D	B	-	-	A	-	-	D
HCM 95th %tile Q(veh)	0.6	0.1	-	-	0	-	-	0.2

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	19	444	2	1	1130	17	0	0	0	16	0	32
Future Vol, veh/h	19	444	2	1	1130	17	0	0	0	16	0	32
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Free	-	-	None	-	-	Free
Storage Length	60	-	-	64	-	98	-	-	-	-	-	25
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	20	467	2	1	1189	18	0	0	0	17	0	34

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1189	0	0	469	0	0	1699	1699	468	1699	1700	-
Stage 1	-	-	-	-	-	-	508	508	-	1191	1191	-
Stage 2	-	-	-	-	-	-	1191	1191	-	508	509	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	-
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	-
Pot Cap-1 Maneuver	594	-	-	1103	-	0	74	93	599	74	93	0
Stage 1	-	-	-	-	-	0	551	542	-	231	263	0
Stage 2	-	-	-	-	-	0	231	263	-	551	541	0
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	594	-	-	1103	-	-	72	90	599	72	90	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	72	90	-	72	90	-
Stage 1	-	-	-	-	-	-	532	524	-	223	263	-
Stage 2	-	-	-	-	-	-	231	263	-	532	523	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0	0	69.6
HCM LOS			A	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	594	-	-	1103	-	72	-
HCM Lane V/C Ratio	-	0.034	-	-	0.001	-	0.234	-
HCM Control Delay (s)	0	11.3	-	-	8.3	-	69.6	0
HCM Lane LOS	A	B	-	-	A	-	F	A
HCM 95th %tile Q(veh)	-	0.1	-	-	0	-	0.8	-

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	8	447	1136	14	19	15
Future Vol, veh/h	8	447	1136	14	19	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	45	-	-	58	0	38
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	8	471	1196	15	20	16

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1211	0	-	0	1683	1196
Stage 1	-	-	-	-	1196	-
Stage 2	-	-	-	-	487	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	583	-	-	-	105	229
Stage 1	-	-	-	-	289	-
Stage 2	-	-	-	-	622	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	583	-	-	-	104	229
Mov Cap-2 Maneuver	-	-	-	-	104	-
Stage 1	-	-	-	-	285	-
Stage 2	-	-	-	-	622	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	36.3
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	583	-	-	-	104	229
HCM Lane V/C Ratio	0.014	-	-	-	0.192	0.069
HCM Control Delay (s)	11.3	-	-	-	47.7	21.9
HCM Lane LOS	B	-	-	-	E	C
HCM 95th %tile Q(veh)	0	-	-	-	0.7	0.2

Intersection	
Int Delay, s/veh	5.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	12	502	4	26	1051	43	6	0	15	49	1	26
Future Vol, veh/h	12	502	4	26	1051	43	6	0	15	49	1	26
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	145	-	145	215	-	225	58	-	-	95	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	13	528	4	27	1106	45	6	0	16	52	1	27

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1151	0	0	532	0	0	1751	1759	528	1724	1718	1106
Stage 1	-	-	-	-	-	-	554	554	-	1160	1160	-
Stage 2	-	-	-	-	-	-	1197	1205	-	564	558	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	614	-	-	1046	-	-	68	86	554	71	91	258
Stage 1	-	-	-	-	-	-	520	517	-	240	272	-
Stage 2	-	-	-	-	-	-	229	259	-	514	515	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	614	-	-	1046	-	-	58	82	554	67	87	258
Mov Cap-2 Maneuver	-	-	-	-	-	-	58	82	-	67	87	-
Stage 1	-	-	-	-	-	-	509	506	-	235	265	-
Stage 2	-	-	-	-	-	-	199	252	-	489	504	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.2	29.6	106.4
HCM LOS			D	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	58	554	614	-	-	1046	-	-	67	240
HCM Lane V/C Ratio	0.109	0.029	0.021	-	-	0.026	-	-	0.77	0.118
HCM Control Delay (s)	74.5	11.7	11	-	-	8.5	-	-	152.9	22
HCM Lane LOS	F	B	B	-	-	A	-	-	F	C
HCM 95th %tile Q(veh)	0.3	0.1	0.1	-	-	0.1	-	-	3.5	0.4

Intersection	
Int Delay, s/veh	5.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	116	468	963	77	33	165
Future Vol, veh/h	116	468	963	77	33	165
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	135	-	-	110	110	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	122	493	1014	81	35	174

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1095	0	-	0	1751	1014
Stage 1	-	-	-	-	1014	-
Stage 2	-	-	-	-	737	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	645	-	-	-	95	292
Stage 1	-	-	-	-	353	-
Stage 2	-	-	-	-	477	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	645	-	-	-	77	292
Mov Cap-2 Maneuver	-	-	-	-	77	-
Stage 1	-	-	-	-	286	-
Stage 2	-	-	-	-	477	-

Approach	EB		WB		SB	
HCM Control Delay, s	2.4		0		42.5	
HCM LOS					E	

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	645	-	-	-	77	292
HCM Lane V/C Ratio	0.189	-	-	-	0.451	0.595
HCM Control Delay (s)	11.9	-	-	-	85.6	33.9
HCM Lane LOS	B	-	-	-	F	D
HCM 95th %tile Q(veh)	0.7	-	-	-	1.8	3.6

Intersection												
Int Delay, s/veh	33.9											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	48	857	2	27	909	115	0	0	11	103	1	63
Future Vol, veh/h	48	857	2	27	909	115	0	0	11	103	1	63
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	110	-	-	105	-	75	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	51	902	2	28	957	121	0	0	12	108	1	66

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1078	0	0	904	0	0	-	-	452	1566	2019	479
Stage 1	-	-	-	-	-	-	-	-	-	1013	1013	-
Stage 2	-	-	-	-	-	-	-	-	-	553	1006	-
Critical Hdwy	4.1	-	-	4.1	-	-	-	-	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	-	-	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	655	-	-	761	-	-	0	0	560	~ 77	59	538
Stage 1	-	-	-	-	-	-	0	0	-	260	319	-
Stage 2	-	-	-	-	-	-	0	0	-	490	321	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	655	-	-	761	-	-	-	-	560	~ 69	52	538
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	~ 69	52	-
Stage 1	-	-	-	-	-	-	-	-	-	240	307	-
Stage 2	-	-	-	-	-	-	-	-	-	443	296	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	0.3	11.6	$ 427.3
HCM LOS			B	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	560	655	-	-	761	-	-	103
HCM Lane V/C Ratio	0.021	0.077	-	-	0.037	-	-	1.707
HCM Control Delay (s)	11.6	11	-	-	9.9	-	-	$ 427.3
HCM Lane LOS	B	B	-	-	A	-	-	F
HCM 95th %tile Q(veh)	0.1	0.2	-	-	0.1	-	-	13.9

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	6.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	11	1069	57	37	594	4	54	0	28	5	0	1
Future Vol, veh/h	11	1069	57	37	594	4	54	0	28	5	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	101	-	-	198	-	45	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	12	1125	60	39	625	4	57	0	29	5	0	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	629	0	0	1185	0	0	1570	1886	593	1290	1912	313
Stage 1	-	-	-	-	-	-	1179	1179	-	703	703	-
Stage 2	-	-	-	-	-	-	391	707	-	587	1209	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.5	6.5	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	963	-	-	596	-	-	76	71	454	123	69	689
Stage 1	-	-	-	-	-	-	206	267	-	399	443	-
Stage 2	-	-	-	-	-	-	610	441	-	468	258	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	963	-	-	596	-	-	71	66	454	108	64	689
Mov Cap-2 Maneuver	-	-	-	-	-	-	71	66	-	108	64	-
Stage 1	-	-	-	-	-	-	204	264	-	394	414	-
Stage 2	-	-	-	-	-	-	569	412	-	432	255	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.7	132.4	35.1
HCM LOS			F	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	100	963	-	-	596	-	-	126
HCM Lane V/C Ratio	0.863	0.012	-	-	0.065	-	-	0.05
HCM Control Delay (s)	132.4	8.8	-	-	11.5	-	-	35.1
HCM Lane LOS	F	A	-	-	B	-	-	E
HCM 95th %tile Q(veh)	4.9	0	-	-	0.2	-	-	0.2

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	13	1059	23	4	616	8	10	0	3	4	0	9
Future Vol, veh/h	13	1059	23	4	616	8	10	0	3	4	0	9
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	105	-	-	199	-	215	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	14	1115	24	4	648	8	11	0	3	4	0	9

