MITIGATED NEGATIVE DECLARATION

Land Development Review
Division
(619) 446-5460

Project No. **327976**
SCH No. *Not Applicable*

SUBJECT: Jefferson Pacific Beach Project: Coastal Development Permit (CDP) and Neighborhood Development Permit (NDP) for the demolition of the former Guy Hill Cadillac car dealership retail buildings and maintenance bays on approximately 2.94 acres, located in the Pacific Beach Community of the City of San Diego. The project includes the development of three levels of residential units with commercial uses along the building frontage, parking, and three 2-story townhome units. The proposed structure would include 172 residential units totaling approximately 200,000 square feet of gross floor area and approximately 15,500 square feet of commercial (office, retail and restaurant) space. Additionally, the proposed project would include the installation of a rooftop solar system (including photovoltaic and thermal technology) and a solar pool system.

Update 8/20/2016:

Revisions have been made to the draft Mitigated Negative Declaration (MND). Added language would appear in an underlined format. The revisions include clarifications to the mitigation measure MM-TR-1 which provides clarity. In accordance with the California Environmental Quality Act, Section 15073.5 (c)(4), the addition of new information that clarifies, amplifies, or makes insignificant modification does not require recirculation as there are no new impacts and no new mitigation identified. An environmental document need only be recirculated when there is identification of new significant environmental impact or the addition of a new mitigation measure required to avoid a significant environmental impact.

I. PROJECT DESCRIPTION: See attached Initial Study.

II. ENVIRONMENTAL SETTING: See attached Initial Study.

III. DETERMINATION: The City of San Diego conducted an Initial Study, which determined that the project could have a significant environmental effect on the following areas: **Cultural Resources (Archaeology), Cultural Resources (Paleontology), Land Use (Noise), and Transportation/Traffic.** Subsequent revisions in the project proposal create the specific mitigation identified in Section V of this Mitigated Negative Declaration. The project as revised

now avoids or mitigates the potentially significant environmental effects previously identified, and the preparation of an Environmental Impact Report will not be required.

IV. DOCUMENTATION: The attached Initial Study documents support the above Determination.

V. MITIGATION, MONITORING AND REPORTING PROGRAM (MMRP):

A. GENERAL REQUIREMENTS – PART I Plan Check Phase (prior to permit issuance)

1. Prior to the issuance of a Notice To Proceed (NTP) for a subdivision, or any construction permits, such as Demolition, Grading or Building, or beginning any construction-related activity on-site, the Development Services Department (DSD) Director's Environmental Designee (ED) shall review and approve all Construction Documents (CD), plans, specification, details, etc. to ensure the MMRP requirements are incorporated into the design.

2. In addition, the ED shall verify that the MMRP Conditions/Notes that apply ONLY to the construction phases of this project are included VERBATIM, under the heading, "**ENVIRONMENTAL/MITIGATION REQUIREMENTS**."

3. These notes must be shown within the first three sheets of the construction documents in the format specified for engineering construction document templates as shown on the City website:

   http://www.sandiego.gov/development-services/industry/standtemp.shtml

4. The **TITLE INDEX SHEET** must also show on which pages the "Environmental/Mitigation Requirements" notes are provided.

5. **SURETY AND COST RECOVERY –** The DSD Director or City Manager may require appropriate surety instruments or bonds from private Permit Holders to ensure the long-term performance or implementation of required mitigation measures or programs. The City is authorized to recover its cost to offset the salary, overhead, and expenses for City personnel and programs to monitor qualifying projects.

B. GENERAL REQUIREMENTS – PART II Post Plan Check (After permit issuance/Prior to start of construction)

1. **PRE CONSTRUCTION MEETING IS REQUIRED 10 WORKING DAYS PRIOR TO BEGINNING ANY WORK ON THIS PROJECT.** The PERMIT HOLDER/OWNER is responsible to arrange and perform this meeting by contacting the CITY RESIDENT ENGINEER (RE) of the Field Engineering Division and City staff from MITIGATION MONITORING COORDINATION (MMC). Attendees must also include the Permit holder's Representative(s), Job Site Superintendent and the following consultants:

   Qualified Archaeologist and Native American Monitor, Qualified Paleontologist

Note: Failure of all responsible Permit Holder's representatives and consultants to attend shall require an additional meeting with all parties present.

CONTACT INFORMATION:

a) The PRIMARY POINT OF CONTACT is the **RE** at the **Field Engineering Division – 858-627-3200**

b) For Clarification of ENVIRONMENTAL REQUIREMENTS, applicant is also required to call **RE and MMC at 858-627-3360**

2. **MMRP COMPLIANCE:** This Project, Project Tracking System (PTS) Number **327976** and/or Environmental Document Number 327976, shall conform to the mitigation requirements contained in the associated Environmental Document and implemented to the satisfaction of the DSD's Environmental Designee (MMC) and the City Engineer (RE). The requirements may not be reduced or changed but may be annotated (i.e., to explain when and how compliance is being met and location of verifying proof, etc.). Additional clarifying information may also be added to other relevant plan sheets and/or specifications as appropriate (i.e., specific locations, times of monitoring, methodology, etc.

Note: Permit Holder's Representatives must alert RE and MMC if there are any discrepancies in the plans or notes, or any changes due to field conditions. All conflicts must be approved by RE and MMC BEFORE the work is performed.

3. **OTHER AGENCY REQUIREMENTS:** Evidence of compliance with all other agency requirements or permits shall be submitted to the RE and MMC for review and acceptance prior to the beginning of work or within one week of the Permit Holder obtaining documentation of those permits or requirements. Evidence shall include copies of permits, letters of resolution or other documentation issued by the responsible agency.

Not Applicable

4. **MONITORING EXHIBITS**

All consultants are required to submit, to RE and MMC, a monitoring exhibit on a 11x17 reduction of the appropriate construction plan, such as site plan, grading, landscape, etc., marked to clearly show the specific areas including the **LIMIT OF WORK**, scope of that discipline's work, and notes indicating when in the construction schedule that work will be performed. When necessary for clarification, a detailed methodology of how the work will be performed shall be included.

NOTE: Surety and Cost Recovery – When deemed necessary by the DSD Director or City Manager, additional surety instruments or bonds from the private Permit Holder may be required to ensure the long-term performance or implementation of required mitigation measures or programs. The City is authorized to recover its cost to offset the salary, overhead, and expenses for City personnel and programs to monitor qualifying projects.

5. **OTHER SUBMITTALS AND INSPECTIONS:**

The Permit Holder/Owner's representative shall submit all required documentation, verification letters, and requests for all associated inspections to the RE and MMC for approval per the following schedule:

DOCUMENT SUBMITTAL/INSPECTION CHECKLIST		
Issue Area	Document Submittal	Associated Inspection/Approvals/Notes
General	Consultant Qualification Letters	Prior to Preconstruction Meeting
General	Consultant Construction Monitoring Exhibits	Prior to or at Preconstruction Meeting
Paleontology	Paleontology Report	Paleontology Site Observation
Archaeology	Archaeology Report	Archaeology Site Observation

B. SPECIFIC MMRP ISSUE AREA CONDITIONS/REQUIREMENTS

ARCHAEOLOGICAL MONITORING PROGRAM

MM-CUL-1

I. Prior to Permit Issuance

A. Entitlements Plan Check

1. Prior to issuance of any construction permits, including but not limited to, the first Grading Permit, Demolition Plans/Permits and Building Plans/Permits or a Notice to Proceed for Subdivisions, but prior to the first preconstruction meeting, whichever is applicable, the Assistant Deputy Director (ADD) Environmental designee shall verify that the requirements for Archaeological Monitoring and Native American monitoring have been noted on the applicable construction documents through the plan check process.

B. Letters of Qualification have been submitted to ADD

1. The applicant shall submit a letter of verification to Mitigation Monitoring Coordination (MMC) identifying the Principal Investigator (PI) for the project and the names of all persons involved in the archaeological monitoring program, as defined in the City of San Diego Historical Resources Guidelines (HRG). If applicable, individuals involved in the archaeological monitoring program must have completed the 40-hour HAZWOPER training with certification documentation.
2. MMC will provide a letter to the applicant confirming the qualifications of the PI and all persons involved in the archaeological monitoring of the project meet the qualifications established in the HRG.
3. Prior to the start of work, the applicant must obtain written approval from MMC for any personnel changes associated with the monitoring program.

II. Prior to Start of Construction

A. Verification of Records Search

1. The PI shall provide verification to MMC that a site specific records search (1/4 mile radius) has been completed. Verification includes, but is not limited to a copy of a confirmation letter from South Coastal Information Center, or, if the search was in-house, a letter of verification from the PI stating that the search was completed.
2. The letter shall introduce any pertinent information concerning expectations and probabilities of discovery during trenching and/or grading activities.
3. The PI may submit a detailed letter to MMC requesting a reduction to the ¼ mile radius.

B. PI Shall Attend Precon Meetings

1. Prior to beginning any work that requires monitoring; the Applicant shall arrange a Precon Meeting that shall include the PI, Native American consultant/monitor (where Native American resources may be impacted), Construction Manager (CM) and/or Grading Contractor, Resident Engineer (RE), Building Inspector (BI), if appropriate, and MMC. The qualified Archaeologist and Native American Monitor shall attend any grading/excavation related Precon Meetings to make comments and/or suggestions concerning the Archaeological Monitoring program with the Construction Manager and/or Grading Contractor.
   a. If the PI is unable to attend the Precon Meeting, the Applicant shall schedule a focused Precon Meeting with MMC, the PI, RE, CM or BI, if appropriate, prior to the start of any work that requires monitoring.
2. Identify Areas to be Monitored
   a. Prior to the start of any work that requires monitoring, the PI shall submit an Archaeological Monitoring Exhibit (AME) (with verification that the AME has been reviewed and approved by the Native American consultant/monitor when Native American resources may be impacted) based on the appropriate construction documents (reduced to 11x17) to MMC identifying the areas to be monitored including the delineation of grading/excavation limits.
   b. The AME shall be based on the results of a site specific records search as well as information regarding existing known soil conditions (native or formation).
3. When Monitoring Will Occur
   a. Prior to the start of any work, the PI shall also submit a construction schedule to MMC through the RE indicating when and where monitoring will occur.
   b. The PI may submit a detailed letter to MMC prior to the start of work or during construction requesting a modification to the monitoring program. This request shall be based on relevant information such as review of final construction documents which indicate site conditions such as depth of excavation and/or site graded to bedrock, etc., which may reduce or increase the potential for resources to be present.

III. During Construction

A. Monitor(s) Shall be Present During Grading/Excavation/Trenching

1. The Archaeological Monitor shall be present full-time during all soil disturbing and grading/excavation/trenching activities which could result in impacts to archaeological resources as identified on the AME. **The Construction Manager is responsible for notifying the RE, PI, and MMC of changes to any construction activities such as in the case of a potential safety concern within the area being monitored. In certain circumstances OSHA safety requirements may necessitate modification of the AME.**

2. The Native American consultant/monitor shall determine the extent of their presence during soil disturbing and grading/excavation/trenching activities based on the AME and provide that information to the PI and MMC. If prehistoric resources are encountered during the Native American consultant/monitor's absence, work shall stop and the Discovery Notification Process detailed in Section III.B-C and IV.A-D shall commence.
3. The PI may submit a detailed letter to MMC during construction requesting a modification to the monitoring program when a field condition such as modern disturbance post-dating the previous grading/trenching activities, presence of fossil formations, or when native soils are encountered that may reduce or increase the potential for resources to be present.
4. The archaeological and Native American consultant/monitor shall document field activity via the Consultant Site Visit Record (CSVR). The CSVR's shall be faxed by the CM to the RE the first day of monitoring, the last day of monitoring, monthly (**Notification of Monitoring Completion**), and in the case of ANY discoveries. The RE shall forward copies to MMC.

B. Discovery Notification Process
1. In the event of a discovery, the Archaeological Monitor shall direct the contractor to temporarily divert all soil disturbing activities, including but not limited to digging, trenching, excavating or grading activities in the area of discovery and in the area reasonably suspected to overlay adjacent resources and immediately notify the RE or BI, as appropriate.
2. The Monitor shall immediately notify the PI (unless Monitor is the PI) of the discovery.
3. The PI shall immediately notify MMC by phone of the discovery, and shall also submit written documentation to MMC within 24 hours by fax or email with photos of the resource in context, if possible.
4. No soil shall be exported off-site until a determination can be made regarding the significance of the resource specifically if Native American resources are encountered.

C. Determination of Significance
1. The PI and Native American consultant/monitor, where Native American resources are discovered shall evaluate the significance of the resource. If Human Remains are involved, follow protocol in Section IV below.
   a. The PI shall immediately notify MMC by phone to discuss significance determination and shall also submit a letter to MMC indicating whether additional mitigation is required.
   b. If the resource is significant, the PI shall submit an Archaeological Data Recovery Program (ADRP) which has been reviewed by the Native American consultant/monitor, and obtain written approval from MMC. Impacts to significant resources must be mitigated before ground disturbing activities in the area of discovery will be allowed to resume. **Note: If a unique archaeological site is also an historical resource as defined in CEQA, then the limits on the amount(s) that a project applicant may be required to pay to cover mitigation costs as indicated in CEQA Section 21083.2 shall not apply.**
   c. If the resource is not significant, the PI shall submit a letter to MMC indicating that artifacts will be collected, curated, and documented in the Final Monitoring Report. The letter shall also indicate that that no further work is required.

IV. Discovery of Human Remains

If human remains are discovered, work shall halt in that area and no soil shall be exported off-site until a determination can be made regarding the provenance of the human remains; and the following procedures as set forth in CEQA Section 15064.5(e), the California Public Resources Code (Sec. 5097.98) and State Health and Safety Code (Sec. 7050.5) shall be undertaken:

A. Notification
   1. Archaeological Monitor shall notify the RE or BI as appropriate, MMC, and the PI, if the Monitor is not qualified as a PI. MMC will notify the appropriate Senior Planner in the Environmental Analysis Section (EAS) of the Development Services Department to assist with the discovery notification process.
   2. The PI shall notify the Medical Examiner after consultation with the RE, either in person or via telephone.

B. Isolate discovery site
   1. Work shall be directed away from the location of the discovery and any nearby area reasonably suspected to overlay adjacent human remains until a determination can be made by the Medical Examiner in consultation with the PI concerning the provenance of the remains.
   2. The Medical Examiner, in consultation with the PI, will determine the need for a field examination to determine the provenance.
   3. If a field examination is not warranted, the Medical Examiner will determine with input from the PI, if the remains are or are most likely to be of Native American origin.

C. If Human Remains **ARE** determined to be Native American
   1. The Medical Examiner will notify the Native American Heritage Commission (NAHC) within 24 hours. By law, **ONLY** the Medical Examiner can make this call.
   2. NAHC will immediately identify the person or persons determined to be the Most Likely Descendent (MLD) and provide contact information.
   3. The MLD will contact the PI within 24 hours or sooner after the Medical Examiner has completed coordination, to begin the consultation process in accordance with CEQA Section 15064.5(e), the California Public Resources and Health & Safety Codes.
   4. The MLD will have 48 hours to make recommendations to the property owner or representative, for the treatment or disposition with proper dignity, of the human remains and associated grave goods.
   5. Disposition of Native American Human Remains will be determined between the MLD and the PI, and, if:
      a. The NAHC is unable to identify the MLD, OR the MLD failed to make a recommendation within 48 hours after being notified by the Commission; OR;
      b. The landowner or authorized representative rejects the recommendation of the MLD and mediation in accordance with PRC 5097.94 (k) by the NAHC fails to provide measures acceptable to the landowner, THEN,
      c. In order to protect these sites, the Landowner shall do one or more of the following:
         (1) Record the site with the NAHC;
         (2) Record an open space or conservation easement on the site;
         (3) Record a document with the County.
      d. Upon the discovery of multiple Native American human remains during a ground

disturbing land development activity, the landowner may agree that additional conferral with descendants is necessary to consider culturally appropriate treatment of multiple Native American human remains. Culturally appropriate treatment of such a discovery may be ascertained from review of the site utilizing cultural and archaeological standards. Where the parties are unable to agree on the appropriate treatment measures the human remains and items associated and buried with Native American human remains shall be reinterred with appropriate dignity, pursuant to Section 5.c., above.

D. If Human Remains are **NOT** Native American
   1. The PI shall contact the Medical Examiner and notify them of the historic era context of the burial.
   2. The Medical Examiner will determine the appropriate course of action with the PI and City staff (PRC 5097.98).
   3. If the remains are of historic origin, they shall be appropriately removed and conveyed to the San Diego Museum of Man for analysis. The decision for internment of the human remains shall be made in consultation with MMC, EAS, the applicant/landowner, any known descendant group, and the San Diego Museum of Man.

V. Night and/or Weekend Work

A. If night and/or weekend work is included in the contract
   1. When night and/or weekend work is included in the contract package, the extent and timing shall be presented and discussed at the precon meeting.
   2. The following procedures shall be followed.
      a. No Discoveries
         In the event that no discoveries were encountered during night and/or weekend work, the PI shall record the information on the CSVR and submit to MMC via fax by 8AM of the next business day.
      b. Discoveries
         All discoveries shall be processed and documented using the existing procedures detailed in Sections III - During Construction, and IV – Discovery of Human Remains. Discovery of human remains shall always be treated as a significant discovery.
      c. Potentially Significant Discoveries
         If the PI determines that a potentially significant discovery has been made, the procedures detailed under Section III - During Construction and IV-Discovery of Human Remains shall be followed.
      d. The PI shall immediately contact MMC, or by 8AM of the next business day to report and discuss the findings as indicated in Section III-B, unless other specific arrangements have been made.

B. If night and/or weekend work becomes necessary during the course of construction
   1. The Construction Manager shall notify the RE, or BI, as appropriate, a minimum of 24 hours before the work is to begin.
   2. The RE, or BI, as appropriate, shall notify MMC immediately.

C. All other procedures described above shall apply, as appropriate.

VI. Post Construction

A. Preparation and Submittal of Draft Monitoring Report

1. The PI shall submit two copies of the Draft Monitoring Report (even if negative), prepared in accordance with the Historical Resources Guidelines (Appendix C/D) which describes the results, analysis, and conclusions of all phases of the Archaeological Monitoring Program (with appropriate graphics) to MMC for review and approval within 90 days following the completion of monitoring. **It should be noted that if the PI is unable to submit the Draft Monitoring Report within the allotted 90-day timeframe resulting from delays with analysis, special study results or other complex issues, a schedule shall be submitted to MMC establishing agreed due dates and the provision for submittal of monthly status reports until this measure can be met.**
    a. For significant archaeological resources encountered during monitoring, the Archaeological Data Recovery Program shall be included in the Draft Monitoring Report.
    b. Recording Sites with State of California Department of Parks and Recreation The PI shall be responsible for recording (on the appropriate State of California Department of Park and Recreation forms-DPR 523 A/B) any significant or potentially significant resources encountered during the Archaeological Monitoring Program in accordance with the City's Historical Resources Guidelines, and submittal of such forms to the South Coastal Information Center with the Final Monitoring Report.
2. MMC shall return the Draft Monitoring Report to the PI for revision or, for preparation of the Final Report.
3. The PI shall submit revised Draft Monitoring Report to MMC for approval.
4. MMC shall provide written verification to the PI of the approved report.
5. MMC shall notify the RE or BI, as appropriate, of receipt of all Draft Monitoring Report submittals and approvals.

B. Handling of Artifacts
1. The PI shall be responsible for ensuring that all cultural remains collected are cleaned and catalogued
2. The PI shall be responsible for ensuring that all artifacts are analyzed to identify function and chronology as they relate to the history of the area; that faunal material is identified as to species; and that specialty studies are completed, as appropriate.
3. The cost for curation is the responsibility of the property owner.

C. Curation of artifacts: Accession Agreement and Acceptance Verification
1. The PI shall be responsible for ensuring that all artifacts associated with the survey, testing and/or data recovery for this project are permanently curated with an appropriate institution. This shall be completed in consultation with MMC and the Native American representative, as applicable.
2. The PI shall include the Acceptance Verification from the curation institution in the Final Monitoring Report submitted to the RE or BI and MMC.
3. When applicable to the situation, the PI shall include written verification from the Native American consultant/monitor indicating that Native American resources were treated in accordance with state law and/or applicable agreements. If the resources were reinterred, verification shall be provided to show what protective measures were taken to ensure no further disturbance occurs in accordance with Section IV – Discovery of Human Remains, Subsection 5.

D. Final Monitoring Report(s)
1. The PI shall submit one copy of the approved Final Monitoring Report to the RE or BI

as appropriate, and one copy to MMC (even if negative), within 90 days after notification from MMC that the draft report has been approved.

2. The RE shall, in no case, issue the Notice of Completion and/or release of the Performance Bond for grading until receiving a copy of the approved Final Monitoring Report from MMC which includes the Acceptance Verification from the curation institution.

PALEONTOLOGICAL RESOURCES MITIGATION

MM-CUL-2

I. Prior to Permit Issuance

A. Entitlements Plan Check

1. Prior to issuance of any construction permits, including but not limited to, the first Grading Permit, Demolition Plans/Permits and Building Plans/Permits or a Notice to Proceed for Subdivisions, but prior to the first preconstruction meeting, whichever is applicable, the Assistant Deputy Director (ADD) Environmental designee shall verify that the requirements for Paleontological Monitoring have been noted on the appropriate construction documents.

B. Letters of Qualification have been submitted to ADD

1. The applicant shall submit a letter of verification to Mitigation Monitoring Coordination (MMC) identifying the Principal Investigator (PI) for the project and the names of all persons involved in the paleontological monitoring program, as defined in the City of San Diego Paleontology Guidelines.
2. MMC will provide a letter to the applicant confirming the qualifications of the PI and all persons involved in the paleontological monitoring of the project.
3. Prior to the start of work, the applicant shall obtain approval from MMC for any personnel changes associated with the monitoring program.

II. Prior to Start of Construction

A. Verification of Records Search

1. The PI shall provide verification to MMC that a site specific records search has been completed. Verification includes, but is not limited to a copy of a confirmation letter from San Diego Natural History Museum, other institution or, if the search was in-house, a letter of verification from the PI stating that the search was completed.
2. The letter shall introduce any pertinent information concerning expectations and probabilities of discovery during trenching and/or grading activities.

B. PI Shall Attend Precon Meetings

1. Prior to beginning any work that requires monitoring; the Applicant shall arrange a Precon Meeting that shall include the PI, Construction Manager (CM) and/or Grading Contractor, Resident Engineer (RE), Building Inspector (BI), if appropriate, and MMC. The qualified paleontologist shall attend any grading/excavation related Precon Meetings to make comments and/or suggestions concerning the Paleontological Monitoring program with the Construction Manager and/or Grading Contractor.
   a. If the PI is unable to attend the Precon Meeting, the Applicant shall schedule a focused Precon Meeting with MMC, the PI, RE, CM or BI, if appropriate, prior to the start of any work that requires monitoring.

2. Identify Areas to be Monitored
   Prior to the start of any work that requires monitoring, the PI shall submit a Paleontological Monitoring Exhibit (PME) based on the appropriate construction documents (reduced to 11x17) to MMC identifying the areas to be monitored including the delineation of grading/excavation limits. The PME shall be based on the results of a site specific records search as well as information regarding existing known soil conditions (native or formation).
3. When Monitoring Will Occur
   a. Prior to the start of any work, the PI shall also submit a construction schedule to MMC through the RE indicating when and where monitoring will occur.
   b. The PI may submit a detailed letter to MMC prior to the start of work or during construction requesting a modification to the monitoring program. This request shall be based on relevant information such as review of final construction documents which indicate conditions such as depth of excavation and/or site graded to bedrock, presence or absence of fossil resources, etc., which may reduce or increase the potential for resources to be present.

III. During Construction

A. Monitor Shall be Present During Grading/Excavation/Trenching
   1. The monitor shall be present full-time during grading/excavation/trenching activities as identified on the PME that could result in impacts to formations with high and moderate resource sensitivity. **The Construction Manager is responsible for notifying the RE, PI, and MMC of changes to any construction activities such as in the case of a potential safety concern within the area being monitored. In certain circumstances OSHA safety requirements may necessitate modification of the PME.**
   2. The PI may submit a detailed letter to MMC during construction requesting a modification to the monitoring program when a field condition such as trenching activities that do not encounter formational soils as previously assumed, and/or when unique/unusual fossils are encountered, which may reduce or increase the potential for resources to be present.
   3. The monitor shall document field activity via the Consultant Site Visit Record (CSVR). The CSVR's shall be faxed by the CM to the RE the first day of monitoring, the last day of monitoring, monthly (**Notification of Monitoring Completion**), and in the case of ANY discoveries. The RE shall forward copies to MMC.

B. Discovery Notification Process
   1. In the event of a discovery, the Paleontological Monitor shall direct the contractor to temporarily divert trenching activities in the area of discovery and immediately notify the RE or BI, as appropriate.
   2. The Monitor shall immediately notify the PI (unless Monitor is the PI) of the discovery.
   3. The PI shall immediately notify MMC by phone of the discovery, and shall also submit written documentation to MMC within 24 hours by fax or email with photos of the resource in context, if possible.

C. Determination of Significance
   1. The PI shall evaluate the significance of the resource.
      a. The PI shall immediately notify MMC by phone to discuss significance determination and shall also submit a letter to MMC indicating whether

additional mitigation is required. The determination of significance for fossil discoveries shall be at the discretion of the PI.

b. If the resource is significant, the PI shall submit a Paleontological Recovery Program (PRP) and obtain written approval from MMC. Impacts to significant resources must be mitigated before ground disturbing activities in the area of discovery will be allowed to resume.

c. If resource is not significant (e.g., small pieces of broken common shell fragments or other scattered common fossils) the PI shall notify the RE, or BI as appropriate, that a non-significant discovery has been made. The Paleontologist shall continue to monitor the area without notification to MMC unless a significant resource is encountered.

d. The PI shall submit a letter to MMC indicating that fossil resources will be collected, curated, and documented in the Final Monitoring Report. The letter shall also indicate that no further work is required.

IV. Night and/or Weekend Work

A. If night and/or weekend work is included in the contract

1. When night and/or weekend work is included in the contract package, the extent and timing shall be presented and discussed at the precon meeting.

2. The following procedures shall be followed.

a. No Discoveries
In the event that no discoveries were encountered during night and/or weekend work, The PI shall record the information on the CSVR and submit to MMC via fax by 8AM on the next business day.

b. Discoveries
All discoveries shall be processed and documented using the existing procedures detailed in Sections III - During Construction.

c. Potentially Significant Discoveries
If the PI determines that a potentially significant discovery has been made, the procedures detailed under Section III - During Construction shall be followed.

d. The PI shall immediately contact MMC, or by 8AM on the next business day to report and discuss the findings as indicated in Section III-B, unless other specific arrangements have been made.

B. If night work becomes necessary during the course of construction

1. The Construction Manager shall notify the RE, or BI, as appropriate, a minimum of 24 hours before the work is to begin.

2. The RE, or BI, as appropriate, shall notify MMC immediately.

C. All other procedures described above shall apply, as appropriate.

V. Post Construction

A. Preparation and Submittal of Draft Monitoring Report

1. The PI shall submit two copies of the Draft Monitoring Report (even if negative), prepared in accordance with the Paleontological Guidelines which describes the results, analysis, and conclusions of all phases of the Paleontological Monitoring Program (with appropriate graphics) to MMC for review and approval within 90 days following the completion of monitoring,

a. For significant paleontological resources encountered during monitoring, the Paleontological Recovery Program shall be included in the Draft Monitoring

Report.

b. Recording Sites with the San Diego Natural History Museum
The PI shall be responsible for recording (on the appropriate forms) any significant or potentially significant fossil resources encountered during the Paleontological Monitoring Program in accordance with the City's Paleontological Guidelines, and submittal of such forms to the San Diego Natural History Museum with the Final Monitoring Report.

2. MMC shall return the Draft Monitoring Report to the PI for revision or, for preparation of the Final Report.
3. The PI shall submit revised Draft Monitoring Report to MMC for approval.
4. MMC shall provide written verification to the PI of the approved report.
5. MMC shall notify the RE or BI, as appropriate, of receipt of all Draft Monitoring Report submittals and approvals.

B. Handling of Fossil Remains
1. The PI shall be responsible for ensuring that all fossil remains collected are cleaned and catalogued.
2. The PI shall be responsible for ensuring that all fossil remains are analyzed to identify function and chronology as they relate to the geologic history of the area; that faunal material is identified as to species; and that specialty studies are completed, as appropriate

C. Curation of fossil remains: Deed of Gift and Acceptance Verification
1. The PI shall be responsible for ensuring that all fossil remains associated with the monitoring for this project are permanently curated with an appropriate institution.
2. The PI shall include the Acceptance Verification from the curation institution in the Final Monitoring Report submitted to the RE or BI and MMC.

D. Final Monitoring Report(s)
1. The PI shall submit two copies of the Final Monitoring Report to MMC (even if negative), within 90 days after notification from MMC that the draft report has been approved.
2. The RE shall, in no case, issue the Notice of Completion until receiving a copy of the approved Final Monitoring Report from MMC which includes the Acceptance Verification from the curation institution.

NOISE

MM-NOI-1

Construction Noise Mitigation: Prior to the issuance of the first demolition permit, the applicant shall implement the following, to the satisfaction of the City of San Diego Development Services Department:

- All construction equipment, fixed or mobile, shall be equipped with properly operating and maintained mufflers.
- Construction noise reduction methods, such as shutting off idling equipment, maximizing the distance between construction equipment staging areas and occupied residential areas, and use of electric air compressors and similar power tools rather than diesel equipment, shall be used.

- During construction, stationary construction equipment shall be placed such that emitted noise is directed away from or shielded from sensitive noise receivers.
- During construction, stockpiling and vehicle staging areas shall be located as far as practical from noise sensitive land uses.

MM-NOI-2

Exterior Noise Mitigation: Prior to issuance of the first occupancy permit, the applicant shall ensure that an exterior noise walls installed along the western boundary of the townhome units located in the northwestern portion of the project site. The height of the noise wall associated with the townhome units shall be ten (10) feet in height above the pad height of the townhome units, or as recommended by a certified acoustician following completion of detailed site design and building plans. The portion of the noise wall extending southwest from the northwest corner of the site may be stepped down to eight (8) feet at the second townhome, or as recommended by a certified acoustician following completion of detailed site design and building plans.

A second noise wall shall be installed along the outdoor pool deck.
The noise wall associated with the pool deck shall be ten (10) feet in height from the height of the pool deck, or as recommended by a certified acoustician following completion of detailed site design and building plans. The noise wall may be stepped down to a height of eight (8) feet at 60 feet southwest of the northeastern corner of the site, or as recommended by a certified acoustician following completion of detailed site design and building plans.

The noise wall constructed at both locations shall be constructed with material that has a minimum density of 2.5 pounds per square inch.

MM-NOI-3

Interior Noise Mitigation (Interior Noise Study): Upon completion of detailed building plans (i.e., room dimensions, wall and roof assemblies and window/door schedules) and prior to the issuance of the first occupancy permit, the applicant shall ensure that an interior noise mitigation analysis be prepared, to the satisfaction of the City of San Diego Development Services Department. The analysis shall identify specific mitigation measures to ensure interior noise levels remain at or below 45 dB per the City of San Diego's interior noise standard. Noise abatement features shall be identified to attenuate noise and shall be incorporated into project design as necessary. For residential units, such features shall include mechanical ventilation or an air-conditioning system (or equivalent means of natural ventilation), sound-rated windows and sound-rated doors. Sound ratings shall be compliant with the recommendations provided in the project-specific noise report prepared by Veneklasen Associates (Veneklasen 2016). For non-residential spaces, sound ratings shall be compliant with the recommendations provided in the project-specific noise report prepared by Veneklasen Associates.

MM-NOI-4

Interior Noise Mitigation (Exterior Façade Construction): Upon completion of detailed building plans (i.e., wall and roof assemblies and window/door schedules), the applicant shall ensure that residential units located within Zone A will be constructed with an "upgraded" exterior façade assembly that would include, but not be limited to, 3-coat stucco, plywood, studs, batt insulation,

Resilient Channel, and gypsum board per specifications provided in the project-specific noise report prepared by Veneklasen Associates (Veneklasen 2016).

TRANSPORTATION/TRAFFIC

MM-TR-1

Prior to issuance of the first building permit, the applicant shall assure by permit and bond the installation of an adaptive signal control system at six intersections on Mission Bay Drive, to the satisfaction of the City Engineer. The six intersections that would be improved include Garnet Avenue and Mission Bay Drive, Magnolia Avenue and Mission Bay Drive, Bunker Hill Street and Mission Bay Drive, Grand Avenue and Mission Bay Drive, Rosewood Street and Mission Bay Drive, and Mission Bay Drive and North Mission Bay Drive. Improvements shall include enhanced fiber optic signal interconnects and communications, additional detection sensors and computer equipment at each intersection, and a remote link to the Traffic Management Center downtown as well as an advance flashing beacon, satisfactory to the City Engineer. Also, with installation of the new traffic signal at Mission Bay Drive/Rosewood Street applicant shall install a centerline stripe on Rosewood Street. A proposed implementation plan for installation of the adaptive signal control system shall be submitted to the City of San Diego by applicant as early as possible. All improvements shall be completed and accepted by the City Engineer prior to issuance of the first certificate of occupancy.

VI. PUBLIC REVIEW DISTRIBUTION

Draft copies or notice of the MITIGATED NEGATIVE DECLARATION were distributed to:

City of San Diego
- Council Member Sherman, District 7
- City Attorney
  - Shannon Thomas (MS 59)
- Development Services Department
  - Morris Dye (MS 302)
  - Jeffrey Szymanski (MS 501)
  - Terre Lien (MS 501)
  - Jack Canning (MS 501)
  - Daniel Neri (MS 501)
  - Ismail Elhamad (MS 501)
  - Jim Quinn (MS 501)
  - Raynard Abalos (MS 501)
- Mitigation Monitoring Coordination Section (77a)
- Central Library MS 17 (81a)
- Pacific Beach/Taylor Branch Library (81x)

Other
- Beach and Bay Press (372)
- Pacific Beach Town Council (374)

Pacific Beach Planning Group (375)
San Diego Gas and Electric (114)
Metropolitan Transit System (115)
San Diego Natural History Museum (166)
Historical Resources Board (87)
Carmen Lucas (206)
South Coastal Information Center (210)
San Diego Archaeological Center (212)
Save Our Heritage Organization (214)
Ron Christman (215)
Clint Linton (215B)
Frank Brown – Inter-Tribal Cultural Resources Council (216)
Campo Band of Mission Indians (217)
San Diego County Archaeological Society, Inc. (218)
Kumeyaay Cultural Heritage Preservation (223)
Kumeyaay Cultural Repatriation Committee (225)
Native American Distribution (225 A-S) (Public Notice & Location Map Only)
Native American Heritage Commission (222)

VI. RESULTS OF PUBLIC REVIEW

( ) No comments were received during the public input period.

( ) Comments were received but did not address the draft Mitigated Negative Declaration finding or the accuracy/completeness of the Initial Study. No response is necessary. The letters are attached.

(x) Comments addressing the findings of the draft Mitigated Negative Declaration and/or accuracy or completeness of the Initial Study were received during the public input period. The letters and responses follow.

Copies of the draft MITIGATED NEGATIVE DECLARATION, the Mitigation Monitoring and Reporting Program and any Initial Study material are available in the office of the Development Services Center for review, or for purchase at the cost of reproduction.

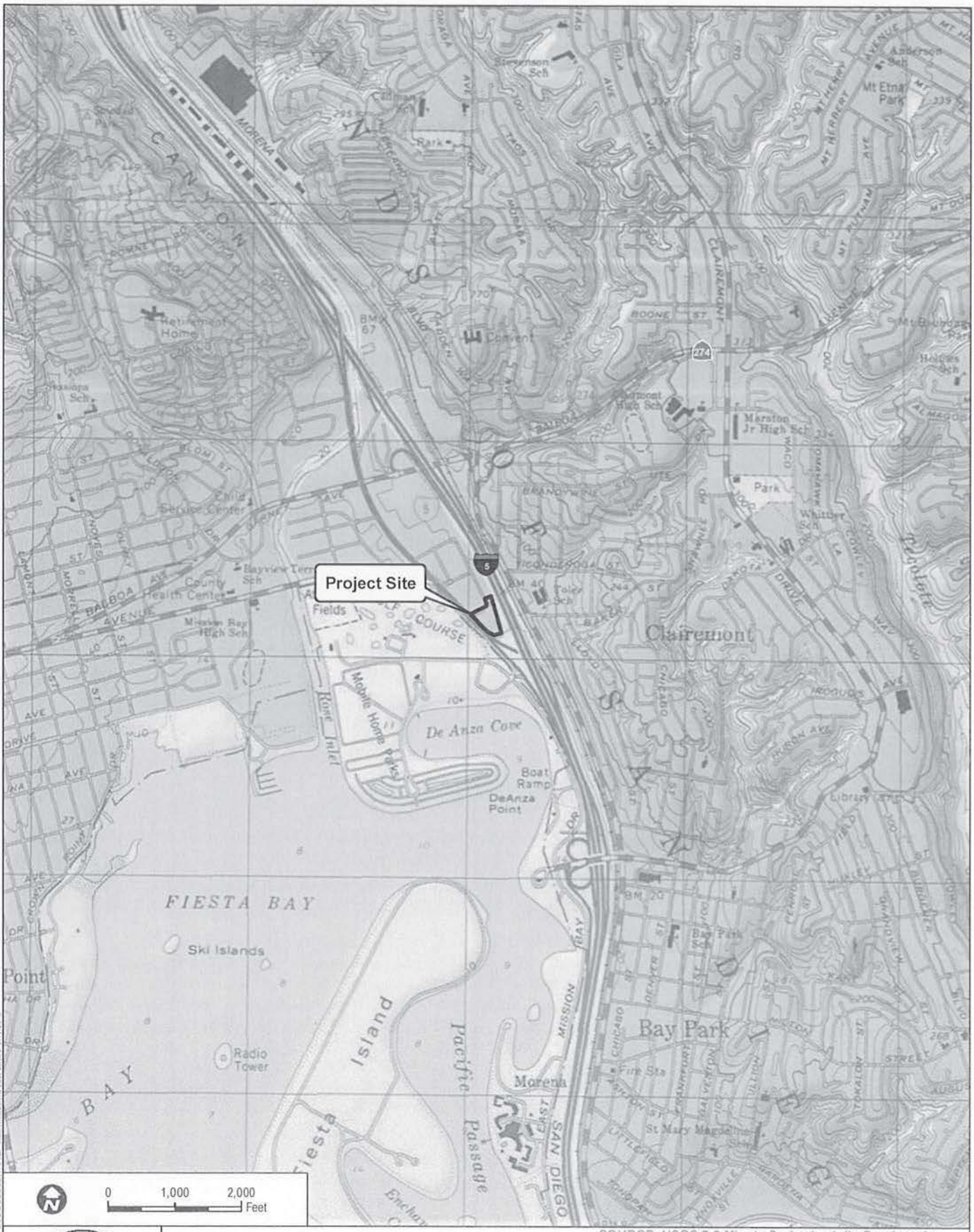
Jeffrey Szymanski, Senior Planner
Development Services Department

August 5, 2016
Date of Draft Report

August 30, 2016
Date of Final Report

Analyst: Jeff Szymanski

Attachments Initial Study Checklist
Figure 1 –Project Location Map
Figure 2 – Site Plan



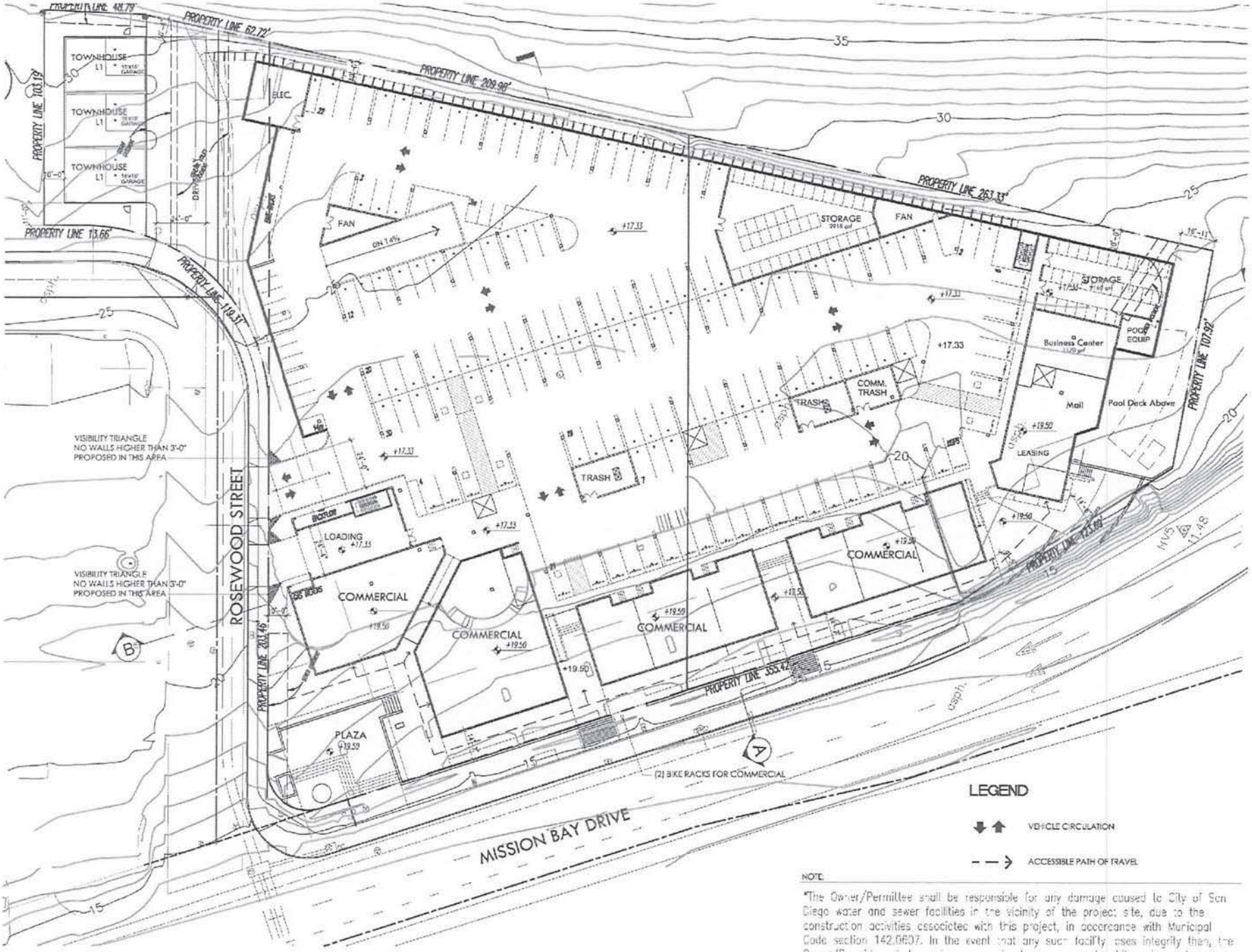
SOURCE: USGS 7.5-Minute Series La Jolla Quadrangle

Vicinity Map

Jefferson Pacific Beach Project MND Project No. 327976

CITY OF SAN DIEGO - DEVELOPMENT SERVICES

FIGURE 1



NOTE:

"The Owner/Permittee shall be responsible for any damage caused to City of San Diego water and sewer facilities in the vicinity of the project site, due to the construction activities associated with this project, in accordance with Municipal Code section 142.0607. In the event that any such facility loses integrity then, the Owner/Permittee shall repair or reconstruct any damaged public water and sewer facility in a manner satisfactory to the Public Utilities Director and the City Engineer."

RINCON BAND OF LUISEÑO INDIANS

Environmental Department

1 W. Tribal Road · Valley Center, California 92082
(760) 297-2330 Fax:(760) 297-2339

August 15, 2016

Jeffrey Szymanski
City of San Diego
Development Services Department
1222 First Avenue, MS 501
San Diego, CA 92101

Re: Jefferson Pacific Beach Project No. 327976

Dear Mr. Szymanski:

This letter is written on behalf of the Rincon Band of Luiseño Indians. Thank you for inviting us to submit comments on the Jefferson Pacific Beach Project No. 327976. Rincon is submitting these comments concerning your projects potential impact on Luiseño cultural resources.

(1) The Rincon Band has concerns for the impacts to historic and cultural resources and the finding of items of significant cultural value that could be disturbed or destroyed and are considered culturally significant to the Luiseño people. This is to inform you, your identified location is not within the Luiseño Aboriginal Territory. We recommend that you locate a tribe within the project area to receive direction on how to handle any inadvertent findings according to their customs and traditions.

If you would like information on tribes within your project area, please contact the Native American Heritage Commission and they will assist with a referral.

Thank you for the opportunity to protect and preserve our cultural assets.

Sincerely,

Vincent Whipple
Manager
Rincon Cultural Resources Department

Bo Mazzetti, Tribal Chairman · Stephanie Spencer, Vice Chairwoman · Steve Stallings, Council Member · Laurie E. Gonzalez, Council Member · Alfonso Kolb, Council Member

Response to Comments

RINCON BAND OF LUISENO INDIANS (August 15, 2016)

1. All culturally affiliated California Native American tribal groups and other members of the Native American community in San Diego County (as noted in the distribution list) were sent a copy of the public notice for the Draft MND in accordance with the provisions of CEQA, the City's General Plan, and the Land Development Code - CEQA Implemertation Procedures. In addition, as required by the Mitigation, Monitoring and Reporting Program (Mitigated Negative Declaration Section V) and as identified on page 15 of the Initial Study, excavation within previously undisturbed soils would be monitored by a qualified archaeological monitor and Native American monitor.

INITIAL STUDY CHECKLIST

1. **Project title/Project number**: Jefferson Pacific Beach Project. Project Number: 327976.

2. **Lead agency name and address**: City of San Diego, Development Services Department, 1222 First Avenue, MS 501, San Diego, California 92101.

3. **Contact person and phone number**: Jeffrey Szymanski, City of San Diego, Senior Planner 619 446-5324

4. **Project location**: 4275 Mission Bay Drive in the Pacific Beach community. Assessor Parcel Numbers (APNs) 424-380-06-00, 424-380-07-00, and 424-362-24-00.

5. **Project Applicant/Sponsor's name and address**: JPI Real Estate Acquisition, LLC, 12250 El Camino Real, Suite 380, San Diego, California 92130.

6. **General/Community Plan designation**: Community Commercial.

7. **Zoning**: CC-4-2.

8. **Description of project** (Describe the whole action involved, including but not limited to, later phases of the project, and any secondary, support, or off-site features necessary for its implementation.):

   The proposed Jefferson Pacific Beach Project (project) consists of the demolition of the former Guy Hill Cadillac car dealership retail buildings and maintenance bays on approximately 2.94 acres, located in the Pacific Beach Community of the City of San Diego (City) (see Figure 1, Regional Map, and Figure 2, Vicinity Map). The project includes the development of three levels of residential units with commercial uses along the building frontage, parking, and three 2-story townhome units. The proposed structure would include 172 residential units totaling approximately 200,000 square feet of gross floor area and approximately 15,500 square feet of commercial (office, retail and restaurant) space. The 172 residences would consist of 3 studio units, 91 one-bedroom units, 66 two-bedroom units, and 12 three-bedroom units. In addition to the residences, parking and commercial space, the project includes lobby and leasing areas as well as residential amenities such as outdoor dining areas, barbeque and seating areas, a fire pit, courtyard lounge area, private lounge patio, pool, spa, gym, and clubhouse (see Figure 3, Site Map, and Figure 4, Site Plan). Additionally, the proposed project would include the installation of a rooftop solar system (including photovoltaic and thermal

technology) and a solar pool system. The photovoltaic panels would produce approximately 268,803 kilowatt-hours per year, and the solar thermal system would produce approximately 1,524 Therms per year of renewable energy (Adroit Energy 2016).

Parking Facilities

All parking would be in a ground-level and subterranean parking garage, not visible from public rights of way. The parking area would total approximately 140,115 square feet, including space for utilities and storage. The project would provide 157 ground-level parking spaces that are wrapped by the building and 234 underground parking spaces. The parking garage would only be accessible from Rosewood Street, there is no curb cut off of Mission Bay Drive.

Transit Oriented Development and Project Access

Pedestrian access to the project would be provided at the entrances along Mission Bay Drive and Rosewood Street as well as Del Rey for the townhomes. The proposed project is designed to be a Transit Oriented Development (TOD) project consistent with the Community Plan recommendations. The project site is located within an urbanized area and would include project features that encourage alternative modes of vehicle transportation (e.g., pedestrian, bicycle, bus and trolley), which are key elements of the project's TOD characteristics. These TOD and sustainable design features are described in Section X: Land Use.

Landscaping

The landscape plan for the project has been reviewed by City Landscape staff and would comply with all applicable City of San Diego ordinances and standards. The landscape plans for the proposed project include the installation of street trees along Mission Bay Drive, Rosewood Street and Del Rey Street, as well as accent or perimeter trees and interior site trees. Low-lying vegetation as part of site landscaping would include shrubs, accent flowers and grasses, parkway groundcover, and interior groundcover.

All proposed landscaping would include native, drought-tolerant species, and exotic or invasive plant species are not proposed. The proposed project would include a drip irrigation system equipped with a rain sensing controller in addition to other high-efficiency water features to limit the amount of water necessary to irrigate the site.

Utilities

Gas and electric services to the project would be provided by San Diego Gas and Electric. Existing electric and gas facilities run in Mission Bay Drive and Rosewood Street adjacent to the project site.

Cable services in the project area are provided by Time Warner Cable and Telecom services in the project area are provided by AT&T.

Water and sewer services to the project would be provided by the City. The proposed project would connect to existing sewer and water mains in Rosewood Street and Mission Bay Drive, as well as an existing storm drain in Rosewood Street.

9. **Surrounding land uses and setting**: Briefly describe the project's surroundings: The project site is bounded by Mission Bay Drive to the west, Interstate 5 northbound off-ramp to the south, Rosewood Street to the north, and the Interstate 5 freeway to the east. In a regional setting, the proposed project is approximately 0.25 mile north of De Anza Cove of Mission Bay, approximately 6.40 miles northwest of downtown San Diego, approximately 2.65 miles east of the Pacific Ocean, approximately 3.00 miles south of California State Route 52 (Figure 2). The visitor destination and residential community of Pacific Beach is almost entirely built-out. Immediate surrounding land uses from the project site include the Mission Bay Golf Course and Practice Center to the west, as well as a variety of residential, commercial, and retail land uses to the north. The project site was previously operated as a car dealership and repair including Guy Hill Cadillac, which operated on site from approximately 1970 through 2007. Existing use of the project include operation of a Jet Ski, U-haul and boat rental facility.

   The project site is located within the City's Community Commercial (CC)-4-2 zone. The CC-4-2 zone is intended to accommodate development with high intensity, strip commercial characteristics, allowing heavy commercial uses and residential uses. The project is also located in the Coastal Height Limitation Overlay Zone, the Coastal Overlay Zone, the Parking Impact Overlay Zone (Coastal), and the Pacific Beach Community Plan and Local Coastal Program Land Use Plan (City of San Diego 1995).

10. **Other public agencies whose approval is required** (e.g., permits, financing approval, or participation agreement.): None.

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

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

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

DETERMINATION: (To be completed by Lead Agency)

On the basis of this initial evaluation:

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

☒ 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.

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

☐ The proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect (a) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and (b) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required.

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

EVALUATION OF ENVIRONMENTAL IMPACTS:

1. A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources a lead agency cites in the parentheses following each question. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone). A "No Impact answer should be explained where it is based on project specific factors as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis.)

2. All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.

3. Once the lead agency has determined that a particular physical impact may occur, then the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required.

4. "Negative Declaration: Less Than Significant With Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact." The lead agency must describe the mitigation measures, and

briefly explain how they reduce the effect to a less-than-significant level (mitigation measures from "Earlier Analyses", as described in (5), may be cross-referenced).

5. Earlier analyses may be used where, pursuant to the tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or (mitigated) negative declaration. Section 15063(c)(3)(D). In this case, a brief discussion should identify the following:

    a. Earlier Analysis Used. Identify and state where they are available for review.

    b. Impacts Adequately Addressed. Identify which effects from the checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.

    c. Mitigation Measures. For effects that are "Less Than Significant With Mitigation Measures Incorporated", describe the mitigation measures that were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.

6. Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g., general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.

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

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

9. The explanation of each issue should identify:

    a. The significance criteria or threshold, if any, used to evaluate each question; and

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

Specific MMRP Issue Area Conditions/Requirements

Cultural Resources

As identified in Section V, Cultural Resources, to reduce potentially significant impacts from the potential discovery of cultural resources to below a level of significance, the following mitigation measures are provided for the proposed project:

ARCHAEOLOGICAL MONITORING PROGRAM

MM-CUL-1

I. Prior to Permit Issuance

A. Entitlements Plan Check

1. Prior to issuance of any construction permits, including but not limited to, the first Grading Permit, Demolition Plans/Permits and Building Plans/Permits or a Notice to Proceed for Subdivisions, but prior to the first pre-construction meeting, whichever is applicable, the Assistant Deputy Director (ADD) Environmental designee shall verify that the requirements for Archaeological Monitoring and Native American monitoring have been noted on the applicable construction documents through the plan check process.

B. Letters of Qualification have been submitted to ADD

1. The applicant shall submit a letter of verification to Mitigation Monitoring Coordination (MMC) identifying the Principal Investigator (PI) for the project and the names of all persons involved in the archaeological monitoring program, as defined in the City of San Diego Historical Resources Guidelines (HRG). If applicable, individuals involved in the archaeological monitoring program must have completed the 40-hour HAZWOPER training with certification documentation.

2. MMC will provide a letter to the applicant confirming the qualifications of the PI and all persons involved in the archaeological monitoring of the project meet the qualifications established in the HRG.

3. Prior to the start of work, the applicant must obtain written approval from MMC for any personnel changes associated with the monitoring program.

II. Prior to Start of Construction

A. Verification of Records Search

1. The PI shall provide verification to MMC that a site specific records search (0.25-mile radius) has been completed. Verification includes but is not limited to, a copy of a confirmation letter from South Coastal Information Center, or if the search was in-house, a letter of verification from the PI stating that the search was completed.

2. The letter shall introduce any pertinent information concerning expectations and probabilities of discovery during trenching and/or grading activities.

3. The PI may submit a detailed letter to MMC requesting a reduction to the 0.25-mile radius.

B. PI Shall Attend Pre-Construction Meetings

1. Prior to beginning any work that requires monitoring; the Applicant shall arrange a Pre-Construction Meeting that shall include the PI; Native American consultant/monitor (where Native American resources may be impacted); Construction Manager (CM) and/or Grading Contractor; Resident Engineer (RE); Building Inspector (BI), if appropriate; and MMC. The qualified Archaeologist and Native American Monitor shall attend any grading/excavation related Pre-Construction Meeting to make comments and/or suggestions concerning the Archaeological Monitoring program with the Construction Manager and/or Grading Contractor.

   a. If the PI is unable to attend the Pre-Construction Meeting, the Applicant shall schedule a focused Pre-Construction Meeting with MMC, the PI, RE, CM or BI, if appropriate, prior to the start of any work that requires monitoring.

2. Identify Areas to be Monitored

   a. Prior to the start of any work that requires monitoring, the PI shall submit an Archaeological Monitoring Exhibit (AME) (with verification that the AME has been reviewed and approved by the Native American consultant/monitor when Native American resources may be impacted) based on the appropriate construction documents (reduced to 11x17) to MMC identifying the areas to be monitored including the delineation of grading/excavation limits.

   b. The AME shall be based on the results of a site specific records search as well as information regarding existing known soil conditions (native or formation).

3. When Monitoring Will Occur

   a. Prior to the start of any work, the PI shall also submit a construction schedule to MMC through the RE indicating when and where monitoring will occur.

   b. The PI may submit a detailed letter to MMC prior to the start of work or during construction requesting a modification to the monitoring program. This request shall be based on relevant information, such as review of final construction documents that indicate site conditions such as depth of excavation and/or site graded to bedrock, which may reduce or increase the potential for resources to be present.

III. During Construction

A. Monitor(s) Shall be Present During Grading/Excavation/Trenching

1. The Archaeological Monitor shall be present full-time during all soil-disturbing and grading/excavation/trenching activities that could result in impacts to archaeological resources as identified on the AME. **The Construction Manager is responsible for notifying the RE, PI, and MMC of changes to any construction activities, such as in the case of a potential safety concern within the area being monitored. In certain**

circumstances, OSHA safety requirements may necessitate modification of the AME.

2. The Native American consultant/monitor shall determine the extent of their presence during soil disturbing and grading/excavation/trenching activities based on the AME and provide that information to the PI and MMC. If prehistoric resources are encountered during the Native American consultant/monitor's absence, work shall stop and the Discovery Notification Process detailed in Sections III.B–C and IV.A–D shall commence.

3. The PI may submit a detailed letter to MMC during construction requesting a modification to the monitoring program when a field condition such as modern disturbance post-dating the previous grading/trenching activities, presence of fossil formations, or when native soils are encountered that may reduce or increase the potential for resources to be present.

4. The archaeological and Native American consultant/monitor shall document field activity via the Consultant Site Visit Record (CSVR). The CSVRs shall be faxed by the CM to the RE the first day of monitoring, the last day of monitoring, monthly (**Notification of Monitoring Completion)**, and in the case of ANY discoveries. The RE shall forward copies to MMC.

B. Discovery Notification Process

1. In the event of a discovery, the Archaeological Monitor shall direct the contractor to temporarily divert all soil disturbing activities, including but not limited to digging, trenching, excavating or grading activities in the area of discovery and in the area reasonably suspected to overlay adjacent resources and immediately notify the RE or BI, as appropriate.

2. The Monitor shall immediately notify the PI (unless Monitor is the PI) of the discovery.

3. The PI shall immediately notify MMC by phone of the discovery, and shall also submit written documentation to MMC within 24 hours by fax or email with photos of the resource in context, if possible.

4. No soil shall be exported off site until a determination can be made regarding the significance of the resource specifically if Native American resources are encountered.

C. Determination of Significance

1. The PI and Native American consultant/monitor, where Native American resources are discovered, shall evaluate the significance of the resource. If human remains are involved, the PI and Native American consultant/monitor shall follow protocol in this section.

   a. The PI shall immediately notify MMC by phone to discuss significance determination and shall also submit a letter to MMC indicating whether additional mitigation is required.

   b. If the resource is significant, the PI shall submit an Archaeological Data Recovery Program (ADRP) that has been reviewed by the Native American consultant/monitor, and obtain written approval from MMC. Impacts to significant resources must be mitigated before ground disturbing activities in the

area of discovery will be allowed to resume. **Note: If a unique archaeological site is also an historical resource as defined in CEQA, then the limits on the amount(s) that a project applicant may be required to pay to cover mitigation costs as indicated in CEQA Section 21083.2 shall not apply.**

c. If the resource is not significant, the PI shall submit a letter to MMC indicating that artifacts will be collected, curated, and documented in the Final Monitoring Report. The letter shall also indicate that that no further work is required.

IV. Discovery of Human Remains

If human remains are discovered, work shall halt in that area and no soil shall be exported off site until a determination can be made regarding the provenance of the human remains, and the following procedures as set forth in CEQA Section 15064.5(e), the California Public Resources Code (Sec. 5097.98), and State Health and Safety Code (Sec. 7050.5) shall be undertaken:

A. Notification

1. The Archaeological Monitor shall notify the RE or BI, as appropriate, the MMC, and the PI, if the Monitor is not qualified as a PI. MMC will notify the appropriate Senior Planner in the Environmental Analysis Section (EAS) of the Development Services Department to assist with the discovery notification process.

2. The PI shall notify the Medical Examiner after consultation with the RE, either in person or via telephone.

B. Isolate Discovery Site

1. Work shall be directed away from the location of the discovery and any nearby area reasonably suspected to overlay adjacent human remains until a determination can be made by the Medical Examiner in consultation with the PI concerning the provenance of the remains.

2. The Medical Examiner, in consultation with the PI, will determine the need for a field examination to determine the provenance.

3. If a field examination is not warranted, the Medical Examiner will determine with input from the PI, if the remains are or are most likely to be of Native American origin.

C. If Human Remains are determined to be Native American

1. The Medical Examiner will notify the Native American Heritage Commission (NAHC) within 24 hours. By law, **ONLY** the Medical Examiner can make this call.

2. NAHC will immediately identify the person or persons determined to be the Most Likely Descendent (MLD) and provide contact information.

3. The MLD will contact the PI within 24 hours or sooner after the Medical Examiner has completed coordination to begin the consultation process in accordance with CEQA Section 15064.5(e), the California Public Resources, and Health and Safety Codes.

4. The MLD will have 48 hours to make recommendations to the property owner or representative for the treatment or disposition with proper dignity of the human remains and associated grave goods.

5. Disposition of Native American human remains will be determined between the MLD and the PI and if:

    a. The NAHC is unable to identify the MLD, OR the MLD failed to make a recommendation within 48 hours after being notified by the Commission; or

    b. The landowner or authorized representative rejects the recommendation of the MLD and mediation in accordance with PRC 5097.94 (k) by the NAHC fails to provide measures acceptable to the landowner, THEN

    c. In order to protect these sites, the Landowner shall do one or more of the following:

        (1) Record the site with the NAHC

        (2) Record an open space or conservation easement on the site

        (3) Record a document with the County

    d. Upon the discovery of multiple Native American human remains during a ground-disturbing land development activity, the landowner may agree that additional conferral with descendants is necessary to consider culturally appropriate treatment of multiple Native American human remains. Culturally appropriate treatment of such a discovery may be ascertained from review of the site utilizing cultural and archaeological standards. Where the parties are unable to agree on the appropriate treatment measures the human remains and items associated and buried with Native American human remains shall be reinterred with appropriate dignity, pursuant to Section 5(c).

D. If Human Remains are **NOT** Native American

1. The PI shall contact the Medical Examiner and notify them of the historic era context of the burial.

2. The Medical Examiner will determine the appropriate course of action with the PI and City staff (PRC 5097.98).

3. If the remains are of historic origin, they shall be appropriately removed and conveyed to the San Diego Museum of Man for analysis. The decision for internment of the human remains shall be made in consultation with MMC, EAS, the applicant/ landowner, any known descendant group, and the San Diego Museum of Man.

V. Night and/or Weekend Work

A. If night and/or weekend work is included in the contract, the following will occur:

1. When night and/or weekend work is included in the contract package, the extent and timing shall be presented and discussed at the pre-construction meeting.

2. The following procedures shall be followed:

    a. No Discoveries

In the event that no discoveries were encountered during night and/or weekend work, the PI shall record the information on the CSVR and submit to MMC via fax by 8 a.m. of the next business day.

b. Discoveries

All discoveries shall be processed and documented using the existing procedures detailed in Sections III, During Construction, and IV, Discovery of Human Remains. Discovery of human remains shall always be treated as a significant discovery.

c. Potentially Significant Discoveries

If the PI determines that a potentially significant discovery has been made, the procedures detailed under Section III, During Construction, and IV, Discovery of Human Remains, shall be followed.

d. The PI shall immediately contact MMC, or by 8 a.m. of the next business day to report and discuss the findings as indicated in Section III-B, unless other specific arrangements have been made.

B. If night and/or weekend work becomes necessary during the course of construction:

1. The Construction Manager shall notify the RE or BI, as appropriate, a minimum of 24 hours before the work is to begin.

2. The RE, or BI, as appropriate, shall notify MMC immediately.

C. All other procedures described previously shall apply, as appropriate.

VI. Post Construction

A. Preparation and Submittal of Draft Monitoring Report

1. The PI shall submit two copies of the Draft Monitoring Report (even if negative), prepared in accordance with the Historical Resources Guidelines (Appendix C/D) that describes the results, analysis, and conclusions of all phases of the Archaeological Monitoring Program (with appropriate graphics) to MMC for review and approval within 90 days following the completion of monitoring. **It should be noted that if the PI is unable to submit the Draft Monitoring Report within the allotted 90-day timeframe resulting from delays with analysis, special study results or other complex issues, a schedule shall be submitted to MMC establishing agreed due dates and the provision for submittal of monthly status reports until this measure can be met.**

a. For significant archaeological resources encountered during monitoring, the Archaeological Data Recovery Program shall be included in the Draft Monitoring Report.

b. Recording Sites with State of California Department of Parks and Recreation

The PI shall be responsible for recording (on the appropriate State of California Department of Park and Recreation forms-DPR 523 A/B) any significant or potentially significant resources encountered during the Archaeological Monitoring Program in accordance with the City's Historical Resources

Guidelines, and submittal of such forms to the South Coastal Information Center with the Final Monitoring Report.

2. MMC shall return the Draft Monitoring Report to the PI for revision or, for preparation of the Final Report.

3. The PI shall submit revised Draft Monitoring Report to MMC for approval.

4. MMC shall provide written verification to the PI of the approved report.

5. MMC shall notify the RE or BI, as appropriate, of receipt of all Draft Monitoring Report submittals and approvals.

B. Handling of Artifacts

1. The PI shall be responsible for ensuring that all cultural remains collected are cleaned and catalogued.

2. The PI shall be responsible for ensuring that all artifacts are analyzed to identify function and chronology as they relate to the history of the area; that faunal material is identified as to species; and that specialty studies are completed, as appropriate.

3. The cost for curation is the responsibility of the property owner.

C. Curation of artifacts: Accession Agreement and Acceptance Verification

1. The PI shall be responsible for ensuring that all artifacts associated with the survey, testing and/or data recovery for this project are permanently curated with an appropriate institution. This shall be completed in consultation with MMC and the Native American representative, as applicable.

2. The PI shall include the Acceptance Verification from the curation institution in the Final Monitoring Report submitted to the RE or BI and MMC.

3. When applicable to the situation, the PI shall include written verification from the Native American consultant/monitor indicating that Native American resources were treated in accordance with state law and/or applicable agreements. If the resources were reinterred, verification shall be provided to show what protective measures were taken to ensure no further disturbance occurs in accordance with Section IV(5), Discovery of Human Remains.

D. Final Monitoring Report(s)

1. The PI shall submit one copy of the approved Final Monitoring Report to the RE or BI as appropriate, and one copy to MMC (even if negative), within 90 days after notification from MMC that the draft report has been approved.

2. The RE shall, in no case, issue the Notice of Completion and/or release of the Performance Bond for grading until receiving a copy of the approved Final Monitoring Report from MMC, which includes the Acceptance Verification from the curation institution.

MM-CUL-2 Prior to the start of construction, a paleontological monitoring program shall be carried out under the supervision of a qualified paleontologist, which includes attendance at preconstruction meetings as well as onsite inspections of active excavations. During construction, if well-preserved fossils are discovered, measures

shall be implemented to retrieve, adequately preserve, and curate the resources. The qualified paleontologist must also submit a monitoring results report to MMC staff.

Noise

As identified in Section XII, Noise, to reduce potentially significant impacts from construction noise to below a level of significance, the following mitigation measures are provided for the proposed project:

MM-NOI-1 **Construction Noise Mitigation:** Prior to the issuance of the first demolition permit, the applicant shall implement the following, to the satisfaction of the City of San Diego Development Services Department:

- All construction equipment, fixed or mobile, shall be equipped with properly operating and maintained mufflers.
- Construction noise reduction methods, such as shutting off idling equipment, maximizing the distance between construction equipment staging areas and occupied residential areas, and use of electric air compressors and similar power tools rather than diesel equipment, shall be used.
- During construction, stationary construction equipment shall be placed such that emitted noise is directed away from or shielded from sensitive noise receivers.
- During construction, stockpiling and vehicle staging areas shall be located as far as practical from noise sensitive land uses.

The following mitigation measure would reduce exterior noise levels to a level below significance.

MM-NOI-2 **Exterior Noise Mitigation:** Prior to issuance of the first occupancy permit, the applicant shall ensure that an exterior noise wall is installed along the western boundary of the townhome units located in the northwestern portion of the project site as shown on Figure 9. The height of the noise wall associated with the townhome units shall be ten (10) feet in height above the pad height of the townhome units, or as recommended by a certified acoustician following completion of detailed site design and building plans. The portion of the noise wall extending southwest from the northwest corner of the site may be stepped down to eight (8) feet at the second townhome as shown on Figure 9, or as recommended by a certified acoustician following completion of detailed site design and building plans.

A second noise wall shall be installed along the outdoor pool deck area as shown on Figure 9. The noise wall associated with the pool deck shall be ten (10) feet in height from the height of the pool deck, or as recommended by a certified acoustician following completion of detailed site design and building plans. The noise wall may be stepped down to a height of eight (8) feet at 60 feet southwest of the northeastern corner of the site (see Figure 9), or as recommended by a certified acoustician following completion of detailed site design and building plans.

The noise wall constructed at both locations shall be constructed with material that has a minimum density of 2.5 pounds per square inch.

The following mitigation measure would reduce interior noise levels to a level below significance.

MM-NOI-3 **Interior Noise Mitigation (Interior Noise Study):** Upon completion of detailed building plans (i.e., room dimensions, wall and roof assemblies and window/door schedules) and prior to the issuance of the first occupancy permit, the applicant shall ensure that an interior noise mitigation analysis be prepared, to the satisfaction of the City of San Diego Development Services Department. The analysis shall identify specific mitigation measures to ensure interior noise levels remain at or below 45 dB per the City of San Diego's interior noise standard. Noise abatement features shall be identified to attenuate noise and shall be incorporated into project design as necessary. For residential units, such features shall include mechanical ventilation or an air-conditioning system (or equivalent means of natural ventilation), sound-rated windows and sound-rated doors. Sound ratings shall be compliant with the recommendations provided in the project-specific noise report prepared by Veneklasen Associates (Veneklasen 2016). For non-residential spaces, sound ratings shall be compliant with the recommendations provided in the project-specific noise report prepared by Veneklasen Associates.

MM-NOI-4 **Interior Noise Mitigation (Exterior Façade Construction):** Upon completion of detailed building plans (i.e., wall and roof assemblies and window/door schedules), the applicant shall ensure that residential units located within Zone A as shown on Figure 9 will be constructed with an "upgraded" exterior façade assembly that would include, but not be limited to, 3-coat stucco, plywood, studs, batt insulation, Resilient Channel, and gypsum board per specifications provided in the project-specific noise report prepared by Veneklasen Associates (Veneklasen 2016).

<u>Traffic</u>

As identified in Section XVI, Traffic, to reduce potentially significant traffic impacts, the following mitigation measures would reduce traffic impacts to a level below significance.

MM-TR-1 Prior to issuance of the first building permit, the applicant shall assure by permit and bond the installation of an adaptive signal control system at six intersections on Mission Bay Drive, to the satisfaction of the City Engineer. The six intersections that would be improved include Garnet Avenue and Mission Bay Drive, Magnolia Avenue and Mission Bay Drive, Bunker Hill Street and Mission Bay Drive, Grand Avenue and Mission Bay Drive, Rosewood Street and Mission Bay Drive, and Mission Bay Drive and North Mission Bay Drive. Improvements shall include enhanced fiber optic signal interconnects and communications, additional detection sensors and computer equipment at each intersection, and a remote link to the Traffic Management Center downtown as well as an advance flashing beacon, satisfactory to the City Engineer. The applicant shall submit a proposed implementation plan for installation of the adaptive signal control system to the City of San Diego as early as possible. All improvements shall be completed and accepted by the City Engineer prior to issuance of the first certificate of occupancy.

MM-TR-2 **Restriping:** Prior to issuance of the first occupancy permit, the applicant shall assure that a centerline stripe be added to improve Rosewood Street between Mission Bay Drive and the project access to a two-lane collector road.

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
I) AESTHETICS – Would the project:				
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☒	☐

The project site is an existing commercial and retail lot located in a highly developed urban area. The project viewshed consists largely of adjacent commercial and residential uses to the north, Mission Bay Golf Course and Practice Center to the west, Interstate 5 (I-5) to the east, and I-5 freeway ramps and Mission Bay Drive to the south. Further south, past Mission Bay Drive is North Mission Bay Drive, De Anza Cove Park and De Anza Cove of Mission Bay. Construction of the proposed project would affect the visual environment during excavation, grading, and on-site storage of equipment and materials, however; all construction equipment utilized on-site would be lower in scale then existing development, and would not substantially effect a scenic vista. Although views may be temporarily altered, construction activities would be short term. Temporary visual impacts would include views of large construction equipment, storage areas, and any other potential construction related materials as a result of the project. All construction equipment would be vacated from the project site upon completion of the proposed project, after which time construction-related visual impacts would cease.

The primary visual resources within the Pacific Beach community include De Anza Cove of Mission Bay located approximately 0.25 mile south, Kate O. Sessions Memorial Park located approximately 1.5 miles northwest, and the Pacific Ocean located approximately 2.6 miles west. However, these resources are located too far away for on-site viewers, and intervening topographic constraints limit views of these resources. Additionally, the proposed project would be consistent with the Coastal Height Limitation Overlay Zone (also referred to as "Proposition D"), which limits the height of buildings and structures to 30 feet (City of San Diego, 2013).

The Pacific Beach Community Plan identifies a number of coastal views throughout the Plan area. In relation to the proposed project, a portion of Mission Bay Drive adjacent to the southern area of the project site is designated as "road with public view of water;" and a portion of the I-5 northeast of the project site is designated as having "intermittent public view." However, development of the proposed project would not affect "public views of water" from the roadway of Mission Bay Drive and Grand Avenue, as the project is located east of those corridors. Additionally, development of the project would not degrade public views of Mission Bay from the portion of I-5 identified as "intermitted public view". Thus, the project would not result in a substantial adverse effect on a scenic vista and impacts would be less than significant.

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

There are no officially designated state scenic highways in the project vicinity, or any designated scenic resources such as trees, rock outcroppings or historic buildings. Interstate 5 is listed as an "eligible" state scenic highway under the Department of Transportation Scenic Highway Program; however, it is not considered an officially designated state scenic highway (DOT 2015). Therefore, no

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact

impacts to scenic resources within a state scenic highway would occur.

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

Redevelopment of the project site from a former car dealership and current jet ski and boat rental, and outdoor storage use to higher-density multifamily residential units would result in changes to the visual character of the project site and immediate vicinity. Construction activities during site development would introduce the potential use of heavy machinery, such as large trucks, cranes, bulldozers, and other equipment needed for grading and construction activities. The presence of this equipment and the grading and construction activities associated with the proposed project would temporarily alter the visual character and quality of the site and would be visible from surrounding areas. Construction of the project would last approximately 24 months, after which time all equipment would be removed from the site and construction-related visual impacts would cease.

Once the project is operational, surrounding commercial and residential areas would have views of the proposed mixed-use retail and residential three-story development. The project design and landscaping plan would improve the visual quality of the project site as compared to its current state as a former car dealership use and boat and jet ski rental facility. The project design would include neutral colors and materials that would be cohesive with adjacent land uses (see Figure 5, Proposed Project Rendering – View of Public Plaza Along Mission Bay Drive, and Figure 6, Proposed Project Rendering – View from Mission Bay Drive Looking Northwest). The landscape plan would conform to the Land Development Code – Landscape Regulations, the Land Development Manual – Landscape Standards, Standard Specifications for Public Works Construction (Green Book), and the San Diego Regional Standard Drawings. Therefore, impacts would be less than significant.

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

Lighting for the proposed project would be provided throughout, affixed to building facades within the parking structures, along the pedestrian walkways, the pool/spa/lounge area, and open space areas. Lighting features would consist of energy-efficient lighting that would be fully shielded and directed downward to minimize light trespass onto surrounding properties. All lighting, with the exception of parking garage lighting, would be turned off during daylight hours. The proposed project has the potential to create new light sources in the project area due to the increase in density from current use. However, because the proposed project is situated within an existing urban area, it would not substantially increase lighting levels above current ambient conditions.

Title 24, Part 6, Building Energy Efficiency Standards for Residential and Nonresidential Buildings, of the California Code of Regulations establishes energy budgets or maximum energy use levels. The standards of Title 24 supersede local regulations, and state requirements mandate Title 24 requirements through implementation by local jurisdictions. The proposed project would comply with Title 24 requirements, bringing development on-site up to current code compared to existing

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact

conditions. All outdoor lighting would adhere to Chapter 14, Article 2, Division 7, Section 142.0740, Outdoor Lighting Regulations, of the City's Municipal Code. In addition, the project would not be located adjacent to a light-sensitive property, and therefore implementation of the proposed project would not create a substantial light or glare impact. Impacts would be less than significant, and no mitigation is required.

II. AGRICULTURAL AND FOREST RESOURCES: In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project, and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. Would the project:

a) Converts Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒

The project site is classified as Urban and Built-Up land by the Farmland Mapping and Monitoring Program (FMMP). Similarly, the land surrounding the project site is also classified as Urban and Built-Up land by the FMMP (Department of Conservation 2015). Therefore, the proposed project would not convert farmland to non-agricultural uses and no impact would occur.

b) Conflict with existing zoning for agricultural use, or a Williamson Act Contract?	☐	☐	☐	☒

The proposed project is not under a Williamson Act Contract nor is any surrounding land under a Williamson Act Contract. No impacts would result due to implementation of the proposed project.

c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 1220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by	☐	☐	☐	☒

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Government Code section 51104(g))?				

No land within the Pacific Beach Community Plan is designated as forest land or timberland. Therefore, the project would not conflict with existing zoning forest land and no impact would occur.

d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒

The proposed project site is located within a largely developed and urbanized area of the City and is not designated as forest land. Therefore, the project would not convert forest land to non-forest use. No impact would occur.

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

No existing agricultural uses are located in the proximity of the project area that could be affected. Therefore, the project would not convert farmland to non-agricultural uses or forestland to non-forest use. No impact would occur.

III. AIR QUALITY – Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied on to make the following determinations – Would the project:

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

The San Diego Air Pollution Control District (SDAPCD) and San Diego Association of Governments (SANDAG) are responsible for developing and implementing the clean air plans for attainment and maintenance of the ambient air quality standards in the San Diego Air Basin (SDAB), specifically the State Implementation Plan (SIP) and Regional Air Quality Strategy (RAQS).[1] The federal O3 maintenance plan, which is part of the SIP, was adopted in 2012. The SIP includes a demonstration that current strategies and tactics will maintain acceptable air quality in the SDAB based on the National Ambient Air Quality Standards (NAAQS). The RAQS was initially adopted in 1991 and is updated on a triennial basis (most recently in 2009). The RAQS outlines SDAPCD's plans and control

[1] For the purpose of this discussion, the relevant federal air quality plan is the ozone maintenance plan (SDAPCD 2012). The RAQS is the applicable plan for purposes of state air quality planning. Both plans reflect growth projections in the SDAB.

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact

measures designed to attain the state air quality standards for O3. The SIP and RAQS rely on information from California Air Resources Board (CARB) and SANDAG, including mobile and area source emissions, as well as information regarding projected growth in San Diego County and the cities in the county, to project future emissions and then determine from that the strategies necessary for the reduction of emissions through regulatory controls. CARB mobile source emission projections and SANDAG growth projections are based on population, vehicle trends, and land use plans developed by San Diego County and the cities in the county as part of the development of their general plans.

If a project proposes development that is greater than that anticipated in the local plan and SANDAG's growth projections, the project might be in conflict with the SIP and RAQS and may contribute to a potentially significant cumulative impact on air quality. The site is zoned CC-4-2 (Community Commercial). The CC-4-2 zone is intended to accommodate development with high intensity, strip commercial characteristics, allowing heavy commercial uses and residential uses. The project would be consistent with the existing zoning and General Plan designation for the site; therefore, vehicle trip generation and planned development for the site is considered to be anticipated in the SIP and RAQS. Because the proposed land uses and associated vehicle trips are considered anticipated in local air quality plans, the proposed project would be consistent at a regional level with the underlying growth forecasts in the RAQS. Impacts would be less than significant.

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

Construction

Construction of the proposed project would result in a temporary addition of pollutants to the local airshed caused by soil disturbance, fugitive dust emissions, and combustion pollutants from on-site construction equipment, as well as from off-site trucks hauling construction materials. Fugitive dust (PM10 and PM2.5) emissions would primarily result from grading and site preparation activities. NOx and CO emissions would primarily result from the use of construction equipment and motor vehicles. Emissions from the construction phase of the project were estimated using the CalEEMod Version 2013.2.2, available online (www.caleemod.com). For the purposes of modeling, it was assumed that construction would occur intermittently over an approximately 2-year period (24 months). Construction of the project would include demolition, excavation, grading, utility connections, building and garage construction, architectural coatings, paving of alleys and sidewalks, public improvements, and landscaping improvements. The entire 2.94-acre project site would be graded with approximately 51,000 cubic yards of cut and 900 cubic yards of fill. Approximately 50,100 cubic yards would be exported to complete the proposed grading. Initial site work would include earthwork, retaining wall construction and storm drain installation.

Model defaults were used for construction equipment specifications, and the equipment mix is meant to represent a reasonably conservative estimate of construction activity. For the analysis, it was generally assumed that heavy construction equipment would be operating at the site for approximately 8 hours per day, 6 days per week (approximately 26 days per month), during

construction. Additionally, CalEEMod model assumptions were used for worker trips and vendor trips during building construction subphases.

Table 1 shows the estimated maximum mitigated daily construction emissions associated with the construction phases of the project in each year. The values shown are the maximum summer or winter daily emissions results from CalEEMod. Complete details of the emissions calculations are provided in Appendix A of this document.

Table 1
Estimated Maximum Daily Construction Emissions (pounds/day)

	VOC	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
2017	6.47	73.61	62.08	0.14	7.63	4.36
2018	5.37	44.73	45.34	0.08	4.47	2.86
2019	39.75	1.97	3.07	0.00	0.44	0.21
Maximum Daily Emissions	*39.75*	*73.61*	*62.08*	*0.14*	*7.63*	*4.36*
Emission Threshold	*137*	*250*	*550*	*250*	*100*	*55*
Threshold Exceeded?	**No**	**No**	**No**	**No**	**No**	**No**

Source: CalEEMod Version 2013.2.2. See Appendix A for complete results.
VOC = volatile organic compound; NO_x = oxides of nitrogen; CO = carbon monoxide; SO_x = sulfur oxides; PM_{10} = coarse particulate matter; $PM_{2.5}$ = fine particulate matter. Emissions shown represent the highest of summer and winter emissions.

As shown, daily construction emissions for the proposed project would not exceed the City's significance thresholds for VOC, NOx, CO, SOx, PM10, or PM2.5; therefore, impacts during construction would be less than significant.

Operation

Following completion of construction activities, the project would generate VOC, NOx, CO, SOx, PM10, and PM2.5 emissions from mobile and stationary sources, including vehicular traffic and area sources (space heating, water heating, landscaping). According to the project's traffic report prepared by Urban Systems (Urban Systems 2016a), the proposed project would result in a total of 1,822 average daily trips. See Appendix H for detailed trip generation information. The CalEEMod Version 2013.2.2 model was used to estimate daily emissions from proposed vehicular and area sources for the operational year 2019.

Table 2 presents the maximum daily emissions associated with the operation of the proposed project. Complete details of the emissions calculations are provided in Appendix A of this document.

Table 2
Estimated Daily Maximum Operational Emissions (pounds/day)

Emission Source	VOC	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
Summer						
Area Sources	8.68	0.17	14.28	0.00	0.08	0.08
Energy	0.03	0.23	0.11	0.00	0.02	0.02
Mobile Sources	4.96	8.50	41.30	0.10	6.86	1.91
Total	*13.67*	*8.90*	*55.69*	*0.10*	*6.96*	*2.01*
Winter						
Area Sources	8.68	0.17	14.28	0.00	0.08	0.08
Energy	0.03	0.23	0.11	0.00	0.02	0.02

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact

Mobile Sources	5.32	9.01	45.47	0.10	6.86	1.91
Total	*14.03*	*9.40*	*59.86*	*0.10*	*6.96*	*2.01*
Emission Threshold	*137*	*250*	*550*	*250*	*100*	*55*
Threshold Exceeded?	**No**	**No**	**No**	**No**	**No**	**No**

Source: See Appendix A for complete results.
Note: Emissions represent maximum of summer and winter. "Summer" emissions are representative of the conditions that may occur during the ozone season (May 1 to October 31), and "winter" emissions are representative of the conditions that may occur during the balance of the year (November 1 to April 30).

As shown, the daily operational emissions would not exceed the City's significance threshold for VOC, NO_x, CO, SO_x, PM_{10}, or $PM_{2.5}$. Operational emissions would, therefore, be less than significant.

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)?	☐	☐	☒	☐

Please see III (a) and III (b). The project would not result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under applicable federal or state ambient air quality standards. Impacts would be less than significant.

d) Create objectionable odors affecting a substantial number of people?	☐	☐	☒	☐

Volatile organic compound emissions from architectural coatings and other potential odor impacts due to the project would not be significant, since any odor generation would be intermittent and would terminate upon completion of the construction phase of the project. Additionally, operation of the proposed mixed-use residential and commercial project would not be associated with a land use that generates significant odor sources. As a result, the proposed project would not create objectionable odors affecting a substantial number of people, and impacts would be less than significant.

IV. BIOLOGICAL RESOURCES – Would the project:

a) Have substantial adverse effects, 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	☐	☐	☒	☐

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Department of Fish and Game or U.S. Fish and Wildlife Service?				

The site has been previously developed within an urban setting, consists primarily of impervious area which does not support biological resources, and does not contain or support any Environmentally Sensitive Lands as defined by the Biology Guidelines of the City's Land Development Manual, native or sensitive vegetation communities, wetlands that would be expected to support special-status wildlife species, or lands that are classified as Tier I Habitats, Tier II Habitats, Tier IIIA Habitats, or Tier IIIB Habitats. According to the Biology Guidelines of the City's Land Development Manual, the different habitat tiers are classified as follows: Tier I Habitats include lands classified as southern fore dunes, Torrey pines forest, coastal bluff scrub, maritime succulent scrub, maritime chaparral, native grasslands, and oak woodlands. Tier II includes lands classified as coastal sage scrub and coastal sage scrub/chaparral. Tier IIIA includes lands classified as mixed chaparral and chamise chaparral. Tier IIIB includes lands classified as non-native grassland. Tier IV includes lands classified as disturbed, agriculture, and eucalyptus.

Moreover, implementation of the project would not have a substantial adverse effect on candidate, sensitive, or special-status species as 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. Impacts would be less than significant.

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

As previously described in response to IV(a), the site has been fully developed within an urban setting, consists primarily of impervious area which does not support biological resources, and does not contain or support any Environmentally Sensitive Lands. The project would not have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in the Pacific Beach Community Plan, the City of San Diego General Plan, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service. Impacts would be less than significant.

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?	☐	☐	☐	☒

The project site is fully developed, in an urban setting. Additionally, as shown in the Pacific Beach

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact

Community Plan and Local Coastal Program Land Use Plan, there are no federally protected wetlands on site. Therefore, construction activities would not cause an impact to wetlands as defined by Section 404 of the Clean Water Act. There would be no impacts to federally protected wetlands.

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?	☐	☐	☐	☒

The project site is fully developed, in a highly urbanized setting. The project site is not located within a wildlife corridor, or within a migratory passageway for any native resident or migratory fish or wildlife species. No impact would occur.

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

The proposed project would be consistent with all relevant goals and policies of the City's General Plan and of the Pacific Beach Community Plan and Local Coastal Land Use Plan regarding the preservation and protection of biological resources. Although the proposed project is not within the City's Multi-Habitat Planning Area (MHPA), the project would be consistent with all relevant goals and policies regarding the preservation and protection of biological resources, as outlined in the City's Multiple Species Conservation Program (MSCP). Additionally, project implementation would be consistent with all biological resources policies in the Pacific Beach Community Plan and Local Coastal Land Use Plan.

The project would remove multiple trees along Rosewood Street; however, the proposed project would be compliant with Chapter 6, Article 2, Division 6 of the City's municipal code regarding tree removal. As such, the proposed project would not conflict with any local tree preservation policies, and impacts would be less than significant.

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?	☐	☐	☒	☐

Although the proposed project is not within the City's Multi-Habitat Planning Area (MHPA), the project would be consistent with all relevant goals and policies regarding the preservation and

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact

protection of biological resources, as outlined in the City's Multiple Species Conservation Program (MSCP). In addition, implementation of the project would be consistent with all biological resources policies outlined in the Pacific Beach Community Plan and Local Coastal Land Use Plan. Impacts would be less than significant.

V. CULTURAL RESOURCES – Would the project:

a) Cause a substantial adverse change in the significance of an historical resource as defined in §15064.5?	☐	☐	☐	☒

The purpose and intent of the Historical Resources Regulations of the Land Development Code (Chapter14, Division 3, and Article 2) is to protect, preserve, and where damaged, restore the historical resources of San Diego. The regulations apply to all proposed development within the City when historical resources are present on the premises. A project that may cause a substantial adverse change in the significance of a historical resource may have a significant effect on the environment (Sections 15064.5(b) and 21084.1). A substantial adverse change is defined as demolition, destruction, relocation, or alteration activities, which would impair historical significance (Sections 15064.5(b)(1)). Any historical resource listed in, or eligible to be listed in the California Register of Historical Resources, including archaeological resources, is considered to be historically or culturally significant.

A historical resources investigation was completed for the proposed project in September 2015 (Appendix B). According to the City's Guidelines for the Application of the Designation Criteria, a building, structure, sign, interior element and fixture, feature, site, place, district, area, or object may be designated as a historical resource by the City of San Diego Historical Resources Board if it meets the designation criteria. The existing site does not represent "special elements" of the community's historical or architectural development under Criterion A; the existing building is not associated with persons or events significant in local, state or national history under Criterion B; the existing building does not represent a recognized architectural style, including any of those identified in the San Diego Historic Modernism Context Statement under Criterion C; the existing building does not represent a type, method, or period of construction under Criterion C; nor was the existing building designed by a Master Architect under Criterion D (Appendix B). Therefore, the project site is not considered to meet any of the established criteria for historic or architectural significance, and the existing development is not considered to be architecturally or historically eligible for the local San Diego Historic Register.

Additionally, according to the City's Guidelines for the application of the Historical Resources Board Designation Criteria, an Integrity Test is utilized to further determine historical significance. Under the City's Guidelines, there are two primary principles for understanding integrity:

1) Integrity is the authenticity of a historical resource's physical integrity clearly indicated by the retention of characteristics that existed during the resource's period of significance.

2) Integrity relates to the presence or absence of historical materials and character defining features.

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact

It was found that the existing buildings have retained their location, materials and workmanship aspects of integrity; however, they have lost their setting, design, and feeling aspects and never possessed associative integrity. Therefore, they do not pass the integrity test and are not considered historic buildings by the City (Appendix B).