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	656	0	0	1139	0	0	1487	1819	570	1242	1823	324
Stage 1	-	-	-	-	-	-	1155	1155	-	656	656	-
Stage 2	-	-	-	-	-	-	332	664	-	586	1167	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.5	6.5	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	941	-	-	621	-	-	88	79	470	133	78	678
Stage 1	-	-	-	-	-	-	213	274	-	426	465	-
Stage 2	-	-	-	-	-	-	661	461	-	468	270	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	941	-	-	621	-	-	85	77	470	130	76	678
Mov Cap-2 Maneuver	-	-	-	-	-	-	85	77	-	130	76	-
Stage 1	-	-	-	-	-	-	210	270	-	420	462	-
Stage 2	-	-	-	-	-	-	648	458	-	458	266	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.1	44.4	17.8
HCM LOS			E	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	105	941	-	-	621	-	-	295
HCM Lane V/C Ratio	0.13	0.015	-	-	0.007	-	-	0.046
HCM Control Delay (s)	44.4	8.9	-	-	10.8	-	-	17.8
HCM Lane LOS	E	A	-	-	B	-	-	C
HCM 95th %tile Q(veh)	0.4	0	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	48	1013	0	0	587	21	0	0	0	19	0	30
Future Vol, veh/h	48	1013	0	0	587	21	0	0	0	19	0	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Free	-	-	None	-	-	Free
Storage Length	60	-	-	64	-	98	-	-	-	-	-	25
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	51	1066	0	0	618	22	0	0	0	20	0	32

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	618	0	0	1066	0	0	1786	1786	1066	1786	1786	-
Stage 1	-	-	-	-	-	-	1168	1168	-	618	618	-
Stage 2	-	-	-	-	-	-	618	618	-	1168	1168	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	-
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	-
Pot Cap-1 Maneuver	972	-	-	661	-	0	64	82	273	64	82	0
Stage 1	-	-	-	-	-	0	238	270	-	480	484	0
Stage 2	-	-	-	-	-	0	480	484	-	238	270	0
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	972	-	-	661	-	-	61	78	273	61	78	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	61	78	-	61	78	-
Stage 1	-	-	-	-	-	-	226	256	-	455	484	-
Stage 2	-	-	-	-	-	-	480	484	-	226	256	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0	0	90.5
HCM LOS			A	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	972	-	-	661	-	61	-
HCM Lane V/C Ratio	-	0.052	-	-	-	-	0.328	-
HCM Control Delay (s)	0	8.9	-	-	0	-	90.5	0
HCM Lane LOS	A	A	-	-	A	-	F	A
HCM 95th %tile Q(veh)	-	0.2	-	-	0	-	1.2	-

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	16	1021	598	17	16	7
Future Vol, veh/h	16	1021	598	17	16	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	45	-	-	58	0	38
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	17	1075	629	18	17	7

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	647	0	-	0	1738	629
Stage 1	-	-	-	-	629	-
Stage 2	-	-	-	-	1109	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	948	-	-	-	97	486
Stage 1	-	-	-	-	535	-
Stage 2	-	-	-	-	318	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	948	-	-	-	95	486
Mov Cap-2 Maneuver	-	-	-	-	95	-
Stage 1	-	-	-	-	525	-
Stage 2	-	-	-	-	318	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	39.2
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	948	-	-	-	95	486
HCM Lane V/C Ratio	0.018	-	-	-	0.177	0.015
HCM Control Delay (s)	8.9	-	-	-	50.9	12.5
HCM Lane LOS	A	-	-	-	F	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.6	0

Intersection	
Int Delay, s/veh	10.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	56	987	11	19	615	53	13	0	40	48	1	19
Future Vol, veh/h	56	987	11	19	615	53	13	0	40	48	1	19
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	145	-	145	215	-	225	58	-	-	95	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	59	1039	12	20	647	56	14	0	42	51	1	20

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	703	0	0	1051	0	0	1883	1900	1039	1871	1856	647
Stage 1	-	-	-	-	-	-	1157	1157	-	687	687	-
Stage 2	-	-	-	-	-	-	726	743	-	1184	1169	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	904	-	-	670	-	-	55	70	283	56	75	475
Stage 1	-	-	-	-	-	-	241	273	-	440	450	-
Stage 2	-	-	-	-	-	-	419	425	-	233	269	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	904	-	-	670	-	-	48	63	283	~ 44	68	475
Mov Cap-2 Maneuver	-	-	-	-	-	-	48	63	-	~ 44	68	-
Stage 1	-	-	-	-	-	-	225	255	-	411	437	-
Stage 2	-	-	-	-	-	-	388	412	-	185	252	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0.3	41.4	236.4
HCM LOS			E	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	48	283	904	-	-	670	-	-	44	366
HCM Lane V/C Ratio	0.285	0.149	0.065	-	-	0.03	-	-	1.148	0.058
HCM Control Delay (s)	107.5	19.9	9.3	-	-	10.5	-	-	$ 328.5	15.4
HCM Lane LOS	F	C	A	-	-	B	-	-	F	C
HCM 95th %tile Q(veh)	1	0.5	0.2	-	-	0.1	-	-	4.8	0.2

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	9.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	177	893	559	50	60	118
Future Vol, veh/h	177	893	559	50	60	118
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	135	-	-	110	110	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	186	940	588	53	63	124

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	641	0	-	0	1900	588
Stage 1	-	-	-	-	588	-
Stage 2	-	-	-	-	1312	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	953	-	-	-	77	513
Stage 1	-	-	-	-	559	-
Stage 2	-	-	-	-	254	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	953	-	-	-	~ 62	513
Mov Cap-2 Maneuver	-	-	-	-	~ 62	-
Stage 1	-	-	-	-	450	-
Stage 2	-	-	-	-	254	-

Approach	EB	WB	SB
HCM Control Delay, s	1.6	0	87.1
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	953	-	-	-	62	513
HCM Lane V/C Ratio	0.196	-	-	-	1.019	0.242
HCM Control Delay (s)	9.7	-	-	-	230.5	14.2
HCM Lane LOS	A	-	-	-	F	B
HCM 95th %tile Q(veh)	0.7	-	-	-	4.9	0.9

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	5.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	50	635	4	8	752	77	0	0	10	80	0	23
Future Vol, veh/h	50	635	4	8	752	77	0	0	10	80	0	23
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	110	-	-	105	-	75	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	53	668	4	8	792	81	0	0	11	84	0	24

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	873	0	0	672	0	0	-	-	336	1248	1586	396
Stage 1	-	-	-	-	-	-	-	-	-	808	808	-
Stage 2	-	-	-	-	-	-	-	-	-	440	778	-
Critical Hdwy	4.1	-	-	4.1	-	-	-	-	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	-	-	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	781	-	-	928	-	-	0	0	666	132	109	609
Stage 1	-	-	-	-	-	-	0	0	-	345	397	-
Stage 2	-	-	-	-	-	-	0	0	-	571	410	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	781	-	-	928	-	-	-	-	666	122	101	609
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	122	101	-
Stage 1	-	-	-	-	-	-	-	-	-	322	393	-
Stage 2	-	-	-	-	-	-	-	-	-	524	382	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	0.1	10.5	75.9
HCM LOS			B	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	666	781	-	-	928	-	-	149
HCM Lane V/C Ratio	0.016	0.067	-	-	0.009	-	-	0.728
HCM Control Delay (s)	10.5	9.9	-	-	8.9	-	-	75.9
HCM Lane LOS	B	A	-	-	A	-	-	F
HCM 95th %tile Q(veh)	0	0.2	-	-	0	-	-	4.3

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	14	778	60	43	591	1	50	0	23	8	1	2
Future Vol, veh/h	14	778	60	43	591	1	50	0	23	8	1	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	101	-	-	198	-	45	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	15	819	63	45	622	1	53	0	24	8	1	2

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	623	0	0	882	0	0	1283	1594	441	1152	1624	311
Stage 1	-	-	-	-	-	-	881	881	-	712	712	-
Stage 2	-	-	-	-	-	-	402	713	-	440	912	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.5	6.5	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	968	-	-	775	-	-	124	108	570	155	104	691
Stage 1	-	-	-	-	-	-	312	367	-	394	439	-
Stage 2	-	-	-	-	-	-	601	438	-	571	355	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	968	-	-	775	-	-	116	100	570	140	97	691
Mov Cap-2 Maneuver	-	-	-	-	-	-	116	100	-	140	97	-
Stage 1	-	-	-	-	-	-	307	361	-	388	414	-
Stage 2	-	-	-	-	-	-	563	413	-	538	350	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.7	49.1	29.9
HCM LOS			E	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	155	968	-	-	775	-	-	156
HCM Lane V/C Ratio	0.496	0.015	-	-	0.058	-	-	0.074
HCM Control Delay (s)	49.1	8.8	-	-	9.9	-	-	29.9
HCM Lane LOS	E	A	-	-	A	-	-	D
HCM 95th %tile Q(veh)	2.4	0	-	-	0.2	-	-	0.2