As a property that is not historically or architecturally significant under local, state, or national significance criteria, the buildings are not eligible for listing in the National Register of Historic Places, the California Register of Historical Resources, the California Historic Resource Inventory, or the San Diego Historical Resources Board Register. Therefore, impacts would be less than significant.

b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	☐	☒	☐	☐

The project site was previously disturbed during construction and paving of the former Guy Hill Cadillac dealership. Due to the extensive disturbance that has occurred on and adjacent to the property, there is minimal potential for sub-surface resources to be unearthed during ground-disturbing activities. However, if unknown archaeological artifact deposits or cultural features are discovered, grading activities **MM-CUL-1** would reduce potentially significant impacts to below a level of significance.

c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☒	☐	☐

The project site is located on the western portion of the coastal plain. Sedimentary materials make up the geologic unit encountered on the project site and consist of late Pleistocene-age Old Paralic Deposits Unit 6 (formerly known as part of the Bay Point Formation) (Appendix C1). The Old Paralic Deposits Unit 6 is a shallow marine and non-marine estuarine with colluvium sediments composed of weakly cemented sandstone, siltstone, and claystone. This unit is in excess of 36 feet thick at the project site and was encountered to at least an elevation of -12.5 feet below mean sea level. The unit has been reported to be over 100 feet thick north of the downtown area and was deposited on the late Pliocene to early Pleistocene-age San Diego Formation, which typically consist of poorly cemented sandstones. Late Pliocene to early Pleistocene-age San Diego Formation was not encountered at the project site during the geotechnical investigation, and is not expected to be encountered during construction. However, it is presumed that the San Diego Formation exists below the Old Paralic Deposits Unit 6 and is at least 75 feet below the existing surface grades. The City's Significance Determination Thresholds guidance contains a Paleontological Monitoring Determination Matrix that identifies the San Diego Formation to have high sensitivity for paleontological resources (City of San Diego 2011). As such, the City's Significance Determination Thresholds state that paleontological monitoring is required in high sensitivity formations when grading would exceed 1,000 cubic yards and would cut to a depth of 10 feet or more.

The project would require 51,000 cubic yards of cut and 900 cubic yards of fill, with maximum depth of cut areas 23 feet; therefore, the proposed project would have a potentially significant impact on

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact

paleontological resources. As such, paleontological monitoring will be required during project grading as delineated in **MM-CUL-2**. Impacts would be less than significant with mitigation incorporated.

d) Disturb and human remains, including those interred outside of formal cemeteries?	☐	☒	☐	☐

The proposed project site is not currently used as a cemetery and is not otherwise known to contain human remains. However, this does not preclude finding human remains during project excavation and grading activities. As standard practice, should any human remains be encountered, State Health and Safety Code Section 7050.5 states that no further disturbance can occur in the immediate area until the County Coroner has made the necessary findings as to origin and disposition, pursuant to Public Resources Code Section 5097.98. If the remains are determined to be prehistoric, the County Coroner will notify the Native American Heritage Commission, which will determine and notify a most likely descendant. With permission of the landowner or an authorized representative, the most likely descendant may inspect the site of the discovery, and will complete the inspection within 24 hours of notification by the Native American Heritage Commission. The most likely descendant would have the opportunity to make recommendations to the Native American Heritage Commission on the disposition of the remains. The proposed project would be required to adhere to the State Health and Safety Code as delineated in **MM-CUL-1**, which would reduce impacts to below a level of significance with mitigation.

VI. GEOLOGY AND SOILS – 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? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☒	☐

A Geotechnical Investigation was conducted for the site by Geocon Incorporated on September 11, 2015 (Appendix C1). A Fault Investigation was completed for the proposed project on September 11, 2015, by Rockwell Consulting (Appendix C2). These investigations found that review of the *City of San Diego Seismic Safety Study Geologic Hazards and Faults Tile 25* indicates that the site vicinity is assigned a Geologic Hazard Category 31, indicating a high liquefaction potential, shallow groundwater, and the presence of hydraulic fills. Additionally, a Geologic Hazard Category 11 is also shown on the property indicating active, Alquist-Priolo Earthquake Fault Zone (Appendix C1).

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact

According to the California Geological Survey Alquist-Priolo Earthquake Fault Zone Map, La Jolla Quadrangle, effective November 1, 1991, the site is located within an Earthquake Fault Special Studies Zone due to the presence of the Rose Canyon Fault Zone (RCFZ). The central and eastern portion of the site is located within a City of San Diego Special Studies Zone, which shows that a buried potentially active, northwest trending fault is located on the northeast portion of the site, and a second buried sub-parallel potentially active fault is located approximately 185 feet to the east along I-5. The main active fault trace within the RCFZ is located approximately 1,250 feet east of the site. The estimated deterministic maximum earthquake magnitude and peak ground acceleration of the Newport Inglewood-Rose Canyon Fault are 7.5 and 0.53g, respectively.

Geocon, Inc. excavated a total of seven trenches during three phases of geotechnical work at the project site. These trenches were adequately-placed and sufficiently deep to expose any faults associated with the Rose Canyon fault zone that may project into or across the project site. Excavation of these trenches found that the soil and underlying strata were found to be continuous and unbroken, indicating the absence of faulting since deposition of these strata (Appendix C2). Although the project site is located in a seismically active area and may be subject to ground shaking due to earthquake activities in the region; both the Geotechnical Investigation and Fault Investigation completed for the project site (Appendix C1 and Appendix C2) concluded that there are no active faults that cross the site or that would potentially impact site development. Additionally, based on the analysis of historical aerial photography near the project site, is the geotechnical analysis provided in Appendix C1 concluded that it is highly unlikely that any active faults lie within 50 feet of the project site boundary.

Based on the results of the geotechnical investigation, the project site can be developed as proposed provided the recommendations of the report are followed and implemented during design and construction (Appendix C1). Additionally, adherence to the most recent California Building Code requirements for geologic and earthquake safety would ensure that impacts related to earthquakes would be less than significant.

ii) Strong seismic ground shaking?	☐	☐	☒	☐

As previously described, according to the California Geological Survey Alquist-Priolo Earthquake Fault Zone Map, La Jolla Quadrangle, the site is located within an Earthquake Fault Special Studies Zone due to the presence of the Rose Canyon Fault Zone (RCFZ) located approximately 0.2 mile from the site. Although there are no fault traces on the site according to the state map, the close proximity of the Newport Inglewood-Rose Canyon Fault would be a dominant source of potential ground motion. Earthquakes that might occur on the Newport Inglewood-Rose Canyon Fault or other faults within the Southern California and northern Baja California area are potential generators of significant ground motion at the site. The estimated deterministic maximum earthquake magnitude and peak ground acceleration of the Newport Inglewood-Rose Canyon Fault are 7.5 and 0.53 g, respectively. Although the proposed project would be subject to strong seismic ground shaking due to the proximity of the Newport Inglewood-Rose Canyon Fault, both the Geotechnical Investigation and Fault Investigation completed for the project site concluded that there are no active faults that cross the site or potentially impact site development; and it is highly unlikely that any active faults lie within 50 feet of the project site boundary. As previously discussed,

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact

the results of the geotechnical investigation state that the project site can be developed as proposed provided the recommendations of the report are followed and implemented during design and construction (Appendix C1). Additionally, adherence to the most recent California Building Code requirements for geologic and earthquake safety would ensure that impacts related to ground shaking would be less than significant.

iii) Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐

As previously stated in Threshold VI(a), a Geotechnical Investigation was completed for the proposed project on September 11, 2015, by Geocon (Appendix C1). This investigation found that review of the *City of San Diego Seismic Safety Study Geologic Hazards and Faults Tile 25* indicates that the site vicinity is assigned a Geologic Hazard Category 31, indicating a high liquefaction potential, shallow groundwater, and the presence of hydraulic fills. Liquefaction typically occurs when a site is located in a zone with seismic activity; on-site soils are cohesionless or silt/clay with low plasticity; groundwater is encountered within 50 feet of the surface; and soil densities are less than about 70% of the maximum dry densities. However due to the age and the dense nature of the underlying Old Paralic Deposits on the project site, the Geotechnical Investigation concludes that liquefaction potential for the project site is considered very low (Appendix C1). Therefore, impacts related to liquefaction would be less than significant.

iv) Landslides?	☐	☐	☒	☐

The Geotechnical Investigation completed for the proposed project states that evidence of ancient landslide deposits at the project site were not observed during the geotechnical investigation or during the review of aerial photographs. In addition, there are no known landslides near the project site, and the project site is not in the path of any known or potential landslides (Appendix C1). Therefore, impacts related to landslides would be less than significant.

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

Construction activities such as excavation and grading may have the potential to cause soil erosion or loss of topsoil. Impacts related to soil erosion and loss of topsoil during construction would be potentially significant. However, a Storm Water Pollution Prevention Plan (SWPPP) would be incorporated, which specifies best management practices (BMPs) to be implemented during project construction to prevent pollutants from contacting stormwater and to control erosion and sedimentation, in conformance with the National Pollutant Discharge Elimination System (NPDES) permit. The SWPPP would be prepared and submitted to the Regional Water Quality Control Board (RWQCB) for review and approval prior to the start of construction. The SWPPP would include standard construction methods such as temporary detention basins to control on-site and off-site erosion. Upon completion of construction, soil erosion would be minimized by the proposed development and landscaping. With approval and implementation of the SWPPP, impacts related to erosion would be less than significant.

c) Be located on a geologic unit or soil that is unstable, or that	☐	☐	☒	☐

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?				

The Geotechnical Investigation conducted for the proposed project (Appendix C1) indicated that the project site is underlain by previously placed fill, undocumented fill, and alluvium overlying Pleistocene-age Old Paralic Deposits.

Previously placed fill (Qpf) is considered suitable to receive additional fill or structures; however, the proposed project would remove those materials during excavation for the subterranean parking. Undocumented fill (Qudf) underlying the project site was encountered at depths ranging from 2.5 to 12 feet below existing grade during the geotechnical field investigation. The undocumented fill is considered unsuitable for support of the proposed project and would require remedial grading; however, the undocumented fill could be reused as new fill for the planned grading and backfill operations. Alluvial deposits (Qal) were encountered within the southern portion of the project site with thicknesses ranging from 3 to 9 feet. This material is associated with an old drainage that existing in this are prior to site grading for the existing development, and is not suitable to receive structural fill or settlement sensitive structures. This material would be removed during excavation for the proposed garage or removed and replaced as compacted fill, as recommended in the Geotechnical Investigation. Late Pleistocene-age Old Paralic Deposits (Qop) Unit 6 underlies the surficial soils to the maximum depth explored of approximately 36 feet or an elevation of at least -12.5 feet below MSL. The Old Paralic Deposits generally have a “low” to “medium” expansion potential and adequate shear strengths. The Old Paralic Deposits are considered suitable for support of the planned development, and the potential for landslides, liquefaction, lateral spreading, subsidence, and; or, collapse is not anticipated (Appendix C1).

In accordance with the City of San Diego Guidelines, recommendations for grading and drainage as identified in the geotechnical report should be incorporated into the design (Appendix C1). In addition, proper engineering design and utilization of standard construction practices would be required and would ensure that impacts would be less than significant.

d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☐	☒	☐

Although the soil encountered in the Geotechnical Investigation is considered to be expansive (expansion index of greater than 20) as defined by the 2013 CBC Section 1803.5.3., the undocumented fill soils and Old Paralic Deposits generally have a “very low” to “low” expansion potential (Appendix C1). The majority of soils encountered at the project site are expected to possess a “very low” to “medium” expansion potential (expansion index of 90 or less). It is not anticipated that soils encountered on site would have a substantial impact to foundation or surface improvements associated with the proposed project (Appendix C1). Compliance with the

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact

recommendations of the Geotechnical Investigation and applicable laws would ensure potential impacts associated with expansive soils would be less than significant.

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

Sewers are available and will serve the Project As a result, septic tanks or alternative wastewater systems would not be used. Therefore, no impact with regard to the capability of soils to adequately support the use of septic tanks or alternative wastewater disposal systems would result.

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?	☐	☐	☒	☐

The GHG analysis presented in this section is based on the Greenhouse Gas Emissions Analysis conducted by Dudek (Appendix D).

Construction

Construction of the proposed project would result in GHG emissions, which are primarily associated with use of off-road construction equipment (i.e. large equipment not permitted for travel on public roadways), on-road hauling and vendor (material delivery) trucks, and worker vehicles. GHG emissions associated with temporary construction activity were quantified using the CalEEMod. See Section III – Air Quality and Appendix D for additional information regarding project construction including schedule and equipment fleet.

Table 3 presents construction emissions for the proposed project in 2017, 2018, and 2019 from on-site and off-site emission sources.

Table 3
Estimated Annual Construction Greenhouse Gas Emissions

Year	MT CO_2	MT CH_4	MT N_2O	MT CO_2E
2017	679	0.08	0.00	680
2018	624	0.09	0.00	626
2019	11	0.00	0.00	11
Total	**1,314**	**0.17**	**0.00**	**1,318**
Annualized Construction Emissions				***44***

Notes: See Appendix D for detailed results.

MT CO_2 – metric tons carbon dioxide; MT CH_4 – metric tons methane; MT N_2O – metric tons nitrous oxide; MT CO_2E – metric tons carbon dioxide equivalent

As shown in Table 3, the estimated GHG emissions generated during project construction would be approximately 680 MT CO2E in 2017, 626 MT CO2E in 2018, and 11 MT CO2E in 2019, for a total of approximately 1,318 MT CO2E. Estimated project-generated construction emissions annualized over 30 years would be approximately 44 MT CO2E per year. Because there is no separate GHG threshold for construction, the evaluation of significance is discussed in the operational emissions analysis in the following text.

Operational

Operation of the proposed project would result in GHG emissions from vehicular traffic, area sources (landscape maintenance), electrical generation, natural gas consumption, water supply (including wastewater generation), and solid waste.

Baseline Conditions

As described in Section III – Air Quality, Guy Hill originally developed the property as a car dealership, which included an automobile show room and repair facility (including a body shop and service bays), in 1967. Guy Hill Cadillac and Mossy Toyota operated the property as a new and/or used car dealership for 40 years from 1967 to 2007. From 2008 to the present time the site has been in use by multiple tenants primarily for the purpose of both marine and automotive vehicle rentals, sales, storage and repair. For example, pursuant to a lease with San Diego Motorsports that commenced in 2012 and is still in place, the property has been primarily used for jet ski, U-Haul and jet boat rentals, marine and automobile vehicle repair and outdoor storage. However, the property is still zoned CC-4-2. The CC-4-2 zone permits all forms of vehicle sales, rentals, repairs and maintenance uses as a matter of right. The property also still includes the physical improvements, such as the showroom, the freeway-oriented pylon sign, the large vehicle parking areas and the service bays, needed to operate a car dealership on site. Further, as car dealerships tend to locate in areas with other existing car dealerships (e.g. Mission Valley and the National City Mile of Cars), it bears noting that car dealerships such as Mossy Toyota, Pacific Nissan, Mossy Ford and a number of others exist in the vicinity of the project. Thus, the project site and its improvements could still be used for an automobile dealership without further discretionary action by the City.

For purposes of determining the existing baseline conditions pursuant to CEQA Guidelines Section 15125, GHG is different from some other CEQA impact areas in its regional, national and international scope. The nature of GHG impacts means the GHG baseline determination should look to available regional analysis from SANDAG about long term regional growth and traffic projections.

SANDAG's long term regional projections (Series 12) identify the Guy Hill Cadillac site as being an Auto Commercial use (same as Mossy Toyota and Pacific Nissan) through 2050. Specifically, the applicable Traffic Analysis Zone (TAZ) map for the area where the project is located, along with SANDAG's Trip Generation by Land Use Zone chart for that TAZ, include the project site in the three properties that make up the approximately 10.5 acres of Auto Commercial. These SANDAG Series 12 regional projections serve as a basis for regional GHG emission projections and long term planning regarding the same, including mobile GHG emissions analyzed and projected in the City's Climate Action Plan

adopted in December 2015. The Climate Action Plan, the City's guidance document for complying with AB 32 and other GHG requirements, includes GHG emissions attributable to an Automobile Commercial use at the project site. Therefore, consistent with the City's use of SANDAG Series 12 growth projections as the basis for GHG emissions projections provided in the Climate Action Plan, the baseline GHG conditions for purposes of this report also includes that same Automobile Commercial use, a car dealership, for the project site. That baseline GHG analysis of a car dealership includes GHG emissions attributable to traffic using the traffic generation rates identified in the City's Trip Generation Manual (City of San Diego 2003), the accepted source of traffic generation rates for projects within the City. The City's trip generation rates for a car dealership are also the same as those used by SANDAG. Thus the site's current temporary, interim uses which include jet ski rentals, office space and vehicle storage do not reflect the GHG emission projections used by SANDAG and the City.

For purposes of the baseline analysis, the vehicle trips associated with the automobile dealership land use are estimated to be an average of approximately 883 trips per day (2.94 acres × 300 trips per acre) (Urban Systems 2016b; City of San Diego 2003; SANDAG 2002). Additional information about the baseline GHG emissions for each category of GHG emissions is included in Appendix D.

The following project design features that would reduce project-generated GHG emissions were evaluated in CalEEMod:

Transportation:

- Increased density – approximately 58.5 dwelling units per acre
- Mixed use development/increase diversity
- Improvement of destination accessibility – 7.6 miles to downtown/job center
- Increase transit accessibility – 0.29 mile to transit station (nearest bus stop at corner of Grand Avenue and Mission Bay Drive), 2.7 miles south to Morena/Linda Vista trolley station, and 3.2 miles south the Old Town Train Station (Amtrak/Coaster/Trolley station). Additionally, the planned Balboa Avenue trolley station would be within a 2,000-foot radius of the project site.
- Integration of below market rate housing – 14 affordable housing units at the very low income level.

Area Sources:

- No hearths assumed

Energy:

- Exceed 2008 Title 24 standards – 25% improvement (compliance with 2013 Title 24 standards).
- Renewable Portfolio Standard (RPS) – adjustment of CO_2 intensity factor to reflect current San Diego Gas and Electric renewable energy usage (36.4% RPS as of 2014).

Water/Wastewater:

- Application of water conservation strategy: 25% reduction in overall water use per Executive Order B-29-15.

Solid Waste:

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact

- Institute Recycling and Composting Services – 75% diversion rate consistent with AB 341 (Chesbro, Chapter 476, Statutes of 2011) (25% increase from the solid waste diversion requirements of AB 939, Integrated Waste Management Act).

The estimated operational project-generated GHG emissions from area sources, energy usage, motor vehicles, solid waste generation, water supply, and wastewater treatment, considering the project design features or other GHG mitigation measures, in 2019 are shown in Table 4.

Table 4
Estimated Annual Operational Project Greenhouse Gas Emissions

	MT CO_2	MT CH_4	MT N_2O	MT CO_2E
Area Sources	2	0.00	0.00	2
Energy	415	0.02	0.00	416
Mobile Sources	1,208	0.05	0.00	1,209
Solid Waste	5	0.28	0.00	11
Water Supply and Wastewater	48	0.01	0.00	51
Total	**1,678**	**0.37**	**0.01**	**1,689**
Amortized Construction Emissions				44
Operation + Amortized Construction Total				**1,733**
Baseline Operational Emissions				(650)
Energy Offset from Solar PV Installations				(218)
Net Increase in Emissions				***865***
Screening Threshold of 900 MT CO_2E Exceeded?				*No*

Notes: See Appendix D for detailed results.
MT CO_2 – metric tons carbon dioxide; MT CH_4 – metric tons methane; MT N_2O – metric tons nitrous oxide; MT CO_2E – metric tons carbon dioxide equivalent

As shown in Table 4, estimated annual project-generated GHG emissions in 2019 would be approximately 1,689 MT CO_2E per year as a result of project operations without the on-site solar. Vehicles traveling to and from the project land uses would be the primary source of project-generated GHG emissions. Estimated annual operational project-generated emissions and amortized project construction emissions of 44 MT CO_2E per year would be approximately 1,733 MT CO_2E per year. The project design feature providing for installation of a solar photovoltaic system on the project site was estimated to offset GHG emissions by approximately 218 MT CO_2E per year (Adroit Energy 2016). Further, consistent with CEQA Section 15125, baseline GHG emissions associated with the car dealership use was estimated to be approximately 650 MT CO_2E per year.

As shown in Table 4, the net increase in GHG emissions, including amortized construction emissions, would be approximately 865 CO_2E per year; therefore, the project would be below the City's 900 CO_2E per year screening threshold. Impacts would be less than significant.

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

The City's General Plan also includes various policies that address conservation with the goal of

reducing GHG emissions by increased energy efficiency and increased use of alternative forms of transportation, among others, including policies outlined in the General Plan's Conservation Element. Specifically, Table CE-1, Issues Related to Climate Change Addressed in the General Plan, of the Conservation Element lists specific policies identified in the various elements of the General Plan that affect climate change. Consistent with policies included in Table CE-1 of the General Plan related to Land Use and Community Planning and Mobility, the proposed project would be constructed as an infill development project located on a previously built up parcel; thus, development of the project would not require greenfield development, substantial infrastructure expansions or additional land resources. Additionally, as an infill project located within the Pacific Beach community, the project would promote walkability and use of bicycle facilities currently provided by the City to local venues, shops, and the beach, reducing the need for automobile use by future residents of the project.

In 2002, the City Council adopted the San Diego Sustainable Community Program, which established a partnership with the Cities for Climate Protection Campaign, a program administered by ICLEI – Local Governments for Sustainability. The Sustainable Community Program established a GHG reduction goal of 15% below 1990 levels by the year 2010. Actions to be taken to achieve this goal are outlined in the City's Climate Protection Action Plan, which was adopted in 2005. The City has continued to reduce its share of GHG emissions through fuel efficiency, energy conservation, use of renewable energy, and use of CH_4 gas (biogas) to generate electricity. In December 2015, the City adopted the final CAP and a PEIR for the CAP was certified. According to the City's CAP, to achieve its proportional share of the state reduction targets for 2020 (AB 32) and 2050 (EO S-3-05), the City has developed implementation strategies and aims to reduce emissions 15% below the baseline to approximately 11.1 MMT CO_2E by 2020, 40% below the baseline to approximately 7.8 MMT CO_2E by 2030, and 50% below the baseline to approximately 6.5 MMT CO_2E by 2035 (City of San Diego 2015a). The CAP currently does not meet the requirements set forth in CEQA Guidelines Section 15183.5, whereby a lead agency may analyze and mitigate the significant effects of GHG emissions at a programmatic level, and tiering from the CAP is not permitted because the CEQA tiering mechanism (i.e., CAP Checklist) is currently not adopted.

Although the CAP Checklist has not been adopted yet, a brief analysis of the project's potential to conflict with the applicable strategies, goals, actions, and targets of the CAP is provided herein for disclosure purposes. The CAP's first strategy is aimed at energy and water efficient buildings. Strategy 1 actions are directed at City staff and City Council to adopt ordinances, plans, and supporting City requirements to achieve the City's targets. The project would not conflict with the City's ability to implement the actions identified in the CAP to meet the required city-wide GHG reductions.

Strategy 2 focuses on clean and renewable energy. Strategy 2 goals would be implemented by the City and would not apply to implementation of the project. Strategy 3 outlines goals and actions related to bicycling, walking, transit, and land use. The project would be consistent with many of the goals under strategy 3, as the project would promote bicycling and walking as a means of local travel and commute, and is sited near an existing bus transit station. The project's TOD design is intended to reduce vehicle miles traveled and associated vehicle fuel consumption, and is consistent with the strategy 3 goals, actions, and supporting measures. Strategy 4, which focuses on zero waste, include goals that would be implemented by various City departments, and the project would not conflict with implementation of the actions required to meet the City's targets. In addition, the project is

assumed to comply with the goal of diverting 75% of the solid waste by 2020 consistent with statewide goals. The fifth and last strategy relates to climate resiliency and includes the goal of increasing tree canopy coverage. The project would not conflict with the City's actions to increase tree canopy coverage through a planting program and supporting measures. In summary, the project would not conflict with the goals applicable to the proposed land uses and the project would not impede the City's ability to implement the actions identified in the draft CAP to achieve the CAP's targets and associated GHG emission reductions. Additional detail regarding CAP consistency is provided in Appendix D.

At the regional level, SANDAG's RTP/SCS[2] has been adopted for the purpose of reducing GHG emissions attributable to passenger vehicles in the San Diego region. Although the EIR for SANDAG's 2050 RTP/SCS is still pending before the California Supreme Court, SANDAG recently adopted the next iteration of its RTP/SCS in accordance with statutorily-mandated timelines. More specifically, in October 2015, SANDAG adopted *San Diego Forward: The Regional Plan*. Like the 2050 RTP/SCS, this planning document meets ARB's 2020 and 2035 reduction targets for the region. While the RTP/SCS does not regulate land use or supersede the exercise of land use authority by SANDAG's member jurisdictions (i.e., the City), the RTP/SCS is a relevant regional reference document for purposes of evaluating the intersection of land use and transportation patterns and the corresponding GHG emissions. The RTP/SCS is not directly applicable to the proposed project because the underlying purpose of the RTP/SCS is to provide direction and guidance on future regional growth (i.e., the location of new residential and non-residential land uses) and transportation patterns throughout the City and greater San Diego County, as stipulated under SB 375.

The proposed project would maintain the existing commercial retail land use component but would be designed to service the existing surrounding neighborhoods by providing a space for social events, art displays, and entertainment and potentially including a small restaurant or small retail/eatery shops. In addition, there would be an overall energy improvement of on-site facilities by demolishing older, less efficient buildings and constructing newer, more efficient structures. The project would also add a residential component to the site creating a mixed-use environment and enhancing pedestrian and bicycle-mobility, as well as providing residences near jobs and bus transit to the City's downtown. Additionally, the higher-density infill development nature of the project would support the overarching intent of the RTP/SCS by improving pedestrian and bicycle access to nearby locations, encouraging non-motorized modes of travel, and thus, reducing vehicle trips and vehicle miles travelled to and from the site. For reasons outlined previously, the project would support the goals and policies of the RTP/SCS.

Additionally, as analyzed in Section VII(a), the proposed project would be below the City's screening threshold of 900 MT CO_2E per year. Moreover, the project is designed to be a TOD and would implement sustainability design features to reduce vehicle trips and vehicle miles traveled, energy consumption, water consumption, and solid waste; therefore, these features would reduce GHG

[2] It should be noted that the EIR for the RTP/SCS (adopted in 2011) is currently in litigation and is in the process of being docketed at the California Supreme Court. A hearing date has not yet been set. The SANDAG Board adopted "San Diego Forward: The Regional Plan" in October 2015, which replaces the 2050 RTP/SCS. No lawsuits have been filed on the San Diego Forward EIR and the time period to challenge that document has ended.

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact

emissions associated with proposed project operations. Implementation of sustainability design features would ensure that the project's potential to conflict with plans, policies, and initiatives designed to reduce GHG emissions would not occur. Therefore, impacts would be less than significant.

VIII. HAZARDS AND HAZARDOUS MATERIALS – Would the project:

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

A Phase I Environmental Site Assessment for the project site was performed by Terracon in July 2015 (Appendix E1). The site was previously occupied by an auto dealership and repair facility, and the Phase I Environmental Site Assessment found the following potential recognized environmental conditions (RECs) on site: subsurface fill material imported from an undocumented source; former automotive servicing operations including 14 in-ground hydraulic lifts, two paint booths, and three sumps; a historical 1,000 gallon waste oil underground storage tank (UST); and petroleum in soil and groundwater. Terracon subsequently completed a Phase II assessment in August 2015 at the project site to investigate the identified RECs. The Phase II identified total petroleum hydrocarbons (TPH) in groundwater across the project site, at concentrations ranging from 205 to 2,200 parts per billion (ppb). While those concentrations exceed the default regulatory standard of 100 ppb, they are generally within the range of concentrations that the County has applied in other cases. Additionally, the Phase II did not identify contaminant concentrations exceeding regulatory standards in soil (Appendix E2).

Although RECs were identified in the environmental site assessments, the site as developed would be protective of human health because impacted soils would be removed during construction, and groundwater would not be used for any reason. The applicant has enrolled the project site in the San Diego County Department of Health Voluntary Assistance Program (VAP). Under the VAP, prior to the start of the earthwork for the site, the applicant must prepare and obtain approval for a Property Mitigation Plan to govern management of impacted materials during construction, and will obtain a no further action letter upon completion of subsurface construction work. The County accepted the site into the VAP in October 2015. The construction plans for the project site would ensure protectiveness of human health and regulatory closure (Appendix E2).

Additionally, construction of the proposed project would require demolition of existing on-site structures associated with the former automobile dealership. The existing structures were identified as having asbestos-containing materials and other hazardous building materials, the removal of which would be required prior to demolition activities (Appendix E3). U.S. EPA, CalEPA, and OSHA heavily regulate both asbestos- and lead- containing materials. Regulations (CFR Part 61, Subpart M; 16 CFR Part 1305; and 16 CFR 1304) and OSHA (29 CFR 1926.1101 and 29 CFR 1910.1001) require proper abatement and disposal of asbestos- and lead-containing materials to protect human health and safety. Per the California Code of Regulations (Title 8, CCR, Article 2.6, Section 341.15), asbestos abatement would be completed or overseen by a certified consultant. Compliance with these regulations would ensure all hazardous materials on the site would be properly identified and, where found, properly handled and removed. Therefore, impacts related to

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact

asbestos and lead-based materials would be less than significant.

Construction of the proposed project would also entail routine transport of potentially hazardous materials, including gasoline, oil solvents, cleaners, and paint. Along with the construction plans discussed previously, proper BMPs, preparation of a SWPPP, and hazardous material handling protocols would be followed to ensure safe storage, handling, transport, use, and disposal of all hazard materials during the construction phase of the proposed project. Construction would also be required to adhere to any local standards set forth by the City, as well as state and federal health and safety requirements that are intended to minimize hazardous materials risks to the public, such as California Occupational Safety and Health Administration (CalOSHA) requirements, the Hazardous Waste Control Act, the California Accidental Release Prevention (CalARP) program, and the California Health and Safety Code. Compliance with these requirements and standards would result in less-than-significant impacts related to hazardous materials storage and handling.

The operational phase of the project would primarily involve residential and retail land uses with associated landscape and facility maintenance. None of the proposed land uses are typically considered hazardous to the public. Hazardous materials would be limited to private use of commercially available cleaning products, landscaping chemicals and fertilizers, and various other commercially available substances. These substances are required to comply with guidelines to minimize health risk to the public associated with hazardous materials. Therefore, impacts related to the construction and operational phases of the proposed project would be less than significant.

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?	☐	☐	☒	☐

There is a low potential for release of hazardous materials related to storage, transport, use, and disposal of construction debris, landscaping, and commercial products at the site. However, as previously stated, the County has accepted the site into the VAP, and the construction plans for the project site would ensure protectiveness of human health and regulatory closure. Additionally, the proposed project would be required to adhere to federal, state, and local laws such as CalOSHA requirements, the Hazardous Waste Control Act, the CalARP program, and the California Health and Safety Code, which regulate the management and use of hazardous materials and are intended to minimize risk to public health associated with hazardous materials. Therefore, impacts associated with the proposed project's compliance with these laws would be less than significant.

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

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact

The closest school to the project site is Mission Bay High School, located approximately 0.68 mile west and no new schools are proposed within ¼ mile. As stated previously, the proposed project would be required to comply with all local, state, and federal regulations regarding the use, transport, and disposal of hazardous materials during construction, and the potential for impacts to occur during the operational phase of the proposed project is minimal. Impacts associated with potential hazardous emissions within ¼ mile of an existing or proposed school would be less than significant.

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

The proposed project site is not identified on the Department of Toxic Substances Control Hazardous Waste and Substances Site List pursuant to Government Code Section 65962.5, known as the Cortese list (DTSC 2007). As discussed previously, an ongoing site assessment for the project site is being evaluated as part of the VAP. The required construction plans for the project site would ensure protectiveness of human health and regulatory closure. Impacts would be less than significant.

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two mile 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?	☐	☐	☒	☐

The closest public airport is Montgomery Field, located approximately 4.4 miles east of the project site. The project site is not located within the Airport Influence Area for Montgomery Field (City of San Diego 2011). Construction of the proposed mixed-use development would not introduce any new features that would create a flight hazard. The proposed development would include residential and retail land uses, which would not result in safety hazards for people residing or working in the project area. Impacts would be less than significant.

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?	☐	☐	☐	☒

The proposed project site is not located within the vicinity of a private airstrip. The surrounding land

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact

uses are largely residential and commercial development. Therefore, the proposed project would not result in safety hazards for people residing or working in the project area, and no impact would occur.

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

The project would not alter an emergency response or evacuation plan, or physically interfere with an adopted emergency response plan or emergency evacuation plan. Adequate emergency access would be provided during both short-term construction and long-term operation of the proposed project. Construction of the proposed project would not involve any street or driveway closures that could impede emergency access. The project would provide access off of Rosewood Street, where installation of an intersection signal would implemented as part of the project in order to facilitate traffic flow and access. Impacts would be less than significant.

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

The proposed project site is located in an urbanized area largely comprised of residential and institutional development. The project site is not adjacent to wildlands or residences intermixed with wildlands. Further, according to the California Department of Forestry and Fire Protection's (CAL FIRE) Very High Fire Hazard Severity Zones in LRA (Local Responsibility Area) map, the project site is not located within or adjacent to a Very High Fire Hazard Severity Zone (CAL FIRE 2009). Therefore, impacts would be less than significant.

IX. HYDROLOGY AND WATER QUALITY - Would the project:

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

This section of this MND is based on the findings of several technical studies prepared by Leppert Engineering for the proposed project including the Drainage Study and Downstream Drainage Study (Appendix F1) and Priority Development Project Storm Water Quality Management Plan (Appendix F2).

The proposed project is located within the Miramar Hydrologic Area (Hydrologic Sub-area 906.40) of the Penasquitos Hydrologic unit. The project site runoff discharges to an existing 60-inch reinforced concrete pipe (RCP) located across Mission Bay Drive from the project site. From there the runoff travels through approximately 750 feet of pipe where it is joined by several other flows before

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact

discharging directly into Mission Bay a total of 750 feet from the discharge point. Mission Bay Shoreline at De Anza Cove is impaired for enterococcus, fecal coliform and total coliform, per the 2012 California 303(d) List of Water Quality Segments (Appendix F1).

The Storm Water Quality Management Plan (SWQMP) prepared for the proposed project (Appendix F2) states that hydromodification controls are not required to be implemented for the project, as the project directs discharge runoff directly to existing underground storm drains discharging directly to an enclosed embayment not within a protected area. The project meets the conditions set forth in Section 1.6 of the City of San Diego Storm Water Standards Manual 2016, and the project is exempt from a Hydromodification Plan (HMP) requirement. Additionally, infiltration tests performed at the project site indicate infiltration rates would be below the City's standard of 0.5 inches per hour; therefore, the project site would include partial infiltration of stormwater (Geocon 2016). There are no areas of special biological significance receiving waters downstream of the project discharge locations, and there are no MHPA or ESA areas adjacent to the project or its BMPs (Appendix F2).

Additionally, as stated in the Drainage Study prepared for the proposed project (Appendix F1), the total site runoff is reduced in the proposed condition as a result of decreased site impervious surface. The peak flow would be reduced from 14.44 cubic feet per second (cfs) in the existing condition to 12.39 cfs in the proposed condition for a reduction of 2.05 cfs. Proposed storm drains would be sized appropriately to accommodate proposed project runoff. The project discharge point is a connection to an existing storm drain system, which will be compliant with the City's current stormwater standards manual, as regulated by the current MS4 permit. The connection point is located downstream of any nearby potential jurisdictional waters of the United States, and as such there is no need for 401/404 permits for the proposed project. Although 401 and 404 permits are not required, the City currently operates under the NPDES Municipal Stormwater Permit issued on May 8, 2013 (Permit Order No. R9-2013-0001), which requires that stormwater best management practices (BMPs) be incorporated into the permanent design of public and private development projects. BMPs associated with the final design are described in the San Diego Region Model BMP Design Manual (February 2016). In addition, the City's *Storm Water Standards* manual, revised January 2012 applies to any project requiring permit approval (City of San Diego 2012).

The proposed project would have the potential to result in the runoff of pollutants to receiving waters; therefore, the SWPPP and SWQMP include site design, source control and treatment control BMPs. Site design BMPs would include minimization of the project's impervious surface footprint through efficient site design, mulching of landscaped areas, sidewalk drainage directed to adjacent landscaping, use of pest-resistant and drought-tolerant landscaping, and installation of rain barrels. Source control BMPs would include drainage of air conditioning condensate to landscaped areas, utilization of on-site inlets marked with storm drain stenciling or signage to discourage illegal dumping, design of refuse storage to reduce pollution contribution, and plumbing of interior parking garage drains to the sanitary system. Lastly, treatment control BMPs would include installation of permeable pavement and incorporation of Bio-filtration planters (including Partial Retention planters) into the project design to minimize the introduction of pollutants of concern into receiving waters. Figure 7 depicts BMP designations and drainage management area (DMA) designations within the project site. Furthermore, the proposed project would decrease impervious area as compared to existing conditions by 7%. With implementation of the SWPPP and associated BMPs, impacts related to water quality would be less than significant.

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☒	☐

The Geotechnical Investigation prepared for the proposed project reported that groundwater was encountered during the drilling operations to a depth varying from 12 to 20 feet across the project site at the location of the four borings (Appendix C1). It is expected that some variations of the levels of groundwater may occur due to tidal influences. Based on measured groundwater elevations, it is expected groundwater would be above the planned finished floor elevation of the subterranean garage. Therefore, dewatering would likely be necessary for construction and maintenance of the structure. The project is located about 1,000 feet from the northern tip of De Anza Cove of Fiesta Bay; therefore, the groundwater may be considered brackish (Appendix C1). The Pacific Beach community receives its water supply from the City's transmission line, which distributes to the community from a pipe that runs underneath Grand Avenue. It is reasonable to assume that the community does not rely on groundwater supplies due to the close proximity of Mission Bay Shoreline, which is impaired for enterococcus, fecal coliform and total coliform, per the 2012 California 303(d) List of Water Quality Segments.

Dewatering and temporary lowering of the groundwater table would be necessary to maintain a safe working environment during excavation and construction activities associated with the proposed subterranean levels. Based on the groundwater elevations encountered during the site investigation and the groundwater encountered in nearby monitoring wells, a temporary dewatering system would be designed for a groundwater elevation of 8 feet above mean sea level (Appendix C1).

Although dewatering would be necessary during construction of the proposed project, these actions would be temporary and would not substantially or permanently affect the groundwater table in the long-term. The project would not have the capacity to increase the amount of water consumed regionally through increased withdrawals from groundwater sources. The project would be connected to the public water supply. It would not rely directly on groundwater in the area and would not substantially deplete any groundwater resources. Impacts would be less than significant.

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?	☐	☐	☒	☐

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact

The project would alter the existing stormwater drainage pattern on the site. The proposed project would have the potential to result in the runoff of pollutants to receiving waters; however, as previously described, the SWPPP will include BMPs, such as a proprietary Bio-filtration, into the project design to minimize the introduction of pollutants of concern into receiving waters. Additionally, the proposed project would plumb all of the on-site bio-filtration BMP sub-drains through the garage and to a private cleanout located adjacent to Mission Bay Drive. A 24-inch RCP pipe would be construction from the proposed private cleanout to the existing 60-inch RCP on the south side of Mission Bay Drive. From that point, drainage would continue through the existing 60-inch piping to Mission Bay where it would be discharged. The majority of the project site would be excavated to a depth of approximately 10–15 feet for the construction of the subterranean parking structure, which could result in erosion or siltation on or off site.

The Drainage Study prepared by Leppert Engineering Corporation on March 3, 2016, for the proposed project includes a proposed drainage map illustrating the four proposed basin areas (Appendix F1). The project design would re-route the stormwater originating on-site to ease the current drainage that flows off-site, by implementing on-site basin areas which would adequately collect and convey peak discharge through the development and off site to drainage areas during both construction and operation of the project. The BMPs outlined in the SWPPP, Appendix F1 and the SWQMP, Appendix F2, address pollutants and their sources, including sources of sediment associated with construction, construction site erosion and other activities associated with construction activity and their associated controls. Site design, source control and treatment control BMPs as listed in Section IX (a) above, will reduce the potential for on- and off-site erosion and siltation, and impacts would be less than significant.

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

The project would alter the existing stormwater drainage pattern on the site. As previously described, the proposed project would include plumbing all of the on-site Bio-Filtration BMP sub-drains through the garage and to a private cleanout located adjacent to Mission Bay Drive. A 24-inch RCP pipe would be constructed from the proposed private cleanout to the existing 60-inch RCP on the south side of Mission Bay Drive. From that point, runoff generated from the proposed development would continue through the existing 60-inch piping to Mission Bay where it would be discharged.

The Drainage Study prepared for the proposed project (Appendix F1) calculated the total runoff from the project site using the guidelines set forth in the City's Drainage Design Manual (1984), and uses a 100 year storm event for the analysis. Compared to the existing condition, the proposed project would decrease the peak runoff from the project site. This is due to the decrease site imperviousness, which would reduce the peak flow from 14.44 cfs to 12.39 cfs. Due to the reduction in peak flow compared to existing conditions and proper drainage design, implementation of the

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact

proposed project is not expected to result in flooding on or off site. Additionally, the proposed storm drains would be sized to provide adequate capacity to accommodate proposed project flows. Although the project would alter the existing drainage pattern, it would reduce the amount of surface runoff from the project site compared to current conditions. Therefore, impacts would be less than significant.

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?	☐	☐	☒	☐

The proposed development is a portion of a larger drainage basin that drains to an existing 60-inch RCP storm drain. The 60-inch storm drain intercepts approximately 220 acres, of which approximately 61 acres is within the drainage basin west of I-5 (west basin) and 159 acres is within the drainage basin east of I-5 (east basin). The project site is part of the west basin, and connects to the existing 60-inch storm drain that discharges to Mission Bay. The 60-inch storm drain has a maximum capacity of approximately 112 cfs (Appendix F1).

The Drainage Study prepared for the proposed project found that the peak runoff for the upstream basins that drain to the 60-inch storm drain exceeds the capacity of the 60-inch storm drain in both the existing and proposed development conditions. However, as compared to the existing condition, the proposed project would decrease peak runoff from the site as a result of a proposed decrease in site imperviousness with the revised proposed site design. The peak flow would be reduced from 14.44 cfs in the existing condition to 12.39 cfs in the proposed condition; a reduction of 2.05 cfs. Since the total site runoff would be reduced in the proposed condition, the project does not create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems (Appendix F1). The project discharge point is a connection to an existing storm drain system that will be compliant with the City's current stormwater standards manual, as regulated by the current MS4 permit. The connection point is located downstream of any nearby potential jurisdictional waters of the United States, and as such there is no need for 401/404 permits for the proposed project.

The City currently operates under the NPDES Municipal Stormwater Permit issued on May 8, 2013 (Permit Order No. R9-2013-0001), which requires that stormwater BMPs be incorporated into the permanent design of public and private development projects. BMPs associated with the final design are described in the San Diego Region Model BMP Design Manual (February 2016). In addition, the City's *Storm Water Standards* manual, revised January 2012 applies to any project requiring permit approval (City of San Diego 2012). The proposed project would have the potential to result in the runoff of pollutants to receiving waters; therefore, the SWQMP includes site design, source control and treatment control BMPs, such as a proprietary Bio-filtration, into the project design to minimize the introduction of pollutants of concern into receiving waters. Site design, source control and treatment control BMPs are listed in Section IX (a) above. Additionally, a SWPPP would be prepared for the proposed project which would include BMPs required for implementation during construction to provide erosion control and stormwater treatment and control. Therefore, project impacts related to stormwater runoff which would provide substantial additional sources of polluted runoff would be less than significant.

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
f) Otherwise substantially degrade water quality?	☐	☐	☒	☐

See response to IX(a) through (e).

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?	☐	☐	☒	☐

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map number 06073C1612G (FEMA, 2012), the project site is located in Zone X, which is designated for areas outside of the 1% and 0.2% annual chance flood hazard areas, and considered to have moderate to minimal flood risk. Therefore the project would not place housing within a 100-year flood hazard area. Impacts would be less than significant.

h) Place within a 100-year flood hazard area, structures that would impede or redirect flood flows?	☐	☐	☒	☐

As previously stated, according to the FEMA National Flood Hazard Layer, the project site is located in Zone X, which is designated for areas of moderate to minimal flood risk. The project would not develop structures within a 100-year flood hazard area that would impede or redirect flows. Impacts would be less than significant.

X. LAND USE AND PLANNING – Would the project:

a) Physically divide an established community?	☐	☐	☐	☒

The project proposes the development of 172 residential units and associated amenities as well as 15,500 square feet of commercial retail space. The project site is located in a largely urbanized area, generally surrounded by similar or compatible land uses. The project does not include the extension of any major arterial streets or other infrastructure through any established neighborhoods or communities. The project site is disturbed from previous grading, and is currently developed with retail land uses including operation of jet ski and boat rentals. On-site improvements would not impede access to any portion of the existing community. The proposed project would not physically divide an established community, and no impact would occur.

b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including but not limited to the general plan,	☐	☐	☐	☒

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?				

The project site is located within the City's Community Commercial (CC)-4-2 zone, which is intended to accommodate development with high intensity, strip commercial characteristics, allowing heavy commercial uses and residential uses (see Figure 8, City of San Diego Zoning Map). The Pacific Beach Community Plan designation for the site is Commercial with a Regional Commercial-specific designation that allows for the development of residential uses. The project site is also located within the Coastal Height Limitation Overlay Zone, the Coastal Overlay Zone, the Parking Impact Overlay Zone (Coastal), and the Pacific Beach Community Plan and Local Coastal Program Land Use Plan area. The proposed project site is currently occupied by retail land uses including operation of jet ski and boat rentals. According to San Diego Municipal Code Section 131.0522, Use Regulations Table for Commercial Zones Table 131-05B, multiple dwelling unit residential development is a permitted use in the CC-4-2 zone but is subject to the provisions set forth in San Diego Municipal Code Section 131.0504, Maximum Permitted Residential Density and Other Residential Regulations.

The project includes the development of a mixed use project with 172 residential units, parking in garages, commercial space and various amenities The proposed project would include 11% low income housing (14 units). As such, consistent with Density Bonus Law, the project utilizes a 35% density bonus and an incentive authorizing ground floor residential uses (the townhomes and parking garage).

Approvals from other public agencies would not be required; however, the following discretionary permits are required from the City of San Diego:

- A Coastal Development Permit (CDP, Process 2, staff-level decision maker) per SDMC Section 126.0702 for the development in the Coastal Overlay Zone.

- A Neighborhood Development Permit (NDP, Process 2, Administrative approval decision) per SDMC 126.0402 for improvements within the City right-of-way.

- An Encroachment Maintenance and Removal Agreement (EMRA) will be required for the construction of new sewer and water services, and parkway landscaping within the public right-of-way. Additionally, the EMRA will cover walls ranging in height from 2-4 feet in the Mission Bay Drive right of way along with two sets of stairs 6 feet in height.

- A grading permit will be required to construct the project. The Grading Plan will need to include Storm Drain Plans, including permanent BMPs to identify how stormwater runoff will be treated before leaving the site or connecting to the downstream storm drain system. BMPs related to stormwater runoff are identified under Hydrology and Water Quality within the Specific MMRP Issue Area Conditions/Requirements subheading.

Additionally, the project would be a Transit Oriented Development (TOD) project, which would support the goals and policies of the City's General Plan, the Pacific Beach Community Plan, and the

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact

City's Climate Action Plan. The project's TOD features would also be consistent with the Complete Streets - PB Pathways goals and improvements, headed by the public non-profit charity of beautifulPB. The focus for PB Pathways is to develop a network of safe neighborhood routes encouraging people to walk, bike or skate to their destinations through the implementation of traffic calming measures and other features to improve safety (beautifulPB, 2016). The proposed project would assist in the facilitation of PB Pathways with the incorporation of the following TOD sustainable design features:

- Bicycle parking – The project would include 78 bicycle parking spaces in multiple locations and exterior seating areas in front of the retail spaces. Bicycle racks would be visible and easily accessible from Mission Bay Drive and Rosewood Street.

- Motorcycle parking – Approximately 18 designated motorcycle parking spaces are proposed.

- Located near transit– The proposed project is located 0.29 mile from the bus stop at corner of Grand Avenue and Mission Bay Drive, 2.7 miles south to the Morena/Linda Vista trolley station, and 3.2 miles south the Old Town Train Station (Amtrak/Coaster/Trolley station). Additionally, the planned Balboa Avenue trolley station would be within a 2,000-foot radius of the project site.

- Public uses to serve residents and workers – The project is providing a plaza available for use by the public and residents on-site. It is intended that it will become a pedestrian activated area available for a variety of uses.

- Pedestrian-oriented environment – Human-scaled details and streetscape amenities are used to support pedestrian connectivity within the neighborhood. Landscaping and raised outdoor space will be designed to enhance the walkable experience and provide buffering from passing cars. The Plaza on the Southeast corner of Mission Bay Drive and Rosewood Street is intended to create visual interest drawing the attention of pedestrian passerby. Primary building entries face the street and feature defining elements appropriate to the scale of the public street. Rosewood Street will face residential units with entries and stoops that interact with pedestrians.

- Service to nearby businesses and outdoor seating – The proposed development would service the adjacent motel and nearby business with a small restaurant or small retail shops and outdoor seating areas.

- Access to park facilities - The signal at the intersection of Rosewood and Mission Bay Drive is a part of the project's traffic improvements and would assist in providing pedestrian access to and from Mission Bay park.

The proposed project is consistent with the existing zoning, General Plan and Community Plan designation for the site. The proposed project, with the mitigation measures included in this MND and the project conditions of approval, would not conflict with applicable General Plan, Community Plan and City of San Diego regulations, adopted for the purpose of avoiding or mitigating an environmental effect. Therefore, no impact would occur.

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☒

As previously discussed in Section IV, although the proposed project is not within the City's Multi-Habitat Planning Area (MHPA), the project would be consistent with all relevant goals and policies regarding the preservation and protection of biological resources, as outlined in the City's Multiple Species Conservation Program (MSCP), and does not have the potential to conflict with any habitat conservation plans. In addition, implementation of the project would be consistent with all biological resources policies outlined in the General Plan, Pacific Beach Community Plan and Local Coastal Land Use Plan. Implementation of the proposed project would not conflict with any applicable plans, and no impact would occur.

XI. MINERAL RESOURCES – 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?	☐	☐	☐	☒

The City of San Diego General Plan Environmental Impact Report designates the project site and the immediately surrounding area as Mineral Resource Zone 1 (MRZ-1). MRZ-1 areas are classified as areas where adequate information indicates that no significant mineral deposits are present, or where it is judged that there is little likelihood for their presence. This project site is located in a developed neighborhood not suitable for mineral extraction. Additionally, there is no record that the site has ever been used for mineral extraction. Therefore, the project would not result in the loss of availability of a known mineral resource that would be of value to the region or the residents of the state. No impact would occur.

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?	☐	☐	☐	☒

See Response XI(a).

XII. NOISE – Would the project result in:

a) Generation of, noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☒	☐	☐

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact

A Noise Study was prepared for the proposed project site by Veneklasen Associates on March 3, 2016 (Appendix G). The Noise Study was prepared in compliance with Section NE-A.4 of the City's General Plan Noise Element; which requires an acoustical study consistent with Acoustical Study Guidelines for proposed developments in areas where the existing or future noise level exceeds or would exceed the compatible noise level thresholds as indicated on the Land Use Noise Compatibility Guidelines, so that appropriate mitigation measures can be included in the project design to meet the noise guideline goals.

Construction Noise

Construction-related noise would be temporary, and is strictly regulated under the San Diego Municipal Code. Division 4 of Article 9.5 of the San Diego Municipal Code addresses the limits of disturbing or offensive construction noise. The Municipal Code states that with the exception of an emergency, it should be unlawful to conduct any construction activity so as to cause, at or beyond the property lines of any property zoned residential, an average sound level greater than 75 decibels (dBA) during the 12-hour period from 7:00 p.m. to 7:00 a.m.

Construction noise represents a short-term impact above ambient noise levels. Noise levels generated by heavy construction equipment can range from 60 dBA to 100 dBA when measured at 50 feet. However, these noise levels diminish rapidly with distance from the construction site at a rate of approximately 6 dBA per doubling of distance. Noise generated by construction equipment includes haul trucks, water trucks, graders, dozers, loaders and scrapers can reach relatively high levels.

Project construction noise levels would be substantially higher than the typical ambient daytime noise levels measured in the area. Although Interstate 5, which is considered a major noise source, is immediately east of the proposed project, construction noise levels would be readily audible and would dominate the noise environment in the area during construction operations. In order to represent a long-term average of construction noise, a point at the center of the project site was selected to be the source of the noise exposure. Since equipment would frequently move about the project site during various phases and the construction of various elements, this center point represents a long-term average of construction noise exposure throughout the duration of the project. It should be noted that noise levels at the residence would vary depending on the number of pieces of equipment in operation and their location on the project site. The closest noise sensitive receptor to the proposed project site is a residence located approximately 275 feet from the centerline of the project. Each phase of construction was analyzed based on the types and number of pieces of equipment anticipated to be used for construction (see Appendix A for list of construction equipment). It is estimated that the long-term average sound level for construction would not exceed 75 dBA L_{eq} during any phase of construction (Appendix G). Although the long-term average noise levels during construction would not exceed City standards, the potential exists for temporary, short-term noise impacts at locations nearest noise sensitive receptors at the north end of the site. As such, mitigation measure **MM-NOI-1** is provided, which would reduce temporary noise impacts during construction to a less-than-significant level. It should be noted that construction equipment would not remain in one location on the project site for an extended period of time, construction noise impacts would be relatively short-term in nature, and following the completion of construction activities construction noise would cease. Therefore, impacts during construction would be less than significant with mitigation incorporated.

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact

Exterior Noise

The City's General Plan Noise Element contains noise guidelines for new development (City of San Diego 2008). The maximum noise exposure depends on the land use category. The City considers outdoor noise levels of up to 70 dB CNEL to be conditionally acceptable for the outdoor use areas of multifamily land uses.

To analyze impacts associated with exterior noise sources, ambient noise measurements were taken at the project site and traffic counts for local streets were analyzed. Noise modeling was conducted to determine exterior noise impacts. As shown in Figure 9, exterior noise levels in Zone A are anticipated to be 79 CNEL and noise levels in Zone B are anticipated to be between 70-72 CNEL (Veneklasen Associates 2016). These noise levels would be in excess of the City's General Plan Noise Element standard of 70 CNEL and hence would be significant. Other outdoor use areas of the project site would not be exposed to noise levels in excess of 70 CNEL.

To reduce exterior noise impacts where useable outdoor spaces are planned, including the three townhome units located in the northwest corner of the site and along the pool deck (see Figure 9), **MM-NOI-2** is provided. **MM-NOI-2** would require the installation of an exterior noise wall at these locations. Implementation of **MM-NOI-2** would reduce impacts associated with exterior noise exposure to below 70 CNEL (Veneklasen Associates 2016) and thus, to a level that is less than significant.

Interior Noise

Additionally, an increase of approximately 492 residents and the typical activities associated with residential and commercial-retail land uses have the potential to result in substantial noise sources. The State of California Building Code (CBC) Part 2, Title 24, CCR, Appendix 12, "Sound Transmission Control" and the City of San Diego Noise Element state that interior CNEL values for residential land uses are not to exceed 45 CNEL in any habitable room. If the windows must be closed to meet an interior level of 45 CNEL, then a mechanical ventilating system or other means of natural ventilation shall be provided.
The Noise Study found that upon operation of the proposed project, interior noise level would range from 43-45 CNEL with windows and doors closed. Interior noise levels would be potentially significant with the windows and doors open; therefore, because the windows and doors must be kept closed to meet the noise requirements, **MM-NOI-3** is provided. **MM-NOI-3** requires mechanical ventilation or other means of natural ventilation be installed for all residential units. The mechanical ventilation will meet all Code requirements without depending on open windows or leakage through windows and doors. Additionally, due to exterior noise levels in excess of the City's General Plan standard of 70 CNEL in Zone A, **MM-NOI-4** is provided which requires the installation of upgraded exterior façade materials for units located within Zone A as shown in Figure 9. With mitigation incorporated, all impacts associated with interior noise would be reduced to a level that is less than significant.

b) Generation of, excessive ground borne vibration or ground borne noise levels?	☐	☐	☒	☐

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact

The amount of demolition, grading and construction required for the proposed project will not generate excessive groundborne vibrations or noise levels. This project is not anticipated to include pile driving activities; therefore, excessive groundborne vibration is not expected to occur during the temporary nature of construction activities. Additionally, ground-borne vibration would not be associated with the proposed project following construction activities. Impacts related to ground-borne vibration are considered to be less than significant.

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

See XII(a) above regarding operational noise impacts.

As shown in Figure 9, exterior noise levels in Zone A are anticipated to be 79 CNEL and noise levels in Zone B are anticipated to be between 70-72 CNEL (Veneklasen Associates 2016). These noise levels would be in excess of the City's General Plan Noise Element standard of 70 CNEL and hence would be significant. Other outdoor use areas of the project site would not be exposed to noise levels in excess of 70 CNEL. To reduce exterior noise impacts where useable outdoor spaces are planned, including the three townhome units located in the northwest corner of the site and along the pool deck (see Figure 9) **MM-NOI-2** is provided. **MM-NOI-2** would require the installation of an exterior noise wall. Implementation of **MM-NOI-2** would reduce impacts associated with exterior noise exposure to below 70 CNEL (Veneklasen Associates 2016) and thus, to a level that is less than significant.

Additionally, an increase of approximately 492 residents and the typical activities associated with residential and commercial-retail land uses have the potential to result in substantial noise sources. The State of California Building Code (CBC) Part 2, Title 24, CCR, Appendix 12, "Sound Transmission Control" and the City of San Diego Noise Element state that *interior CNEL* values for residential land uses are not to exceed 45 CNEL in any habitable room. If the windows must be closed to meet an interior level of 45 CNEL, then a mechanical ventilating system or other means of natural ventilation shall be provided.

The Noise Study found that upon operation of the proposed project, interior noise level would range from 43-45 CNEL with windows and doors closed. Interior noise levels would be potentially significant with the windows and doors open; therefore, because the windows and doors must be kept closed to meet the noise requirements, **MM-NOI-3** is provided. **MM-NOI-3** requires mechanical ventilation or other means of natural ventilation be installed for all residential units. The mechanical ventilation will meet all Code requirements without depending on open windows or leakage through windows and doors. Additionally, due to exterior noise levels in excess of the City's General Plan standard of 70 CNEL in Zone A, **MM-NOI-4** is provided which requires the installation of upgraded exterior façade materials for units located within Zone A as shown in Figure 9. With mitigation incorporated, all impacts associated with interior noise would be reduced to a level that is less than significant.

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above existing without the project?	☐	☒	☐	☐

As described in XII a), the only "temporary or periodic" noise sources would be construction-related. Construction noise would be short-term and is strictly regulated under the San Diego Municipal Code. Division 4 of Article 9.5 of the San Diego Municipal Code addresses the limits of disturbing or offensive construction noise. The Municipal Code states that with the exception of an emergency, it should be unlawful to conduct any construction activity so as to cause, at or beyond the property lines of any property zoned residential, an average sound level greater than 75 decibels (dBA) during the 12-hour period from 7:00 a.m. to 7:00 p.m. The nearest noise-sensitive land uses are single-family and multifamily residences, as well as a motel, located immediately north across Rosewood Street. Based on the number of pieces of primary equipment anticipated to be used for construction of the proposed project, the average sound level for construction would not exceed the City's 75 dBA standard for daytime noise levels; thus, impacts would be potentially significant. Although the long-term average noise levels during construction would not exceed City standards, the potential exists for temporary, short-term noise impacts at locations nearest noise sensitive receptors at the north end of the site. As such, mitigation measure **MM-NOI-1** is provided, which would reduce temporary noise impacts during construction to a less-than-significant level.

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

The closest public airport to the project site is Montgomery Field Airport, located approximately 4.4 miles east. The project site is not located within the Airport Influence Area for Montgomery Field, and therefore future residents would not be exposed to excessive noise levels. Impacts would be less than significant.

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

The project is not located within the vicinity of a private airstrip; therefore, people residing or working in the area of the project would not be exposed to excessive noise from a private airport. No impacts would result.

Issue	Potentially Significant Impact	Less Than Significant with 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)?	☐	☐	☒	☐

The proposed project would involve the redevelopment of the project site from an existing commercial-retail lot, to a mixed-use development including 172 residential units and 15,345 square feet of retail space. The proposed project would directly induce population growth by developing new homes and businesses; however, the growth is anticipated by applicable local and regional plans. As stated in Section VII – Greenhouse Gases, the proposed project would generate a population of approximately 492 people based on default population generation rates provided in CalEEMod. CalEEMod applies a 2.86 persons per residential unit rate (CalEEMod 2013, Appendix D).

The proposed project is within the Pacific Beach Community Area of the City, and would be consistent with the site's recommended land use under the Pacific Beach Community Plan and Local Coastal Program Land Use Plan and the of Community Commercial (CC)-4-2 zone. According to San Diego Municipal Code Section 131.0522, Use Regulations Table for Commercial Zones Table 131-05B, multiple dwelling unit residential development is a permitted use in the CC-4-2 zone. The proposed project would include sidewalks, parkway landscaping, public plaza and community signage; however, the project would not expand utility infrastructure beyond what is adequate to serve the project.

By providing additional housing opportunities at affordable and market rate rents in a transit-oriented, mixed-use development, the project would implement the Community Plan's Commercial Element goals and policies for the Mission Bay Drive commercial spine and Residential Element goals regarding promotion of a variety of housing types. According to the City's most recent General Plan Housing Element (2013–2020) (City of San Diego 2013), SANDAG allocated 88,096 housing units to the City for the Regional Housing Needs Assessment (RHNA) period of January 1, 2010–December 31, 2020. The City has not met this annual growth in housing in any of the relevant years and the project would help the City meet its RHNA goals. As stated in the City's Housing Element, currently zoned residential land would adequately meet this allocation (City of San Diego 2013).

The project would be consistent with the City's General Plan and the Pacific Beach Community Plan. Therefore, the housing and resulting population induced by the proposed project would not induce substantial population growth that would result in a potentially significant impact.

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

The proposed project would not displace existing housing. The project proposes the development of 172 residential units on a site with commercial uses, and construction of replacement housing as a

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact

result of the proposed project would not be required. Therefore, no impact would occur.

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

Although redevelopment of the project site would displace businesses, this displacement is not considered substantial nor would that displacement necessitate the construction of replacement housing elsewhere. In addition to the 172 residences proposed, the project proposes 15,500 square feet of commercial space. Therefore, no impact would occur.

XIV. PUBLIC SERVICES

a) Would the project result in substantial adverse physical impacts associated with the provisions of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service rations, response times or other performance objectives for any of the public services:

i) Fire Protection	☐	☐	☒	☐

The City of San Diego Fire-Rescue Department (SDFD) encompasses all fire, emergency medical, lifeguard and emergency management services. SDFD serves 331 square miles, including the project site, and serves a population of 1,337,000. SDFD has 801 uniformed fire personnel and 48 fire stations available to service the project site. The closest fire stations to the project site are Station 21 (approximately 2.51 miles west), and Station 25 (approximately 1.35 miles south).

The proposed project would construct and establish residential development that would directly increase the service population of SDFD and, therefore, increase demand for fire protection services. However, the project site is currently developed and served by the SDFD; and the proposed residential development would be consistent with the City's zoning and Pacific Beach Community Plan's designated land use for the site. In addition, The proposed project would be required to comply with applicable Development Impact Fees (DIF), which are collected to address the impact of new development prior to the issuance of any building permit as identified in the City's General Plan and Chapter 14, Article 2, Division 6: Public Facility Regulations of the City's Municipal Code. The applicant's payment of DIFs would ensure maintenance of existing levels of service for the project site. Additionally, the proposed project would be built in conformance with all applicable Fire Code policies. No new or expanded facilities would be required, and impacts related to fire protection services would be less than significant.

ii) Police Protection	☐	☐	☒	☐

The City of San Diego Police Department (SDPD) would serve the proposed project. The project site is located within the SDPD's Northern Division, which serves a population of 225,234 people and encompasses 41.3 square miles. The addition of 172 units or approximately 492 new residents would not substantially increase the demand in police services, as multiple dwelling unit residential development is a permitted use in the CC-4-2 zone, and accounted for in the City's general plan. In addition, the existing commercial-retail uses on the project site are currently being serviced by the

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact

SDPD Northern Division.

As stated previously, the proposed project would be required to comply with applicable DIFs, which are collected to address the impact of new development prior to the issuance of any building permit as identified in the City's General Plan and Chapter 14, Article 2, Division 6: Public Facility Regulations of the City's Municipal Code. Although the proposed project would establish residential development that would directly increase the service population of the SDPD, the applicant's payment of DIFs would ensure maintenance of existing levels of service for the project site. SDPD personnel and existing facilities would adequately service the project site, and no new or expanded facilities would be required. Impacts would be less than significant.

iii) Schools	☐	☐	☒	☐

The project site is located within the San Diego Unified School District (SDUSD). The schools within the Pacific Beach Community whose boundaries encompass the project site include, Crown Point Elementary School located approximately 1.6 miles west; Pacific Beach Middle School located approximately 1.70 miles west; and Mission Bay High School located approximately 0.68 mile west. Potential impacts to schools serving the project site would be related to the number of students generated by the project. Student generation rates vary based on the type of project, number of units, bedroom mix, affordable senior housing components, proximity to schools and other amenities, neighborhood, and other factors. SDUSD does not have standard generation rates, but estimates the number of students generated from a project by these factors, as well as looking at the number of existing students at comparable developments in the general vicinity. Table 6 below outlines the estimated student generation for the proposed project.

Table 6
Potential Student Generation for the Jefferson Pacific Beach Project

School	Maximum Capacity	SDUSD Enrollment Fall 2015	SDUSD Anticipated Students Per Unit	SDUSD Anticipated Students Generated from Project
Crown Point Elementary School (K–5)	410[1]	393[1]	0.013–0.026	0-5
Pacific Beach Middle School (6–8)	1,004[2]	677[2]	0.005–0.010	0–2
Mission Bay High School (9–12)	1,945[2]	1,055[2]	0.005–0.010	0–2
Total				0–9

Source:
[1] Pers Com., 2016. [2] San Diego Unified School District, 2015.

As shown in Table 7, all three schools which would serve the proposed project have sufficient capacity at this time to accommodate any increase in students generated by the proposed project. Although Pacific Beach Elementary School is close to capacity, the number of students estimated to be generated by the project is not considered substantial, and would be adequately served by Crown Point Elementary School. Additionally, other elementary schools within the community such as Sessions Elementary School, located 1.3 miles northwest; and Pacific Beach Elementary School, located 2.3 miles northwest would be able to accommodate students generated by the proposed project.

Senate Bill (SB) 50 was enacted on August 27, 1998. The bill authorized a $9.2 billion K–12 school and

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact

higher education bond to be presented to the voters of California. The state bond measure, known as the "Class Size Reduction Kindergarten - University Public Education Facilities Bond Act of 1998," was approved by the voters on November 3, 1998. SB 50 significantly revised developer fee and mitigation procedures for school facilities as set forth in Government Code Section 65996. The legislation holds that the statutory fees are the exclusive means of considering and mitigating school impacts. The project would not impact SDUSD's ability to comply with SB 50, and the project would be required to pay the school facilities fee. The proposed project would not require the construction of new school facilities, and the district currently does not have plans for new or expanded school facilities that would serve the project site. With payment of the school facilities fee, impacts would be less than significant pursuant to California Government Code Section 65996.

v) Parks	☐	☐	☒	☐

The nearest parks to the project site include De Anza Cove Park, 0.20 mile southwest; Mission Bay Park, 0.78 mile south; South Clairemont Community Park, 0.83 mile northeast; Mission Valley YMCA Krause Family Skate/Bike Park, 0.86 mile east; Capehart Dog Park, 0.88 mile northwest; Fiesta Island Park, 1.67 miles southwest; Kate O. Sessions Memorial Park, 1.78 miles northwest; Tecolote Canyon Natural Park, 1.93 miles southeast; and Fanuel Street Park, 1.94 miles west. In addition to these public parks, Mission Bay is located 0.25 mile southwest; and the Pacific Ocean, specifically Pacific Beach and Mission Beach, are located approximately 2.5 miles west of the project site.

The proposed project is required to provide a total of 32,680 square feet of useable open space within the development per the City's Municipal Code (190 square feet per dwelling unit). The project proposes a total of 34,196 square feet of useable open space between all four levels (Carrier Johnson 2015), which includes private residential amenities on site such as outdoor dining areas, barbeque and seating areas, a fire pit, courtyard lounge areas, a private lounge patio, pool, spa, gym, and clubhouse; as well as public store-front seating and lounge areas. With the convenience of proposed on-site residential and recreational amenities, and the 11 recreational facilities within a 2-mile radius of the project site, the proposed project is not expected to result in substantial deterioration or adverse effects to the existing parks.

Additionally, the proposed project would be required to comply with applicable DIFs, which are collected to address the impact of new development prior to the issuance of any building permit as identified in the City's General Plan and in accordance with Municipal Code Chapter 9, Article 6, Division 4 (Development of Park and Recreational Facilities). Therefore, impacts would be less than significant.

vi) Other public facilities	☐	☐	☒	☐

The proposed project is located within the City of San Diego public library system. The Pacific Beach community is currently served through the Pacific Beach Taylor Library, located approximately 2.2 miles west of the project site at 4275 Cass Street. This local branch is part of the City library system, which allows residents to use any branch or the main library. The library is expected to experience an increase in use of the Pacific Beach Taylor Library due to the anticipated increase of approximately 492 residents; however, residents would be allowed to use any branch within thse City library system, including the Clairemont Library that is located approximately 1.2 miles southeast of the project site. Residents would often use the library most convenient to them, such as one near their work or school, not necessarily the library located closest to their home. Due to the dispersal of residents to library

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact

branches throughout the City as well as the availability of materials and digital reading that can be accessed online, the project would not have an adverse effect, or result in a need for new or modified government services associated with libraries.

Additionally, the proposed project would be required to comply with applicable general development regulations, such as DIFs, as identified in the City's Municipal Code Chapter 14, Article 2, Division 6 (Public Facility Regulations). These regulations assure that the cost of providing public facilities to serve new development is the responsibility of that development and that minimum standards for public facilities are maintained to protect the public health, safety and welfare (City of San Diego, 2016). For these reasons, impacts would be less than significant.

XV. RECREATION

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?	☐	☐	☒	☐

As previously described in Section XIV (v), the nearest parks to the project site include De Anza Cove Park, 0.20 mile southwest; Mission Bay Park, 0.78 mile south; South Clairemont Community Park, 0.83 mile northeast; Mission Valley YMCA Krause Family Skate/Bike Park, 0.86 mile east; Capehart Dog Park, 0.88 mile northwest; Fiesta Island Park, 1.67 miles southwest; Kate O. Sessions Memorial Park, 1.78 miles northwest; Tecolote Canyon Natural Park, 1.93 miles southeast; and Fanuel Street Park, 1.94 miles west. In addition to these public parks, Mission Bay is located 0.25 mile southwest, and the Pacific Ocean, specifically Pacific Beach and Mission Beach, are located approximately 2.5 miles west of the project site.

Although the proposed project would generate approximately 492 people, the project proposes a total of 34,196 square feet of useable open space between all four levels (Carrier Johnson 2015), which includes private residential amenities on site such as outdoor dining areas, barbeque and seating areas, a fire pit, courtyard lounge areas, a private lounge patio, pool, spa, gym, and clubhouse; as well as public store-front seating and lounge areas. The useable open space proposed would exceed the required total of 32,680 square feet of useable open space within the development per the City's Municipal Code (190 square feet per dwelling unit). Between the proposed residential and recreational amenities, and the eleven recreational facilities within a 2-mile radius of the project site, the proposed project is not expected to result in substantial deterioration or adverse effects to the existing parks.

Additionally, the proposed project would be required to comply with applicable DIFs, which are collected to address the impact of new development prior to the issuance of any building permit as identified in the City's General Plan and in accordance with Municipal Code Chapter 9, Article 6, Division 4 (Development of Park and Recreational Facilities) of the City's Municipal Code. Therefore, impacts would be less than significant.

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
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?	☐	☐	☒	☐

The proposed project is required to provide a total of 32,680 square feet of useable open space within the development and proposes a total of 34,196 square feet of useable open space between all four levels. The project would provide 3,400 square feet of residential amenities on the first level, such as outdoor dining areas, barbeque and seating areas, a fire pit, courtyard lounge areas, a private lounge patio, pool, spa, gym, and clubhouse. The potential adverse physical effects on the environment from the on-site recreational facilities is analyzed in this Initial Study. For the reasons discussed in subsection (a) above, the project will not result in the expansion of offsite recreational facilities. Therefore, the proposed project would not require the expansion or construction of new recreational facilities off site, and impacts would be less than significant.

XVI. TRANSPORTATION/TRAFFIC – Would the project?

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

A Traffic Impact Analysis (TIA) was completed for the project by Urban Systems Associates Inc. on May 12, 2016 (Appendix H). The vehicular traffic generation of the project was estimated based on trip generation rates from the City's current *Trip Generation Manual* (2003) as well as counts of existing uses. The analysis found that the proposed project is expected to generate 1,822 cumulative average daily trips (ADT), or 1,507 net cumulative ADT with 66 AM (8 in / 58 out) peak hour trips and 110 PM (75 in / 35 out) peak hour trips. This equates to 1,867 net driveway trips with 113 AM (46 in / 67 out) peak hour trips and 185 PM (102 in / 83 out) peak hour trips. The existing uses on site generate 315 ADT with 38 AM (21 in /17 out) peak hour trips and 42 PM (20 in / 22 out) peak hour trips.

The addition of project traffic was evaluated in Existing, Near Term (Opening Day 2019), and Horizon Year (2035) scenarios. The traffic impact study area consists of nine (9) roadway segments and six (6) intersections. Based on project distribution, fewer than 50 peak-hour project trips are expected to access Interstate 5 and less than 20 peak-hour project trips are expected to utilize metered freeway

on-ramps; therefore, freeway segments and metered on-ramps were not evaluated within the TIA. The TIA determined that development of the proposed project would result in segment impacts to Mission Bay Drive, specifically; direct project impacts were identified in the Existing with Project and Near Term with Project (2019) scenarios on Mission Bay Drive between Grand Avenue and Rosewood Street, between Rosewood Street and North Mission Bay Drive, and on Rosewood Street west of the Project Driveway. Additionally, cumulative project impacts were identified in the Horizon Year 2035 with Project scenario on four segments; Mission Bay Drive between Garnet Avenue and Magnolia Avenue, between Grand Avenue and Rosewood Street, between Rosewood Street and North Mission Bay Drive, and on Rosewood Street west of the project driveway.

Furthermore, impacts to several intersections were determined. Specifically, direct project impacts were identified in the Existing with Project and Near Term with Project (2019) scenarios at the intersection of Rosewood Street and Mission Bay Drive. Cumulative project impacts were identified in the Year 2035 with Project scenario at the intersections of Garnet Avenue/Mission Bay Drive, Magnolia Avenue/Mission Bay Drive, Bunker Hill Street/Mission Bay Drive and Rosewood Street/Mission Bay Drive. See Appendix H for details.

To reduce identified traffic impacts to a level that is less than significant, mitigation measures **MM-TR-1** and **MM-TR-2** would be implemented. **MM-TR-1** would require the installation of a traffic signal at the intersection of Rosewood Street and Mission Bay Drive using adaptive signal control technology. **MM-TR-2** would require the installation of centerline striping on Rosewood Street. Additionally, **MM-TR-1** would require adaptive signal control improvements to other signals on Mission Bay Drive including enhanced fiber optic signal interconnects and communications, as well as additional detection sensors and computer equipment at each intersection. Adaptive signal control leverages advanced cameras and sensors in the street, as well as current computing and communications technologies to fine tune signal timing in real time based on actual traffic conditions. Implementation of **MM-TR-1** would reduce identified traffic impacts to a level that is less than significant.

Following implementation of **MM-TR-1**, the intersection of Mission Bay Drive and Rosewood Street would be improved from a minor street Level of Service (LOS) “F” to “A/B” overall. Additionally, with implementation of the adaptive traffic control system, the Mission Bay Drive corridor overall would be expected to experience an approximately 13.8% reduction in total system delay in the AM peak hour and an approximately 1.7% improvement in total system delay in the PM peak hour, with total corridor stops expected to be reduced 4.2% in the AM peak hour and 5.8% in the PM peak hour. Therefore, the proposed project would not conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system. Impacts would be less than significant with mitigation incorporated.

Non-Motorized Modes of Transportation

Pedestrian Access

Pedestrian access to the proposed project site is provided via non-contiguous sidewalks on Mission Bay Drive (on the project frontage) and Rosewood Street (on the project frontage). Pedestrians can enter the site at various stairways along Mission Bay Drive as well as sidewalks at the main driveway on Rosewood Street. In addition, a plaza would be located at the north-western corner of the project site to provide pedestrian access to the site. Additionally, pedestrian pathways front the commercial

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact

spaces along Mission Bay Drive. Walkways on the third and fourth floor would connect pedestrian pathways on the upper levels of the complex. A new pedestrian crossing to Mission Bay Park would be provided when the project installs the proposed signal at Rosewood as described in **MM-TR-1**. This crossing will also aid in the facilitation of access to MTS bus route 30 along Grand Avenue via sidewalks on the west side of Mission Bay Drive. Therefore, implementation of the proposed project would improve pedestrian circulation in and around the site, and no impacts would occur.

Bicycle Access

A Class II bike lane already exists on the west side (southbound) of Mission Bay Drive south of Grand Avenue. The proposed project would also provide 74 bicycle spaces for bike parking. Moreover, as part of the TDM Plan, newsletters and bulletin boards will encourage alternative modes of transportation such as bicycling. Therefore, implementation of the proposed project would not adversely impact bicycle access and circulation in and around the site; therefore, no impacts related to bicycle access would occur.

Transit

A new trolley station will be constructed at the southeast corner of the Balboa Avenue/I-5 interchange as part of the Mid-Coast Trolley Line. This new trolley station is within approximately 2,000 feet of the proposed project. According to SANDAG, the trolley station construction is anticipated to begin in the second half of 2016, with service anticipated to begin in 2021. In addition, MTS bus route 27 services Garnet Avenue approximately every 30 minutes with a westbound stop approximately 280 feet east of Mission Bay Drive and an eastbound stop approximately 580 feet east of Mission Bay Drive. Route 30 services Grand Avenue approximately every 25 minutes with a westbound stop approximately 50 feet northwest of Mission Bay Drive and an eastbound stop approximately 600 feet northwest of Mission Bay Drive. Route 30 is within an approximate 1,000 foot radius of the project and Route 27 is within an approximate 2,000-foot radius of the project. Therefore, implementation of the proposed project would improve access to mass transit in the area as part of the TOD design concept; therefore, no impacts related to transit access would occur.

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?	☐	☒	☐	☐

The TIA found that all study street segments currently operate at a level of service (LOS) D or better with the exception of: Mission Bay Drive between Grand Avenue and Rosewood Street; and Mission Bay Drive between Rosewood Street and North Mission Bay Drive. With implementation of the project, all study segments are projected to operate at level of service D or better when project traffic is added with the exceptions of: Mission Bay Drive between Grand Avenue and Rosewood Street; Mission Bay

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact

Drive between Rosewood Street and North Mission Bay Drive; and Rosewood Street west of the project driveway.

All study intersections currently operate at LOS D or better in both the AM and PM peak hour with the following exceptions: Mission Bay Drive at Garnet Avenue in the PM Peak Hour (LOS E); Mission Bay Drive at Rosewood Street in the AM peak hour (LOS F); and Mission Bay Drive at Rosewood Street in the PM Peak Hour (LOS F). With implementation of the proposed project, all intersections are projected to operate at LOS D when project traffic is added with the following exceptions: Mission Bay Drive at Garnet Avenue in the PM Peak Hour (LOS E); Mission Bay Drive at Rosewood Street in the AM peak hour (LOS F); and Mission Bay Drive at Rosewood Street in the PM Peak Hour (LOS F) (see Appendix H).

Direct project impacts were identified in the Existing with Project and Near Term with Project (2019) scenarios on Mission Bay Drive between Grand Avenue and Rosewood Street, between Rosewood Street and North Mission Bay Drive, and on Rosewood Street west of the Project Driveway. Additionally, cumulative project impacts were identified in the Horizon Year 2035 with Project scenario on four segments; Mission Bay Drive between Garnet Avenue and Magnolia Avenue, between Grand Avenue and Rosewood Street, between Rosewood Street and North Mission Bay Drive, and on Rosewood Street west of the project driveway.

Regarding intersection impacts, direct project impacts were identified in the Existing with Project and Near Term with Project (2019) scenarios at the intersection of Rosewood Street and Mission Bay Drive. Cumulative project impacts were identified in the Year 2035 with Project scenario at the intersections of Garnet Avenue/Mission Bay Drive, Magnolia Avenue/Mission Bay Drive, Bunker Hill Street/Mission Bay Drive and Rosewood Street/Mission Bay Drive. See Appendix H for details.

As described previously in threshold (a), following implementation of **MM-TR-1**, project traffic impacts to the identified street segments and intersections would be reduced to a less-than-significant level.

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?	☐	☐	☒	☐

The project is not located within any Airport Safety Zone, and is therefore not subject to compatible development guidelines, including those that apply to air traffic patterns. Additionally, project implementation would not result in a change in air traffic patterns at the Montgomery Air Field. Moreover, the project is consistent with height and bulk regulations and is not at the scale that would result in a change in, or adverse impact to, air traffic patterns. Impacts would be less than significant.

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

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact

As previously discussed, primary access to the project site would be provided off of Rosewood Street through the currently minor street stop controlled intersection of Mission Bay Drive and Rosewood Street. This intersection is not currently signalized and left turns from Rosewood Street operate at LOS F in both the AM and PM peak hour. However, the project proposes the installation of a signal and restriping at this intersection in order to mitigate the impact at this intersection under **MM-TR-1**. Once on Rosewood Street, access to the project would be approximately 190 feet east of Mission Bay Drive. The driveway would provide access to the street parking lot and a ramp that would lead to an underground parking garage. Rosewood Street west of the project driveway currently operates under capacity. With the installation of a traffic signal at the intersection of Mission Bay Drive (MM-TR-1) and Rosewood Street and re-striping (MM-TR-2), Rosewood Street would sufficiently handle all expected traffic.

Installation of the adaptive traffic signalization system as proposed in **MM-TR-1** would not result in the potential for residual traffic-related hazards. The adaptive signalization system would be implemented to optimize traffic flow coming off the freeway to create more efficient circulation patterns in the immediate vicinity of the project so that substantial freeway back-up does not occur. Additionally, under the proposed standard traffic signal design, the signal would be visible from approximately 575 feet. Following installation of the proposed western mast signal indicator, the traffic signal would be visible from approximately 705 feet, thus increasing visibility compared to existing conditions. Traffic exiting the freeway has a speed warning sign indicating 50 miles per hour (mph) for the off-ramp which transitions down to 35 mph on Mission Bay Drive. Based on a radar speed survey of traffic approaching the proposed Rosewood Street traffic signal, the design speed of 50 mph has been established despite the posted transition speed limit of 45 mph within this segment of the road. The minimum distance necessary for proper signal visibility at a speed of 50 mph is 540 feet; therefore, with a visibility range between 575 to 705 feet, the proposed traffic signal location exceeds the applicable safety standards. Additionally, an advanced warning sign would be installed at the off-ramp to notify motorists of the signal ahead (Urban Systems 2016c).

Additionally, a new pedestrian crosswalk would be installed at the intersection of Rosewood Street and Mission Bay Drive, which would provide the only safe direct path of travel for pedestrians and bicyclists travelling from Mission Bay and other land uses on the west side of Mission Bay Drive. Currently, the Bunker Hill controlled crossing does not provide a direct path of travel to Mission Bay and Mission Bay Park. Thus, the proposed crosswalk and signal improvements would provide a safe, straightforward pedestrian and cycling route option for accessing these recreational areas and the larger Pacific Beach community amenities (Urban Systems 2016c).

Moreover, pedestrian amenities in the area would be improved throughout the site to increase pedestrian safety including the development of a pedestrian-only plaza, improved sidewalks, and pedestrian bridges. Therefore, potential impacts associated with these hazards would be less than significant.

e) Result in inadequate emergency access?	☐	☐	☒	☐

Emergency access would be provided during both short-term construction and long-term operation of the proposed project. Construction of the proposed project would not involve any street or driveway closures that could impede emergency access. Impacts would be less than significant.

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	☐	☐	☒	☐

A new trolley station is proposed to be constructed at the southeast corner of the Balboa Avenue/I-5 interchange as part of the Mid-Coast Trolley Line. This new trolley station is approximately 2,000 feet from the project, and will provide high quality transit service close to the project site. In addition, MTS bus route 27 services Garnet Avenue approximately every 30 minutes, and route 30 services Grand Avenue approximately every 25 minutes. Both bus routes are less than a half mile from the project site. Pedestrian access to the project site would be provided by sidewalks on Mission Bay Drive and Rosewood Street. A new pedestrian crossing to Mission Bay Park would be provided when the new signal at Rosewood is completed. No bike lanes are included as part of the project; however, a Class II bike lane already exists on the west side (southbound) of Mission Bay Drive south of Grand Avenue, and the Pacific Beach Community Plan calls for lanes on the east side (northbound) of Mission Bay Drive.

Therefore, the proposed project would not conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities. Impacts would be less than significant.

XVII. UTILITIES AND SERVICE SYSTEMS – Would the project:

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

The City's Water Department maintains and operates three water treatment plants with a combined total treated capacity of 294 MGD. The department maintains and operates 32 treated water storage facilities, and a series of distribution lines to serve City residents. All sewage in the Pacific Beach community is pumped to the Point Loma Sewage Treatment Plant for processing, which has a treatment capacity of 240 MGD. After final screening during the treatment process, the treated wastewater (effluent) is discharged to the ocean through the Point Loma Ocean Outfall. The Point Loma Ocean Outfall is 4.5 miles long, twelve feet in diameter and operating via gravity-feed. Through a combination of factors, including industrial source control, advanced primary treatment of wastewater, a deep ocean outfall, and comprehensive environmental monitoring, both the U.S. Environmental Protection Agency and the Regional Water Quality Control Board agreed that the Point Loma Treatment Plant full protects the ocean (City of San Diego, 2016).

An Engineering Feasibility Report was prepared for the proposed project by Leppert Engineering Corporation (March 2016) (Appendix I) including a disclosure of utility services that would be provided to the proposed project. A Will Serve Letter from the City's Utility Department is included as an Appendix to the Engineering Feasibility Report that confirms that sewer services to the project

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact

site would be provided by the City. Although the amount of wastewater may increase due to the increase in residential units and number of potential residents, the project would comply with Title 24 Green Building Standards (CALGreen), which includes the mandatory standard of 20% reduction in indoor water use. The proposed project would be served by the City, and wastewater would be treated at the Point Loma Sewage Treatment Plant which has available resources to serve the anticipated 109,797 gallons per day. It is concluded that the existing wastewater treatment facilities and sewer mains have sufficient capacity to serve the proposed project (Appendix I). Therefore, implementation of the proposed project would not exceed requirements of the San Diego Regional Water Quality Control Board, and impacts would be less than significant.

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?	☐	☐	☒	☐

A Will Serve Letter from the Utility Department is included as an Appendix to the Engineering Feasibility Report that confirms that water and sewer services to the project site would be provided by the City (Appendix I). An 8-inch cast-iron water main exists in Rosewood Street, as well as an existing 12-inch water main located in Mission Bay Drive. These water mains would be available to provide adequate water service to the project site.

Development of the proposed project would result in a residential water demand of 61,500 gallons per day (gpd), and a commercial water demand of 2,181 gpd, for a total water demand of 63,681 gpd and total peak hour demand of 388,454 gpd. The City's Significance Determination Thresholds guidance lists project types and sizes that would require the preparation of a water supply assessment, including residential projects proposing 500 or more dwelling units. The project would be below the 500 dwelling unit screening threshold; therefore, a water supply assessment would not be required (City of San Diego 2011). Additionally, as previously stated in (a), the total sewer demand for the proposed project is estimated to be 109,797 gallons per day, and it is concluded that the existing sewer mains have sufficient capacity to serve the proposed project (Appendix I).Therefore, implementation of the proposed project would not require the construction or expansion of water or wastewater facilities, and impacts would be less than significant.

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?	☐	☐	☒	☐

A Downstream Drainage Study was prepared by Leppert Engineering Corporation on November 30, 2015, for the proposed project (Appendix F1). The proposed project is a portion of a larger drainage basin that drains to an existing 60-inch RCP storm drain. The 60-inch storm drain intercepts approximately 220 acres, of which approximately 61 acres is within the drainage basin west of I-5

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact

(west basin) and 159 acres is within the drainage basin east of I-5 (east basin). The project site is part of the west basin, and connects to the existing 60-inch storm drain that discharges to Mission Bay. The 60-inch storm drain has a maximum capacity of approximately 112 cfs.

The Drainage Study found that the peak runoff for the upstream basins that drain to the 60-inch storm drain exceeds the capacity of the 60-inch storm drain in both the existing and proposed development conditions; however, peak runoff from the proposed development condition would be less than the existing peak runoff rate of the existing project site Therefore, there would be no adverse impacts to the existing downstream drainage facilities as a result of the proposed project. Additionally, all proposed storm drains would be sized to provide adequate capacity, and the proposed project would reduce impervious area on-site from approximately 96% to 70%. Development of the proposed project would not require the construction of new stormwater drainage facilities, or expansion of existing facilities as proposed peak runoff rates would be less than existing rates once constructed. Given the above, the Project will not require or result in the construction or expansion of storm water drainage facilities; therefore, impacts would be less than significant.

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

The San Diego region relies mostly upon imported water from Northern California and the Colorado River to meet its demands. Water is purchased from the San Diego County Water Authority (SDCWA), which is a wholesale water agency that provides imported water to its 24 member agencies. The SDCWA purchases water from the Metropolitan Water District (MWD) of Southern California, which is a cooperative of 26 cities and water agencies serving 18 million people in six counties. The SDCWA and the City are required by the state to prepare urban water management plan (UWMP) and update them every five years. The City's 2010 UWMP (City of San Diego, 2011) addresses the City's water system and includes a description of the water supply sources, magnitudes of historical and projected water use, water conservation methods, and a comparison of water supply to water demands during normal, single-dry, and multiple-dry years; in order to prepare for future supply and demand. As stated in the City's UWMP, the City currently purchases most of its water from the SDCWA, and has purchased between 100,000 and 228,000 AF of water per year. SDCWA has projected their supply to meet the demand of 260,170 AF per year in 2035 (City of San Diego, 2011) to provide supply reliability to customers.

The City's Water Department maintains and operates 49 water pump plants, 127-plus pressure zones, 31 treated water storage facilities with more than 200 million gallons of potable water storage capacity, including steel tanks, standpipes, concrete tanks and rectangular concrete reservoirs. Recycled water demand is anticipated to increase, as additional recycled water supplies and transmission infrastructure are made available.

Development of the proposed project would result in a residential water demand of 61,500 gallons per day (gpd), and a commercial water demand of 2,181 gpd, for a total water demand of 63,681 gpd and total peak hour demand of 388,454 gpd. A Will Serve Letter from the City's Utility Department is included as an appendix to the Engineering Feasibility Report (Appendix I) which states that Existing

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact

water supply facilities of the City have sufficient supply to serve the proposed project. In addition, the proposed project would incorporate sustainable design features to minimize the increase in water demand. These features include low water use, drought tolerant landscaping, rain barrels, and reclaimed water use for irrigation. Based on Title 24 regulations, low demand water appliances proposed for the project, and projections from SDCWA and the City, there would be sufficient water supplies to service the proposed project, and impacts would be less than significant.

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?	☐	☐	☒	☐

As previously described in Section XVII(a), sewer services to the project site would be provided by the City. A Will Serve Letter from the City's Utility Department is included as an Appendix to the Engineering Feasibility Report (Appendix I). The proposed project would be served by an existing 30-inch trunk sewer main and sewer easement, located at the northwest corner of the project site. Additionally, an existing 10-inch sewer main is located along the northerly side of Rosewood Street, and is available to provide sanitary service to the project site.

The total sewer demand for the proposed project is estimated to be 109,797 gpd, and the City's wastewater treatment facilities are determined to have adequate capacity to serve the proposed project's demands (Appendix I). Impacts would be less than significant.

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

A Waste Management Plan (WMP) was completed for the proposed project (Appendix J). Due to the project being in the entitlement stages, the waste generation and waste segregation calculated in the WMP are estimates, and will be refined prior to obtaining a demolition permit, and or, building permit. The WMP will be completed and submitted to the City of San Diego Environmental Services Department for approval prior to issuance of the demolition and, or, building permit.

The construction and demolition waste will include asphalt, concrete, brick, masonry, tiles, cabinets, doors, fixtures, windows, cardboard, carpet, padding, foam, ceiling tiles, dirt, drywall, landscape debris, roofing materials, scrap metal, stucco, treated/painted and unpainted/untreated wood. Wastes generated during ongoing use will include paper, packaging, food waste, polystyrene, plastic, bimetal cans, bulky items, landscape debris, electronic waste, and other specific to future retail tenants.

The proposed project is estimated to generate approximately 2,294 tons of waste during demolition. Approximately 2,179.5 tons of material would be recycled, including landscaping, concrete, asphalt, foundations, building structure, masonry walls, curb and gutter, and switch gear and cable.

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact

Approximately 114.7 tons of debris would be disposed of at a landfill, including non-useable lumber, drywall, glass, miscellaneous trash, roofing, paper, broken roof tiles, and floor tile. The proposed project would implement a target of 20 percent recycled material and 75 percent for landfill diversion. 86 percent of the construction materials generated by the project are expected to be diverted from landfills (Appendix J). Materials to be recycled would be redirected to appropriate recipients selected from the Environmental Services Department (ESD) directory of facilities that recycle demolition materials, scrap metal, and yard waste. To the greatest extent feasible, the project proposes to utilize asphalt, stone, and concrete demolition waste by grinding it up and reusing it on site during construction as "shading" of pipe trenches, base or sub-base for paving or hardscape, and/or backfill or flat work. If the goal of reusing the asphalt, stone waste is not achieved, the excess materials would be sourced and separated and taken to an appropriate facility certified by the City. Additionally if not reused, concrete recycling would be taken to Hanson Aggregates West (Miramar), and mixed debris would be taken to Sanco Resource Recovery & Buy Back Center. Waste generated from the construction of the proposed project would be taken to Miramar Landfill. Construction recycle bins would reduce the impact of construction on the local landfill.

During occupancy, ongoing use wastes is estimated to be approximately 250 tons per year; which includes approximately 206.4 tons per year generated by residential and approximately 43.4 tons per year generated by commercial-retail. Waste generated from occupancy of the development would be taken to Miramar Landfill. The Miramar Landfill's maximum permitted capacity is 87,760,000 cubic yards with a maximum throughput of 8,000 tons per day. The remaining capacity for Miramar Landfill is 15,527,878 cubic yards. It is anticipated that the Miramar Landfill would have sufficient permitted capacity to accommodate the project's solid waste disposal needs. In order to reduce the project's impact on the local landfill, the developer shall be required to implement collection of recyclables at least twice a month; collection of at least plastic and glass bottles and jars, paper, newspaper, metal containers, and cardboard at designated recycling collection areas; and appropriate recycling containers and signage at minimum in order to comply with the City of San Diego Municipal Code Chapter 6, Article 6, Division 7. The proposed project would divert 50% of generated materials as outlined in the WMP, which would reduce impacts on local landfills. Overall, construction and operation of the proposed project would be served by a landfill with adequate capacity and impacts would be less than significant.

g) Comply with federal, state, and local statutes and regulation related to solid waste?	☐	☐	☒	☐

Construction practices would comply with local, state, and federal regulations regarding the handling of building materials to ensure that waste minimization requirements are met. Consistent with those requirements, the project will work towards the goal of 50% waste reduction for construction and demolition debris, consistent with the requirements of Chapter 6, Article 6, Division 6, of the Municipal Code and City policies regarding waste reduction, recycling, and product procurement. The project would also divert waste generated during the occupancy phase. As stated in the WMP, the project will reduce waste and comply with all solid waste and recycling laws and regulations, including the guidelines set forth in AB 939 and AB 341, City Ordinances O-19420, O-19694 and O-19678, and the City's Municipal Code Refuse and Recyclable Materials Storage Regulations. Impacts related to compliance with solid waste regulations would be less than significant.

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
XVIII. MANDATORY FINDINGS OF SIGNIFICANCE –				
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☐	☒	☐

The site has been fully developed within an urban setting, and does not contain or support any Environmentally Sensitive Lands as defined by the Biology Guidelines of the City's Land Development Manual, native or sensitive vegetation communities, wetlands that would be expected to support special-status wildlife species, or lands that are classified as Tier I Habitats, Tier II Habitats, Tier IIIA Habitats, or Tier IIIB Habitats. Implementation of the project would not have a substantial adverse effect on candidate, sensitive, or special-status species as identified in local or regional plans, policies, or regulations, and the project would not have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in the Pacific Beach Community Plan, the City of San Diego General Plan, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service. Impacts would be less than significant.

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 futures projects)?	☐	☒	☐	☐

The proposed project would incrementally contribute to cumulative impacts in combination with other projects occurring within the City. However, all reasonably foreseeable future development in the City would be subject to the same land use and environmental regulations that are described throughout this document. Furthermore, all development projects are guided by the policies identified in the City's General Plan and by the regulations established in the Municipal Code.

Issue	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact

As provided in the analysis presented above for each resource area, the proposed project would not result in significant impacts to aesthetics, agriculture and forestry resources, air quality, biological resources, geology/soils, GHG emissions, hydrology and water quality, land use and planning, mineral resources, population and housing, public services, recreation, and utilities and service systems.

Mitigation measures related to cultural resources (MM-CUL-1, MM-CUL-2); noise (MM-NOI-1, MM-NOI-2, MM-NOI-3 and MM-NOI-4); and traffic (MM-TR-1), have been identified in order to reduce potentially significant impacts to a less than significant level. These identified mitigation measures, as well as compliance with applicable land use and environmental regulations would ensure that environmental effects associated with the proposed project do not combine with effects from reasonably foreseeable future development in the City to cause cumulatively considerable significant impacts. Cumulative impacts would, therefore, be less than significant with mitigation incorporated.

c) Does the project have environmental effects, which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☒	☐	☐

Based on the analysis contained herein, all potential impacts related to the proposed project that would cause adverse effects on human beings would be mitigated to a level below significance. Therefore, substantial adverse impacts on human beings, either directly or indirectly, would not occur as a result of the proposed project. Impacts would be less than significant with mitigation incorporated.

INITIAL STUDY CHECKLIST

REFERENCES

I. Aesthetics / Neighborhood Character

X City of San Diego General Plan.

X Community Plans: Pacific Beach Community Plan and Local Coastal Program Land Use Plan

X Local Coastal Plan. Pacific Beach Community Plan and Local Coastal Program Land Use Plan

X Site Specific Report:

DOT (Department of Transportation). 2015. California Scenic Highway Mapping System. Updated May 5, 2015. http://www.dot.ca.gov/hq/LandArch/16_livability/scenic_highways/index.htm.

City of San Diego. 2013. Determination of Building Height in the Coastal Height Limitation Overlay Zone. August 2013. https://www.sandiego.gov/sites/default/files/legacy/development-services/pdf/industry/techbulletin/bldg-5-4.pdf

II. Agricultural Resources & Forest Resources

X City of San Diego General Plan

___ U.S. Department of Agriculture, Soil Survey - San Diego Area, California, Part I and II, 1973

X California Agricultural Land Evaluation and Site Assessment Model (1997)

X Site Specific Report:

DOC (Department of Conservation). 2015. California Department of Conservation, Division of Land Resource Protection. Farmland Mapping and Monitoring Program. San Diego County Important Farmland 2012, Sheet 1 of 2. Map published June, 2015. ftp://ftp.consrv.ca.gov/pub/dlrp/FMMP/pdf/2012/sdg12_w.pdf

III. Air Quality

___ California Clean Air Act Guidelines (Indirect Source Control Programs) 1990

X Regional Air Quality Strategies (RAQS) - APCD

___ Site Specific Report:

IV. Biology

X City of San Diego, Multiple Species Conservation Program (MSCP), Subarea Plan, 1997

___ City of San Diego, MSCP, "Vegetation Communities with Sensitive Species and Vernal Pools" Maps, 1996

X City of San Diego, MSCP, "Multiple Habitat Planning Area" maps, 1997

___ Community Plan - Resource Element

___ California Department of Fish and Game, California Natural Diversity Database, "State and Federally-listed Endangered, Threatened, and Rare Plants of California," January 2001

___ California Department of Fish and Game, California Natural Diversity Database, "State and Federally-listed Endangered and Threatened Animals of California, "January 2001

___ City of San Diego Land Development Code Biology Guidelines

___ Site Specific Report:

V. Cultural Resources (includes Historical Resources)

X City of San Diego Historical Resources Guidelines

___ City of San Diego Archaeology Library

X Historical Resources Board List

___ Community Historical Survey:

X Site Specific Report: Appendix B. Marie Burke Lia. 2015. Letter Report – Guy Hill Cadillac LLC Property. 4275 Mission Bay Drive, San Diego, CA 92109. Prepared by Marie Burke Lia, Historical Consultant. September 2015.

VI. Geology/Soils

X City of San Diego Seismic Safety Study

___ U.S. Department of Agriculture Soil Survey - San Diego Area, California, Part I and II, December 1973 and Part III, 1975

X Site Specific Report: Rockwell Consulting. 2015. Fault Investigation at the Guy Hill Property, San Diego. September 11, 2015.

X Geocon. 2015. Geotechnical Investigation. Guy Hill Property. 4275 East Mission Bay Drive. San Diego, California. September 11, 2015.

X California Geological Survey Alquist-Priolo Earthquake Fault Zone Map, La Jolla Quadrangle, effective November 1, 1991. http://gmw.consrv.ca.gov/shmp/download/quad/LA_JOLLA/maps/LAJOLLA.PDF

VII. Greenhouse Gas Emissions

X Site Specific Report: Appendix D. Dudek. 2015. Greenhouse Gas Emissions Analysis for the Mission Bay Drive Mixed-Use Project (Jefferson Pacific Beach). City of San Diego, California. Prepared for JPI Real Estate Acquisition LLC. May 2016.

City of San Diego. 2003. San Diego Municipal Code. Land Development Code. Trip Generation Manual. Revised May 2003. https://www.sandiego.gov/sites/default/files/legacy/planning/documents/pdf/trans/tripmanual.pdf

VIII. Hazards and Hazardous Materials

____ San Diego County Hazardous Materials Environmental Assessment Listing

____ San Diego County Hazardous Materials Management Division

____ FAA Determination

____ State Assessment and Mitigation, Unauthorized Release Listing, Public Use Authorized

X Airport Land Use Compatibility Plan: City of San Diego 2011. Montgomery Field Airport Land Use Compatibility Plan. http://docs.sandiego.gov/councilcomm_agendas_attach/2011/LUH_110309_8ppt.pdf

X Site Specific Report: Terracon. 2015. Phase I Environmental Site Assessment. July 30, 2015

DTSC (Department of Toxic Substance Control). 2007. Hazardous Waste and Substances Site List. http://www.envirostor.dtsc.ca.gov/public/search.asp?cmd=search&reporttype=CORTESE&site_type=CSITES%2COPEN%2CFUDS%2CCLOSE&status=ACT%2CBKLG%2CCOM&reporttitle=HAZARDOUS%20WASTE%20AND%20SUBSTANCES%20SITE%20LIST

X California Department of Forestry and Fire Protection's (CAL FIRE). 2009. Very High Fire Hazard Severity Zones in LRA (Local Responsibility Area) map.

X Terracon. 2015. Asbestos and Lead Paint Survey, and Hazardous Materials Inventory Report. September 4, 2015.

IX. Hydrology/Water Quality

X Flood Insurance Rate Map (FIRM): Map number 06073C1612G

X Federal Emergency Management Agency (FEMA), National Flood Insurance Program-Flood Boundary and Floodway Map

____ Clean Water Act Section 303(b) list, http://www.swrcb.ca.gov/tmdl/303d_lists.html

X Site Specific Reports: Leppert Engineering. 2015. Conceptual Grading and Drainage Plan – Podium Level. "Flood Hazard Information." November 25, 2015.

X Leppert Engineering. 2016. Priority Development Project Storm Water Quality Management Plan for Jefferson Pacific Beach. February 19, 2016.

X Leppert Engineering. 2016. Drainage Study for Jefferson Pacific Beach. February 19, 2016

X Leppert Engineering. 2015. Down Stream Drainage Study for Jefferson Pacific Beach. November 30, 2015.

X Geocon, Incorporated. 2016. Response to Comments Jefferson PB. July 5, 2016.

X City of San Diego. 2012. City of San Diego Storm Water Standards Manual.

X City of San Diego. 1984. City of San Diego Drainage Design Manual.

X. Land Use and Planning

X City of San Diego General Plan

X Community Plan

___ Airport Land Use Compatibility Plan

X City of San Diego Zoning Maps

___ FAA Determination

___ Site Specific Reports:

X Other: beautifulPB. 2016. Complete Streets – PB Pathways. Accessed March, 2016. http://beautifulpb.com/projects/bike-friendly/

XI. Mineral Resources

___ California Department of Conservation - Division of Mines and Geology, Mineral Land Classification

___ Division of Mines and Geology, Special Report 153 - Significant Resources Maps

___ Site Specific Report:

XII. Noise

X City of San Diego General Plan

___ Community Plan

____ San Diego International Airport - Lindbergh Field CNEL Maps

____ Brown Field Airport Master Plan CNEL Maps

____ Montgomery Field CNEL Maps

____ San Diego Association of Governments - San Diego Regional Average Weekday Traffic Volumes

____ San Diego Metropolitan Area Average Weekday Traffic Volume Maps, SANDAG

X Site Specific Report: Veneklasen Associates. 2015. Exterior Noise Impact Report. November 23, 2015.

XIII. Paleontological Resources

X City of San Diego Paleontological Guidelines

____ Deméré, Thomas A., and Stephen L. Walsh, "Paleontological Resources City of San Diego," Department of Paleontology San Diego Natural History Museum, 1996

____ Kennedy, Michael P., and Gary L. Peterson, "Geology of the San Diego Metropolitan Area, California. Del Mar, La Jolla, Point Loma, La Mesa, Poway, and SW 1/4 Escondido 7 1/2 Minute Quadrangles," California Division of Mines and Geology Bulletin 200, Sacramento, 1975

____ Kennedy, Michael P., and Siang S. Tan, "Geology of National City, Imperial Beach and Otay Mesa Quadrangles, Southern San Diego Metropolitan Area, California," Map Sheet 29, 1977

____ Site Specific Report:

XIV. Population / Housing

X City of San Diego General Plan

X Community Plan

____ Series 11/Series 12 Population Forecasts, SANDAG

____ Other:

XV. Public Services

X City of San Diego General Plan

X Community Plan

X Other: City of San Diego. 2016. San Diego Municipal Code. *Chapter 14: General Regulations, Article 2: General Development Regulations, Division 6: Public Facility Regulations.* Incorporated December 9, 1997. Accessed March, 2016. http://docs.sandiego.gov/municode/MuniCodeChapter14/Ch14Art02Division06.pdf

X San Diego Unified School District. 2015. Office of Special Projects. *Official Enrollment Totals September 25, 2015*. Accessed March, 2016. https://www.sandiegounified.org/sites/default/files_link/district/files/dept/instructional_facilities_planning/Official%202015-16.pdf

X Personal Communication (Pers Com). 2016. Crown Point Elementary School. March 22, 2016.

XVI. Recreational Resources

X City of San Diego General Plan

X Community Plan

____ Department of Park and Recreation

____ City of San Diego - San Diego Regional Bicycling Map

____ Additional Resources: Carrier Johnson. 2015. Site Plan. Jefferson Pacific Beach Entitlement Package. November 25, 2015.

XVII. Transportation / Circulation

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X Community Plan

____ San Diego Metropolitan Area Average Weekday Traffic Volume Maps, SANDAG

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X Site Specific Report: Urban Systems Associates Inc. 2016a. Traffic Impact Analysis for Jefferson Pacific Beach. May 12, 2016.

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XVIII. Utilities

X Site Specific Report : Leppert Engineering. 2015. Engineering Feasibility Report. August 11, 2015.

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XIX. Water Conservation

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Created: REVISED - October 11, 2013

USW 805439568.1

Regional Map

Jefferson Pacific Beach Project MND Project No. 327976

CITY OF SAN DIEGO - DEVELOPMENT SERVICES

FIGURE
1

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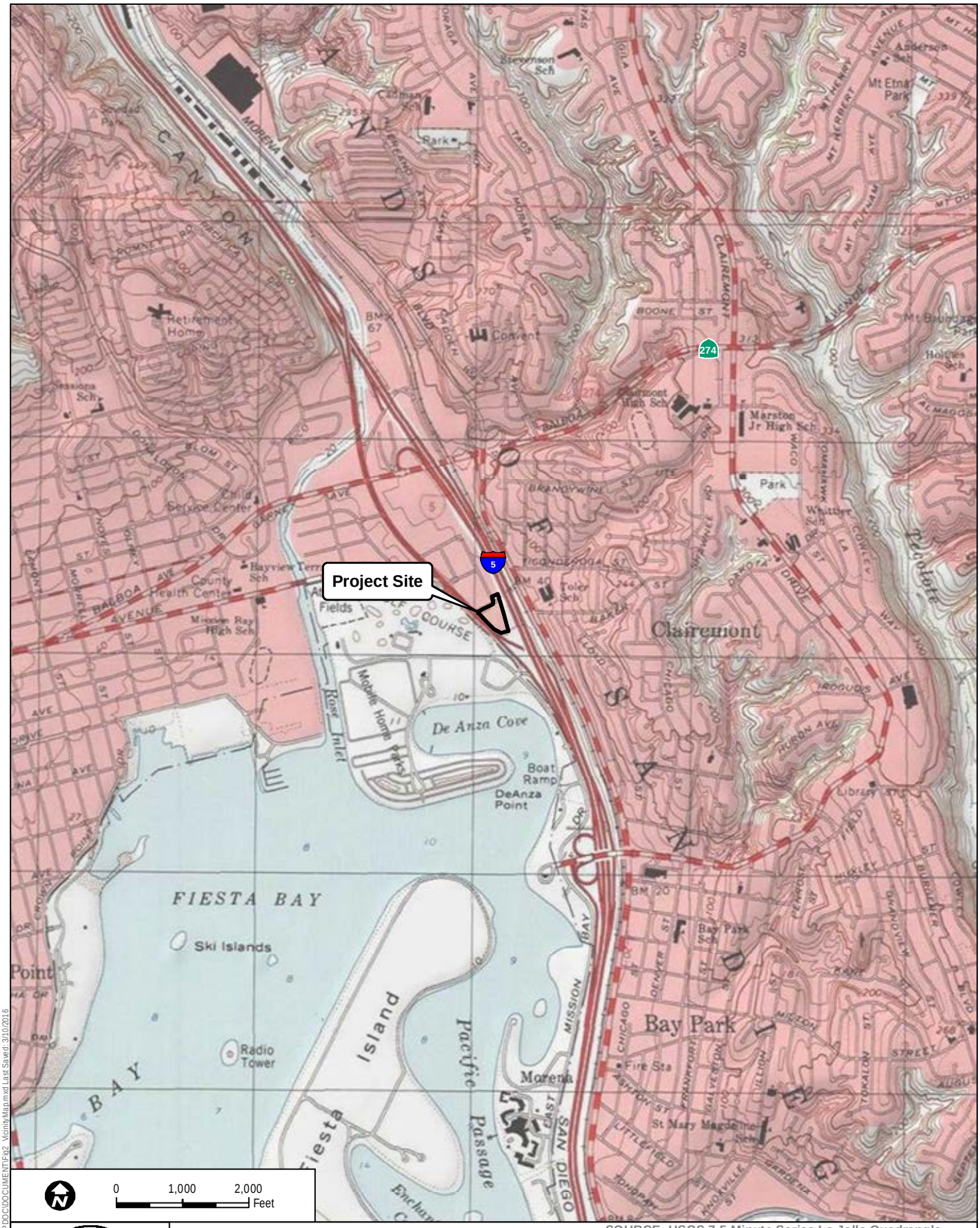

SOURCE: USGS 7.5-Minute Series La Jolla Quadrangle

Vicinity Map

Jefferson Pacific Beach Project MND Project No. 327976

CITY OF SAN DIEGO - DEVELOPMENT SERVICES

FIGURE
2

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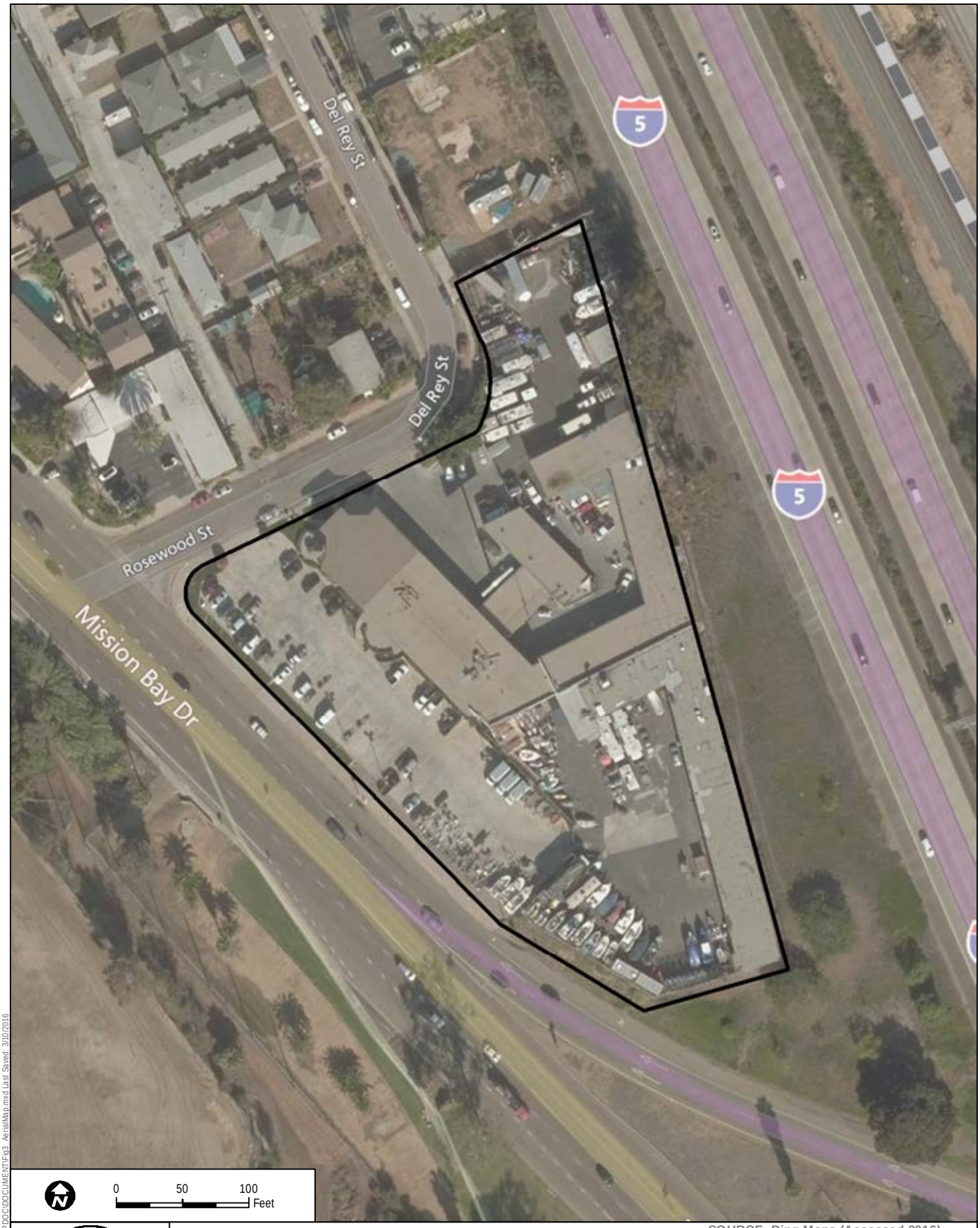

SOURCE: Bing Maps (Accessed 2016)

Aerial Map

Jefferson Pacific Beach Project MND Project No. 327976

CITY OF SAN DIEGO - DEVELOPMENT SERVICES

FIGURE
3

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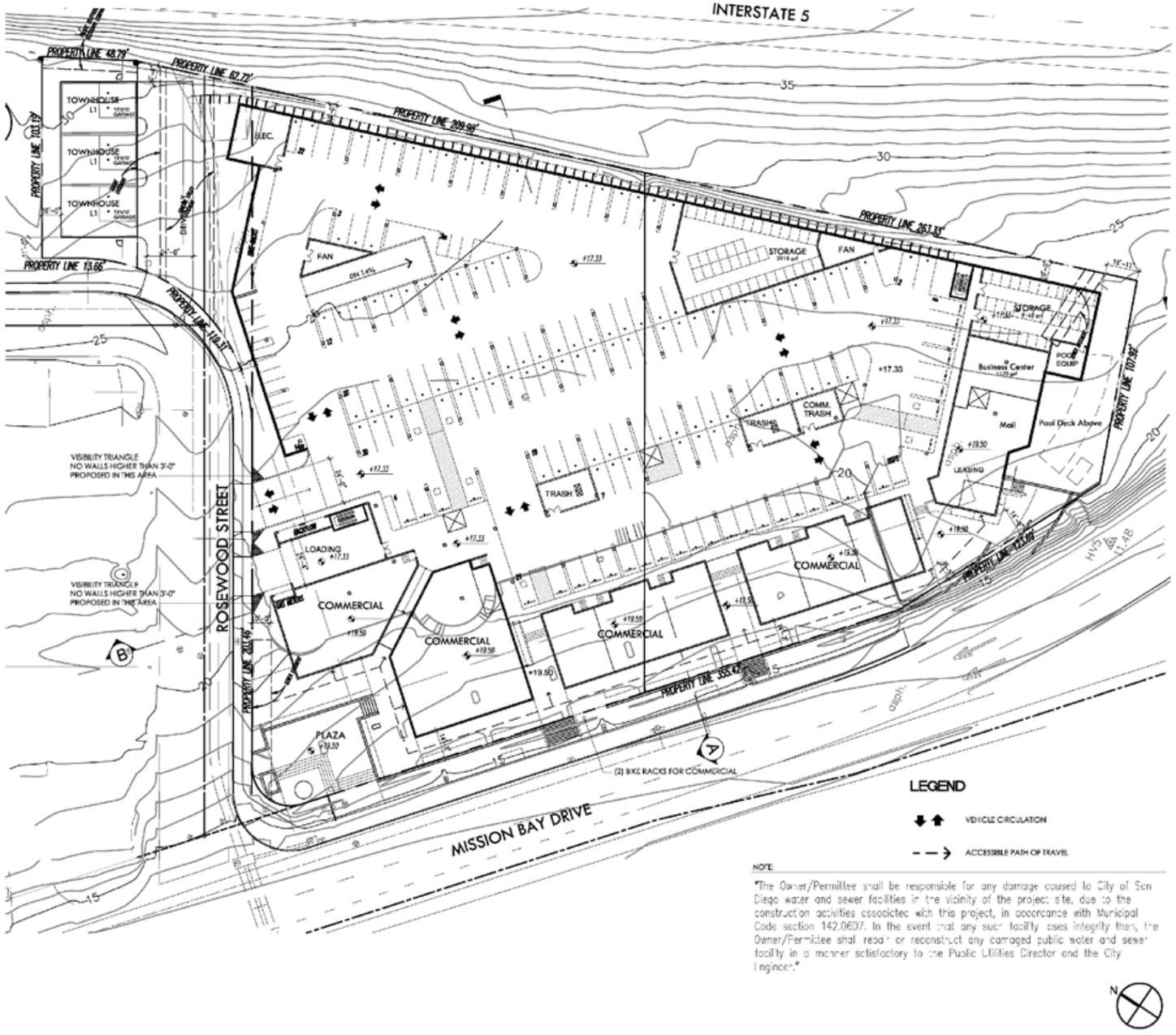

SOURCE: Carrier Johnson + CULTURE (2015)

Site Plan

Jefferson Pacific Beach Project MND Project No. 327976

CITY OF SAN DIEGO - DEVELOPMENT SERVICES

FIGURE 4

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SOURCE: Carrier Johnson + CULTURE (2015)

Proposed Project Rendering - View of Public Plaza Along Mission Bay Drive

Jefferson Pacific Beach Project MND Project No. 327976

CITY OF SAN DIEGO - DEVELOPMENT SERVICES

FIGURE

5

Path: Z:\Projects\94940\MAPDOC\DOCUMENT\Fig5_ProposedProjectRendering.mxd LastSaved: 3/10/2016

SOURCE: Carrier Johnson + CULTURE (2015)

Proposed Project Rendering - View from Mission Bay Drive Looking North

Jefferson Pacific Beach Project MND Project No. 327976

CITY OF SAN DIEGO - DEVELOPMENT SERVICES

FIGURE

6

SOURCE: Leppert Engineering (2016)

Best Management Practices (BMP) Plan

Jefferson Pacific Beach Project MND Project No. 327976

CITY OF SAN DIEGO - DEVELOPMENT SERVICES

FIGURE 7

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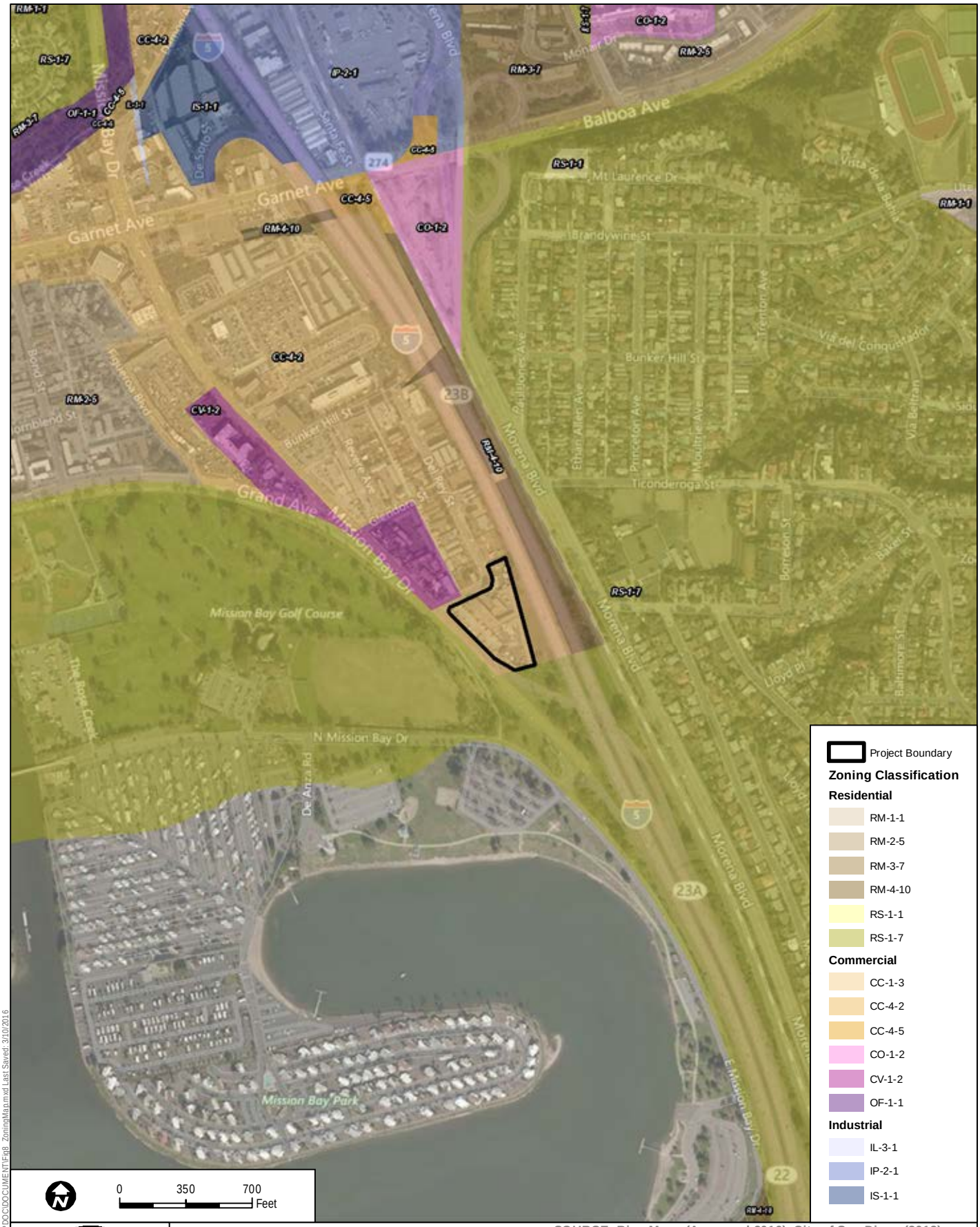


SOURCE: Bing Maps (Accessed 2016), City of San Diego (2012)

City of San Diego Zoning Map

Jefferson Pacific Beach Project MND Project No. 327976

CITY OF SAN DIEGO - DEVELOPMENT SERVICES

FIGURE 8

Path: Z:\Projects\949\401\MAP\DOC\DOCUMENT\Fig8_ZoningMap.mxd Last Saved: 3/10/2016

SOURCE: Carrier Johnson + CULTURE (2016), Veneklasen Associates (2016)

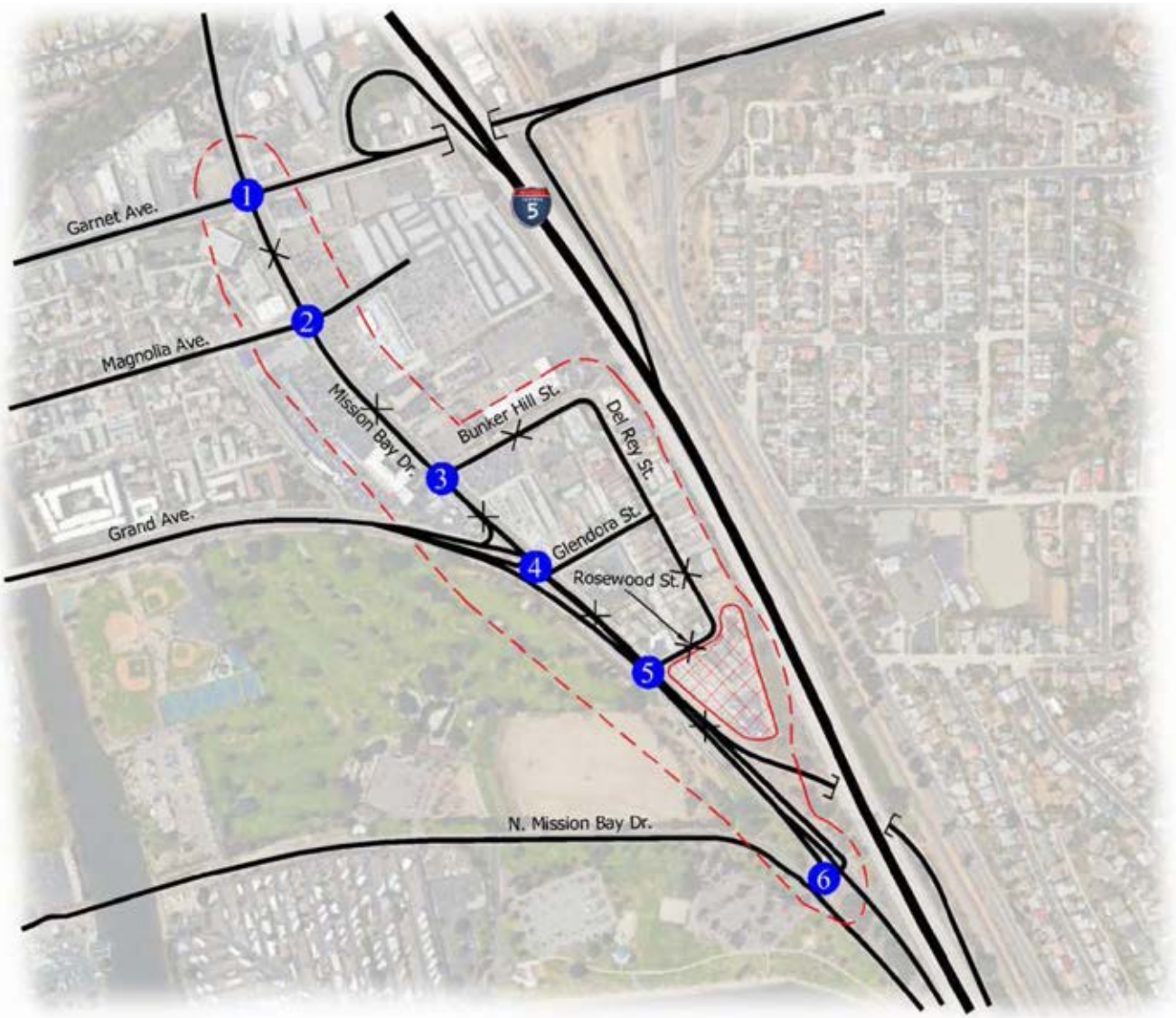
Noise Zones and Exterior Noise Wall Locations

Jefferson Pacific Beach Project MND Project No. 327976

CITY OF SAN DIEGO - DEVELOPMENT SERVICES

FIGURE 9

Path: Z:\Projects\949401\MAPDOC\DOCUMENT\Fig9_NoiseMap.mxd Last Saved: 3/24/2016



Legend

= Project Location

= Study Area Boundary

= Study Intersection

× = Study Street Segments

N
NO SCALE

SOURCE: Urban Systems Associates, Inc. (2016)

Traffic Impact Study Area

Jefferson Pacific Beach Project MND Project No. 327976

CITY OF SAN DIEGO - DEVELOPMENT SERVICES

FIGURE
10

Path: Z:\Projects\949401\MAP\DOC\DOCUMENT\Fig10_TrafficMap.mxd Last Saved: 7/15/2016

WASTE MANAGEMENT PLAN

FOR

Jefferson Pacific Beach

San Diego, California

Project No. 327976

APN#: 424-380-06-00, 424-380-07-00 & 424-362-24-00

Prepared for:

City of San Diego Environmental Services Department
9601 Ridgehaven Court, Suite 320
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March 4, 2016

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1.1 INTRODUCTION

The purpose of this Waste Management Plan (WMP) for the *Jefferson Pacific Beach Project* in the City of San Diego is to provide analysis of the solid waste impacts anticipated for the *Jefferson Pacific Beach Project* and how those impacts will be mitigated. The goal of this WMP is to identify sufficient mitigation, where needed, in order to reduce the potential impacts of the *Jefferson Pacific Beach Project* on solid waste services. Two acceptable approaches to managing waste are to reduce the tons disposed to 60 tons or less, or to provide diversion of 75 percent or more, thus meeting the goal established by Assembly Bill 341.

The 2.94-acre *Jefferson Pacific Beach Project* site is located at 4275 Mission Bay Drive, San Diego, California 92109. The site is situated on the east side of Mission Bay Drive, west of Interstate 5 (I-5), north of the northbound Mission Bay Drive I-5 exit, and south of Rosewood Street and is within the Pacific Beach Community Plan area. (See Figure 1, *Jefferson Pacific Beach Project Location Map and Aerial.*) The project site is developed with commercial uses (Jet ski, jet boat and Uhaul rentals), storage, surface parking, and vehicle maintenance bays. Residential and commercial uses are located north of the project site. The site is zoned CC-4-2 (Pacific Beach – Commercial-Community) and is designated Commercial with a Regional Commercial designation in the Pacific Beach Community Plan.

The proposed project involves demolition of existing structures (36,765 square feet) and on-site surface parking and construction of a mixed-use development (approximately 196,604 square feet residential gross floor area) consisting of residential, commercial, retail, and shopkeepers units in a "podium design." The project ranges in height from two stories to three stories and would have a total of 172 residential units, 8,000 square feet of small office space and 7,500 square feet of retail/restaurant space. A total of 382 parking spaces would be provided in a two-story, partially below ground parking structure. The project is being designed to comply with the USGBC LEED standards. (See Figure 2, *Jefferson Pacific Beach Project Site Plan.*)

The proposed *Jefferson Pacific Beach Project* involves the processing of a Coastal Development Permit (CDP) and a Neighborhood Development Permit (NDP) through Staff Administrative Review (Process Two). The project proposes a mix of residential and commercial, and complies with the Pacific Beach Community Plan Transit Oriented Design (TOD) requirements. The project is consistent with the existing zoning and land use designation and therefore will not require any Rezone and/or Community Plan Amendment.

Figure 1
Jefferson Pacific Beach Project Location Map and Aerial

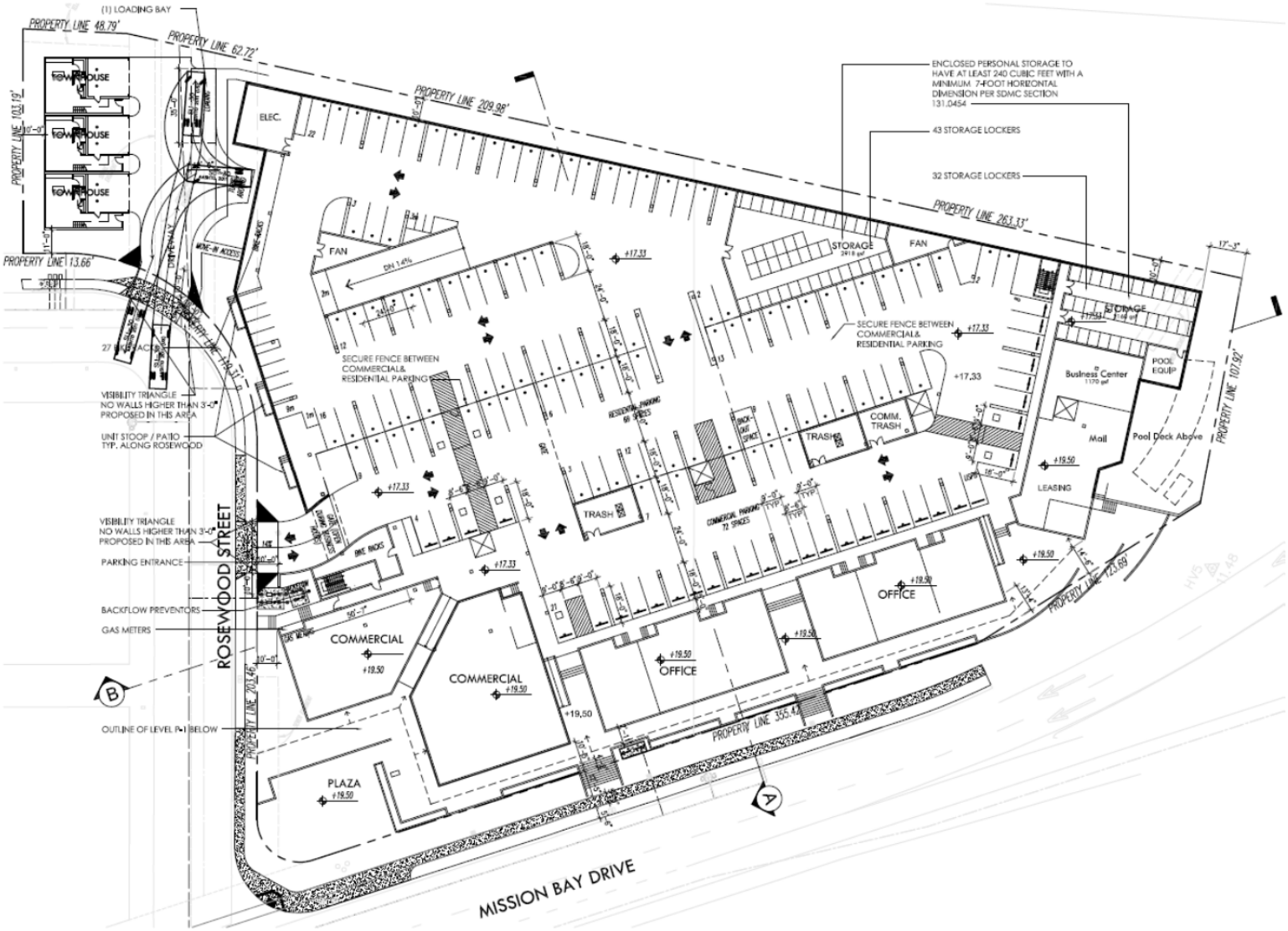

Figure 2
Jefferson Pacific Beach Project Site Plan

This WMP consists of two sections corresponding to the implementation of site development: the *Construction Phase* (to include demolition) and the *Occupancy Phase* (post-construction). The WMP addresses the projected amount of waste that could be generated by the project based on current City generation rates and estimates; waste reduction goals; and recommended techniques to achieve the waste reduction goals, such as recycling. The project includes two months of demolition. Construction of the project (including demolition) will take approximately 24 – 26 months. Construction will take place as a single phase and is estimated to begin early 2017.

Waste disposal sites and recycling methods and opportunities may change from those available today; however, it is not expected that waste diversion and disposal sites listed in Table 3 would change by the time the project is anticipated to begin construction. This WMP includes the following general information known at the time the WMP was prepared:

- Projected waste generation calculations and identification of types of waste materials generated;
- Source separation techniques for waste generated;
- How materials will be re-used on-site;
- Name and location of current recycling, re-use, and landfill facilities where waste will be disposed of if not re-used on-site;
- A "buy recycled" program;
- Measures to be implemented directed at reducing construction debris;
- Method(s) for communicating waste reduction and recycling goals to subcontractors;
- A general time line for construction and development; and
- A list of required progress and inspections by City staff, based on current ordinances.

2.1 BACKGROUND

In 1989, the California Legislature passed Assembly Bill (AB) 939: Integrated Waste Management Act, which mandated that all cities reduce waste disposed in landfills from generators within their borders by 50 percent by the year 2000. AB 939 required all local governments to prepare a Source Reduction and Recycling Element, which incorporates waste management policies and programs to achieve the mandated waste reduction. Since 1990, the City has diverted more than 50 percent of its generated waste stream from disposal. This bill specified that solid waste should be considered by the equation GENERATED = DISPOSED + DIVERTED. "Diverted" materials are put into a *hierarchy* in the law, as follows:

- First *source reduction*, such as using a reusable bag, making double-sided copies, or other measure that stops waste at the source.
- Secondary measures include *recycling* and *composting*. Because these measures often have transportation and processing impacts, they are considered less preferable than source reduction.
- In the Public Resources Code, various methods of *transformation* for energy production are limited to ten percent of the total waste reduction target.

In 2008, SB 1016 was chaptered. Known as the Solid Waste Disposal Measurement Act, SB 1016 maintained the 50 percent diversion requirement, but changed to a disposal-based measurement system, expressed as the 50 percent Equivalent Per Capita Disposal Target. This built upon AB 939 by implementing a simplified and timelier indicator of jurisdiction performance that focuses on reported disposal at Board-permitted disposal facilities. This established a goal of not recycling more, but disposing of less. AB 341: Jobs and Recycling, chaptered in 2011, was intended to create green jobs by expanding recycling to every multi-family dwelling and business. It charged CalRecycle with responsibility for ensuring that the State is diverting at least 75 percent of the garbage that is generated within the State by 2020. SB 1016 establishes that compliance with State law is measured by reducing the amount of waste material requiring disposal, and AB 341 increases the diversion target to 75 percent.

Additional local regulation pertaining to solid waste management includes the City of San Diego's Municipal Code Ch.14 Art. 2 Div. 8: §142.0810, §142.0820, Ch. 6 Art. 6 Div. 7; §66.0706, §66.0709, §66.0710; and Ch. 6 Art. 6 Div. 6; §66.0711, §66.0604, §66.0606. These statues designate refuse and recycling space allocation requirements for:

- on-site refuse and recyclable material storage requirements,
- diversion of construction and demolition debris regulations, and
- diversion of recyclable materials generated from residential facilities, businesses, commercial/institutional facilities, apartments, condominiums, and special events requiring a City permit.

The City of San Diego has established a demolition, construction and ongoing use threshold of 40,000 square feet of development as generating sufficient waste (60 tons) to have a potentially cumulatively significant impact on solid waste services. While the *Jefferson Pacific Beach Project* will demolish a building smaller than 40,000 square feet the estimated waste is greater than 60 tons and therefore exceeds the City of San Diego threshold as proposed. The purpose of this WMP is to identify mitigation measures to reduce this potential impact to below a level of significance.

The City Recycling Ordinance is found in Municipal Code section 66.0701 et. seq. It requires the provision of recycling service for all single-family residences; and commercial facilities and multifamily residences with service for four cubic yards or more. In addition, the ordinance also requires development of educational materials to ensure occupants are informed about the City's ordinance and recycling services including information on types of recyclable materials accepted.

Construction and Demolition (C&D) Debris Diversion Deposit Program applies to all applicants for building, demolition, and removal permits. This ordinance requires that the applicant post a deposit (Table 1, *C&D Debris Deposit Table*). The deposit is not returned until the applicant demonstrates that a minimum amount of the material generated has been diverted from disposal in landfills. Mixed construction debris recycling facilities in San Diego are evaluated quarterly to determine how much of the throughput is recycled, and how much is a "residual" material requiring disposal. Facilities that accept mixed debris typically achieve a 68 percent or less diversion rate. Single materials recyclers, such as metal recyclers, often achieve a nearly 100 percent diversion rate. When comingled materials are sent to a mixed facility, the 75 percent diversion goal established by AB 341 will not be met. Depending on the project, to ensure that the overall diversion goal is attained, some materials must often be separated and trucked to facilities with higher diversion rates, such as aggregate and metal recyclers.

Table 1
C&D Debris Deposit Table

Building Category	Sq. Ft. Subject to Ordinance*	Deposit per Sq. Ft.	Range of Deposits
Residential New Construction	500-125,000 detached 500-100,000 attached	$0.40	$200-$50,000 $200-$40,000
Non-residential New Construction	1,000-25,000 commercial 1,000-75,000 industrial	$0.20	$200-$5,000 $200-$15,000
Non-residential Alterations	286 with no maximum	$0.70	$200 and up
Residential Demolition	286 with no maximum	$0.70	$200 and up
Non-residential Demolition	1,000 with no maximum	$0.20	$200 and up
Roof Tear-off	All projects	-	$200
Residential Alterations	500 and above	-	$1,000

* Projects under the minimum square footage subject to the ordinance are exempt from the C&D debris recycling deposit.

2.1 Exterior Refuse and Recyclable Material Storage Area Requirements

The *Jefferson Pacific Beach Project* will develop in one phase over an approximate 24-month period. Development is anticipated to begin early 2017. Because the *Jefferson Pacific Project* includes residential and nonresidential development, exterior refuse and recyclable material storage areas will be provided in accordance with City regulations per Chapter 14, Article 2, Division 8: Refuse and Recyclable Material Storage Regulations, §142.0820 and §142.0830.

2.2 Exterior Refuse and Recyclable Material Storage Areas for the *Jefferson Pacific Beach Project*

The *Jefferson Pacific Beach Project* would develop a mixed-use project with a total of 172 residential units, 8,000 square feet of small office space and 7,500 square feet of retail/restaurant space. Table 2, *Minimum Exterior and Recyclable Material Storage Areas for Residential Development*, shows the required amount of refuse and recyclable storage areas for the project's residential element. As shown in Table 2, the project would be required to provide 336 square feet each of exterior refuse and recyclable material storage area, for a total of 672 square feet of material storage area. Table 3, *Minimum Exterior and Recyclable Material Storage Areas for Commercial and Industrial Development*, shows the required amount of refuse and recyclable storage areas for the project's commercial retail element. As shown in Table 3, the project would be required to provide 48 square feet each of exterior refuse and recyclable material storage area, for a total of 96 square feet of material storage area.

Table 2
Minimum Exterior Refuse and Recyclable Material Storage Areas for Residential Development

Number of Dwelling Units per Development	Minimum Refuse Storage Area per Development (square feet)	Minimum Recyclable Material Storage Area per Development (square feet)	Total Minimum Storage Area per Development (square feet)
2-6	12	12	24
7-15	24	24	48
16-25	48	48	96
26-50	96	96	192
51-75	144	144	288
76-100	192	192	384
101-125	240	240	480
126-150	288	288	576
151-175	336	336	672
176-200	384	384	768
201+	384 plus 48 square feet for every 25 dwelling units above 201	384 plus 48 square feet for every 25 dwelling units above 201	768 plus 96 square feet for every 25 dwelling units above 201

Source: City of San Diego Municipal Code, Chapter 14, Article 2, Division 8: Refuse and Recyclable Material Storage Regulations, §142.0820, Table 142P08B, effective January 1, 2000.

Table 3
Minimum Exterior Refuse and Recyclable Material Storage Areas for Commercial and Industrial Development

Gross Floor Area per Development (square feet)	Minimum Refuse Storage Area per Development (square feet)	Minimum Recyclable Material Storage Area per Development (square feet)	Total Minimum Storage Area per Development (square feet)
0 – 5,000	12	12	24
5,001 – 10,000	24	24	48
10,001 – 25,0000	48	48	96
25,001 – 50,000	96	96	192
50,001 – 75,000	144	144	288
75,001 – 100,000	192	192	384
100, 001+	192 plus 48 square feet for every 25,000 square feet of building area above 100,001	192 plus 48 square feet for every 25,000 square feet of building area above 100,001	384 plus 96 square feet for every 25,000 square feet of building area above 100,001

Source: City of San Diego Municipal Code, Chapter 14, Article 2, Division 8: Refuse and Recyclable Material Storage Regulations, §142.0830, Table 142P08C, effective January 1, 2000.

3.0 EXISTING CONDITIONS

The *Jefferson Pacific Beach Project* site encompasses approximately 2.94 previously developed acres. The site is situated on the east side of Mission Bay Drive, west of Interstate 5 (I-5), north of the northbound Mission Bay Drive I-5 exit, and south of Rosewood Street. The project site is currently developed with 36,475 square feet of commercial use in the form of vehicle repair facilities, boat rentals, storage, and vehicle parking.

4.0 PROPOSED CONDITIONS

The proposed project involves demolition of existing structures (36,475 square feet) and on-site surface parking and construction of a mixed-use development (approximately 196,604 square feet residential gross floor area) consisting of residential, commercial, and retail/restaurant in a "podium design." The project would range in height from two stories to three stories and would have a total of 172 residential units, 8,000 square feet of small office space, and

7,500 square feet of retail/restaurant space. A total of 382 parking spaces would be provided in a two-story, partially below ground parking structure. The project is being designed to comply with the USGBC LEED standards. (See Figure 2, *Jefferson Pacific Beach Project Site Plan.*)

Construction will be completed in a single phase over a 24-month period with construction anticipated to begin in early to mid 2017. Construction practices will comply with local, State, and Federal regulations regarding handling of building materials to ensure waste minimization requirements are met.

5.1 CONSTRUCTION WASTE

Construction activities would generate packaging materials and unpainted wood, including wood pallets, and other miscellaneous debris. Construction debris would be separated on-site into material-specific containers to facilitate reuse and recycling and to increase the efficiency of waste reclamation and/or would be collected by a contracted waste hauler and separated at the facility. Source separation of materials at the construction site is essential to (1) ensure appropriate waste diversion rate, (2) minimize costs associated with transportation and disposal, and (3) facilitate compliance with the C&D ordinance. The types of construction waste anticipated to be generated include:

- Asphalt and Concrete
- Brick/Masonry/Tile
- Ceiling tiles
- Carpet, Padding/Foam
- Drywall
- Landscape Debris
- Mixed C&D Debris
- Roofing Materials
- Floor tiles
- Unpainted Wood and Pallets
- Garbage/Trash

Materials to be recycled would be redirected to appropriate recipients selected from ESD's directory of facilities that recycle construction materials, scrap metal, and yard waste.

5.2 Recycled Construction Materials

The *Jefferson Pacific Beach Project* will implement a target of 20 percent recycled material.

5.2 Managing Construction Material

Demolition and construction will occur over a period of approximately two months. ESD staff would be present for an early pre-construction meeting to evaluate waste segregation, signage, and salvage.

The project site is the location of an existing commercial development. The demolition phase will include the deconstruction/demolition and removal of the existing buildings, associated structures, asphalt parking and walkway areas, and interior landscaping. Approximately 2,294.23 tons of waste is expected to be generated during demolition. Approximately 2,179.5 tons of material would be recycled, to include landscaping, concrete, asphalt, foundations, building structure, masonry walls, curb and gutter, and switch gear and cable. Approximately 114.73 tons of debris would be disposed in a landfill, to include non-useable lumber, drywall, glass, miscellaneous trash, roofing paper, broken roof tiles, and floor tile. Table 4, *Jefferson Pacific Beach Project Waste Generation – Demolition*, summarizes the type and amount of demolition materials, as well as diversion/disposal.

Table 4
Jefferson Pacific Beach Project Waste Generation – Demolition

Material Type	Estimated Waste Quantity (tons)	Handling	Estimated Diversion (tons)	Estimated Disposal (tons)
DEMOLITION WASTE				
Asphalt and Concrete	265.74	**Hanson Aggregates** 9229 Harris Plant Road San Diego, CA 92126 (100%	265.74	--
Foundations/ Building Structure	1367.81	**Vulcan Carroll Canyon Landfill and Recycle Site** 10051 Black Mountain Road San Diego, CA 92126 (100% diversion)	1,367.81	--
Brick/Masonry/ Tile	380.52	**Vulcan Carroll Canyon Landfill and Recycle Site** 10051 Black Mountain Road San Diego, CA 92126 (100% diversion)	380.52	--
Ceiling Tiles	3	**AMS** 4674 Cardin St. San Diego, CA 92111 (100% diversion)	3	--
Drywall	10	**EDCO Station Transfer and Buy Back Center** 8184 Commercial Street La Mesa, CA 91942	7	3
Landscape Materials	20	**Miramar Greenery** 5180 Convoy Street San Diego, CA 92111 (100% diversion)	20	--
Carpet/Carpet Padding	3.13	**DFS Flooring** 10178 Willow Creek Rd San Diego, CA 92154 (100% Diversion)	3.13	--
Roofing Materials	108	**LEED Recycling** 8725 Miramar Place San Diego, CA 92121 (100% diversion)	108	--

Floor Tile	8.75	**Otay C&D/Inert Debris Processing Facility** 1700 Maxwell Road Chula Vista, CA 91913 (76% diversion)	6.65	2.1
Glass	14.78	**Otay C&D/Inert Debris Processing Facility** 1700 Maxwell Road Chula Vista, CA 91913 (76% diversion)	11.23	3.55
Non-Useable Lumber	4.5	**Otay C&D/Inert Debris Processing Facility** 1700 Maxwell Road Chula Vista, CA 91913 (76% diversion)	3.42	1.08
Garbage/Trash	108	**Miramar Landfill** 5180 Convoy Street San Diego, CA 92111 (0% diversion)	--	108
TOTAL	**2294.23**		**2179.50**	**114.73**

In accordance with State diversion targets, a minimum of 75 percent of construction materials will be recycled. Materials to be recycled would be redirected to appropriate recipients selected from ESD's directory of facilities that recycle demolition materials, scrap metal, and yard waste.

To facilitate management of construction materials, the developer shall identify one person or agency connected with the proposed development to act as Solid Waste Management Coordinator, whose responsibility it becomes to work with all contractors and subcontractors to ensure material separation and coordinate proper disposal and diversion of waste generated. The Solid Waste Management Coordinator will help to ensure all diversion practices outlined in this Waste Management Plan are upheld and communicate goals to all contractors involved efficiently.

The responsibilities of the Solid Waste Management Coordinator, include, but are not limited to, the following:

- Review the Solid Waste Management Plan including responsibilities of Solid Waste Management Coordinator.
- Review and update procedures as needed for material separation and verify availability of containers and bins needed to avoid delays.
- Review and update procedures for periodic solid waste collection and transportation to recycling and disposing facilities.
- The authority to issue stop work orders if proper procedures are not being allowed.

The contractors will perform daily inspections of the construction site to ensure compliance with the requirements of the Waste Management Plan and all other applicable laws and ordinances and report directly to Solid Waste Management Coordinator. Daily inspections will include verifying the availability and number of dumpsters based on amount of debris being generated correct labeling of dumpsters, proper sorting and segregation materials, and salvaging of excess materials. Additionally, the following apply:

- Solid waste management coordinator will be responsible for educating contractors and subcontractors regarding waste management plan requirements and ensuring that contractors and subcontractors carry out the measures described in the WMP.
- Solid waste management coordinator will ensure ESD attendance at a Precon and assure compliance with segregation requirements, and verification of recycled content in base materials.
- Recycling areas will be clearly identified with large signs, approved by ESD, and sufficient amounts of material-specific bins will be provided for necessary segregation.
- Recycling bins will be placed in areas that are readily accessible to contractors/subcontractors and in areas that will minimize misuse or contamination by employees and the public.
- Solid waste management coordinator will be responsible for ensuring that contamination rates in bins remain below 5 percent by weight of the bin.

Table 5, *Jefferson Pacific Beach Project Waste Generation – Construction*, incorporates a standard calculation of three pounds per square foot divided equally amongst each category and is included below to summarize the types of waste generated, the approximately amount of each waste type diverted, and the approximate overall amount remaining to be disposed of in landfills. Construction waste processing facilities that may be used for any of the construction phases include but are not limited to those facilities listed in Table 5. Because certified diversion rates and authorized facilities are updated quarterly and the decision on which facility will be contracted for waste hauling will be made at the time of construction based on market conditions and the facility's certified rate, the developer reserves the right to select any authorized facility as long as the facility is City-certified to meet minimum diversion requirements.

Table 5
Jefferson Pacific Beach Project Waste Generation – Construction

Material Type	Estimated Waste Quantity (tons)	Handling	Estimated Diversion (tons)	Estimated Disposal (tons)
CONSTRUCTION WASTE				
Asphalt and Concrete	28.92	**Hanson Aggregates** 9229 Harris Plant Road San Diego, CA 92126 (100% diversion)	28.92	--
Brick/Masonry/ Tile	28.92	**Vulcan Carroll Canyon Landfill and Recycle Site** 10051 Black Mountain Road San Diego, CA 92126 (100% diversion)	28.92	--
Cardboard	28.92	**Allan Company** 6733 Consolidated Way San Diego, CA 92121 (100% diversion)	28.92	--
Carpet, Padding/Foam	28.92	**DFS Flooring** 10178 Willow Creek Road San Diego, CA 92131 (100% diversion)	28.92	--
Drywall	28.92	**EDCO Station Transfer and Buy Back Center** 8184 Commercial Street La Mesa, CA 91942 (70% diversion)	20.25	8.68
Landscape Debris	28.92	**Miramar Greenery** 5180 Convoy Street San Diego, CA 92111 (100% diversion)	28.92	--

Mixed C&D Debris	28.92	**Otay C&D/Inert Debris Processing Facility** 1700 Maxwell Road Chula Vista, CA 91913 (76% diversion)	21.98	6.94
Roofing Materials	28.92	**LEED Recycling** 8725 Miramar Place San Diego, CA 92121 (100% diversion)	28.92	--
Scrap Metal	28.92	**Allan Company** 6733 Consolidated Way San Diego, CA 92121 (100% diversion)	28.92	--
Unpainted Wood & Pallets	28.92	**Miramar Greenery** 5180 Convoy Street San Diego, CA 92111 (100% diversion)	28.92	--
Garbage/Trash	28.92	**Miramar Landfill** 5180 Convoy Street San Diego, CA 92111 (0% diversion)	--	28.92
TOTAL	**318.156**		**273.59**	**44.54**

Construction debris will be separated onsite into material-specific containers, corresponding to the materials types in Table 5, to facilitate reuse and recycling and to increase the efficiency of waste reclamation. The *Jefferson Pacific Beach Project* will implement a target of 20 percent recycled material and 75 percent for landfill diversion. As shown in Table 5, 86 percent of the construction materials generated by the project are expected to be diverted from landfills.

6.1 OCCUPANCY PHASE

While the construction phase for the *Jefferson Pacific Beach Project* occurs as a one-time waste generation event as construction of the project proceeds, tenant/owner occupancy requires an on-going plan to manage waste disposal to meet the waste reduction goals established by the City and State.

6.2 Solid Waste Recycling

The following table expresses the anticipated refuse and recyclable storage requirements based on Table 142-08B and 142.08C of the City of San Diego Municipal Code.

Table 6
Minimum Exterior and Recyclable Material Storage Areas for the Jefferson Pacific Beach Project

Land Use	Gross Floor Area/Units	Minimum Refuse Storage Area (square feet)	Minimum Recyclable Material Storage Area (square feet)	Total Minimum Storage Area (square feet)
Residential	172 units	336	336	672
Commercial Retail	15,500 sq ft	48	48	96
TOTAL		384	384	768

As shown in Table 7, *Estimated Solid Waste Generation from the Jefferson Pacific Beach Project*, during occupancy, the expected generated waste per year from the *Jefferson Pacific Beach Project* when fully occupied would be approximately 249.8 tons.

Table 7
Estimated Solid Waste Generation from the Jefferson Pacific Beach Project – Occupancy Phase

Use	Intensity	Waste Generation Rate	Estimated Waste Generated (tons/year)
Residential	172 units	1.2 tons/year/unit	206.4
Commercial-Retail	15,500 sq ft	0.0028 tons/year/sq ft	43.4
		TOTAL	249.8

On-site recycling services shall be provided to all tenants/residents within the *Jefferson Pacific Beach Project*. Tenants/residents within *Jefferson Pacific Beach Project* that receive solid waste collection service shall participate in a recycling program by separating recyclable materials from other solid waste and depositing the recyclable materials in the recycling container provided for the occupants. Recycling services are required by Section 66.0707 of the City of San Diego Land Development Code. Based on current requirements, these services shall include the following:

- Collection of recyclable materials as frequently as necessary to meet demand;
- Collection of plastic bottles and jars, paper, newspaper, metal containers, cardboard, and glass containers;
- Collection of other recyclable materials for which markets exist, such as scrap metal, wood pallets
- Use of recycling receptacles or containers which comply with the standards in the Container and Signage Guidelines established by the City of San Diego Environmental Services Department;
- Designated recycling collection and storage areas; and
- Signage on all recycling receptacles, containers, chutes, and/or enclosures which complies with the standards described in the Container and Signage Guidelines established by the City of San Diego Environmental Services Department

As required by Section 66.0707 of the City of San Diego Land Development Code, the building management or other designated personnel shall ensure that occupants are educated about the recycling services as follows:

- Information, including the types of recyclable materials accepted, the location of recycling containers, and the occupants responsibility to recycle shall be distributed to all occupants annually;
- All new occupants shall be given information and instructions upon occupancy; and
- All occupants shall be given information and instructions upon any change in recycling service to the commercial facility.

6.2 Landscaping

Plant material selection will be guided by the macro-and micro-climate characteristics of the project site and surrounding region to encourage long-term sustainability without the excessive use of water pesticides and fertilizers. Irrigation of these areas, where practical, will utilize water applied via low precipitation rate spray heads, drip emitters, or other highly efficient systems. The project does not include turf areas and tree trimmings will be mulched and reused either on or off-site by our landscapers. This will help further reduce the waste generated by developments within the *Jefferson Pacific Beach Project* during the occupancy phases.

7.1 CONCLUSION

The City of San Diego Development Services Department is requiring that this Preliminary WMP be prepared and submitted to the City of San Diego's ESD. Since the project is in the design phase, this is only a preliminary plan, which specifies the intent to meet the requirements of PRC 939 and City ordinances. Prior to the issuance of any permits for construction within each neighborhood of *Jefferson Pacific Beach Project*, final reports will be submitted to ESD for final review and approval.

This Preliminary WMP will be implemented to the fullest degree of accuracy and efficiency. Additionally, the project will be required to adhere to City ordinances, including the *Construction and Demolition Debris Diversion Deposit Program*, the City's *Recycling Ordinance*, and the *Refuse and Recyclable Materials Storages Regulations*. The WMP plan for the *Jefferson Pacific Beach Project* is designed to implement and adhere to all city ordnance and regulations with regards to waste management. The measures in the WMP would ensure that impacts are mitigated to below a level of significance.

Prior to the issuance of any grading or construction permits, the Solid Waste Coordinator will ensure ESD's attendance at a precon. The Solid Waste Coordinator will ensure that 1) the proposed approach to contractor education is approved, 2) the written specifications for base materials, concrete pavers, decomposed granite, and mulch, is approved, and 3) that the ESD inspector approves the separate waste containers, signage, and hauling contract(s) for the following materials:

- Asphalt/concrete
- Brick/masonry/Tile
- Cardboard
- Carpet/padding/foam
- Drywall
- Landscape debris
- Mixed C&D debris
- Scrap metal
- UNTREATED woodwaste
- Refuse

The project will be designed to achieve 75 percent of construction waste to be source reduced and/or recycled. While diversion activities during occupancy will achieve only 40 percent diversion and will not achieve the State target of 75 percent, the project incorporates several measures above and beyond the requirements of local ordinance.

- First, the project exceeds ordinance requirements and even the State waste reduction target during construction.
- Second, the project includes landscaping that will reduce yard waste, and the landscaping company will provide transportation to a composting facility for the applicable yard waste that is produced. The project proponent will ensure that ESD reviews the landscaping plans and hauling contract for the facility to verify that waste reduction goals are met.
- Third, the project would include LEED measures to reduce waste.

The project will target 20 percent of solid waste to be recycled material and 75 percent for landfill diversion.

These measures ensure that the waste generated by the project will be properly managed and that solid waste services will not be impacted.

The following standard mitigation applies to the project to reduce cumulative impacts on solid waste to below a level of significance:

1.1 Prior to Permit Issuance or Bid opening/Bid award

A. LDR Plan check

1. Prior to the issuance of any construction permit, including but not limited to, demolition, grading, building or any other construction permit, the Assistant Deputy Director (ADD) Environmental Designee shall verify that the all the requirements of the Refuse & Recyclable Materials Storage Regulations and all of the requirements of the waste management plan are shown and noted on the appropriate construction documents. All requirements, notes and graphics shall be in substantial conformance with the conditions and exhibits of the associated discretionary approval.

   The construction documents shall include a waste management plan.

   Notification shall be sent to:

   MMC Environmental Review Specialist

Development Service Department	*Environmental Services Department (ESD)*
9601 Ridgehaven Court	9601 Ridgehaven Court
Ste. 220, MS 1102 B	Ste. 210, MS 1102 A
San Diego, California 92123 1636	San Diego, California 92123 1636
(619) 980 7122	(858) 573-1236

II. Prior to Start of Construction

A. Grading and Building Permit - Prior to issuance of any grading or building permit, the permittee shall be responsible to arrange a preconstruction meeting to coordinate the

implementation of the MMRP. The Precon Meeting that shall include: the Construction Manager, Building/Grading Contractor; MMC; and ESD and the Building Inspector and/or the RE (whichever is applicable) to verify that implementation of the waste management plan shall be performed in compliance with the plan approved by LDR and the San Diego ESD, to ensure that impacts to solid waste facilities are mitigated to below a level of significance.

1. At the Precon Meeting, the Permittee shall submit reduced copies (11" x 17") of the approved waste management plan, the RE, BI, MMC, and ESD.
2. Prior to the start of construction, the Permittee/Construction Manager shall submit a construction schedule to the RE, BI, MMC, and ESD.

III. During Construction

The Permittee/Construction Manager shall call for inspections by the RE/BI and both MMC and ESD, who will periodically visit the demolition/construction site to verify implementation of the waste management plan. The Consultant Site Visit Record (CSVR) shall be used to document the Daily Waste Management Activity/progress.

IV. Post Construction

A. Within 30 days after the completion of the implementation of the Mitigation Monitoring Reporting Program (MMRP), for any demolition or construction permit, a final results report shall be submitted to both MMC and ESD for review and approval to the satisfaction of the City. MMC will coordinate the approval with ESD and issue the approval notification. ESD will review/approve City Recycling Ordinance-required educational materials prior to occupancy.

TRAFFIC IMPACT ANALYSIS

For

Jefferson Pacific Beach

Prepared for the

CITY OF SAN DIEGO

&

JPI Real Estate Acquisition, LLC

FINAL SUBMITTAL: **May 12, 2016**

© URBAN SYSTEMS ASSOCIATES, INC.
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1.0 EXECUTIVE SUMMARY

Urban Systems Associates, Inc. (USAI) was retained by JPI to determine potential transportation impacts and appropriate mitigation measures for the development of the Jefferson Pacific Beach mixed-use project at the former Guy Hill Cadillac site in Pacific Beach (Project). The Project includes the construction of approximately 15,500 SF of mixed-use retail/office/restaurant and 172 apartment units on a former car dealership site. **Figure 1-1** shows a vicinity map of the Project.

After accounting for the existing traffic from the project site, the full project is expected to generate 1,507 net cumulative average daily trips (ADT) with 66 AM (8 in / 58 out) peak hour trips and 110 PM (75 in / 35 out) peak hour trips. This equates to 1,867 net driveway trips with 113 AM (46 in / 67 out) peak hour trips and 185 PM (102 in / 83 out) peak hour trips. The existing uses on site generate 315 ADT with 38 AM (21 in / 17 out) peak hour trips and 42 PM (20 in / 22 out) peak hour trips.

In order to determine a study area for the Traffic Impact Study, staff of Urban Systems Associates used the City of San Diego's *Traffic Impact Study Manual* guidelines and consulted with staff from the City of San Diego on the scope of the study area. This effort resulted in a study area consisting of nine (9) roadway segments and six (6) intersections. Based on project distribution, less than 50 peak hour trips are expected to access I-5 and less than 20 peak hour trips are expected to utilize metered freeway on-ramps. Therefore freeway segments and metered on-ramps were not included in this study.

The vehicular traffic generation of the Project was estimated based on trip generation rates from the City of San Diego's current *Trip Generation Manual* (2003) as well as counts of existing uses. The addition of Project traffic was evaluated in Existing, Near Term (Opening Day), and Horizon Year 2035 scenarios, and an impact analysis was completed in which six scenarios were analyzed. The following scenarios

were included in the report: Existing, Existing With Project, Near Term Without Project, Near Term With Project (Opening Day 2019), Horizon Year 2035 Without Project, and Horizon Year 2035 With Project. The term "Near Term" is meant to discuss a condition occurring at the Project's estimated opening day (Year 2019) where traffic from other known development projects in the area is added onto existing traffic levels. This reflects the best information available for determining what traffic would be in the next several years. The term "Horizon Year 2035" is meant to discuss traffic conditions to the Year 2035. The horizon year analysis used SANDAG's Series 12 interim year modeling for the Year 2035 consistent with City policy. The methodology used for this study is consistent with the City of San Diego, Traffic Impact Study Manual as discussed in Chapter 4.0.

Study Results:

Based upon this transportation impact analysis, it was determined that development of the Project would have the following impacts.

Street Segments – Impacts to two segments of Mission Bay Drive were determined in all conditions. Specifically, direct impacts were discovered in Existing with Project and Near Term with Project (2019) scenarios on Mission Bay Drive between Grand Avenue and N. Mission Bay Drive as well as one segment of Rosewood Street west of the Project Driveway (total of 3 segments). Additionally, cumulative impacts were discovered in the Year 2035 with Project scenario on three segments of Mission Bay Drive between Garnet Avenue and Magnolia Avenue as well as between Grand Avenue and N. Mission Bay Drive and one segment of Rosewood Street west of the Project Driveway (total of 4 segments). Please refer to **Tables 1-1** thru **1-3** for details.

Intersections – Impacts to five intersections were determined as a result of the analysis. Specifically, direct impacts were discovered in the Existing with Project and Near Term with Project (2019) scenarios at the intersection of Rosewood Street and Mission Bay Drive. Additionally, cumulative impacts were discovered in the Year 2035 with Project scenario at the intersections of Garnet Ave. /Mission Bay Drive, Magnolia Ave. /Mission Bay Drive, Bunker Hill St. /Mission Bay Drive and Rosewood St. /Mission Bay Drive. Please refer to **Tables 1-4** thru **1-6** for details.

Mitigation:

In order to mitigate the impacts listed above, signalization, operational improvements and restriping are proposed.

Signalization at the intersection of Rosewood and Mission Bay Drive is warranted (See Appendix J). In order to mitigate direct project impacts at that location and to improve level of service to an acceptable level, it is recommended that the project install a traffic signal and coordinate it with other signals on Mission Bay Drive (see **Appendix K**). With the installation of a traffic signal at the intersection of Mission Bay Drive and Rosewood Street, it is recommended that a centerline stripe be added to improve Rosewood Street between Mission Bay Drive and the Project access to a two lane collector road. This signalization and restriping will improve the level of service at this intersection from "F" for the minor movement to "A/B" overall.

Additional Project impacts are anticipated along the Mission Bay Drive corridor. The Pacific Beach Community Plan shows the ultimate classification of Mission Bay Drive as a four-lane Major road. Mission Bay Drive has generally been improved to its ultimate configuration. Additional widening would be inconsistent with the Community Plan and is not recommended.

Therefore, building upon the fact that the City already operates Mission Bay Drive within the Project study area as a coordinated corridor, improvements to signal operations are recommended to address the Project's direct traffic impacts. Specifically, it is recommended that the Mission Bay Drive corridor be improved with enhanced traffic signal interconnect and communications as well as additional detection sensors and computer equipment at each intersection.

The proposed upgrades allow for more advanced signal timing which adapts to actual traffic conditions on a real-time basis. This type of system is called "adaptive traffic control". Various studies evaluating the effectiveness of adaptive traffic control are included in **Appendix L**. As discussed in those studies, the various types of adaptive traffic control can significantly improve signal operations and corridor operations.

A conservative corridor-specific evaluation was commissioned for the Project study area's portion of Mission Bay Drive from an adaptive traffic control developer. This evaluation was completed by Trafficware using their Synchro Green system and SimTraffic software to simulate corridor operations using virtual signal controllers running compatible signal controller software. The results of this evaluation were observed and recorded by Trafficware. The results of this evaluation have been included in **Appendix L**. The analysis shows that operations in the Mission Bay Drive corridor will improve with the application of new technology and installation of an adaptive traffic control system. With Project traffic and implementation of the adaptive traffic control system, the Mission Bay Drive corridor would experience an overall 13.8% reduction in total system delay in the AM peak hour and a 1.7% improvement in total system delay in the PM peak hour.

Additionally, the simulation shows that in the mitigated condition the Mission Bay Drive corridor would operate better as total corridor stops would be reduced 4.2% in the AM peak hour and 5.8% in the PM peak hour. Finally, the Trafficware simulation showed improvements in travel speeds through the Mission Bay Drive corridor with a 2 mph average improvement in the AM peak hour and a 1 mph average improvement in the PM peak hour.

Given the above, the mitigated Project would not have a significant adverse impact on traffic. The ultimate adaptive traffic control system and settings will be selected by the City of San Diego's Signal Operations Section. It is recommended that system engineering and selection be made by City Signal Operations staff as early as possible during final engineering for the corridor improvements. Additionally, the project will upgrade communications within the corridor. The project will provide fiber optic signal interconnects between the six study intersections and a remote link to the Traffic Management Center downtown as well as appropriate advance flashing beacon.

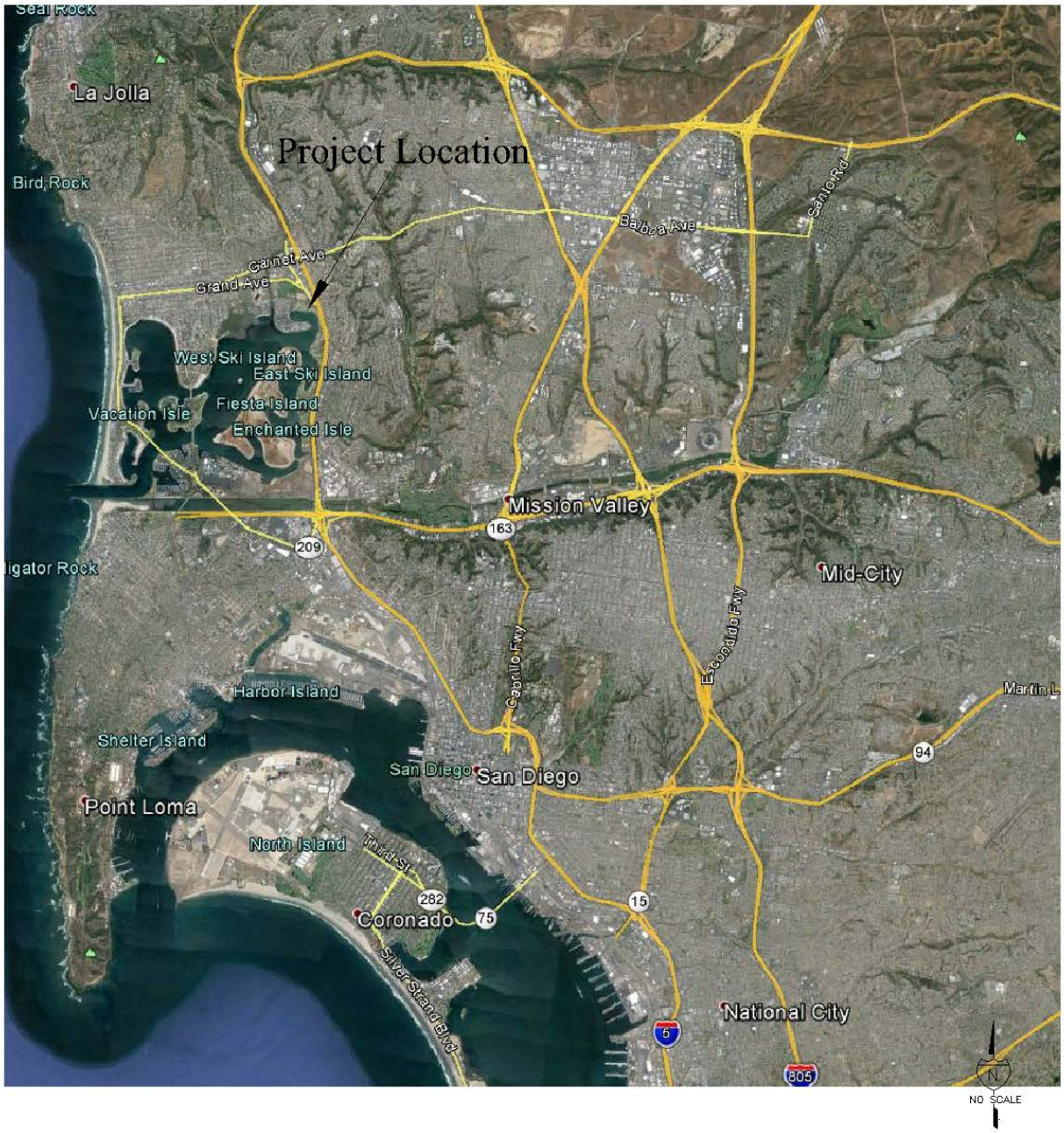


FIGURE 1-1

Project Vicinity Map

TABLE 1-1

Existing Without and Existing With Project Street Segment Comparison

Road	Segment	# of Lanes	LOS "E" Capacity	Class.	Existing			Existing + Project			ΔV/C	Is this impact Significant?
					Volume	LOS	V/C	Volume	LOS	V/C		
Mission Bay Dr.	Garnet Ave. to Magnolia Ave.	4	40,000	4-M	30,487	D	0.76	31,105	D	0.78	0.015	***NO***
	Magnolia Ave. to Bunker Hill St.	4	40,000	4-M	30,265	D	0.76	30,943	D	0.77	0.017	***NO***
	Bunker Hill St. to Grand Ave.	4	40,000	4-M	30,294	D	0.76	30,972	D	0.77	0.017	***NO***
	Grand Ave. to Rosewood St.	4	40,000	4-M	50,602	F	1.27	51,597	F	1.29	0.025	***YES***
	Rosewood St. to N. Mission Bay Dr.	4	40,000	4-M	54,658	F	1.37	55,170	F	1.38	0.013	***YES***
Bunker Hill St.	Mission Bay Dr. to Del Rey St.	2	8,000	2-Cc	3,535	C	0.44	3,535	C	0.44	0.000	***NO***
Del Rey St.	Glendora St. to Rosewood St.	2	2,200	Local	865	UC		865	UC		-	***NO***
Rosewood St.	West of Project Driveway	2	2,200	Local	753	UC		2,260	OC		-	***YES***
	East of Project Driveway	2	2,200	Local	753	UC		753	UC		-	***NO***

Legend:

LOS= Level of Service

V/C= Volume to Capacity Ratio

ΔV/C= Change in V/C ratio

2-Cc = 2 Lane Collector (w/ commercial-industrial property

4-M = 4 Lane Major Arterial

UC = Under Capacity

OC = Over Capacity

TABLE 1-2

Near Term Without and Near Term With Project (2019) Street Segment Comparison

Road	Segment	# of Lanes	LOS "E" Capacity	Class.	Near Term			Near Term + Project			ΔV/C	Is this impact Significant?
					Volume	LOS	V/C	Volume	LOS	V/C		
Mission Bay Dr.	Garnet Ave. to Magnolia Ave.	4	40,000	4-M	31,706	D	0.79	32,324	D	0.81	0.015	***NO***
	Magnolia Ave. to Bunker Hill St.	4	40,000	4-M	31,476	D	0.79	32,154	D	0.80	0.017	***NO***
	Bunker Hill St. to Grand Ave.	4	40,000	4-M	31,506	D	0.79	32,184	D	0.80	0.017	***NO***
	Grand Ave. to Rosewood St.	4	40,000	4-M	52,626	F	1.32	53,621	F	1.34	0.025	***YES***
	Rosewood St. to N. Mission Bay Dr.	4	40,000	4-M	56,844	F	1.42	57,357	F	1.43	0.013	***YES***
Bunker Hill St.	Mission Bay Dr. to Del Rey St.	2	8,000	2-Cc	3,676	C	0.46	3,676	C	0.46	0.000	***NO***
Del Rey St.	Glendora St. to Rosewood St.	2	2,200	Local	900	UC		900	UC		-	***NO***
Rosewood St.	West of Project Driveway	2	2,200	Local	783	UC		2,290	OC		-	***YES***
	East of Project Driveway	2	2,200	Local	783	UC		783	UC		-	***NO***

Legend:

LOS= Level of Service

V/C= Volume to Capacity Ratio

ΔV/C= Change in V/C ratio

2-Cc = 2 Lane Collector (w/ commercial-industrial property

4-M = 4 Lane Major Arterial

UC = Under Capacity

OC = Over Capacity

TABLE 1-3

Year 2035 Without and Year 2035 With Project Street Segment Comparison

Road	Segment	# of Lanes	LOS "E" Capacity	Class.	Year 2030			Year 2030 + Project			ΔV/C	Is this impact Significant?
					Volume	LOS	V/C	Volume	LOS	V/C		
Mission Bay D	Garnet Ave. to Magnolia Ave.	4	40,000	4-M	41,400	F	1.04	42,018	F	1.05	0.015	***YES***
	Magnolia Ave. to Bunker Hill St.	4	40,000	4-M	37,300	E	0.93	37,978	E	0.95	0.017	***NO***
	Bunker Hill St. to Grand Ave.	4	40,000	4-M	37,900	E	0.95	38,578	E	0.96	0.017	***NO***
	Grand Ave. to Rosewood St.	4	40,000	4-M	57,200	F	1.43	58,195	F	1.45	0.025	***YES***
	Rosewood St. to N. Mission Bay Dr.	4	40,000	4-M	57,200	F	1.43	57,712	F	1.44	0.013	***YES***
Bunker Hill St.	Mission Bay Dr. to Del Rey St.	2	8,000	2-Cc	4,242	C	0.53	4,242	C	0.53	0.000	***NO***
Del Rey St.	Glendora St. to Rosewood St.	2	2,200	Local	1,038	UC		1,038	UC		-	***NO***
Rosewood St.	West of Project Driveway	2	2,200	Local	904	UC		2,411	OC		-	***YES***
	East of Project Driveway	2	2,200	Local	904	UC		904	UC		-	***NO***

Legend:

LOS= Level of Service

V/C= Volume to Capacity Ratio

ΔV/C= Change in V/C ratio

2-Cc = 2 Lane Collector (w/ commercial-industrial property

4-M = 4 Lane Major Arterial

UC = Under Capacity

OC = Over Capacity

TABLE 1-4

Existing Without and Existing With Project Intersection Comparison

#	Intersection	Control	Existing				Existing With Project							
			AM Peak Hour		PM Peak Hour		AM Peak Hour		Δ	S ?	PM Peak Hour		Δ	S ?
			D	LOS	D	LOS	D	LOS			D	LOS		
1	Garnet Ave. / Mission Bay Dr.	Signalized	50.4	D	65.2	E	51.2	D	0.8	No	66.0	E	0.8	No
2	Magnolia Ave. / Mission Bay Dr.	Signalized	52.9	D	38.6	D	53.5	D	0.6	No	39.8	D	1.2	No
3	Bunker Hill St. / Mission Bay Dr.	Signalized	25.3	C	48.7	D	27.1	C	1.8	No	52.6	D	3.9	No
4	Grand Ave. / Mission Bay Dr.	Signalized	14.9	B	24.2	C	15.0	B	0.1	No	24.6	C	0.4	No
5	Rosewood St. / Mission Bay Dr.	Minor Street Stop	71.1	F	641.1	F	349.3	F	278.2	Yes	(1)	F	>>1	Yes
6	Mission Bay Dr. / N. Mission Bay Dr.	Signalized	9.7	A	7.9	A	9.7	A	0.0	No	8.1	A	0.2	No

Notes:

LOS = Level of Service

Δ = Change (seconds)

S = Significant

D= Delay (seconds / vehicle)

>>1 = Change in delay is much greater than 1 and was not reported.

(1) = Delay exceeds reliable delay values and not reported in Synchro.

TABLE 1-5

Near Term Without and Near Term With Project (2019) Intersection Comparison

#	Intersection	Control	Near Term				Near Term With Project							
			AM Peak Hour		PM Peak Hour		AM Peak Hour		Δ	S ?	PM Peak Hour		Δ	S ?
			D	LOS	D	LOS	D	LOS			D	LOS		
1	Garnet Ave. / Mission Bay Dr.	Signalized	54.5	D	70.6	E	54.5	D	0.0	No	71.3	E	0.7	No
2	Magnolia Ave. / Mission Bay Dr.	Signalized	77.1	E	45.3	D	77.3	E	0.2	No	46.5	D	1.2	No
3	Bunker Hill St. / Mission Bay Dr.	Signalized	27.9	C	50.3	D	30.4	C	2.5	No	54.6	D	4.3	No
4	Grand Ave. / Mission Bay Dr.	Signalized	16.9	B	35.3	D	17.0	B	0.1	No	36.7	D	1.4	No
5	Rosewood St. / Mission Bay Dr.	Minor Street Stop	87.2	F	871.4	F	478.3	F	391.1	Yes	(1)	F	>>1	Yes
6	Mission Bay Dr. / N. Mission Bay Dr.	Signalized	10.0	B	8.0	A	10.1	B	0.1	No	8.3	A	0.3	No

Notes:
LOS = Level of Service
Δ = Change (seconds)
S = Significant
D= Delay (seconds / vehicle)
>>1 = Change in delay is much greater than 1 and was not reported.
(1) = Delay exceeds reliable delay values and not reported in Synchro.