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	965	15	13	582	5	11	0	4	4	0	3
Future Vol, veh/h	10	965	15	13	582	5	11	0	4	4	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	105	-	-	199	-	215	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	11	1016	16	14	613	5	12	0	4	4	0	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	618	0	0	1032	0	0	1381	1692	516	1171	1695	307
Stage 1	-	-	-	-	-	-	1046	1046	-	641	641	-
Stage 2	-	-	-	-	-	-	335	646	-	530	1054	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.5	6.5	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	972	-	-	681	-	-	105	94	509	150	94	695
Stage 1	-	-	-	-	-	-	248	308	-	434	473	-
Stage 2	-	-	-	-	-	-	658	470	-	506	305	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	972	-	-	681	-	-	102	91	509	145	91	695
Mov Cap-2 Maneuver	-	-	-	-	-	-	102	91	-	145	91	-
Stage 1	-	-	-	-	-	-	245	305	-	429	463	-
Stage 2	-	-	-	-	-	-	642	460	-	496	302	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.2	36.5	22
HCM LOS			E	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	130	972	-	-	681	-	-	219
HCM Lane V/C Ratio	0.121	0.011	-	-	0.02	-	-	0.034
HCM Control Delay (s)	36.5	8.7	-	-	10.4	-	-	22
HCM Lane LOS	E	A	-	-	B	-	-	C
HCM 95th %tile Q(veh)	0.4	0	-	-	0.1	-	-	0.1

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	34	933	0	0	552	19	0	0	0	22	0	37
Future Vol, veh/h	34	933	0	0	552	19	0	0	0	22	0	37
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Free	-	-	None	-	-	Free
Storage Length	60	-	-	64	-	98	-	-	-	-	-	25
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	36	982	0	0	581	20	0	0	0	23	0	39

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	581	0	0	982	0	0	1635	1635	982	1635	1635	-
Stage 1	-	-	-	-	-	-	1054	1054	-	581	581	-
Stage 2	-	-	-	-	-	-	581	581	-	1054	1054	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	-
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	-
Pot Cap-1 Maneuver	1003	-	-	711	-	0	82	102	305	82	102	0
Stage 1	-	-	-	-	-	0	276	305	-	503	503	0
Stage 2	-	-	-	-	-	0	503	503	-	276	305	0
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	1003	-	-	711	-	-	80	98	305	80	98	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	80	98	-	80	98	-
Stage 1	-	-	-	-	-	-	266	294	-	485	503	-
Stage 2	-	-	-	-	-	-	503	503	-	266	294	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0	0	67.4
HCM LOS			A	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	1003	-	-	711	-	80	-
HCM Lane V/C Ratio	-	0.036	-	-	-	-	0.289	-
HCM Control Delay (s)	0	8.7	-	-	0	-	67.4	0
HCM Lane LOS	A	A	-	-	A	-	F	A
HCM 95th %tile Q(veh)	-	0.1	-	-	0	-	1.1	-

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	10	936	559	18	14	9
Future Vol, veh/h	10	936	559	18	14	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	45	-	-	58	0	38
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	11	985	588	19	15	9

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	607	0	-	0	1595	588
Stage 1	-	-	-	-	588	-
Stage 2	-	-	-	-	1007	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	981	-	-	-	119	513
Stage 1	-	-	-	-	559	-
Stage 2	-	-	-	-	356	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	981	-	-	-	118	513
Mov Cap-2 Maneuver	-	-	-	-	118	-
Stage 1	-	-	-	-	553	-
Stage 2	-	-	-	-	356	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	29
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	981	-	-	-	118	513
HCM Lane V/C Ratio	0.011	-	-	-	0.125	0.018
HCM Control Delay (s)	8.7	-	-	-	39.8	12.2
HCM Lane LOS	A	-	-	-	E	B
HCM 95th %tile Q(veh)	0	-	-	-	0.4	0.1

Intersection	
Int Delay, s/veh	6.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	39	883	4	23	528	44	15	2	37	48	0	29
Future Vol, veh/h	39	883	4	23	528	44	15	2	37	48	0	29
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	145	-	145	215	-	225	58	-	-	95	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	41	929	4	24	556	46	16	2	39	51	0	31

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	602	0	0	933	0	0	1654	1661	929	1638	1619	556
Stage 1	-	-	-	-	-	-	1011	1011	-	604	604	-
Stage 2	-	-	-	-	-	-	643	650	-	1034	1015	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	985	-	-	742	-	-	79	98	327	81	104	534
Stage 1	-	-	-	-	-	-	291	320	-	489	491	-
Stage 2	-	-	-	-	-	-	465	468	-	283	318	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	985	-	-	742	-	-	70	91	327	66	96	534
Mov Cap-2 Maneuver	-	-	-	-	-	-	70	91	-	66	96	-
Stage 1	-	-	-	-	-	-	279	307	-	468	475	-
Stage 2	-	-	-	-	-	-	424	453	-	237	305	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.4	33.8	100.4
HCM LOS			D	F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	70	289	985	-	-	742	-	-	66	534
HCM Lane V/C Ratio	0.226	0.142	0.042	-	-	0.033	-	-	0.766	0.057
HCM Control Delay (s)	70.8	19.5	8.8	-	-	10	-	-	153.7	12.2
HCM Lane LOS	F	C	A	-	-	B	-	-	F	B
HCM 95th %tile Q(veh)	0.8	0.5	0.1	-	-	0.1	-	-	3.5	0.2

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	94	875	526	53	44	77
Future Vol, veh/h	94	875	526	53	44	77
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	135	-	-	110	110	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	99	921	554	56	46	81

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	610	0	-	0	1673	554
Stage 1	-	-	-	-	554	-
Stage 2	-	-	-	-	1119	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	979	-	-	-	106	536
Stage 1	-	-	-	-	580	-
Stage 2	-	-	-	-	315	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	979	-	-	-	95	536
Mov Cap-2 Maneuver	-	-	-	-	95	-
Stage 1	-	-	-	-	521	-
Stage 2	-	-	-	-	315	-

Approach	EB	WB	SB
HCM Control Delay, s	0.9	0	35.3
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	979	-	-	-	95	536
HCM Lane V/C Ratio	0.101	-	-	-	0.488	0.151
HCM Control Delay (s)	9.1	-	-	-	74.6	12.9
HCM Lane LOS	A	-	-	-	F	B
HCM 95th %tile Q(veh)	0.3	-	-	-	2.1	0.5

APPENDIX B-6

YEAR 2030 FUTURE WITH PROJECT WITH MITIGATION CONDITIONS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	62	893	4	33	561	145	0	0	3	116	0	80
Future Volume (veh/h)	62	893	4	33	561	145	0	0	3	116	0	80
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	65	940	4	35	591	153	0	0	3	122	0	84
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	570	2679	11	462	2623	1170	0	0	252	198	6	97
Arrive On Green	0.73	0.73	0.73	0.73	0.73	0.73	0.00	0.00	0.16	0.16	0.00	0.16
Sat Flow, veh/h	728	3686	16	603	3610	1610	0	0	1610	859	36	616
Grp Volume(v), veh/h	65	460	484	35	591	153	0	0	3	206	0	0
Grp Sat Flow(s),veh/h/ln	728	1805	1897	603	1805	1610	0	0	1610	1512	0	0
Q Serve(g_s), s	2.9	8.4	8.4	2.0	4.8	2.6	0.0	0.0	0.1	11.5	0.0	0.0
Cycle Q Clear(g_c), s	7.7	8.4	8.4	10.5	4.8	2.6	0.0	0.0	0.1	12.0	0.0	0.0
Prop In Lane	1.00		0.01	1.00		1.00	0.00		1.00	0.59		0.41
Lane Grp Cap(c), veh/h	570	1311	1378	462	2623	1170	0	0	252	301	0	0
V/C Ratio(X)	0.11	0.35	0.35	0.08	0.23	0.13	0.00	0.00	0.01	0.69	0.00	0.00
Avail Cap(c_a), veh/h	570	1311	1378	462	2623	1170	0	0	519	549	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	5.3	4.5	4.5	6.4	4.0	3.7	0.0	0.0	32.1	37.0	0.0	0.0
Incr Delay (d2), s/veh	0.4	0.7	0.7	0.3	0.2	0.2	0.0	0.0	0.0	1.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.7	4.1	4.3	0.4	2.2	1.1	0.0	0.0	0.1	7.9	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	5.7	5.3	5.2	6.8	4.2	3.9	0.0	0.0	32.1	38.0	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	A	A	C	D	A	A
Approach Vol, veh/h		1009			779			3			206	
Approach Delay, s/veh		5.3			4.3			32.1			38.0	
Approach LOS		A			A			C			D	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		71.4		18.6		71.4		18.6				
Change Period (Y+Rc), s		6.0		4.5		6.0		4.5				
Max Green Setting (Gmax), s		50.5		29.0		50.5		29.0				
Max Q Clear Time (g_c+I1), s		10.4		14.0		12.5		2.1				
Green Ext Time (p_c), s		0.8		0.2		0.7		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			8.3									
HCM 6th LOS			A									

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	456	18	23	1103	9	92	0	41	0	0	0
Future Vol, veh/h	5	456	18	23	1103	9	92	0	41	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	45	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	5	480	19	24	1161	9	97	0	43	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1170	0	0	499	0	0	1129	1718	250	1459	1718	581
Stage 1	-	-	-	-	-	-	500	500	-	1209	1209	-
Stage 2	-	-	-	-	-	-	629	1218	-	250	509	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.5	6.5	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	604	-	-	1075	-	-	161	91	756	92	91	462
Stage 1	-	-	-	-	-	-	527	546	-	197	258	-
Stage 2	-	-	-	-	-	-	442	255	-	738	541	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	604	-	-	1075	-	-	152	84	756	82	84	462
Mov Cap-2 Maneuver	-	-	-	-	-	-	277	180	-	161	182	-
Stage 1	-	-	-	-	-	-	521	540	-	195	241	-
Stage 2	-	-	-	-	-	-	414	239	-	688	535	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.5	22.5	0
HCM LOS			C	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	344	604	-	-	1075	-	-	-
HCM Lane V/C Ratio	0.407	0.009	-	-	0.023	-	-	-
HCM Control Delay (s)	22.5	11	0.1	-	8.4	0.3	-	0
HCM Lane LOS	C	B	A	-	A	A	-	A
HCM 95th %tile Q(veh)	1.9	0	-	-	0.1	-	-	-

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	19	444	2	1	1130	17	0	0	0	16	0	32
Future Vol, veh/h	19	444	2	1	1130	17	0	0	0	16	0	32
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Free	-	-	None	-	-	Free
Storage Length	60	-	-	-	-	98	-	-	-	-	-	25
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	20	467	2	1	1189	18	0	0	0	17	0	34

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1189	0	0	469	0	0	1699	1699	468	1699	1700	-
Stage 1	-	-	-	-	-	-	508	508	-	1191	1191	-
Stage 2	-	-	-	-	-	-	1191	1191	-	508	509	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	-
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	-
Pot Cap-1 Maneuver	594	-	-	1103	-	0	74	93	599	74	93	0
Stage 1	-	-	-	-	-	0	551	542	-	231	263	0
Stage 2	-	-	-	-	-	0	231	263	-	551	541	0
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	594	-	-	1103	-	-	72	90	599	72	90	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	72	90	-	169	194	-
Stage 1	-	-	-	-	-	-	532	524	-	223	262	-
Stage 2	-	-	-	-	-	-	230	262	-	532	523	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0	0	28.6
HCM LOS			A	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	594	-	-	1103	-	169	-
HCM Lane V/C Ratio	-	0.034	-	-	0.001	-	0.1	-
HCM Control Delay (s)	0	11.3	-	-	8.3	0	28.6	0
HCM Lane LOS	A	B	-	-	A	A	D	A
HCM 95th %tile Q(veh)	-	0.1	-	-	0	-	0.3	-

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	12	502	4	26	1051	43	6	0	15	49	1	26
Future Vol, veh/h	12	502	4	26	1051	43	6	0	15	49	1	26
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	145	-	-	225	58	-	-	95	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	13	528	4	27	1106	45	6	0	16	52	1	27

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1151	0	0	532	0	0	1751	1759	528	1724	1718	1106
Stage 1	-	-	-	-	-	-	554	554	-	1160	1160	-
Stage 2	-	-	-	-	-	-	1197	1205	-	564	558	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	614	-	-	1046	-	-	68	86	554	71	91	258
Stage 1	-	-	-	-	-	-	520	517	-	240	272	-
Stage 2	-	-	-	-	-	-	229	259	-	514	515	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	614	-	-	1046	-	-	56	77	554	64	82	258
Mov Cap-2 Maneuver	-	-	-	-	-	-	138	171	-	166	183	-
Stage 1	-	-	-	-	-	-	504	501	-	233	252	-
Stage 2	-	-	-	-	-	-	189	240	-	484	500	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.2	17.6	30.8
HCM LOS			C	D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	138	554	614	-	-	1046	-	-	166	254
HCM Lane V/C Ratio	0.046	0.029	0.021	-	-	0.026	-	-	0.311	0.112
HCM Control Delay (s)	32.3	11.7	11	0	-	8.5	0	-	36.2	21
HCM Lane LOS	D	B	B	A	-	A	A	-	E	C
HCM 95th %tile Q(veh)	0.1	0.1	0.1	-	-	0.1	-	-	1.2	0.4

Intersection	
Int Delay, s/veh	4.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	116	468	963	77	33	165
Future Vol, veh/h	116	468	963	77	33	165
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	135	-	-	110	110	0
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	122	493	1014	81	35	174

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1095	0	-	0	1751	1014
Stage 1	-	-	-	-	1014	-
Stage 2	-	-	-	-	737	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	645	-	-	-	95	292
Stage 1	-	-	-	-	353	-
Stage 2	-	-	-	-	477	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	645	-	-	-	77	292
Mov Cap-2 Maneuver	-	-	-	-	179	-
Stage 1	-	-	-	-	286	-
Stage 2	-	-	-	-	477	-

Approach	EB	WB	SB
HCM Control Delay, s	2.4	0	33.2
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	645	-	-	-	179	292
HCM Lane V/C Ratio	0.189	-	-	-	0.194	0.595
HCM Control Delay (s)	11.9	-	-	-	29.9	33.9
HCM Lane LOS	B	-	-	-	D	D
HCM 95th %tile Q(veh)	0.7	-	-	-	0.7	3.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	48	857	2	27	909	115	0	0	11	103	1	63
Future Volume (veh/h)	48	857	2	27	909	115	0	0	11	103	1	63
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	51	902	2	28	957	121	0	0	12	108	1	66
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	428	2755	6	496	2692	1201	0	0	222	185	7	77
Arrive On Green	0.75	0.75	0.75	0.75	0.75	0.75	0.00	0.00	0.14	0.14	0.14	0.14
Sat Flow, veh/h	532	3695	8	626	3610	1610	0	0	1610	877	52	562
Grp Volume(v), veh/h	51	441	463	28	957	121	0	0	12	175	0	0
Grp Sat Flow(s),veh/h/ln	532	1805	1899	626	1805	1610	0	0	1610	1491	0	0
Q Serve(g_s), s	3.3	7.4	7.4	1.4	8.3	1.9	0.0	0.0	0.6	9.7	0.0	0.0
Cycle Q Clear(g_c), s	11.6	7.4	7.4	8.8	8.3	1.9	0.0	0.0	0.6	10.3	0.0	0.0
Prop In Lane	1.00		0.00	1.00		1.00	0.00		1.00	0.62		0.38
Lane Grp Cap(c), veh/h	428	1346	1416	496	2692	1201	0	0	222	270	0	0
V/C Ratio(X)	0.12	0.33	0.33	0.06	0.36	0.10	0.00	0.00	0.05	0.65	0.00	0.00
Avail Cap(c_a), veh/h	428	1346	1416	496	2692	1201	0	0	519	545	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	6.0	3.9	3.9	5.3	4.0	3.1	0.0	0.0	33.7	37.9	0.0	0.0
Incr Delay (d2), s/veh	0.6	0.6	0.6	0.2	0.4	0.2	0.0	0.0	0.0	1.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.6	3.4	3.5	0.3	3.5	0.8	0.0	0.0	0.4	6.9	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	6.5	4.5	4.5	5.6	4.3	3.3	0.0	0.0	33.7	38.9	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	A	A	C	D	A	A
Approach Vol, veh/h		955			1106			12			175	
Approach Delay, s/veh		4.6			4.3			33.7			38.9	
Approach LOS		A			A			C			D	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		73.1		16.9		73.1		16.9				
Change Period (Y+Rc), s		6.0		4.5		6.0		4.5				
Max Green Setting (Gmax), s		50.5		29.0		50.5		29.0				
Max Q Clear Time (g_c+I1), s		13.6		12.3		10.8		2.6				
Green Ext Time (p_c), s		0.8		0.2		1.1		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			7.3									
HCM 6th LOS			A									