TABLE 1-6

Year 2035 Without and Year 2035 With Project Intersection Comparison

#	Intersection	Control	Year 2035				Year 2035 + Project							
			AM Peak Hour		PM Peak Hour		AM Peak Hour		Δ	S ?	PM Peak Hour		Δ	S ?
			D	LOS	D	LOS	D	LOS			D	LOS		
1	Garnet Ave. / Mission Bay Dr.	Signalized	77.5	E	101.2	F	78.4	E	0.9	No	103.1	F	1.9	Yes
2	Magnolia Ave. / Mission Bay Dr.	Signalized	133.3	F	93.1	F	140.4	F	7.1	Yes	95.4	F	2.3	Yes
3	Bunker Hill St. / Mission Bay Dr.	Signalized	51.3	D	81.0	F	55.1	E	3.8	Yes	83.4	F	2.4	Yes
4	Grand Ave. / Mission Bay Dr.	Signalized	39.6	D	32.1	C	39.6	D	0.0	No	32.9	C	0.8	No
5	Rosewood St. / Mission Bay Dr.	Minor Street Stop	110.6	F	(1)	F	699.4	F	588.8	Yes	(1)	F	>>1	Yes
6	Mission Bay Dr. / N. Mission Bay Dr.	Signalized	13.6	B	8.7	A	13.6	B	0.0	No	11.8	B	3.1	No

Notes:

LOS = Level of Service

Δ = Change (seconds)

S = Significant

D= Delay (seconds / vehicle)

>>1 = Change in delay is much greater than 1 and was not reported.

(1) = Delay exceeds reliable delay values and not reported in Synchro.

2.0 INTRODUCTION

Urban Systems Associates, Inc. (USAI) was retained by JPI to determine potential transportation impacts and appropriate mitigation measures for the development of Jefferson Pacific Beach site. The project is located off of Mission Bay Drive on the west side of Interstate 5 (I-5) in the community of Pacific Beach. The Project site is bound by Mission Bay Drive on the southwest, Rosewood Street to the north, and I-5 to the east. **Figure 2-1** shows the Project location.

The Project is a mixed-use development consisting of a combined 15,500 square feet of retail/office/commercial with 172 apartment units. The Project is expected to generate 1,507 net cumulative average daily trips (ADT) with 66 AM (8 in / 58 out) peak hour trips and 110 PM (75 in / 35 out) peak hour trips. This equates to 1,867 net driveway trips with 113 AM (46 in / 67 out) peak hour trips and 185 PM (102 in / 83 out) peak hour trips. The existing uses on site generate 315 ADT with 38 AM (21 in / 17 out) peak hour trips and 42 PM (20 in / 22 out) peak hour trips. For a detailed summary of the existing and proposed trip generation, refer to Section 3.1 of this report.

For study area purposes, USAI used the City of San Diego, Traffic Impact Study Manual recommendation and Santec/ITE regional guidelines of fifty trips in one direction during a peak hour as a basis for determining the studied intersections, street segments, and freeway segments as wells as twenty peak hour trips for studying metered freeway ramps. **Figure 2-3** shows the study area which includes nine (9) roadway segments and six (6) intersections. Based on project distribution, less than 50 peak hour directional trips are expected to access I-5 and less than 20 peak hour trips are expected to utilize freeway on-ramps. Therefore freeway segments and metered on-ramps were not included in this study. **Table 2-1** lists the study area street segments and intersections.

Legend

= Project Location

N
NO SCALE

FIGURE 2-1

Project Location Map

See the following page for the Project Site Plan.

FIGURE 2-2

Project Site Plan

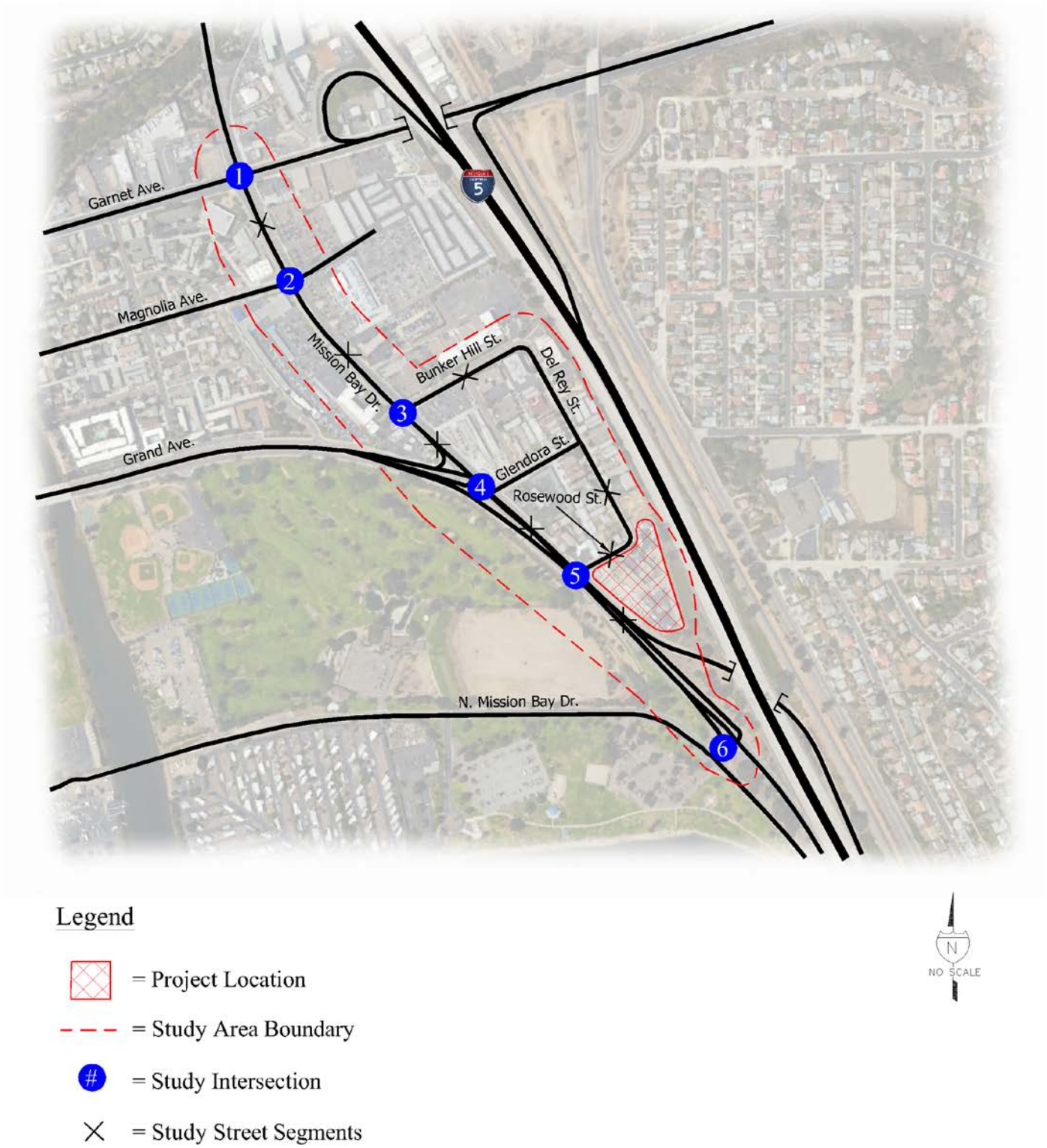


FIGURE 2-3

Study Area Boundary / Intersection Key

TABLE 2-1

Study Area Street Segments and Intersections

Street Segments	
Road	**Segment**
Mission Bay Dr.	Garnet Ave. to Magnolia Ave.
	Magnolia Ave. to Bunker Hill St.
	Bunker Hill St. to Grand Ave.
	Grand Ave. to Rosewood St.
	Rosewood St. to N. Mission Bay Dr.
Bunker Hill St.	Mission Bay Dr. to Del Rey St.
Del Rey St.	Glendora St. to Rosewood St.
Rosewood St.	West of Project Driveway
	East of Project Driveway

Intersections	
Number	**Intersection**
1	Garnet Ave. / Mission Bay Dr.
2	Magnolia Ave. / Mission Bay Dr.
3	Bunker Hill St. / Mission Bay Dr.
4	Grand Ave. / Mission Bay Dr.
5	Rosewood St. / Mission Bay Dr.
6	Mission Bay Dr. / N. Mission Bay Dr.

In order to summarize Project impacts and required mitigation, this report is divided into the following text sections:

1.0 Executive Summary

2.0 Introduction

3.0 Proposed Project

4.0 Methodology

5.0 Existing Conditions

6.0 Existing With Project

7.0 Other Projects

8.0 Near Term Without Project

9.0 Near Term With Project (Opening Day 2019)

10.0 Horizon Year 2035 Without Project

11.0 Horizon Year 2035 With Project

12.0 Onsite Circulation and Access

13.0 Parking

14.0 Other Modes

15.0 Transportation Demand Management

16.0 Conclusions and Recommendations

17.0 References

18.0 Urban Systems Associates, Inc., Preparers

3.0 PROPOSED PROJECT

The proposed Project (Project) consists of approximately 15,500 SF of mixed-use retail/commercial/office and 172 apartment units.

3.1 TRIP GENERATION

A trip generation rate of 72 daily cumulative trips and 120 daily driveway trips per 1000 square feet for a neighborhood shopping center as well as 6 trips per dwelling unit for apartments were taken from the *City of San Diego Trip Generation Manual, 2003.* The Project is expected to generate 1,507 net cumulative average daily trips (ADT) with 66 AM (8 in / 58 out) peak hour trips and 110 PM (75 in / 35 out) peak hour trips. This equates to 1,867 net driveway trips with 113 AM (46 in / 67 out) peak hour trips and 185 PM (102 in / 83 out) peak hour trips. The existing uses on site generate 315 ADT with 38 AM (21 in / 17 out) peak hour trips and 42 PM (20 in / 22 out) peak hour trips. **Table 3-1** shows a vehicle trip generation table for both cumulative and driveway trips for the Project.

Previously, the Project site contained a car dealership (Guy Hill Cadillac) which closed in 2005, currently the site is occupied by a Jet Ski, boat rental and U-Haul rental facility. Although previously higher traffic volumes were apparently generated by the site, recent count data for the existing rental facilities were utilized to calculate the net increase in trip generation in order to conservatively estimate future traffic once the site is redeveloped.

In order to estimate the existing traffic volumes of the existing operations, driveway counts were obtained for three consecutive days from Tuesday, September 1, 2015 through Thursday, September 3, 2015. These counts were then used to calculate the estimated existing traffic volumes. See **Table 3-2**. As shown, it was found that the existing site generates 315 weekday ADT with 38 AM (21 in / 17 out) peak hour trips and 42 PM (20 in / 22 out) peak hour trips. See **Appendix A** for the existing Traffic Volume Counts.

3.2 TRIP DISTRIBUTION AND ASSIGNMENT

Per City of San Diego Traffic Impact Study Manual, trip distribution percentages were based on a SANDAG Series 12 Select Zone Full Forecast Model, dated October 2014, included in **Appendix B**. **Figure 3-1** shows the Project's distribution. As shown, approximately 66% of Project traffic travels northwest with the remaining 34% traveling southeast on Mission Bay Drive. From the Project site, approximately 21% of traffic traveling into Pacific Beach use Grand Avenue. Approximately 26% of Project traffic is expected to access southbound I-5 and 17% to access northbound I-5.

Figure 3-2 shows the Project only average daily traffic volumes.

Figure 3-3 shows the Project only AM/PM peak hour intersection volumes.

TABLE 3-1

Jefferson Pacific Beach Project Trip Generation

PROJECT TRIP GENERATION- Driveway

Use	Intensity	Rate	ADT	AM						PM					
				Peak %	Vol.	In %	Out%	In	Out	Peak %	Vol.	In %	Out%	In	Out
Mixed-Use Retail - Driveway	7,500 SF	120 /KSF	**900**	4%	**36**	60%	40%	**22**	**14**	11%	**99**	50%	50%	**50**	**50**
Multi-tenant Office	8,000 SF	Formula	**250**	13%	**33**	90%	10%	**29**	**3**	14%	**35**	20%	80%	**7**	**28**
Apartments	172 DU	6 /DU	**1,032**	8%	**83**	20%	80%	**17**	**66**	9%	**93**	70%	30%	**65**	**28**
Driveway Total			**2,182**		**151**			**67**	**84**		**227**			**122**	**105**

PROJECT TRIP GENERATION- Net Driveway

Use	Intensity	Rate	ADT	AM						PM					
				Peak %	Vol.	In %	Out%	In	Out	Peak %	Vol.	In %	Out%	In	Out
Driveway Total			**2,182**		**151**			**67**	**84**		**227**			**122**	**105**
Existing			**315**	12%	**38**	56%	44%	**21**	**17**	13%	**42**	47%	53%	**20**	**22**
Net Total (Proposed-Existing)			**1,867**		**113**			**46**	**67**		**185**			**102**	**83**

PROJECT TRIP GENERATION- Cumulative

Use	Intensity	Rate	ADT	AM						PM					
				Peak %	Vol.	In %	Out%	In	Out	Peak %	Vol.	In %	Out%	In	Out
Mixed-Use Retail - Cumulative	7,500 SF	72 /KSF	**540**	4%	**22**	60%	40%	**13**	**9**	11%	**59**	50%	50%	**30**	**30**
Multi-tenant Office	8,000 SF	Formula	**250**	13%	**33**	90%	10%	**29**	**3**	14%	**35**	20%	80%	**7**	**28**
Apartments	172 DU	6 /DU	**1,032**	8%	**83**	20%	80%	**17**	**66**	9%	**93**	70%	30%	**65**	**28**
Cumulative Total			**1,822**		**104**			**29**	**75**		**152**			**95**	**58**

PROJECT TRIP GENERATION- Net Cumulative

Use	Intensity	Rate	ADT	AM						PM					
				Peak %	Vol.	In %	Out%	In	Out	Peak %	Vol.	In %	Out%	In	Out
Cumulative Total			**1,822**		**104**			**29**	**75**		**152**			**95**	**58**
Existing			**315**	12%	**38**	56%	44%	**21**	**17**	13%	**42**	47%	53%	**20**	**22**
Net Total (Proposed-Existing)			**1,507**		**66**			**8**	**58**		**110**			**75**	**35**

Source:
Rates taken from the City of San Diego Trip Generation Manual, May 2003

TABLE 3-2

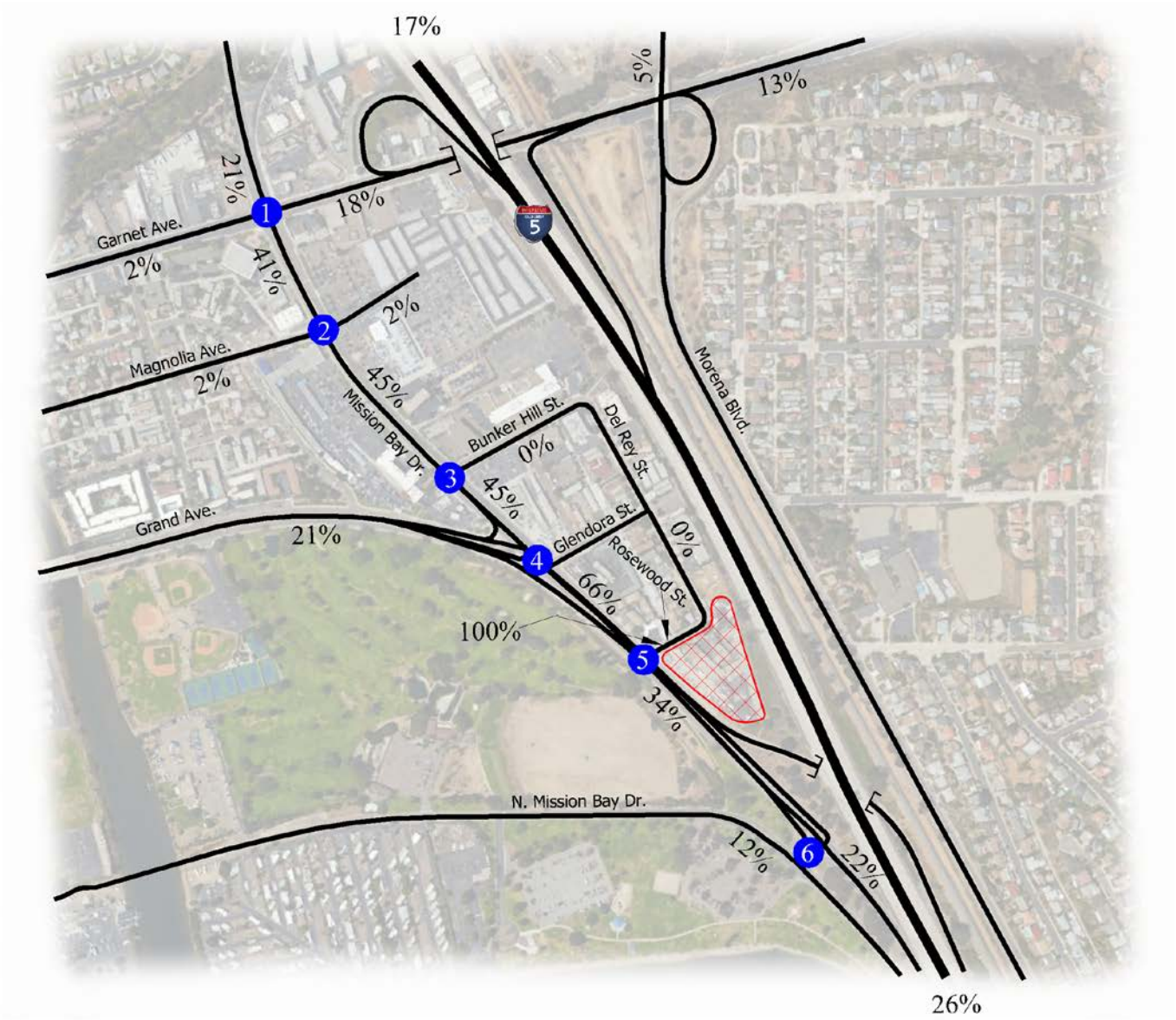
Existing Trip Generation Calculations

Date of Counts 9/1/15-9/3/15

	Day 1	Day 2	Day 3	Average
West Driveway	158	172	168	166
East Driveway	176	109	163	149
Total	334	281	331	315

		Day 1		Day 2		Day 3		Average	
		Vol	%	Vol	%	Vol	%	Vol	%
West Driveway	AM	25	15.8%	21	12.2%	15	8.9%	20	12.2%
	PM	16	10.1%	25	14.5%	25	14.9%	22	13.3%
East Driveway	AM	23	13.1%	12	11.0%	18	11.0%	18	11.8%
	PM	27	15.3%	15	13.8%	19	11.7%	20	6.4%
Total	AM	48	14.4%	33	11.7%	33	10.0%	38	12.1%
	PM	43	12.9%	40	14.2%	44	13.3%	42	13.4%

		Day 1		Day 2		Day 3		Average	
		In	Out	In	Out	In	Out	In	Out
West Driveway	AM	59%	41%	61%	39%	62%	38%	61%	39%
	PM	44%	57%	44%	56%	46%	55%	44%	56%
East Driveway	AM	49%	51%	51%	49%	51%	49%	50%	50%
	PM	50%	50%	50%	50%	48%	49%	50%	50%
Average							AM	56%	44%
							PM	47%	53%



Legend

= Project Location

= Study Area Boundary

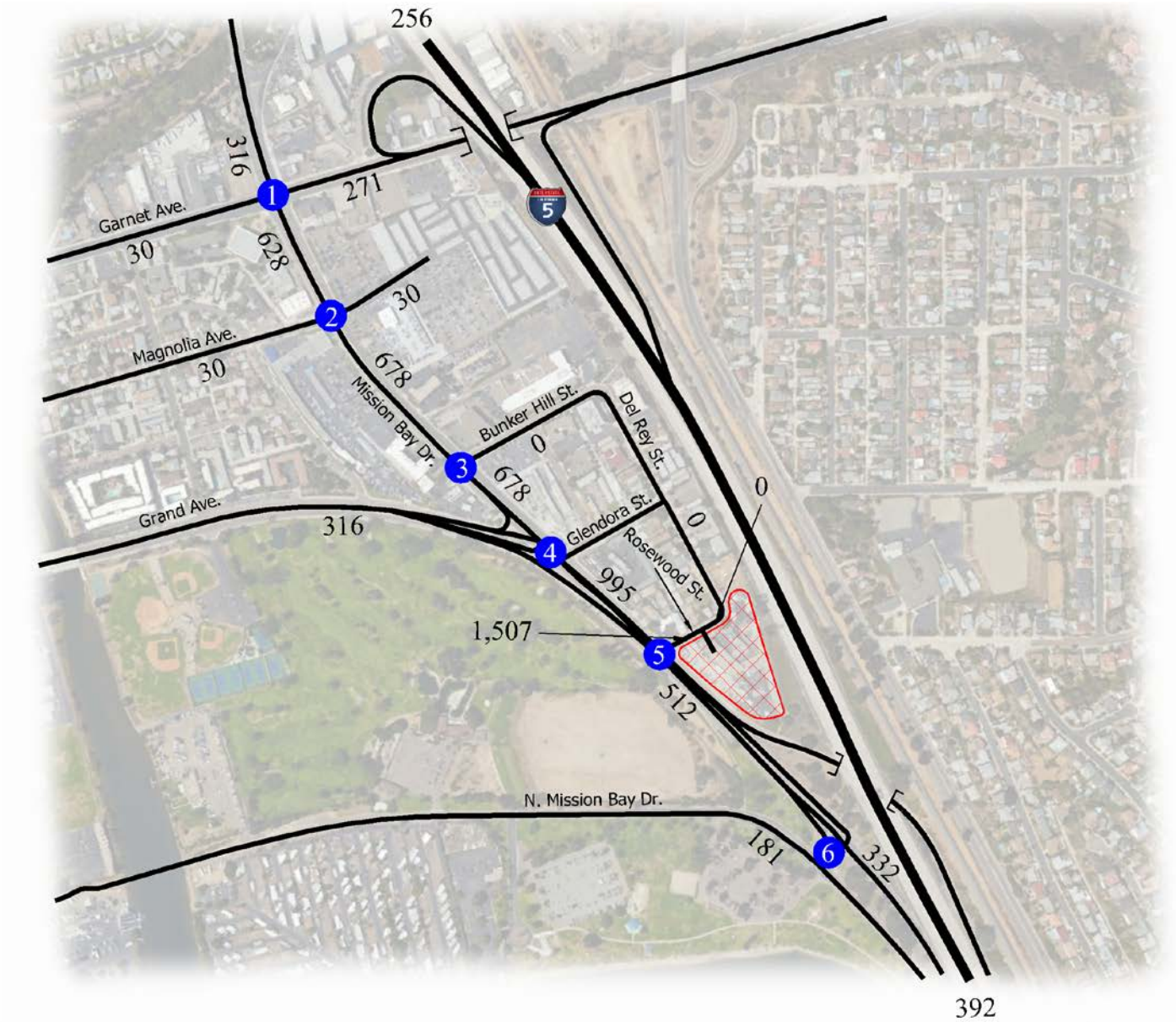
= Study Intersection

XX% = Distribution Percentage

N
NO SCALE

FIGURE 3-1

Project Distribution Percentages



Legend

= Project Location

= Study Area Boundary

= Study Intersection

XX,XXX = Average Daily Traffic Volumes

N
NO SCALE

FIGURE 3-2

Project Only Average Daily Traffic

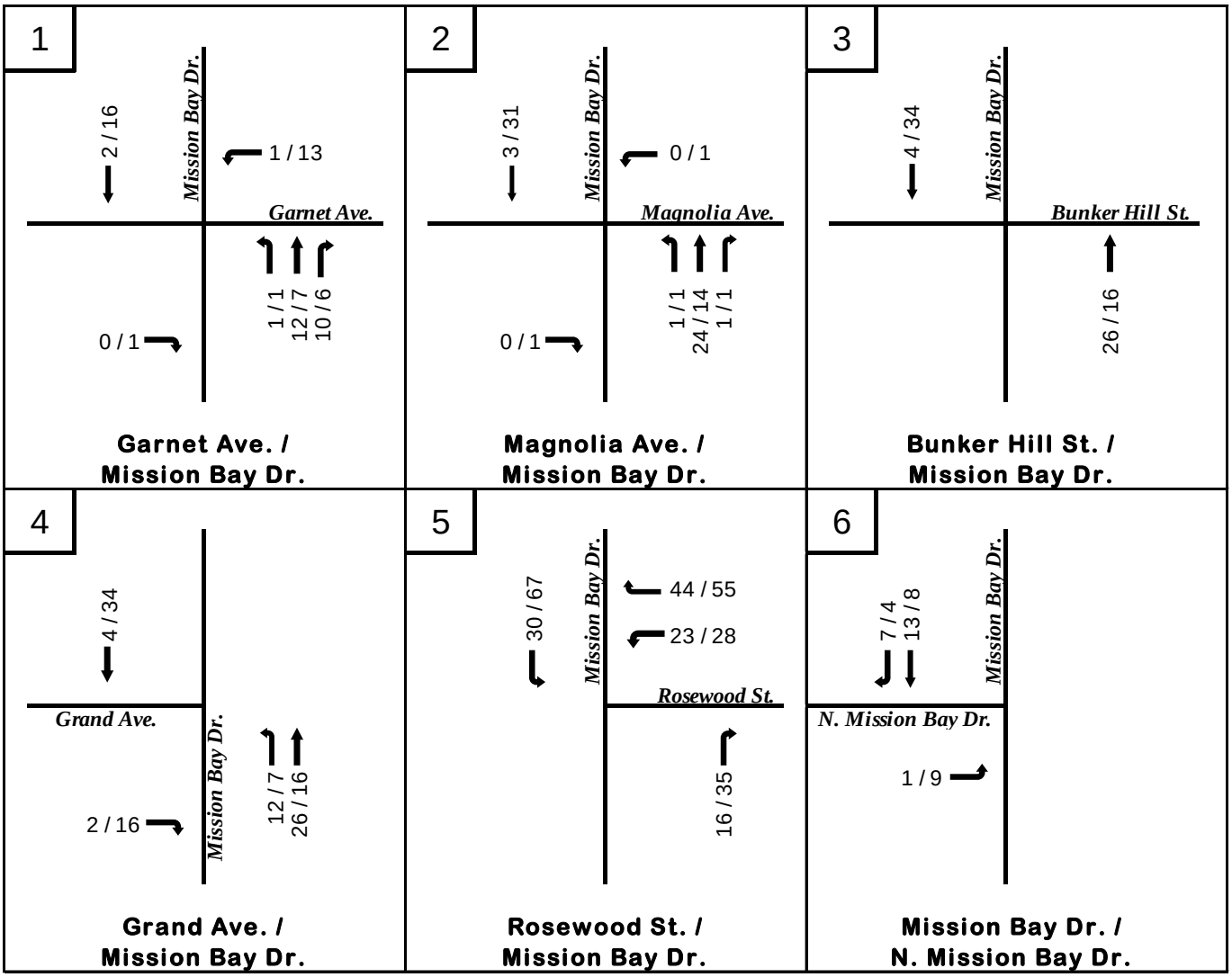


FIGURE 3-3

Project Only AM / PM Peak Hour Traffic

4.0 METHODOLOGY

This section of the report describes various analysis procedures and criteria that are used to determine if the Project has a significant impact and if mitigation is required. Mitigation may be either specific improvements by a project for a direct or cumulative impact or a financial contribution toward an improvement by others if a cumulative impact occurs. Two criteria must be met before project mitigation is required. First, the intersection or street segment must be projected to operate at an unacceptable LOS after project trips are added (i.e., "E" or "F" as discussed below). Second, the amount of project traffic must be significant based on the application of criteria also discussed below. For an intersection, if the change in delay anticipated due to a project is greater than 2 seconds and the LOS is "E" or "F" respectively, then a project's intersection impacts would be considered significant. For a street segment, if the change in volume to capacity ratio (V/C ratio) anticipated due to the project exceeds 0.02, and the LOS is "E" or "F," respectively, then a project's street segment impact would be considered significant. If project traffic causes an intersection, roadway segment, or freeway segment to degrade from LOS "D" to LOS "E" or LOS "F," a project impact would be significant and project mitigation is required. For freeway segment impacts to be considered significant, the segment would need to operate at an unacceptable LOS and exceed a change in V/C ratio of 0.01 for LOS "E" and "F," respectively. A project ramp meter impact would be significant if the ramp meter calculations show 15 minutes of delay or greater and the change in delay due to the project is greater than 2 minutes and the freeway mainline segments are expected to operate at LOS "E" and "F," respectively, using the most restrictive meter rate method. For this study, the freeway criteria is not applicable because the Project would not be expected to contribute 50 directional peak hour trips to I-5.

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4.1 CITY OF SAN DIEGO GUIDELINES

The City of San Diego has developed a Traffic Impact Study Manual (7/98). The stated purpose of the Traffic Impact Study Manual is "....to ensure consistency with all applicable City and State regulations." The Traffic Impact Study Manual provides guidance regarding preparation of traffic impact reports in the City of San Diego. Since the Project is located in the City of San Diego, this traffic impact report follows the procedures outlined in the City's Manual. The Manual includes guidelines for forecasting, trip generation and assignment, and analysis procedures.

The manual also establishes criteria for measuring project impacts at intersections. The City Traffic Impact Study Manual specifies use of the most current Highway Capacity Manual (HCM) operational method for studying intersections. The most current HCM is HCM 2010. For analyzing intersections, a software package called Synchro is used. This software package is a direct and faithful application of the HCM methodology.

4.2 TRIP DISTRIBUTION

Trip distribution is the process of determining traffic percentage splits on the regional and local roadway network. Trip distribution for the Project was based on a SANDAG Series 12 Select Zone Full Forecast Model dated October 2014.

4.3 STREET LOS THRESHOLD

When analyzing street segments, the LOS must be determined. LOS is a measure used to describe the conditions of traffic flow. LOS is expressed using letter designations from "A" to "F." LOS "A" represents the best case, and LOS "F" represents the worst case. Generally LOS "A" through "C" represents free-flowing traffic conditions with little or no delay. LOS "D" represents limited congestion

and some delay. However, the duration of periods of delay is acceptable to most people. LOS "E" and "F" represent significant delays on local streets, which are generally unacceptable for urban design purposes. The LOS descriptions are from Chapter 9 of the HCM (Transportation Research Board 2010).

The City of San Diego has developed LOS threshold tables based on the different functional street classifications and their ability to carry traffic. For the City of San Diego, LOS "D" is the acceptable LOS standard for roadways and intersections.

4.4 INTERSECTION LOS PROCEDURES

The City and SANTEC/ITE guidelines, as adopted by SANDAG (2006), determine the procedures to be used for intersection peak hour analysis. To determine an intersection peak hour LOS, the City and SANTEC/ITE guidelines suggest use of the most recent methodology from the HCM (Transportation Research Board 2010). The procedure, which is used to analyze signalized intersections, is the "operational method." This method determines LOS based on average control delay expressed in seconds. **Table 4-1** shows the LOS based upon the delay. A computer program is used to complete the analysis. As discussed above, the City and SANTEC/ITE guidelines have established LOS "D" or better as the objective for intersections and street segments.

TABLE 4-1

Level of Service Criteria for Signalized Intersections

Level of Service	Control Delay Per Vehicle (sec)
A	≤10
B	>10 and ≤20
C	>20 and ≤35
D	>35 and ≤55
E	>55 and ≤80
F	>80

Source: Transportation Research Board 2010, Table 18-4

Level of Service Criteria for Un-signalized Intersections

Level of Service	Control Delay Per Vehicle (sec)
A	≤10
B	>10 and ≤15
C	>15 and ≤25
D	>25 and ≤35
E	>35 and ≤50
F	>50

Source: Transportation Research Board 2010, Table 19-1

4.5 FREEWAY SEGMENT LOS PROCEDURES

To determine the LOS of main-lane freeway segments, a V/C analysis would be conducted consistent with California Department of Transportation (Caltrans) District 11 Procedures for Estimating Freeway Level of Service. This analysis does not include any freeway analysis so these procedures have not been utilized.

4.6 SIGNIFICANCE THRESHOLDS

As discussed above, two criteria must be met before project traffic mitigation is required. First, an unacceptable LOS (i.e., "E" or "F") must occur, and second, significance thresholds for only project traffic must be exceeded. Alternatively, if project traffic causes a facility to degrade from LOS "D" to "E," a significant impact would occur. The City's significance thresholds are summarized in **Table 4-2**. These thresholds are used in this analysis along with LOS to determine if project mitigation is required. **Table 4-3** shows the roadway classifications for the City of San Diego as defined in Table 4 of the City's Traffic Impact Study Manual.

TABLE 4-2

Significance Thresholds

Level of Service with Project*	Allowable Increase Due to Project Impacts**					
	Freeways		Roadway Segments		Intersections	Ramp Metering
	V/C	*Speed (mph)*	*V/C*	*Speed (mph)*	*Delay (sec.)*	*Delay (min.)*
E (or ramp meter delays above 15 minutes)	0.010	1.0	0.02	1.0	2.0	2.0
F (or ramp meter delays above 15 minutes)	0.005	0.5	0.01	0.5	1.0	1.0

Note 1: The allowable increase in delay at a ramp meter with more than 15 minutes delay and freeway LOS E is 2 minutes.
Note 2: The allowable increase in delay at a ramp meter with more than 15 minutes delay and freeway LOS F is 1 minute.
* All LOS measurements are based upon Highway Capacity Manual procedures for peak-hour conditions. However, V/C ratios for roadway segments are estimated on an ADT/24-hour traffic volume basis (using Table 2 of the City's Traffic Impact Study Manual). The acceptable LOS for freeways, roadways, and intersections is generally "D" ("C" for undeveloped locations). For metered freeway ramps, LOS does not apply. However,ramp meter delays above 15 minutes are considered excessive.

** If a proposed project's traffic causes the values shown in the table to be exceeded, the impacts are determined to be significant. The project applicant shall then identify feasible improvements (within the Traffic Impact Study) that will restore/ and maintain the traffic facility at an acceptable LOS. If the LOS with the proposed project becomes unacceptable (see above * note), or if the project adds a significant amount of peak hour trips to cause any traffic queues to exceed on- or off-ramp storage capacities, the project applicant shall be responsible for mitigating the project's direct significant and / or cumulatively considerable traffic impacts.

Key:
1. V/C =Volume to Capacity Ratio
2. Speed = Arterial speed measured in miles per hour
3. Delay = Average control delay per vehicle measured in seconds for intersections, or minutes for ramp meters
4. LOS = Level of Service

TABLE 4-3
Roadway Classifications

		Level of Service W/ADT				
Street Classification	**Lanes**	**A**	**B**	**C**	**D**	**E**
Expressway	6 Lanes	30,000	42,000	60,000	70,000	80,000
Prime Arterial	6 Lanes	25,000	35,000	50,000	55,000	60,000
Major Arterial	6 Lanes	20,000	28,000	40,000	45,000	50,000
Major Arterial	4 Lanes	15,000	21,000	30,000	35,000	40,000
Secondary Arterial/ Collector	4 Lanes	10,000	14,000	20,000	25,000	30,000
Collector (no center lane) (continuous left-turn lane)	4 Lanes 2 Lanes	5,000	7,000	10,000	13,000	15,000
Collector (no fronting property)	2 Lanes	4,000	5,500	7,500	9,000	10,000
Collector (commercial-industrial fronting)	2 Lanes	2,500	3,500	5,000	6,500	8,000
Collector (multi-family)	2 Lanes	2,500	3,500	5,000	6,500	8,000
Sub-Collector (single-family)	2 Lanes	---	---	2,200	---	---

Notes:

1. The volumes and the average daily level of service listed above are only intended as a general planning guidline.
2. Levels of service are not applied to residential streets since their primary purpose is to serve abutting lots, not carry through traffic. Levels of service normally apply to roads carrying through traffic between major trip generators and attractors.

5.0 EXISTING CONDITIONS

The Project is located off of Mission Bay Drive on the west side of I-5 in the community of Pacific Beach. See **Figure 1-1** for a vicinity map and **Figure 2-1** for a Project location map.

5.1 EXISTING ROADWAY FACILITIES

Mission Bay Drive- runs northwest to southeast and is constructed as a four lane divided roadway with raised medians in most locations. Directly adjacent to the proposed project, the street is approximately 85 feet wide and the total right-of-way is approximately 120 feet. It is classified as a 4 lane Major Arterial according to the Pacific Beach Community Plan Circulation Element (see **Appendix B**). Between Garnet Avenue and Magnolia Avenue, parking is allowed on the west side of the street only. Between Magnolia and Grand Avenue, parking is allowed intermittently on both sides of the street. South of Grand Avenue, parking is allowed intermittently on the east side of the street. The posted speed limit is 45 mph. Bike lanes are available on the west side of Mission Bay Drive south of Grand Avenue.

Del Rey Street- runs north to south and functions as local street (single family/ sub-collector). It is unclassified in the Pacific Beach Community Plan Circulation Element. The street is approximately 36 feet wide and the total right-of-way is approximately 70 feet. Parking is allowed on both sides of the street. It primarily serves local residents as well as the occasional office. There is no posted speed limit, however because it is a residential street, the prima facie speed limit is 25 mph.

Rosewood Street- runs east to west and connects Del Rey Street to Mission Bay Drive. The street is approximately 40 feet wide and the total right-of-way is approximately 60 feet. It is unclassified in the Pacific Beach Community Plan Circulation Element. The Project access points are located on Rosewood

Street. The "Tee" intersection of Rosewood Street and Mission Bay Drive is unsignalized and is minor-street stop controlled. There is no posted speed limit.

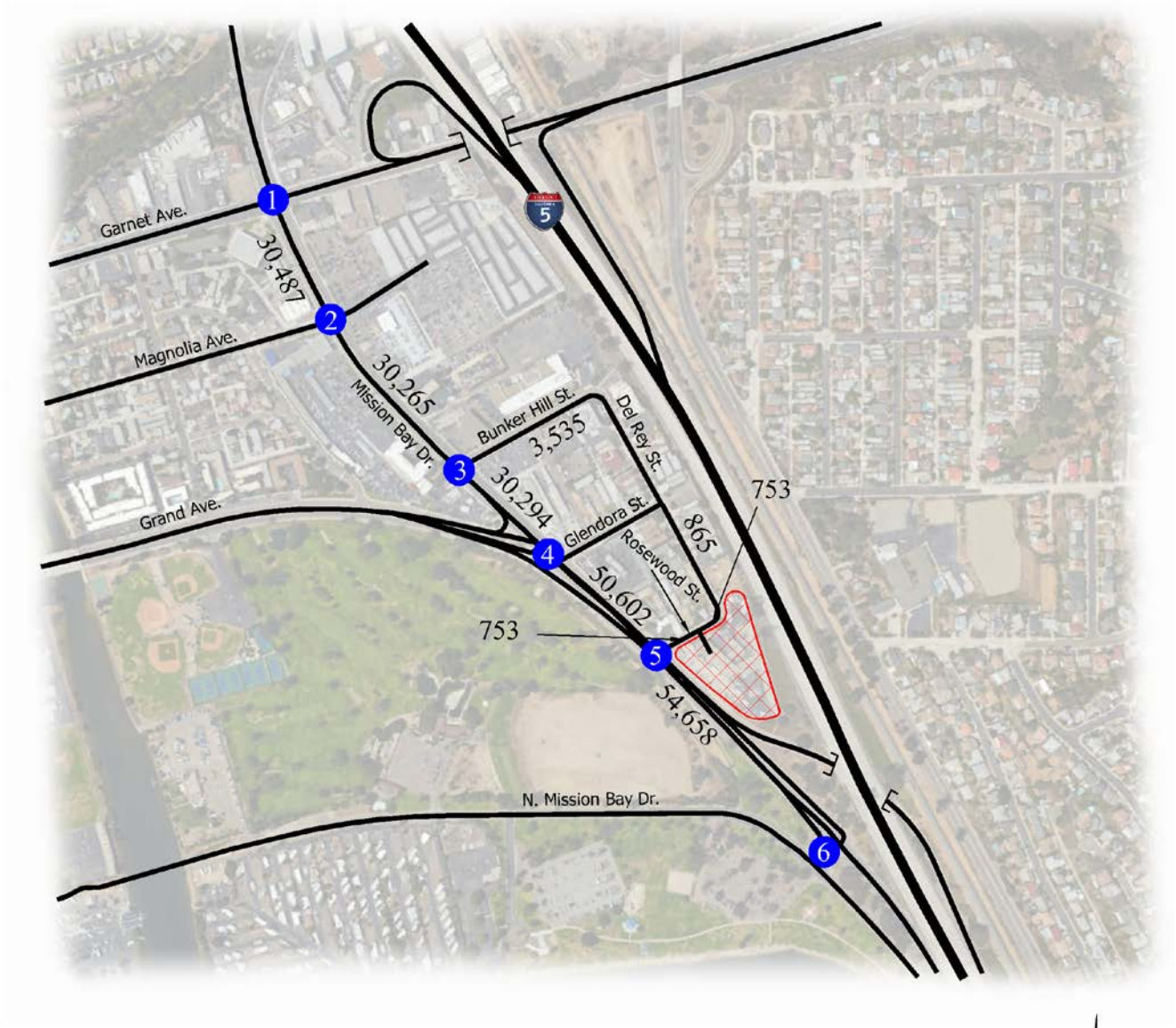
Bunker Hill Street- runs east to west and connects Del Rey Street to Mission Bay Drive. The street is approximately 40 feet wide and the total right-of-way is approximately 60 feet. It is unclassified in the Pacific Beach Community Plan Circulation Element. Parking is allowed on both sides of the street. It primarily serves office buildings as well as a connector to residents on Del Rey Street. There is no posted speed limit.

5.2 EXISTING TRAFFIC VOLUMES

Figure 5-1 shows the existing average weekday 24-hour traffic volumes for street segments in the project study area. Existing street segment functional classifications were used for purposes of this analysis.

Figure 5-2 shows the lane configurations for the existing roadway network at the Project access and at intersections studied.

Existing traffic volume counts were obtained for the studied street segments and intersections as shown in **Table 2-1**. Traffic volume counts were obtained on Wednesday, August 5, 2015. Existing signal timing sheets were also used to analyze the Existing conditions. Traffic volume counts and signal timing sheets can be found in **Appendix A**.



Legend

= Project Location

= Study Area Boundary

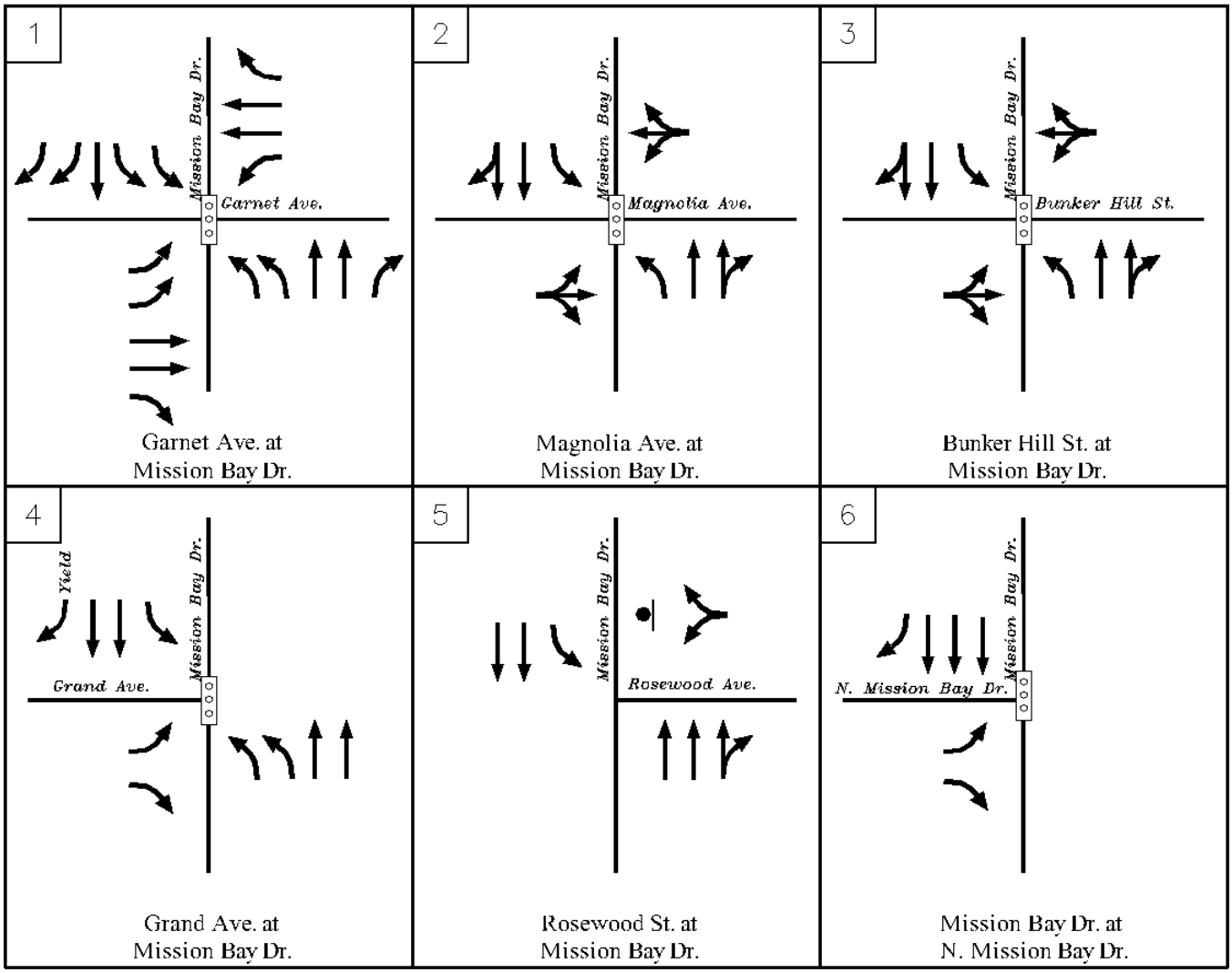
= Study Intersection

XX,XXX = Average Daily Traffic Volumes

N
NO SCALE

FIGURE 5-1

Existing Average Daily Traffic



Legend

– Signalized Intersection

– Stop Sign

FIGURE 5-2

Existing Lane Configurations

5.3 STREET SEGMENT ANALYSIS

As discussed previously, Del Rey Street and Rosewood Street are unclassified in the Pacific Beach Community Plan. Therefore they were analyzed as local streets and were reported as over or under the capacity of LOS "C" of 2,200 ADT as defined in the City of San Diego Traffic Impact Study manual.

Table 5-1 shows the street segment levels of service (LOS) using roadway classifications from the City of San Diego Traffic Impact Study Manual. As shown, all study streets currently operate a level of service D or better with the exception of the segments listed below:

- Mission Bay Drive between Grand Avenue and Rosewood Street
- Mission Bay Drive between Rosewood Street and N. Mission Bay Drive

5.4 EXISTING INTERSECTIONS

As previously discussed in Section 5.2, **Figure 5-2** shows the existing lane configurations for the intersections in the study area.

5.5 EXISTING INTERSECTION PEAK HOUR VOLUMES AND LOS

Figure 5-3 shows Existing AM/PM peak hour intersection volumes.

Table 5-2 shows the average delay and levels of service (LOS) that was determined for all study intersections based on the methodology developed in the Highway Capacity Manual (HCM) using the computer software program Synchro version 9 (HCM 2010). As shown, all study intersections operate at LOS D or better in both the AM and PM peak hour with the following exceptions:

- Mission Bay Drive at Garnet Avenue in the PM Peak Hour, LOS E

- Mission Bay Drive at Rosewood Street in the AM Peak Hour, LOS F
- Mission Bay Drive at Rosewood street in the PM Peak Hour, LOS F

Existing Synchro worksheets can be found in **Appendix C**.

TABLE 5-1

Existing Street Segment Levels of Service

Road	Segment	Standard	# of Ln.	Class.	Cap.	Volume	V/C	LOS
Mission Bay Dr.	Garnet Ave. to Magnolia Ave.	SD	4	4-M	40,000	30,487	0.76	D
	Magnolia Ave. to Bunker Hill St.	SD	4	4-M	40,000	30,265	0.76	D
	Bunker Hill St. to Grand Ave.	SD	4	4-M	40,000	30,294	0.76	D
	Grand Ave. to Rosewood St.	SD	4	4-M	40,000	50,602	1.27	F
	Rosewood St. to N. Mission Bay Dr.	SD	4	4-M	40,000	54,658	1.37	F
Bunker Hill St.	Mission Bay Dr. to Del Rey St.	SD	2	2-Cc	8,000	3,535	0.44	C
Del Rey St.	Glendora St. to Rosewood St.	SD	2	Local	2,200	865	UC	
Rosewood St.	West of Project Driveway	SD	2	Local	2,200	753	UC	
	East of Project Driveway	SD	2	Local	2,200	753	UC	

Legend:

Count Date: August 5, 2015

Class. = Functional Class

Cap. = Capacity

LOS = Level of Service

2-Cc = 2 Lane Collector (w/ commercial-industrial property

4-M = 4 Lane Major Arterial

UC = Under Capacity

OC = Over Capacity

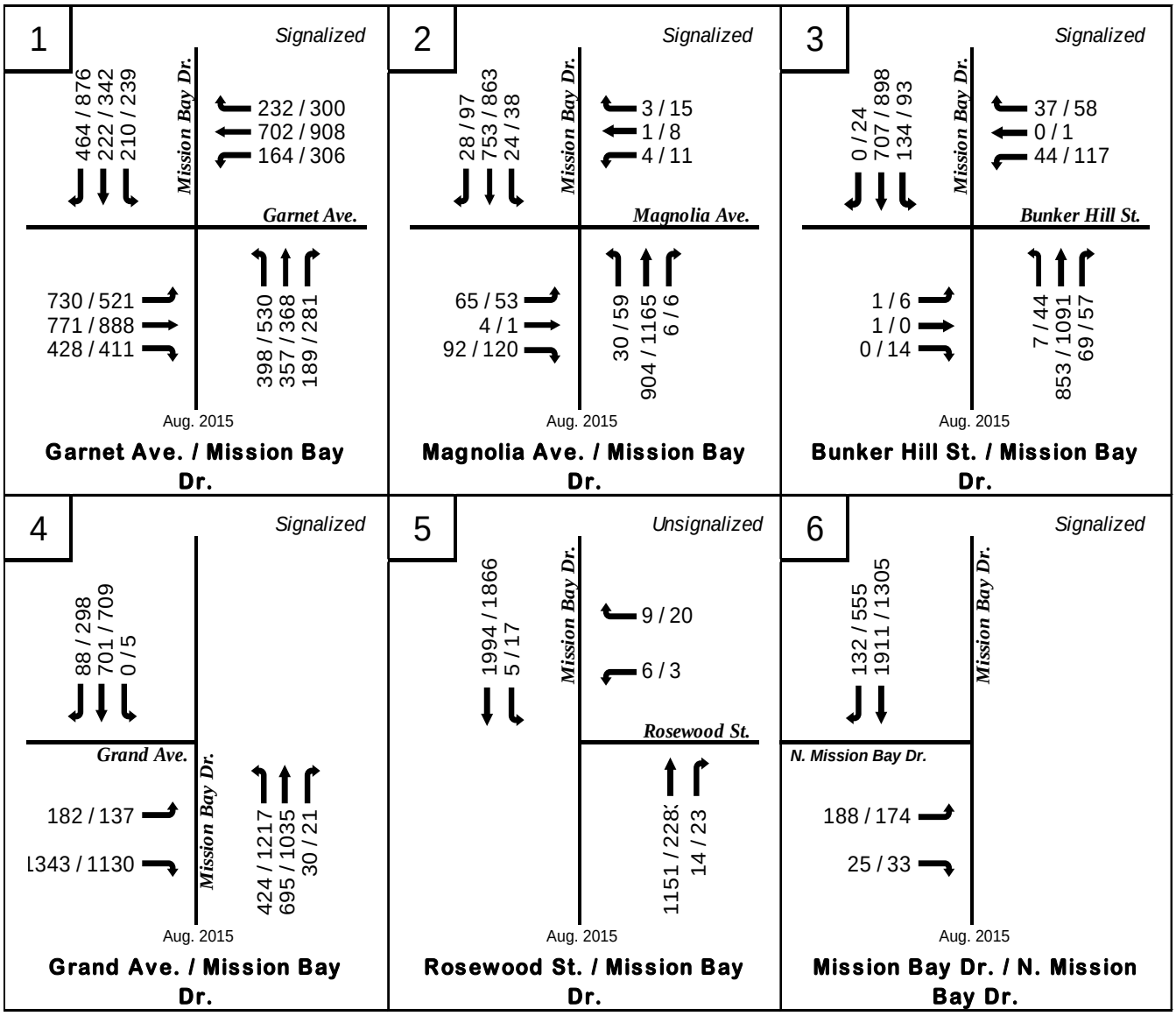


FIGURE 5-3

Existing AM/PM Peak Hour Traffic

TABLE 5-2

Existing Intersection Levels of Service

Number	Intersection	Control	AM Peak Hour		PM Peak Hour	
			Average Control Delay	LOS	Average Control Delay	LOS
1	Garnet Ave. / Mission Bay Dr.	Signalized	50.4	D	65.2	E
2	Magnolia Ave. / Mission Bay Dr.	Signalized	52.9	D	38.6	D
3	Bunker Hill St. / Mission Bay Dr.	Signalized	25.3	C	48.7	D
4	Grand Ave. / Mission Bay Dr.	Signalized	14.9	B	24.2	C
5	Rosewood St./ Mission Bay Dr. *	Minor Street Stop	71.1	F	641.1	F
6	Mission Bay Dr. / N. Mission Bay Dr.	Signalized	9.7	A	7.9	A

Notes:

Delay= seconds / vehicle

LOS = Level of Service

*= Minor Street Right Turn Movement

6.0 EXISTING WITH PROJECT

Project traffic was added to the existing traffic to determine if any significant direct impacts would occur. The summary of the results for street segments and intersections are listed below.

6.1 STREET SEGMENTS

Figure 6-1 shows the average daily traffic volumes in the Existing with Project condition.

Table 6-1 shows that all study segments are projected to operate at level of service D or better when Project traffic is added with the following exceptions:

- Mission Bay Drive between Grand Avenue and Rosewood Street
- Mission Bay Drive between Rosewood Street and N. Mission Bay Drive
- Rosewood Street west of the Project Driveway (overcapacity)

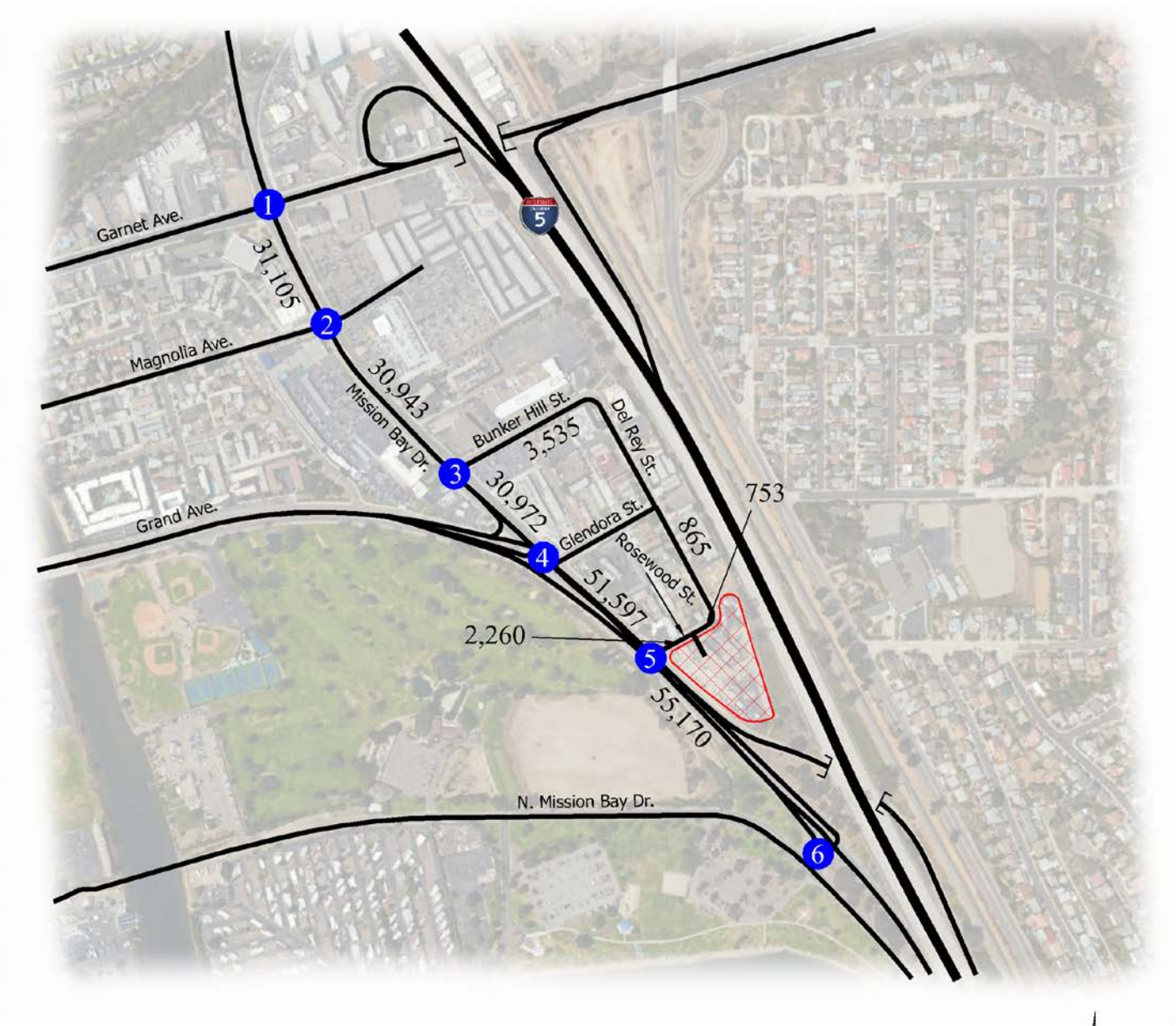
6.2 INTERSECTIONS

Figure 6-2 shows Existing with Project AM/PM peak hour intersection volumes.

Table 6-2 shows the all intersections are projected to operate at LOS D or better when Project traffic is added with the following exceptions:

- Mission Bay Drive at Garnet Avenue in the PM Peak Hour, LOS E
- Mission Bay Drive at Rosewood Street in the AM Peak Hour, LOS F
- Mission Bay Drive at Rosewood street in the PM Peak Hour, LOS F

Existing with Project Synchro worksheets can be found in **Appendix D**.



Legend

= Project Location

= Study Area Boundary

= Study Intersection

XX,XXX = Average Daily Traffic Volumes

N
NO SCALE

FIGURE 6-1

Existing + Project Average Daily Traffic

TABLE 6-1

Existing + Project Street Segment Levels of Service

Mission Bay Dr.	Garnet Ave. to Magnolia Ave.	SD	4	4-M	40,000	31,105	0.78	D
	Magnolia Ave. to Bunker Hill St.	SD	4	4-M	40,000	30,943	0.77	D
	Bunker Hill St. to Grand Ave.	SD	4	4-M	40,000	30,972	0.77	D
	Grand Ave. to Rosewood St.	SD	4	4-M	40,000	51,597	1.29	F
	Rosewood St. to N. Mission Bay Dr.	SD	4	4-M	40,000	55,170	1.38	F
Bunker Hill St.	Mission Bay Dr. to Del Rey St.	SD	2	2-Cc	8,000	3,535	0.44	C
Del Rey St.	Glendora St. to Rosewood St.	SD	2	Local	2,200	865	UC	
Rosewood St.	West of Project Driveway	SD	2	Local	2,200	2,260	OC	
	East of Project Driveway	SD	2	Local	2,200	753	UC	

Legend:

Class. = Functional Class

Cap. = Capacity

LOS = Level of Service

2-Cc = 2 Lane Collector (w/ commercial-industrial property

4-M = 4 Lane Major Arterial

UC = Under Capacity

OC = Over Capacity

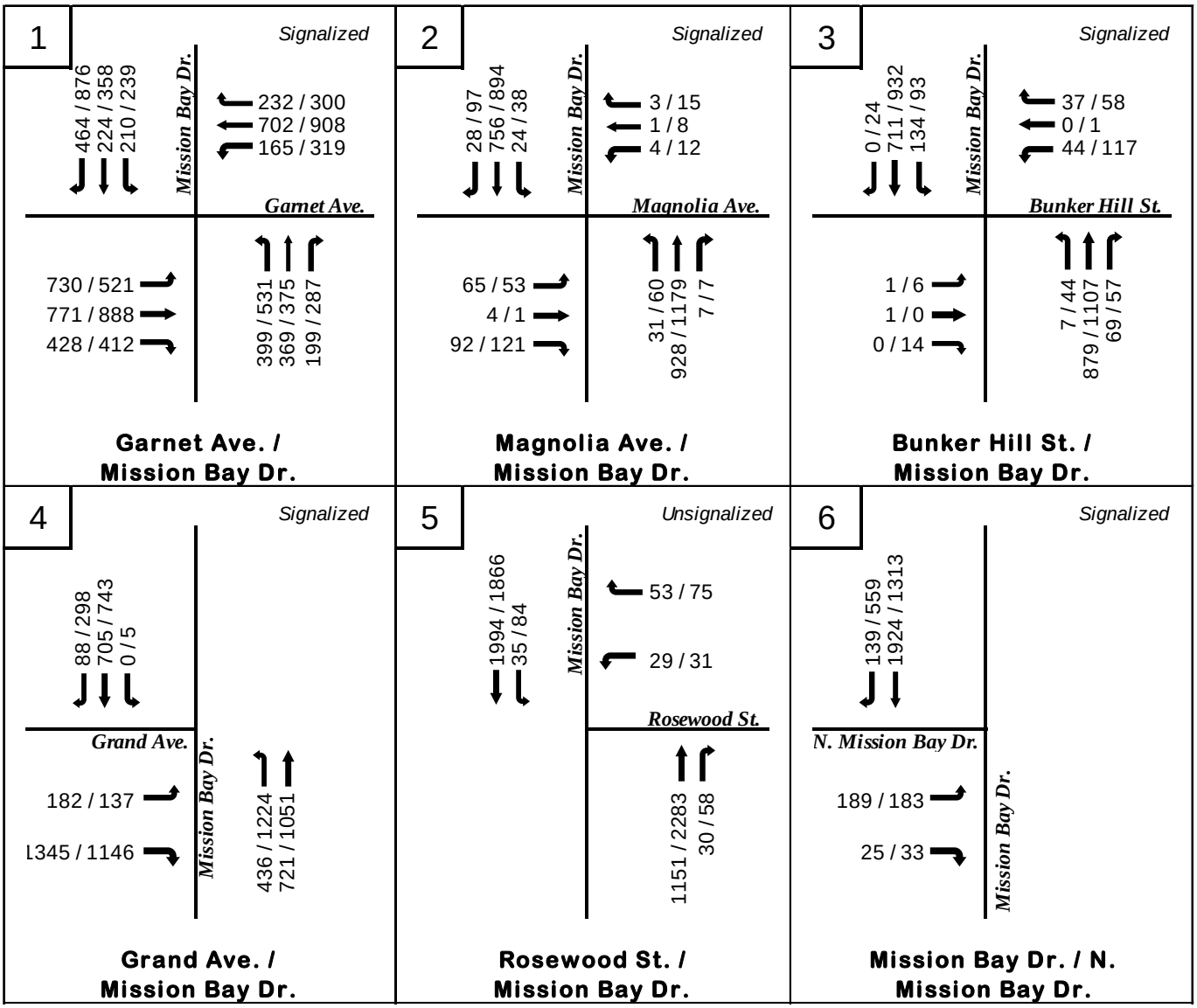


FIGURE 6-2

Existing + Project AM / PM Peak Hour Traffic

TABLE 6-2

Existing With Project Intersection Levels of Service

Number	Intersection	Control	AM Peak Hour		PM Peak Hour	
			Average Control Delay	LOS	Average Control Delay	LOS
1	Garnet Ave. / Mission Bay Dr.	Signalized	51.2	D	66	E
2	Magnolia Ave. / Mission Bay Dr.	Signalized	53.5	D	39.8	D
3	Bunker Hill St. / Mission Bay Dr.	Signalized	27.1	C	52.6	D
4	Grand Ave. / Mission Bay Dr.	Signalized	15	B	24.6	C
5	Rosewood St./ Mission Bay Dr. *	Minor Street Stop	349.3	F	(1)	F
6	Mission Bay Dr. / N. Mission Bay Dr.	Signalized	9.7	A	8.1	A

Notes:

Delay = seconds/ vehicle

LOS = Level of Service

(1) = Delay exceeds reliable delay values and not reported in Synchro.

*= Minor Street Right Turn Movement

7.0 OTHER PROJECTS

Other projects surrounding the site were reviewed to determine whether to add traffic from the reasonably foreseeable projects which would be expected to be open and occupied by the project's expected opening day in 2019. All other projects identified had little or no influence on the immediate study area and would therefore cause little or no increase in traffic. **Table 7-1** lists "other projects" considered. As a result, an ambient growth rate was applied based on a straight line growth estimate generated by comparing future model predicted volumes on Mission Bay Drive derived from SANDAG's Transportation Forecast Information Center (TFIC) Series 12 traffic model to existing volumes on the same segments.

The growth rate was determined to be approximately 1% per year increase in traffic volumes as shown in **Table 7-2**. As discussed previously, the expected opening day of the proposed project is in 2019, therefore a total growth of 4% is expected on the studied street segments between 2015 and 2019. **Figure 7-1** shows the average daily traffic volumes utilizing the ambient growth rate of 4% as discussed above.

TABLE 7-1

Other Projects List

Project	Location	ADT
Santa Barbara Place Residences	East of Mission Boulevard, North of West Mission Bay Drive, and south of El Carmel Place.	72
Mission Beach Residences	East of Mission Boulevard, North of West Mission Bay Drive, and south of El Carmel Place.	318

TABLE 7-2

Growth Rate Calculation

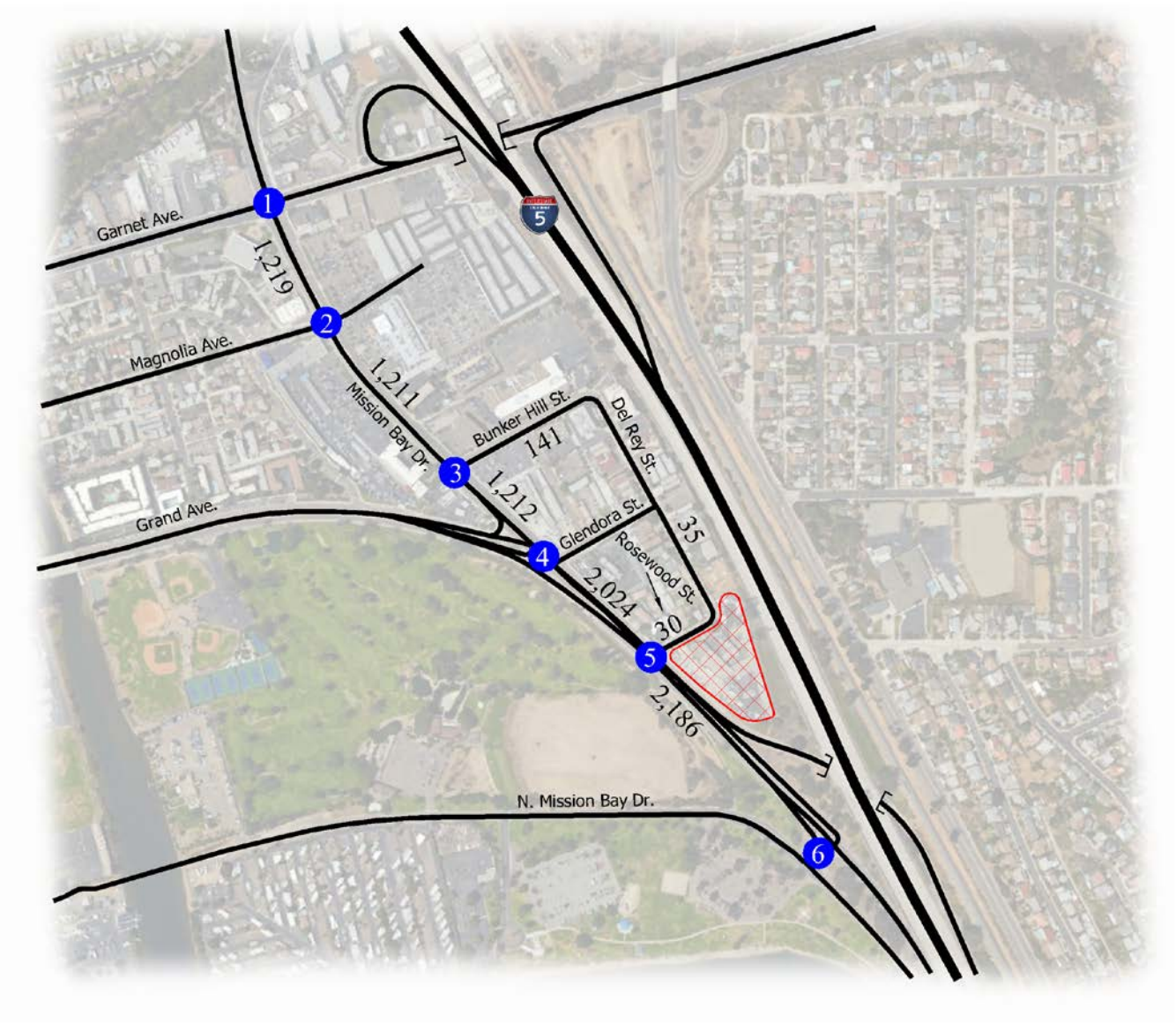
Road	Street Segment	Existing (2015) ADT [1]	Year 2035 ADT[2]	% Growth	% Growth Per Year
Mission Bay Drive	Garnet Ave. to Magnolia Ave.	30,487	41,400	35.80%	1.79%
	Magnolia Ave. to Bunker Hill St.	30,265	37,300	23.24%	1.16%
	Bunker Hill St. to Grand Ave.	30,294	37,900	25.11%	1.26%
	Grand Ave. to Rosewood St.	50,602	57,200	13.04%	0.65%
	Rosewood St. to I-5 Ramps	54,658	57,200	4.65%	0.23%
			Average	20.37%	1.02%
			Assumed	20%	1%

Legend

ADT= Average Daily Traffic

1= Year 2015 ADT taken from existing counts conducted on August 5, 2015

2= Year 2035 ADT taken from *SANDAG Transportation Forecast Information Center, Series 12*



Legend

= Project Location

= Study Area Boundary

= Study Intersection

XX,XXX = Average Daily Traffic Volumes

N
NO SCALE

FIGURE 7-1

Other Projects Average Daily Traffic

8.0 NEAR TERM WITHOUT PROJECT

As previously mentioned, a growth rate of 4% from 2015 to the project opening day in 2019 was utilized to estimate traffic volumes at the time of Project occupancy. The resulting conditions at the Project's opening day (Year 2019) were then evaluated. A summary of the results for street segment and intersections follows.

8.1 STREET SEGMENTS

Figure 8-1 shows the average daily traffic volumes in the Near Term without Project condition.

Table 8-1 shows that all study segments are projected to operate at level of service D or better with the following exceptions:

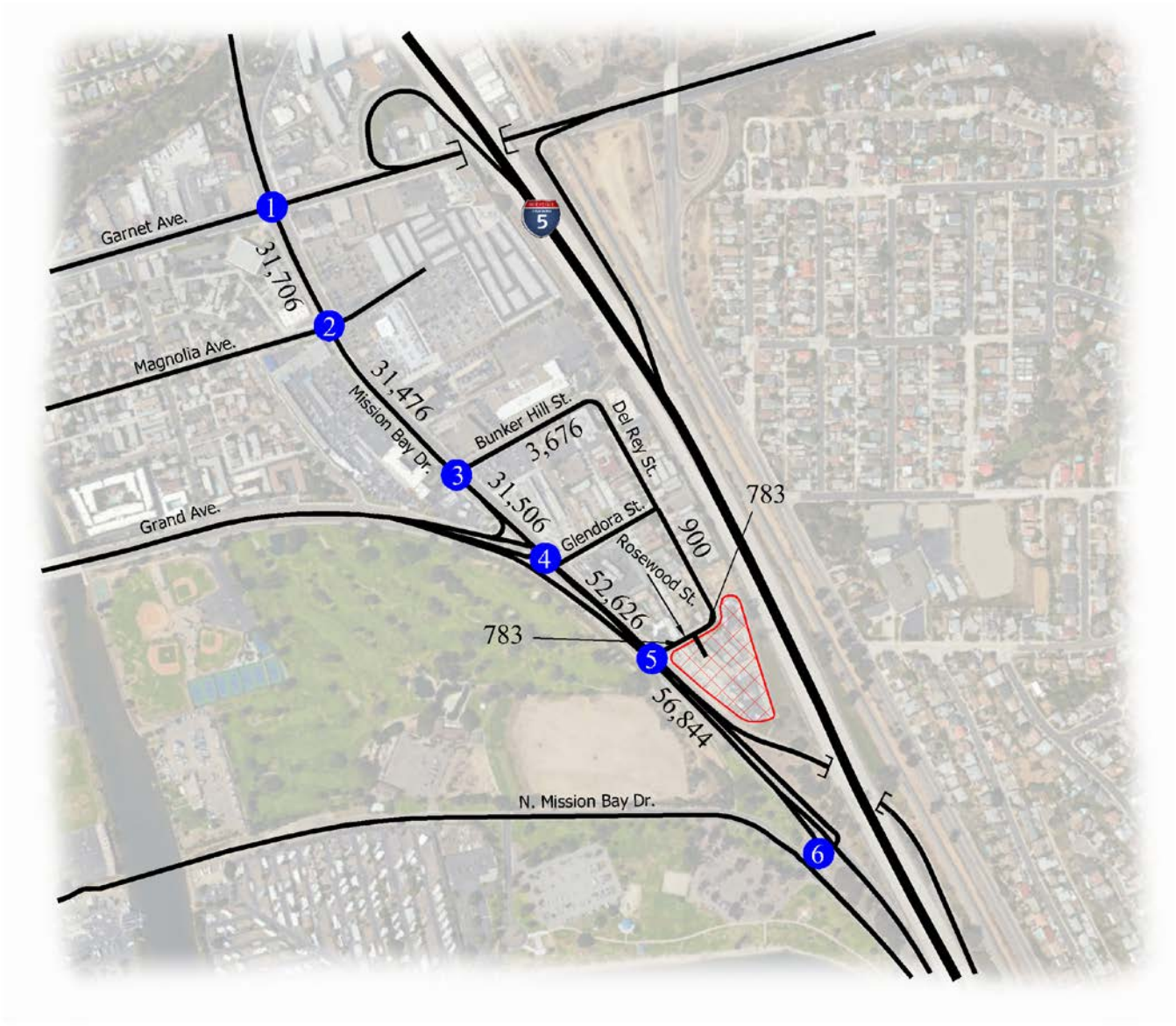
- Mission Bay Drive between Grand Avenue and Rosewood Street
- Mission Bay Drive between Rosewood Street and N. Mission Bay Drive

8.2 INTERSECTIONS

Figure 8-2 shows Near Term without Project AM/PM peak hour intersection volumes. **Table 8-2** shows all intersections are projected to operate at level of service D or better in the AM and PM peak hour with the following exceptions:

- Mission Bay Drive at Garnet Avenue in the PM Peak Hour, LOS E
- Mission Bay Drive at Magnolia Avenue in the AM Peak Hour, LOS E
- Mission Bay Drive at Rosewood Street in the AM Peak Hour, LOS F
- Mission Bay Drive at Rosewood street in the PM Peak Hour, LOS F

Near Term without Project Synchro worksheets can be found in **Appendix E**.



Legend

= Project Location

= Study Area Boundary

= Study Intersection

XX,XXX = Average Daily Traffic Volumes

N
NO SCALE

FIGURE 8-1

Near Term without Project Average Daily Traffic

TABLE 8-1

Near Term Without Project Street Segment Levels of Service

Road	Segment	Standard	# of Ln.	Class.	Cap.	Volume	V/C	LOS
Mission Bay Dr.	Garnet Ave. to Magnolia Ave.	SD	4	4-M	40,000	31,706	0.79	D
	Magnolia Ave. to Bunker Hill St.	SD	4	4-M	40,000	31,476	0.79	D
	Bunker Hill St. to Grand Ave.	SD	4	4-M	40,000	31,506	0.79	D
	Grand Ave. to Rosewood St.	SD	4	4-M	40,000	52,626	1.32	F
	Rosewood St. to N. Mission Bay Dr.	SD	4	4-M	40,000	56,844	1.42	F
Bunker Hill St.	Mission Bay Dr. to Del Rey St.	SD	2	2-Cc	8,000	3,676	0.46	C
Del Rey St.	Glendora St. to Rosewood St.	SD	2	Local	2,200	900	UC	
Rosewood St.	West of Project Driveway	SD	2	Local	2,200	783	UC	
	East of Project Driveway	SD	2	Local	2,200	783	UC	

Legend:

Class. = Functional Class

Cap. = Capacity

LOS = Level of Service

2-Cc = 2 Lane Collector (w/ commercial-industrial property

4-M = 4 Lane Major Arterial

UC = Under Capacity

OC = Over Capacity

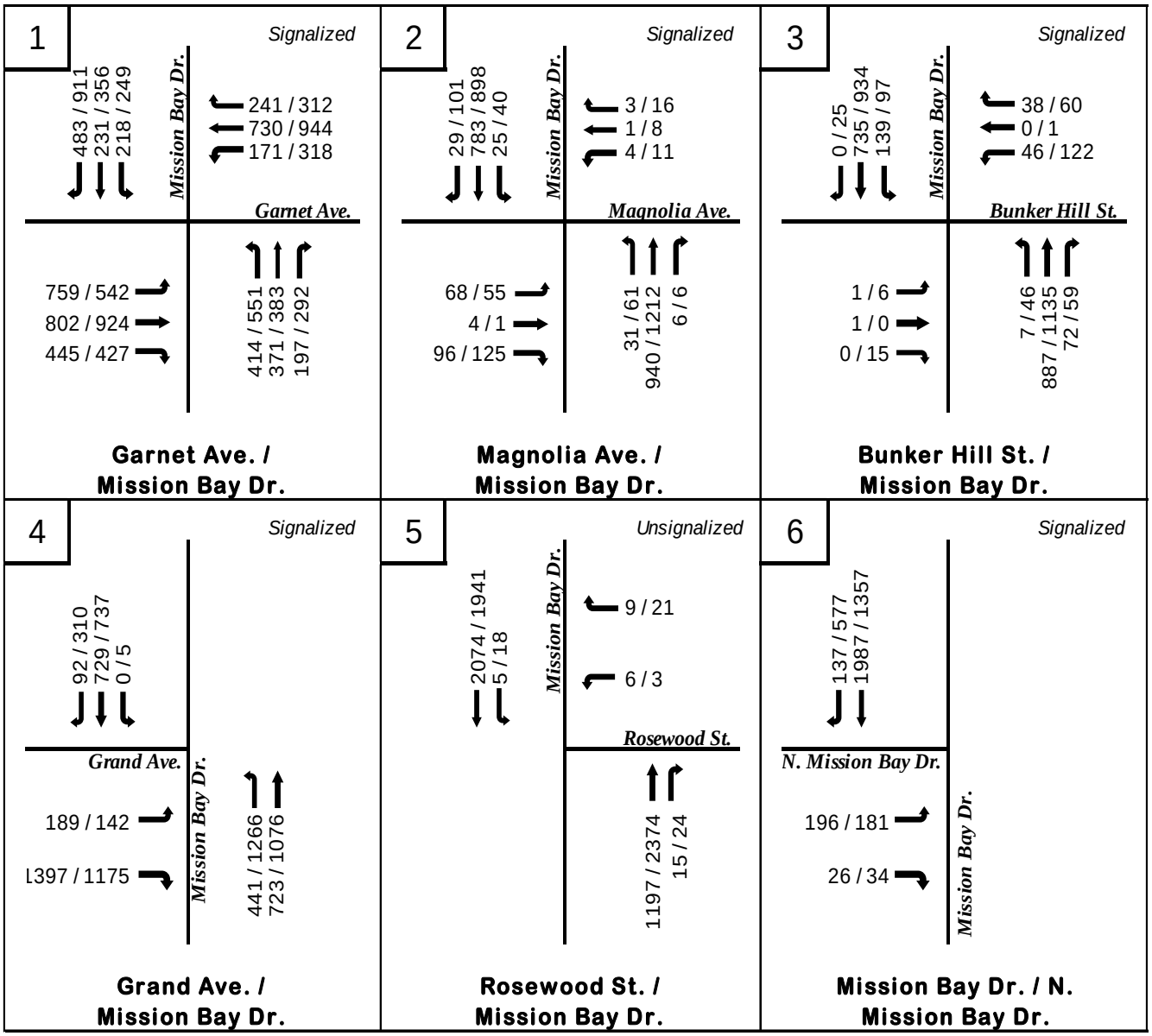


FIGURE 8-2

Near Term Without Project AM/PM Peak Hour Traffic

TABLE 8-2

Near Term without Project Intersection Levels of Service

Number	Intersection	Control	AM Peak Hour		PM Peak Hour	
			Delay	LOS	Delay	LOS
1	Garnet Ave. / Mission Bay Dr.	Signalized	54.5	D	70.6	E
2	Magnolia Ave. / Mission Bay Dr.	Signalized	77.1	E	45.3	D
3	Bunker Hill St. / Mission Bay Dr.	Signalized	27.9	C	50.3	D
4	Grand Ave. / Mission Bay Dr.	Signalized	16.9	B	35.3	D
5	Rosewood St./ Mission Bay Dr. *	Minor Street Stop	87.2	F	871.4	F
6	Mission Bay Dr. / N. Mission Bay Dr.	Signalized	10.0	B	8.0	A

Notes:

Delay = seconds / vehicle

LOS = Level of Service

*= Minor Street Right Turn Movement

9.0 NEAR TERM WITH PROJECT

The Project traffic was added to Near Term Without Project traffic to determine project impacts. The summary of the analysis results for street segments and intersections are listed below.

9.1 STREET SEGMENTS

Figure 9-1 shows the average daily traffic volumes in the Near Term with Project condition.

Table 9-1 shows that all study segments are projected to operate at level of service D or better when Project traffic is added with the following exceptions:

- Mission Bay Drive between Garnet Avenue and Rosewood Street
- Mission Bay Drive between Rosewood Street and N. Mission Bay Drive
- Rosewood Street west of the Project Driveway (overcapacity)

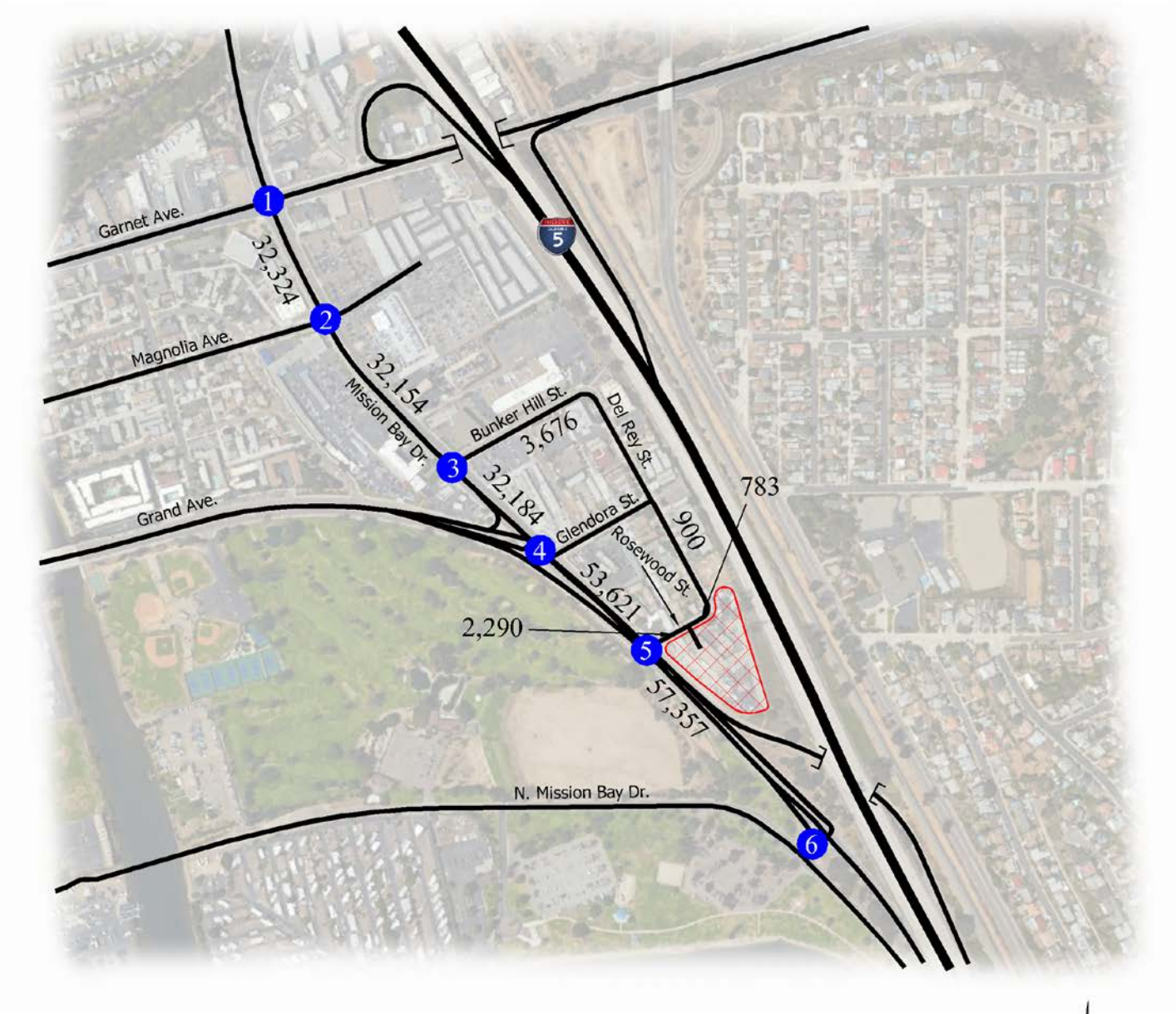
9.2 INTERSECTIONS

Figure 9-2 shows Near Term with Project AM/PM peak hour intersection volumes

Table 9-2 shows all intersections are projected to operate at level of service D or better in the AM and PM peak hour with the following exceptions:

- Mission Bay Drive at Garnet Avenue in the PM Peak Hour, LOS E
- Mission Bay Drive at Magnolia Avenue in the AM Peak Hour, LOS E
- Mission Bay Drive at Rosewood Street in the AM Peak Hour, LOS F
- Mission Bay Drive at Rosewood street in the PM Peak Hour, LOS F

Near Term with Project Synchro worksheets can be found in **Appendix F**



Legend

= Project Location

= Study Area Boundary

= Study Intersection

XX,XXX = Average Daily Traffic Volumes

N
NO SCALE

FIGURE 9-1

Near Term with Project Average Daily Traffic

TABLE 9-1

Near Term with Project Street Segment Levels of Service

Road	Segment	Standard	# of Ln.	Class.	Cap.	Volume	V/C	LOS
Mission Bay Dr.	Garnet Ave. to Magnolia Ave.	SD	4	4-M	40,000	32,324	0.81	D
	Magnolia Ave. to Bunker Hill St.	SD	4	4-M	40,000	32,154	0.80	D
	Bunker Hill St. to Grand Ave.	SD	4	4-M	40,000	32,184	0.80	D
	Grand Ave. to Rosewood St.	SD	4	4-M	40,000	53,621	1.34	F
	Rosewood St. to N. Mission Bay Dr.	SD	4	4-M	40,000	57,357	1.43	F
Bunker Hill St.	Mission Bay Dr. to Del Rey St.	SD	2	2-Cc	8,000	3,676	0.46	C
Del Rey St.	Glendora St. to Rosewood St.	SD	2	Local	2,200	900	UC	
Rosewood St.	West of Project Driveway	SD	2	Local	2,200	2,290	OC	
	East of Project Driveway	SD	2	Local	2,200	783	UC	

Legend:

Class. = Functional Class

Cap. = Capacity

LOS = Level of Service

2-Cc = 2 Lane Collector (w/ commercial-industrial property

4-M = 4 Lane Major Arterial

UC = Under Capacity

OC = Over Capacity

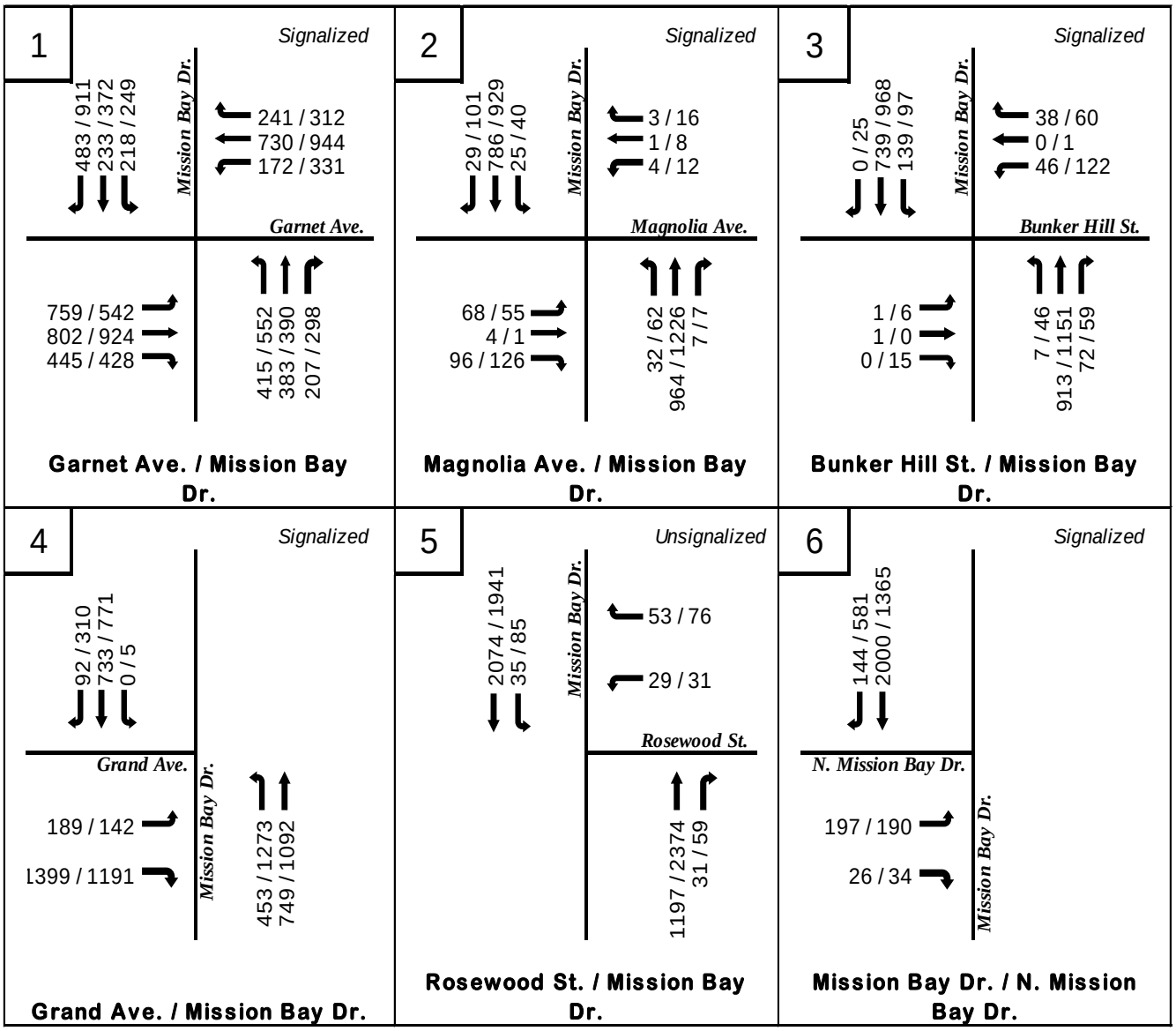


FIGURE 9-2

Near Term With Project AM/PM Peak Hour Traffic

TABLE 9-2

Near Term with Project Intersection Levels of Service

Number	Intersection	Control	AM Peak Hour		PM Peak Hour	
			Delay	LOS	Delay	LOS
1	Garnet Ave. / Mission Bay Dr.	Signalized	54.5	D	71.3	E
2	Magnolia Ave. / Mission Bay Dr.	Signalized	77.3	E	46.5	D
3	Bunker Hill St. / Mission Bay Dr.	Signalized	30.4	C	54.6	D
4	Grand Ave. / Mission Bay Dr.	Signalized	17	B	36.7	D
5	Rosewood St./ Mission Bay Dr. *	Minor Street Stop	478.3	F	(1)	F
6	Mission Bay Dr. / N. Mission Bay Dr.	Signalized	10.1	B	8.3	A

Notes:

Delay = seconds / vehicle

LOS = Level of Service

(1) = Delay exceeds reliable delay values and not reported in Synchro.