Intersection												
Int Delay, s/veh	2.2											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	11	1069	57	37	594	4	54	0	28	5	0	1
Future Vol, veh/h	11	1069	57	37	594	4	54	0	28	5	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	45	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	12	1125	60	39	625	4	57	0	29	5	0	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	629	0	0	1185	0	0	1570	1886	593	1290	1912	313
Stage 1	-	-	-	-	-	-	1179	1179	-	703	703	-
Stage 2	-	-	-	-	-	-	391	707	-	587	1209	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.5	6.5	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	963	-	-	596	-	-	76	71	454	123	69	689
Stage 1	-	-	-	-	-	-	206	267	-	399	443	-
Stage 2	-	-	-	-	-	-	610	441	-	468	258	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	963	-	-	596	-	-	68	61	454	103	60	689
Mov Cap-2 Maneuver	-	-	-	-	-	-	155	167	-	222	149	-
Stage 1	-	-	-	-	-	-	198	257	-	384	398	-
Stage 2	-	-	-	-	-	-	548	396	-	421	248	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	1.1	36	19.8
HCM LOS			E	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	200	963	-	-	596	-	-	250
HCM Lane V/C Ratio	0.432	0.012	-	-	0.065	-	-	0.025
HCM Control Delay (s)	36	8.8	0.2	-	11.5	0.5	-	19.8
HCM Lane LOS	E	A	A	-	B	A	-	C
HCM 95th %tile Q(veh)	2	0	-	-	0.2	-	-	0.1

Intersection												
Int Delay, s/veh	0.6											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	48	1013	0	0	587	21	0	0	0	19	0	30
Future Vol, veh/h	48	1013	0	0	587	21	0	0	0	19	0	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Free	-	-	None	-	-	Free
Storage Length	60	-	-	-	-	98	-	-	-	-	-	25
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	51	1066	0	0	618	22	0	0	0	20	0	32

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	618	0	0	1066	0	0	1786	1786	1066	1786	1786	-
Stage 1	-	-	-	-	-	-	1168	1168	-	618	618	-
Stage 2	-	-	-	-	-	-	618	618	-	1168	1168	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	-
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	-
Pot Cap-1 Maneuver	972	-	-	661	-	0	64	82	273	64	82	0
Stage 1	-	-	-	-	-	0	238	270	-	480	484	0
Stage 2	-	-	-	-	-	0	480	484	-	238	270	0
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	972	-	-	661	-	-	61	78	273	61	78	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	61	78	-	162	184	-
Stage 1	-	-	-	-	-	-	226	256	-	455	484	-
Stage 2	-	-	-	-	-	-	480	484	-	226	256	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0	0	30.3
HCM LOS			A	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	972	-	-	661	-	162	-
HCM Lane V/C Ratio	-	0.052	-	-	-	-	0.123	-
HCM Control Delay (s)	0	8.9	-	-	0	-	30.3	0
HCM Lane LOS	A	A	-	-	A	-	D	A
HCM 95th %tile Q(veh)	-	0.2	-	-	0	-	0.4	-

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	56	987	11	19	615	53	13	0	40	48	1	19
Future Vol, veh/h	56	987	11	19	615	53	13	0	40	48	1	19
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	145	-	-	225	58	-	-	95	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	59	1039	12	20	647	56	14	0	42	51	1	20

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	703	0	0	1051	0	0	1883	1900	1039	1871	1856	647
Stage 1	-	-	-	-	-	-	1157	1157	-	687	687	-
Stage 2	-	-	-	-	-	-	726	743	-	1184	1169	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	904	-	-	670	-	-	55	70	283	56	75	475
Stage 1	-	-	-	-	-	-	241	273	-	440	450	-
Stage 2	-	-	-	-	-	-	419	425	-	233	269	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	904	-	-	670	-	-	44	56	283	~ 40	60	475
Mov Cap-2 Maneuver	-	-	-	-	-	-	133	150	-	110	151	-
Stage 1	-	-	-	-	-	-	203	230	-	371	428	-
Stage 2	-	-	-	-	-	-	381	404	-	167	227	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0.3	23.6	48.5
HCM LOS			C	E

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	133	283	904	-	-	670	-	-	110	429
HCM Lane V/C Ratio	0.103	0.149	0.065	-	-	0.03	-	-	0.459	0.049
HCM Control Delay (s)	35.1	19.9	9.3	0	-	10.5	0	-	62.9	13.8
HCM Lane LOS	E	C	A	A	-	B	A	-	F	B
HCM 95th %tile Q(veh)	0.3	0.5	0.2	-	-	0.1	-	-	2	0.2

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	9.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	177	893	559	50	60	118
Future Vol, veh/h	177	893	559	50	60	118
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	135	-	-	110	110	0
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	186	940	588	53	63	124

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	641	0	-	0	1900	588
Stage 1	-	-	-	-	588	-
Stage 2	-	-	-	-	1312	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	953	-	-	-	77	513
Stage 1	-	-	-	-	559	-
Stage 2	-	-	-	-	254	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	953	-	-	-	~ 62	513
Mov Cap-2 Maneuver	-	-	-	-	~ 62	-
Stage 1	-	-	-	-	450	-
Stage 2	-	-	-	-	254	-

Approach	EB	WB	SB
HCM Control Delay, s	1.6	0	87.1
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	953	-	-	-	62	513
HCM Lane V/C Ratio	0.196	-	-	-	1.019	0.242
HCM Control Delay (s)	9.7	-	-	-	230.5	14.2
HCM Lane LOS	A	-	-	-	F	B
HCM 95th %tile Q(veh)	0.7	-	-	-	4.9	0.9

Notes
~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	635	4	8	752	77	0	0	10	80	0	23
Future Volume (veh/h)	50	635	4	8	752	77	0	0	10	80	0	23
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	53	668	4	8	792	81	0	0	11	84	0	24
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	550	2901	17	657	2847	1270	0	0	153	172	3	30
Arrive On Green	0.79	0.79	0.79	0.79	0.79	0.79	0.00	0.00	0.09	0.09	0.00	0.09
Sat Flow, veh/h	645	3679	22	778	3610	1610	0	0	1610	1063	27	312
Grp Volume(v), veh/h	53	328	344	8	792	81	0	0	11	108	0	0
Grp Sat Flow(s),veh/h/ln	645	1805	1896	778	1805	1610	0	0	1610	1402	0	0
Q Serve(g_s), s	2.2	4.2	4.2	0.2	5.3	1.0	0.0	0.0	0.6	6.3	0.0	0.0
Cycle Q Clear(g_c), s	7.5	4.2	4.2	4.5	5.3	1.0	0.0	0.0	0.6	6.9	0.0	0.0
Prop In Lane	1.00		0.01	1.00		1.00	0.00		1.00	0.78		0.22
Lane Grp Cap(c), veh/h	550	1423	1495	657	2847	1270	0	0	153	204	0	0
V/C Ratio(X)	0.10	0.23	0.23	0.01	0.28	0.06	0.00	0.00	0.07	0.53	0.00	0.00
Avail Cap(c_a), veh/h	550	1423	1495	657	2847	1270	0	0	519	537	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	3.6	2.5	2.5	3.0	2.6	2.1	0.0	0.0	37.1	40.2	0.0	0.0
Incr Delay (d2), s/veh	0.3	0.4	0.4	0.0	0.2	0.1	0.0	0.0	0.1	0.8	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.4	1.5	1.6	0.1	1.7	0.3	0.0	0.0	0.4	4.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	3.9	2.8	2.8	3.1	2.8	2.2	0.0	0.0	37.2	40.9	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	A	A	D	D	A	A
Approach Vol, veh/h		725			881			11			108	
Approach Delay, s/veh		2.9			2.8			37.2			40.9	
Approach LOS		A			A			D			D	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		77.0		13.0		77.0		13.0				
Change Period (Y+Rc), s		6.0		4.5		6.0		4.5				
Max Green Setting (Gmax), s		50.5		29.0		50.5		29.0				
Max Q Clear Time (g_c+I1), s		9.5		8.9		7.3		2.6				
Green Ext Time (p_c), s		0.6		0.1		0.8		0.0				

Intersection Summary			
HCM 6th Ctrl Delay			5.4
HCM 6th LOS			A

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	14	778	60	43	591	1	50	0	23	8	1	2
Future Vol, veh/h	14	778	60	43	591	1	50	0	23	8	1	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	45	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	15	819	63	45	622	1	53	0	24	8	1	2

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	623	0	0	882	0	0	1283	1594	441	1152	1624	311
Stage 1	-	-	-	-	-	-	881	881	-	712	712	-
Stage 2	-	-	-	-	-	-	402	713	-	440	912	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.5	6.5	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	968	-	-	775	-	-	124	108	570	155	104	691
Stage 1	-	-	-	-	-	-	312	367	-	394	439	-
Stage 2	-	-	-	-	-	-	601	438	-	571	355	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	968	-	-	775	-	-	112	95	570	135	92	691
Mov Cap-2 Maneuver	-	-	-	-	-	-	221	212	-	255	197	-
Stage 1	-	-	-	-	-	-	302	356	-	382	400	-
Stage 2	-	-	-	-	-	-	544	399	-	530	344	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	1	23.2	18.4
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	274	968	-	-	775	-	-	280
HCM Lane V/C Ratio	0.28	0.015	-	-	0.058	-	-	0.041
HCM Control Delay (s)	23.2	8.8	0.1	-	9.9	0.4	-	18.4
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	1.1	0	-	-	0.2	-	-	0.1

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	34	933	0	0	552	19	0	0	0	22	0	37
Future Vol, veh/h	34	933	0	0	552	19	0	0	0	22	0	37
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Free	-	-	None	-	-	Free
Storage Length	60	-	-	-	-	98	-	-	-	-	-	25
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	36	982	0	0	581	20	0	0	0	23	0	39

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	581	0	0	982	0	0	1635	1635	982	1635	1635	-
Stage 1	-	-	-	-	-	-	1054	1054	-	581	581	-
Stage 2	-	-	-	-	-	-	581	581	-	1054	1054	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	-
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	-
Pot Cap-1 Maneuver	1003	-	-	711	-	0	82	102	305	82	102	0
Stage 1	-	-	-	-	-	0	276	305	-	503	503	0
Stage 2	-	-	-	-	-	0	503	503	-	276	305	0
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	1003	-	-	711	-	-	80	98	305	80	98	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	80	98	-	189	210	-
Stage 1	-	-	-	-	-	-	266	294	-	485	503	-
Stage 2	-	-	-	-	-	-	503	503	-	266	294	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0	0	26.7
HCM LOS			A	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	1003	-	-	711	-	189	-
HCM Lane V/C Ratio	-	0.036	-	-	-	-	0.123	-
HCM Control Delay (s)	0	8.7	-	-	0	-	26.7	0
HCM Lane LOS	A	A	-	-	A	-	D	A
HCM 95th %tile Q(veh)	-	0.1	-	-	0	-	0.4	-

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	39	883	4	23	528	44	15	2	37	48	0	29
Future Vol, veh/h	39	883	4	23	528	44	15	2	37	48	0	29
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	145	-	-	225	58	-	-	95	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	41	929	4	24	556	46	16	2	39	51	0	31

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	602	0	0	933	0	0	1654	1661	929	1638	1619	556
Stage 1	-	-	-	-	-	-	1011	1011	-	604	604	-
Stage 2	-	-	-	-	-	-	643	650	-	1034	1015	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	985	-	-	742	-	-	79	98	327	81	104	534
Stage 1	-	-	-	-	-	-	291	320	-	489	491	-
Stage 2	-	-	-	-	-	-	465	468	-	283	318	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	985	-	-	742	-	-	67	85	327	64	90	534
Mov Cap-2 Maneuver	-	-	-	-	-	-	172	192	-	151	192	-
Stage 1	-	-	-	-	-	-	266	292	-	446	467	-
Stage 2	-	-	-	-	-	-	417	445	-	226	290	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.4	20.9	29.8
HCM LOS			C	D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	172	316	985	-	-	742	-	-	151	534
HCM Lane V/C Ratio	0.092	0.13	0.042	-	-	0.033	-	-	0.335	0.057
HCM Control Delay (s)	28	18.1	8.8	0	-	10	0	-	40.4	12.2
HCM Lane LOS	D	C	A	A	-	B	A	-	E	B
HCM 95th %tile Q(veh)	0.3	0.4	0.1	-	-	0.1	-	-	1.4	0.2

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	94	875	526	53	44	77
Future Vol, veh/h	94	875	526	53	44	77
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	135	-	-	110	110	0
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	99	921	554	56	46	81

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	610	0	-	0	1673	554
Stage 1	-	-	-	-	554	-
Stage 2	-	-	-	-	1119	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	979	-	-	-	106	536
Stage 1	-	-	-	-	580	-
Stage 2	-	-	-	-	315	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	979	-	-	-	95	536
Mov Cap-2 Maneuver	-	-	-	-	173	-
Stage 1	-	-	-	-	521	-
Stage 2	-	-	-	-	315	-

Approach	EB	WB	SB
HCM Control Delay, s	0.9	0	20.3
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	979	-	-	-	173	536
HCM Lane V/C Ratio	0.101	-	-	-	0.268	0.151
HCM Control Delay (s)	9.1	-	-	-	33.2	12.9
HCM Lane LOS	A	-	-	-	D	B
HCM 95th %tile Q(veh)	0.3	-	-	-	1	0.5

Appendix H

Abalone Cove Sewer Capacity Report

Abalone Cove Sewer Capacity Report

The Abalone Cove Sewer System is defined as the area included in the City's Redevelopment Agency sewer system improvements constructed in 2000/2001, within the Abalone Cove HOA, as shown in **Exhibit 1**. Parcels adjacent to that sewer system collection area have not been included in this capacity evaluation.

The overall Abalone Cove sewer system includes 114 existing connections, and 66 future connections form currently vacant lots, for a total of 180 parcels. Sewer connections consist of conventional gravity laterals tributary to gravity mains, as well as individual grinder pumps with low pressure/small diameter force mains tributary to gravity mains.

As summarized in the Abalone Cove Sewer Needs Assessment, equivalent residential units (ERU) have an average dry weather flow (ADWF) generation of 260 gallons per day (gpd). To analyze peak wet weather flows (PWWF) for the parcels connected with gravity laterals, a peaking factor of 4.0 has been applied, for a PWWF of 1,040 gpd per ERU. This peaking factor accounts for the diurnal variation in flow, as well as inflow and infiltration into the gravity pipes.

The flows from parcels connected by grinder pumps do not have the same peaking factor; however, they are instead regulated by the pumping rate of the unit, which is 11 gallons per minute (gpm), or 15,840 gpd. The grinder pump vendor, E-One, has evaluated the simultaneous operations of individual grinder pumps within developments, and developed a statistical model to predict the expected number of pumps operating at the same time. This number of simultaneous pumps, each at 11 gpm, constitutes the PWWF from this type of subarea.

The Abalone Cove sewer system includes three lift stations to serve various low areas within the development. All flows are eventually conveyed by gravity to the Abalone Cove Lift Station located on Palos Verdes Drive, which pumps to a regional City lift station. The service areas are summarized in **Table 1**, and shown in **Exhibit 2**.

Table 1. Existing and Future Flow Estimates

SUBAREA	Grinder Pump*		Gravity		TOTALS	
	Parcels	PWWF (gpd)	Parcels	PWWF (gpd)	Parcels	PWWF (gpd)
UPPER SWEETBAY						
Existing	2	31,680	6	6,240	**8**	**37,920**
Future	2	15,840	2	2,080	**4**	**17,920**
SUBTOTAL	**4**	**47,520**	**8**	**8,320**	**12**	**55,840**
LOWER SWEETBAY						
Existing	-	-	9	9,360	**9**	**9,360**
Future	-	-	4	4,160	**4**	**4,160**
SUBTOTAL	**-**	**-**	**13**	**13,520**	**13**	**13,520**
THYME						
Existing	2	31,680	10	10,400	**12**	**42,080**
Future	2	31,680	1	1,040	**3**	**32,720**
SUBTOTAL	**4**	**63,360**	**11**	**11,440**	**15**	**74,800**
ABALONE COVE						
Existing	47	260	38	39,520	**85**	**39,780**
Future	2	260	53	55,120	**55**	**55,380**
SUBTOTAL	**49**	**520**	**91**	**94,640**	**140**	**95,160**
TOTAL EXISTING	**51**	**63,620**	**63**	**65,520**	**114**	**129,140**
TOTAL FUTURE	**6**	**47,780**	**60**	**62,400**	**66**	**110,180**
TOTAL ABALONE COVE	**57**	**111,400**	**123**	**127,920**	**180**	**239,320**

Gravity Main PWWF Per Parcel:	260	ADWF x	4.0	PF =	1,040	PWWF (gpd)
Grinder Pump PWWF Per Parcel:	11		gpm per pump =		15,840	PWWF (gpd)

* Simultaneous pumps per E-One Analysis

The capacities of the four lift stations have been estimated using the total dynamic head (TDH) reported at each, the shaft horsepower of the motors, and an assumed 65% pump efficiency, as summarized in **Table 2**.