*= Minor Street Right Turn Movement

10.0 HORIZON YEAR 2035 WITHOUT PROJECT

A SANDAG, Series 12, Year 2035 forecast was utilized to estimate horizon year conditions. This forecast is included in **Appendix A**. It was determined that the Select Zone Forecast Year 2035 volumes were predicted to be lower than existing. Therefore, volumes from SANDAG's Transportation Forecast Information Center (TFIC), Series 12 Year 2035 was used. For street segments not accounted for in the TFIC, a growth factor of 1% per year for 20 years (20% growth) was used, as previously discussed in Chapter 7.0. Intersections also used this same growth factor to reflect future turn movements. No lane alignment changes or intersection configurations modifications were assumed in the study area for future conditions. The summary of the analysis results for street segments and intersections are listed below.

10.1 STREET SEGMENTS

Figure 10-1 shows the average daily traffic volumes in the Year 2035 without Project condition.

Table 10-1 shows that all study segments are projected to operate at level of service D or better when Project traffic is added with the following exceptions:

- Mission Bay Drive between Garnet Avenue and Magnolia Avenue
- Mission Bay Drive between Magnolia Avenue and Bunker Hill Street
- Mission Bay Drive between Bunker Hills Street and Grand Avenue
- Mission Bay Drive between Grand Avenue and Rosewood Street
- Mission Bay Drive between Rosewood Street and N. Mission Bay Drive

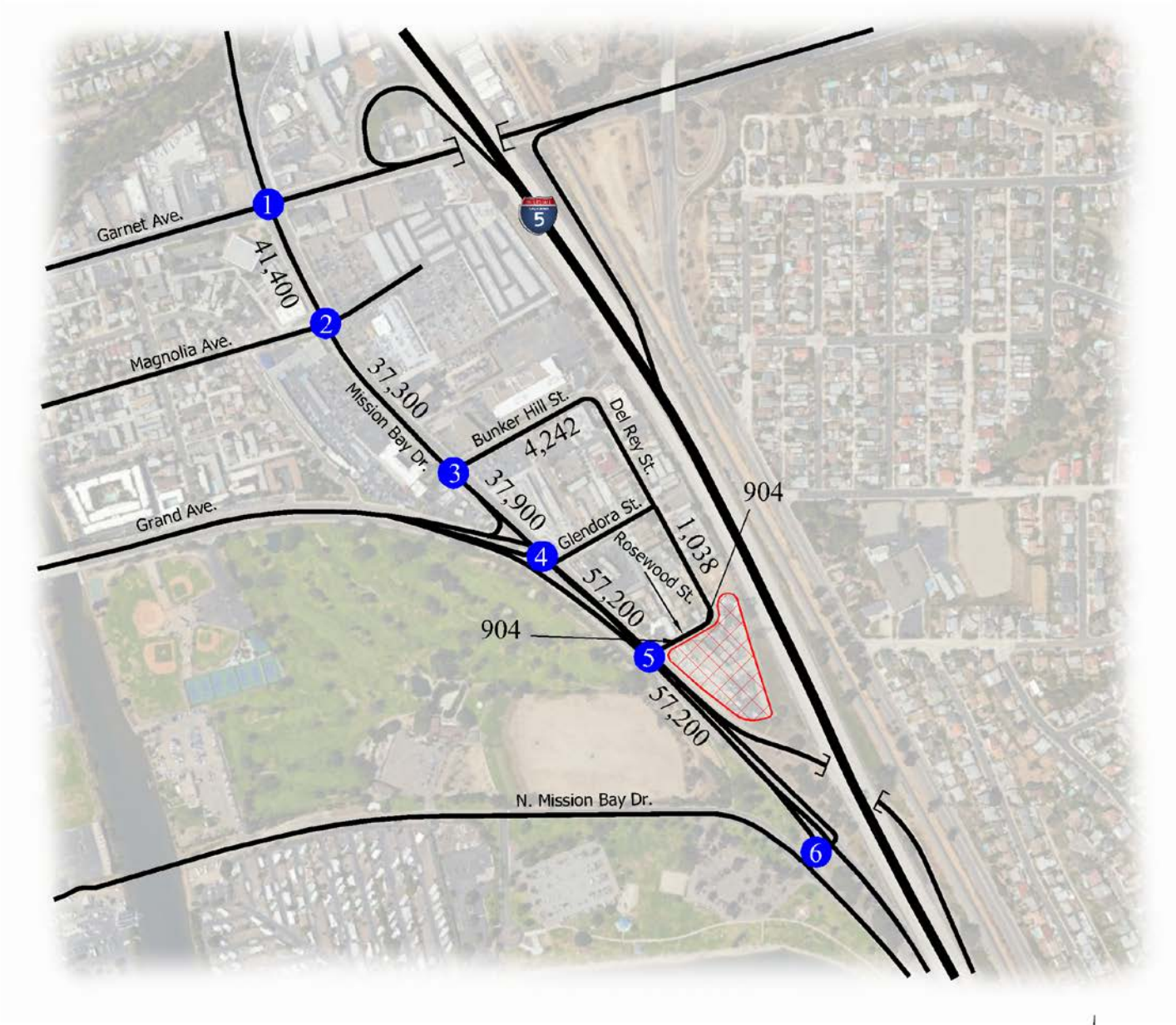
10.2 INTERSECTIONS

Figure 10-2 shows Year 2035 without Project AM/PM peak hour intersection volumes

Table 10-2 shows the expected levels of service of the AM and PM peak hour for the studied intersections. As shown, the following intersections are expected to have deficient levels of service:

- Mission Bay Drive at Garnet Avenue in the AM Peak Hour, LOS E
- Mission Bay Drive at Garnet Avenue in the PM Peak Hour, LOS F
- Mission Bay Drive at Magnolia Avenue in the AM Peak Hour, LOS F
- Mission Bay Drive at Magnolia Avenue in the PM Peak Hour, LOS F
- Mission Bay Drive at Bunker Hill Street in the PM Peak Hour, LOS F
- Mission Bay Drive at Rosewood Street in the AM Peak Hour, LOS F
- Mission Bay Drive at Rosewood street in the PM Peak Hour, LOS F

Year 2035 without Project Synchro worksheets can be found in **Appendix G**.



Legend

= Project Location

= Study Area Boundary

= Study Intersection

XX,XXX = Average Daily Traffic Volumes

N
NO SCALE

FIGURE 10-1

Horizon Year 2035 without Project Average Daily Traffic

TABLE 10-1

Horizon Year 2035 without Project Street Segment Levels of Service

Road	Segment	Standard	# of Ln.	Class.	Cap.	Volume	V/C	LOS
Mission Bay Dr.	Garnet Ave. to Magnolia Ave.	SD	4	4-M	40,000	41,400	1.04	F
	Magnolia Ave. to Bunker Hill St.	SD	4	4-M	40,000	37,300	0.93	E
	Bunker Hill St. to Grand Ave.	SD	4	4-M	40,000	37,900	0.95	E
	Grand Ave. to Rosewood St.	SD	4	4-M	40,000	57,200	1.43	F
	Rosewood St. to N. Mission Bay Dr.	SD	4	4-M	40,000	57,200	1.43	F
Bunker Hill St.	Mission Bay Dr. to Del Rey St.	SD	2	2-Cc	8,000	4,242	0.53	C
Del Rey St.	Glendora St. to Rosewood St.	SD	2	Local	2,200	1,038	UC	
Rosewood St.	West of Project Driveway	SD	2	Local	2,200	904	UC	
	East of Project Driveway	SD	2	Local	2,200	904	UC	

Legend:

Class. = Functional Class

Cap. = Capacity

LOS = Level of Service

2-Cc = 2 Lane Collector (w/ commercial-industrial property

4-M = 4 Lane Major Arterial

UC = Under Capacity

OC = Over Capacity

Notes:

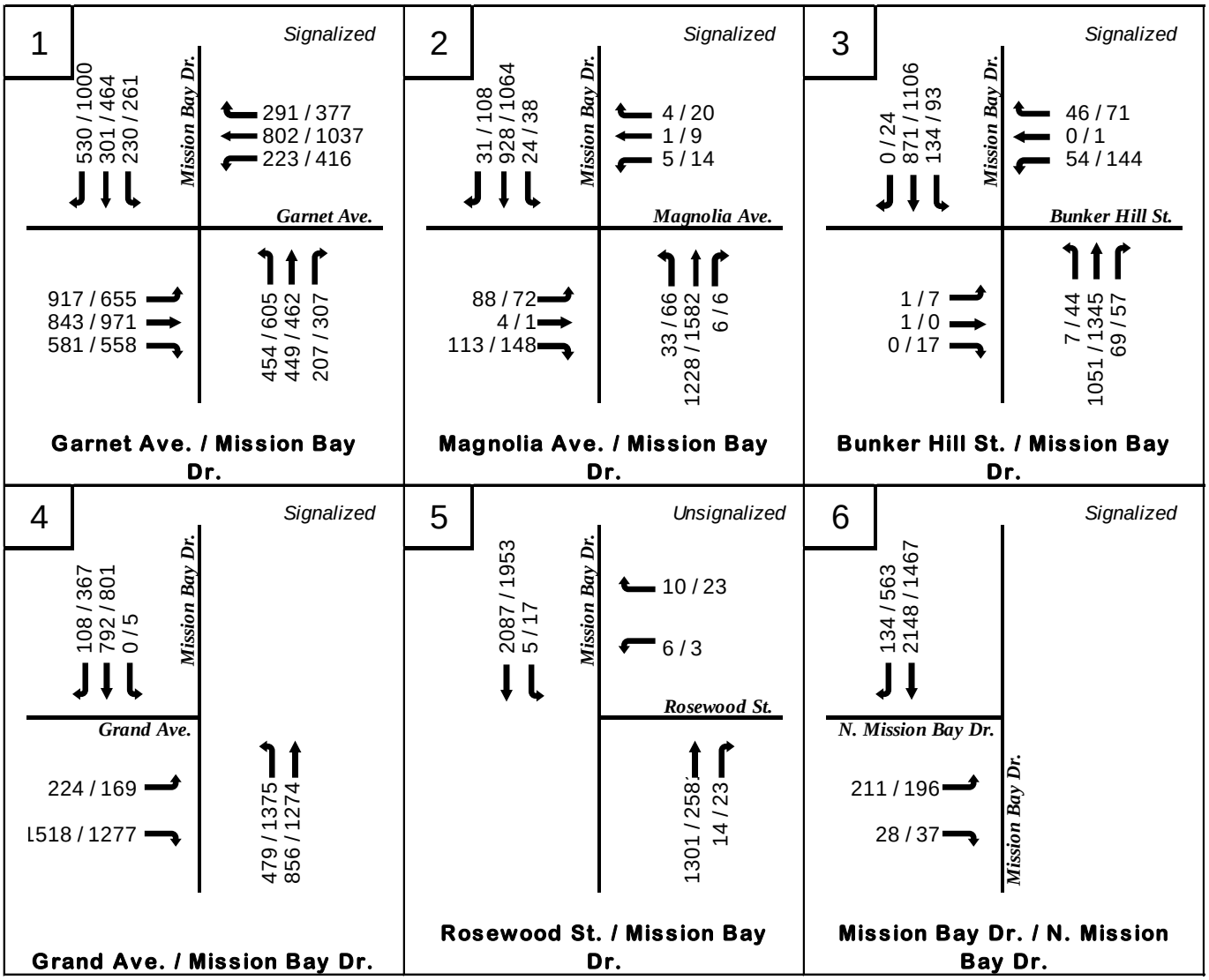


FIGURE 10-2

Horizon Year 2035 without Project AM/PM Peak Hour Traffic Volumes

TABLE 10-2

Horizon Year 2035 without Project Intersection Levels of Service

Number	Intersection	Control	AM Peak Hour		PM Peak Hour	
			Delay	LOS	Delay	LOS
1	Garnet Ave. / Mission Bay Dr.	Signalized	77.5	E	101.2	F
2	Magnolia Ave. / Mission Bay Dr.	Signalized	133.3	F	93.1	F
3	Bunker Hill St. / Mission Bay Dr.	Signalized	51.3	D	81	F
4	Grand Ave. / Mission Bay Dr.	Signalized	39.6	D	32.1	C
5	Rosewood St./ Mission Bay Dr.*	Minor Street Stop	110.6	F	(1)	F
6	Mission Bay Dr. / N. Mission Bay Dr.	Signalized	13.6	B	8.7	A

Notes:

Delay= seconds / vehicle

LOS = Level of Service

(1)= Delay exceeds reliable delay values and not reported in Synchro

*= Minor Street Right Turn Movement

11.0 HORIZON YEAR 2035 WITH PROJECT

As discussed in Section 10.0, horizon year traffic volumes were estimated using a SANDAG Series 12, Year 2035 traffic model. The Project only volumes determined as discussed in Section 3.0 were then added to the volumes discussed in Section 10.0 to determine Year 2035 with Project volumes. The summary of the analysis results for street segments and intersections are listed below.

11.1 STREET SEGMENTS

Figure 11-1 shows the average daily traffic volumes in the Year 2035 with Project condition.

Table 11-1 shows the expected levels of service of the studied street segments. As shown, the following segments are expected to have deficient levels of service:

- Mission Bay Drive between Garnet Avenue and Magnolia Avenue
- Mission Bay Drive between Magnolia Avenue and Bunker Hill Street
- Mission Bay Drive between Bunker Hills Street and Grand Avenue
- Mission Bay Drive between Grand Avenue and Rosewood Street
- Mission Bay Drive between Rosewood Street and N. Mission Bay Drive
- Rosewood Street west of the Project Driveway (overcapacity)

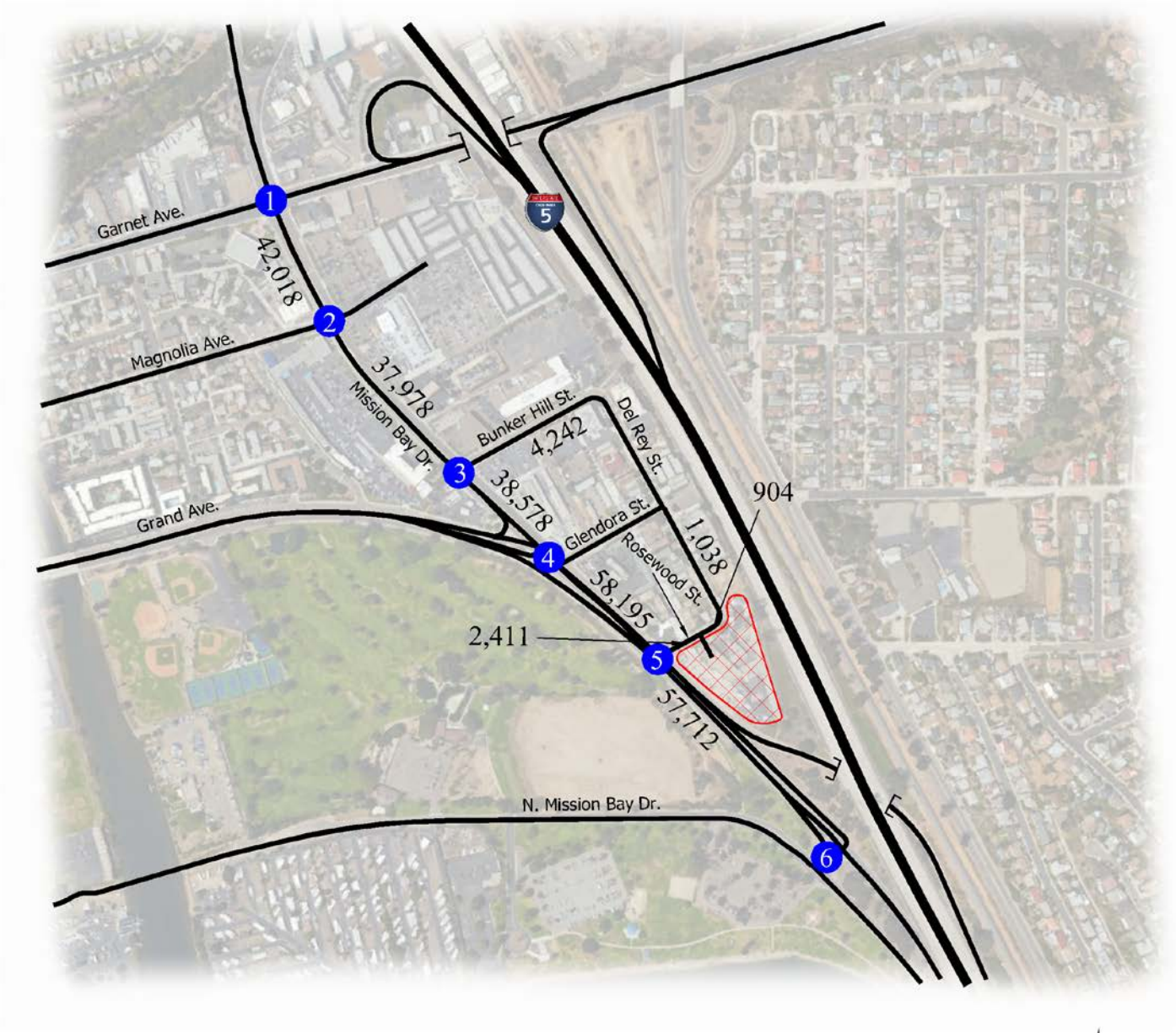
11.2 INTERSECTIONS

Figure 11-2 shows Year 2035 with Project AM/PM peak hour intersection volumes

Table 11-2 shows the expected levels of service of the AM and PM peak hour for the studied intersections. As shown, the following intersections are expected to have deficient levels of service:

- Mission Bay Drive at Garnet Avenue in the AM Peak Hour, LOS E
- Mission Bay Drive at Garnet Avenue in the PM Peak Hour, LOS F
- Mission Bay Drive at Magnolia Avenue in the AM Peak Hour, LOS F
- Mission Bay Drive at Magnolia Avenue in the PM Peak Hour, LOS F
- Mission Bay Drive at Bunker Hill Street in the AM Peak Hour, LOS E
- Mission Bay Drive at Bunker Hill Street in the PM Peak Hour, LOS F
- Mission Bay Drive at Rosewood Street in the AM Peak Hour, LOS F
- Mission Bay Drive at Rosewood street in the PM Peak Hour, LOS F

Year 2035 with Project Synchro worksheets can be found in **Appendix H**.



Legend

= Project Location

= Study Area Boundary

= Study Intersection

XX,XXX = Average Daily Traffic Volumes

N
NO SCALE

FIGURE 11-1

Horizon Year 2035 With Project Average Daily Traffic

TABLE 11-1

Horizon Year 2035 With Project Street Segment Levels of Service

Road	Segment	Standard	# of Ln.	Class.	Cap.	Volume	V/C	LOS
Mission Bay Dr.	Garnet Ave. to Magnolia Ave.	SD	4	4-M	40,000	42,018	1.05	F
	Magnolia Ave. to Bunker Hill St.	SD	4	4-M	40,000	37,978	0.95	E
	Bunker Hill St. to Grand Ave.	SD	4	4-M	40,000	38,578	0.96	E
	Grand Ave. to Rosewood St.	SD	4	4-M	40,000	58,195	1.45	F
	Rosewood St. to N. Mission Bay Dr.	SD	4	4-M	40,000	57,712	1.44	F
Bunker Hill St.	Mission Bay Dr. to Del Rey St.	SD	2	2-Cc	8,000	4,242	0.53	C
Del Rey St.	Glendora St. to Rosewood St.	SD	2	Local	2,200	1,038	UC	
Rosewood St.	West of Project Driveway	SD	2	Local	2,200	2,411	OC	
	East of Project Driveway	SD	2	Local	2,200	904	UC	

Legend:

Class. = Functional Class

Cap. = Capacity

LOS = Level of Service

2-Cc = 2 Lane Collector (w/ commercial-industrial property

4-M = 4 Lane Major Arterial

UC = Under Capacity

OC = Over Capacity

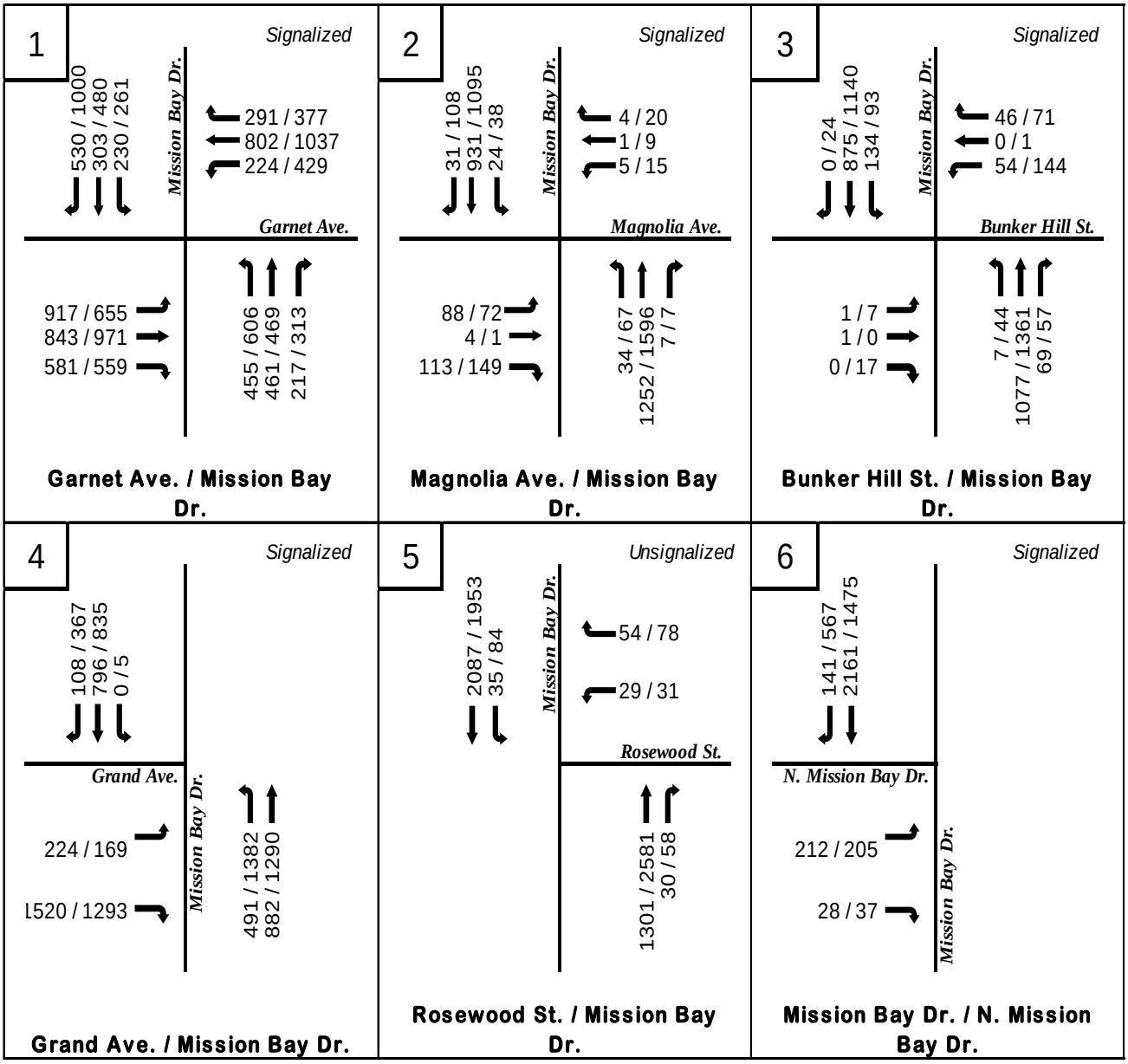


FIGURE 11-2

Horizon Year 2035 With Project AM/PM Peak Hour Traffic

TABLE 11-2

Horizon Year 2035 With Project Intersection Levels of Service

Number	Intersection	Control	AM Peak Hour		PM Peak Hour	
			Delay	LOS	Delay	LOS
1	Garnet Ave. / Mission Bay Dr.	Signalized	78.4	E	103.1	F
2	Magnolia Ave. / Mission Bay Dr.	Signalized	140.4	F	95.4	F
3	Bunker Hill St. / Mission Bay Dr.	Signalized	55.1	E	83.4	F
4	Grand Ave. / Mission Bay Dr.	Signalized	39.6	D	32.9	C
5	Rosewood St./ Mission Bay Dr.*	Minor Street Stop	699.4	F	(1)	F
6	Mission Bay Dr. / N. Mission Bay Dr.	Signalized	13.6	B	11.8	B

Notes:

Delay = seconds/ vehicle

LOS = Level of Service

(1) = Delay exceeds reliable delay values and not reported in Synchro.

*= Minor Street Right Turn Movement

12.0 ONSITE CIRCULATION AND ACCESS

As discussed in previous sections, primary access to the Project site would be off of Rosewood Street through the minor-street stop controlled intersection of Mission Bay Drive and Rosewood Street. This intersection is currently unsignalized and operates at LOS F in both the AM and PM peak hour. However, signal warrants were prepared at this intersection as shown in **Appendix J**. Warrants 3, 7 and 8 are met and it is recommended that a signal be installed to mitigate direct and cumulative traffic impacts.

Once on Rosewood Street, access to the project will be approximately 190 feet east of Mission Bay Drive. This driveway is gated but will remain opened during normal business hours and will provide access to the street level parking garage. Because this gate will be open during normal business hours, no queuing into the public street is expected at the project driveway. A second gate is located inside the parking garage. This gate, as well as secure fencing, will separate the residential and commercial parking areas. A ramp will lead to an underground parking garage for additional residential parking. **Figure 12-1** shows the proposed Project access, parking, and on-site circulation. Please refer to Chapter 13.0 for further discussion on parking.

As shown in the analysis, Rosewood Street west of the Project Driveway operates under capacity. With the installation of a traffic signal at the intersection of Mission Bay Drive and Rosewood Street, it is recommended that a centerline stripe be added to improve Rosewood Street between Mission Bay Drive and the Project access to a two lane collector road.

See the following page for the Site Access and Parking.

FIGURE 12-1

Site Access and Parking

13.0 PARKING

As discussed in Chapter 12.0, parking will be provided via an underground and street-level parking located beneath the residential apartments. Please refer to **Figure 12-1** parking layout.

Parking calculations are based on Section 142.0525 of the City of San Diego Municipal Code as well as Government Code Section 65915(p) that provides density bonus parking requirements. See **Appendix I** for an excerpt of the Government Code. As shown in **Table 13-1**, the minimum required parking spaces for this project would be 58 spaces for office/commercial, and 250 for residential for a total of 308 parking spaces. The majority of proposed parking will be provided within a parking garage located below the residential units. Within that garage, the project will provide 234 below grade parking spaces and 148 stalls at grade level for a total of 382 parking spaces. It should be noted that 64 of the sub-grade parking spaces will be designated tandem as shown in **Figure 12-1**. As shown, parking for the townhome units will be provided in an at-grade garages beneath the townhome units and accessed via a separate driveway from Rosewood Street. Therefore, the project would provide an excess of 74 parking spaces on-site. The project will also provide 18 motorcycle spaces and 74 bicycle spaces.

TABLE 13-1

Parking Calculations

Government Code Section 65915 (p) Density Bonus Parking Requirement and San Diego Municipal Code Section 142.0740(f)(1)	
Unit Type	Minimum Spaces
Studio/1 Bdrm.	1
2 Bdrm./3 Bdrm.	2
4+ Bdrm.	2.5

Footnote:
~ Section 65915(p) subsection (4) along with San Diego Municipal Code section 143.0740(f)(3) states that "For purposes of this subdivision, a development may provide on-site parking through tandem parking or uncovered parking, but not through on-street parking."

Commercial Parking Per Table 142-05E			
Zoning	Outside a Transit Area	Within a Transit Area	Max. Permitted
CC-4-2	2.5	2.1	6.5

Eating & Drinking Establishment Per Table 142-05F			
Zoning	Outside a Transit Area	Within a Transit Area	Max. Permitted
CC-4-2/Coastal Overlay Zone	5.0	4.3	25

Table 142-05C	
Unit Size	Basic
Studio up to 400 sq.ft.	1.25
1 bdrm or Studio over 400 sq.ft.	1.5
2 bdrms	2
3-4 bdrms	2.25
5 bdrms	2.25

Minimum Required Parking									
Unit Types	**No. Units**	**Per Unit Parking Requirement [1]**	**Spaces Required [1]**	**Per Unit Parking Requirement [2]**	**Spaces Required [2]**	**Motorcycle Gen. Rate**	**Motorcycle Spaces Required**	**Bicycle Gen. Rate**	**Bicycle Spaces Required**
Studio	3	1	3.00 [1]	1.25	3.75 [2]	0.1	0.3	0.4	1.2
1 Bdrm	83	1	83.00 [1]	1.5	124.5 [2]	0.1	8.3	0.4	33.2
1 Bdrm Aff.	8	1	8.00 [1]	1	8 [2]				
2 Bdrm	61	2	122.00 [1]	2	122 [2]	0.1	6.1	0.5	30.5
2 Bdrm Aff.	5	2	10.00 [1]	2	10 [2]				
3 Bdrm	8	2	16.00 [1]	2.25	18 [2]	0.1	0.8	0.5	4
3 Bdrm Aff.	1	2	2.00 [1]	2	2 [2]				
3 Bdrm Townhome	3	2	6.00 [1]	2.25	6.75 [2]	0.1	0.3	0.5	1.5
Retail/Food	7500	5	37.50 [3]	5.0	37.50 [3]	2%	0.75	5% of Auto Spaces	1.875 [5]
Office	8000	2.5	20.00 [4]	2.5	20.00 [4]	2%	0.40	5% of Auto Spaces	1 [5]
Totals	**172**		**307.50**		**352.5**		**16.95**		**73.28**

Footnotes:

1 - Per Government Code Section 65915(p) and SDMC Section 142.0740(f)(1)
2 - City Table 142-05C derived parking - Note: Applicable Tandem Parking count identified in SDMC 143.0740(f)(3) applies and is counted here (64 spaces).
3 - Per City Table 142-05E
4 - Per City Table 142-05F
5 - Includes short term bicycle parking per SDMC section 142.0530(e)

14.0 OTHER MODES OF TRANSPORTATION

14.1 PEDESTRIAN

Pedestrian access to the site is provided via non-contiguous sidewalks on Mission Bay Drive (on the project frontage) and Rosewood Street (on the project frontage). As shown in **Figure 12-1**, pedestrians can enter the site at various stairways along Mission Bay Drive as well as sidewalks at the main driveway on Rosewood Street. In addition, a plaza will be located at the north-western corner of the project site to provide pedestrian access to the site. Pedestrian pathways front the commercial spaces along Mission Bay Drive. Walkways on the third and fourth floor will connect pedestrian pathways on the upper levels of the complex. A new pedestrian crossing to Mission Bay Park would be provided when the project installs the proposed signal at Rosewood. This crossing will also help facilitate access to MTS bus route 30 along Grand Avenue via sidewalks on the west side of Mission Bay Drive.

14.2 BICYCLE

Figure 14-1 shows the existing bikeways within Pacific Beach. A Class II bike lane already exists on the west side (southbound) of Mission Bay Drive south of Grand Avenue and the Pacific Beach Community Plan calls for bike lanes on the east side (northbound) of Mission Bay Drive. **Figure 14-2** shows the future bikeways according the Pacific Beach Community Plan. As discussed in Chapter 13.0, the proposed project will also provide 74 bicycle spaces. In addition, as part of the TDM Plan, newsletters and bulletin boards will encourage alternative modes of transportation such as bicycling.

14.3 TRANSIT

A new trolley station will be constructed at the southeast corner of the Balboa Avenue/ I-5 interchange as part of the Mid-Coast Trolley Line. This new trolley station is within approximately 2,000 feet of the

Project. According to SANDAG, "Primary construction of the project is expected to begin in the second half of 2016, with service anticipated to begin in 2021."

In addition, MTS bus route 27 services Garnet Avenue approximately every 30 minutes with a westbound stop approximately 280 feet east of Mission Bay Drive and an eastbound stop approximately 580 feet east of Mission Bay Drive as shown in **Figure 14-3**. Route 30 services Grand Avenue approximately every 25 minutes with a westbound stop approximately 50 feet northwest of Mission Bay Drive and an eastbound stop approximately 600 feet northwest of Mission Bay Drive. Route 30 is within an approximate 1,000 foot radius of the project and Route 27 is within an approximate 2,000 foot radius of the project.

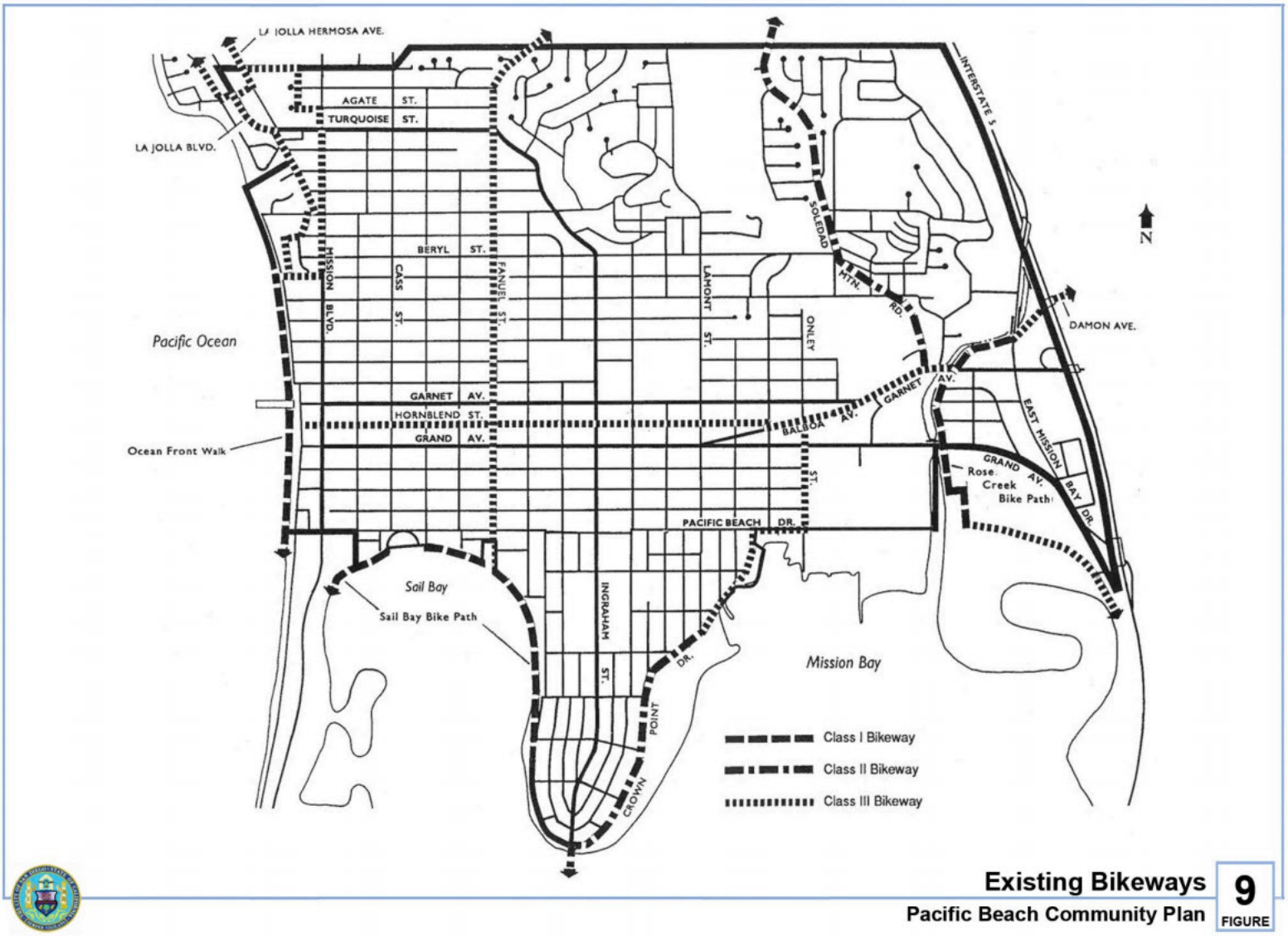


FIGURE 14-1

Existing Bikeways

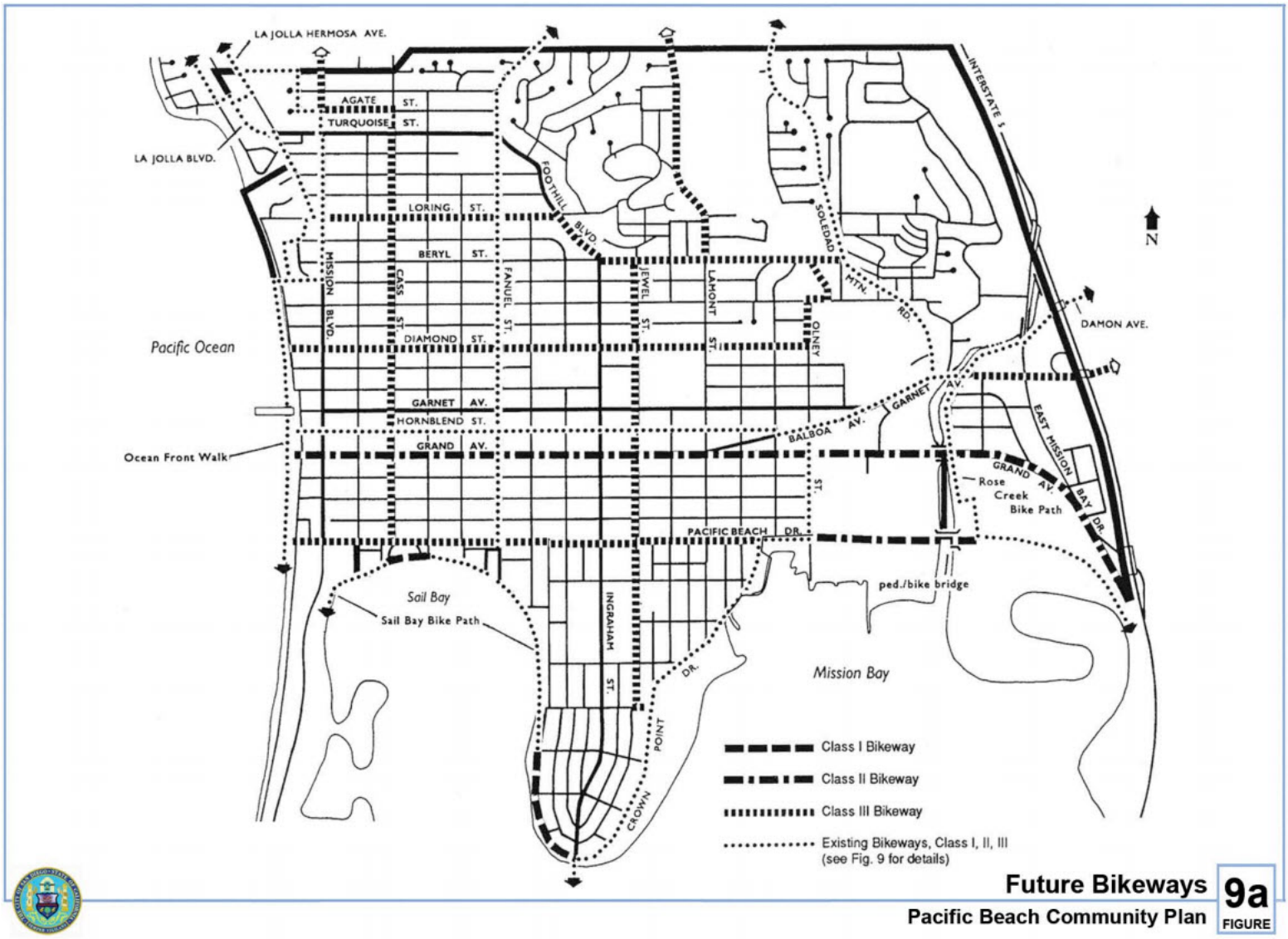
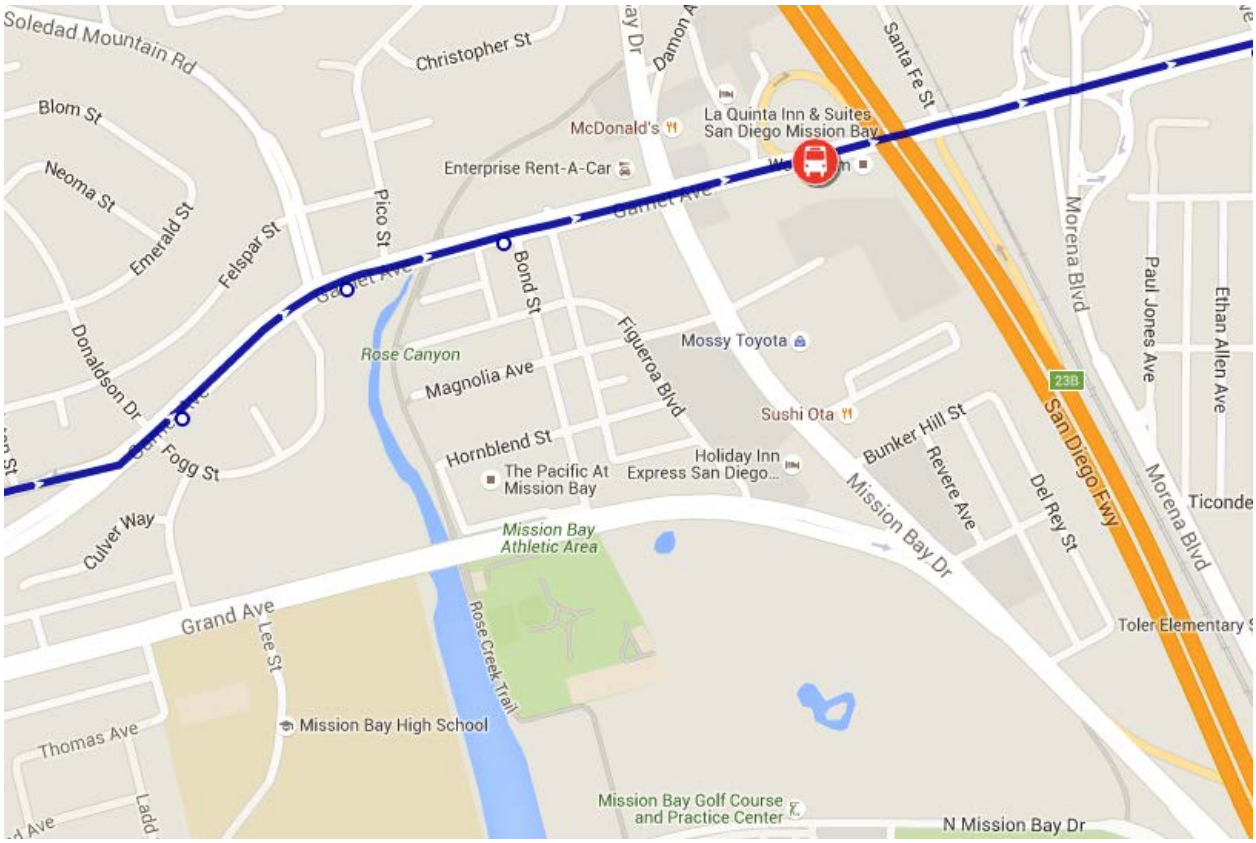
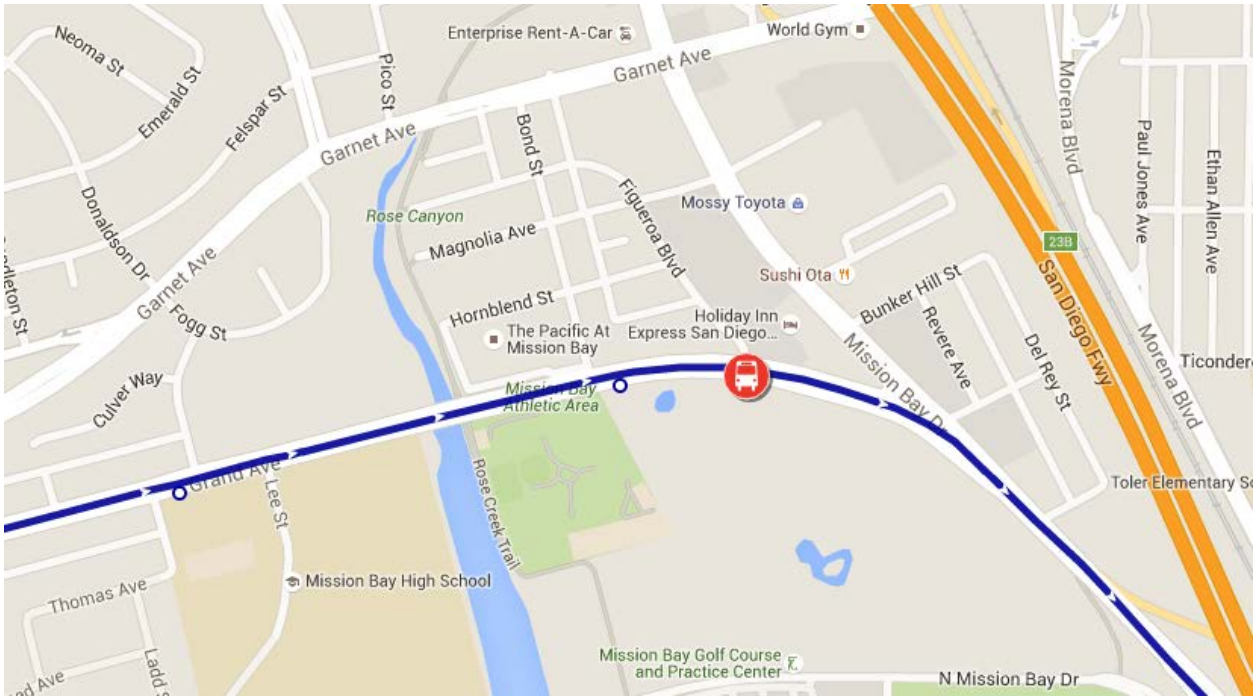


FIGURE 14-2

Future Bikeways



Route 27



Route 30

FIGURE 14-3

Bus Route Map

15.0 TRANSPORTATION DEMAND MANAGEMENT (TDM)

Transportation Demand Management, called "TDM" for short, is a strategy designed to reduce single occupant vehicle trips during the AM and PM peak weekday hours. Since most commuting and congestion occur during weekday peak periods, TDM seeks to shift commuters to transportation modes other than cars as well as reduce peak hour trips by encouraging commuting in non-peak periods and other strategies.

TDM measures that Jefferson Pacific Beach will incorporate include the following:

- Bulletin boards in central locations, which encourage alternative transportation programs.
- Suggest office tenants implement telecommute and staggered work hours to avoid peak hour traffic.
- A TDM coordinator for the tenants to facilitate publication and distribution of information as well as ensure it remains current.
- Informational quarterly newsletters to tenants discussing Ride-Link and other tools for carpooling, bicycling, and alternative modes of transportation.
- Bike lockers will be provided on-site.
- Offer 1 month MTS regional pass per unit at move-in

16.0 CONCLUSIONS AND RECOMMENDATIONS

16.1 PROJECT TRIP GENERATION

The Project for a mixed-use development on the Jefferson Pacific Beach site of approximately 15,500 SF of mixed-use retail/office/ commercial and 172 apartment units is expected to add 1,507 net cumulative average daily trips (ADT) with 66 AM (8 in / 58 out) peak hour trips and 110 PM (75 in / 35 out) peak hour trips. This equates to 1,867 net driveway trips with 113 AM (46 in / 67 out) peak hour trips and 185 PM (102 in / 83 out) peak hour trips. The existing uses on site generate 315 ADT with 38 AM (21 in / 17 out) peak hour trips and 42 PM (20 in / 22 out) peak hour trips.

16.2 EXISTING CONDITIONS

Street Segments:

Table 5-1 shows the street segment levels of service (LOS) using roadway classifications from the City of San Diego Traffic Impact Analysis Guidelines. The analysis found that all study streets currently operate a level of service D or better with the exception of the deficient segments listed below:

- Mission Bay Drive between Grand Avenue and Rosewood Street
- Mission Bay Drive between Rosewood Street and N. Mission Bay Drive

Intersections:

Figure 5-3 shows Existing AM/PM peak hour intersection volumes.

Table 5-2 shows the average delay and levels of service (LOS) that was determined for all study intersections based on the methodology developed in the Highway Capacity Manual (HCM) using the

computer software program Synchro version 9. The analysis found that all study intersections operate at LOS D or better in both the AM and PM peak hour with the following exceptions:

- Mission Bay Drive at Garnet Avenue in the PM Peak Hour, LOS E
- Mission Bay Drive at Rosewood Street in the AM and PM Peak Hours, LOS F

16.3 EXISTING WITH PROJECT

Street Segments:

Figure 6-1 shows the average daily traffic volumes in the Existing with Project condition.

The analysis found that all study segments are projected to operate at level of service D or better when Project traffic is added with the following exceptions:

- Mission Bay Drive between Grand Avenue and Rosewood Street
- Mission Bay Drive between Rosewood Street and N. Mission Bay Drive
- Rosewood Street west of the Project Driveway (over capacity)

Table 16-1 shows the level of service street segment comparison between the Existing and Existing with Project scenarios.

Intersections:

Figure 6-2 shows Existing with Project AM/PM peak hour intersection volumes.

The analysis found that all intersections are projected to operate at LOS D or better when Project traffic is added with the following exceptions:

- Mission Bay Drive at Garnet Avenue in the PM Peak Hour, LOS E
- Mission Bay Drive at Rosewood Street in the AM and PM Peak Hours, LOS F

Table 16-3 shows the intersection level of service comparison between Existing and Existing with Project scenarios. In all cases, a deficient level of service occurs both with and without the Project and without mitigation.

16.4 NEAR TERM WITHOUT PROJECT

Street Segments:

Figure 8-1 shows the average daily traffic volumes in the Near Term without Project condition.

The analysis found that all study segments are projected to operate at level of service D or better with the following exceptions:

- Mission Bay Drive between Grand Avenue and Rosewood Street
- Mission Bay Drive between Rosewood Street and N. Mission Bay Drive

Intersections:

Figure 8-2 shows Near Term without Project AM/PM peak hour intersection volumes. The analysis found that all intersections are projected to operate at level of service D or better in the AM and PM peak hour with the following exceptions:

- Mission Bay Drive at Garnet Avenue in the PM Peak Hour, LOS E
- Mission Bay Drive at Magnolia Avenue in the AM Peak Hour, LOS E
- Mission Bay Drive at Rosewood Street in the AM Peak Hour, LOS F

- Mission Bay Drive at Rosewood street in the PM Peak Hour, LOS F

16.5 NEAR TERM WITH PROJECT

Street Segments:

Figure 10-1 shows the average daily traffic volumes in the Year 2035 without Project condition.

The analysis found that all study segments are projected to operate at level of service D or better when Project traffic is added with the following exceptions:

- Mission Bay Drive between Grand Avenue and Rosewood Street
- Mission Bay Drive between Rosewood Street and N. Mission Bay Drive
- Rosewood Street west of the Project Driveway (over capacity)

Table 16-2 shows the level of service street segment comparison between the Near Term and Near Term with Project scenarios. In all cases, a deficient level of service occurs both with and without the Project and without mitigation.

Intersections:

The analysis found that all intersections are projected to operate at level of service D or better in the AM and PM peak hour with the following exceptions:

- Mission Bay Drive at Garnet Avenue in the PM Peak Hour, LOS E
- Mission Bay Drive at Magnolia Avenue in the AM Peak Hour, LOS E
- Mission Bay Drive at Rosewood Street in the AM Peak Hour, LOS F
- Mission Bay Drive at Rosewood street in the PM Peak Hour, LOS F

Table 16-4 shows the intersection level of service comparison between Near Term and Near Term with Project scenarios. In all cases, a deficient level of service occurs both with and without the Project and without mitigation.

TABLE 16-1

Existing With and Without Project Street Segment Comparison

Road	Segment	# of Lanes	LOS "E" Capacity	Class.	Existing			Existing + Project			ΔV/C	Is this impact Significant?
					Volume	LOS	V/C	Volume	LOS	V/C		
Mission Bay Dr.	Garnet Ave. to Magnolia Ave.	4	40,000	4-M	30,487	D	0.76	31,105	D	0.78	0.015	***NO***
	Magnolia Ave. to Bunker Hill St.	4	40,000	4-M	30,265	D	0.76	30,943	D	0.77	0.017	***NO***
	Bunker Hill St. to Grand Ave.	4	40,000	4-M	30,294	D	0.76	30,972	D	0.77	0.017	***NO***
	Grand Ave. to Rosewood St.	4	40,000	4-M	50,602	F	1.27	51,597	F	1.29	0.025	***YES***
	Rosewood St. to N. Mission Bay Dr.	4	40,000	4-M	54,658	F	1.37	55,170	F	1.38	0.013	***YES***
Bunker Hill St.	Mission Bay Dr. to Del Rey St.	2	8,000	2-Cc	3,535	C	0.44	3,535	C	0.44	0.000	***NO***
Del Rey St.	Glendora St. to Rosewood St.	2	2,200	Local	865	UC		865	UC		-	***NO***
Rosewood St.	West of Project Driveway	2	2,200	Local	753	UC		2,260	OC		-	***YES***
	East of Project Driveway	2	2,200	Local	753	UC		753	UC		-	***NO***

Legend:

LOS= Level of Service

V/C= Volume to Capacity Ratio

ΔV/C= Change in V/C ratio

2-Cc = 2 Lane Collector (w/ commercial-industrial property

4-M = 4 Lane Major Arterial

UC = Under Capacity

OC = Over Capacity

TABLE 16-2

Near Term Without and Near Term With Project Street Segment Comparison

Road	Segment	# of Lanes	LOS "E" Capacity	Class.	Near Term			Near Term + Project			ΔV/C	Is this impact Significant?
					Volume	LOS	V/C	Volume	LOS	V/C		
Mission Bay Dr.	Garnet Ave. to Magnolia Ave.	4	40,000	4-M	31,706	D	0.79	32,324	D	0.81	0.015	***NO***
	Magnolia Ave. to Bunker Hill St.	4	40,000	4-M	31,476	D	0.79	32,154	D	0.80	0.017	***NO***
	Bunker Hill St. to Grand Ave.	4	40,000	4-M	31,506	D	0.79	32,184	D	0.80	0.017	***NO***
	Grand Ave. to Rosewood St.	4	40,000	4-M	52,626	F	1.32	53,621	F	1.34	0.025	***YES***
	Rosewood St. to N. Mission Bay Dr.	4	40,000	4-M	56,844	F	1.42	57,357	F	1.43	0.013	***YES***
Bunker Hill St.	Mission Bay Dr. to Del Rey St.	2	8,000	2-Cc	3,676	C	0.46	3,676	C	0.46	0.000	***NO***
Del Rey St.	Glendora St. to Rosewood St.	2	2,200	Local	900	UC		900	UC		-	***NO***
Rosewood St.	West of Project Driveway	2	2,200	Local	783	UC		2,290	OC		-	***YES***
	East of Project Driveway	2	2,200	Local	783	UC		783	UC		-	***NO***

Legend:

LOS= Level of Service

V/C= Volume to Capacity Ratio

ΔV/C= Change in V/C ratio

2-Cc = 2 Lane Collector (w/ commercial-industrial property

4-M = 4 Lane Major Arterial

UC = Under Capacity

OC = Over Capacity

TABLE 16-3

Existing Without and Existing With Project Intersection Comparison

#	Intersection	Control	Existing				Existing With Project							
			AM Peak Hour		PM Peak Hour		AM Peak Hour		Δ	S ?	PM Peak Hour		Δ	S ?
			D	LOS	D	LOS	D	LOS			D	LOS		
1	Garnet Ave. / Mission Bay Dr.	Signalized	50.4	D	65.2	E	51.2	D	0.8	No	66.0	E	0.8	No
2	Magnolia Ave. / Mission Bay Dr.	Signalized	52.9	D	38.6	D	53.5	D	0.6	No	39.8	D	1.2	No
3	Bunker Hill St. / Mission Bay Dr.	Signalized	25.3	C	48.7	D	27.1	C	1.8	No	52.6	D	3.9	No
4	Grand Ave. / Mission Bay Dr.	Signalized	14.9	B	24.2	C	15.0	B	0.1	No	24.6	C	0.4	No
5	Rosewood St. / Mission Bay Dr.	Minor Street Stop	71.1	F	641.1	F	349.3	F	278.2	Yes	(1)	F	>>1	Yes
6	Mission Bay Dr. / N. Mission Bay Dr.	Signalized	9.7	A	7.9	A	9.7	A	0.0	No	8.1	A	0.2	No

Notes:

LOS = Level of Service

Δ = Change (seconds)

S = Significant

D= Delay (seconds / vehicle)

>>1 = Change in delay is much greater than 1 and was not reported.

(1) = Delay exceeds reliable delay values and not reported in Synchro.

TABLE 16-4

Near Term Without and Near Term With Project Intersection Comparison

#	Intersection	Control	Near Term				Near Term With Project							
			AM Peak Hour		PM Peak Hour		AM Peak Hour		Δ	S ?	PM Peak Hour		Δ	S ?
			D	LOS	D	LOS	D	LOS			D	LOS		
1	Garnet Ave. / Mission Bay Dr.	Signalized	54.5	D	70.6	E	54.5	D	0.0	No	71.3	E	0.7	No
2	Magnolia Ave. / Mission Bay Dr.	Signalized	77.1	E	45.3	D	77.3	E	0.2	No	46.5	D	1.2	No
3	Bunker Hill St. / Mission Bay Dr.	Signalized	27.9	C	50.3	D	30.4	C	2.5	No	54.6	D	4.3	No
4	Grand Ave. / Mission Bay Dr.	Signalized	16.9	B	35.3	D	17.0	B	0.1	No	36.7	D	1.4	No
5	Rosewood St. / Mission Bay Dr.	Minor Street Stop	87.2	F	871.4	F	478.3	F	391.1	Yes	(1)	F	>>1	Yes
6	Mission Bay Dr. / N. Mission Bay Dr.	Signalized	10.0	B	8.0	A	10.1	B	0.1	No	8.3	A	0.3	No

Notes:

LOS = Level of Service

Δ = Change (seconds)

S = Significant

D= Delay (seconds / vehicle)

>>1 = Change in delay is much greater than 1 and was not reported.

(1) = Delay exceeds reliable delay values and not reported in Synchro.

16.7 HORIZON YEAR 2035 WITHOUT PROJECT

When future (Year 2035) traffic volumes without Project are evaluated, the following results occur.

Street Segments:

Figure 10-1 shows the average daily traffic volumes in the Year 2035 without Project condition.

The analysis found that that all study segments are projected to operate at level of service D or better when Project traffic is added with the following exceptions:

- Mission Bay Drive between Garnet Avenue and Magnolia Avenue
- Mission Bay Drive between Magnolia Avenue and Bunker Hill Street
- Mission Bay Drive between Bunker Hills Street and Grand Avenue
- Mission Bay Drive between Grand Avenue and Rosewood Street
- Mission Bay Drive between Rosewood Street and N. Mission Bay Drive

Intersections:

Figure 10-2 shows Year 2035 without Project AM/PM peak hour intersection volumes

The analysis found that all intersections are Project to operate at level of service D or better in the AM and PM peak hour with the following exceptions:

- Mission Bay Drive at Garnet Avenue in the AM Peak Hour, LOS E
- Mission Bay Drive at Garnet Avenue in the PM Peak Hour, LOS F
- Mission Bay Drive at Magnolia Avenue in the AM Peak Hour, LOS F
- Mission Bay Drive at Magnolia Avenue in the PM Peak Hour, LOS F

- Mission Bay Drive at Bunker Hill Street in the PM Peak Hour, LOS F
- Mission Bay Drive at Rosewood Street in the AM Peak Hour, LOS F
- Mission Bay Drive at Rosewood street in the PM Peak Hour, LOS F

16.8 HORIZON YEAR 2035 WITH PROJECT

Street Segments:

Figure 11-1 shows the average daily traffic volumes in the Year 2035 with Project condition.

The analysis found that all study segments are projected to operate at level of service D or better when Project traffic is added with the following exceptions:

- Mission Bay Drive between Garnet Avenue and Magnolia Avenue
- Mission Bay Drive between Magnolia Avenue and Bunker Hill Street
- Mission Bay Drive between Bunker Hills Street and Grand Avenue
- Mission Bay Drive between Grand Avenue and Rosewood Street
- Mission Bay Drive between Rosewood Street and N. Mission Bay Drive
- Rosewood Street west of the Project Driveway (over capacity)

Table 16-5 shows the level of service street segment comparison between the Year 2035 and Year 2035 with Project scenarios. In all cases, a deficient level of service occurs both with and without the Project and without mitigation.

Intersections:

Figure 11-2 shows Year 2035 with Project AM/PM peak hour intersection volumes

The analysis found that all intersections are project to operate at level of service D or better in the AM and PM peak hour with the following exceptions:

- Mission Bay Drive at Garnet Avenue in the AM Peak Hour, LOS E
- Mission Bay Drive at Garnet Avenue in the PM Peak Hour, LOS F
- Mission Bay Drive at Magnolia Avenue in the AM Peak Hour, LOS F
- Mission Bay Drive at Magnolia Avenue in the PM Peak Hour, LOS F
- Mission Bay Drive at Bunker Hill Street in the AM Peak Hour, LOS E
- Mission Bay Drive at Bunker Hill Street in the PM Peak Hour, LOS F
- Mission Bay Drive at Rosewood Street in the AM Peak Hour, LOS F
- Mission Bay Drive at Rosewood street in the PM Peak Hour, LOS F

Table 16-6 shows the intersection level of service comparison between Year 2035 and Year 2035 with Project scenarios. In all cases, a deficient level of service occurs both with and without the project and without mitigation.

TABLE 16-5

Horizon Year 2035 Without and With Project Street Segment Comparison

Road	Segment	# of Lanes	LOS "E" Capacity	Class.	Year 2030			Year 2030 + Project			ΔV/C	Is this impact Significant?
					Volume	LOS	V/C	Volume	LOS	V/C		
Mission Bay D	Garnet Ave. to Magnolia Ave.	4	40,000	4-M	41,400	F	1.04	42,018	F	1.05	0.015	***YES***
	Magnolia Ave. to Bunker Hill St.	4	40,000	4-M	37,300	E	0.93	37,978	E	0.95	0.017	***NO***
	Bunker Hill St. to Grand Ave.	4	40,000	4-M	37,900	E	0.95	38,578	E	0.96	0.017	***NO***
	Grand Ave. to Rosewood St.	4	40,000	4-M	57,200	F	1.43	58,195	F	1.45	0.025	***YES***
	Rosewood St. to N. Mission Bay Dr.	4	40,000	4-M	57,200	F	1.43	57,712	F	1.44	0.013	***YES***
Bunker Hill St.	Mission Bay Dr. to Del Rey St.	2	8,000	2-Cc	4,242	C	0.53	4,242	C	0.53	0.000	***NO***
Del Rey St.	Glendora St. to Rosewood St.	2	2,200	Local	1,038	UC		1,038	UC		-	***NO***
Rosewood St.	West of Project Driveway	2	2,200	Local	904	UC		2,411	OC		-	***YES***
	East of Project Driveway	2	2,200	Local	904	UC		904	UC		-	***NO***

Legend:

LOS= Level of Service

V/C= Volume to Capacity Ratio

ΔV/C= Change in V/C ratio

2-Cc = 2 Lane Collector (w/ commercial-industrial property

4-M = 4 Lane Major Arterial

UC = Under Capacity

OC = Over Capacity

TABLE 16-6

Horizon Year 2035 With and Without Project Intersection Summary

#	Intersection	Control	Year 2035				Year 2035 + Project							
			AM Peak Hour		PM Peak Hour		AM Peak Hour		Δ	S ?	PM Peak Hour		Δ	S ?
			D	LOS	D	LOS	D	LOS			D	LOS		
1	Garnet Ave. / Mission Bay Dr.	Signalized	77.5	E	101.2	F	78.4	E	0.9	No	103.1	F	1.9	Yes
2	Magnolia Ave. / Mission Bay Dr.	Signalized	133.3	F	93.1	F	140.4	F	7.1	Yes	95.4	F	2.3	Yes
3	Bunker Hill St. / Mission Bay Dr.	Signalized	51.3	D	81.0	F	55.1	E	3.8	Yes	83.4	F	2.4	Yes
4	Grand Ave. / Mission Bay Dr.	Signalized	39.6	D	32.1	C	39.6	D	0.0	No	32.9	C	0.8	No
5	Rosewood St. / Mission Bay Dr.	Minor Street Stop	110.6	F	(1)	F	699.4	F	588.8	Yes	(1)	F	>>1	Yes
6	Mission Bay Dr. / N. Mission Bay Dr.	Signalized	13.6	B	8.7	A	13.6	B	0.0	No	11.8	B	3.1	No

Notes:

LOS = Level of Service

Δ = Change (seconds)

S = Significant

D= Delay (seconds / vehicle)

>>1 = Change in delay is much greater than 1 and was not reported.

(1) = Delay exceeds reliable delay values and not reported in Synchro.

16.9 Study Results:

Based upon this transportation impact analysis, it was determined that development of the Project would have the following impacts.

Street Segments – Impacts to two segments of Mission Bay Drive were determined in all conditions. Specifically, direct impacts were discovered in Existing with Project and Near Term with Project (2019) scenarios on Mission Bay Drive between Grand Avenue and N. Mission Bay Drive as well as one segment of Rosewood Street west of the Project Driveway (total of 3 segments). Additionally, cumulative impacts were discovered in the Year 2035 with Project scenario on three segments of Mission Bay Drive between Garnet Avenue and Magnolia Avenue as well as between Grand Avenue and N. Mission Bay Drive and one segment of Rosewood Street west of the Project Driveway (total of 4 segments). Please refer to **Tables 1-1** thru **1-3** for details.

Intersections – Impacts to five intersections were determined as a result of the analysis. Specifically, direct impacts were discovered in the Existing with Project and Near Term with Project (2019) scenarios at the intersection of Rosewood Street and Mission Bay Drive. Additionally, cumulative impacts were discovered in the Year 2035 with Project scenario at the intersections of Garnet Ave. /Mission Bay Drive, Magnolia Ave. /Mission Bay Drive, Bunker Hill St. /Mission Bay Drive and Rosewood St. /Mission Bay Drive. Please refer to **Tables 1-4** thru **1-6** for details.

<u>Mitigation:</u>

In order to mitigate the impacts listed above, signalization, operational improvements and restriping are proposed.

Signalization at the intersection of Rosewood and Mission Bay Drive is warranted (See Appendix J). In order to mitigate direct project impacts at that location and to improve level of service to an acceptable level, it is recommended that the project install a traffic signal and coordinate it with other signals on Mission Bay Drive (see **Appendix K**). With the installation of a traffic signal at the intersection of Mission Bay Drive and Rosewood Street, it is recommended that a centerline stripe be added to improve Rosewood Street between Mission Bay Drive and the Project access to a two lane collector road. This signalization and restriping will improve the level of service at this intersection from "F" for the minor movement to "A/B" overall.

Additional Project impacts are anticipated along the Mission Bay Drive corridor. The Pacific Beach Community Plan shows the ultimate classification of Mission Bay Drive as a four-lane Major road. Mission Bay Drive has generally been improved to its ultimate configuration. Additional widening would be inconsistent with the Community Plan and is not recommended. Therefore, building upon the fact that the City already operates Mission Bay Drive within the Project study area as a coordinated corridor, improvements to signal operations are recommended to address the Project's direct traffic impacts. Specifically, it is recommended that the Mission Bay Drive corridor be improved with enhanced traffic signal interconnect and communications as well as additional detection sensors and computer equipment at each intersection.

The proposed upgrades allow for more advanced signal timing which adapts to actual traffic conditions on a real-time basis. This type of system is called "adaptive traffic control". Various studies evaluating the effectiveness of adaptive traffic control are included in **Appendix L**. As discussed in those studies, the various types of adaptive traffic control can significantly improve signal operations and corridor operations.

A conservative corridor-specific evaluation was commissioned for the Project study area's portion of Mission Bay Drive from an adaptive traffic control developer. This evaluation was completed by Trafficware using their Synchro Green system and SimTraffic software to simulate corridor operations using virtual signal controllers running compatible signal controller software. The results of this evaluation were observed and recorded by Trafficware. The results of this evaluation have been included in **Appendix L**. The analysis shows that operations in the Mission Bay Drive corridor will improve with the application of new technology and installation of an adaptive traffic control system. With Project traffic and implementation of the adaptive traffic control system, the Mission Bay Drive corridor would experience an overall 13.8% reduction in total system delay in the AM peak hour and a 1.7% improvement in total system delay in the PM peak hour.

Additionally, the simulation shows that in the mitigated condition the Mission Bay Drive corridor would operate better as total corridor stops would be reduced 4.2% in the AM peak hour and 5.8% in the PM peak hour. Finally, the Trafficware simulation showed improvements in travel speeds through the Mission Bay Drive corridor with a 2 mph average improvement in the AM peak hour and a 1 mph average improvement in the PM peak hour.

Given the above, the mitigated Project would not have a significant adverse impact on traffic. The ultimate adaptive traffic control system and settings will be selected by the City of San Diego's Signal Operations Section. It is recommended that system engineering and selection be made by City Signal Operations staff as early as possible during final engineering for the corridor improvements. Additionally, the project will upgrade communications within the corridor. The project will provide fiber

optic signal interconnects between the six study intersections and a remote link to the Traffic Management Center downtown as well as appropriate advance flashing beacon.

TABLE 16-7

Mission Bay Drive at Rosewood Street with and without a Traffic Signal

Study Intersections	Without Mitigation				Impact	Recommended Mitigation	With Mitigation			
	AM		PM				AM		PM	
	Delay	LOS	Delay	LOS			Delay	LOS	Delay	LOS
EXISTING WITH PROJECT										
Mission Bay Drive / Rosewood Street	278.2	F	(1)	F	Direct	Install Traffic Signal	7.3	A	10.2	B
NEAR TERM WITH PROJECT										
Mission Bay Drive / Rosewood Street	478.3	F	(1)	F	Direct	Install Traffic Signal	7.7	A	11	B
YEAR 2035 WITH PROJECT										
Mission Bay Drive / Rosewood Street	699.4	F	(1)	F	Cumulative	Install Traffic Signal	11.8	B	12.2	B

Notes:
LOS= Level of Service
Delay= seconds per vehicle
(1)= Delay is excessive and not reported in Synchro

17.0 REFERENCES

City of San Diego, 2003. *San Diego Municipal Code, Land Development Code, Trip Generation Manual.* San Diego, California: Development Services Department 2003.

City of San Diego, 1998. *Traffic Impact Study Manual.* San Diego, California: Development Services Department 1998.

City of San Diego, 2011. *California Environmental Quality Act, Significant Determination Thresholds.* San Diego, California: Development Services Department 2011.

SANDAG (San Diego Association of Governments) 2006 *Congestion Management Program Update, Appendix D- Traffic Impact Study Guidelines*. San Diego, California: SANDAG. July 2006.

Transportation Research Board. 2010. *Highway Capacity Manual 2010*. Washington, D.C.: Transportation Research Board.

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APPENDIX A

EXISTING TRAFFIC COUNTS & SIGNAL TIMING SHEETS

APPENDIX B

SANDAG SELECT ZONE FORECAST MODEL, & PACIFIC BEACH COMMUNITY PLAN CIRCULATION ELEMENT STREET CLASSIFICATIONS

APPENDIX C

EXISTING SYNCHRO WORKSHEETS

APPENDIX D

EXISTING WITH PROJECT SYNCHRO WORKSHEETS

APPENDIX E

NEAR TERM WITHOUT PROJECT SYNCHRO WORKSHEETS

APPENDIX F

NEAR TERM WITH PROJECT SYNCHRO WORKSHEETS

APPENDIX G

HORIZON YEAR 2035 WITHOUT PROJECT SYNCHRO WORKSHEETS

APPENDIX H

HORIZON YEAR 2035 WITH PROJECT SYNCHRO WORKSHEETS

APPENDIX I

GOVERNMENT CODE SECTION 65915,

APPENDIX J

TRAFFIC SIGNAL WARRANT FOR ROSEWOOD STREET AT MISSION BAY DRIVE

APPENDIX K

SYNCHRO WORKSHEETS FOR PROPOSED MITIGATION

APPENDIX L

ADAPTIVE TRAFFIC CONTROL TEST SYSTEMS EVALUATION, URBAN SYSTEMS ASSOCIATES, JULY 2014

APPENDIX A

EXISTING TRAFFIC COUNTS & SIGNAL TIMING SHEETS

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: PACIFIC TECHNICAL DATA

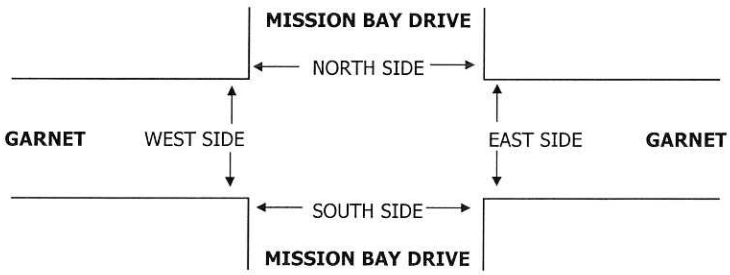
DATE: 8/5/15 WEDNESDAY	LOCATION:	MISSION BAY	PROJECT #:	PTD15-0807-03
	NORTH & SOUTH:	MISSION BAY DRIVE	LOCATION #:	1
	EAST & WEST:	GARNET	CONTROL:	SIGNAL

NOTES:

AM / PM / MD / OTHER / OTHER

N ▲ ◄ W E ► S ▼

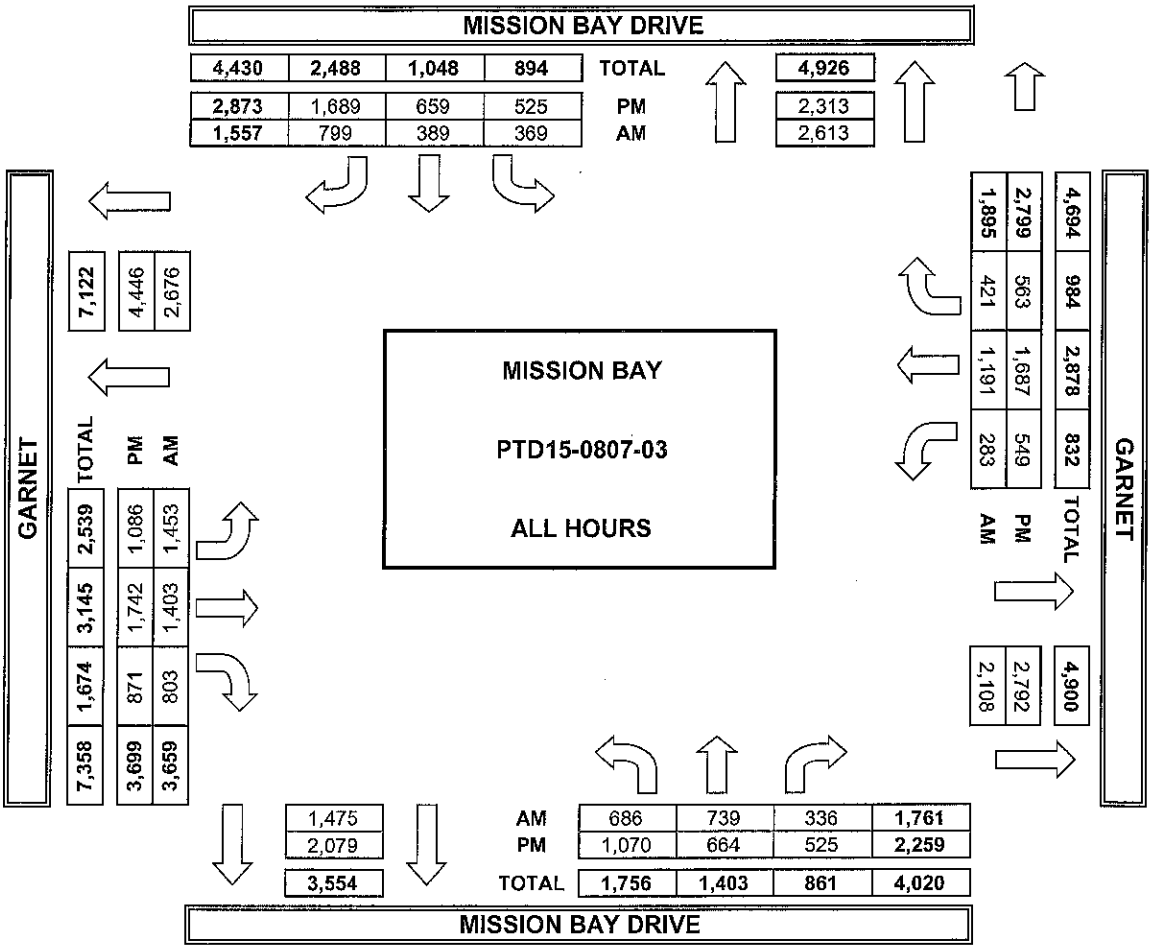
		NORTHBOUND MISSION BAY DRIVE			SOUTHBOUND MISSION BAY DRIVE			EASTBOUND GARNET			WESTBOUND GARNET				U-TURNS				
	LANES:	NL 2	NT 2	NR 1	SL 2	ST 0.5	SR 1.5	EL 2	ET 2	ER 1	WL 1	WT 2	WR 1	TOTAL	NB X	SB X	EB X	WB X	TTL
AM	7:00 AM	84	86	28	30	31	75	170	133	71	23	92	50	873					0
	7:15 AM	61	92	36	38	51	79	176	138	101	24	128	51	975					0
	7:30 AM	69	109	36	44	40	75	177	169	96	35	99	47	996					0
	7:45 AM	74	95	47	47	45	106	200	192	107	37	170	41	1,161					0
	8:00 AM	93	87	45	65	57	118	205	198	84	40	161	44	1,197					0
	8:15 AM	90	105	43	50	67	94	180	193	122	34	170	59	1,207		1			1
	8:30 AM	104	102	51	38	46	128	164	157	113	39	195	74	1,211					0
	8:45 AM	111	63	50	57	52	124	181	223	109	51	176	55	1,252					0
	VOLUMES	686	739	336	369	389	799	1,453	1,403	803	283	1,191	421	8,872	0	1	0	0	1
	APPROACH %	39%	42%	19%	24%	25%	51%	40%	38%	22%	15%	63%	22%						
	APP/DEPART	1,761	/	2,613	1,557	/	1,475	3,659	/	2,108	1,895	/	2,676	0					
	BEGIN PEAK HR		8:00 AM																
	VOLUMES	398	357	189	210	222	464	730	771	428	164	702	232	4,867					
	APPROACH %	42%	38%	20%	23%	25%	52%	38%	40%	22%	15%	64%	21%						
	PEAK HR FACTOR		0.918			0.933			0.940			0.891		0.972					
	APP/DEPART	944	/	1,319	896	/	814	1,929	/	1,170	1,098	/	1,564	0					
PM	4:00 PM	111	68	68	64	82	194	178	205	112	55	186	58	1,381					0
	4:15 PM	142	69	56	78	98	199	128	237	123	61	188	64	1,443					0
	4:30 PM	157	74	59	75	62	201	129	210	124	57	201	60	1,409					0
	4:45 PM	130	85	61	69	75	219	130	202	101	70	204	81	1,427		1			1
	5:00 PM	130	87	59	63	82	221	133	238	95	76	228	82	1,494		1			1
	5:15 PM	114	97	71	71	83	212	118	237	104	81	230	83	1,501					0
	5:30 PM	149	95	79	51	86	215	132	207	102	75	240	66	1,497		1			1
	5:45 PM	137	89	72	54	91	228	138	206	110	74	210	69	1,478					0
	VOLUMES	1,070	664	525	525	659	1,689	1,086	1,742	871	549	1,687	563	11,630	0	3	0	0	3
	APPROACH %	47%	29%	23%	18%	23%	59%	29%	47%	24%	20%	60%	20%						
	APP/DEPART	2,259	/	2,313	2,873	/	2,079	3,699	/	2,792	2,799	/	4,446	0					
	BEGIN PEAK HR		5:00 PM																
	VOLUMES	530	368	281	239	342	876	521	888	411	306	908	300	5,970					
	APPROACH %	45%	31%	24%	16%	23%	60%	29%	49%	23%	20%	60%	20%						
	PEAK HR FACTOR		0.913			0.977			0.976			0.961		0.994					
	APP/DEPART	1,179	/	1,189	1,457	/	1,059	1,820	/	1,408	1,514	/	2,314	0					

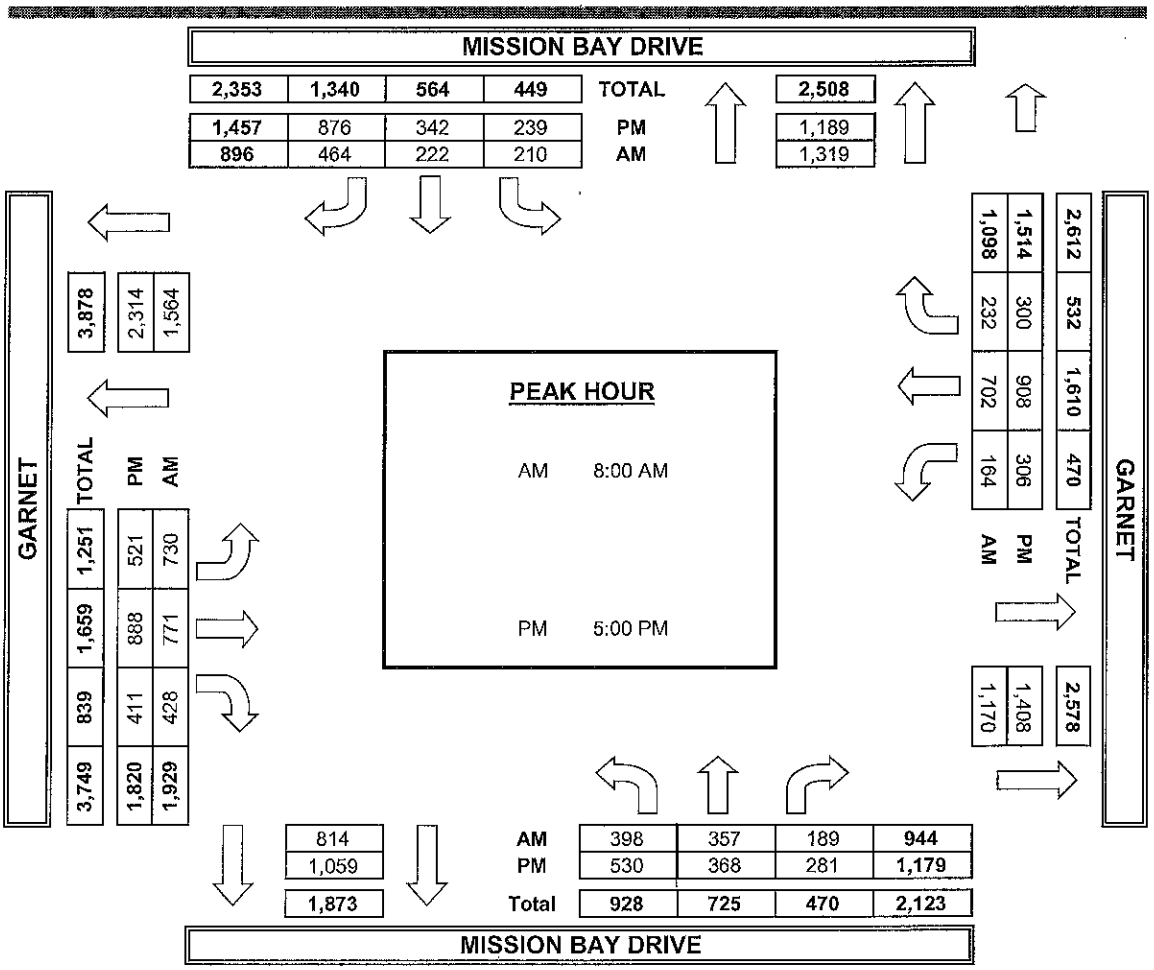


		PEDESTRIAN CROSSINGS					PEDESTRIAN ACTIVATIONS					BICYCLE CROSSINGS				
		N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
AM	7:00 AM					0					0					0
	7:15 AM					0					0					0
	7:30 AM					0					0					0
	7:45 AM					0					0					0
	8:00 AM					0					0					0
	8:15 AM					0					0					0
	8:30 AM					0					0					0
	8:45 AM					0					0					0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:00 PM					0					0					0
	4:15 PM					0					0					0
	4:30 PM					0					0					0
	4:45 PM					0					0					0
	5:00 PM					0					0					0
	5:15 PM					0					0					0
	5:30 PM					0					0					0
	5:45 PM					0					0					0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PACIFIC TECHNICAL DATA

TURNING MOVEMENT COUNTS





INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: PACIFIC TECHNICAL DATA

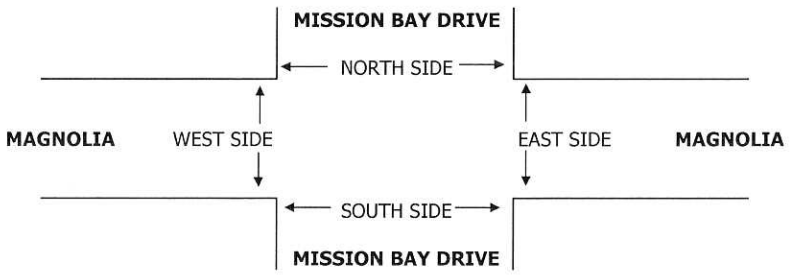
DATE: 8/5/15 WEDNESDAY	LOCATION:	MISSION BAY	PROJECT #:	PTD15-0807-03
	NORTH & SOUTH:	MISSION BAY DRIVE	LOCATION #:	2
	EAST & WEST:	MAGNOLIA	CONTROL:	SIGNAL

NOTES:

AM / PM / MD / OTHER / OTHER

N ▲ ◄ W E ► S ▼

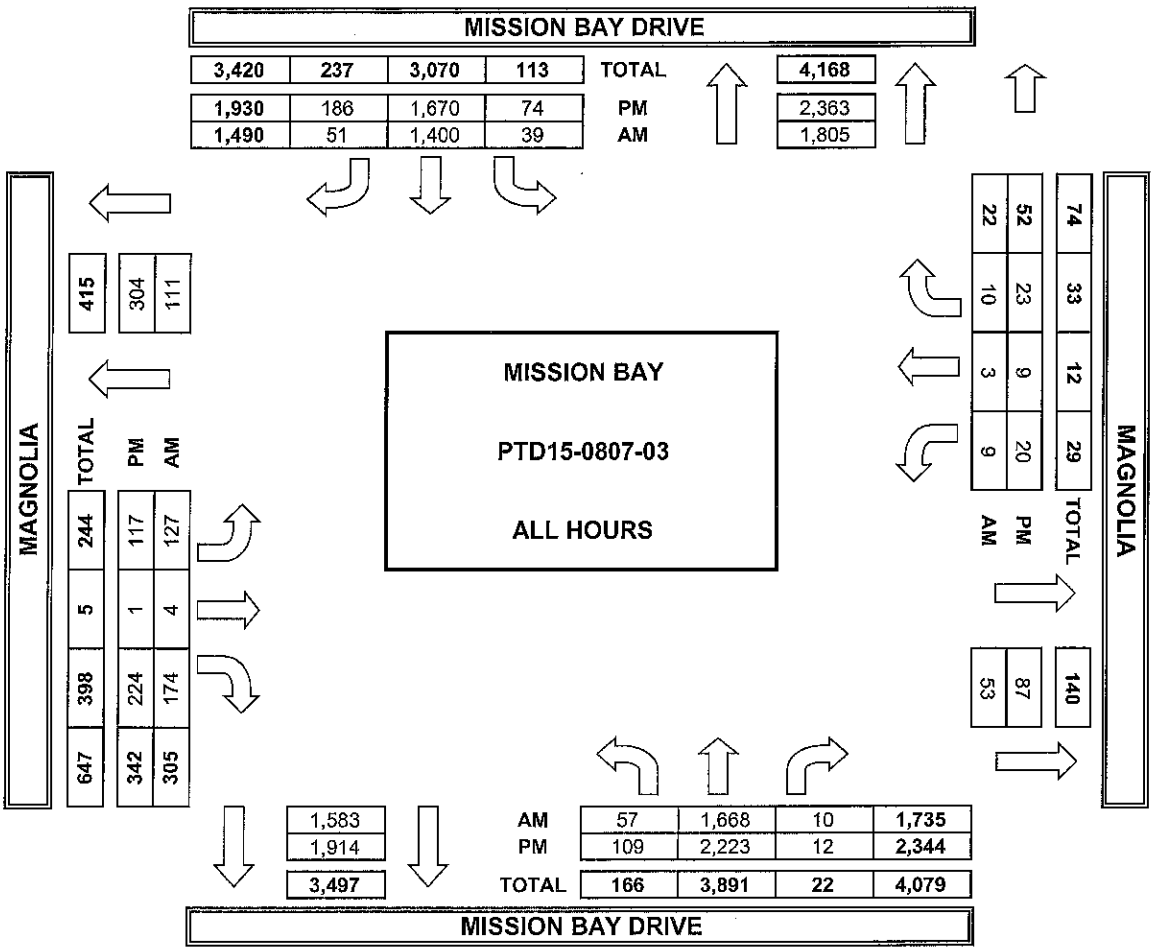
		NORTHBOUND MISSION BAY DRIVE			SOUTHBOUND MISSION BAY DRIVE			EASTBOUND MAGNOLIA			WESTBOUND MAGNOLIA				U-TURNS				
	LANES:	NL 1	NT 2	NR 0	SL 1	ST 2	SR 0	EL 0	ET 1	ER 0	WL 0	WT 1	WR 0	TOTAL	NB X	SB X	EB X	WB X	TTL
AM	7:00 AM	7	198	1	6	124	4	13	0	12	0	2	3	370	1	3			4
	7:15 AM	10	173	1	3	177	5	18	0	20	2	0	1	410	4	1			5
	7:30 AM	2	187	0	2	163	7	9	0	26	0	0	0	396	2	2			4
	7:45 AM	8	206	2	4	183	7	22	0	24	3	0	3	462	6	3			9
	8:00 AM	8	220	1	4	165	8	12	0	16	1	0	3	438	2	3			5
	8:15 AM	6	227	0	7	204	4	21	3	22	1	0	0	495	1	3			4
	8:30 AM	4	223	3	3	198	6	21	0	30	0	0	0	488	2	3			5
	8:45 AM	12	234	2	10	186	10	11	1	24	2	1	0	493	5	3			8
	VOLUMES	57	1,668	10	39	1,400	51	127	4	174	9	3	10	3,552	23	21	0	0	44
	APPROACH %	3%	96%	1%	3%	94%	3%	42%	1%	57%	41%	14%	45%						
	APP/DEPART	1,735	/	1,805	1,490	/	1,583	305	/	53	22	/	111	0					
	BEGIN PEAK HR		8:00 AM																
	VOLUMES	30	904	6	24	753	28	65	4	92	4	1	3	1,914					
	APPROACH %	3%	96%	1%	3%	94%	3%	40%	2%	57%	50%	13%	38%						
	PEAK HR FACTOR		0.948			0.936			0.789			0.500		0.967					
	APP/DEPART	940	/	972	805	/	849	161	/	34	8	/	59	0					
PM	4:00 PM	8	252	0	5	220	16	18	0	16	1	0	1	537	5	3			8
	4:15 PM	18	276	4	7	205	23	11	0	22	1	0	0	567	10	3			13
	4:30 PM	12	271	0	12	174	30	19	0	38	6	1	6	569	7	3			10
	4:45 PM	12	259	2	12	208	20	16	0	28	1	0	1	559	5	5			10
	5:00 PM	12	300	2	5	212	25	15	0	45	1	2	9	628	8	0			8
	5:15 PM	22	275	1	15	201	20	16	0	30	7	3	0	590	9	3			12
	5:30 PM	18	296	2	10	222	22	17	1	31	1	1	2	623	9	6			15
	5:45 PM	7	294	1	8	228	30	5	0	14	2	2	4	595	3	1			4
	VOLUMES	109	2,223	12	74	1,670	186	117	1	224	20	9	23	4,668	56	24	0	0	80
	APPROACH %	5%	95%	1%	4%	87%	10%	34%	0%	65%	38%	17%	44%						
	APP/DEPART	2,344	/	2,363	1,930	/	1,914	342	/	87	52	/	304	0					
	BEGIN PEAK HR		5:00 PM																
	VOLUMES	59	1,165	6	38	863	97	53	1	120	11	8	15	2,436					
	APPROACH %	5%	95%	0%	4%	86%	10%	30%	1%	69%	32%	24%	44%						
	PEAK HR FACTOR		0.973			0.938			0.725			0.708		0.970					
	APP/DEPART	1,230	/	1,233	998	/	994	174	/	45	34	/	164	0					

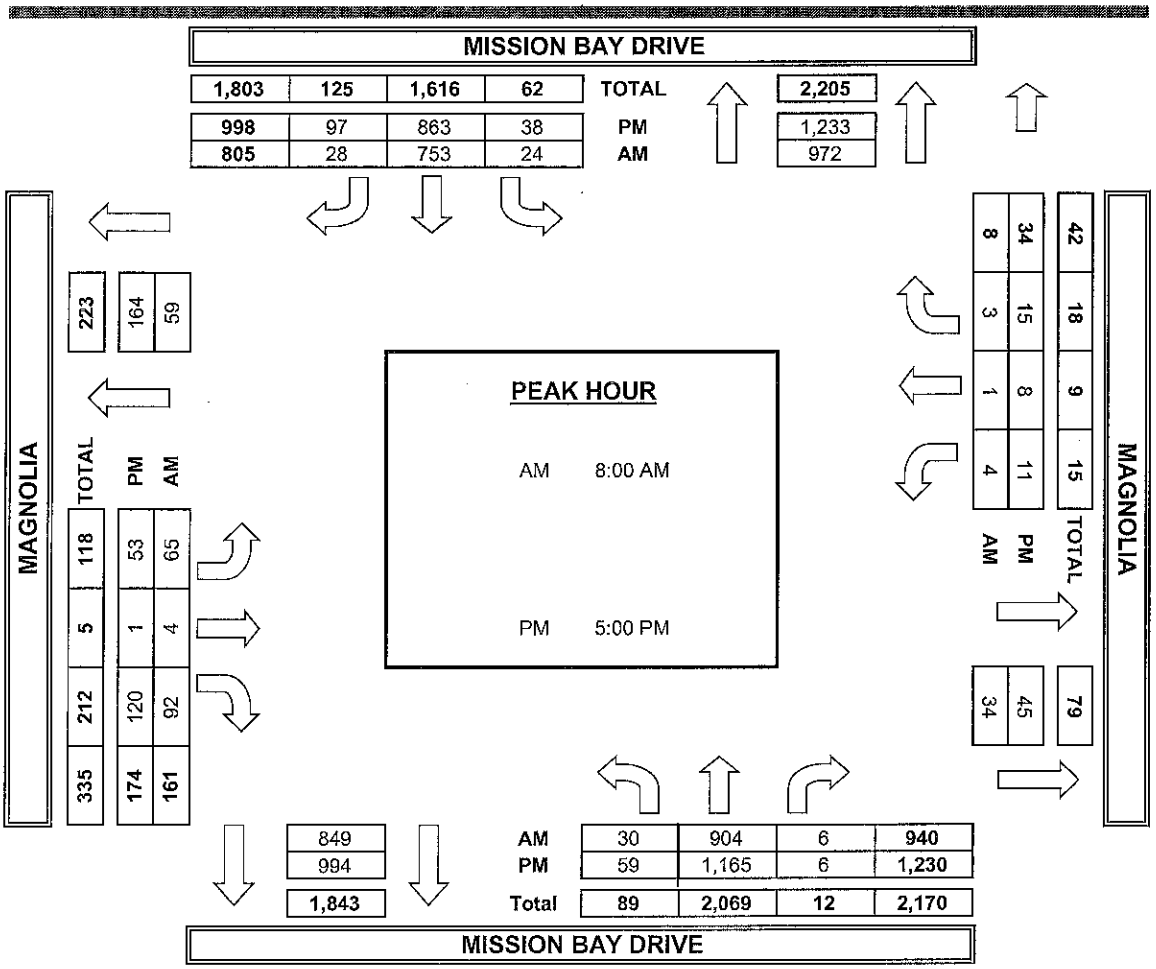


		PEDESTRIAN CROSSINGS					PEDESTRIAN ACTIVATIONS					BICYCLE CROSSINGS				
		N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
AM	7:00 AM					0					0					0
	7:15 AM					0					0					0
	7:30 AM					0					0					0
	7:45 AM					0					0					0
	8:00 AM					0					0					0
	8:15 AM					0					0					0
	8:30 AM					0					0					0
	8:45 AM					0					0					0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:00 PM					0					0					0
	4:15 PM					0					0					0
	4:30 PM					0					0					0
	4:45 PM					0					0					0
	5:00 PM					0					0					0
	5:15 PM					0					0					0
	5:30 PM					0					0					0
	5:45 PM					0					0					0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PACIFIC TECHNICAL DATA

TURNING MOVEMENT COUNTS





INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: PACIFIC TECHNICAL DATA

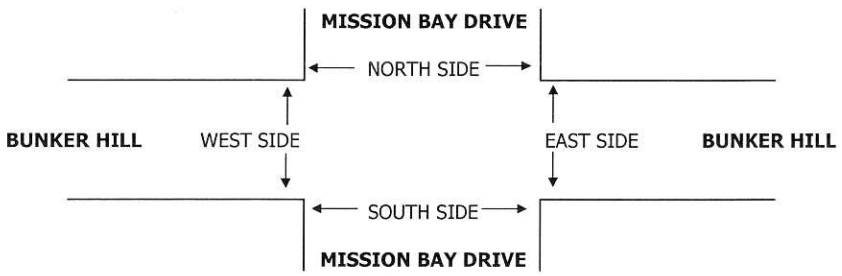
DATE:	LOCATION:	MISSION BAY	PROJECT #:	PTD15-0807-03
8/5/15	NORTH & SOUTH:	MISSION BAY DRIVE	LOCATION #:	3
WEDNESDAY	EAST & WEST:	BUNKER HILL	CONTROL:	SIGNAL

NOTES:

AM / PM / MD / OTHER / OTHER

N ▲ ◄ W E ► S ▼

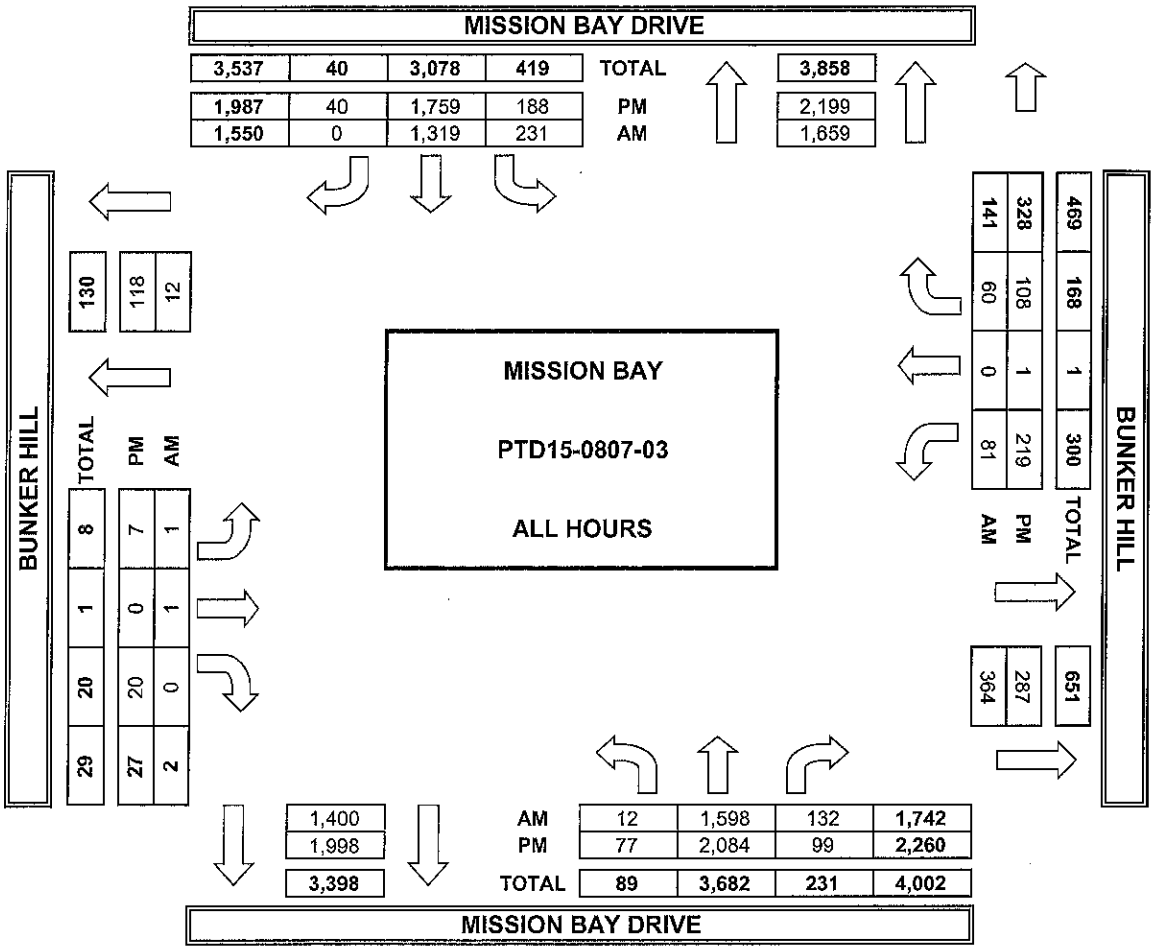
		NORTHBOUND MISSION BAY DRIVE			SOUTHBOUND MISSION BAY DRIVE			EASTBOUND BUNKER HILL			WESTBOUND BUNKER HILL				U-TURNS				
	LANES:	NL 1	NT 2	NR 0	SL 1	ST 2	SR 0	EL 0	ET 1	ER 0	WL 0	WT 1	WR 0	TOTAL	NB X	SB X	EB X	WB X	TTL
AM	7:00 AM	2	193	17	22	121	0	0	0	0	8	0	1	364	2	8			10
	7:15 AM	2	179	10	24	151	0	0	0	0	8	0	6	380	2	8			10
	7:30 AM	0	168	17	28	163	0	0	0	0	9	0	8	393		5			5
	7:45 AM	1	205	19	23	177	0	0	0	0	12	0	8	445	2	1			3
	8:00 AM	2	193	12	23	147	0	1	1	0	7	0	10	396	2	4			6
	8:15 AM	3	230	16	36	198	0	0	0	0	11	0	12	506	2	7			9
	8:30 AM	0	220	25	36	190	0	0	0	0	13	0	12	496		5			5
	8:45 AM	2	210	16	39	172	0	0	0	0	13	0	3	455	2	7			9
	VOLUMES	12	1,598	132	231	1,319	0	1	1	0	81	0	60	3,435	12	45	0	0	57
	APPROACH %	1%	92%	8%	15%	85%	0%	50%	50%	0%	57%	0%	43%						
	APP/DEPART	1,742	/	1,659	1,550	/	1,400	2	/	364	141	/	12	0					
	BEGIN PEAK HR		8:00 AM																
	VOLUMES	7	853	69	134	707	0	1	1	0	44	0	37	1,853					
	APPROACH %	1%	92%	7%	16%	84%	0%	50%	50%	0%	54%	0%	46%						
	PEAK HR FACTOR		0.933			0.899			0.250			0.810		0.916					
	APP/DEPART	929	/	891	841	/	751	2	/	204	81	/	7	0					
PM	4:00 PM	13	225	8	25	218	4	0	0	3	19	0	14	529	11	4			15
	4:15 PM	4	269	11	21	236	6	0	0	1	24	0	12	584	3	5			8
	4:30 PM	5	246	15	21	196	4	0	0	2	31	0	16	536	1	12			13
	4:45 PM	11	253	8	28	211	2	1	0	0	28	0	8	550	7	9			16
	5:00 PM	6	245	17	24	229	2	3	0	6	36	0	17	585	0	7			7
	5:15 PM	16	305	16	25	215	4	0	0	3	25	0	21	630	8	6			14
	5:30 PM	8	270	11	25	225	8	2	0	3	24	1	7	584	6	7			13
	5:45 PM	14	271	13	19	229	10	1	0	2	32	0	13	604	10	7			17
	VOLUMES	77	2,084	99	188	1,759	40	7	0	20	219	1	108	4,602	46	57	0	0	103
	APPROACH %	3%	92%	4%	9%	89%	2%	26%	0%	74%	67%	0%	33%						
	APP/DEPART	2,260	/	2,199	1,987	/	1,998	27	/	287	328	/	118	0					
	BEGIN PEAK HR		5:00 PM																
	VOLUMES	44	1,091	57	93	898	24	6	0	14	117	1	58	2,403					
	APPROACH %	4%	92%	5%	9%	88%	2%	30%	0%	70%	66%	1%	33%						
	PEAK HR FACTOR		0.884			0.984			0.556			0.830		0.954					
	APP/DEPART	1,192	/	1,155	1,015	/	1,029	20	/	150	176	/	69	0					

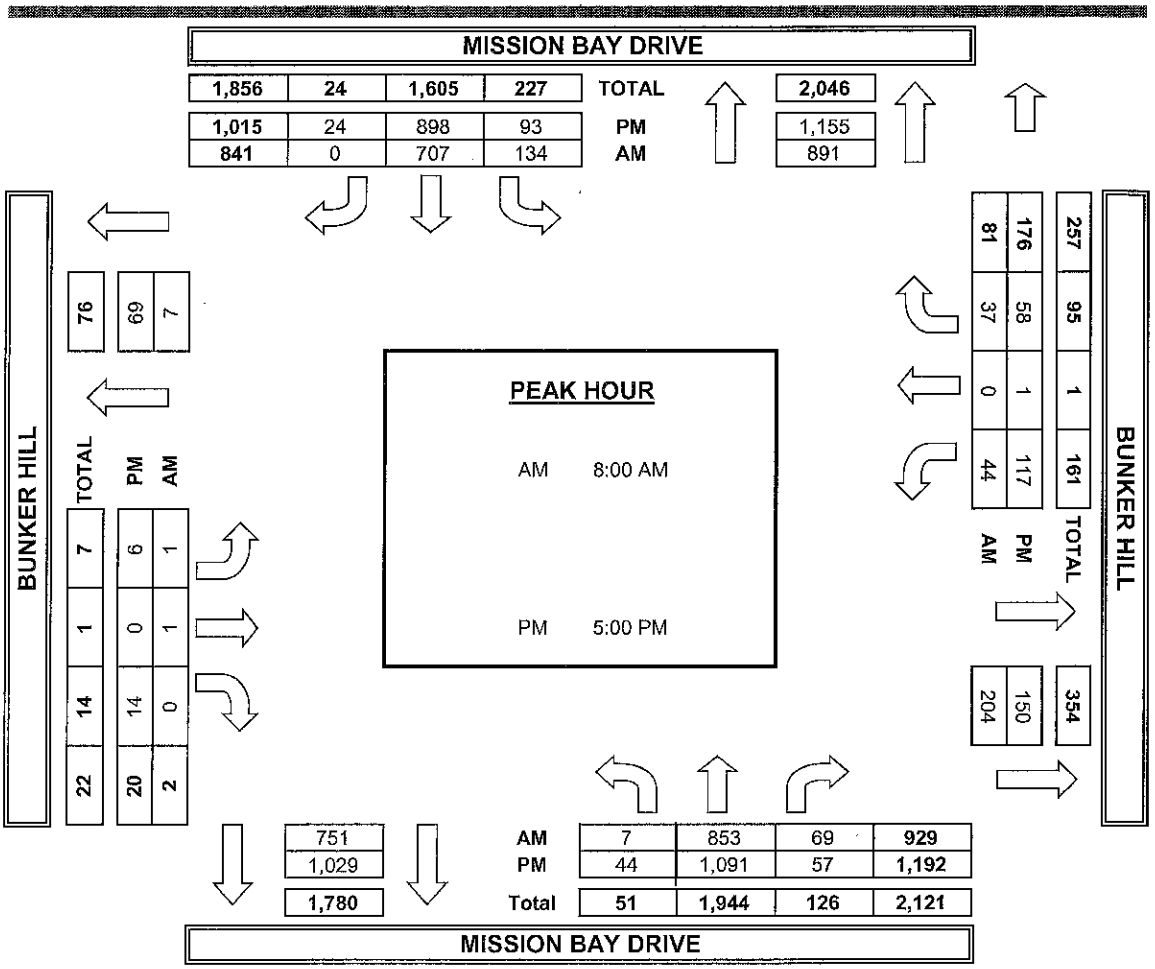


		PEDESTRIAN CROSSINGS					PEDESTRIAN ACTIVATIONS					BICYCLE CROSSINGS				
		N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
AM	7:00 AM					0					0					0
	7:15 AM					0					0					0
	7:30 AM					0					0					0
	7:45 AM					0					0					0
	8:00 AM					0					0					0
	8:15 AM					0					0					0
	8:30 AM					0					0					0
	8:45 AM					0					0					0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:00 PM					0					0					0
	4:15 PM					0					0					0
	4:30 PM					0					0					0
	4:45 PM					0					0					0
	5:00 PM					0					0					0
	5:15 PM					0					0					0
	5:30 PM					0					0					0
	5:45 PM					0					0					0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PACIFIC TECHNICAL DATA

TURNING MOVEMENT COUNTS





INTERSECTION TURNING MOVEMENT COUNTS

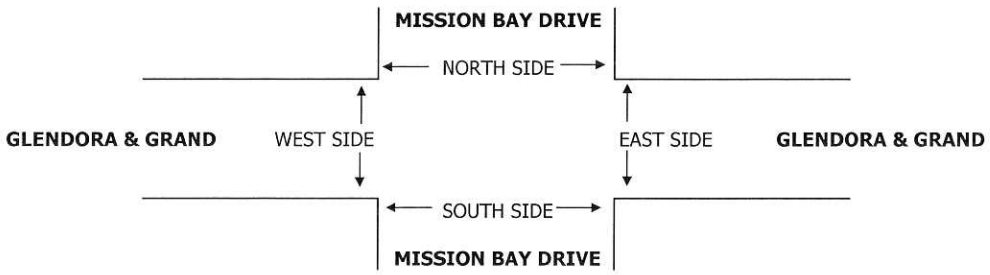
PREPARED BY: PACIFIC TECHNICAL DATA

DATE:	LOCATION:	MISSION BAY	PROJECT #:	PTD15-0807-03
8/5/15	NORTH & SOUTH:	MISSION BAY DRIVE	LOCATION #:	4
WEDNESDAY	EAST & WEST:	GLENDORA & GRAND	CONTROL:	SIGNAL

NOTES:

AM / PM / MD / OTHER / OTHER — ◄ W, E ►, ▲ N, S ▼

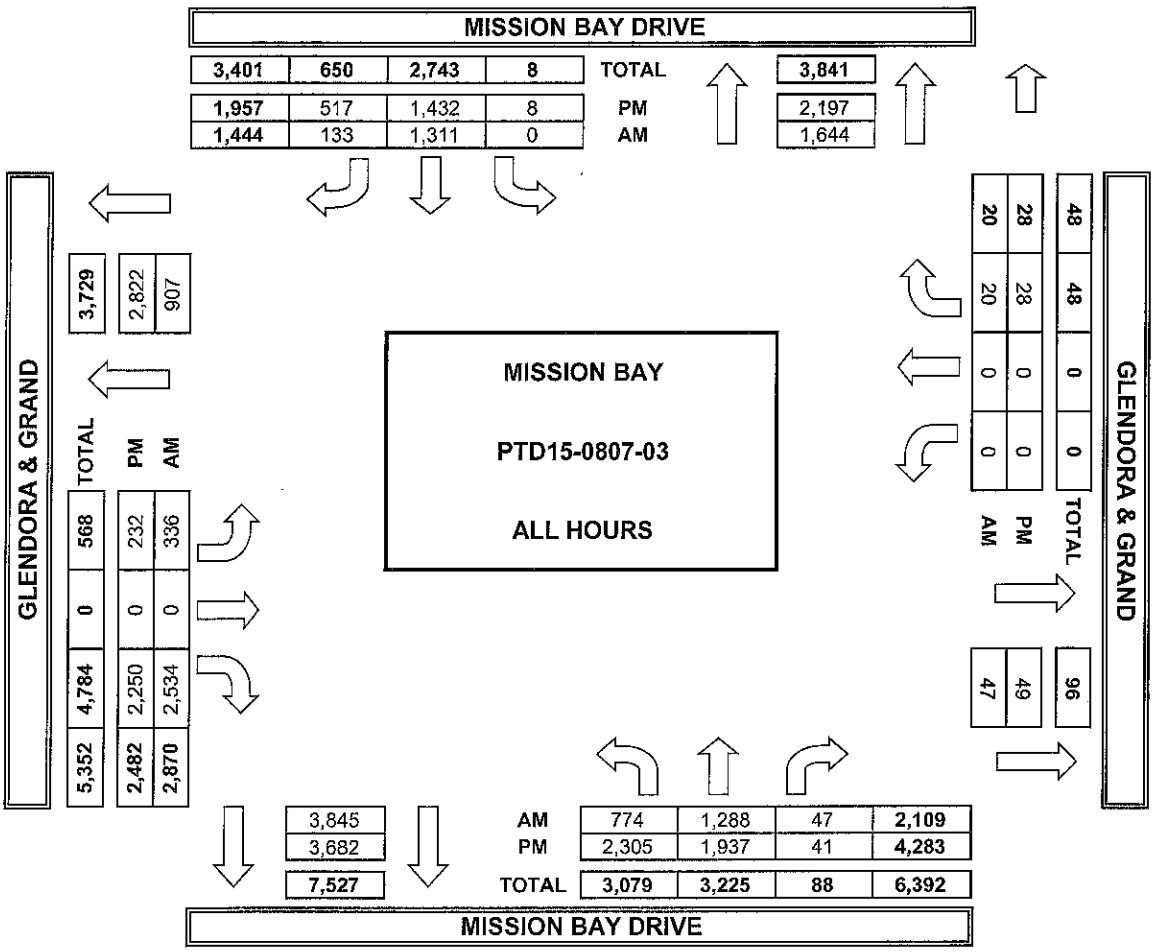
		NORTHBOUND MISSION BAY DRIVE			SOUTHBOUND MISSION BAY DRIVE			EASTBOUND GLENDORA & GRAND			WESTBOUND GLENDORA & GRAND				U-TURNS				
	LANES:	NL 2	NT 2	NR 0	SL X	ST 2	SR 1	EL 1	ET X	ER 1	WL X	WT X	WR 1	TOTAL	NB X	SB X	EB X	WB X	TTL
AM	7:00 AM	98	147	3		111	15	54		215			1	644					0
	7:15 AM	87	157	3		167	8	15		289			1	727					0
	7:30 AM	70	120	3		163	11	47		374			0	788					0
	7:45 AM	95	169	8		169	11	38		313			4	807					0
	8:00 AM	94	161	6		172	19	37		323			5	817					0
	8:15 AM	96	180	7		185	26	41		350			1	886					0
	8:30 AM	102	165	5		183	16	62		362			0	895					0
	8:45 AM	132	189	12		161	27	42		308			8	879					0
	VOLUMES	774	1,288	47	0	1,311	133	336	0	2,534	0	0	20	6,443	0	0	0	0	0
	APPROACH %	37%	61%	2%	0%	91%	9%	12%	0%	88%	0%	0%	100%						
	APP/DEPART	2,109	/	1,644	1,444	/	3,845	2,870	/	47	20	/	907	0					
	BEGIN PEAK HR		8:00 AM																
	VOLUMES	424	695	30	0	701	88	182	0	1,343	0	0	14	3,477					
	APPROACH %	37%	60%	3%	0%	89%	11%	12%	0%	88%	0%	0%	100%						
	PEAK HR FACTOR		0.863			0.935			0.899			0.438		0.971					
	APP/DEPART	1,149	/	891	789	/	2,044	1,525	/	30	14	/	512	0					
PM	4:00 PM	252	206	4		164	48	41		305			3	1,023					0
	4:15 PM	277	235	3	2	190	50	26		268			4	1,055	1	2			3
	4:30 PM	275	233	5		198	61	6		271			3	1,052					0
	4:45 PM	284	228	8	1	171	60	22		276			3	1,053		1			1
	5:00 PM	291	246	4	4	192	62	37		277			4	1,117		4			4
	5:15 PM	360	267	6		155	64	35		281			4	1,172					0
	5:30 PM	284	273	2	1	190	79	30		283			5	1,147		1			1
	5:45 PM	282	249	9		172	93	35		289			2	1,131					0
	VOLUMES	2,305	1,937	41	8	1,432	517	232	0	2,250	0	0	28	8,750	1	8	0	0	9
	APPROACH %	54%	45%	1%	0%	73%	26%	9%	0%	91%	0%	0%	100%						
	APP/DEPART	4,283	/	2,197	1,957	/	3,682	2,482	/	49	28	/	2,822	0					
	BEGIN PEAK HR		5:00 PM																
	VOLUMES	1,217	1,035	21	5	709	298	137	0	1,130	0	0	15	4,567					
	APPROACH %	54%	46%	1%	0%	70%	29%	11%	0%	89%	0%	0%	100%						
	PEAK HR FACTOR		0.898			0.937			0.978			0.750		0.974					
	APP/DEPART	2,273	/	1,187	1,012	/	1,839	1,267	/	26	15	/	1,515	0					

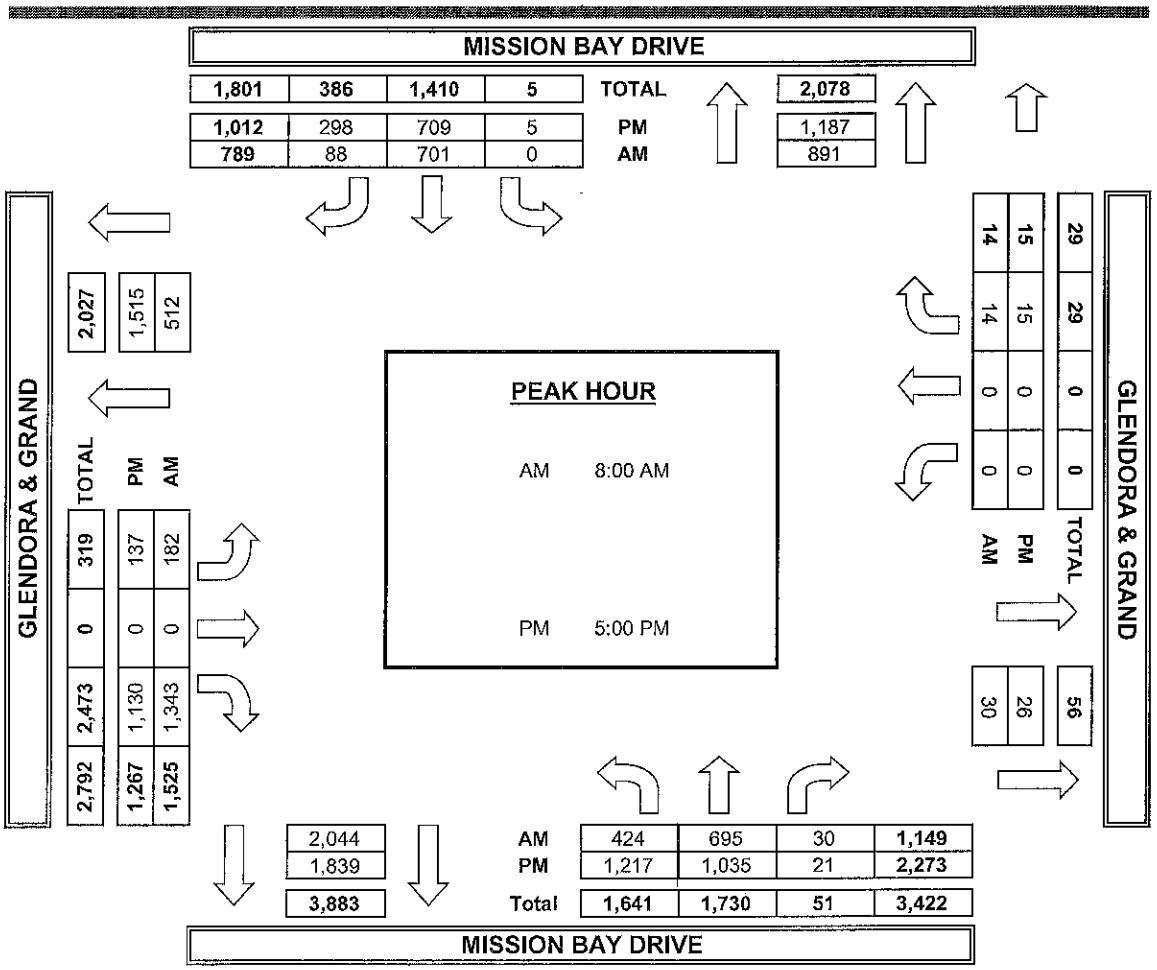


		PEDESTRIAN CROSSINGS					PEDESTRIAN ACTIVATIONS					BICYCLE CROSSINGS				
		N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
AM	7:00 AM					0					0					0
	7:15 AM					0					0					0
	7:30 AM					0					0					0
	7:45 AM					0					0					0
	8:00 AM					0					0					0
	8:15 AM					0					0					0
	8:30 AM					0					0					0
	8:45 AM					0					0					0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:00 PM					0					0					0
	4:15 PM					0					0					0
	4:30 PM					0					0					0
	4:45 PM					0					0					0
	5:00 PM					0					0					0
	5:15 PM					0					0					0
	5:30 PM					0					0					0
	5:45 PM					0					0					0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PACIFIC TECHNICAL DATA

TURNING MOVEMENT COUNTS





INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: PACIFIC TECHNICAL DATA

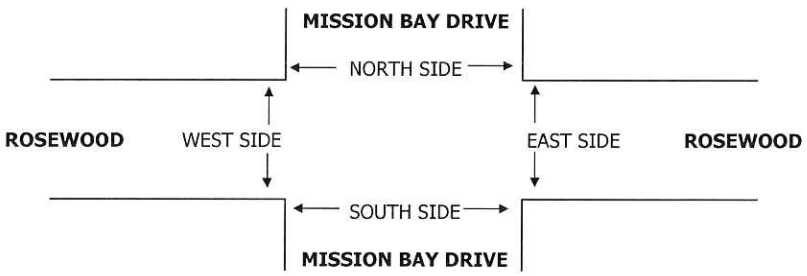
DATE:	LOCATION:	MISSION BAY	PROJECT #:	PTD15-0807-03
8/5/15	NORTH & SOUTH:	MISSION BAY DRIVE	LOCATION #:	5
WEDNESDAY	EAST & WEST:	ROSEWOOD	CONTROL:	1-WAY STOP (WB)

NOTES:

AM / PM / MD / OTHER / OTHER

N ▲ ◄ W E ► S ▼

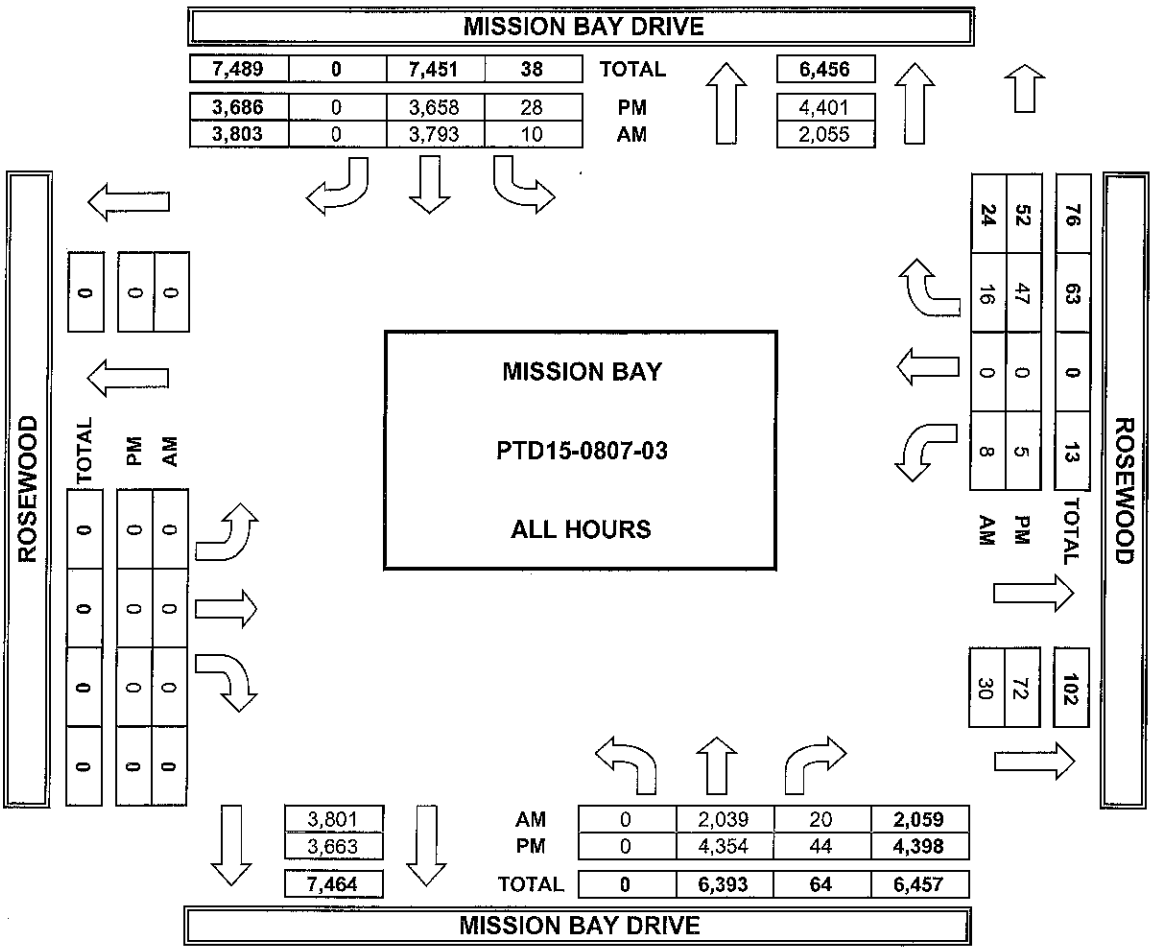
		NORTHBOUND MISSION BAY DRIVE			SOUTHBOUND MISSION BAY DRIVE			EASTBOUND ROSEWOOD			WESTBOUND ROSEWOOD				U-TURNS				
	LANES:	NL X	NT 3	NR 0	SL 1	ST 2	SR X	EL X	ET X	ER X	WL 0.5	WT X	WR 0.5	TOTAL	NB X	SB X	EB X	WB X	TTL
AM	7:00 AM		250	1	0	328					0		0	579					0
	7:15 AM		209	3	2	444					1		2	661		1			1
	7:30 AM		185	1	1	494					1		4	686					0
	7:45 AM		244	1	2	533					0		1	781					0
	8:00 AM		256	2	1	434					1		4	698					0
	8:15 AM		301	2	0	568					0		0	871					0
	8:30 AM		281	1	0	517					2		2	803					0
	8:45 AM		313	9	4	475					3		3	807					0
	VOLUMES	0	2,039	20	10	3,793	0	0	0	0	8	0	16	5,886	0	1	0	0	1
	APPROACH %	0%	99%	1%	0%	100%	0%	0%	0%	0%	33%	0%	67%						
	APP/DEPART	2,059	/	2,055	3,803	/	3,801	0	/	30	24	/	0	0					
	BEGIN PEAK HR		8:00 AM																
	VOLUMES	0	1,151	14	5	1,994	0	0	0	0	6	0	9	3,179					
	APPROACH %	0%	99%	1%	0%	100%	0%	0%	0%	0%	40%	0%	60%						
	PEAK HR FACTOR		0.905			0.880			0.000			0.625		0.912					
	APP/DEPART	1,165	/	1,160	1,999	/	2,000	0	/	19	15	/	0	0					
PM	4:00 PM		495	7	2	485					0		4	993		1			1
	4:15 PM		498	5	4	447					1		7	962		2			2
	4:30 PM		505	7	4	438					1		13	968		1			1
	4:45 PM		539	4	3	472					1		8	1,027					0
	5:00 PM		571	7	7	490					1		4	1,080		1			1
	5:15 PM		601	4	4	459					0		5	1,073		2			2
	5:30 PM		572	8	3	445					1		3	1,032		1			1
	5:45 PM		573	2	1	422					0		3	1,001					0
	VOLUMES	0	4,354	44	28	3,658	0	0	0	0	5	0	47	8,136	0	8	0	0	8
	APPROACH %	0%	99%	1%	1%	99%	0%	0%	0%	0%	10%	0%	90%						
	APP/DEPART	4,398	/	4,401	3,686	/	3,663	0	/	72	52	/	0	0					
	BEGIN PEAK HR		4:45 PM																
	VOLUMES	0	2,283	23	17	1,866	0	0	0	0	3	0	20	4,212					
	APPROACH %	0%	99%	1%	1%	99%	0%	0%	0%	0%	13%	0%	87%						
	PEAK HR FACTOR		0.953			0.947			0.000			0.639		0.975					
	APP/DEPART	2,306	/	2,303	1,883	/	1,869	0	/	40	23	/	0	0					

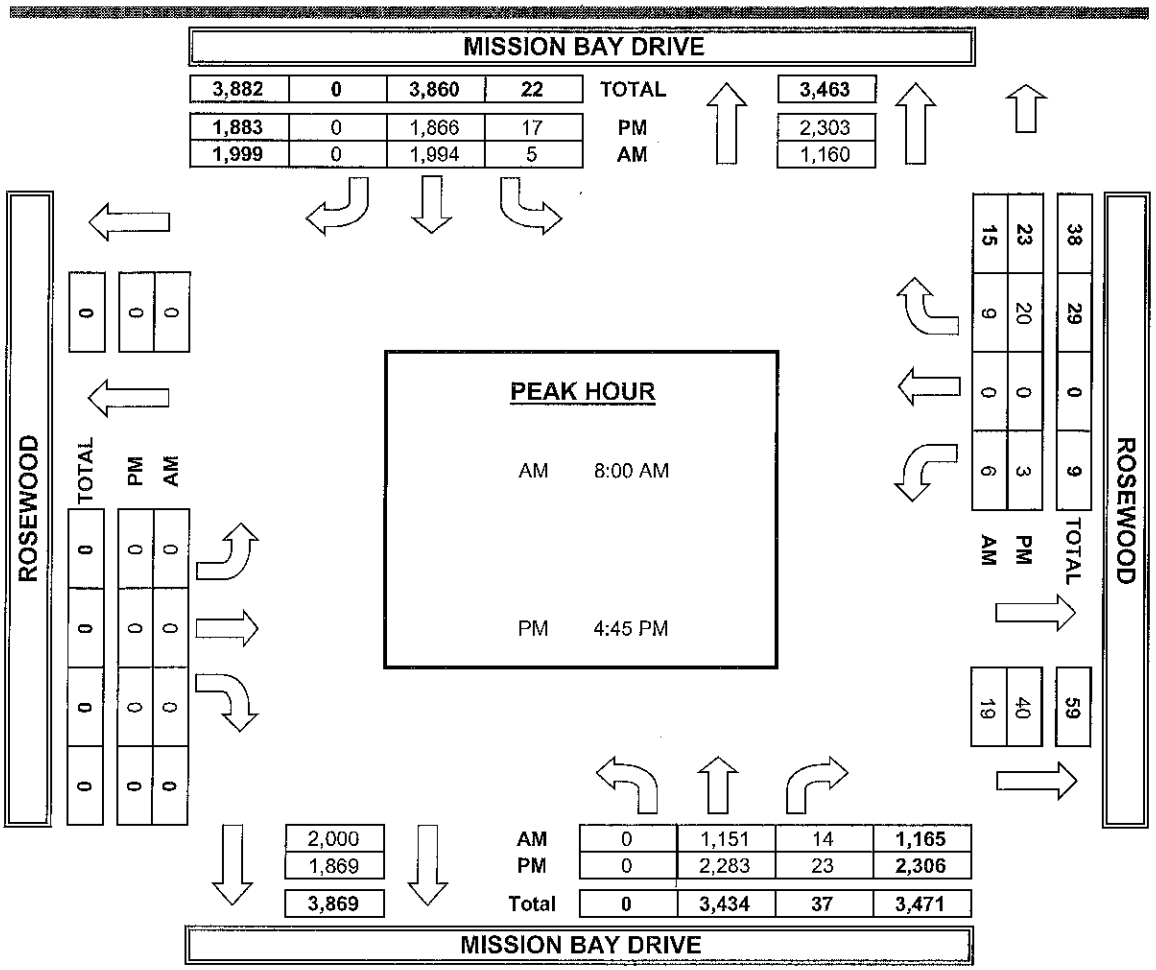


		PEDESTRIAN CROSSINGS					PEDESTRIAN ACTIVATIONS					BICYCLE CROSSINGS				
		N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
AM	7:00 AM					0					0					0
	7:15 AM					0					0					0
	7:30 AM					0					0					0
	7:45 AM					0					0					0
	8:00 AM					0					0					0
	8:15 AM					0					0					0
	8:30 AM					0					0					0
	8:45 AM					0					0					0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:00 PM					0					0					0
	4:15 PM					0					0					0
	4:30 PM					0					0					0
	4:45 PM					0					0					0
	5:00 PM					0					0					0
	5:15 PM					0					0					0
	5:30 PM					0					0					0
	5:45 PM					0					0					0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PACIFIC TECHNICAL DATA

TURNING MOVEMENT COUNTS





INTERSECTION TURNING MOVEMENT COUNTS

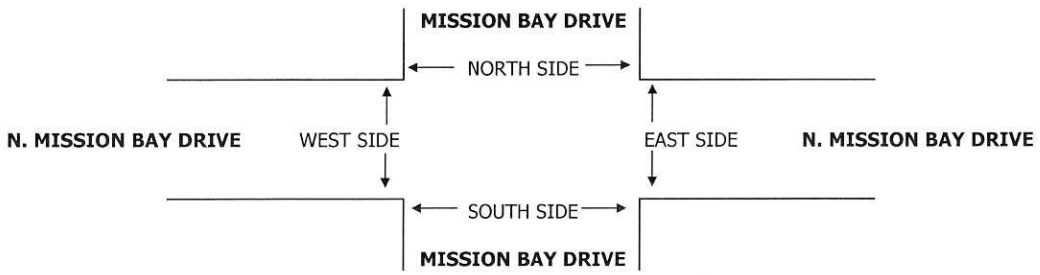
PREPARED BY: PACIFIC TECHNICAL DATA

DATE:	LOCATION:	MISSION BAY	PROJECT #:	PTD15-0807-03
8/5/15	NORTH & SOUTH:	MISSION BAY DRIVE	LOCATION #:	6
WEDNESDAY	EAST & WEST:	N. MISSION BAY DRIVE	CONTROL:	SIGNAL

NOTES:

AM / PM / MD / OTHER / OTHER — ▲ N, ◄ W, E ►, S ▼

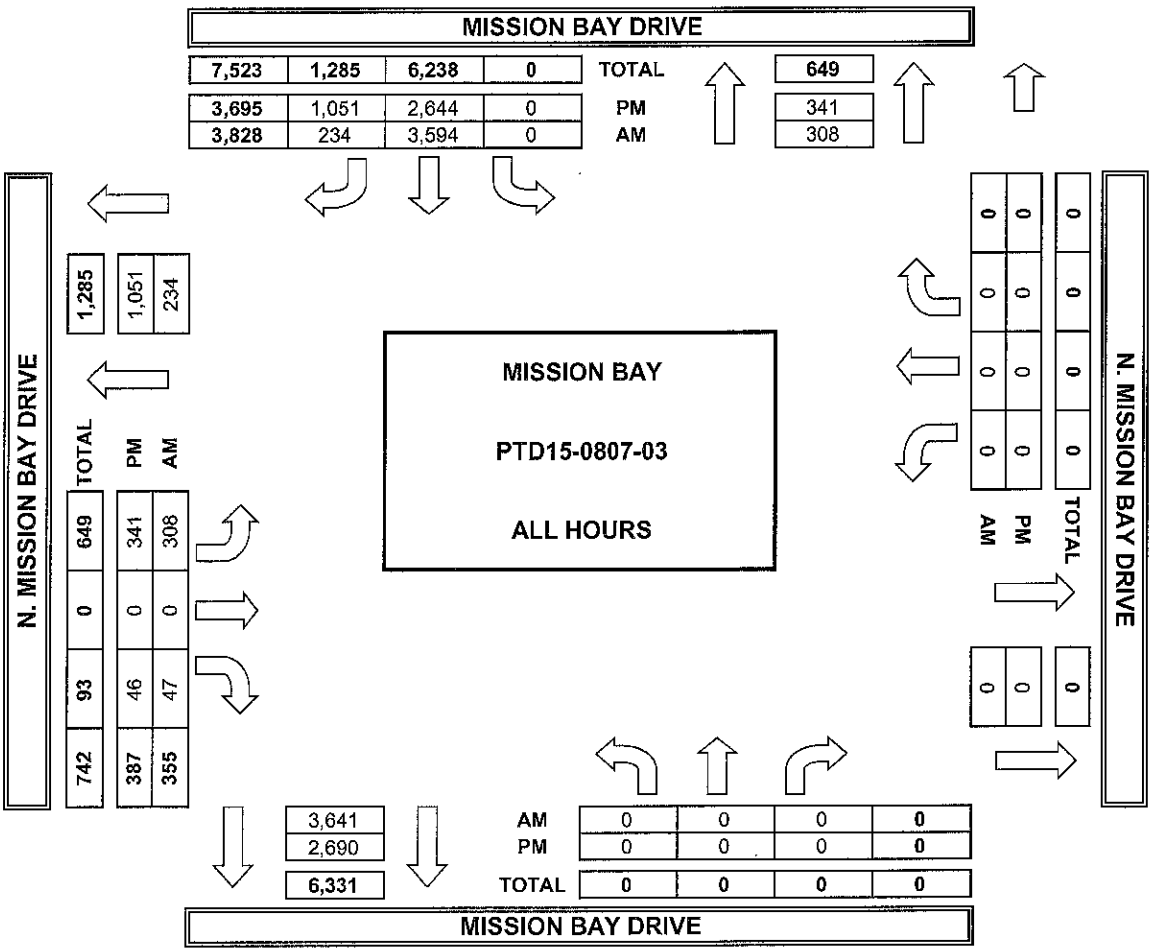
		NORTHBOUND MISSION BAY DRIVE			SOUTHBOUND MISSION BAY DRIVE			EASTBOUND N. MISSION BAY DRIVE			WESTBOUND N. MISSION BAY DRIVE				U-TURNS				
	LANES:	NL X	NT X	NR X	SL X	ST 2	SR 1	EL 1	ET X	ER 1	WL X	WT X	WR X	TOTAL	NB X	SB X	EB X	WB X	TTL
AM	7:00 AM					322	16	20		7				365					0
	7:15 AM					400	28	30		3				461					0
	7:30 AM					488	29	34		6				557					0
	7:45 AM					473	29	36		6				544					0
	8:00 AM					427	36	46		5				514					0
	8:15 AM					517	23	46		8				594					0
	8:30 AM					528	24	40		6				598					0
	8:45 AM					439	49	56		6				550		1			1
	VOLUMES	0	0	0	0	3,594	234	308	0	47	0	0	0	4,183	0	1	0	0	1
	APPROACH %	0%	0%	0%	0%	94%	6%	87%	0%	13%	0%	0%	0%						
	APP/DEPART	0	/	308	3,828	/	3,641	355	/	0	0	/	234	0					
	BEGIN PEAK HR		8:00 AM																
	VOLUMES	0	0	0	0	1,911	132	188	0	25	0	0	0	2,256					
	APPROACH %	0%	0%	0%	0%	94%	6%	88%	0%	12%	0%	0%	0%						
	PEAK HR FACTOR		0.000			0.925			0.859			0.000		0.943					
	APP/DEPART	0	/	188	2,043	/	1,936	213	/	0	0	/	132	0					
PM	4:00 PM					350	116	39		3				508					0
	4:15 PM					366	120	32		4				522					0
	4:30 PM					321	131	42		4				498					0
	4:45 PM					332	125	44		6				507					0
	5:00 PM					329	138	42		8				517					0
	5:15 PM					333	160	41		7				541					0
	5:30 PM					311	132	47		12				502					0
	5:45 PM					302	129	54		2				487					0
	VOLUMES	0	0	0	0	2,644	1,051	341	0	46	0	0	0	4,082	0	0	0	0	0
	APPROACH %	0%	0%	0%	0%	72%	28%	88%	0%	12%	0%	0%	0%						
	APP/DEPART	0	/	341	3,695	/	2,690	387	/	0	0	/	1,051	0					
	BEGIN PEAK HR		4:45 PM																
	VOLUMES	0	0	0	0	1,305	555	174	0	33	0	0	0	2,067					
	APPROACH %	0%	0%	0%	0%	70%	30%	84%	0%	16%	0%	0%	0%						
	PEAK HR FACTOR		0.000			0.943			0.877			0.000		0.955					
	APP/DEPART	0	/	174	1,860	/	1,338	207	/	0	0	/	555	0					

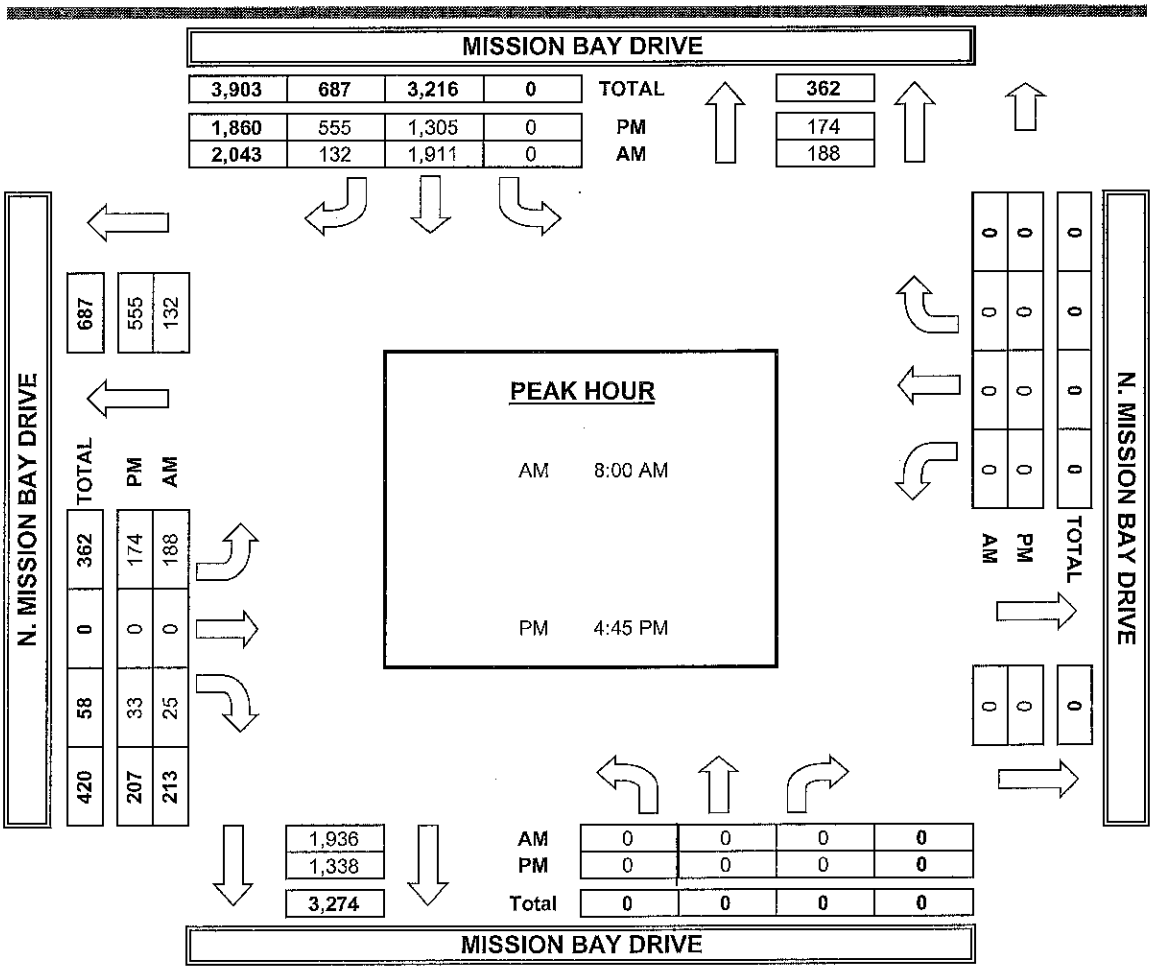


		PEDESTRIAN CROSSINGS					PEDESTRIAN ACTIVATIONS					BICYCLE CROSSINGS				
		N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
AM	7:00 AM					0					0					0
	7:15 AM					0					0					0
	7:30 AM					0					0					0
	7:45 AM					0					0					0
	8:00 AM					0					0					0
	8:15 AM					0					0					0
	8:30 AM					0					0					0
	8:45 AM					0					0					0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:00 PM					0					0					0
	4:15 PM					0					0					0
	4:30 PM					0					0					0
	4:45 PM					0					0					0
	5:00 PM					0					0					0
	5:15 PM					0					0					0
	5:30 PM					0					0					0
	5:45 PM					0					0					0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PACIFIC TECHNICAL DATA

TURNING MOVEMENT COUNTS





WEDNESDAY, AUG 5, 2015 CITY: SAN DIEGO - MISSION BAY PROJECT: PTD15-0807-03

Mission Bay Dr. (Bunker Hill St. to Glendora St.)

AM Period	NB		SB		EB	WB		PM Period	NB		SB		EB	WB	
00:00	52		51					12:00	236		191				
00:15	37		40					12:15	250		232				
00:30	29		36					12:30	256		219				
00:45	23	141	31	158			299	12:45	277	1019	213	855			1874
01:00	22		24					13:00	226		203				
01:15	16		27					13:15	249		273				
01:30	18		26					13:30	216		236				
01:45	13	69	22	99			168	13:45	236	927	267	979			1906
02:00	18		19					14:00	226		206				
02:15	17		25					14:15	230		228				
02:30	11		25					14:30	224		230				
02:45	15	61	12	81			142	14:45	256	936	313	977			1913
03:00	11		10					15:00	234		244				
03:15	17		11					15:15	254		229				
03:30	11		10					15:30	251		262				
03:45	13	52	7	38			90	15:45	250	989	255	990			1979
04:00	14		13					16:00	270		210				
04:15	21		19					16:15	270		251				
04:30	13		16					16:30	244		266				
04:45	44	92	34	82			174	16:45	251	1035	238	965			2000
05:00	42		36					17:00	295		255				
05:15	55		44					17:15	305		229				
05:30	71		61					17:30	311		268				
05:45	110	278	58	199			477	17:45	282	1193	261	1013			2206
06:00	133		80					18:00	261		299				
06:15	150		112					18:15	274		249				
06:30	214		114					18:30	251		328				
06:45	213	710	131	437			1147	18:45	231	1017	231	1107			2124
07:00	215		124					19:00	230		249				
07:15	175		167					19:15	222		203				
07:30	161		180					19:30	223		208				
07:45	215	766	189	660			1426	19:45	237	912	178	838			1750
08:00	205		158					20:00	206		165				
08:15	228		224					20:15	206		160				
08:30	235		189					20:30	190		154				
08:45	244	912	200	771			1683	20:45	154	756	131	610			1366
09:00	280		170					21:00	187		160				
09:15	241		192					21:15	167		160				
09:30	266		198					21:30	133		115				
09:45	285	1072	191	751			1823	21:45	124	611	98	533			1144
10:00	209		185					22:00	130		117				
10:15	238		187					22:15	103		82				
10:30	198		175					22:30	123		85				
10:45	252	897	197	744			1641	22:45	70	426	52	336			762
11:00	202		178					23:00	75		64				
11:15	245		218					23:15	63		64				
11:30	230		221					23:30	45		56				
11:45	252	929	213	830			1759	23:45	31	214	43	227			441
Total Vol.		5979		4850			**10829**			10035		9430			**19465**

Daily Totals

NB	SB	EB	WB	**Combined**
16014	14280			**30294**

	AM			**PM**		
Split %	55.2%	44.8%	**35.7%**	51.6%	48.4%	**64.3%**
Peak Hour	09:00	11:30	**11:45**	17:00	17:45	**17:15**
Volume	1072	857	**1849**	1193	1137	**2216**
P.H.F.	0.94	0.92	**0.96**	0.98	0.87	**0.96**

WEDNESDAY, AUG 5, 2015 CITY: SAN DIEGO - MISSION BAY PROJECT: PTD15-0807-03

Mission Bay Dr. (Glendora St. to Rosewood St.)

AM Period	NB		SB		EB	WB		PM Period	NB		SB		EB	WB	
00:00	80		77					12:00	410		396				
00:15	70		60					12:15	371		420				
00:30	68		44					12:30	433		313				
00:45	70	288	51	232			520	12:45	448	1662	333	1462			3124
01:00	55		35					13:00	411		342				
01:15	42		44					13:15	449		356				
01:30	35		41					13:30	441		365				
01:45	40	172	20	140			312	13:45	394	1695	374	1437			3132
02:00	41		19					14:00	399		351				
02:15	28		20					14:15	374		388				
02:30	21		16					14:30	365		419				
02:45	19	109	18	73			182	14:45	333	1471	404	1562			3033
03:00	22		22					15:00	384		412				
03:15	20		16					15:15	391		426				
03:30	18		21					15:30	419		391				
03:45	26	86	22	81			167	15:45	404	1598	418	1647			3245
04:00	41		32					16:00	446		449				
04:15	33		44					16:15	521		462				
04:30	65		65					16:30	518		488				
04:45	45	184	70	211			395	16:45	535	2020	432	1831			3851
05:00	65		88					17:00	541		466				
05:15	58		106					17:15	638		431				
05:30	103		121					17:30	562		484				
05:45	121	347	184	499			846	17:45	518	2259	442	1823			4082
06:00	111		222					18:00	448		401				
06:15	184		277					18:15	454		333				
06:30	205		269					18:30	421		319				
06:45	235	735	284	1052			1787	18:45	403	1726	341	1394			3120
07:00	251		333					19:00	441		303				
07:15	262		451					19:15	418		284				
07:30	208		556					19:30	395		266				
07:45	262	983	482	1822			2805	19:45	412	1666	242	1095			2761
08:00	255		462					20:00	362		222				
08:15	282		551					20:15	318		218				
08:30	262		540					20:30	342		191				
08:45	310	1109	452	2005			3114	20:45	318	1340	141	772			2112
09:00	312		418					21:00	321		156				
09:15	303		426					21:15	333		142				
09:30	289		435					21:30	284		135				
09:45	291	1195	404	1683			2878	21:45	262	1200	121	554			1754
10:00	312		388					22:00	218		108				
10:15	318		345					22:15	205		111				
10:30	323		351					22:30	161		98				
10:45	305	1258	327	1411			2669	22:45	142	726	88	405			1131
11:00	289		398					23:00	151		70				
11:15	310		362					23:15	128		65				
11:30	345		377					23:30	106		55				
11:45	384	1328	384	1521			2849	23:45	88	473	70	260			733
Total Vol.		7794		10730			**18524**			17836		14242			**32078**

Daily Totals

NB	SB	EB	WB	Combined
25630	24972			**50602**

	AM			PM		
Split %	42.1%	57.9%	**36.6%**	55.6%	44.4%	**63.4%**
Peak Hour	11:45	07:30	**08:15**	16:45	16:15	**16:45**
Volume	1598	2051	**3127**	2276	1848	**4089**
P.H.F.	0.92	0.92	**0.94**	0.92	0.95	**0.96**

WEDNESDAY, AUG 5, 2015 CITY: SAN DIEGO - MISSION BAY PROJECT: PTD15-0807-03

Mission Bay Dr. (Rosewood St. to N Mission Bay Dr.)

AM Period	NB		SB		EB	WB		PM Period	NB		SB		EB	WB	
00:00	113		74					12:00	414		402				
00:15	76		65					12:15	452		427				
00:30	78		51					12:30	429		418				
00:45	64	331	44	234			565	12:45	433	1728	406	1653			3381
01:00	56		35					13:00	405		419				
01:15	40		26					13:15	436		404				
01:30	53		35					13:30	413		384				
01:45	39	188	22	118			306	13:45	394	1648	377	1584			3232
02:00	49		29					14:00	431		365				
02:15	31		19					14:15	414		351				
02:30	24		16					14:30	426		344				
02:45	34	138	15	79			217	14:45	473	1744	352	1412			3156
03:00	13		11					15:00	447		368				
03:15	15		18					15:15	468		375				
03:30	19		18					15:30	485		395				
03:45	25	72	24	71			143	15:45	520	1920	416	1554			3474
04:00	21		21					16:00	503		468				
04:15	27		26					16:15	488		451				
04:30	30		44					16:30	519		444				
04:45	66	144	35	126			270	16:45	522	2032	478	1841			3873
05:00	65		65					17:00	568		499				
05:15	86		70					17:15	618		462				
05:30	96		88					17:30	579		484				
05:45	172	419	142	365			784	17:45	556	2321	418	1863			4184
06:00	189		184					18:00	472		404				
06:15	237		212					18:15	492		416				
06:30	297		222					18:30	447		384				
06:45	264	987	305	923			1910	18:45	413	1824	365	1569			3393
07:00	247		318					19:00	438		377				
07:15	217		446					19:15	427		384				
07:30	190		451					19:30	388		391				
07:45	259	913	552	1767			2680	19:45	400	1653	365	1517			3170
08:00	250		448					20:00	358		333				
08:15	296		526					20:15	334		318				
08:30	276		542					20:30	328		284				
08:45	332	1154	449	1965			3119	20:45	304	1324	265	1200			2524
09:00	377		451					21:00	334		242				
09:15	363		468					21:15	317		235				
09:30	422		477					21:30	297		218				
09:45	464	1626	414	1810			3436	21:45	249	1197	222	917			2114
10:00	351		426					22:00	231		198				
10:15	427		435					22:15	215		161				
10:30	345		404					22:30	215		145				
10:45	415	1538	391	1656			3194	22:45	147	808	121	625			1433
11:00	364		396					23:00	157		88				
11:15	415		387					23:15	124		98				
11:30	413		411					23:30	102		91				
11:45	462	1654	423	1617			3271	23:45	81	464	88	365			829
Total Vol.		9164		10731			**19895**			18663		16100			**34763**

Daily Totals

NB	SB	EB	WB	**Combined**
27827	26831			**54658**

	AM			**PM**		
Split %	46.1%	53.9%	**36.4%**	53.7%	46.3%	**63.6%**
Peak Hour	11:45	07:45	**09:00**	17:00	16:45	**16:45**
Volume	1757	2068	**3436**	2321	1923	**4210**
P.H.F.	0.95	0.94	**0.96**	0.95	0.96	**0.97**

WEDNESDAY, AUG 5, 2015 CITY: SAN DIEGO - MISSION BAY PROJECT: PTD15-0807-03

Bunker Hill St. (Mission Bay Dr. to Del Rey St.)

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			6		8			12:00			28		22		
00:15			0		4			12:15			27		23		
00:30			2		5			12:30			29		33		
00:45			10	18	1	18	36	12:45			43	127	25	103	230
01:00			2		3			13:00			44		28		
01:15			5		0			13:15			35		46		
01:30			5		6			13:30			28		37		
01:45			3	15	3	12	27	13:45			26	133	28	139	272
02:00			1		1			14:00			34		24		
02:15			0		2			14:15			22		19		
02:30			0		1			14:30			20		19		
02:45			1	2	0	4	6	14:45			38	114	17	79	193
03:00			1		1			15:00			32		32		
03:15			1		0			15:15			33		31		
03:30			1		1			15:30			19		25		
03:45			3	6	1	3	9	15:45			33	117	26	114	231
04:00			0		1			16:00			35		35		
04:15			3		2			16:15			31		40		
04:30			1		2			16:30			33		41		
04:45			1	5	0	5	10	16:45			38	137	38	154	291
05:00			0		8			17:00			44		51		
05:15			5		5			17:15			40		50		
05:30			1		2			17:30			31		30		
05:45			6	12	8	23	35	17:45			33	148	41	172	320
06:00			8		4			18:00			19		21		
06:15			8		10			18:15			40		30		
06:30			20		9			18:30			25		31		
06:45			24	60	8	31	91	18:45			37	121	19	101	222
07:00			30		11			19:00			20		22		
07:15			25		16			19:15			19		23		
07:30			26		18			19:30			22		17		
07:45			44	125	20	65	190	19:45			23	84	9	71	155
08:00			26		16			20:00			22		12		
08:15			55		24			20:15			25		16		
08:30			68		28			20:30			17		18		
08:45			51	200	17	85	285	20:45			19	83	7	53	136
09:00			37		20			21:00			14		24		
09:15			29		20			21:15			8		12		
09:30			35		22			21:30			13		11		
09:45			45	146	16	78	224	21:45			17	52	11	58	110
10:00			25		22			22:00			15		5		
10:15			25		15			22:15			10		2		
10:30			22		24			22:30			8		3		
10:45			20	92	26	87	179	22:45			9	42	6	16	58
11:00			17		24			23:00			13		3		
11:15			20		23			23:15			9		6		
11:30			19		21			23:30			9		6		
11:45			21	77	20	88	165	23:45			14	45	0	15	60
Total Vol.				758		499	**1257**					1203		1075	**2278**

Daily Totals

	NB	SB	EB	WB	**Combined**
			1961	1574	**3535**
			AM	**PM**	
Split %			60.3%	39.7%	**35.6%**
			52.8%	47.2%	**64.4%**
Peak Hour			08:15	11:45	**08:15**
			16:30	16:30	**16:30**
Volume			211	98	**300**
			155	180	**335**
P.H.F.			0.78	0.74	**0.78**
			0.88	0.88	**0.88**

WEDNESDAY, AUG 5, 2015 CITY: SAN DIEGO - MISSION BAY PROJECT: PTD15-0807-03

Del Rey St. (Glendora St. to Rosewood St.)

AM Period	NB		SB		EB	WB		PM Period	NB		SB		EB	WB	
00:00	0		0					12:00	5		4				
00:15	1		0					12:15	5		5				
00:30	0		0					12:30	7		13				
00:45	0	1	0	0			1	12:45	7	24	18	40			64
01:00	0		0					13:00	3		7				
01:15	0		0					13:15	5		15				
01:30	0		1					13:30	11		11				
01:45	0	0	3	4			4	13:45	5	24	5	38			62
02:00	0		0					14:00	5		12				
02:15	0		0					14:15	7		12				
02:30	0		0					14:30	5		2				
02:45	0	0	0	0				14:45	9	26	12	38			64
03:00	0		0					15:00	6		6				
03:15	1		1					15:15	5		6				
03:30	1		0					15:30	5		1				
03:45	0	2	1	2			4	15:45	3	19	9	22			41
04:00	0		0					16:00	4		7				
04:15	0		1					16:15	5		5				
04:30	0		0					16:30	5		12				
04:45	0	0	0	1			1	16:45	3	17	9	33			50
05:00	3		2					17:00	7		16				
05:15	0		1					17:15	7		12				
05:30	0		2					17:30	4		7				
05:45	1	4	1	6			10	17:45	7	25	10	45			70
06:00	0		1					18:00	5		13				
06:15	2		0					18:15	11		17				
06:30	2		2					18:30	3		6				
06:45	1	5	3	6			11	18:45	5	24	6	42			66
07:00	6		9					19:00	7		2				
07:15	2		5					19:15	8		5				
07:30	3		8					19:30	3		5				
07:45	2	13	5	27			40	19:45	3	21	15	27			48
08:00	1		2					20:00	3		6				
08:15	2		3					20:15	0		8				
08:30	10		13					20:30	1		3				
08:45	8	21	29	47			68	20:45	2	6	1	18			24
09:00	4		7					21:00	4		7				
09:15	5		10					21:15	2		2				
09:30	12		9					21:30	4		3				
09:45	4	25	9	35			60	21:45	0	10	3	15			25
10:00	4		5					22:00	3		5				
10:15	4		6					22:15	0		4				
10:30	3		5					22:30	0		3				
10:45	10	21	16	32			53	22:45	2	5	3	15			20
11:00	5		13					23:00	1		1				
11:15	3		10					23:15	0		5				
11:30	5		17					23:30	0		3				
11:45	8	21	7	47			68	23:45	0	1	1	10			11
Total Vol.		113		207			**320**			202		343			**545**

Daily Totals

NB	SB	EB	WB	Combined
315	550			**865**

	AM			PM		
Split %	35.3%	64.7%	**37.0%**	37.1%	62.9%	**63.0%**
Peak Hour	08:45	08:30	**08:30**	13:30	12:30	**12:45**
Volume	29	59	**86**	28	53	**77**
P.H.F.	0.60	0.51	**0.58**	0.59	0.74	**0.77**

WEDNESDAY, AUG 5, 2015 CITY: SAN DIEGO - MISSION BAY PROJECT: PTD15-0807-03

Rosewood St. (Mission Bay Dr. to Del Rey St.)

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			2		0			12:00			5		10		
00:15			2		2			12:15			7		6		
00:30			0		0			12:30			5		5		
00:45			0	4	0	2	6	12:45			6	23	14	35	58
01:00			1		0			13:00			6		16		
01:15			1		2			13:15			6		15		
01:30			3		0			13:30			5		9		
01:45			0	5	0	2	7	13:45			0	17	5	45	62
02:00			0		0			14:00			6		12		
02:15			1		1			14:15			0		21		
02:30			0		0			14:30			6		14		
02:45			0	1	0	1	2	14:45			13	25	7	54	79
03:00			2		2			15:00			2		6		
03:15			0		0			15:15			1		10		
03:30			0		2			15:30			4		4		
03:45			0	2	0	4	6	15:45			3	10	11	31	41
04:00			0		0			16:00			10		5		
04:15			0		0			16:15			8		6		
04:30			0		0			16:30			12		18		
04:45			0	0	0	0		16:45			8	38	11	40	78
05:00			0		0			17:00			15		4		
05:15			0		0			17:15			7		6		
05:30			0		3			17:30			12		4		
05:45			1	1	1	4	5	17:45			4	38	2	16	54
06:00			1		2			18:00			5		6		
06:15			1		0			18:15			2		7		
06:30			0		1			18:30			4		13		
06:45			0	2	0	3	5	18:45			0	11	7	33	44
07:00			1		0			19:00			2		6		
07:15			4		3			19:15			3		6		
07:30			1		6			19:30			1		5		
07:45			3	9	2	11	20	19:45			2	8	5	22	30
08:00			4		4			20:00			4		9		
08:15			2		1			20:15			2		7		
08:30			0		3			20:30			5		3		
08:45			12	18	5	13	31	20:45			3	14	1	20	34
09:00			9		16			21:00			2		3		
09:15			2		2			21:15			1		4		
09:30			0		10			21:30			0		5		
09:45			4	15	4	32	47	21:45			1	4	0	12	16
10:00			1		6			22:00			3		6		
10:15			2		7			22:15			2		2		
10:30			4		5			22:30			0		0		
10:45			10	17	8	26	43	22:45			1	6	2	10	16
11:00			5		13			23:00			1		1		
11:15			7		7			23:15			2		1		
11:30			1		10			23:30			1		2		
11:45			8	21	9	39	60	23:45			1	5	0	4	9
Total Vol.				95		137	**232**					199		322	**521**

Daily Totals

NB	SB	EB	WB	**Combined**
		294	459	**753**

	AM			**PM**		
Split %	40.9%	59.1%	**30.8%**	38.2%	61.8%	**69.2%**
Peak Hour	10:30	11:00	**10:45**	16:15	12:45	**16:15**
Volume	26	39	**61**	43	54	**82**
P.H.F.	0.65	0.75	**0.85**	0.72	0.84	**0.68**

WEDNESDAY, AUG 5, 2015 CITY: SAN DIEGO - MISSION BAY PROJECT: PTD15-0807-03

Mission Bay Dr. (Garnet Ave. to Magnolia Ave.)

AM Period	NB		SB		EB	WB		PM Period	NB		SB		EB	WB	
00:00	55		40					12:00	247		189				
00:15	35		35					12:15	257		226				
00:30	30		27					12:30	258		205				
00:45	28	148	21	123			271	12:45	222	984	218	838			1822
01:00	25		26					13:00	256		191				
01:15	16		22					13:15	260		235				
01:30	17		15					13:30	245		255				
01:45	15	73	18	81			154	13:45	235	996	262	943			1939
02:00	23		21					14:00	238		212				
02:15	15		16					14:15	242		205				
02:30	10		20					14:30	240		221				
02:45	13	61	12	69			130	14:45	245	965	226	864			1829
03:00	14		11					15:00	253		232				
03:15	16		10					15:15	276		218				
03:30	11		8					15:30	287		252				
03:45	18	59	9	38			97	15:45	280	1096	242	944			2040
04:00	17		9					16:00	246		255				
04:15	14		10					16:15	271		230				
04:30	18		16					16:30	290		212				
04:45	40	89	28	63			152	16:45	288	1095	244	941			2036
05:00	51		21					17:00	301		251				
05:15	53		33					17:15	299		235				
05:30	71		45					17:30	337		262				
05:45	113	288	51	150			438	17:45	295	1232	261	1009			2241
06:00	122		68					18:00	278		262				
06:15	151		118					18:15	255		274				
06:30	199		126					18:30	273		284				
06:45	225	697	135	447			1144	18:45	214	1020	252	1072			2092
07:00	213		135					19:00	220		244				
07:15	193		191					19:15	226		218				
07:30	221		180					19:30	199		205				
07:45	225	852	179	685			1537	19:45	264	909	189	856			1765
08:00	228		184					20:00	209		186				
08:15	249		212					20:15	208		161				
08:30	253		205					20:30	190		144				
08:45	225	955	218	819			1774	20:45	169	776	133	624			1400
09:00	267		191					21:00	189		121				
09:15	234		184					21:15	171		141				
09:30	262		196					21:30	129		152				
09:45	270	1033	180	751			1784	21:45	120	609	116	530			1139
10:00	224		162					22:00	136		101				
10:15	262		181					22:15	113		88				
10:30	215		204					22:30	115		90				
10:45	250	951	198	745			1696	22:45	84	448	91	370			818
11:00	249		227					23:00	76		65				
11:15	258		196					23:15	65		35				
11:30	236		205					23:30	49		28				
11:45	248	991	188	816			1807	23:45	31	221	33	161			382
Total Vol.		6197		4787			**10984**			10351		9152			**19503**

Daily Totals

NB	SB	EB	WB	**Combined**
16548	13939			**30487**

	AM			**PM**		
Split %	56.4%	43.6%	**36.0%**	53.1%	46.9%	**64.0%**
Peak Hour	09:00	08:15	**08:15**	17:00	17:45	**17:00**
Volume	1033	826	**1820**	1232	1081	**2241**
P.H.F.	0.96	0.95	**0.99**	0.95	0.95	**0.94**

WEDNESDAY, AUG 5, 2015 CITY: SAN DIEGO - MISSION BAY PROJECT: PTD15-0807-03

Mission Bay Dr. (Magnolia Ave. to Bunker Hill St.)

AM Period	NB		SB		EB	WB		PM Period	NB		SB		EB	WB	
00:00	57		44					12:00	212		184				
00:15	35		38					12:15	253		212				
00:30	32		31					12:30	251		222				
00:45	29	153	30	143			296	12:45	235	951	213	831			1782
01:00	21		28					13:00	237		209				
01:15	17		21					13:15	250		262				
01:30	18		22					13:30	233		251				
01:45	11	67	26	97			164	13:45	234	954	242	964			1918
02:00	20		20					14:00	232		212				
02:15	13		21					14:15	233		218				
02:30	11		24					14:30	249		226				
02:45	15	59	11	76			135	14:45	246	960	235	891			1851
03:00	11		9					15:00	243		241				
03:15	14		10					15:15	258		222				
03:30	12		11					15:30	266		266				
03:45	19	56	8	38			94	15:45	230	997	250	979			1976
04:00	13		12					16:00	258		238				
04:15	16		15					16:15	284		242				
04:30	15		18					16:30	268		212				
04:45	39	83	31	76			159	16:45	255	1065	244	936			2001
05:00	47		33					17:00	298		251				
05:15	54		41					17:15	301		248				
05:30	65		55					17:30	288		262				
05:45	115	281	54	183			464	17:45	301	1188	235	996			2184
06:00	121		69					18:00	253		288				
06:15	149		121					18:15	267		274				
06:30	207		118					18:30	265		296				
06:45	222	699	127	435			1134	18:45	214	999	242	1100			2099
07:00	215		141					19:00	225		215				
07:15	197		180					19:15	230		222				
07:30	201		196					19:30	219		216				
07:45	220	833	212	729			1562	19:45	246	920	202	855			1775
08:00	216		184					20:00	204		161				
08:15	248		236					20:15	208		144				
08:30	240		228					20:30	203		151				
08:45	228	932	215	863			1795	20:45	164	779	132	588			1367
09:00	268		184					21:00	195		146				
09:15	234		191					21:15	176		152				
09:30	257		190					21:30	132		121				
09:45	278	1037	184	749			1786	21:45	130	633	108	527			1160
10:00	210		161					22:00	135		101				
10:15	238		177					22:15	105		90				
10:30	200		184					22:30	125		81				
10:45	245	893	191	713			1606	22:45	80	445	70	342			787
11:00	219		165					23:00	72		54				
11:15	245		222					23:15	70		40				
11:30	239		218					23:30	52		51				
11:45	255	958	202	807			1765	23:45	30	224	36	181			405
Total Vol.		6051		4909			**10960**			10115		9190			**19305**

Daily Totals

NB	SB	EB	WB	**Combined**
16166	14099			**30265**

	AM			**PM**		
Split %	55.2%	44.8%	**36.2%**	52.4%	47.6%	**63.8%**
Peak Hour	09:00	08:00	**08:15**	17:00	18:00	**17:00**
Volume	1037	863	**1847**	1188	1100	**2184**
P.H.F.	0.93	0.91	**0.95**	0.98	0.93	**0.99**

INTERSECTION: Garnet Avenue @ Mission Bay Drive

233 Program

Group Assignment:
Field Master Assignment:
System Reference Number:

N/S St: Mission Bay
E/W St: Garnet

Last Database Change:

Timing sheets by: KT
Approved by:
Drawing Number: 32895-2-D
Timing implemented on: 11/22/14

Row	Phase Numbers--->	1 (Mission Bay)	2 (Garnet)	3	4	5	6 (Mission Bay)	7	8 (Garnet)
0	Ped Walk		7		7		7		7
1	Ped FDW		26		26		24		26
2	Min Green	6	8	4	8	6	8	4	8
3	Type 3 Disconnect								
4	Added per Vehicle								
5	Veh Extension	2.0	3.3	2.0	4.3	2.0	4.5	2.0	4.1
6	Max Gap	2.0	3.3	2.0	4.3	2.0	4.5	2.0	4.1
7	Min Gap	2.0	0.2	2.0	0.2	2.0	0.2	2.0	0.2
8	Max Limit	45	50	45	60	45	50	35	60
9	Max Limit 2								
A	Adv. / Delay Walk								
B	PE Min Ped FDW								
C	Cond Serv Check								
D	Reduce Every		1.0		0.7		0.7		0.8
E	Yellow Change	3.4	4.3	3.4	3.9	3.4	3.9	3.4	3.9
F	Red Clear	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

Phase Timing - Bank 1 <F/1+Phase+Row>

	E
RR-1 Delay	
RR-1 Clear	
EV-A Delay	0
EV-A Clear	0
EV-B Delay	0
EV-B Clear	0
EV-C Delay	0
EV-C Clear	0
EV-D Delay	0
EV-D Clear	0
RR-2 Delay	
RR-2 Clear	
View EV Delay	---
View EV Clear	---
View RR Delay	---
View RR Clear	---

Preempt Timing <F/1+E+Row>

Row		F
0	Permit	12345678
1	Red Lock	
2	Yellow Lock	
3	Min Recall	
4	Ped Recall	
5	View Set Peds	2 4 6 8
6	Rest In Walk	
7	Red Rest	
8	Double Entry	
9	Max Recall	
A	Soft Recall	2 6
B	Max 2	
C	Cond. Service	
D	Man Cntrl Calls	
E	Yellow Start	4 8
F	First Phases	1 5

Phase Functions <F/1+F+Row>

Current Calculated Cycle Length: C/0 + B + F

	9	A	B	C	D
	---	---	---	---	---
Phase 1					
Phase 2					
Phase 3					
Phase 4					
Phase 5					
Phase 6					
Phase 7					
Phase 8					
Max Initial					
Alternate Walk					
Alternate FDW					
Alternate Initial					
Alternate Extension					

Alternate Timing <F/1+Column+Phase>

Drop Number	5	<C/0+0+0>
Zone Number	5	<C/0+0+1>
Area Number	6	<C/0+0+2>
Area Address	5	<C/0+0+3>
QuicNet Channel (COM)	42	(QuicNet)

Communication Addresses

Flash Start	0	<F/1+0+E>
Red Revert	5.0	<F/1+0+F>
All Red Start	0.0	<F/1+C+0>

Start / Revert Times

Manual Plan
0 = Automatic
1-9 = Plan 1-9
14 = Free
15 = Flash

Manual Offset
0 = Automatic
1 = Offset A
2 = Offset B
3 = Offset C

(Outputs specified in Assignable Outputs at E/127+A+E & F)

Exclusive Walk	0	<F/1+0+0>
Exclusive FDW	0	<F/1+0+1>
All Red Clear	0.0	<F/1+0+2>

Exclusive Ped Phase

Manual Plan	0	<C/0+A+1>
Manual Offset	0	<C/0+B+1>

Manual Selection

Free Lag	2 4 6 8	<C/1+F+0>

How to Set Page Access Code:
F/1 – C + 0 + F = 1

Notes:

INTERSECTION: Garnet Avenue @ Mission Bay Drive

233 Program

Row		Overlap 1	2	3	4	5	6	7	8
0	Load Switch Number								
1	Veh Set 1 - Phases	67	1 8	23	45				
2	Veh Set 2 - Phases								
3	Veh Set 3 - Phases								
4	Neg Veh Phases	5 8	2 7	1 4	3 6				
5	Neg Ped Phases	8	2	4	6				
6	Green Omit Phases	6	8	2	4				
7	Green Clear Omit Phs.								
8									
9									
A									
B									
C									
D	Green Clear								
E	Yellow Change	3.4	3.4	3.4	3.4				
F	Red Clear	1.0	1.0	1.0	1.0				

Overlap Assignments <E/29+Column+Row>

Row		F
0	Fast Green Flash Phase	
1	Green Flash Phases	
2	Flashing Walk Phases	
3	Guaranteed Passage	
4	Simultaneous Gap Term	12345678
5	Sequential Timing	
6	Advance Walk Phases	
7	Delay Walk Phases	
8	External Recall	
9	Start-up Overlap Green	
A	Max Extension	
B	Inhibit Ped Reservice	
C	Semi-Actuated	
D	Start-up Overlap Yellow	
E	Start-up Vehicle Calls	12345678
F	Start-up Ped Calls	12345678

Specials <F/2÷F+Row>

Row		E
0	Exclusive Phases	
1	RR-1 Clear Phases	
2	RR-2 Clear Phases	
3	RR-2 Limited Service	
4	Prot / Perm Phases	
5	Flash to PE Circuits	
6	Flash Entry Phases	
7	Disable Yellow Range	
8	Disable Ovp Yel Range	
9	Overlap Yellow Flash	
A	EV-A Phases	2 5
B	EV-B Phases	4 7
C	EV-C Phases	1 6
D	EV-D Phases	3 8
E	Extra 1 Config. Bits	1 345
F	IC Select (Interconnect)	2

Configuration <E/125+E+Row>

	F
Ext. Permit 1 Phases	
Ext. Permit 2 Phases	
Exclusive Ped Assign	
Preempt Non-Lock	12345678
Ped for 2P Output	2
Ped for 6P Output	6
Ped for 4P Output	4
Ped for 8P Output	8
Yellow Flash Phases	
Low Priority A Phases	
Low Priority B Phases	
Low Priority C Phases	
Low Priority D Phases	
Restricted Phases	
Extra 2 Config. Bits	3

Configuration <E/125+F+Row>

	C
EV-A	
EV-B	
EV-C	
EV-D	
RR-1 *	---
RR-2 *	---
SE-1	0
SE-2	0

<E/125+C+Row>

Preemption Priority

(* RR-1 is always Highest, and RR-2 is always Second Highest)

	2
Phase 1	10
Phase 2	10
Phase 3	10
Phase 4	10
Phase 5	10
Phase 6	10
Phase 7	10
Phase 8	10

<C/5+2+Row>

Coordination Transition Minimums

Extra 1 Flags
1 = TBC Type 1
2 = NEMA Ext. Coord
3 = Auto Daylight Savings
4 = EV Advance
5 = Extended Status
6 = International Ped
7 = Flash - Clear Outputs
8 = Split Ring

IC Select Flags
1 =
2 = Modem
3 = 7-Wire Slave
4 = Flash / Free
5 =
6 = Simplex Master
7 = 7-Wire Master
8 = Offset Interrupter

Extra 2 Flags
1 = AWB During Initial
2 = LMU Installed
3 = Disable Min Walk
4 = QuicNet/4 System
5 = Ignore P/P on EV
6 =
7 = Reserved
8 =

Flash to PE & PE Non-Lock
1 = EV A 5 = RR 1
2 = EV B 6 = RR 2
3 = EV C 7 = SE 1
4 = EV D 8 = SE 2

8-0 Hour, Minute, Day-of-Week
8-1 Day-of-Month, Year, Month
8-F Seconds

Time and Date

Begin Month	0	<C/5+2+A>
Begin Week	0	<C/5+2+B>
End Month	0	<C/5+2+C>
End Week	0	<C/5+2+D>

Daylight Savings Time

Daylight Savings Date:
If set to all zeros, standard dates will be used.