Table 2. Abalone Cove Lift Station Capacities

LIFT STATION	HP	TDH (ft)	CAPACITY (One Pump, GPD)
Upper Sweetbay LS	7 ½	29	864,000
Lower Sweetbay LS	10	74	504,000
Thyme LS	7 ½	60	432,000
Abalone Cove LS	10	68	540,000

The capacities of the sewer system components relative to the projected flows are summarized in **Table 3**.

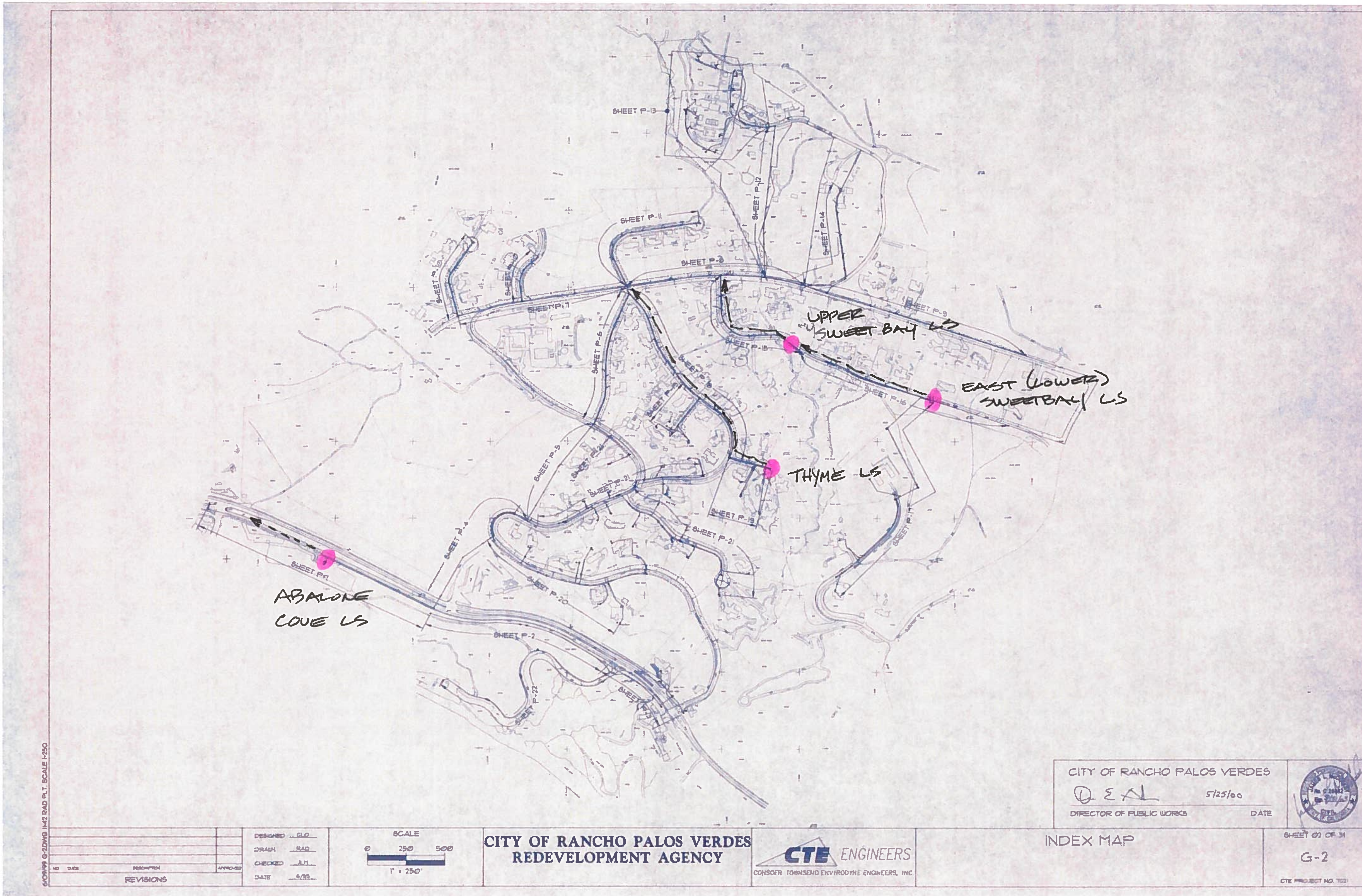
Table 3. Abalone Cove Sewer System Component Capacities

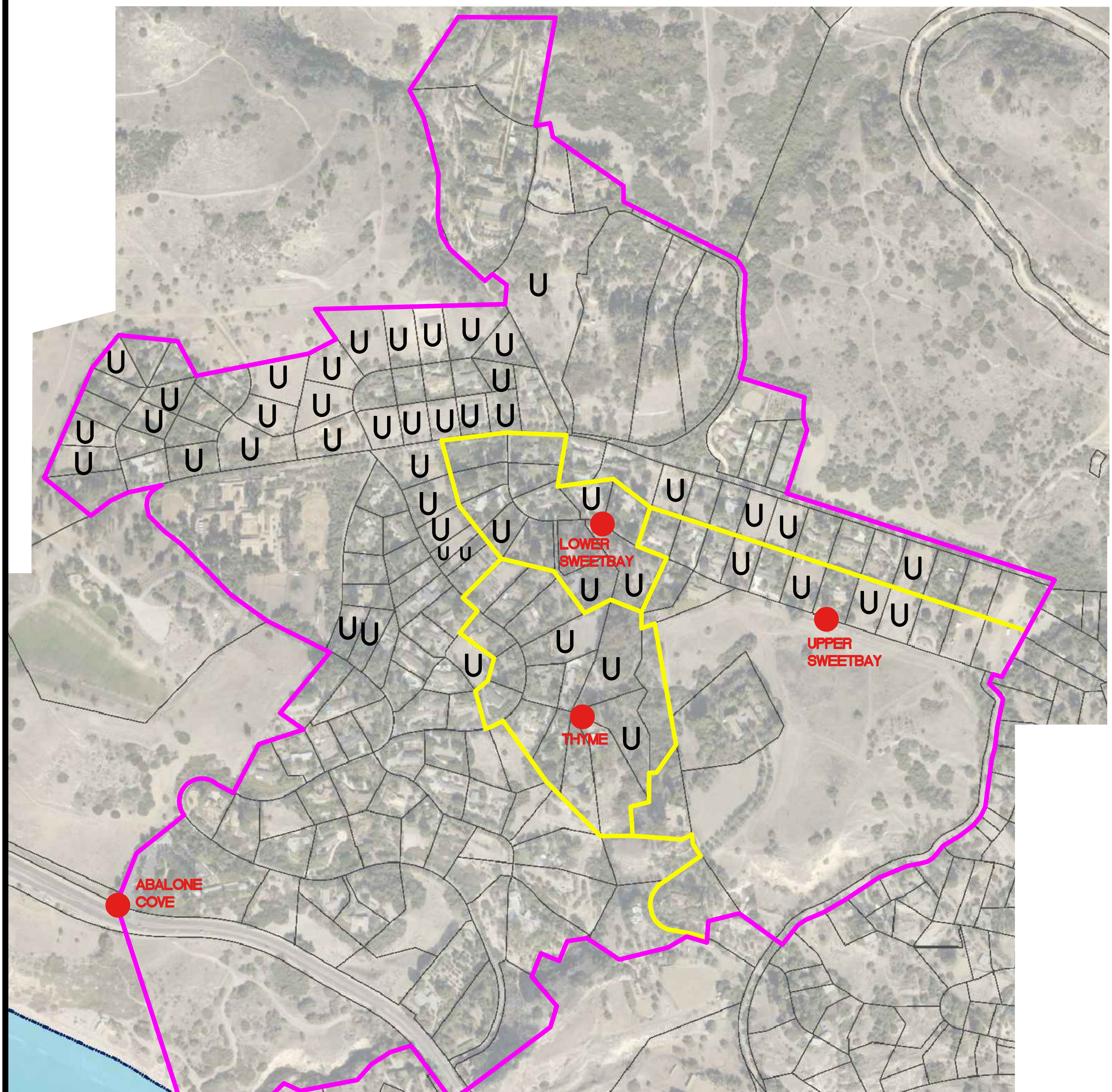
COMPONENT	CAPACITY (GPD)	PEAK FLOW (GPD)	ADEQUACY
Low Pressure FM: 1.5 to 3-in	31,680 to 158,400	31,680 to 158,400	Yes
Upper Sweetbay LS	864,000	55,840	Yes
Lower Sweetbay LS	504,000	13,520	Yes
Thyme LS	432,000	74,800	Yes
Abalone Cove LS	540,000	239,320	Yes
Gravity Sewers: 8-in	480,000 (at 0.5% slope)	239,320	Yes

The grinder pump/low pressure force main systems are evaluated on the capacity of the force mains, with 5.0 feet per second (fps) used as the maximum allowable velocity. The various numbers of grinder pumps potentially connected to the 1.5-in to 3.0-in force mains result in projected flows within the 5 fps range.