INTERSECTION: Garnet Avenue @ Mission Bay Drive

233 Program

Row	Detector Name	0 C1 Pin Number	1 Attributes	2 Phase(s)	3 Assign	1 Delay	3 Carry-Over
0	2I2U	39	45_7_	2	123		1.8
1	6J2U	40	45_7_	6	123		1.8
2	4I6U	41	45_7_	4	123		1.8
3	8J6U	42	45_7_	8	123		1.8
4	2I2L	43	45_7_	2	123		
5	6J2L	44	45_7_	6	123		
6	4I6L	45	45_7_	4	123		
7	8J6L	46	45_7_	8	123		
8	2I4	47	67_	2	123		
9	6J4	48	67_	6	123		
A	4I8	49	67_	4	123	10.0	
B	8J8	50	67_	8	123		
C	5J1U	55	45_7_	5	123		
D	1I1U	56	45_7_	1	123		
E	7J5	57	45_7_	7	123		
F	3I5	58	45_7_	3	123		

Row	Detector Name	4 C1 Pin Number	5 Attributes	6 Phase(s)	7 Assign	2 Delay	4 Carry-Over
0	5J9U	59	45_7_	5	123		
1	1I9U	60	45_7_	1	123		
2	7J9L	61	45_7_	7	123		
3	3I9L	62	45_7_	3	123		
4	2I3U	63	45_7_	2	123		
5	6J3U	64	45_7_	6	123		
6	4I7U	65	45_7_	4	123		
7	8J7U	66	45_7_	8	123		
8	2 PPB	67	2	2	123		
9	6 PPB	68	2	6	123		
A	5 PPB	69	2	4	123		
B	8 PPB	70	2	8	123		
C	2I3L	76	45_7_	2	123		
D	6J3L	77	45_7_	6	123		
E	4I7L	78	45_7_	4	123		
F	8J7L	79	45_7_	8	123		

Detector Assignments <E/126+Column+Row> <D/0+Column+Row>

Detector Attributes
1 = Full Time Delay
2 = Ped Call
3 =
4 = Count
5 = Extension
6 = Type 3
7 = Calling
8 = Alternate

Det. Assignments
1 = Det. Set 1
2 = Det. Set 2
3 = Det. Set 3
4 =
5 =
6 = Failure - Min Recall
7 = Failure - Max Recall
8 = Report on Failure

Program Type:

	Ped / Phase / Overlap 1	2	3	4	5	6	7	8	Row
Walk									0
Don't Walk									1
Phase Green									2
Phase Yellow									3
Phase Red									4
Overlap Green	35	36	90	87					5
Overlap Yellow	37	38	89	86					6
Overlap Red									7

Redirect Phase Outputs <E/127+Column+Row>

Cabinet Type	30

<E/125+D+0>

Enable Redirection
(Enable Redirection = 30)

Max OFF (minutes)	5	<D/0+0+1>
Max ON (minutes)	60	<D/0+0+2>

Detector Failure Monitor

	D	Row
		0
Output Port 1		1
Output Port 2		2
Output Port 3		3
Output Port 4		4
Output Port 5		5
Output Port 6		6
Output Port 7		7

Dimming <E/125+D+Row>

	D
Number of Digits	
1 st Digit	
2 ed Digit	
3 ed Digit	
4 th Digit	
5 th Digit	
6 th Digit	
7 th Digit	
8 th Digit	
9 th Digit	
10 th Digit	
11 th Digit	
12 th Digit	
13 th Digit	
14 th Digit	
15 th Digit	

<C/5+D+Row>

Dial-Back Telephone Number

Disable Alarms
1 = Stop Time
2 = Flash Serise
3 = Keyboard Entry
4 = Manual Plan
5 = Police Control
6 = External Alarm
7 = Detector Failure
8 =

	B	Row
DELAY-A	0	A
DELAY-B	0	B
DELAY-C	0	C
DELAY-D	0	D
DELAY-E	0	E
DELAY-F	0	F

<D/0+B+Row> (seconds)

Delay Logic Times

Omit Alarm	

<C/5+F+0>

Disable Alarm Reporting

Time	0	<C/5+C+0>

Redial Time (minutes)
(View Redial Timer at E/2+D+6)

INTERSECTION: Garnet Avenue @ Mission Bay Drive

233 Program

Row	Time	Plan	Offset	Day of Week
0	06 : 30	1	A	23456
1	09 : 00	2	A	1 7
2	11 : 00	2	A	23456
3	15 : 00	4	A	23456
4	18 : 00	2	A	23456
5	18 : 00	E	A	1 7
6	19 : 30	E	A	23456
7				
8				
9				
A				
B				
C				
D				
E				
F				

TOD Coordination <9/0.1+Row> (Bank 1)

Time	Funct.	Day of Week
00 : 01	E	1234567

TOD Function <7/0.1+Row>

Column 4 Phases/Bits
1

<E/27+4+Row>

Row	Day	Year	Month	Holiday Type
0				
1				
2				
3				
4				
5				
6				
7				
8				
9				
A				
B				
C				
D				
E				
F				

Holiday Dates <8/1.1+Row> (Bank 1)

Time	Plan	Offset	Holiday Type

Holiday Events <9/1.1+Row> (Bank 1)

Row
0
1
2
3
4
5
6
7
8
9
A
B
C
D
E
F

T.O.D. Functions:

0 =
1 = Red Lock
2 = Yellow Lock
3 = Veh Min Recall
4 = Ped Recall
5 =
6 = Rest In Walk
7 = Red Rest
8 = Double Entry
9 = Veh Max Recall
A = Veh Soft Recall
B = Maximum 2
C = Conditional Service
D = Free Lag Phases
E = Bit 1 - Local Override
Bit 4 - Disable Detector OFF Monitor
Bit 7 - Detector Count Monitor
Bit 8 - Real Time Split Monitor
F = Output Bits 1 thru 8

Plan Select:

1 thru 9 = Coordination Plan 1 thru 9
14 or E = Free
15 or F = Flash

Month Select:

1 = January
2 = February
3 = March
4 = April
5 = May
6 = June
7 = July
8 = August
9 = September
A = October
B = November
C = December

Cycle Timer:

Master: C/0 + A + 0
Ring A: C/0 + B + 0
Ring B: C/0 + D + 0

Interval Timer:

Ring A: F/0 + A + Interval Row
Ring B: F/0 + B + Interval Row

Master Plan: C/0 + A + 2
Current Plan: C/0 + A + 3
TOD Plan: C/0 + A + 5

Row	Time	Plan	Offset	Day of Week
0				
1				
2				
3				
4				
5				
6				
7				
8				
9				
A				
B				
C				
D				
E				
F				

TOD Coordination <9/0.2+Row> (Bank 2)

Time	Funct.	Holiday Type

Holiday TOD Function <7/0.2+Row>

Column 4 Phases/Bits

<E/28+Row>

Row	Day	Year	Month	Holiday Type
0				
1				
2				
3				
4				
5				
6				
7				
8				
9				
A				
B				
C				
D				
E				
F				

Holiday Dates <8/1.2+Row> (Bank 2)

Time	Plan	Offset	Holiday Type

Holiday Events <9/1.2+Row> (Bank 2)

Row
0
1
2
3
4
5
6
7
8
9
A
B
C
D
E
F

INTERSECTION: Garnet Avenue @ Mission Bay Drive

233 Program

Coord Extra
1 = Programmed WALK Time for Sync Phases
2 = Always Terminate Sync Phase Peds

Row	Plan Name --->	Plan 1 AM	2 MID	3 PM	4 PM	5	6	7	8	9
0	Cycle Length	150	150	170	170					
1	Phase 1 - ForceOff	114	113	127	40					
2	Phase 2 - ForceOff	0	0	0	78					
3	Phase 3 - ForceOff	42	41	40	118					
4	Phase 4 - ForceOff	80	82	87	0					
5	Phase 5 - ForceOff	111	113	123	36					
6	Phase 6 - ForceOff	0	0	0	78					
7	Phase 7 - ForceOff	26	34	35	113					
8	Phase 8 - ForceOff	80	82	87	0					
9	Ring Offset									
A	Offset 1	0	0	0	87					
B	Offset 2									
C	Offset 3									
D	Perm 1 - End	15	15	17	17					
E	Hold Release	255	255	255	255					
F	Zone Offset	0	0	0	0					

Coordination - Timing Plans <C/1+Plan+Row>

Row		E
0		
1	Plan 1 - Sync	2 6
2	Plan 2 - Sync	2 6
3	Plan 3 - Sync	2 6
4	Plan 4 - Sync	4 8
5	Plan 5 - Sync	
6	Plan 6 - Sync	
7	Plan 7 - Sync	
8	Plan 8 - Sync	
9	Plan 9 - Sync	
A	NEMA Sync	
B	NEMA Hold	
C		
D		
E	Coord Extra	
F		

Sync Phases <C/1+E+Row>

Row		
0	Ped Adjustment	2 2
1	Perm 2 - Start	
2	Perm 2 - End	
3	Perm 3 - Start	
4	Perm 3 - End	
5	Reservice Time	
6	Reservice Phases	
7		
8	Pretimed Phases	
9	Max Recall	
A	Perm 1 Veh Phase	
B	Perm 1 Ped Phase	
C	Perm 2 Veh Phase	
D	Perm 2 Ped Phase	
E	Perm 3 Veh Phase	
F	Perm 3 Ped Phase	

Coordination - Parameters <C/2+Plan+Row>

Row		F
0	Free Lag	2 4 6 8
1	Plan 1 - Lag	2 4 6 8
2	Plan 2 - Lag	2 4 6 8
3	Plan 3 - Lag	2 4 6 8
4	Plan 4 - Lag	2 4 6 8
5	Plan 5 - Lag	
6	Plan 6 - Lag	
7	Plan 7 - Lag	
8	Plan 8 - Lag	
9	Plan 9 - Lag	
A	External Lag	
B		
C		
D		
E		
F		

Lag Phases <C/1+F+Row>

Coordination Timing By:

Row	Column 9		Column A		Column B		Column C		Column D		Column E		Column F		Row
0	Spec. Funct. 1		NOT-3		Max 2		Pretimed		Set Monday		Dial 2 (7-Wire)		Sim Term		0
1	Spec. Funct. 2		NOT-4		System Det 1		Plan 1		Ext. Perm 1		Dial 3 (7-Wire)		EV-A	71	1
2	Spec. Funct. 3		OR-4 (a)		System Det 2		Plan 2		Ext. Perm 2		Offset 1 (7-Wire)		EV-B	72	2
3	Spec. Funct. 4		OR-4 (b)		System Det 3		Plan 3		Dimming		Offset 2 (7-Wire)		EV-C	73	3
4	NAND-3 (a)		OR-5 (a)		System Det 4		Plan 4		Set Clock		Offset 3 (7-Wire)		EV-D	74	4
5	NAND-3 (b)		OR-5 (b)		System Det 5		Plan 5		Stop Time	82	Free (7-Wire)		RR-1	51	5
6	NAND-4 (a)		OR-6 (a)		System Det 6		Plan 6		Flash Sense	81	Flash (7-Wire)		RR-2	52	6
7	NAND-4 (b)		OR-6 (b)		System Det 7		Plan 7		Manual Enable		Excl. Ped Omit		Spec. Event 1		7
8	OR-7 (a)		Fig 3 Diamond		System Det 8		Plan 8		Man. Advance		NOT-1		Spec. Event 2		8
9	OR-7 (b)		Fig 4 Diamond		Max Inhibit (nema)		Plan 9		External Alarm		NOT-2		External Lag		9
A	OR-7 (c)		AND-4 (a)		Force A (nema)		DELAY-A		Phase Bank 2		OR-1 (a)		AND-1 (a)		A
B	OR-7 (d)		AND-4 (b)		Force B (nema)		DELAY-B		Phase Bank 3		OR-1 (b)		AND-1 (b)		B
C	OR-8 (a)		NAND-1 (a)		C.N.A. (nema)		DELAY-C		Overlap Set 2		OR-2 (a)		AND-2 (a)		C
D	OR-8 (b)		NAND-1 (b)		Hold (nema)		DELAY-D		Overlap Set 3		OR-2 (b)		AND-2 (b)		D
E	OR-8 (c)		NAND-2 (a)		Max Recall		DELAY-E		Detector Set 2		OR-3 (a)		AND-3 (a)		E
F	OR-8 (d)		NAND-2 (b)		Min Recall		DELAY-F		Detector Set 3		OR-3 (b)		AND-3 (b)		F

Assignable Inputs **<E/126+Column+Row>**

Row	Column 9		Column A		Column B		Column C		Column D		Column E		Column F		Row
0	Phase ON - 1		Preempt Fail		Flasher 0		Free		NOT-1		TOD Out 1		Dial 2 (7-Wire)		0
1	Phase ON - 2		Sp Evnt Out 1		Flasher 1		Plan 1		OR-1		TOD Out 2		Dial 3 (7-Wire)		1
2	Phase ON - 3		Sp Evnt Out 2		Fast Flasher		Plan 2		OR-2		TOD Out 3		Offset 1 (7-Wire)		2
3	Phase ON - 4		Sp Evnt Out 3		Fig 3 Diamond		Plan 3		OR-3		TOD Out 4		Offset 2 (7-Wire)		3
4	Phase ON - 5		Sp Evnt Out 4		Fig 4 Diamond		Plan 4		AND-1		TOD Out 5		Offset 3 (7-Wire)		4
5	Phase ON - 6		Sp Evnt Out 5				Plan 5		AND-2		TOD Out 6		Free (7-Wire)		5
6	Phase ON - 7		Sp Evnt Out 6				Plan 6		AND-3		TOD Out 7		Flash (7-Wire)		6
7	Phase ON - 8		Sp Evnt Out 7				Plan 7		NOT-2		TOD Out 8		Preempt		7
8	Ph. Check - 1		Sp Evnt Out 8		NOT-3		Plan 8		EV-A		Adv. Warn - 1		Low Priority A		8
9	Ph. Check - 2				NOT-4		Plan 9		EV-B		Adv. Warn - 2		Low Priority B		9
A	Ph. Check - 3		Detector Fail		OR-4		Spec. Funct. 3		EV-C		DELAY-A		Low Priority C		A
B	Ph. Check - 4		Spec. Funct. 1		OR-5		Spec. Funct. 4		EV-D		DELAY-B		Low Priority D		B
C	Ph. Check - 5		Spec. Funct. 2		OR-6		NAND-3		RR-1		DELAY-C				C
D	Ph. Check - 6		Central Control		AND-4		NAND-4		RR-2		DELAY-D				D
E	Ph. Check - 7		Excl. Ped DW		NAND-1		OR-7		Spec. Event 1		DELAY-E				E
F	Ph. Check - 8		Excl. Ped WK		NAND-2		OR-8		Spec. Event 2		DELAY-F				F

Assignable Outputs **<E/127+Column+Row>**

INTERSECTION: Garnet Avenue @ Mission Bay Drive

233 Program

Row		Phase 1	2	3	4	5	6	7	8
0	Ped Walk								
1	Ped FDW								
2	Min Green								
3	Type 3 Disconnect								
4	Added per Vehicle								
5	Veh Extension								
6	Max Gap								
7	Min Gap								
8	Max Limit								
9	Max Limit 2								
A	Adv. / Delay Walk								
B	PE Min Ped FDW								
C	Cond Serv Check								
D	Reduce Every								
E	Yellow Change								
F	Red Clear								

Phase Timing - Bank 2 <C+0+F=2>

	9	A	B	C	D
	---	---	---	---	---
Phase 1					
Phase 2					
Phase 3					
Phase 4					
Phase 5					
Phase 6					
Phase 7					
Phase 8					
Max Initial					
Alternate Walk					
Alternate FDW					
Alternate Initial					
Alternate Extension					

Alternate Timing

Transition Type
0.X = Shortway
1.X = Lengthen
X.1 thru X.4 = Number of cycles when lengthing

Transition Type	0.0	<C/5+1+9>

TBC Transition

Lag Hold Phases		<C/5+1+A>

Coordinated Lag Hold Phases

Sync Output Time	0.0	<C/5+1+C>

7-Wire Master

Time B4 Yellow	0.0	<F/1+C+E>
Phase Number	0	<F/1+C+F>

Advance Warning Beacon - Sign 1

Time B4 Yellow	0.0	<F/1+D+E>
Phase Number	0	<F/1+D+F>

Advance Warning Beacon - Sign 2

Row		1	2	3	4	5	6	7	8
0	Ped Walk								
1	Ped FDW								
2	Min Green								
3	Type 3 Disconnect								
4	Added per Vehicle								
5	Veh Extension								
6	Max Gap								
7	Min Gap								
8	Max Limit								
9	Max Limit 2								
A	Adv. / Delay Walk								
B	PE Min Ped FDW								
C	Cond Serv Check								
D	Reduce Every								
E	Yellow Change								
F	Red Clear								

Phase Timing - Bank 3 <C+0+F=3>

	9	A	B	C	D
	---	---	---	---	---
Phase 1					
Phase 2					
Phase 3					
Phase 4					
Phase 5					
Phase 6					
Phase 7					
Phase 8					
Max Initial					
Alternate Walk					
Alternate FDW					
Alternate Initial					
Alternate Extension					

Alternate Timing

Long Failure	0.5	<F/1+0+6>
Short Failure	0.5	<F/1+0+7>

Power Cycle Correction (Default = 0.7)

Min Time (seconds)	0	<F/1+0+8>

Min Green Before PE Force Off

Max Time (minutes)	0	<F/1+0+9>

Max Preempt Time Before Failure

Min Time (seconds)	0	<F/1+0+A>

Min Time Between Same Preempts
(Does Not Apply To Railroad Preempt)

Low Priority
1 = Channel A
2 = Channel B
3 = Channel C
4 = Channel D

Low Pri. Channel	#NAME?	<E/125+C+8>

Disable Low Priority Channel

INTERSECTION: Magnolia Ave @ Mission Bay Dr

Group Assignment: 4070
Field Master Assignment: none

N/S Street Name: Mission Bay
E/W Street Name: Magnolia

223 P[illegible]ram

Last Database Change:
System Ref. Number:

N

Row	Column # -->	1	2	3	4	5	6	7	8
	Phase # -->	1	2	3	4	5	6	7	8
			Mission Bay	Private d/w	Private d/w		Mission Bay		Magnolia
0	Ped Walk		7	7			7		7
1	Ped FDW		8	16			8		16
2	Min Green	4	18	6	6	4	18		4
3	Type 3 Limit								
4	Add/Veh								
5	Veh Extn	2.0	3.7	2.0	2.0	2.0	3.7		2.0
6	Max Gap	2.0	3.7	2.0	2.0	2.0	3.7		2.0
7	Min Gap	2.0	0.2	2.0	2.0	2.0	0.2		2.0
8	Max Limit	30	60	30	30	30	60		30
9	Max Limit 2								
A	Bus Adv								
B	Call to Phs								
C	Reduce By		0.1				0.1		
D	Every		0.9				0.9		
E	Yellow	3.4	4.0	3.9	3.9	3.4	4.0		3.9
F	Red Clear	1.0	1.0	1.0	1.0	1.0	1.0		1.0
	Grade								

Phase Timing - Bank 1
F + Phase + Row

<F Page>

	E
RR-1 Delay	
RR-1 Clear	
EV-A Delay	0
EV-A Clear	0
EV-B Delay	
EV-B Clear	
EV-C Delay	0
EV-C Clear	0
EV-D Delay	
EV-D Clear	
RR-2 Delay	
RR-2 Clear	
View EV Delay	---
View EV Clear	---
View RR Delay	---
View RR Clear	---

Preempt Timing
F + E + Row

Row		F
0	Permit	123456_8
1	Red Lock	
2	Yellow Lock	
3	Min Recall	_2__6__
4	Ped Recall	
5	Peds (View)	_23__6_8
6	Rest In Walk	
7	Red Rest	
8	Dbl Entry	
9	Max Recall	
A	Soft Recall	
B	Max 2	
C	Cond Serv	
D	Ped Lock	12345678
E	Yellow Start	_2__6__
F	1st Phases	__4__8

Phase Functions <F Page>
F + F + Row

Max Initial	0	F + 0 + E
Red Revert	5.0	F + 0 + F
All Red Start	0.0	F + C + O

Start / Revert Times

Drop Number	4	C + 0 + 0
Zone Number	4	C + 0 + 1
Area Number	6	C + 0 + 2
Area Address	4	C + 0 + 3
QuicNet Channel	DIGI17:	(QuicNet)

Communication Addresses

C + F + O	F	Row
Free Lag	_2_4_6_8	0

Lag Phases <C Page>

Overlap Timing

	Row	9 Green Clear	C Yellow Change	D Red Clear	0 Load-Switch #
Overlap A	A				
Overlap B	B				
Overlap C	C				
Overlap D	D				

<F Page> F + COLOR +

<D Page> D + 0 + OVERLAP

Manual Plan	0	C + A + 1
Manual Offset	0	C + B + 1

Manual Selection

Manual Plan
0 = Automatic
1-9 = Plan 1-9
14 = Free
15 = Flash

Manual Offset
0 = Automatic
1 = Offset A
2 = Offset B
3 = Offset C

Downtime Flash	255	(minutes)

Downtime Before Auto Manual Flash
F + 0 + 8

Disable Ports	_234___

Disable Communication Ports
D + D + 9

Timing Sheet By: FLG
Approved By: EFF
Drawing Number:
Timing Implemented On:

4

INTERSECTION: Magnolia Ave @ Mission Bay Dr

223 Pr[illegible]am

	Time	Function	Day of Week	Column F Phases/Bits
0	00 : 01	E	1234567	1
1				
2				
3				
4				
5				
6				
7				
8				
9				
A				
B				
C				
D				
E				
F				

TOD Function

7 + ROW

<D Page>

D + F + ROW

T.O.D. Functions
0 = Permitted Phases
1 = Red Lock
2 = Yellow Lock
3 = Veh Min Recall
4 = Ped Recall
5 =
6 = Rest In Walk
7 = Red Rest
8 = Double Entry
9 = Veh Max Recall
A = Veh Soft Recall
B = Maximum 2
C = Conditional Service
D = Free Lag Phases
E = Bit 1 - Local Override
Bit 2 - Phase Bank 2
Bit 3 - Phase Bank 3
Bit 4 - Disable Detector OFF Monitor
Bit 7 - Detector Count Monitor
Bit 8 - Real Time Split Monitor
F = Output Bits 1 thru 4

Row		F
0		
1	RR Overlap A - Phases	
2	RR Overlap B - Phases	
3	RR Overlap C - Phases	
4	RR Overlap D - Phases	
5	Ped 2P	2
6	Ped 6P	6
7	Ped 4P	3
8	Ped 8P	8
9	Yellow Flash Phases	
A	Overlap A - Phases	
B	Overlap B - Phases	
C	Overlap C - Phases	
D	Overlap D - Phases	
E	Restricted Phases	
F	Assign 5 Outputs	

Configuration

<E Page>

E + F + ROW

Day of Week

1 = Sunday
2 = Monday
3 = Tuesday
4 = Wednesday
5 = Thursday
6 = Friday
7 = Saturday

Assign 5 Outputs
1 = Right Turn Overlap
2 = TOD Outputs
3 = EV Beacon - Steady
4 = EV Beacon - Flashing
5 = Special Event Outputs
6 = Phase 3 & 7 Ped
7 = Advanced Warning Sign
8 =

Row		E
0	Exclusive Phases	
1	RR-1 Clear Phases	
2	RR-2 Clear Phases	
3	RR-2 Limited Service	
4	Prot / Perm Phases	
5	Overlap A - Green Omit	
6	Overlap B - Green Omit	
7	Overlap C - Green Omit	
8	Overlap D - Green Omit	
9	Overlap Yellow Flash	
A	EV-A Phases	2 5
B	EV-B Phases	
C	EV-C Phases	1 6
D	EV-D Phases	
E	Extra 1 Config. Bits	1 345
F	IC Select (Interconnect)	2

Extra 1 Flags
1 = TBC Type 1
2 = NEMA Ext. Coord
3 = Auto Daylight Savings
4 = EV Advance
5 = Remote Download
6 = Special Event
7 = Pretimed Operation
8 = Split Ring Operation

IC Select Flags
1 =
2 = Modem
3 = 7-Wire Slave
4 = Flash / Free
5 =
6 = Simplex Master
7 = 7-Wire Master
8 = Offset Interrupter

Configuration

For access, set F + 9 + E = 1

E + E + ROW

Time and Date

8-0 Hour, Minute, Day-of-Week
8-1 Day-of-Month, Year, Month
8-F Seconds

Disable Parity	0	D+B+0

Dial-Up Telephone Communications

(If set to a non-zero value, parity will be disabled)

Program Information

C + C + 0 = program
C + C + F = version

Remote Download

C + 0 + 4 = 1-255
w/ E + E + E bit 5 on

INTERSECTION: Magnolia Ave @ Mission Bay Dr

223 Program

Row	1 Delay	3 Carry-over
0		
1		
2		1.8
3		
4		
5		
6	10.0	
7		
8		
9		
A		
B		
C		
D		
E	---	---
F	---	---

Detector Name	332 Input File	Detector Number
	1I1	14
	2I2U	1
	2I2L	5
	2I3U	21
	2I3L	25
	2I4	9
	3I5	16
	4I6U	3
	4I6L	7
	4I7U	23
	4I7L	27
	4I8	11
	1I9U	18
	3I9L	20
---	---	---
---	---	---

Row	2 Delay	4 Carry-over
0		
1		1.8
2		
3		
4		
5		
6		
7		
8		
9		
A		
B		
C		
D		
E	---	---
F	---	---

Detector Name	332 Input File	Detector Number
	5J1	13
	6J2U	2
	6J2L	6
	6J3U	22
	6J3L	26
	6J4	10
	7J5	15
	8J6U	4
	8J6L	8
	8J7U	24
	8J7L	28
	8J8	12
	5J9U	17
	7J9L	19
---	---	---
---	---	---

Detector Delay & Carryover <D Page>

D + X (across) + ROW

Row	Detector Numbers	E
A	1 2 3 4 5 6 7 8	12345678
B	9 10 11 12 -- -- -- --	1234__
C	13 14 15 16 17 18 19 20	12345678
D	-- -- -- -- 21 22 23 24	___5678
E	-- -- -- -- -- -- -- --	1234__
F	-- 25 26 27 28 -- -- --	_2345__

Active Detectors <D Page>

Row		0 Detector #
0		
1	System Det. # 1	0
2	System Det. # 2	0
3	System Det. # 3	0
4	System Det. # 4	0
5	System Det. # 5	0
6	System Det. # 6	0
7	System Det. # 7	0
8	System Det. # 8	0

System Detectors <D Page>

Max ON (min)	5	D+A+E
Max OFF (min)	60	D+A+F

Detector Failure Monitor

Phase Number	0	F+C+1
Time Before Yellow	0.0	F+C+3

Advance Warning Beacon - Sign 1

Phase Number	0	F+D+1
Time Before Yellow	0.0	F+D+3

Advance Warning Beacon - Sign 2

Long Failure	0.5	F+0+6
Short Failure	0.5	F+0+7

Power Cycle Correction (Default = 0.5)

INTERSECTION: Magnolia Ave @ Mission Bay Dr

223 Prog

Coordination Timing By: KHA
Implemented On: 9/18/07

Row	Plan Name --->	1 AM	2 Mid	3 PM	4	5	6	7	8	9
0	Cycle Length	150	150	170						
1	Phase 1 - ForceOff	52	63	57						
2	Phase 2 - ForceOff	0	0	0						
3	Phase 3 - ForceOff	11	13	12						
4	Phase 4 - ForceOff	37	42	39						
5	Phase 5 - ForceOff	51	63	60						
6	Phase 6 - ForceOff	0	0	0						
7	Phase 7 - ForceOff									
8	Phase 8 - ForceOff	37	42	39						
9	Ring Offset									
A	Offset A	44	36	31						
B	Offset B									
C	Offset C									
D	Permissive	10	10	10						
E	Hold Release	255	255	255						
F	Ped Shift	4	4	4						

Column # ---> (Plan)

Coordination <C Page>

C + Plan + ROW

FOR OBSERVATION ONLY

Master Plan	C + A + 2
Current Plan	C + A + 3
Next Plan	C + A + 4
T.O.D. Plan	C + A + 5
Master Cycle	C + A + 0
Ring A Cycle	C + B + 0
Ring B Cycle	C + D + 0
Min Cycle	C + A + E
Max Cycle	C + B + E

Row	Time	Plan	Offset	Day of Week
0	06 : 30	1	A	_23456_
1	09 : 00	2	A	1____7
2	11 : 00	2	A	_23456_
3	15 : 00	3	A	_23456_
4	18 : 00	2	A	_23456_
5	18 : 00	E	A	1____7
6	19 : 30	E	A	_23456_
7				
8				
9				
A				
B				
C				
D				
E				
F				

TOD Coordination

<9 Key with C+0+9=1>

	E
Plan 1	_2__6__
Plan 2	_2__6__
Plan 3	_2__6__
Plan 4	
Plan 5	
Plan 6	
Plan 7	
Plan 8	
Plan 9	
Coord Ped*	
NEMA Hold	

Sync Phases

C + E + FUNCTION #

Row		F
0	Free Lag	
1	Plan 1 - Lag	_2_4_6_8
2	Plan 2 - Lag	_2_4_6_8
3	Plan 3 - Lag	_2_4_6_8
4	Plan 4 - Lag	
5	Plan 5 - Lag	
6	Plan 6 - Lag	
7	Plan 7 - Lag	
8	Plan 8 - Lag	
9	Plan 9 - Lag	
A	Coord Max *	
B	Coord Lag *	
C		
D		
E		
F		

Lag Phases <C Page>

C + F + FUNCTION #

Transition Type	0

TBC Transition
C + D + D

Transition Type
0 = Shortway
Non-zero = Lengthen

Plan Select
1 thru 9 = Coordination Plan 1 thru 9
14 or E = Free
15 or F = Flash

INTERSECTION: Bunker Hill St @ Mission Bay Dr

223 Program

Group Assignment: 4070
Field Master Assignment: none

N/S Street Name: Mission Bay
E/W Street Name: Bunker Hill

Last Database Change:
System Ref. Number:

N

Row	Column # → / Phase # →	1	2	3	4	5	6	7	8
		Mission Bay			Bunker Hill		Mission Bay		
0	Ped Walk		7		7		7		
1	Ped FDW		8		18		10		
2	Min Green	6	10		4	4	10		
3	Type 3 Limit								
4	Add/Veh								
5	Veh Extn	2.0	3.2		2.0	2.0	3.2		
6	Max Gap	2.0	3.2		2.0	2.0	3.2		
7	Min Gap	2.0	0.2		2.0	2.0	0.2		
8	Max Limit	30	60		40	30	60		
9	Max Limit 2								
A	Bus Adv								
B	Call to Phs								
C	Reduce By		0.1				0.1		
D	Every		1.0				1.0		
E	Yellow	3.4	4.0		3.9	3.4	4.0		
F	Red Clear	1.0	1.0		1.0	1.0	1.0		
	Grade								

Phase Timing - Bank 1
F + Phase + Row

<F Page>

	E
RR-1 Delay	
RR-1 Clear	
EV-A Delay	
EV-A Clear	
EV-B Delay	
EV-B Clear	
EV-C Delay	
EV-C Clear	
EV-D Delay	
EV-D Clear	
RR-2 Delay	
RR-2 Clear	
View EV Delay	---
View EV Clear	---
View RR Delay	---
View RR Clear	---

Preempt Timing
F + E + Row

Row		F
0	Permit	12_456__
1	Red Lock	
2	Yellow Lock	
3	Min Recall	_2___6__
4	Ped Recall	
5	Peds (View)	_2_4_6__
6	Rest In Walk	
7	Red Rest	
8	Dbl Entry	
9	Max Recall	
A	Soft Recall	
B	Max 2	
C	Cond Serv	
D	Ped Lock	12345678
E	Yellow Start	_2___6__
F	1st Phases	___4____

Phase Functions <F Page>
F + F + Row

Max Initial	0
Red Revert	5.0
All Red Start	0.0

F + 0 + E
F + 0 + F
F + C + O

Start / Revert Times

Drop Number	3	C + 0 + 0
Zone Number	3	C + 0 + 1
Area Number	6	C + 0 + 2
Area Address	3	C + 0 + 3
QuicNet Channel	DIGI17:	(QuicNet)

Communication Addresses

C + F + O	F	Row
Free Lag	_2_4_6__	0

Lag Phases <C Page>

Overlap Timing

	Row	9 Green Clear	C Yellow Change	D Red Clear	0 Load-Switch #
Overlap A	A				
Overlap B	B				
Overlap C	C				
Overlap D	D				

<F Page>
F + COLOR +

<D Page>
D + 0 + OVERLAP

Manual Plan	0	C + A + 1
Manual Offset	0	C + B + 1

Manual Selection

Manual Plan
0 = Automatic
1-9 = Plan 1-9
14 = Free
15 = Flash

Manual Offset
0 = Automatic
1 = Offset A
2 = Offset B
3 = Offset C

Downtime Flash	255	(minutes)

Downtime Before Auto Manual Flash
F + 0 + 8

Disable Ports	_234____

Disable Communication Ports
D + D + 9

Timing Sheet By: FLG
Approved By: EFF
Drawing Number:
Timing Implemented On:

5

INTERSECTION: Bunker Hill St @ Mission Bay Dr

Row	Time	Function	Day of Week	Column F Phases/Bits
0	00 : 01	E	1234567	1
1				
2				
3				
4				
5				
6				
7				
8				
9				
A				
B				
C				
D				
E				
F				

TOD Function

7 + ROW

<D Page>

D + F + ROW

T.O.D. Functions
0 = Permitted Phases
1 = Red Lock
2 = Yellow Lock
3 = Veh Min Recall
4 = Ped Recall
5 =
6 = Rest In Walk
7 = Red Rest
8 = Double Entry
9 = Veh Max Recall
A = Veh Soft Recall
B = Maximum 2
C = Conditional Service
D = Free Lag Phases
E = Bit 1 - Local Override
Bit 2 - Phase Bank 2
Bit 3 - Phase Bank 3
Bit 4 - Disable Detector OFF Monitor
Bit 7 - Detector Count Monitor
Bit 8 - Real Time Split Monitor
F = Output Bits 1 thru 4

Row		F
0		
1	RR Overlap A - Phases	
2	RR Overlap B - Phases	
3	RR Overlap C - Phases	
4	RR Overlap D - Phases	
5	Ped 2P	2
6	Ped 6P	6
7	Ped 4P	4
8	Ped 8P	
9	Yellow Flash Phases	
A	Overlap A - Phases	
B	Overlap B - Phases	
C	Overlap C - Phases	
D	Overlap D - Phases	
E	Restricted Phases	
F	Assign 5 Outputs	

Configuration

<E Page>

E + F + ROW

Day of Week

1 = Sunday
2 = Monday
3 = Tuesday
4 = Wednesday
5 = Thursday
6 = Friday
7 = Saturday

Assign 5 Outputs
1 = Right Turn Overlap
2 = TOD Outputs
3 = EV Beacon - Steady
4 = EV Beacon - Flashing
5 = Special Event Outputs
6 = Phase 3 & 7 Ped
7 = Advanced Warning Sign
8 =

Row		E
0	Exclusive Phases	
1	RR-1 Clear Phases	
2	RR-2 Clear Phases	
3	RR-2 Limited Service	
4	Prot / Perm Phases	
5	Overlap A - Green Omit	
6	Overlap B - Green Omit	
7	Overlap C - Green Omit	
8	Overlap D - Green Omit	
9	Overlap Yellow Flash	
A	EV-A Phases	
B	EV-B Phases	
C	EV-C Phases	
D	EV-D Phases	
E	Extra 1 Config. Bits	1_345
F	IC Select (Interconnect)	2

Extra 1 Flags
1 = TBC Type 1
2 = NEMA Ext. Coord
3 = Auto Daylight Savings
4 = EV Advance
5 = Remote Download
6 = Special Event
7 = Pretimed Operation
8 = Split Ring Operation

IC Select Flags
1 =
2 = Modem
3 = 7-Wire Slave
4 = Flash / Free
5 =
6 = Simplex Master
7 = 7-Wire Master
8 = Offset Interrupter

Configuration

For access, set F + 9 + E = 1

E + E + ROW

Time and Date

8-0 Hour, Minute, Day-of-Week
8-1 Day-of-Month, Year, Month
8-F Seconds

Disable Parity	0	D+B+0

Dial-Up Telephone Communications
(If set to a non-zero value, parity will be disabled)

Program Information

C + C + 0 = program
C + C + F = version

Remote Download

C + 0 + 4 = 1 -255
w/ E + E + E bit 5 on

INTERSECTION: Bunker Hill St @ Mission Bay Dr — 223 Program

Row	1 Delay	3 Carry-over
0		
1		
2		1.8
3		
4		
5		
6		
7		
8		
9		
A		
B		
C		
D		
E	---	---
F	---	---

Detector Name	332 Input File	Detector Number
	1I1	14
	2I2U	1
	2I2L	5
	2I3U	21
	2I3L	25
	2I4	9
	3I5	16
	4I6U	3
	4I6L	7
	4I7U	23
	4I7L	27
	4I8	11
	1I9U	18
	3I9L	20
---	---	---
---	---	---

Row	2 Delay	4 Carry-over
0		
1		1.8
2		
3		
4		
5		
6		
7		
8		
9		
A		
B		
C		
D		
E	---	---
F	---	---

Detector Name	332 Input File	Detector Number
	5J1	13
	6J2U	2
	6J2L	6
	6J3U	22
	6J3L	26
	6J4	10
	7J5	15
	8J6U	4
	8J6L	8
	8J7U	24
	8J7L	28
	8J8	12
	5J9U	17
	7J9L	19
---	---	---
---	---	---

Detector Delay & Carryover <D Page>

D + X (across) + ROW

Row	Detector Numbers	E
A	1 2 3 4 5 6 7 8	12345678
B	9 10 11 12 -- -- -- --	1234____
C	13 14 15 16 17 18 19 20	12345678
D	-- -- -- -- 21 22 23 24	____5678
E	-- -- -- -- -- -- -- --	1234____
F	-- 25 26 27 28 -- -- --	_2345___

Active Detectors <D Page>

Row		0 Detector #
0		
1	System Det. # 1	0
2	System Det. # 2	0
3	System Det. # 3	0
4	System Det. # 4	0
5	System Det. # 5	0
6	System Det. # 6	0
7	System Det. # 7	0
8	System Det. # 8	0

System Detectors <D Page>

Max ON (min)	5	D+A+E
Max OFF (min)	60	D+A+F

Detector Failure Monitor

Phase Number	0	F+C+1
Time Before Yellow	0.0	F+C+3

Advance Warning Beacon - Sign 1

Phase Number	0	F+D+1
Time Before Yellow	0.0	F+D+3

Advance Warning Beacon - Sign 2

Long Failure	0.5	F+0+6
Short Failure	0.5	F+0+7

Power Cycle Correction (Default = 0.5)

INTERSECTION: Bunker Hill St @ Mission Bay Dr

223 Progr[illegible]

Coordination Timing By: K[illegible]
Implemented On: 9/18/07

Row	Column # ---> / Plan Name --->	Plan 1 AM	Plan 2 Mid	Plan 3 PM	4	5	6	7	8	9
0	Cycle Length	75	75	85						
1	Phase 1 - ForceOff	51	15	49						
2	Phase 2 - ForceOff	0	0	0						
3	Phase 3 - ForceOff									
4	Phase 4 - ForceOff	39	39	37						
5	Phase 5 - ForceOff	14	56	14						
6	Phase 6 - ForceOff	0	8	0						
7	Phase 7 - ForceOff									
8	Phase 8 - ForceOff									
9	Ring Offset									
A	Offset A	47	30	24						
B	Offset B									
C	Offset C									
D	Permissive	10	15	10						
E	Hold Release	255	255	255						
F	Ped Shift	5	5	5						

Coordination <C Page>

C + Plan + ROW

FOR OBSERVATION ONLY

Master Plan	C + A + 2
Current Plan	C + A + 3
Next Plan	C + A + 4
T.O.D. Plan	C + A + 5
Master Cycle	C + A + 0
Ring A Cycle	C + B + 0
Ring B Cycle	C + D + 0
Min Cycle	C + A + E
Max Cycle	C + B + E

Row	Time	Plan	Offset	Day of Week
0	06 : 30	1	A	_23456_
1	09 : 00	2	A	1____7
2	11 : 00	2	A	_23456_
3	15 : 00	3	A	_23456_
4	18 : 00	2	A	_23456_
5	18 : 00	E	A	1____7
6	19 : 30	E	A	_23456_
7				
8				
9				
A				
B				
C				
D				
E				
F				

TOD Coordination

<9 Key with C+0+9=1>

	E
Plan 1	_2__6_
Plan 2	_2__6_
Plan 3	_2__6_
Plan 4	
Plan 5	
Plan 6	
Plan 7	
Plan 8	
Plan 9	
Coord Ped*	
NEMA Hold	

Sync Phases

C + E + FUNCTION #

Row		F
0	Free Lag	
1	Plan 1 - Lag	_2_45__
2	Plan 2 - Lag	1_4_6__
3	Plan 3 - Lag	_2_45__
4	Plan 4 - Lag	
5	Plan 5 - Lag	
6	Plan 6 - Lag	
7	Plan 7 - Lag	
8	Plan 8 - Lag	
9	Plan 9 - Lag	
A	Coord Max *	
B	Coord Lag *	
C		
D		
E		
F		

Lag Phases <C Page>

C + F + FUNCTION #

Transition Type	0

TBC Transition
C + D + D

Transition Type
0 = Shortway
Non-zero = Lengthen

Plan Select
1 thru 9 = Coordination
Plan 1 thru 9
14 or E = Free
15 or F = Flash

ITERSECTION: Grand Ave @ Mission Bay Dr

223 P ram

Group Assignment:
Field Master Assignment: none

N/S Street Name: Mission Bay
E/W Street Name: Grand

Last Database Change:
System Ref. Number:

N

Row	Column # ---> / Phase # --->	1	2	3	4	5	6	7	8
		Mission Bay			Grand		Mission Bay		
0	Ped Walk								
1	Ped FDW								
2	Min Green	4	7		4	4	7		
3	Type 3 Limit								
4	Add/Veh								
5	Veh Extn	2.0	3.6		2.0	2.0	4.6		
6	Max Gap	2.0	3.6		2.0	2.0	4.6		
7	Min Gap	2.0	0.2		2.0	2.0	0.2		
8	Max Limit	50	60		30	30	50		
9	Max Limit 2								
A	Bus Adv								
B	Call to Phs								
C	Reduce By		0.1				0.1		
D	Every		0.9				0.9		
E	Yellow	4.7	3.9		3.4	3.4	4.7		
F	Red Clear	1.0	1.0		1.0	1.0	1.0		
	Grade								

Phase Timing - Bank 1
F + Phase + Row

<F Page>

	E
RR-1 Delay	
RR-1 Clear	
EV-A Delay	0
EV-A Clear	0
EV-B Delay	0
EV-B Clear	0
EV-C Delay	0
EV-C Clear	0
EV-D Delay	
EV-D Clear	
RR-2 Delay	
RR-2 Clear	
View EV Delay	---
View EV Clear	---
View RR Delay	---
View RR Clear	---

Preempt Timing
F + E + Row

Row		F
0	Permit	12_456__
1	Red Lock	
2	Yellow Lock	
3	Min Recall	_2___6__
4	Ped Recall	
5	Peds (View)	
6	Rest In Walk	
7	Red Rest	
8	Dbl Entry	
9	Max Recall	
A	Soft Recall	
B	Max 2	
C	Cond Serv	
D	Ped Lock	12345678
E	Yellow Start	_2___6__
F	1st Phases	___4____

Phase Functions <F Page>
F + F + Row

Max Initial	0	F + 0 + E
Red Revert	5.0	F + 0 + F
All Red Start	0.0	F + C + O

Start / Revert Times

Drop Number	2	C + 0 + 0
Zone Number	2	C + 0 + 1
Area Number	6	C + 0 + 2
Area Address	2	C + 0 + 3
QuicNet Channel	DIGI17:	(QuicNet)

Communication Addresses

C + F + O	F	Row
Free Lag	_2_4_6__	0

Lag Phases <C Page>

Overlap Timing

	Row	9 Green Clear	C Yellow Change	D Red Clear	0 Load-Switch #
Overlap A	A				
Overlap B	B				
Overlap C	C				
Overlap D	D				

<F Page>
F + COLOR +

<D Page>
D + 0 + OVERLAP

Manual Plan	0	C + A + 1
Manual Offset	0	C + B + 1

Manual Selection

Manual Plan
0 = Automatic
1-9 = Plan 1-9
14 = Free
15 = Flash

Manual Offset
0 = Automatic
1 = Offset A
2 = Offset B
3 = Offset C

Downtime Flash	255	(minutes)

Downtime Before Auto Manual Flash
F + 0 + 8

Disable Ports	_234____

Disable Communication Ports
D + D + 9

Timing Sheet By: FLG
Approved By: EFF
Drawing Number: 29028-2-D
Timing Implemented On:

6

INTERSECTION: Grand Ave @ Mission Bay Dr

Row	Time	Function	Day of Week	Column F Phases/Bits
0				
1				
2				
3				
4				
5				
6				
7				
8				
9				
A				
B				
C				
D				
E				
F				

TOD Function

7 + ROW

<D Page>

D + F + ROW

T.O.D. Functions
0 = Permitted Phases
1 = Red Lock
2 = Yellow Lock
3 = Veh Min Recall
4 = Ped Recall
5 =
6 = Rest In Walk
7 = Red Rest
8 = Double Entry
9 = Veh Max Recall
A = Veh Soft Recall
B = Maximum 2
C = Conditional Service
D = Free Lag Phases
E = Bit 1 - Local Override
Bit 2 - Phase Bank 2
Bit 3 - Phase Bank 3
Bit 4 - Disable Detector OFF Monitor
Bit 7 - Detector Count Monitor
Bit 8 - Real Time Split Monitor
F = Output Bits 1 thru 4

Row		F
0		
1	RR Overlap A - Phases	
2	RR Overlap B - Phases	
3	RR Overlap C - Phases	
4	RR Overlap D - Phases	
5	Ped 2P	
6	Ped 6P	
7	Ped 4P	
8	Ped 8P	
9	Yellow Flash Phases	
A	Overlap A - Phases	
B	Overlap B - Phases	
C	Overlap C - Phases	
D	Overlap D - Phases	
E	Restricted Phases	
F	Assign 5 Outputs	

Configuration

<E Page>

E + F + ROW

Day of Week

1 = Sunday
2 = Monday
3 = Tuesday
4 = Wednesday
5 = Thursday
6 = Friday
7 = Saturday

Row		E
0	Exclusive Phases	
1	RR-1 Clear Phases	
2	RR-2 Clear Phases	
3	RR-2 Limited Service	
4	Prot / Perm Phases	
5	Overlap A - Green Omit	
6	Overlap B - Green Omit	
7	Overlap C - Green Omit	
8	Overlap D - Green Omit	
9	Overlap Yellow Flash	
A	EV-A Phases	2 5
B	EV-B Phases	4
C	EV-C Phases	1 6
D	EV-D Phases	
E	Extra 1 Config. Bits	1 345
F	IC Select (Interconnect)	2

Configuration

For access, set F + 9 + E = 1

E + E + ROW

Extra 1 Flags
1 = TBC Type 1
2 = NEMA Ext. Coord
3 = Auto Daylight Savings
4 = EV Advance
5 = Remote Download
6 = Special Event
7 = Pretimed Operation
8 = Split Ring Operation

IC Select Flags
1 =
2 = Modem
3 = 7-Wire Slave
4 = Flash / Free
5 =
6 = Simplex Master
7 = 7-Wire Master
8 = Offset Interrupter

Assign 5 Outputs
1 = Right Turn Overlap
2 = TOD Outputs
3 = EV Beacon - Steady
4 = EV Beacon - Flashing
5 = Special Event Outputs
6 = Phase 3 & 7 Ped
7 = Advanced Warning Sign
8 =

Time and Date

8-0 Hour, Minute, Day-of-Week
8-1 Day-of-Month, Year, Month
8-F Seconds

Disable Parity	0	D+B+0

Dial-Up Telephone Communications
(If set to a non-zero value, parity will be disabled)

Program Information
C + C + 0 = program
C + C + F = version

Remote Download
C + 0 + 4 = 1 -255
w/ E + E + E bit 5 on

ERSECTION: Grand Ave @ Mission Bay Dr

223 Program

Row	1 Delay	3 Carry-over	Detector Name	332 Input File	Detector Number
0				1I1	14
1		1.8		2I2U	1
2				2I2L	5
3				2I3U	21
4				2I3L	25
5				2I4	9
6				3I5	16
7				4I6U	3
8				4I6L	7
9				4I7U	23
A				4I7L	27
B				4I8	11
C				1I9U	18
D				3I9L	20
E	---	---	---	---	---
F	---	---	---	---	---

Row	2 Delay	4 Carry-over	Detector Name	332 Input File	Detector Number
0				5J1	13
1		1.8		6J2U	2
2				6J2L	6
3				6J3U	22
4				6J3L	26
5				6J4	10
6				7J5	15
7				8J6U	4
8				8J6L	8
9				8J7U	24
A				8J7L	28
B				8J8	12
C				5J9U	17
D				7J9L	19
E	---	---	---	---	---
F	---	---	---	---	---

Detector Delay & Carryover <D Page>

D + X (across) + ROW

Row	Detector Numbers	E
A	1 2 3 4 5 6 7 8	12345678
B	9 10 11 12 -- -- -- --	1234___
C	13 14 15 16 17 18 19 20	12345678
D	-- -- -- -- 21 22 23 24	___5678
E	-- -- -- -- -- -- -- --	1234___
F	-- 25 26 27 28 -- -- --	_2345___

Active Detectors <D Page>

Row		0 Detector #
0		
1	System Det. # 1	0
2	System Det. # 2	0
3	System Det. # 3	0
4	System Det. # 4	0
5	System Det. # 5	0
6	System Det. # 6	0
7	System Det. # 7	0
8	System Det. # 8	0

System Detectors <D Page>

Max ON (min)	5	D+A+E
Max OFF (min)	60	D+A+F

Detector Failure Monitor

Phase Number	0	F+C+1
Time Before Yellow	0.0	F+C+3

Advance Warning Beacon - Sign 1

Phase Number	0	F+D+1
Time Before Yellow	0.0	F+D+3

Advance Warning Beacon - Sign 2

Long Failure	0.5	F+0+6
Short Failure	0.5	F+0+7

Power Cycle Correction (Default = 0.5)

INTERSECTION: Grand Ave @ Mission Bay Dr

223 Prog

Coordination Timing By: KHA
Implemented On: 9/18/07

Row	Column # → / Plan Name →	1 AM	2 Mid	3 PM	4	5	6	7	8	9
0	Cycle Length	75	75	170						
1	Phase 1 - ForceOff	47	40	105						
2	Phase 2 - ForceOff	0	0	0						
3	Phase 3 - ForceOff									
4	Phase 4 - ForceOff	20	15	28						
5	Phase 5 - ForceOff	29	25	38						
6	Phase 6 - ForceOff	0	0	0						
7	Phase 7 - ForceOff									
8	Phase 8 - ForceOff									
9	Ring Offset									
A	Offset A	56	38	110						
B	Offset B									
C	Offset C									
D	Permissive	10	10	10						
E	Hold Release	255	255	255						
F	Red Shift	0	0	0						

Coordination <C Page>

C + Plan + ROW

FOR OBSERVATION ONLY

Master Plan	C + A + 2
Current Plan	C + A + 3
Next Plan	C + A + 4
T.O.D. Plan	C + A + 5
Master Cycle	C + A + 0
Ring A Cycle	C + B + 0
Ring B Cycle	C + D + 0
Min Cycle	C + A + E
Max Cycle	C + B + E

Row	Time	Plan	Offset	Day of Week
0	06 : 30	1	A	_23456_
1	09 : 00	2	A	1____7
2	11 : 00	2	A	_23456_
3	15 : 00	3	A	_23456_
4	18 : 00	2	A	_23456_
5	18 : 00	E	A	1____7
6	19 : 30	E	A	_23456_
7				
8				
9				
A				
B				
C				
D				
E				
F				

TOD Coordination

<9 Key with C+0+9=1>

	E
Plan 1	_2__6__
Plan 2	_2__6__
Plan 3	_2__6__
Plan 4	
Plan 5	
Plan 6	
Plan 7	
Plan 8	
Plan 9	
Coord Ped*	
NEMA Hold	

Sync Phases

C + E + FUNCTION #

Row		F
0	Free Lag	
1	Plan 1 - Lag	_2_4_6__
2	Plan 2 - Lag	_2_4_6__
3	Plan 3 - Lag	_2_4_6__
4	Plan 4 - Lag	
5	Plan 5 - Lag	
6	Plan 6 - Lag	
7	Plan 7 - Lag	
8	Plan 8 - Lag	
9	Plan 9 - Lag	
A	Coord Max *	
B	Coord Lag *	
C		
D		
E		
F		

Lag Phases <C Page>

C + F + FUNCTION #

Transition Type	0

TBC Transition
C + D + D

Transition Type
0 = Shortway
Non-zero = Lengthen

Plan Select
1 thru 9 = Coordination
Plan 1 thru 9
14 or E = Free
15 or F = Flash

TERSECTION: Mission Bay Dr @ I-5/De Anza

223 P[illegible]ram

Group Assignment: 4070
Field Master Assignment: none

N/S Street Name: Mission Bay
E/W Street Name: De Anza

Last Database Change:
System Ref. Number:

N

Row	Column # ---> / Phase # --->	1	2 (Mission Bay)	3	4 (De Anza)	5	6	7	8
0	Ped Walk								
1	Ped FDW								
2	Min Green		10		4				
3	Type 3 Limit								
4	Add/Veh								
5	Veh Extn		6.1		3.0				
6	Max Gap		6.1		3.0				
7	Min Gap		2.0		3.0				
8	Max Limit		50		40				
9	Max Limit 2								
A	Bus Adv								
B	Call to Phs								
C	Reduce By		0.1						
D	Every		0.7						
E	Yellow		4.7		3.4				
F	Red Clear		2.0		1.0				
	Grade								

Phase Timing - Bank 1
F + Phase + Row

<F Page>

	E
RR-1 Delay	
RR-1 Clear	
EV-A Delay	
EV-A Clear	
EV-B Delay	
EV-B Clear	
EV-C Delay	
EV-C Clear	
EV-D Delay	
EV-D Clear	
RR-2 Delay	
RR-2 Clear	
View EV Delay	---
View EV Clear	---
View RR Delay	---
View RR Clear	---

Preempt Timing
F + E + Row

	F
Permit	2 4
Red Lock	
Yellow Lock	
Min Recall	2
Ped Recall	
Peds (View)	
Rest In Walk	
Red Rest	
Dbl Entry	
Max Recall	
Soft Recall	
Max 2	
Cond Serv	
Ped Lock	12345678
Yellow Start	2
1st Phases	4

Phase Functions <F Page>
F + F + Row

Max Initial	0	F + 0 + E
Red Revert	5.0	F + 0 + F
All Red Start	0.0	F + C + O

Start / Revert Times

Drop Number	1	C + 0 + 0
Zone Number	1	C + 0 + 1
Area Number	6	C + 0 + 2
Area Address	1	C + 0 + 3
QuicNet Channel	DIGI17:	(QuicNet)

Communication Addresses

C + F + O	F	Row
Free Lag	2 4	0

Lag Phases <C Page>

Overlap Timing

	Row	9 Green Clear	C Yellow Change	D Red Clear	0 Load-Switch #
Overlap A	A				
Overlap B	B				
Overlap C	C				
Overlap D	D				

<F Page> F + COLOR +

<D Page> D + 0 + OVERLAP

Manual Plan	0	C + A + 1
Manual Offset	0	C + B + 1

Manual Selection

Manual Plan
0 = Automatic
1-9 = Plan 1-9
14 = Free
15 = Flash

Manual Offset
0 = Automatic
1 = Offset A
2 = Offset B
3 = Offset C

Downtime Flash	255	(minutes)

Downtime Before Auto Manual Flash
F + 0 + 8

Disable Ports	234

Disable Communication Ports
D + D + 9

Timing Sheet By: FLG
Approved By: EFF
Drawing Number:
Timing Implemented On:

7

TERSECTION: Mission Bay Dr @ I-5/De Anza

Row	Time	Function	Day of Week	Column F Phases/Bits
0	00 : 01	E	1234567	1
1				
2				
3				
4				
5				
6				
7				
8				
9				
A				
B				
C				
D				
E				
F				

TOD Function

7 + ROW

<D Page>

D + F + ROW

T.O.D. Functions
0 = Permitted Phases
1 = Red Lock
2 = Yellow Lock
3 = Veh Min Recall
4 = Ped Recall
5 =
6 = Rest In Walk
7 = Red Rest
8 = Double Entry
9 = Veh Max Recall
A = Veh Soft Recall
B = Maximum 2
C = Conditional Service
D = Free Lag Phases
E = Bit 1 - Local Override
Bit 2 - Phase Bank 2
Bit 3 - Phase Bank 3
Bit 4 - Disable Detector OFF Monitor
Bit 7 - Detector Count Monitor
Bit 8 - Real Time Split Monitor
F = Output Bits 1 thru 4

Row		F
0		
1	RR Overlap A - Phases	
2	RR Overlap B - Phases	
3	RR Overlap C - Phases	
4	RR Overlap D - Phases	
5	Ped 2P	
6	Ped 6P	
7	Ped 4P	
8	Ped 8P	
9	Yellow Flash Phases	
A	Overlap A - Phases	
B	Overlap B - Phases	
C	Overlap C - Phases	
D	Overlap D - Phases	
E	Restricted Phases	
F	Assign 5 Outputs	

Configuration

<E Page>

E + F + ROW

Day of Week

1 = Sunday
2 = Monday
3 = Tuesday
4 = Wednesday
5 = Thursday
6 = Friday
7 = Saturday

Assign 5 Outputs
1 = Right Turn Overlap
2 = TOD Outputs
3 = EV Beacon - Steady
4 = EV Beacon - Flashing
5 = Special Event Outputs
6 = Phase 3 & 7 Ped
7 = Advanced Warning Sign
8 =

Row		E
0	Exclusive Phases	
1	RR-1 Clear Phases	
2	RR-2 Clear Phases	
3	RR-2 Limited Service	
4	Prot / Perm Phases	
5	Overlap A - Green Omit	
6	Overlap B - Green Omit	
7	Overlap C - Green Omit	
8	Overlap D - Green Omit	
9	Overlap Yellow Flash	
A	EV-A Phases	
B	EV-B Phases	
C	EV-C Phases	
D	EV-D Phases	
E	Extra 1 Config. Bits	1_3_5
F	IC Select (Interconnect)	2

Configuration

For access, set F + 9 + E = 1

E + E + ROW

Extra 1 Flags
1 = TBC Type 1
2 = NEMA Ext. Coord
3 = Auto Daylight Savings
4 = EV Advance
5 = Remote Download
6 = Special Event
7 = Pretimed Operation
8 = Split Ring Operation

IC Select Flags
1 =
2 = Modem
3 = 7-Wire Slave
4 = Flash / Free
5 =
6 = Simplex Master
7 = 7-Wire Master
8 = Offset Interrupter

Time and Date

8-0 Hour, Minute, Day-of-Week
8-1 Day-of-Month, Year, Month
8-F Seconds

Disable Parity	0	D+B+0

Dial-Up Telephone Communications

(If set to a non-zero value, parity will be disabled)

Program Information

C + C + 0 = program
C + C + F = version

Remote Download

C + 0 + 4 = 1-255
w/ E + E + E bit 5 on

INTERSECTION: Mission Bay Dr @ I-5/De Anza

223 Program

Row	1 Delay	3 Carry-over
0		
1		
2		
3		
4		
5		
6		
7		
8		
9		
A		
B		
C		
D		
E	---	---
F	---	---

Detector Name	332 Input File	Detector Number
	1I1	14
	2I2U	1
	2I2L	5
	2I3U	21
	2I3L	25
	2I4	9
	3I5	16
	4I6U	3
	4I6L	7
	4I7U	23
	4I7L	27
	4I8	11
	1I9U	18
	3I9L	20
---	---	---
---	---	---

Row	2 Delay	4 Carry-over
0		
1		
2		
3		
4		
5		
6		
7		
8		
9		
A		
B		
C		
D		
E	---	---
F	---	---

Detector Name	332 Input File	Detector Number
	5J1	13
	6J2U	2
	6J2L	6
	6J3U	22
	6J3L	26
	6J4	10
	7J5	15
	8J6U	4
	8J6L	8
	8J7U	24
	8J7L	28
	8J8	12
	5J9U	17
	7J9L	19
---	---	---
---	---	---

Detector Delay & Carryover <D Page>

D + X (across) + ROW

Row	Detector Numbers	E
A	1 2 3 4 5 6 7 8	12345678
B	9 10 11 12 -- -- -- --	1234____
C	13 14 15 16 17 18 19 20	12345678
D	-- -- -- -- 21 22 23 24	____5678
E	-- -- -- -- -- -- -- --	1234____
F	-- 25 26 27 28 -- -- --	_2345___

Active Detectors <D Page>

Row		0 Detector #
0		
1	System Det. # 1	0
2	System Det. # 2	0
3	System Det. # 3	0
4	System Det. # 4	0
5	System Det. # 5	0
6	System Det. # 6	0
7	System Det. # 7	0
8	System Det. # 8	0

System Detectors <D Page>

Max ON (min)	5	D+A+E
Max OFF (min)	60	D+A+F

Detector Failure Monitor

Phase Number	0	F+C+1
Time Before Yellow	0.0	F+C+3

Advance Warning Beacon - Sign 1

Phase Number	0	F+D+1
Time Before Yellow	0.0	F+D+3

Advance Warning Beacon - Sign 2

Long Failure	0.5	F+0+6
Short Failure	0.5	F+0+7

Power Cycle Correction (Default = 0.5)

INTERSECTION: Mission Bay Dr @ I-5/De Anza

223 Progr

Coordination Timing By: KH
Implemented On: 9/13/07

Row	Column # --->	Plan 1	2	3	4	5	6	7	8	9
	Plan Name --->	AM	Mid	PM						
0	Cycle Length	75	75	85						
1	Phase 1 - ForceOff									
2	Phase 2 - ForceOff	0	0	0						
3	Phase 3 - ForceOff									
4	Phase 4 - ForceOff	28	32	34						
5	Phase 5 - ForceOff									
6	Phase 6 - ForceOff									
7	Phase 7 - ForceOff									
8	Phase 8 - ForceOff									
9	Ring Offset									
A	Offset A	36	4	32						
B	Offset B									
C	Offset C									
D	Permissive	10	10	10						
E	Hold Release	255	255	255						
F	Ped Shift	0	0	0						

Coordination <C Page>

C + Plan + ROW

FOR OBSERVATION ONLY

Master Plan	C + A + 2
Current Plan	C + A + 3
Next Plan	C + A + 4
T.O.D. Plan	C + A + 5
Master Cycle	C + A + 0
Ring A Cycle	C + B + 0
Ring B Cycle	C + D + 0
Min Cycle	C + A + E
Max Cycle	C + B + E

Row	Time	Plan	Offset	Day of Week
0	06 : 30	1	A	_23456_
1	09 : 00	2	A	1____7
2	11 : 00	2	A	_23456_
3	15 : 00	3	A	_23456_
4	18 : 00	2	A	_23456_
5	18 : 00	E	A	1____7
6	19 : 30	E	A	_23456_
7				
8				
9				
A				
B				
C				
D				
E				
F				

TOD Coordination

<9 Key with C+0+9=1>

	E
Plan 1	_2_____
Plan 2	_2_____
Plan 3	_2_____
Plan 4	
Plan 5	
Plan 6	
Plan 7	
Plan 8	
Plan 9	
Coord Ped*	
NEMA Hold	

Sync Phases

C + E + FUNCTION #

Row		F
0	Free Lag	
1	Plan 1 - Lag	_2_4____
2	Plan 2 - Lag	_2_4____
3	Plan 3 - Lag	_2_4____
4	Plan 4 - Lag	
5	Plan 5 - Lag	
6	Plan 6 - Lag	
7	Plan 7 - Lag	
8	Plan 8 - Lag	
9	Plan 9 - Lag	
A	Coord Max *	
B	Coord Lag *	
C		
D		
E		
F		

Lag Phases <C Page>

C + F + FUNCTION #

Transition Type	0

TBC Transition
C + D + D

Plan Select
1 thru 9 = Coordination Plan 1 thru 9
14 or E = Free
15 or F = Flash

Transition Type
0 = Shortway
Non-zero = Lengthen

RAMP METER RATE

Location (I.D.)	Route	Dir	Period	Cars per green	Sec./ Cycle	(per lane) Veh./hr	Total # lanes	HOV
Mission Bay Dr (16203)	5	SB	1500 - 1900	2	7.2 - 15.2	996 - 475	3	Lt

The meters normally operate in a traffic responsive mode.
There are 15 separate rates or steps between the slowest and the fastest discharge rate that depend on the mainlane volumes.

APPENDIX B

SANDAG SELECT ZONE FORECAST MODEL, & PACIFIC BEACH COMMUNITY PLAN CIRCULATION ELEMENT STREET CLASSIFICATIONS

SANDAG
Series 12
2035rc11

Guy Hill
Cadillac Site

Select Zone Plot

Functional Classifications

- Freeway
- Prime
- Major
- Collector
- Light Collector
- Rural Collector
- Local
- Freeway Ramp
- Local Ramp
- Zone Connector

Traffic Analysis Zones

Selz Volumes & Percentage

Unadjusted ADT(x1000)

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N

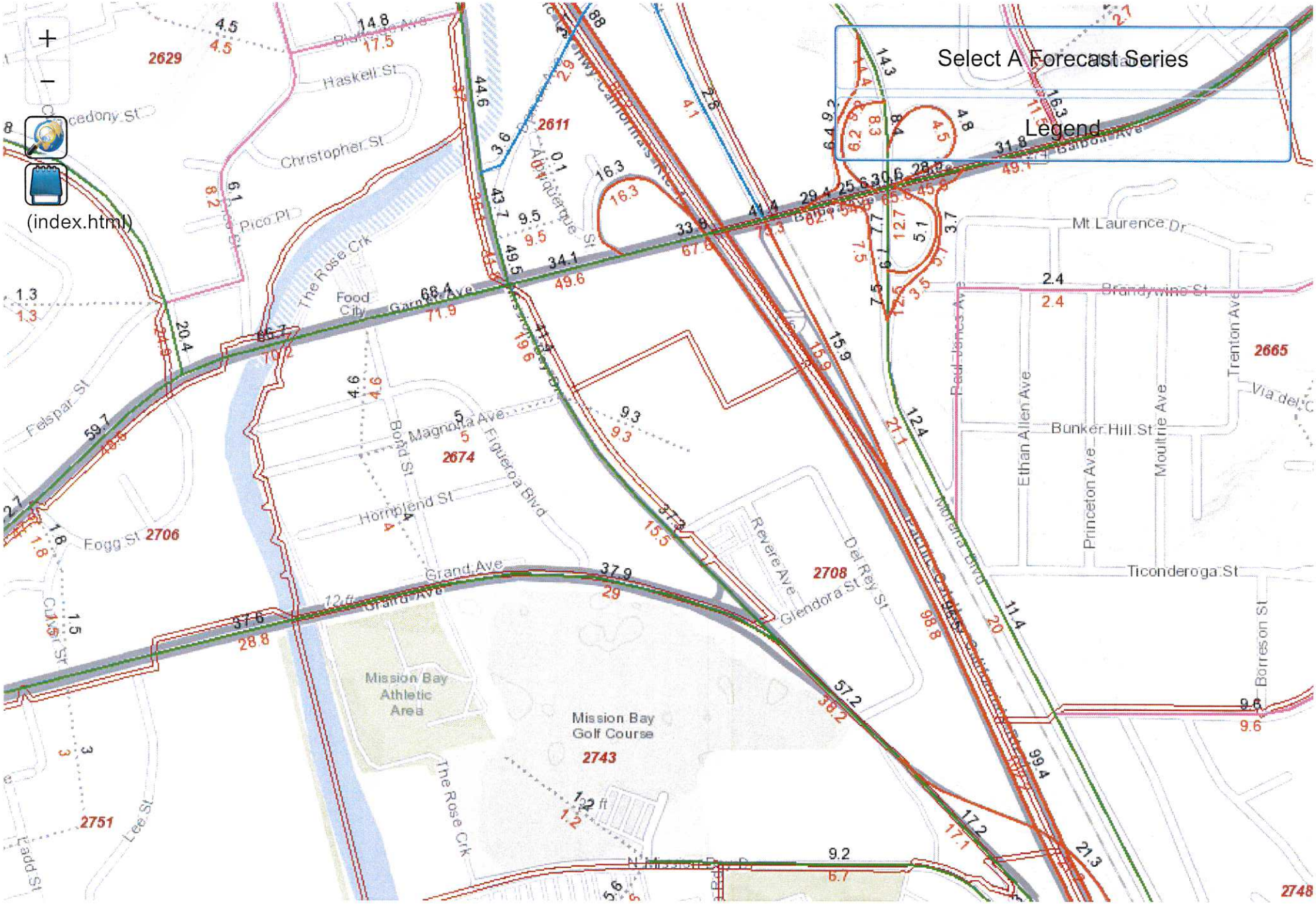
0 0.05 0.1 0.15
Miles

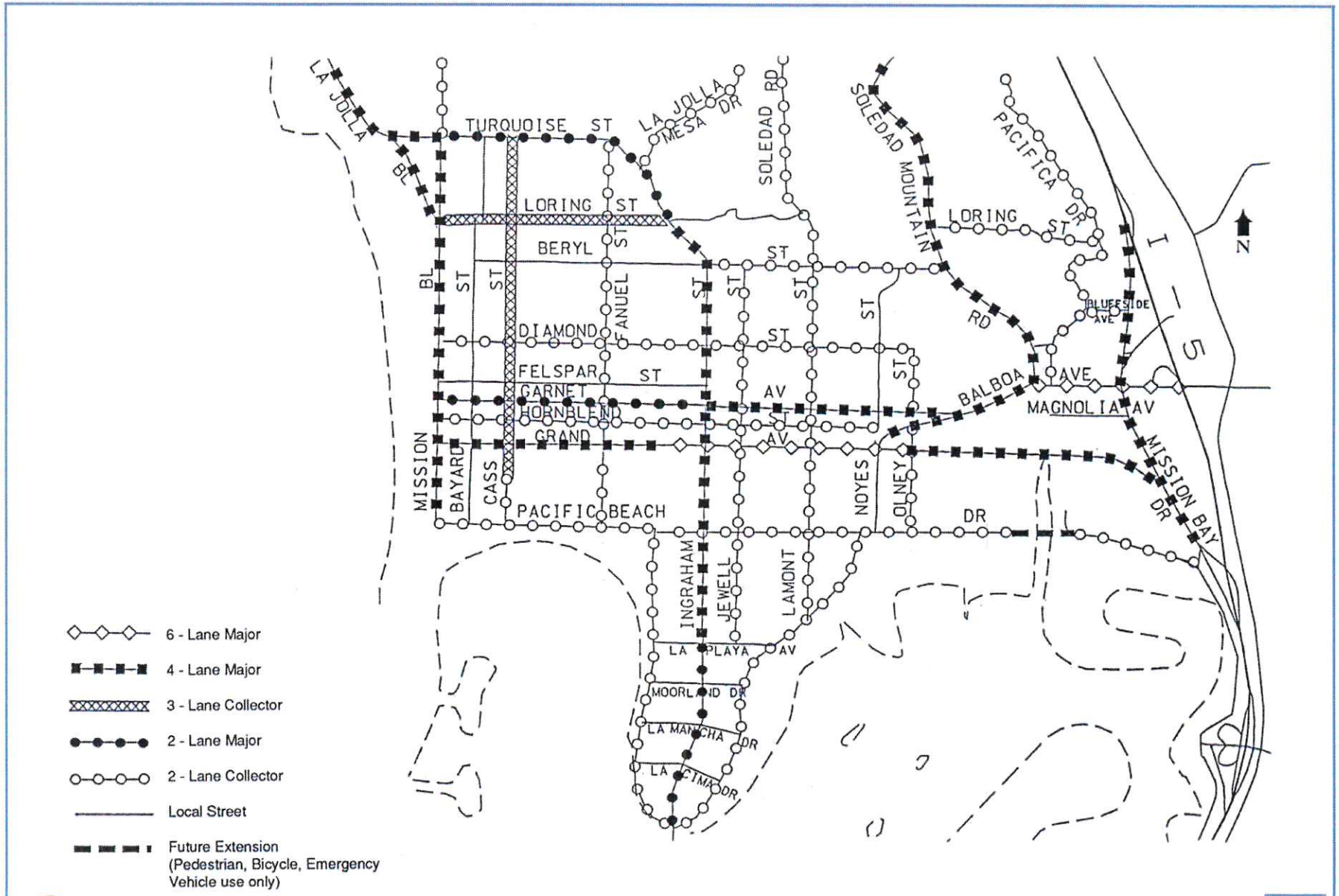
SANDAG

servicebureau

Date: October 22, 2014

Series 12 Year 2035





Street Classifications

Pacific Beach Community Plan

7
FIGURE

APPENDIX C

EXISTING SYNCHRO WORKSHEETS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	730	771	428	164	702	232	398	357	186	210	222	464
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	4.9	4.4	4.4	4.9	4.4	4.4	4.9	4.4	4.4	5.3	4.4
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00	0.97	1.00	0.88
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	3433	3539	1583	3433	1863	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	3539	1583	3433	3539	1583	3433	1863	2787
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	768	812	451	173	739	244	419	376	196	221	234	488
RTOR Reduction (vph)	0	0	166	0	0	72	0	0	51	0	0	28
Lane Group Flow (vph)	768	812	285	173	739	172	419	376	145	221	234	460
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	3	8	1	7	4	5	1	6	7	5	2	3
Permitted Phases			8			4			6			2
Actuated Green, G (s)	28.5	43.3	60.5	16.6	31.4	43.7	17.2	39.2	55.8	12.3	33.9	62.4
Effective Green, g (s)	28.5	43.3	60.5	16.6	31.4	43.7	17.2	39.2	55.8	12.3	33.9	62.4
Actuated g/C Ratio	0.22	0.33	0.47	0.13	0.24	0.34	0.13	0.30	0.43	0.09	0.26	0.48
Clearance Time (s)	4.4	4.9	4.4	4.4	4.9	4.4	4.4	4.9	4.4	4.4	5.3	4.4
Vehicle Extension (s)	2.0	4.1	2.0	2.0	4.3	2.0	2.0	4.5	2.0	2.0	3.3	2.0
Lane Grp Cap (vph)	752	1178	736	226	854	532	454	1067	679	324	485	1337
v/s Ratio Prot	c0.22	0.23	0.05	0.10	c0.21	0.03	c0.12	0.11	0.03	0.06	c0.13	0.08
v/s Ratio Perm			0.13			0.08			0.06			0.09
v/c Ratio	1.02	0.69	0.39	0.77	0.87	0.32	0.92	0.35	0.21	0.68	0.48	0.34
Uniform Delay, d1	50.8	37.5	22.7	54.8	47.3	32.1	55.7	35.5	23.3	57.0	40.6	21.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	38.3	1.9	0.1	13.0	9.6	0.1	24.0	0.9	0.1	4.7	3.4	0.1
Delay (s)	89.0	39.4	22.8	67.8	56.9	32.3	79.8	36.4	23.4	61.6	44.0	21.1
Level of Service	F	D	C	E	E	C	E	D	C	E	D	C
Approach Delay (s)		54.5			53.3			52.2			36.3	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	50.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	79.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	65	4	92	4	1	3	30	904	6	24	753	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.9	4.9			4.9		4.4	5.0		4.4	5.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.86			0.95		1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1594			1725		1770	3535		1770	3520	
Flt Permitted	0.95	1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1594			1725		1770	3535		1770	3520	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	71	4	100	4	1	3	33	983	7	26	818	30
RTOR Reduction (vph)	0	91	0	0	3	0	0	0	0	0	1	0
Lane Group Flow (vph)	71	13	0	0	5	0	33	990	0	26	847	0
Turn Type	Split	NA		Split	NA		Prot	NA		Prot	NA	
Protected Phases	8	8		3 4	3 4		1	6		5	2	
Permitted Phases												
Actuated Green, G (s)	14.2	14.2			16.5		6.4	41.8		58.3	93.7	
Effective Green, g (s)	14.2	14.2			16.5		6.4	41.8		58.3	93.7	
Actuated g/C Ratio	0.09	0.09			0.11		0.04	0.28		0.39	0.62	
Clearance Time (s)	4.9	4.9					4.4	5.0		4.4	5.0	
Vehicle Extension (s)	2.0	2.0					2.0	3.7		2.0	3.7	
Lane Grp Cap (vph)	167	150			189		75	985		687	2198	
v/s Ratio Prot	c0.04	0.01			c0.00		c0.02	c0.28		0.01	c0.24	
v/s Ratio Perm												
v/c Ratio	0.43	0.09			0.03		0.44	1.01		0.04	0.39	
Uniform Delay, d1	64.0	62.0			59.6		70.1	54.1		28.4	13.9	
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	0.1			0.0		1.5	29.9		0.1	0.5	
Delay (s)	64.7	62.1			59.6		71.6	84.0		28.6	14.4	
Level of Service	E	E			E		E	F		C	B	
Approach Delay (s)		63.1			59.6			83.6			14.8	
Approach LOS		E			E			F			B	

Intersection Summary			
HCM 2000 Control Delay	52.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	24.1
Intersection Capacity Utilization	39.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	134	707	0	7	853	69	1	1	0	44	0	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	5.0		4.4	5.0			4.9			4.9	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	1.00		1.00	0.99			1.00			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.97	
Satd. Flow (prot)	1770	3539		1770	3499			1817			1702	
Flt Permitted	0.95	1.00		0.95	1.00			0.91			0.83	
Satd. Flow (perm)	1770	3539		1770	3499			1688			1450	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	146	768	0	8	927	75	1	1	0	48	0	40
RTOR Reduction (vph)	0	0	0	0	7	0	0	0	0	0	80	0
Lane Group Flow (vph)	146	768	0	8	995	0	0	2	0	0	8	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases							4			8		
Actuated Green, G (s)	36.5	61.7		1.2	26.4			7.8			7.8	
Effective Green, g (s)	36.5	61.7		1.2	26.4			7.8			7.8	
Actuated g/C Ratio	0.43	0.73		0.01	0.31			0.09			0.09	
Clearance Time (s)	4.4	5.0		4.4	5.0			4.9			4.9	
Vehicle Extension (s)	2.0	3.2		2.0	3.2			2.0			2.0	
Lane Grp Cap (vph)	760	2568		24	1086			154			133	
v/s Ratio Prot	c0.08	c0.22		0.00	c0.28							
v/s Ratio Perm								0.00			c0.01	
v/c Ratio	0.19	0.30		0.33	0.92			0.01			0.06	
Uniform Delay, d1	15.1	4.1		41.5	28.2			35.1			35.3	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.6	0.3		3.0	13.4			0.0			0.1	
Delay (s)	15.6	4.4		44.5	41.6			35.1			35.3	
Level of Service	B	A		D	D			D			D	
Approach Delay (s)		6.2			41.6			35.1			35.3	
Approach LOS		A			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	25.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	14.3
Intersection Capacity Utilization	51.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL2	EBL	EBR	SEL	SET	SER	NWL	NWT	NWR	SWL	SWR
Lane Configurations											
Volume (vph)	182	0	1343	0	701	88	424	695	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4		4.0		4.9	4.9	5.7	5.7			
Lane Util. Factor	1.00		1.00		0.95	1.00	0.97	0.95			
Frt	1.00		0.85		1.00	0.85	1.00	1.00			
Flt Protected	0.95		1.00		1.00	1.00	0.95	1.00			
Satd. Flow (prot)	1770		1583		3539	1583	3433	3539			
Flt Permitted	0.95		1.00		1.00	1.00	0.95	1.00			
Satd. Flow (perm)	1770		1583		3539	1583	3433	3539			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	198	0	1460	0	762	96	461	755	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	64	0	0	0	0	0
Lane Group Flow (vph)	198	0	1460	0	762	32	461	755	0	0	0
Turn Type	Prot		Free	Prot	NA	Perm	Prot	NA			
Protected Phases	4			5	2		1	6			
Permitted Phases			Free			2					
Actuated Green, G (s)	12.7		75.0		25.1	25.1	22.2	52.2			
Effective Green, g (s)	12.7		75.0		25.1	25.1	22.2	52.2			
Actuated g/C Ratio	0.17		1.00		0.33	0.33	0.30	0.70			
Clearance Time (s)	4.4				4.9	4.9	5.7	5.7			
Vehicle Extension (s)	2.0				3.6	3.6	2.0	4.6			
Lane Grp Cap (vph)	299		1583		1184	529	1016	2463			
v/s Ratio Prot	0.11				0.22		0.13	0.21			
v/s Ratio Perm			c0.92			0.02					
v/c Ratio	0.66		0.92		0.64	0.06	0.45	0.31			
Uniform Delay, d1	29.1		0.0		21.2	16.9	21.5	4.4			
Progression Factor	1.00		1.00		1.00	1.00	1.00	1.00			
Incremental Delay, d2	4.2		10.4		2.7	0.2	1.5	0.3			
Delay (s)	33.4		10.4		23.9	17.2	22.9	4.7			
Level of Service	C		B		C	B	C	A			
Approach Delay (s)		13.1			23.1			11.6		0.0	
Approach LOS		B			C			B		A	

Intersection Summary			
HCM 2000 Control Delay	14.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	1.15		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	53.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Volume (veh/h)	5	1994	1151	14	6	9
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	2167	1251	15	7	10
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		651	1106			
pX, platoon unblocked					0.83	
vC, conflicting volume	1266				2353	425
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1266				2217	425
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				78	98
cM capacity (veh/h)	545				30	578

Direction, Lane #	SE 1	SE 2	SE 3	NW 1	NW 2	NW 3	SW 1
Volume Total	5	1084	1084	500	500	265	16
Volume Left	5	0	0	0	0	0	7
Volume Right	0	0	0	0	0	15	10
cSH	545	1700	1700	1700	1700	1700	70
Volume to Capacity	0.01	0.64	0.64	0.29	0.29	0.16	0.23
Queue Length 95th (ft)	1	0	0	0	0	0	20
Control Delay (s)	11.7	0.0	0.0	0.0	0.0	0.0	71.1
Lane LOS	B						F
Approach Delay (s)	0.0			0.0			71.1
Approach LOS							F

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	65.1%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations	↑↑↑	↱↱			↰	↱
Volume (vph)	1911	132	0	0	188	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7	4.0			4.4	4.4
Lane Util. Factor	0.91	0.88			1.00	1.00
Frt	1.00	0.85			1.00	0.85
Flt Protected	1.00	1.00			0.95	1.00
Satd. Flow (prot)	5085	2787			1770	1583
Flt Permitted	1.00	1.00			0.95	1.00
Satd. Flow (perm)	5085	2787			1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2077	143	0	0	204	27
RTOR Reduction (vph)	0	0	0	0	0	1
Lane Group Flow (vph)	2077	143	0	0	204	26
Turn Type	NA	Free			Prot	Perm
Protected Phases	2				4	
Permitted Phases		Free				4
Actuated Green, G (s)	49.8	75.0			14.1	14.1
Effective Green, g (s)	49.8	75.0			14.1	14.1
Actuated g/C Ratio	0.66	1.00			0.19	0.19
Clearance Time (s)	6.7				4.4	4.4
Vehicle Extension (s)	6.1				3.0	3.0
Lane Grp Cap (vph)	3376	2787			332	297
v/s Ratio Prot	c0.41				c0.12	
v/s Ratio Perm		0.05				0.02
v/c Ratio	0.62	0.05			0.61	0.09
Uniform Delay, d1	7.2	0.0			28.0	25.1
Progression Factor	1.00	1.00			1.00	1.00
Incremental Delay, d2	0.8	0.0			3.4	0.1
Delay (s)	8.0	0.0			31.3	25.3
Level of Service	A	A			C	C
Approach Delay (s)	7.5			0.0	30.6	
Approach LOS	A			A	C	

Intersection Summary			
HCM 2000 Control Delay	9.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	11.1
Intersection Capacity Utilization	56.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	521	888	411	306	908	300	530	368	281	239	342	876
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	4.9	4.4	4.4	4.9	4.4	4.4	4.9	4.4	4.4	5.3	4.4
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00	0.97	1.00	0.88
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	3433	3539	1583	3433	1863	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	3539	1583	3433	3539	1583	3433	1863	2787
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	548	935	433	322	956	316	558	387	296	252	360	922
RTOR Reduction (vph)	0	0	89	0	0	83	0	0	27	0	0	30
Lane Group Flow (vph)	548	935	344	322	956	233	558	387	269	252	360	892
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	3	8	1	7	4	5	1	6	7	5	2	3
Permitted Phases			8			4			6			2
Actuated Green, G (s)	20.6	33.1	53.7	22.6	35.1	48.6	20.6	42.2	64.8	13.5	34.7	55.3
Effective Green, g (s)	20.6	33.1	53.7	22.6	35.1	48.6	20.6	42.2	64.8	13.5	34.7	55.3
Actuated g/C Ratio	0.16	0.25	0.41	0.17	0.27	0.37	0.16	0.32	0.50	0.10	0.27	0.43
Clearance Time (s)	4.4	4.9	4.4	4.4	4.9	4.4	4.4	4.9	4.4	4.4	5.3	4.4
Vehicle Extension (s)	2.0	4.1	2.0	2.0	4.3	2.0	2.0	4.5	2.0	2.0	3.3	2.0
Lane Grp Cap (vph)	543	901	653	307	955	591	543	1148	789	356	497	1185
v/s Ratio Prot	0.16	0.26	0.08	c0.18	c0.27	0.04	c0.16	0.11	0.06	0.07	0.19	c0.12
v/s Ratio Perm			0.13			0.11			0.11			0.20
v/c Ratio	1.01	1.04	0.53	1.05	1.00	0.39	1.03	0.34	0.34	0.71	0.72	0.75
Uniform Delay, d1	54.7	48.5	28.6	53.7	47.5	29.9	54.7	33.3	19.7	56.3	43.3	31.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	40.9	40.2	0.4	64.7	29.4	0.2	45.9	0.8	0.1	5.2	8.9	2.4
Delay (s)	95.6	88.6	29.0	118.4	76.8	30.0	100.6	34.1	19.8	61.5	52.2	34.0
Level of Service	F	F	C	F	E	C	F	C	B	E	D	C
Approach Delay (s)		77.2			76.0			60.6			42.8	
Approach LOS		E			E			E			D	

Intersection Summary			
HCM 2000 Control Delay	65.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	90.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	53	1	120	11	8	15	59	1165	6	38	863	97
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.9	4.9			4.9		4.4	5.0		4.4	5.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.85			0.94		1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1585			1726		1770	3536		1770	3486	
Flt Permitted	0.95	1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1585			1726		1770	3536		1770	3486	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	58	1	130	12	9	16	64	1266	7	41	938	105
RTOR Reduction (vph)	0	119	0	0	14	0	0	0	0	0	3	0
Lane Group Flow (vph)	58	12	0	0	23	0	64	1273	0	41	1040	0
Turn Type	Split	NA		Split	NA		Prot	NA		Prot	NA	
Protected Phases	8	8		3 4	3 4		1	6		5	2	
Permitted Phases												
Actuated Green, G (s)	14.0	14.0			21.4		10.5	61.7		53.7	104.9	
Effective Green, g (s)	14.0	14.0			21.4		10.5	61.7		53.7	104.9	
Actuated g/C Ratio	0.08	0.08			0.13		0.06	0.36		0.32	0.62	
Clearance Time (s)	4.9	4.9					4.4	5.0		4.4	5.0	
Vehicle Extension (s)	2.0	2.0					2.0	3.7		2.0	3.7	
Lane Grp Cap (vph)	145	130			217		109	1283		559	2151	
v/s Ratio Prot	c0.03	0.01			c0.01		c0.04	c0.36		0.02	c0.30	
v/s Ratio Perm												
v/c Ratio	0.40	0.09			0.11		0.59	0.99		0.07	0.48	
Uniform Delay, d1	74.0	72.1			65.8		77.6	53.9		40.7	17.8	
Progression Factor	1.00	1.00			1.00		0.92	0.68		1.00	1.00	
Incremental Delay, d2	0.7	0.1			0.1		1.3	10.9		0.3	0.8	
Delay (s)	74.7	72.2			65.9		73.0	47.3		41.0	18.5	
Level of Service	E	E			E		E	D		D	B	
Approach Delay (s)		73.0			65.9			48.5			19.4	
Approach LOS		E			E			D			B	

Intersection Summary			
HCM 2000 Control Delay	38.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	170.0	Sum of lost time (s)	24.1
Intersection Capacity Utilization	59.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	93	898	24	44	1091	57	6	0	14	117	1	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	5.0		4.4	5.0			4.9			4.9	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	1.00		1.00	0.99			0.91			0.96	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.97	
Satd. Flow (prot)	1770	3525		1770	3513			1665			1723	
Flt Permitted	0.95	1.00		0.95	1.00			0.92			0.79	
Satd. Flow (perm)	1770	3525		1770	3513			1557			1400	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	101	976	26	48	1186	62	7	0	15	127	1	63
RTOR Reduction (vph)	0	2	0	0	5	0	0	18	0	0	25	0
Lane Group Flow (vph)	101	1000	0	48	1243	0	0	4	0	0	166	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases							4			8		
Actuated Green, G (s)	28.0	51.4		4.2	27.6			15.1			15.1	
Effective Green, g (s)	28.0	51.4		4.2	27.6			15.1			15.1	
Actuated g/C Ratio	0.33	0.60		0.05	0.32			0.18			0.18	
Clearance Time (s)	4.4	5.0		4.4	5.0			4.9			4.9	
Vehicle Extension (s)	2.0	3.2		2.0	3.2			2.0			2.0	
Lane Grp Cap (vph)	583	2131		87	1140			276			248	
v/s Ratio Prot	0.06	c0.28		c0.03	c0.35							
v/s Ratio Perm								0.00			c0.12	
v/c Ratio	0.17	0.47		0.55	1.09			0.01			0.67	
Uniform Delay, d1	20.3	9.3		39.5	28.7			28.8			32.6	
Progression Factor	1.10	1.00		1.06	1.04			1.00			1.00	
Incremental Delay, d2	0.6	0.7		4.0	54.1			0.0			5.5	
Delay (s)	22.9	10.0		46.0	83.9			28.8			38.1	
Level of Service	C	A		D	F			C			D	
Approach Delay (s)		11.2			82.5			28.8			38.1	
Approach LOS		B			F			C			D	

Intersection Summary			
HCM 2000 Control Delay	48.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	14.3
Intersection Capacity Utilization	65.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL2	EBL	EBR	SEL	SET	SER	NWL	NWT	NWR	SWL	SWR
Lane Configurations											
Volume (vph)	137	0	1130	5	709	298	1217	1035	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4		4.0	4.4	4.9	4.9	5.7	5.7			
Lane Util. Factor	1.00		1.00	1.00	0.95	1.00	0.97	0.95			
Frt	1.00		0.85	1.00	1.00	0.85	1.00	1.00			
Flt Protected	0.95		1.00	0.95	1.00	1.00	0.95	1.00			
Satd. Flow (prot)	1770		1583	1770	3539	1583	3433	3539			
Flt Permitted	0.95		1.00	0.95	1.00	1.00	0.95	1.00			
Satd. Flow (perm)	1770		1583	1770	3539	1583	3433	3539			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	149	0	1228	5	771	324	1323	1125	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	186	0	0	0	0	0
Lane Group Flow (vph)	149	0	1228	5	771	138	1323	1125	0	0	0
Turn Type	Prot		Free	Prot	NA	Perm	Prot	NA			
Protected Phases	4			5	2		1	6			
Permitted Phases			Free			2					
Actuated Green, G (s)	18.3		170.0	1.2	49.9	49.9	86.8	136.0			
Effective Green, g (s)	18.3		170.0	1.2	49.9	49.9	86.8	136.0			
Actuated g/C Ratio	0.11		1.00	0.01	0.29	0.29	0.51	0.80			
Clearance Time (s)	4.4			4.4	4.9	4.9	5.7	5.7			
Vehicle Extension (s)	2.0			2.0	3.6	3.6	2.0	4.6			
Lane Grp Cap (vph)	190		1583	12	1038	464	1752	2831			
v/s Ratio Prot	0.08			0.00	0.22		0.39	0.32			
v/s Ratio Perm			c0.78			0.09					
v/c Ratio	0.78		0.78	0.42	0.74	0.30	0.76	0.40			
Uniform Delay, d1	73.9		0.0	84.1	54.3	46.5	33.1	5.0			
Progression Factor	1.00		1.00	0.97	0.74	0.66	1.04	0.92			
Incremental Delay, d2	17.5		3.8	7.6	4.4	1.5	3.1	0.4			
Delay (s)	91.4		3.8	89.1	44.6	32.4	37.6	5.0			
Level of Service	F		A	F	D	C	D	A			
Approach Delay (s)		13.3			41.2			22.6		0.0	
Approach LOS		B			D			C		A	