The four lift stations as configured have adequate capacity for potential future flows, as do the gravity collector sewers.

EXHIBIT 1. ABALONE COVE SEWER SYSTEM





LEGEND

LIFT STATION

UNDEVELOPED LAND U

SERVICE AREA

SUB AREA

	EXISTING PARCELS	FUTURE PARCELS	TOTAL PARCELS
TOTAL ABALONE COVE	114	66	180

PREPARED BY:
NV5
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ABALONE COVE HOA
SEWER CAPACITY ANALYSIS
SERVICE AREA

SHEET 1 OF 1

MARCH 18, 2019

Environment One Corporation

Pressure Sewer Preliminary

Cost and Design Analysis

For

Rancho Palos Verdes
Abalone Cove Sewer System

Prepared For:
NV5
9890 Irvine Center Dr.
Irvine CA 92618 USA
Tel: 949-585-0477
Fax:
Prepared By: NV5

March 1, 2019

Rancho Palos Verdes
Abalone Cove Sewer System

Prepared by : NV5 **On:** March 1, 2019

Notes :
Pumps for
Zone 1 - Vanderlip Estates
Zone 2- Pomegranate To Sweetbay
Zone 3 - Narcissa
Zone 4 - Figtree and Narcissa

<<<<< E N D O F N O T E S >>>>>

PRELIMINARY PRESSURE SEWER - PIPE SIZING AND BRANCH ANALYSIS

Prepared By: Rancho Palos Verdes

NV5 Abalone Cove Sewer System March 1, 2019

Zone Number	Connects to Zone	Number of Pumps in Zone	Accum Pumps in Zone	Gals/day per Pump	Max Flow Per Pump (gpm)	Max Sim Ops	Max Flow (GPM)	Pipe Size (inches)	Max Velocity (FPS)	Length of Main this Zone	Friction Loss Factor (ft/100 ft)	Friction Loss This Zone	Accum Fric Loss (feet)	Max Main Elevation	Minimum Pump Elevation	Static Head (feet)	Total Dynamic Head (ft)
This spreadsheet was calculated using pipe diameters for: SDR21PVC										Friction loss calculations were based on a Constant for inside roughness "C" of: 150							
1.00	1.00	10	10	260	11.00	4	44.00	2.50	2.66	600.00	1.04	6.23	6.23	10.00	0.00	10.00	16.23
2.00	2.00	3	3	260	11.00	2	22.00	1.50	3.04	1,500.00	2.15	32.27	32.27	30.00	0.00	30.00	62.27
3.00	3.00	6	6	260	11.00	3	33.00	2.00	2.92	1,000.00	1.54	15.43	15.43	30.00	0.00	30.00	45.43
4.00	4.00	20	20	260	11.00	5	55.00	3.00	2.24	1,800.00	0.60	10.86	10.86	78.00	0.00	78.00	88.86

Note: This analysis is valid only with the use of progressive cavity type grinder pumps as manufactured by Environment One.

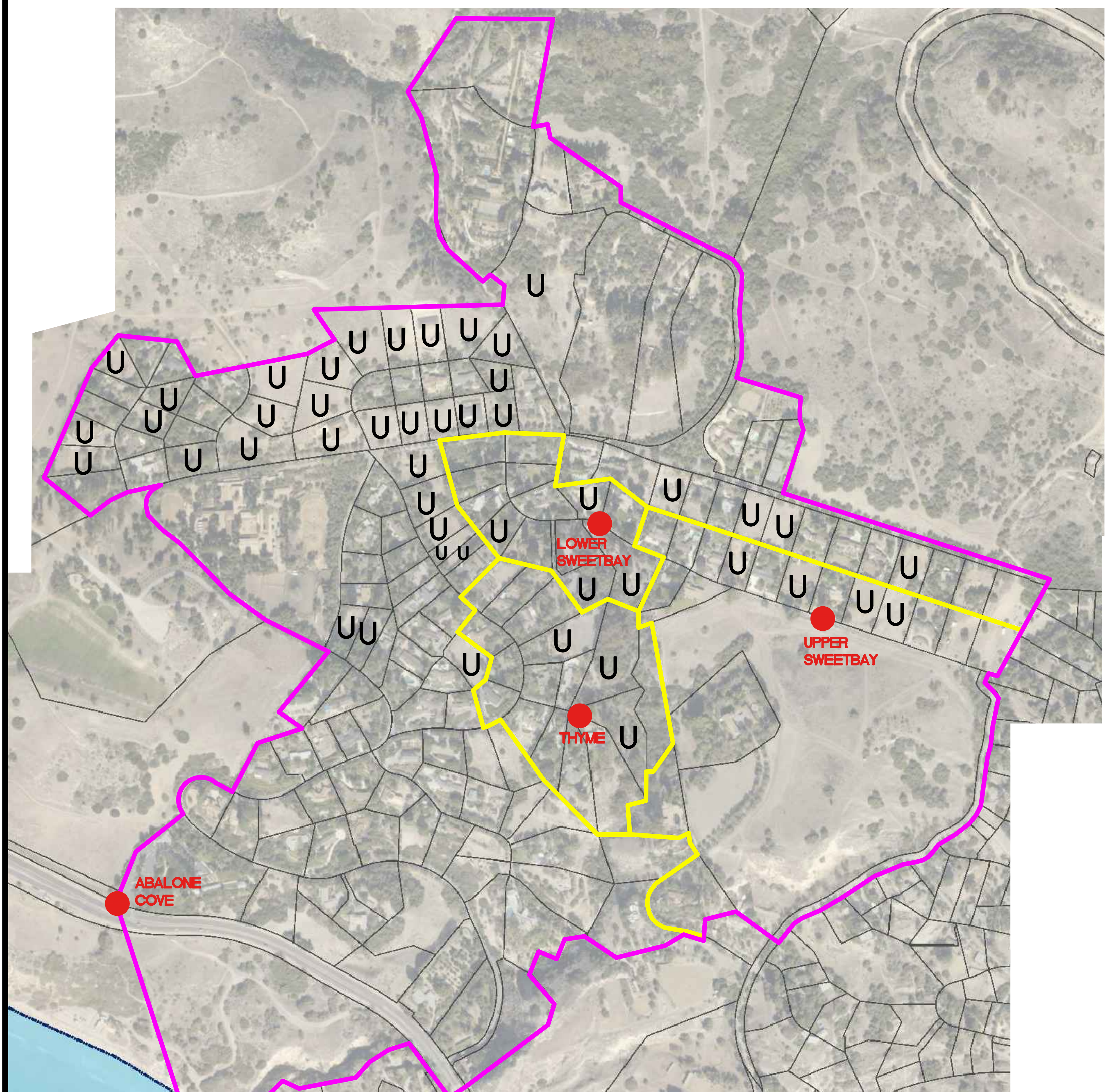
PRELIMINARY PRESSURE SEWER- ACCUMULATED RETENTION TIME(HR)

Prepared By: Rancho Palos Verdes

NV5 Abalone Cove Sewer System March 1, 2019

Zone Number	Connects to Zone	Accumulated Total of Pumps this Zone	Pipe Size (inches)	Gallons per 100 lineal feet	Length of Zone	Capacity of Zone	Average Daily Flow	Average Fluid Changes per Day	Average Retention Time (Hr)	Accumulated Retention Time (Hr)
This spreadsheet was calculated using pipe diameters for: SDR21PVC								Gals per Day per Dwelling		200
1.00	1.00	10	2.50	27.60	600.00	165.61	2,600	15.70	1.53	1.53
2.00	2.00	3	1.50	12.07	1,500.00	181.05	780	4.31	5.57	5.57
3.00	3.00	6	2.00	18.84	1,000.00	188.42	1,560	8.28	2.90	2.90
4.00	4.00	20	3.00	40.90	1,800.00	736.12	5,200	7.06	3.40	3.40

Note: This analysis is valid only with the use of progressive cavity type grinder pumps as manufactured by Environment One



LEGEND

LIFT STATION

UNDEVELOPED LAND U

SERVICE AREA

SUB AREA

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ABALONE COVE HOA
SEWER CAPACITY ANALYSIS
SERVICE AREA

SHEET 1 OF 1

MARCH 18, 2019