Intersection Summary			
HCM 2000 Control Delay	24.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	170.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	74.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Volume (veh/h)	17	1866	2283	23	3	20
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	18	2028	2482	25	3	22
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		651	1106			
pX, platoon unblocked					0.80	
vC, conflicting volume	2507				3545	840
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2507				3678	840
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	90				0	93
cM capacity (veh/h)	178				3	309

Direction, Lane #	SE 1	SE 2	SE 3	NW 1	NW 2	NW 3	SW 1
Volume Total	18	1014	1014	993	993	521	25
Volume Left	18	0	0	0	0	0	3
Volume Right	0	0	0	0	0	25	22
cSH	178	1700	1700	1700	1700	1700	18
Volume to Capacity	0.10	0.60	0.60	0.58	0.58	0.31	1.37
Queue Length 95th (ft)	9	0	0	0	0	0	88
Control Delay (s)	27.5	0.0	0.0	0.0	0.0	0.0	641.1
Lane LOS	D						F
Approach Delay (s)	0.2			0.0			641.1
Approach LOS							F

Intersection Summary			
Average Delay	3.6		
Intersection Capacity Utilization	61.6%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations	↑↑↑	↱			↰	↱
Volume (vph)	1305	555	0	0	174	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7	4.0			4.4	4.4
Lane Util. Factor	0.91	1.00			1.00	1.00
Frt	1.00	0.85			1.00	0.85
Flt Protected	1.00	1.00			0.95	1.00
Satd. Flow (prot)	5085	1583			1770	1583
Flt Permitted	1.00	1.00			0.95	1.00
Satd. Flow (perm)	5085	1583			1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1418	603	0	0	189	36
RTOR Reduction (vph)	0	0	0	0	0	28
Lane Group Flow (vph)	1418	603	0	0	189	8
Turn Type	NA	Free			Prot	Perm
Protected Phases	2				4	
Permitted Phases		Free				4
Actuated Green, G (s)	56.6	85.0			17.3	17.3
Effective Green, g (s)	56.6	85.0			17.3	17.3
Actuated g/C Ratio	0.67	1.00			0.20	0.20
Clearance Time (s)	6.7				4.4	4.4
Vehicle Extension (s)	6.1				6.1	6.1
Lane Grp Cap (vph)	3386	1583			360	322
v/s Ratio Prot	0.28				c0.11	
v/s Ratio Perm		c0.38				0.01
v/c Ratio	0.42	0.38			0.53	0.03
Uniform Delay, d1	6.6	0.0			30.2	27.1
Progression Factor	1.00	1.00			1.00	1.00
Incremental Delay, d2	0.4	0.7			3.5	0.1
Delay (s)	7.0	0.7			33.7	27.2
Level of Service	A	A			C	C
Approach Delay (s)	5.1			0.0	32.7	
Approach LOS	A			A	C	

Intersection Summary			
HCM 2000 Control Delay	7.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	11.1
Intersection Capacity Utilization	44.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

APPENDIX D

EXISTING WITH PROJECT SYNCHRO WORKSHEETS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	730	771	428	166	702	232	399	369	200	210	224	464
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	4.9	4.4	4.4	4.9	4.4	4.4	4.9	4.4	4.4	5.3	4.4
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00	0.97	1.00	0.88
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	3433	3539	1583	3433	1863	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	3539	1583	3433	3539	1583	3433	1863	2787
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	768	812	451	175	739	244	420	388	211	221	236	488
RTOR Reduction (vph)	0	0	152	0	0	70	0	0	52	0	0	28
Lane Group Flow (vph)	768	812	299	175	739	174	420	388	159	221	236	460
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	3	8	1	7	4	5	1	6	7	5	2	3
Permitted Phases			8			4			6			2
Actuated Green, G (s)	28.1	43.9	61.1	15.6	31.4	43.7	17.2	39.6	55.2	12.3	34.3	62.4
Effective Green, g (s)	28.1	43.9	61.1	15.6	31.4	43.7	17.2	39.6	55.2	12.3	34.3	62.4
Actuated g/C Ratio	0.22	0.34	0.47	0.12	0.24	0.34	0.13	0.30	0.42	0.09	0.26	0.48
Clearance Time (s)	4.4	4.9	4.4	4.4	4.9	4.4	4.4	4.9	4.4	4.4	5.3	4.4
Vehicle Extension (s)	2.0	4.1	2.0	2.0	4.3	2.0	2.0	4.5	2.0	2.0	3.3	2.0
Lane Grp Cap (vph)	742	1195	744	212	854	532	454	1078	672	324	491	1337
v/s Ratio Prot	c0.22	0.23	0.05	0.10	c0.21	0.03	c0.12	0.11	0.03	0.06	c0.13	0.07
v/s Ratio Perm			0.14			0.08			0.07			0.09
v/c Ratio	1.04	0.68	0.40	0.83	0.87	0.33	0.93	0.36	0.24	0.68	0.48	0.34
Uniform Delay, d1	51.0	37.0	22.5	55.9	47.3	32.2	55.8	35.3	23.9	57.0	40.3	21.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	42.4	1.7	0.1	21.3	9.6	0.1	24.3	0.9	0.1	4.7	3.3	0.1
Delay (s)	93.4	38.7	22.6	77.2	56.9	32.3	80.1	36.2	24.0	61.6	43.7	21.1
Level of Service	F	D	C	E	E	C	F	D	C	E	D	C
Approach Delay (s)		55.8			54.8			51.8			36.2	
Approach LOS		E			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	51.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	79.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	65	4	92	4	1	3	31	928	7	24	757	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.9	4.9			4.9		4.4	5.0		4.4	5.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.86			0.95		1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1594			1725		1770	3535		1770	3521	
Flt Permitted	0.95	1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1594			1725		1770	3535		1770	3521	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	71	4	100	4	1	3	34	1009	8	26	823	30
RTOR Reduction (vph)	0	91	0	0	3	0	0	1	0	0	1	0
Lane Group Flow (vph)	71	13	0	0	5	0	34	1016	0	26	852	0
Turn Type	Split	NA		Split	NA		Prot	NA		Prot	NA	
Protected Phases	8	8		3 4	3 4		1	6		5	2	
Permitted Phases												
Actuated Green, G (s)	14.2	14.2			16.5		6.4	42.7		57.4	93.7	
Effective Green, g (s)	14.2	14.2			16.5		6.4	42.7		57.4	93.7	
Actuated g/C Ratio	0.09	0.09			0.11		0.04	0.28		0.38	0.62	
Clearance Time (s)	4.9	4.9					4.4	5.0		4.4	5.0	
Vehicle Extension (s)	2.0	2.0					2.0	3.7		2.0	3.7	
Lane Grp Cap (vph)	167	150			189		75	1006		677	2199	
v/s Ratio Prot	c0.04	0.01			c0.00		c0.02	c0.29		0.01	c0.24	
v/s Ratio Perm												
v/c Ratio	0.43	0.09			0.03		0.45	1.01		0.04	0.39	
Uniform Delay, d1	64.0	62.0			59.6		70.1	53.6		29.0	13.9	
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	0.1			0.0		1.6	30.9		0.1	0.5	
Delay (s)	64.7	62.1			59.6		71.7	84.6		29.1	14.5	
Level of Service	E	E			E		E	F		C	B	
Approach Delay (s)		63.1			59.6			84.1			14.9	
Approach LOS		E			E			F			B	

Intersection Summary			
HCM 2000 Control Delay	53.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	24.1
Intersection Capacity Utilization	40.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	1	1	0	44	0	37	134	711	0	7	879	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9			4.9		4.4	5.0		4.4	5.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		1.00			0.94		1.00	1.00		1.00	0.99	
Flt Protected		0.98			0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1817			1702		1770	3539		1770	3501	
Flt Permitted		0.91			0.83		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1688			1450		1770	3539		1770	3501	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	1	0	48	0	40	146	773	0	8	955	75
RTOR Reduction (vph)	0	0	0	0	80	0	0	0	0	0	7	0
Lane Group Flow (vph)	0	2	0	0	8	0	146	773	0	8	1023	0
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		7.8			7.8		36.5	61.7		1.2	26.4	
Effective Green, g (s)		7.8			7.8		36.5	61.7		1.2	26.4	
Actuated g/C Ratio		0.09			0.09		0.43	0.73		0.01	0.31	
Clearance Time (s)		4.9			4.9		4.4	5.0		4.4	5.0	
Vehicle Extension (s)		2.0			2.0		2.0	3.2		2.0	3.2	
Lane Grp Cap (vph)		154			133		760	2568		24	1087	
v/s Ratio Prot							c0.08	c0.22		0.00	c0.29	
v/s Ratio Perm		0.00			c0.01							
v/c Ratio		0.01			0.06		0.19	0.30		0.33	0.94	
Uniform Delay, d1		35.1			35.3		15.1	4.1		41.5	28.5	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.0			0.1		0.6	0.3		3.0	16.4	
Delay (s)		35.1			35.3		15.6	4.4		44.5	44.9	
Level of Service		D			D		B	A		D	D	
Approach Delay (s)		35.1			35.3			6.2			44.9	
Approach LOS		D			D			A			D	

Intersection Summary			
HCM 2000 Control Delay	27.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	14.3
Intersection Capacity Utilization	51.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL2	EBL	EBR	SEL	SET	SER	NWL	NWT	NWR	SWL	SWR
Lane Configurations											
Volume (vph)	182	0	1345	0	705	88	436	721	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4		4.0		4.9	4.9	5.7	5.7			
Lane Util. Factor	1.00		1.00		0.95	1.00	0.97	0.95			
Frt	1.00		0.85		1.00	0.85	1.00	1.00			
Flt Protected	0.95		1.00		1.00	1.00	0.95	1.00			
Satd. Flow (prot)	1770		1583		3539	1583	3433	3539			
Flt Permitted	0.95		1.00		1.00	1.00	0.95	1.00			
Satd. Flow (perm)	1770		1583		3539	1583	3433	3539			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	198	0	1462	0	766	96	474	784	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	64	0	0	0	0	0
Lane Group Flow (vph)	198	0	1462	0	766	32	474	784	0	0	0
Turn Type	Prot		Free	Prot	NA	Perm	Prot	NA			
Protected Phases	4			5	2		1	6			
Permitted Phases			Free			2					
Actuated Green, G (s)	12.7		75.0		24.9	24.9	22.4	52.2			
Effective Green, g (s)	12.7		75.0		24.9	24.9	22.4	52.2			
Actuated g/C Ratio	0.17		1.00		0.33	0.33	0.30	0.70			
Clearance Time (s)	4.4				4.9	4.9	5.7	5.7			
Vehicle Extension (s)	2.0				3.6	3.6	2.0	4.6			
Lane Grp Cap (vph)	299		1583		1174	525	1025	2463			
v/s Ratio Prot	0.11				0.22		0.14	0.22			
v/s Ratio Perm			c0.92			0.02					
v/c Ratio	0.66		0.92		0.65	0.06	0.46	0.32			
Uniform Delay, d1	29.1		0.0		21.4	17.1	21.4	4.5			
Progression Factor	1.00		1.00		1.00	1.00	1.00	1.00			
Incremental Delay, d2	4.2		10.5		2.8	0.2	1.5	0.3			
Delay (s)	33.4		10.5		24.2	17.3	22.9	4.8			
Level of Service	C		B		C	B	C	A			
Approach Delay (s)		13.2			23.4			11.6		0.0	
Approach LOS		B			C			B		A	

Intersection Summary			
HCM 2000 Control Delay	15.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	1.15		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	54.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Volume (veh/h)	35	1994	1151	30	29	53
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	38	2167	1251	33	32	58
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		651	1106			
pX, platoon unblocked					0.82	
vC, conflicting volume	1284				2427	433
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1284				2305	433
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	93				0	90
cM capacity (veh/h)	536				25	571

Direction, Lane #	SE 1	SE 2	SE 3	NW 1	NW 2	NW 3	SW 1
Volume Total	38	1084	1084	500	500	283	89
Volume Left	38	0	0	0	0	0	32
Volume Right	0	0	0	0	0	33	58
cSH	536	1700	1700	1700	1700	1700	65
Volume to Capacity	0.07	0.64	0.64	0.29	0.29	0.17	1.38
Queue Length 95th (ft)	6	0	0	0	0	0	188
Control Delay (s)	12.2	0.0	0.0	0.0	0.0	0.0	349.3
Lane LOS	B						F
Approach Delay (s)	0.2			0.0			349.3
Approach LOS							F

Intersection Summary			
Average Delay	8.8		
Intersection Capacity Utilization	66.7%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Volume (vph)	1924	139	0	0	189	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7	4.0			4.4	4.4
Lane Util. Factor	0.91	0.88			1.00	1.00
Frt	1.00	0.85			1.00	0.85
Flt Protected	1.00	1.00			0.95	1.00
Satd. Flow (prot)	5085	2787			1770	1583
Flt Permitted	1.00	1.00			0.95	1.00
Satd. Flow (perm)	5085	2787			1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2091	151	0	0	205	27
RTOR Reduction (vph)	0	0	0	0	0	1
Lane Group Flow (vph)	2091	151	0	0	205	26
Turn Type	NA	Free			Prot	Perm
Protected Phases	2				4	
Permitted Phases		Free				4
Actuated Green, G (s)	49.8	75.0			14.1	14.1
Effective Green, g (s)	49.8	75.0			14.1	14.1
Actuated g/C Ratio	0.66	1.00			0.19	0.19
Clearance Time (s)	6.7				4.4	4.4
Vehicle Extension (s)	6.1				3.0	3.0
Lane Grp Cap (vph)	3376	2787			332	297
v/s Ratio Prot	c0.41				c0.12	
v/s Ratio Perm		0.05				0.02
v/c Ratio	0.62	0.05			0.62	0.09
Uniform Delay, d1	7.2	0.0			28.0	25.1
Progression Factor	1.00	1.00			1.00	1.00
Incremental Delay, d2	0.9	0.0			3.4	0.1
Delay (s)	8.1	0.0			31.4	25.3
Level of Service	A	A			C	C
Approach Delay (s)	7.5			0.0	30.7	
Approach LOS	A			A	C	

Intersection Summary			
HCM 2000 Control Delay	9.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	11.1
Intersection Capacity Utilization	56.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	521	888	413	320	908	300	531	376	288	239	358	876
Future Volume (vph)	521	888	413	320	908	300	531	376	288	239	358	876
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	4.9	4.4	4.4	4.9	4.4	4.4	4.9	4.4	4.4	5.3	4.4
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00	0.97	1.00	0.88
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	3433	3539	1583	3433	1863	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	3539	1583	3433	3539	1583	3433	1863	2787
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	548	935	435	337	956	316	559	396	303	252	377	922
RTOR Reduction (vph)	0	0	83	0	0	75	0	0	26	0	0	53
Lane Group Flow (vph)	548	935	352	337	956	241	559	396	277	252	377	869
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	3	8	1	7	4	5	1	6	7	5	2	3
Permitted Phases			8			4			6			2
Actuated Green, G (s)	19.6	32.1	52.7	24.6	37.1	50.6	20.6	41.2	65.8	13.5	33.7	53.3
Effective Green, g (s)	19.6	32.1	52.7	24.6	37.1	50.6	20.6	41.2	65.8	13.5	33.7	53.3
Actuated g/C Ratio	0.15	0.25	0.41	0.19	0.29	0.39	0.16	0.32	0.51	0.10	0.26	0.41
Clearance Time (s)	4.4	4.9	4.4	4.4	4.9	4.4	4.4	4.9	4.4	4.4	5.3	4.4
Vehicle Extension (s)	2.0	4.1	2.0	2.0	4.3	2.0	2.0	4.5	2.0	2.0	3.3	2.0
Lane Grp Cap (vph)	517	873	641	334	1009	616	543	1121	801	356	482	1142
v/s Ratio Prot	0.16	c0.26	0.09	c0.19	0.27	0.04	c0.16	0.11	0.07	0.07	c0.20	0.11
v/s Ratio Perm			0.14			0.11			0.11			0.20
v/c Ratio	1.06	1.07	0.55	1.01	0.95	0.39	1.03	0.35	0.35	0.71	0.78	0.76
Uniform Delay, d1	55.2	49.0	29.6	52.7	45.5	28.6	54.7	34.2	19.2	56.3	44.7	32.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	56.4	51.3	0.5	51.5	17.2	0.2	46.4	0.9	0.1	5.2	12.0	2.7
Delay (s)	111.6	100.3	30.1	104.2	62.7	28.8	101.1	35.0	19.3	61.5	56.7	35.6
Level of Service	F	F	C	F	E	C	F	D	B	E	E	D
Approach Delay (s)		87.6			64.7			60.6			45.0	
Approach LOS		F			E			E			D	

Intersection Summary			
HCM 2000 Control Delay	66.0	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	92.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	53	1	122	13	8	15	60	1180	7	38	895	97
Future Volume (vph)	53	1	122	13	8	15	60	1180	7	38	895	97
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.9	4.9			4.9		4.4	5.0		4.4	5.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.85			0.94		1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1585			1729		1770	3536		1770	3488	
Flt Permitted	0.95	1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1585			1729		1770	3536		1770	3488	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	58	1	133	14	9	16	65	1283	8	41	973	105
RTOR Reduction (vph)	0	122	0	0	14	0	0	0	0	0	3	0
Lane Group Flow (vph)	58	12	0	0	25	0	65	1291	0	41	1075	0
Turn Type	Split	NA		Split	NA		Prot	NA		Prot	NA	
Protected Phases	8	8		3 4	3 4		1	6		5	2	
Permitted Phases												
Actuated Green, G (s)	14.0	14.0			21.4		10.6	62.2		53.2	104.8	
Effective Green, g (s)	14.0	14.0			21.4		10.6	62.2		53.2	104.8	
Actuated g/C Ratio	0.08	0.08			0.13		0.06	0.37		0.31	0.62	
Clearance Time (s)	4.9	4.9					4.4	5.0		4.4	5.0	
Vehicle Extension (s)	2.0	2.0					2.0	3.7		2.0	3.7	
Lane Grp Cap (vph)	145	130			217		110	1293		553	2150	
v/s Ratio Prot	c0.03	0.01			c0.01		c0.04	c0.37		0.02	c0.31	
v/s Ratio Perm												
v/c Ratio	0.40	0.09			0.12		0.59	1.00		0.07	0.50	
Uniform Delay, d1	74.0	72.1			65.9		77.6	53.9		41.1	18.1	
Progression Factor	1.00	1.00			1.00		0.94	0.67		1.00	1.00	
Incremental Delay, d2	0.7	0.1			0.1		1.8	13.7		0.3	0.8	
Delay (s)	74.7	72.2			66.0		74.6	49.6		41.3	18.9	
Level of Service	E	E			E		E	D		D	B	
Approach Delay (s)		73.0			66.0			50.8			19.7	
Approach LOS		E			E			D			B	

Intersection Summary			
HCM 2000 Control Delay	39.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	170.0	Sum of lost time (s)	24.1
Intersection Capacity Utilization	61.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	93	933	24	44	1108	57	6	0	14	117	1	58
Future Volume (vph)	93	933	24	44	1108	57	6	0	14	117	1	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	5.5		4.4	5.5			4.9			4.9	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	1.00		1.00	0.99			0.91			0.96	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.97	
Satd. Flow (prot)	1770	3526		1770	3513			1665			1723	
Flt Permitted	0.95	1.00		0.95	1.00			0.92			0.79	
Satd. Flow (perm)	1770	3526		1770	3513			1557			1400	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	101	1014	26	48	1204	62	7	0	15	127	1	63
RTOR Reduction (vph)	0	1	0	0	4	0	0	18	0	0	25	0
Lane Group Flow (vph)	101	1039	0	48	1262	0	0	4	0	0	166	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases							4			8		
Actuated Green, G (s)	27.6	50.3		4.8	27.5			15.1			15.1	
Effective Green, g (s)	27.6	50.3		4.8	27.5			15.1			15.1	
Actuated g/C Ratio	0.32	0.59		0.06	0.32			0.18			0.18	
Clearance Time (s)	4.4	5.5		4.4	5.5			4.9			4.9	
Vehicle Extension (s)	2.0	3.2		2.0	3.2			2.0			2.0	
Lane Grp Cap (vph)	574	2086		99	1136			276			248	
v/s Ratio Prot	0.06	c0.29		c0.03	c0.36							
v/s Ratio Perm								0.00			c0.12	
v/c Ratio	0.18	0.50		0.48	1.11			0.01			0.67	
Uniform Delay, d1	20.6	10.0		38.9	28.8			28.8			32.6	
Progression Factor	1.10	1.09		1.08	1.03			1.00			1.00	
Incremental Delay, d2	0.6	0.8		1.3	61.8			0.0			5.5	
Delay (s)	23.2	11.8		43.1	91.5			28.8			38.1	
Level of Service	C	B		D	F			C			D	
Approach Delay (s)		12.8			89.7			28.8			38.1	
Approach LOS		B			F			C			D	

Intersection Summary			
HCM 2000 Control Delay	52.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	14.8
Intersection Capacity Utilization	66.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL2	EBL	EBR	SEL	SET	SER	NWL	NWT	NWR	SWL	SWR
Lane Configurations											
Traffic Volume (vph)	137	0	1146	5	744	298	1225	1052	0	0	0
Future Volume (vph)	137	0	1146	5	744	298	1225	1052	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4		4.0	4.4	4.9	4.9	5.7	5.7			
Lane Util. Factor	1.00		1.00	1.00	0.95	1.00	0.97	0.95			
Frt	1.00		0.85	1.00	1.00	0.85	1.00	1.00			
Flt Protected	0.95		1.00	0.95	1.00	1.00	0.95	1.00			
Satd. Flow (prot)	1770		1583	1770	3539	1583	3433	3539			
Flt Permitted	0.95		1.00	0.95	1.00	1.00	0.95	1.00			
Satd. Flow (perm)	1770		1583	1770	3539	1583	3433	3539			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	149	0	1246	5	809	324	1332	1143	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	177	0	0	0	0	0
Lane Group Flow (vph)	149	0	1246	5	809	147	1332	1143	0	0	0
Turn Type	Prot		Free	Prot	NA	Perm	Prot	NA			
Protected Phases	4			5	2		1	6			
Permitted Phases			Free			2					
Actuated Green, G (s)	18.3		170.0	1.2	50.9	50.9	85.8	136.0			
Effective Green, g (s)	18.3		170.0	1.2	50.9	50.9	85.8	136.0			
Actuated g/C Ratio	0.11		1.00	0.01	0.30	0.30	0.50	0.80			
Clearance Time (s)	4.4			4.4	4.9	4.9	5.7	5.7			
Vehicle Extension (s)	2.0			2.0	3.6	3.6	2.0	4.6			
Lane Grp Cap (vph)	190		1583	12	1059	473	1732	2831			
v/s Ratio Prot	0.08			0.00	0.23		0.39	0.32			
v/s Ratio Perm			c0.79			0.09					
v/c Ratio	0.78		0.79	0.42	0.76	0.31	0.77	0.40			
Uniform Delay, d1	73.9		0.0	84.1	54.1	46.0	34.1	5.0			
Progression Factor	1.00		1.00	0.98	0.74	0.66	1.04	0.93			
Incremental Delay, d2	17.5		4.0	7.5	4.7	1.5	3.4	0.4			
Delay (s)	91.4		4.0	89.7	44.9	32.1	38.8	5.1			
Level of Service	F		A	F	D	C	D	A			
Approach Delay (s)		13.4			41.5			23.2		0.0	
Approach LOS		B			D			C		A	

Intersection Summary			
HCM 2000 Control Delay	24.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	170.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	75.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Volume (veh/h)	84	1866	2283	58	31	75
Future Volume (Veh/h)	84	1866	2283	58	31	75
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	91	2028	2482	63	34	82
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		651	1106			
pX, platoon unblocked					0.80	
vC, conflicting volume	2545				3710	859
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2545				3892	859
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	47				0	73
cM capacity (veh/h)	172				1	300

Direction, Lane #	SE 1	SE 2	SE 3	NW 1	NW 2	NW 3	SW 1
Volume Total	91	1014	1014	993	993	559	116
Volume Left	91	0	0	0	0	0	34
Volume Right	0	0	0	0	0	63	82
cSH	172	1700	1700	1700	1700	1700	3
Volume to Capacity	0.53	0.60	0.60	0.58	0.58	0.33	37.29
Queue Length 95th (ft)	67	0	0	0	0	0	Err
Control Delay (s)	47.2	0.0	0.0	0.0	0.0	0.0	Err
Lane LOS	E						F
Approach Delay (s)	2.0			0.0			Err
Approach LOS							F

Intersection Summary			
Average Delay	243.6		
Intersection Capacity Utilization	66.4%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Traffic Volume (vph)	1313	559	0	0	183	33
Future Volume (vph)	1313	559	0	0	183	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7	4.0			4.4	4.4
Lane Util. Factor	0.91	1.00			1.00	1.00
Frt	1.00	0.85			1.00	0.85
Flt Protected	1.00	1.00			0.95	1.00
Satd. Flow (prot)	5085	1583			1770	1583
Flt Permitted	1.00	1.00			0.95	1.00
Satd. Flow (perm)	5085	1583			1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1427	608	0	0	199	36
RTOR Reduction (vph)	0	0	0	0	0	27
Lane Group Flow (vph)	1427	608	0	0	199	9
Turn Type	NA	Free			Prot	Perm
Protected Phases	2				4	
Permitted Phases		Free				4
Actuated Green, G (s)	56.2	85.0			17.7	17.7
Effective Green, g (s)	56.2	85.0			17.7	17.7
Actuated g/C Ratio	0.66	1.00			0.21	0.21
Clearance Time (s)	6.7				4.4	4.4
Vehicle Extension (s)	6.1				6.1	6.1
Lane Grp Cap (vph)	3362	1583			368	329
v/s Ratio Prot	0.28				c0.11	
v/s Ratio Perm		c0.38				0.01
v/c Ratio	0.42	0.38			0.54	0.03
Uniform Delay, d1	6.8	0.0			30.0	26.8
Progression Factor	1.00	1.00			1.00	1.00
Incremental Delay, d2	0.4	0.7			3.7	0.1
Delay (s)	7.2	0.7			33.7	26.9
Level of Service	A	A			C	C
Approach Delay (s)	5.2			0.0	32.7	
Approach LOS	A			A	C	

Intersection Summary			
HCM 2000 Control Delay	8.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	11.1
Intersection Capacity Utilization	44.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

APPENDIX E

NEAR TERM WITHOUT PROJECT SYNCHRO WORKSHEETS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	759	802	445	171	730	241	414	371	197	218	231	483
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	4.9	4.4	4.4	4.9	4.4	4.4	4.9	4.4	4.4	5.3	4.4
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00	0.97	1.00	0.88
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	3433	3539	1583	3433	1863	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	3539	1583	3433	3539	1583	3433	1863	2787
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	799	844	468	180	768	254	436	391	207	229	243	508
RTOR Reduction (vph)	0	0	147	0	0	67	0	0	52	0	0	28
Lane Group Flow (vph)	799	844	321	180	768	187	436	391	155	229	243	480
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	3	8	1	7	4	5	1	6	7	5	2	3
Permitted Phases			8			4			6			2
Actuated Green, G (s)	28.1	44.1	61.3	15.8	31.8	44.4	17.2	38.9	54.7	12.6	33.9	62.0
Effective Green, g (s)	28.1	44.1	61.3	15.8	31.8	44.4	17.2	38.9	54.7	12.6	33.9	62.0
Actuated g/C Ratio	0.22	0.34	0.47	0.12	0.24	0.34	0.13	0.30	0.42	0.10	0.26	0.48
Clearance Time (s)	4.4	4.9	4.4	4.4	4.9	4.4	4.4	4.9	4.4	4.4	5.3	4.4
Vehicle Extension (s)	2.0	4.1	2.0	2.0	4.3	2.0	2.0	4.5	2.0	2.0	3.3	2.0
Lane Grp Cap (vph)	742	1200	746	215	865	540	454	1058	666	332	485	1329
v/s Ratio Prot	c0.23	0.24	0.06	0.10	c0.22	0.03	c0.13	0.11	0.03	0.07	c0.13	0.08
v/s Ratio Perm			0.15			0.08			0.07			0.09
v/c Ratio	1.08	0.70	0.43	0.84	0.89	0.35	0.96	0.37	0.23	0.69	0.50	0.36
Uniform Delay, d1	51.0	37.3	22.8	55.8	47.4	32.0	56.1	35.9	24.2	56.8	40.9	21.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	55.7	2.1	0.1	22.8	11.4	0.1	31.9	1.0	0.1	4.7	3.7	0.1
Delay (s)	106.6	39.3	22.9	78.6	58.8	32.1	88.0	36.9	24.2	61.5	44.5	21.5
Level of Service	F	D	C	E	E	C	F	D	C	E	D	C
Approach Delay (s)		61.2			56.1			55.9			36.6	
Approach LOS		E			E			E			D	

Intersection Summary			
HCM 2000 Control Delay	54.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	81.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	68	4	96	4	1	3	31	940	6	25	783	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.9	4.9			4.9		4.4	5.0		4.4	5.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.86			0.95		1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1594			1725		1770	3536		1770	3520	
Flt Permitted	0.95	1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1594			1725		1770	3536		1770	3520	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	74	4	104	4	1	3	34	1022	7	27	851	32
RTOR Reduction (vph)	0	94	0	0	3	0	0	0	0	0	1	0
Lane Group Flow (vph)	74	14	0	0	5	0	34	1029	0	27	882	0
Turn Type	Split	NA		Split	NA		Prot	NA		Prot	NA	
Protected Phases	8	8		3 4	3 4		1	6		5	2	
Permitted Phases												
Actuated Green, G (s)	14.3	14.3			16.5		6.4	38.1		61.9	93.6	
Effective Green, g (s)	14.3	14.3			16.5		6.4	38.1		61.9	93.6	
Actuated g/C Ratio	0.10	0.10			0.11		0.04	0.25		0.41	0.62	
Clearance Time (s)	4.9	4.9					4.4	5.0		4.4	5.0	
Vehicle Extension (s)	2.0	2.0					2.0	3.7		2.0	3.7	
Lane Grp Cap (vph)	168	151			189		75	898		730	2196	
v/s Ratio Prot	c0.04	0.01			c0.00		c0.02	c0.29		0.02	c0.25	
v/s Ratio Perm												
v/c Ratio	0.44	0.09			0.03		0.45	1.15		0.04	0.40	
Uniform Delay, d1	64.1	61.9			59.6		70.1	56.0		26.3	14.1	
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	0.1			0.0		1.6	78.8		0.1	0.5	
Delay (s)	64.7	62.0			59.6		71.7	134.7		26.4	14.7	
Level of Service	E	E			E		E	F		C	B	
Approach Delay (s)		63.1			59.6			132.7			15.0	
Approach LOS		E			E			F			B	

Intersection Summary			
HCM 2000 Control Delay	77.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	24.1
Intersection Capacity Utilization	41.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	1	1	0	46	0	38	139	735	0	7	887	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9			4.9		4.4	5.0		4.4	5.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		1.00			0.94		1.00	1.00		1.00	0.99	
Flt Protected		0.98			0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1817			1703		1770	3539		1770	3499	
Flt Permitted		0.91			0.83		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1697			1449		1770	3539		1770	3499	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	1	0	50	0	41	151	799	0	8	964	78
RTOR Reduction (vph)	0	0	0	0	83	0	0	0	0	0	7	0
Lane Group Flow (vph)	0	2	0	0	8	0	151	799	0	8	1035	0
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		7.8			7.8		36.5	61.7		1.2	26.4	
Effective Green, g (s)		7.8			7.8		36.5	61.7		1.2	26.4	
Actuated g/C Ratio		0.09			0.09		0.43	0.73		0.01	0.31	
Clearance Time (s)		4.9			4.9		4.4	5.0		4.4	5.0	
Vehicle Extension (s)		2.0			2.0		2.0	3.2		2.0	3.2	
Lane Grp Cap (vph)		155			132		760	2568		24	1086	
v/s Ratio Prot							c0.09	c0.23		0.00	c0.30	
v/s Ratio Perm		0.00			c0.01							
v/c Ratio		0.01			0.06		0.20	0.31		0.33	0.95	
Uniform Delay, d1		35.1			35.3		15.1	4.1		41.5	28.7	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.0			0.1		0.6	0.3		3.0	18.1	
Delay (s)		35.1			35.3		15.7	4.4		44.5	46.8	
Level of Service		D			D		B	A		D	D	
Approach Delay (s)		35.1			35.3			6.2			46.8	
Approach LOS		D			D			A			D	

Intersection Summary			
HCM 2000 Control Delay	27.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	14.3
Intersection Capacity Utilization	52.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL2	EBL	EBR	SEL	SET	SER	NWL	NWT	NWR	SWL	SWR
Lane Configurations											
Volume (vph)	189	0	1397	0	729	92	441	723	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4		4.0		4.9	4.9	5.7	5.7			
Lane Util. Factor	1.00		1.00		0.95	1.00	0.97	0.95			
Frt	1.00		0.85		1.00	0.85	1.00	1.00			
Flt Protected	0.95		1.00		1.00	1.00	0.95	1.00			
Satd. Flow (prot)	1770		1583		3539	1583	3433	3539			
Flt Permitted	0.95		1.00		1.00	1.00	0.95	1.00			
Satd. Flow (perm)	1770		1583		3539	1583	3433	3539			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	205	0	1518	0	792	100	479	786	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	67	0	0	0	0	0
Lane Group Flow (vph)	205	0	1518	0	792	33	479	786	0	0	0
Turn Type	Prot		Free	Prot	NA	Perm	Prot	NA			
Protected Phases	4			5	2		1	6			
Permitted Phases			Free			2					
Actuated Green, G (s)	13.0		75.0		25.1	25.1	21.9	51.9			
Effective Green, g (s)	13.0		75.0		25.1	25.1	21.9	51.9			
Actuated g/C Ratio	0.17		1.00		0.33	0.33	0.29	0.69			
Clearance Time (s)	4.4				4.9	4.9	5.7	5.7			
Vehicle Extension (s)	2.0				3.6	3.6	2.0	4.6			
Lane Grp Cap (vph)	306		1583		1184	529	1002	2448			
v/s Ratio Prot	0.12				0.22		0.14	0.22			
v/s Ratio Perm			c0.96			0.02					
v/c Ratio	0.67		0.96		0.67	0.06	0.48	0.32			
Uniform Delay, d1	29.0		0.0		21.4	17.0	21.8	4.6			
Progression Factor	1.00		1.00		1.00	1.00	1.00	1.00			
Incremental Delay, d2	4.3		14.8		3.0	0.2	1.6	0.3			
Delay (s)	33.3		14.8		24.4	17.2	23.5	4.9			
Level of Service	C		B		C	B	C	A			
Approach Delay (s)		17.0			23.6			11.9		0.0	
Approach LOS		B			C			B		A	

Intersection Summary			
HCM 2000 Control Delay	16.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	1.20		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	55.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Volume (veh/h)	5	2074	1197	15	6	9
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	2254	1301	16	7	10
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		651	1106			
pX, platoon unblocked					0.82	
vC, conflicting volume	1317				2447	442
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1317				2322	442
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				74	98
cM capacity (veh/h)	521				25	563

Direction, Lane #	SE 1	SE 2	SE 3	NW 1	NW 2	NW 3	SW 1
Volume Total	5	1127	1127	520	520	277	16
Volume Left	5	0	0	0	0	0	7
Volume Right	0	0	0	0	0	16	10
cSH	521	1700	1700	1700	1700	1700	59
Volume to Capacity	0.01	0.66	0.66	0.31	0.31	0.16	0.27
Queue Length 95th (ft)	1	0	0	0	0	0	24
Control Delay (s)	12.0	0.0	0.0	0.0	0.0	0.0	87.2
Lane LOS	B						F
Approach Delay (s)	0.0			0.0			87.2
Approach LOS							F

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	67.3%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Volume (vph)	1987	137	0	0	196	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7	4.0			4.4	4.4
Lane Util. Factor	0.91	0.88			1.00	1.00
Frt	1.00	0.85			1.00	0.85
Flt Protected	1.00	1.00			0.95	1.00
Satd. Flow (prot)	5085	2787			1770	1583
Flt Permitted	1.00	1.00			0.95	1.00
Satd. Flow (perm)	5085	2787			1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2160	149	0	0	213	28
RTOR Reduction (vph)	0	0	0	0	0	6
Lane Group Flow (vph)	2160	149	0	0	213	22
Turn Type	NA	Free			Prot	Perm
Protected Phases	2				4	
Permitted Phases		Free				4
Actuated Green, G (s)	49.7	75.0			14.2	14.2
Effective Green, g (s)	49.7	75.0			14.2	14.2
Actuated g/C Ratio	0.66	1.00			0.19	0.19
Clearance Time (s)	6.7				4.4	4.4
Vehicle Extension (s)	6.1				3.0	3.0
Lane Grp Cap (vph)	3369	2787			335	299
v/s Ratio Prot	c0.42				c0.12	
v/s Ratio Perm		0.05				0.01
v/c Ratio	0.64	0.05			0.64	0.07
Uniform Delay, d1	7.4	0.0			28.0	25.0
Progression Factor	1.00	1.00			1.00	1.00
Incremental Delay, d2	0.9	0.0			3.9	0.1
Delay (s)	8.4	0.0			31.9	25.1
Level of Service	A	A			C	C
Approach Delay (s)	7.8			0.0	31.1	
Approach LOS	A			A	C	

Intersection Summary			
HCM 2000 Control Delay	10.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	11.1
Intersection Capacity Utilization	58.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	542	924	427	318	944	312	551	383	292	249	356	911
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	4.9	4.4	4.4	4.9	4.4	4.4	4.9	4.4	4.4	5.3	4.4
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00	0.97	1.00	0.88
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	3433	3539	1583	3433	1863	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	3539	1583	3433	3539	1583	3433	1863	2787
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	571	973	449	335	994	328	580	403	307	262	375	959
RTOR Reduction (vph)	0	0	80	0	0	72	0	0	27	0	0	31
Lane Group Flow (vph)	571	973	369	335	994	256	580	403	280	262	375	928
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	3	8	1	7	4	5	1	6	7	5	2	3
Permitted Phases			8			4			6			2
Actuated Green, G (s)	20.6	33.2	54.0	23.1	35.7	49.6	20.8	41.2	64.3	13.9	33.9	54.5
Effective Green, g (s)	20.6	33.2	54.0	23.1	35.7	49.6	20.8	41.2	64.3	13.9	33.9	54.5
Actuated g/C Ratio	0.16	0.26	0.42	0.18	0.27	0.38	0.16	0.32	0.49	0.11	0.26	0.42
Clearance Time (s)	4.4	4.9	4.4	4.4	4.9	4.4	4.4	4.9	4.4	4.4	5.3	4.4
Vehicle Extension (s)	2.0	4.1	2.0	2.0	4.3	2.0	2.0	4.5	2.0	2.0	3.3	2.0
Lane Grp Cap (vph)	543	903	657	314	971	603	549	1121	782	367	485	1168
v/s Ratio Prot	0.17	0.27	0.09	c0.19	c0.28	0.05	c0.17	0.11	0.06	0.08	0.20	c0.13
v/s Ratio Perm			0.14			0.12			0.11			0.21
v/c Ratio	1.05	1.08	0.56	1.07	1.02	0.42	1.06	0.36	0.36	0.71	0.77	0.79
Uniform Delay, d1	54.7	48.4	29.0	53.5	47.1	29.7	54.6	34.2	20.2	56.1	44.5	32.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	52.9	53.1	0.7	69.6	35.0	0.2	54.2	0.9	0.1	5.4	11.4	3.6
Delay (s)	107.6	101.5	29.6	123.1	82.2	29.8	108.8	35.1	20.3	61.5	55.9	36.4
Level of Service	F	F	C	F	F	C	F	D	C	E	E	D
Approach Delay (s)		87.0			80.1			64.7			45.1	
Approach LOS		F			F			E			D	

Intersection Summary			
HCM 2000 Control Delay	70.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	93.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	55	1	125	11	8	16	61	1212	6	40	898	101
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.9	4.9			4.9		4.4	5.0		4.4	5.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.85			0.94		1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1585			1723		1770	3536		1770	3485	
Flt Permitted	0.95	1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1585			1723		1770	3536		1770	3485	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	60	1	136	12	9	17	66	1317	7	43	976	110
RTOR Reduction (vph)	0	125	0	0	15	0	0	0	0	0	3	0
Lane Group Flow (vph)	60	12	0	0	23	0	66	1324	0	43	1083	0
Turn Type	Split	NA		Split	NA		Prot	NA		Prot	NA	
Protected Phases	8	8		3 4	3 4		1	6		5	2	
Permitted Phases												
Actuated Green, G (s)	14.1	14.1			21.4		10.7	68.7		46.6	104.6	
Effective Green, g (s)	14.1	14.1			21.4		10.7	68.7		46.6	104.6	
Actuated g/C Ratio	0.08	0.08			0.13		0.06	0.40		0.27	0.62	
Clearance Time (s)	4.9	4.9					4.4	5.0		4.4	5.0	
Vehicle Extension (s)	2.0	2.0					2.0	3.7		2.0	3.7	
Lane Grp Cap (vph)	146	131			216		111	1428		485	2144	
v/s Ratio Prot	c0.03	0.01			c0.01		c0.04	c0.37		0.02	c0.31	
v/s Ratio Perm												
v/c Ratio	0.41	0.09			0.11		0.59	0.93		0.09	0.50	
Uniform Delay, d1	74.0	72.0			65.8		77.5	48.3		45.9	18.2	
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	0.1			0.1		5.6	11.8		0.4	0.9	
Delay (s)	74.7	72.2			65.9		83.1	60.1		46.3	19.1	
Level of Service	E	E			E		F	E		D	B	
Approach Delay (s)		72.9			65.9			61.2			20.1	
Approach LOS		E			E			E			C	

Intersection Summary			
HCM 2000 Control Delay	45.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	170.0	Sum of lost time (s)	24.1
Intersection Capacity Utilization	60.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	97	934	25	46	1135	59	6	0	15	122	1	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	5.0		4.4	5.0			4.9			4.9	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	1.00		1.00	0.99			0.91			0.96	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.97	
Satd. Flow (prot)	1770	3525		1770	3513			1663			1723	
Flt Permitted	0.95	1.00		0.95	1.00			0.92			0.79	
Satd. Flow (perm)	1770	3525		1770	3513			1559			1398	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	105	1015	27	50	1234	64	7	0	16	133	1	65
RTOR Reduction (vph)	0	2	0	0	5	0	0	19	0	0	24	0
Lane Group Flow (vph)	105	1040	0	50	1293	0	0	4	0	0	175	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases							4			8		
Actuated Green, G (s)	27.1	51.2		4.5	28.6			15.5			15.5	
Effective Green, g (s)	27.1	51.2		4.5	28.6			15.5			15.5	
Actuated g/C Ratio	0.32	0.60		0.05	0.33			0.18			0.18	
Clearance Time (s)	4.4	5.0		4.4	5.0			4.9			4.9	
Vehicle Extension (s)	2.0	3.2		2.0	3.2			2.0			2.0	
Lane Grp Cap (vph)	561	2110		93	1175			282			253	
v/s Ratio Prot	0.06	c0.30		c0.03	c0.37							
v/s Ratio Perm								0.00			c0.13	
v/c Ratio	0.19	0.49		0.54	1.10			0.01			0.69	
Uniform Delay, d1	21.2	9.8		39.5	28.4			28.7			32.8	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.7	0.8		3.0	58.3			0.0			6.5	
Delay (s)	21.9	10.6		42.5	86.8			28.7			39.2	
Level of Service	C	B		D	F			C			D	
Approach Delay (s)		11.6			85.1			28.7			39.2	
Approach LOS		B			F			C			D	

Intersection Summary			
HCM 2000 Control Delay	50.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	85.5	Sum of lost time (s)	14.3
Intersection Capacity Utilization	67.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL2	EBL	EBR	SEL	SET	SER	NWL	NWT	NWR	SWL	SWR
Lane Configurations											
Volume (vph)	142	0	1175	5	737	310	1266	1076	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4		4.0	4.4	4.9	4.9	5.7	5.7			
Lane Util. Factor	1.00		1.00	1.00	0.95	1.00	0.97	0.95			
Frt	1.00		0.85	1.00	1.00	0.85	1.00	1.00			
Flt Protected	0.95		1.00	0.95	1.00	1.00	0.95	1.00			
Satd. Flow (prot)	1770		1583	1770	3539	1583	3433	3539			
Flt Permitted	0.95		1.00	0.95	1.00	1.00	0.95	1.00			
Satd. Flow (perm)	1770		1583	1770	3539	1583	3433	3539			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	154	0	1277	5	801	337	1376	1170	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	182	0	0	0	0	0
Lane Group Flow (vph)	154	0	1277	5	801	155	1376	1170	0	0	0
Turn Type	Prot		Free	Prot	NA	Perm	Prot	NA			
Protected Phases	4			5	2		1	6			
Permitted Phases			Free			2					
Actuated Green, G (s)	18.4		170.0	1.2	69.1	69.1	67.5	135.9			
Effective Green, g (s)	18.4		170.0	1.2	69.1	69.1	67.5	135.9			
Actuated g/C Ratio	0.11		1.00	0.01	0.41	0.41	0.40	0.80			
Clearance Time (s)	4.4			4.4	4.9	4.9	5.7	5.7			
Vehicle Extension (s)	2.0			2.0	3.6	3.6	2.0	4.6			
Lane Grp Cap (vph)	191		1583	12	1438	643	1363	2829			
v/s Ratio Prot	0.09			0.00	0.23		c0.40	0.33			
v/s Ratio Perm			c0.81			0.10					
v/c Ratio	0.81		0.81	0.42	0.56	0.24	1.01	0.41			
Uniform Delay, d1	74.1		0.0	84.1	38.7	33.2	51.2	5.1			
Progression Factor	1.00		1.00	1.00	1.00	1.00	1.03	1.02			
Incremental Delay, d2	20.4		4.5	8.3	1.6	0.9	26.7	0.4			
Delay (s)	94.4		4.5	92.4	40.3	34.1	79.7	5.7			
Level of Service	F		A	F	D	C	E	A			
Approach Delay (s)		14.2			38.7			45.7		0.0	
Approach LOS		B			D			D		A	

Intersection Summary			
HCM 2000 Control Delay	35.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	170.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	76.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Volume (veh/h)	18	1941	2374	24	3	21
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	20	2110	2580	26	3	23
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		651	1106			
pX, platoon unblocked					0.83	
vC, conflicting volume	2607				3688	873
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2607				3831	873
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	88				0	92
cM capacity (veh/h)	163				2	293

Direction, Lane #	SE 1	SE 2	SE 3	NW 1	NW 2	NW 3	SW 1
Volume Total	20	1055	1055	1032	1032	542	26
Volume Left	20	0	0	0	0	0	3
Volume Right	0	0	0	0	0	26	23
cSH	163	1700	1700	1700	1700	1700	15
Volume to Capacity	0.12	0.62	0.62	0.61	0.61	0.32	1.73
Queue Length 95th (ft)	10	0	0	0	0	0	97
Control Delay (s)	30.1	0.0	0.0	0.0	0.0	0.0	871.4
Lane LOS	D						F
Approach Delay (s)	0.3			0.0			871.4
Approach LOS							F

Intersection Summary			
Average Delay	4.9		
Intersection Capacity Utilization	63.7%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations	↑↑↑	↱			↰	↱
Volume (vph)	1357	577	0	0	181	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7	4.0			4.4	4.4
Lane Util. Factor	0.91	1.00			1.00	1.00
Frt	1.00	0.85			1.00	0.85
Flt Protected	1.00	1.00			0.95	1.00
Satd. Flow (prot)	5085	1583			1770	1583
Flt Permitted	1.00	1.00			0.95	1.00
Satd. Flow (perm)	5085	1583			1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1475	627	0	0	197	37
RTOR Reduction (vph)	0	0	0	0	0	24
Lane Group Flow (vph)	1475	627	0	0	197	13
Turn Type	NA	Free			Prot	Perm
Protected Phases	2				4	
Permitted Phases		Free				4
Actuated Green, G (s)	56.3	85.0			17.6	17.6
Effective Green, g (s)	56.3	85.0			17.6	17.6
Actuated g/C Ratio	0.66	1.00			0.21	0.21
Clearance Time (s)	6.7				4.4	4.4
Vehicle Extension (s)	6.1				6.1	6.1
Lane Grp Cap (vph)	3368	1583			366	327
v/s Ratio Prot	0.29				c0.11	
v/s Ratio Perm		c0.40				0.01
v/c Ratio	0.44	0.40			0.54	0.04
Uniform Delay, d1	6.8	0.0			30.1	26.9
Progression Factor	1.00	1.00			1.00	1.00
Incremental Delay, d2	0.4	0.7			3.7	0.1
Delay (s)	7.2	0.7			33.8	27.1
Level of Service	A	A			C	C
Approach Delay (s)	5.3			0.0	32.7	
Approach LOS	A			A	C	

Intersection Summary			
HCM 2000 Control Delay	8.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	11.1
Intersection Capacity Utilization	45.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

APPENDIX F

NEAR TERM WITH PROJECT SYNCHRO WORKSHEETS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	759	802	445	173	730	241	415	383	208	218	233	483
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	4.9	4.4	4.4	4.9	4.4	4.4	4.9	4.4	4.4	5.3	4.4
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00	0.97	1.00	0.88
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	3433	3539	1583	3433	1863	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	3539	1583	3433	3539	1583	3433	1863	2787
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	799	844	468	182	768	254	437	403	219	229	245	508
RTOR Reduction (vph)	0	0	149	0	0	63	0	0	52	0	0	28
Lane Group Flow (vph)	799	844	319	182	768	191	437	403	167	229	245	480
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	3	8	1	7	4	5	1	6	7	5	2	3
Permitted Phases			8			4			6			2
Actuated Green, G (s)	28.1	43.6	60.8	16.3	31.8	44.4	17.2	38.9	55.2	12.6	33.9	62.0
Effective Green, g (s)	28.1	43.6	60.8	16.3	31.8	44.4	17.2	38.9	55.2	12.6	33.9	62.0
Actuated g/C Ratio	0.22	0.34	0.47	0.13	0.24	0.34	0.13	0.30	0.42	0.10	0.26	0.48
Clearance Time (s)	4.4	4.9	4.4	4.4	4.9	4.4	4.4	4.9	4.4	4.4	5.3	4.4
Vehicle Extension (s)	2.0	4.1	2.0	2.0	4.3	2.0	2.0	4.5	2.0	2.0	3.3	2.0
Lane Grp Cap (vph)	742	1186	740	221	865	540	454	1058	672	332	485	1329
v/s Ratio Prot	c0.23	0.24	0.06	0.10	c0.22	0.03	c0.13	0.11	0.03	0.07	c0.13	0.08
v/s Ratio Perm			0.14			0.09			0.07			0.09
v/c Ratio	1.08	0.71	0.43	0.82	0.89	0.35	0.96	0.38	0.25	0.69	0.51	0.36
Uniform Delay, d1	51.0	37.7	23.1	55.4	47.4	32.1	56.1	36.0	24.1	56.8	40.9	21.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	55.7	2.2	0.1	20.4	11.4	0.1	32.4	1.0	0.1	4.7	3.7	0.1
Delay (s)	106.6	39.9	23.2	75.9	58.8	32.2	88.5	37.1	24.1	61.5	44.6	21.5
Level of Service	F	D	C	E	E	C	F	D	C	E	D	C
Approach Delay (s)		61.5			55.7			55.6			36.6	
Approach LOS		E			E			E			D	

Intersection Summary			
HCM 2000 Control Delay	54.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	81.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	68	4	96	4	1	3	32	964	7	25	787	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.9	4.9			4.9		4.4	5.0		4.4	5.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.86			0.95		1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1594			1725		1770	3535		1770	3520	
Flt Permitted	0.95	1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1594			1725		1770	3535		1770	3520	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	74	4	104	4	1	3	35	1048	8	27	855	32
RTOR Reduction (vph)	0	94	0	0	3	0	0	1	0	0	1	0
Lane Group Flow (vph)	74	14	0	0	5	0	35	1055	0	27	886	0
Turn Type	Split	NA		Split	NA		Prot	NA		Prot	NA	
Protected Phases	8	8		3 4	3 4		1	6		5	2	
Permitted Phases												
Actuated Green, G (s)	14.3	14.3			16.5		6.5	39.1		60.9	93.5	
Effective Green, g (s)	14.3	14.3			16.5		6.5	39.1		60.9	93.5	
Actuated g/C Ratio	0.10	0.10			0.11		0.04	0.26		0.41	0.62	
Clearance Time (s)	4.9	4.9					4.4	5.0		4.4	5.0	
Vehicle Extension (s)	2.0	2.0					2.0	3.7		2.0	3.7	
Lane Grp Cap (vph)	168	151			189		76	921		718	2194	
v/s Ratio Prot	c0.04	0.01			c0.00		c0.02	c0.30		0.02	c0.25	
v/s Ratio Perm												
v/c Ratio	0.44	0.09			0.03		0.46	1.15		0.04	0.40	
Uniform Delay, d1	64.1	61.9			59.6		70.0	55.4		26.9	14.2	
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	0.1			0.0		1.6	78.4		0.1	0.6	
Delay (s)	64.7	62.0			59.6		71.6	133.9		27.0	14.8	
Level of Service	E	E			E		E	F		C	B	
Approach Delay (s)		63.1			59.6			131.9			15.1	
Approach LOS		E			E			F			B	

Intersection Summary			
HCM 2000 Control Delay	77.3	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	24.1
Intersection Capacity Utilization	41.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	1	1	0	46	0	38	139	739	0	7	913	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9			4.9		4.4	5.0		4.4	5.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		1.00			0.94		1.00	1.00		1.00	0.99	
Flt Protected		0.98			0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1817			1703		1770	3539		1770	3501	
Flt Permitted		0.91			0.83		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1697			1449		1770	3539		1770	3501	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	1	0	50	0	41	151	803	0	8	992	78
RTOR Reduction (vph)	0	0	0	0	83	0	0	0	0	0	7	0
Lane Group Flow (vph)	0	2	0	0	8	0	151	803	0	8	1063	0
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		7.8			7.8		36.5	61.7		1.2	26.4	
Effective Green, g (s)		7.8			7.8		36.5	61.7		1.2	26.4	
Actuated g/C Ratio		0.09			0.09		0.43	0.73		0.01	0.31	
Clearance Time (s)		4.9			4.9		4.4	5.0		4.4	5.0	
Vehicle Extension (s)		2.0			2.0		2.0	3.2		2.0	3.2	
Lane Grp Cap (vph)		155			132		760	2568		24	1087	
v/s Ratio Prot							c0.09	c0.23		0.00	c0.30	
v/s Ratio Perm		0.00			c0.01							
v/c Ratio		0.01			0.06		0.20	0.31		0.33	0.98	
Uniform Delay, d1		35.1			35.3		15.1	4.1		41.5	29.0	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.0			0.1		0.6	0.3		3.0	22.5	
Delay (s)		35.1			35.3		15.7	4.4		44.5	51.5	
Level of Service		D			D		B	A		D	D	
Approach Delay (s)		35.1			35.3			6.2			51.5	
Approach LOS		D			D			A			D	

Intersection Summary			
HCM 2000 Control Delay	30.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	14.3
Intersection Capacity Utilization	53.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL2	EBL	EBR	SEL	SET	SER	NWL	NWT	NWR	SWL	SWR
Lane Configurations											
Volume (vph)	189	0	1399	0	733	92	453	749	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4		4.0		4.9	4.9	5.7	5.7			
Lane Util. Factor	1.00		1.00		0.95	1.00	0.97	0.95			
Frt	1.00		0.85		1.00	0.85	1.00	1.00			
Flt Protected	0.95		1.00		1.00	1.00	0.95	1.00			
Satd. Flow (prot)	1770		1583		3539	1583	3433	3539			
Flt Permitted	0.95		1.00		1.00	1.00	0.95	1.00			
Satd. Flow (perm)	1770		1583		3539	1583	3433	3539			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	205	0	1521	0	797	100	492	814	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	67	0	0	0	0	0
Lane Group Flow (vph)	205	0	1521	0	797	33	492	814	0	0	0
Turn Type	Prot		Free	Prot	NA	Perm	Prot	NA			
Protected Phases	4			5	2		1	6			
Permitted Phases			Free			2					
Actuated Green, G (s)	13.0		75.0		25.1	25.1	21.9	51.9			
Effective Green, g (s)	13.0		75.0		25.1	25.1	21.9	51.9			
Actuated g/C Ratio	0.17		1.00		0.33	0.33	0.29	0.69			
Clearance Time (s)	4.4				4.9	4.9	5.7	5.7			
Vehicle Extension (s)	2.0				3.6	3.6	2.0	4.6			
Lane Grp Cap (vph)	306		1583		1184	529	1002	2448			
v/s Ratio Prot	0.12				0.23		0.14	0.23			
v/s Ratio Perm			c0.96			0.02					
v/c Ratio	0.67		0.96		0.67	0.06	0.49	0.33			
Uniform Delay, d1	29.0		0.0		21.4	17.0	21.9	4.6			
Progression Factor	1.00		1.00		1.00	1.00	1.00	1.00			
Incremental Delay, d2	4.3		15.0		3.1	0.2	1.7	0.4			
Delay (s)	33.3		15.0		24.5	17.2	23.7	5.0			
Level of Service	C		B		C	B	C	A			
Approach Delay (s)		17.2			23.7			12.0		0.0	
Approach LOS		B			C			B		A	

Intersection Summary			
HCM 2000 Control Delay	17.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	1.20		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	55.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Volume (veh/h)	35	2074	1197	31	29	53
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	38	2254	1301	34	32	58
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		651	1106			
pX, platoon unblocked					0.81	
vC, conflicting volume	1335				2521	451
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1335				2412	451
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	93				0	90
cM capacity (veh/h)	513				21	556

Direction, Lane #	SE 1	SE 2	SE 3	NW 1	NW 2	NW 3	SW 1
Volume Total	38	1127	1127	520	520	294	89
Volume Left	38	0	0	0	0	0	32
Volume Right	0	0	0	0	0	34	58
cSH	513	1700	1700	1700	1700	1700	54
Volume to Capacity	0.07	0.66	0.66	0.31	0.31	0.17	1.64
Queue Length 95th (ft)	6	0	0	0	0	0	209
Control Delay (s)	12.6	0.0	0.0	0.0	0.0	0.0	478.3
Lane LOS	B						F
Approach Delay (s)	0.2			0.0			478.3
Approach LOS							F

Intersection Summary			
Average Delay	11.6		
Intersection Capacity Utilization	68.9%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Volume (vph)	2000	144	0	0	197	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7	4.0			4.4	4.4
Lane Util. Factor	0.91	0.88			1.00	1.00
Frt	1.00	0.85			1.00	0.85
Flt Protected	1.00	1.00			0.95	1.00
Satd. Flow (prot)	5085	2787			1770	1583
Flt Permitted	1.00	1.00			0.95	1.00
Satd. Flow (perm)	5085	2787			1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2174	157	0	0	214	28
RTOR Reduction (vph)	0	0	0	0	0	6
Lane Group Flow (vph)	2174	157	0	0	214	22
Turn Type	NA	Free			Prot	Perm
Protected Phases	2				4	
Permitted Phases		Free				4
Actuated Green, G (s)	49.7	75.0			14.2	14.2
Effective Green, g (s)	49.7	75.0			14.2	14.2
Actuated g/C Ratio	0.66	1.00			0.19	0.19
Clearance Time (s)	6.7				4.4	4.4
Vehicle Extension (s)	6.1				3.0	3.0
Lane Grp Cap (vph)	3369	2787			335	299
v/s Ratio Prot	c0.43				c0.12	
v/s Ratio Perm		0.06				0.01
v/c Ratio	0.65	0.06			0.64	0.07
Uniform Delay, d1	7.5	0.0			28.0	25.0
Progression Factor	1.00	1.00			1.00	1.00
Incremental Delay, d2	1.0	0.0			4.0	0.1
Delay (s)	8.4	0.0			32.0	25.1
Level of Service	A	A			C	C
Approach Delay (s)	7.9			0.0	31.2	
Approach LOS	A			A	C	

Intersection Summary			
HCM 2000 Control Delay	10.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	11.1
Intersection Capacity Utilization	58.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	542	924	429	332	944	312	552	391	299	249	372	911
Future Volume (vph)	542	924	429	332	944	312	552	391	299	249	372	911
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	4.9	4.4	4.4	4.9	4.4	4.4	4.9	4.4	4.4	5.3	4.4
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00	0.97	1.00	0.88
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	3433	3539	1583	3433	1863	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	3539	1583	3433	3539	1583	3433	1863	2787
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	571	973	452	349	994	328	581	412	315	262	392	959
RTOR Reduction (vph)	0	0	73	0	0	70	0	0	27	0	0	52
Lane Group Flow (vph)	571	973	379	349	994	258	581	412	288	262	392	907
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	3	8	1	7	4	5	1	6	7	5	2	3
Permitted Phases			8			4			6			2
Actuated Green, G (s)	20.8	33.0	53.6	23.6	35.8	49.6	20.6	41.0	64.6	13.8	33.8	54.6
Effective Green, g (s)	20.8	33.0	53.6	23.6	35.8	49.6	20.6	41.0	64.6	13.8	33.8	54.6
Actuated g/C Ratio	0.16	0.25	0.41	0.18	0.28	0.38	0.16	0.32	0.50	0.11	0.26	0.42
Clearance Time (s)	4.4	4.9	4.4	4.4	4.9	4.4	4.4	4.9	4.4	4.4	5.3	4.4
Vehicle Extension (s)	2.0	4.1	2.0	2.0	4.3	2.0	2.0	4.5	2.0	2.0	3.3	2.0
Lane Grp Cap (vph)	549	898	652	321	974	603	543	1116	786	364	484	1170
v/s Ratio Prot	0.17	0.27	0.09	c0.20	c0.28	0.05	c0.17	0.12	0.07	0.08	c0.21	0.12
v/s Ratio Perm			0.15			0.12			0.12			0.20
v/c Ratio	1.04	1.08	0.58	1.09	1.02	0.43	1.07	0.37	0.37	0.72	0.81	0.78
Uniform Delay, d1	54.6	48.5	29.5	53.2	47.1	29.7	54.7	34.5	20.1	56.2	45.1	32.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	49.2	55.3	0.9	75.6	34.1	0.2	58.7	0.9	0.1	5.6	13.7	3.0
Delay (s)	103.8	103.8	30.4	128.8	81.2	29.9	113.4	35.4	20.2	61.8	58.8	35.4
Level of Service	F	F	C	F	F	C	F	D	C	E	E	D
Approach Delay (s)		87.2			81.1			66.4			45.4	
Approach LOS		F			F			E			D	

Intersection Summary			
HCM 2000 Control Delay	71.3	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	95.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	1	127	13	8	16	62	1227	7	40	930	101
Future Volume (vph)	55	1	127	13	8	16	62	1227	7	40	930	101
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.9	4.9			4.9		4.4	5.0		4.4	5.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.85			0.94		1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1585			1726		1770	3536		1770	3487	
Flt Permitted	0.95	1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1585			1726		1770	3536		1770	3487	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	60	1	138	14	9	17	67	1334	8	43	1011	110
RTOR Reduction (vph)	0	127	0	0	15	0	0	0	0	0	3	0
Lane Group Flow (vph)	60	12	0	0	25	0	67	1342	0	43	1118	0
Turn Type	Split	NA		Split	NA		Prot	NA		Prot	NA	
Protected Phases	8	8		3 4	3 4		1	6		5	2	
Permitted Phases												
Actuated Green, G (s)	14.1	14.1			21.4		10.8	62.0		53.3	104.5	
Effective Green, g (s)	14.1	14.1			21.4		10.8	62.0		53.3	104.5	
Actuated g/C Ratio	0.08	0.08			0.13		0.06	0.36		0.31	0.61	
Clearance Time (s)	4.9	4.9					4.4	5.0		4.4	5.0	
Vehicle Extension (s)	2.0	2.0					2.0	3.7		2.0	3.7	
Lane Grp Cap (vph)	146	131			217		112	1289		554	2143	
v/s Ratio Prot	c0.03	0.01			c0.01		c0.04	c0.38		0.02	c0.32	
v/s Ratio Perm												
v/c Ratio	0.41	0.10			0.12		0.60	1.04		0.08	0.52	
Uniform Delay, d1	74.0	72.1			65.9		77.5	54.0		41.1	18.6	
Progression Factor	1.00	1.00			1.00		0.96	0.78		1.00	1.00	
Incremental Delay, d2	0.7	0.1			0.1		0.5	21.3		0.3	0.9	
Delay (s)	74.7	72.2			66.0		75.1	63.3		41.3	19.5	
Level of Service	E	E			E		E	E		D	B	
Approach Delay (s)		72.9			66.0			63.9			20.3	
Approach LOS		E			E			E			C	

Intersection Summary			
HCM 2000 Control Delay	46.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	170.0	Sum of lost time (s)	24.1
Intersection Capacity Utilization	63.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	97	969	25	46	1152	59	6	0	15	122	1	60
Future Volume (vph)	97	969	25	46	1152	59	6	0	15	122	1	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	5.5		4.4	5.5			4.9			4.9	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	1.00		1.00	0.99			0.91			0.96	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.97	
Satd. Flow (prot)	1770	3526		1770	3513			1663			1723	
Flt Permitted	0.95	1.00		0.95	1.00			0.92			0.79	
Satd. Flow (perm)	1770	3526		1770	3513			1558			1398	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	105	1053	27	50	1252	64	7	0	16	133	1	65
RTOR Reduction (vph)	0	2	0	0	4	0	0	19	0	0	24	0
Lane Group Flow (vph)	105	1078	0	50	1312	0	0	4	0	0	175	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases							4			8		
Actuated Green, G (s)	26.2	50.4		4.3	28.5			15.5			15.5	
Effective Green, g (s)	26.2	50.4		4.3	28.5			15.5			15.5	
Actuated g/C Ratio	0.31	0.59		0.05	0.34			0.18			0.18	
Clearance Time (s)	4.4	5.5		4.4	5.5			4.9			4.9	
Vehicle Extension (s)	2.0	3.2		2.0	3.2			2.0			2.0	
Lane Grp Cap (vph)	545	2090		89	1177			284			254	
v/s Ratio Prot	0.06	c0.31		c0.03	c0.37							
v/s Ratio Perm								0.00			c0.13	
v/c Ratio	0.19	0.52		0.56	1.11			0.01			0.69	
Uniform Delay, d1	21.6	10.1		39.4	28.2			28.5			32.5	
Progression Factor	0.98	1.30		0.99	1.10			1.00			1.00	
Incremental Delay, d2	0.7	0.8		4.4	62.8			0.0			6.4	
Delay (s)	21.9	14.0		43.6	93.9			28.5			38.9	
Level of Service	C	B		D	F			C			D	
Approach Delay (s)		14.7			92.1			28.5			38.9	
Approach LOS		B			F			C			D	

Intersection Summary			
HCM 2000 Control Delay	54.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	14.8
Intersection Capacity Utilization	68.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL2	EBL	EBR	SEL	SET	SER	NWL	NWT	NWR	SWL	SWR
Lane Configurations											
Traffic Volume (vph)	142	0	1191	5	772	310	1274	1093	0	0	0
Future Volume (vph)	142	0	1191	5	772	310	1274	1093	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4		4.0	4.4	4.9	4.9	5.7	5.7			
Lane Util. Factor	1.00		1.00	1.00	0.95	1.00	0.97	0.95			
Frt	1.00		0.85	1.00	1.00	0.85	1.00	1.00			
Flt Protected	0.95		1.00	0.95	1.00	1.00	0.95	1.00			
Satd. Flow (prot)	1770		1583	1770	3539	1583	3433	3539			
Flt Permitted	0.95		1.00	0.95	1.00	1.00	0.95	1.00			
Satd. Flow (perm)	1770		1583	1770	3539	1583	3433	3539			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	154	0	1295	5	839	337	1385	1188	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	178	0	0	0	0	0
Lane Group Flow (vph)	154	0	1295	5	839	159	1385	1188	0	0	0
Turn Type	Prot		Free	Prot	NA	Perm	Prot	NA			
Protected Phases	4			5	2		1	6			
Permitted Phases			Free			2					
Actuated Green, G (s)	19.1		170.0	1.2	66.6	66.6	69.3	135.2			
Effective Green, g (s)	19.1		170.0	1.2	66.6	66.6	69.3	135.2			
Actuated g/C Ratio	0.11		1.00	0.01	0.39	0.39	0.41	0.80			
Clearance Time (s)	4.4			4.4	4.9	4.9	5.7	5.7			
Vehicle Extension (s)	2.0			2.0	3.6	3.6	2.0	4.6			
Lane Grp Cap (vph)	198		1583	12	1386	620	1399	2814			
v/s Ratio Prot	0.09			0.00	0.24		c0.40	0.34			
v/s Ratio Perm			c0.82			0.10					
v/c Ratio	0.78		0.82	0.42	0.61	0.26	0.99	0.42			
Uniform Delay, d1	73.4		0.0	84.1	41.2	35.0	50.0	5.4			
Progression Factor	1.00		1.00	0.95	0.99	2.19	1.03	1.00			
Incremental Delay, d2	15.9		4.8	7.4	1.7	0.9	21.8	0.5			
Delay (s)	89.3		4.8	87.4	42.7	77.3	73.4	5.8			
Level of Service	F		A	F	D	E	E	A			
Approach Delay (s)		13.8			52.7			42.2		0.0	
Approach LOS		B			D			D		A	

Intersection Summary			
HCM 2000 Control Delay	36.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	170.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	77.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Volume (veh/h)	85	1941	2374	59	31	76
Future Volume (Veh/h)	85	1941	2374	59	31	76
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	92	2110	2580	64	34	83
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		651	1106			
pX, platoon unblocked					0.81	
vC, conflicting volume	2644				3851	892
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2644				4045	892
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	41				0	71
cM capacity (veh/h)	157				1	285

Direction, Lane #	SE 1	SE 2	SE 3	NW 1	NW 2	NW 3	SW 1
Volume Total	92	1055	1055	1032	1032	580	117
Volume Left	92	0	0	0	0	0	34
Volume Right	0	0	0	0	0	64	83
cSH	157	1700	1700	1700	1700	1700	2
Volume to Capacity	0.59	0.62	0.62	0.61	0.61	0.34	53.48
Queue Length 95th (ft)	77	0	0	0	0	0	Err
Control Delay (s)	56.0	0.0	0.0	0.0	0.0	0.0	Err
Lane LOS	F						F
Approach Delay (s)	2.3			0.0			Err
Approach LOS							F

Intersection Summary			
Average Delay	236.8		
Intersection Capacity Utilization	68.3%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Traffic Volume (vph)	1365	581	0	0	190	34
Future Volume (vph)	1365	581	0	0	190	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7	4.0			4.4	4.4
Lane Util. Factor	0.91	1.00			1.00	1.00
Frt	1.00	0.85			1.00	0.85
Flt Protected	1.00	1.00			0.95	1.00
Satd. Flow (prot)	5085	1583			1770	1583
Flt Permitted	1.00	1.00			0.95	1.00
Satd. Flow (perm)	5085	1583			1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1484	632	0	0	207	37
RTOR Reduction (vph)	0	0	0	0	0	25
Lane Group Flow (vph)	1484	632	0	0	207	12
Turn Type	NA	Free			Prot	Perm
Protected Phases	2				4	
Permitted Phases		Free				4
Actuated Green, G (s)	55.9	85.0			18.0	18.0
Effective Green, g (s)	55.9	85.0			18.0	18.0
Actuated g/C Ratio	0.66	1.00			0.21	0.21
Clearance Time (s)	6.7				4.4	4.4
Vehicle Extension (s)	6.1				6.1	6.1
Lane Grp Cap (vph)	3344	1583			374	335
v/s Ratio Prot	0.29				c0.12	
v/s Ratio Perm		c0.40				0.01
v/c Ratio	0.44	0.40			0.55	0.04
Uniform Delay, d1	7.0	0.0			29.9	26.6
Progression Factor	1.00	1.00			1.00	1.00
Incremental Delay, d2	0.4	0.8			3.9	0.1
Delay (s)	7.5	0.8			33.8	26.7
Level of Service	A	A			C	C
Approach Delay (s)	5.5			0.0	32.7	
Approach LOS	A			A	C	

Intersection Summary			
HCM 2000 Control Delay	8.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	11.1
Intersection Capacity Utilization	46.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

APPENDIX G

HORIZON YEAR 2035 WITHOUT PROJECT SYNCHRO WORKSHEETS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	917	843	581	223	802	291	454	449	207	230	301	530
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	4.9	4.4	4.4	4.9	4.4	4.4	4.9	4.4	4.4	5.3	4.4
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00	0.97	1.00	0.88
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	3433	3539	1583	3433	1863	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	3539	1583	3433	3539	1583	3433	1863	2787
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	965	887	612	235	844	306	478	473	218	242	317	558
RTOR Reduction (vph)	0	0	117	0	0	60	0	0	51	0	0	27
Lane Group Flow (vph)	965	887	495	235	844	246	478	473	167	242	317	531
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	3	8	1	7	4	5	1	6	7	5	2	3
Permitted Phases			8			4			6			2
Actuated Green, G (s)	28.6	41.7	56.5	19.7	32.8	45.9	14.8	36.9	56.6	13.1	34.8	63.4
Effective Green, g (s)	28.6	41.7	56.5	19.7	32.8	45.9	14.8	36.9	56.6	13.1	34.8	63.4
Actuated g/C Ratio	0.22	0.32	0.43	0.15	0.25	0.35	0.11	0.28	0.44	0.10	0.27	0.49
Clearance Time (s)	4.4	4.9	4.4	4.4	4.9	4.4	4.4	4.9	4.4	4.4	5.3	4.4
Vehicle Extension (s)	2.0	4.1	2.0	2.0	4.3	2.0	2.0	4.5	2.0	2.0	3.3	2.0
Lane Grp Cap (vph)	755	1135	687	268	892	558	390	1004	689	345	498	1359
v/s Ratio Prot	c0.28	0.25	0.08	0.13	c0.24	0.04	c0.14	0.13	0.04	0.07	c0.17	0.09
v/s Ratio Perm			0.23			0.11			0.07			0.10
v/c Ratio	1.28	0.78	0.72	0.88	0.95	0.44	1.23	0.47	0.24	0.70	0.64	0.39
Uniform Delay, d1	50.7	40.0	30.3	54.0	47.7	32.2	57.6	38.5	23.2	56.6	42.0	21.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	135.3	3.8	3.2	25.2	18.5	0.2	122.3	1.6	0.1	5.2	6.1	0.1
Delay (s)	186.0	43.8	33.4	79.2	66.3	32.4	179.9	40.1	23.2	61.8	48.1	21.1
Level of Service	F	D	C	E	E	C	F	D	C	E	D	C
Approach Delay (s)		96.9			61.0			94.1			37.6	
Approach LOS		F			E			F			D	

Intersection Summary			
HCM 2000 Control Delay	77.5	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	93.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	88	4	113	5	1	4	33	1228	6	24	928	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.9	4.9			4.9		4.4	5.0		4.4	5.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.85			0.95		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1592			1719		1770	3536		1770	3522	
Flt Permitted	0.95	1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1592			1719		1770	3536		1770	3522	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	96	4	123	5	1	4	36	1335	7	26	1009	34
RTOR Reduction (vph)	0	111	0	0	4	0	0	0	0	0	1	0
Lane Group Flow (vph)	96	16	0	0	6	0	36	1342	0	26	1042	0
Turn Type	Split	NA		Split	NA		Prot	NA		Prot	NA	
Protected Phases	8	8		3 4	3 4		1	6		5	2	
Permitted Phases												
Actuated Green, G (s)	15.2	15.2			17.7		6.7	40.8		57.1	91.2	
Effective Green, g (s)	15.2	15.2			17.7		6.7	40.8		57.1	91.2	
Actuated g/C Ratio	0.10	0.10			0.12		0.04	0.27		0.38	0.61	
Clearance Time (s)	4.9	4.9					4.4	5.0		4.4	5.0	
Vehicle Extension (s)	2.0	2.0					2.0	3.7		2.0	3.7	
Lane Grp Cap (vph)	179	161			202		79	961		673	2141	
v/s Ratio Prot	c0.05	0.01			c0.00		c0.02	c0.38		0.01	c0.30	
v/s Ratio Perm												
v/c Ratio	0.54	0.10			0.03		0.46	1.40		0.04	0.49	
Uniform Delay, d1	64.1	61.2			58.6		69.9	54.6		29.2	16.4	
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.5	0.1			0.0		1.5	184.8		0.1	0.8	
Delay (s)	65.6	61.3			58.6		71.4	239.4		29.3	17.2	
Level of Service	E	E			E		E	F		C	B	
Approach Delay (s)		63.2			58.6			235.0			17.5	
Approach LOS		E			E			F			B	

Intersection Summary			
HCM 2000 Control Delay	133.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	24.1
Intersection Capacity Utilization	51.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	1	1	0	54	0	46	134	871	0	7	1051	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9			4.9		4.4	5.0		4.4	5.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		1.00			0.94		1.00	1.00		1.00	0.99	
Flt Protected		0.98			0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1817			1701		1770	3539		1770	3506	
Flt Permitted		0.90			0.83		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1684			1451		1770	3539		1770	3506	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	1	0	59	0	50	146	947	0	8	1142	75
RTOR Reduction (vph)	0	0	0	0	99	0	0	0	0	0	6	0
Lane Group Flow (vph)	0	2	0	0	10	0	146	947	0	8	1211	0
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		7.8			7.8		36.5	61.7		1.2	26.4	
Effective Green, g (s)		7.8			7.8		36.5	61.7		1.2	26.4	
Actuated g/C Ratio		0.09			0.09		0.43	0.73		0.01	0.31	
Clearance Time (s)		4.9			4.9		4.4	5.0		4.4	5.0	
Vehicle Extension (s)		2.0			2.0		2.0	3.2		2.0	3.2	
Lane Grp Cap (vph)		154			133		760	2568		24	1088	
v/s Ratio Prot							c0.08	c0.27		0.00	c0.35	
v/s Ratio Perm		0.00			c0.01							
v/c Ratio		0.01			0.08		0.19	0.37		0.33	1.11	
Uniform Delay, d1		35.1			35.3		15.1	4.4		41.5	29.3	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.0			0.1		0.6	0.4		3.0	64.0	
Delay (s)		35.1			35.4		15.6	4.8		44.5	93.3	
Level of Service		D			D		B	A		D	F	
Approach Delay (s)		35.1			35.4			6.2			93.0	
Approach LOS		D			D			A			F	

Intersection Summary			
HCM 2000 Control Delay	51.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	14.3
Intersection Capacity Utilization	58.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL2	EBL	EBR	SEL	SET	SER	NWL	NWT	NWR	SWL	SWR
Lane Configurations											
Volume (vph)	224	0	1518	0	792	108	479	856	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4		4.0		4.9	4.9	5.7	5.7			
Lane Util. Factor	1.00		1.00		0.95	1.00	0.97	0.95			
Frt	1.00		0.85		1.00	0.85	1.00	1.00			
Flt Protected	0.95		1.00		1.00	1.00	0.95	1.00			
Satd. Flow (prot)	1770		1583		3539	1583	3433	3539			
Flt Permitted	0.95		1.00		1.00	1.00	0.95	1.00			
Satd. Flow (perm)	1770		1583		3539	1583	3433	3539			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	243	0	1650	0	861	117	521	930	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	78	0	0	0	0	0
Lane Group Flow (vph)	243	0	1650	0	861	39	521	930	0	0	0
Turn Type	Prot		Free	Prot	NA	Perm	Prot	NA			
Protected Phases	4			5	2		1	6			
Permitted Phases			Free			2					
Actuated Green, G (s)	14.1		75.0		25.1	25.1	20.8	50.8			
Effective Green, g (s)	14.1		75.0		25.1	25.1	20.8	50.8			
Actuated g/C Ratio	0.19		1.00		0.33	0.33	0.28	0.68			
Clearance Time (s)	4.4				4.9	4.9	5.7	5.7			
Vehicle Extension (s)	2.0				3.6	3.6	2.0	4.6			
Lane Grp Cap (vph)	332		1583		1184	529	952	2397			
v/s Ratio Prot	0.14				0.24		0.15	0.26			
v/s Ratio Perm			c1.04			0.02					
v/c Ratio	0.73		1.04		0.73	0.07	0.55	0.39			
Uniform Delay, d1	28.7		37.5		21.9	17.0	23.1	5.3			
Progression Factor	1.00		1.00		1.00	1.00	1.06	1.05			
Incremental Delay, d2	7.0		34.5		3.9	0.3	2.3	0.5			
Delay (s)	35.7		72.0		25.9	17.3	26.7	6.0			
Level of Service	D		E		C	B	C	A			
Approach Delay (s)		67.3			24.8			13.4		0.0	
Approach LOS		E			C			B		A	

Intersection Summary			
HCM 2000 Control Delay	39.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.30		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	60.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Volume (veh/h)	5	2087	1301	14	6	10
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	2268	1414	15	7	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		651	1106			
pX, platoon unblocked					0.81	
vC, conflicting volume	1429				2567	479
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1429				2462	479
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				67	98
cM capacity (veh/h)	472				20	533

Direction, Lane #	SE 1	SE 2	SE 3	NW 1	NW 2	NW 3	SW 1
Volume Total	5	1134	1134	566	566	298	17
Volume Left	5	0	0	0	0	0	7
Volume Right	0	0	0	0	0	15	11
cSH	472	1700	1700	1700	1700	1700	50
Volume to Capacity	0.01	0.67	0.67	0.33	0.33	0.18	0.35
Queue Length 95th (ft)	1	0	0	0	0	0	31
Control Delay (s)	12.7	0.0	0.0	0.0	0.0	0.0	110.6
Lane LOS	B						F
Approach Delay (s)	0.0			0.0			110.6
Approach LOS							F

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	67.7%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Volume (vph)	2148	134	0	0	211	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7	4.0			4.4	4.4
Lane Util. Factor	0.91	0.88			1.00	1.00
Frt	1.00	0.85			1.00	0.85
Flt Protected	1.00	1.00			0.95	1.00
Satd. Flow (prot)	5085	2787			1770	1583
Flt Permitted	1.00	1.00			0.95	1.00
Satd. Flow (perm)	5085	2787			1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2335	146	0	0	229	30
RTOR Reduction (vph)	0	0	0	0	0	4
Lane Group Flow (vph)	2335	146	0	0	229	26
Turn Type	NA	Free			Prot	Perm
Protected Phases	2				4	
Permitted Phases		Free				4
Actuated Green, G (s)	49.4	75.0			14.5	14.5
Effective Green, g (s)	49.4	75.0			14.5	14.5
Actuated g/C Ratio	0.66	1.00			0.19	0.19
Clearance Time (s)	6.7				4.4	4.4
Vehicle Extension (s)	6.1				3.0	3.0
Lane Grp Cap (vph)	3349	2787			342	306
v/s Ratio Prot	c0.46				c0.13	
v/s Ratio Perm		0.05				0.02
v/c Ratio	0.70	0.05			0.67	0.08
Uniform Delay, d1	8.1	0.0			28.0	24.8
Progression Factor	1.46	1.00			1.00	1.00
Incremental Delay, d2	0.6	0.0			4.9	0.1
Delay (s)	12.4	0.0			32.9	24.9
Level of Service	B	A			C	C
Approach Delay (s)	11.6			0.0	32.0	
Approach LOS	B			A	C	

Intersection Summary			
HCM 2000 Control Delay	13.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	11.1
Intersection Capacity Utilization	62.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	655	971	558	416	1037	377	605	462	307	261	464	1000
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	4.9	4.4	4.4	4.9	4.4	4.4	4.9	4.4	4.4	5.3	4.4
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00	0.97	1.00	0.88
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	3433	3539	1583	3433	1863	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	3539	1583	3433	3539	1583	3433	1863	2787
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	689	1022	587	438	1092	397	637	486	323	275	488	1053
RTOR Reduction (vph)	0	0	46	0	0	40	0	0	27	0	0	31
Lane Group Flow (vph)	689	1022	541	438	1092	357	637	486	296	275	488	1022
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	3	8	1	7	4	5	1	6	7	5	2	3
Permitted Phases			8			4			6			2
Actuated Green, G (s)	19.6	34.1	52.7	23.6	38.1	52.6	18.6	39.2	62.8	14.5	34.7	54.3
Effective Green, g (s)	19.6	34.1	52.7	23.6	38.1	52.6	18.6	39.2	62.8	14.5	34.7	54.3
Actuated g/C Ratio	0.15	0.26	0.41	0.18	0.29	0.40	0.14	0.30	0.48	0.11	0.27	0.42
Clearance Time (s)	4.4	4.9	4.4	4.4	4.9	4.4	4.4	4.9	4.4	4.4	5.3	4.4
Vehicle Extension (s)	2.0	4.1	2.0	2.0	4.3	2.0	2.0	4.5	2.0	2.0	3.3	2.0
Lane Grp Cap (vph)	517	928	641	321	1037	640	491	1067	764	382	497	1164
v/s Ratio Prot	0.20	0.29	0.12	c0.25	c0.31	0.06	c0.19	c0.14	0.07	0.08	c0.26	0.13
v/s Ratio Perm			0.22			0.16			0.12			0.23
v/c Ratio	1.33	1.10	0.84	1.36	1.05	0.56	1.30	0.46	0.39	0.72	0.98	0.88
Uniform Delay, d1	55.2	48.0	34.9	53.2	46.0	29.8	55.7	36.8	21.4	55.8	47.3	34.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	162.6	61.3	9.5	182.8	43.0	0.6	148.2	1.4	0.1	5.3	36.1	7.5
Delay (s)	217.8	109.2	44.5	236.0	88.9	30.4	203.9	38.2	21.5	61.1	83.5	42.3
Level of Service	F	F	D	F	F	C	F	D	C	E	F	D
Approach Delay (s)		125.2			110.3			107.5			56.2	
Approach LOS		F			F			F			E	

Intersection Summary			
HCM 2000 Control Delay	101.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.13		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	107.4%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	72	1	148	14	9	20	66	1582	6	38	1064	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.9	4.9			4.9		4.4	5.0		4.4	5.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.85			0.94		1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1585			1718		1770	3537		1770	3490	
Flt Permitted	0.95	1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1585			1718		1770	3537		1770	3490	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	78	1	161	15	10	22	72	1720	7	41	1157	117
RTOR Reduction (vph)	0	147	0	0	19	0	0	0	0	0	3	0
Lane Group Flow (vph)	78	15	0	0	28	0	72	1727	0	41	1271	0
Turn Type	Split	NA		Split	NA		Prot	NA		Prot	NA	
Protected Phases	8	8		3 4	3 4		1	6		5	2	
Permitted Phases												
Actuated Green, G (s)	14.9	14.9			21.4		11.6	68.8		45.7	102.9	
Effective Green, g (s)	14.9	14.9			21.4		11.6	68.8		45.7	102.9	
Actuated g/C Ratio	0.09	0.09			0.13		0.07	0.40		0.27	0.61	
Clearance Time (s)	4.9	4.9					4.4	5.0		4.4	5.0	
Vehicle Extension (s)	2.0	2.0					2.0	3.7		2.0	3.7	
Lane Grp Cap (vph)	155	138			216		120	1431		475	2112	
v/s Ratio Prot	c0.04	0.01			c0.02		c0.04	c0.49		0.02	c0.36	
v/s Ratio Perm												
v/c Ratio	0.50	0.11			0.13		0.60	1.21		0.09	0.60	
Uniform Delay, d1	74.0	71.4			66.0		76.9	50.6		46.5	20.8	
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.9	0.1			0.1		5.3	99.9		0.4	1.3	
Delay (s)	75.0	71.6			66.1		82.2	150.5		46.9	22.1	
Level of Service	E	E			E		F	F		D	C	
Approach Delay (s)		72.7			66.1			147.8			22.9	
Approach LOS		E			E			F			C	

Intersection Summary			
HCM 2000 Control Delay	93.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	170.0	Sum of lost time (s)	24.1
Intersection Capacity Utilization	74.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	93	1106	24	44	1345	59	7	0	17	144	1	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	5.0		4.4	5.0			4.9			4.9	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	1.00		1.00	0.99			0.91			0.96	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.97	
Satd. Flow (prot)	1770	3528		1770	3517			1663			1723	
Flt Permitted	0.95	1.00		0.95	1.00			0.92			0.78	
Satd. Flow (perm)	1770	3528		1770	3517			1550			1395	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	101	1202	26	48	1462	64	8	0	18	157	1	77
RTOR Reduction (vph)	0	1	0	0	4	0	0	21	0	0	23	0
Lane Group Flow (vph)	101	1227	0	48	1522	0	0	5	0	0	212	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases							4			8		
Actuated Green, G (s)	24.4	49.9		4.1	29.6			17.2			17.2	
Effective Green, g (s)	24.4	49.9		4.1	29.6			17.2			17.2	
Actuated g/C Ratio	0.29	0.58		0.05	0.35			0.20			0.20	
Clearance Time (s)	4.4	5.0		4.4	5.0			4.9			4.9	
Vehicle Extension (s)	2.0	3.2		2.0	3.2			2.0			2.0	
Lane Grp Cap (vph)	505	2059		84	1217			311			280	
v/s Ratio Prot	0.06	c0.35		c0.03	c0.43							
v/s Ratio Perm								0.00			c0.15	
v/c Ratio	0.20	0.60		0.57	1.25			0.02			0.76	
Uniform Delay, d1	23.2	11.4		39.8	27.9			27.4			32.2	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.9	1.3		5.7	119.8			0.0			9.9	
Delay (s)	24.0	12.6		45.6	147.7			27.4			42.1	
Level of Service	C	B		D	F			C			D	
Approach Delay (s)		13.5			144.6			27.4			42.1	
Approach LOS		B			F			C			D	

Intersection Summary			
HCM 2000 Control Delay	81.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	85.5	Sum of lost time (s)	14.3
Intersection Capacity Utilization	75.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL2	EBL	EBR	SEL	SET	SER	NWL	NWT	NWR	SWL	SWR
Lane Configurations											
Volume (vph)	169	0	1277	5	801	367	1375	1274	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4		4.0	4.4	4.9	4.9	5.7	5.7			
Lane Util. Factor	1.00		1.00	1.00	0.95	1.00	0.97	0.95			
Frt	1.00		0.85	1.00	1.00	0.85	1.00	1.00			
Flt Protected	0.95		1.00	0.95	1.00	1.00	0.95	1.00			
Satd. Flow (prot)	1770		1583	1770	3539	1583	3433	3539			
Flt Permitted	0.95		1.00	0.95	1.00	1.00	0.95	1.00			
Satd. Flow (perm)	1770		1583	1770	3539	1583	3433	3539			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	184	0	1388	5	871	399	1495	1385	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	189	0	0	0	0	0
Lane Group Flow (vph)	184	0	1388	5	871	210	1495	1385	0	0	0
Turn Type	Prot		Free	Prot	NA	Perm	Prot	NA			
Protected Phases	4			5	2		1	6			
Permitted Phases			Free			2					
Actuated Green, G (s)	20.7		170.0	1.2	49.1	49.1	85.2	133.6			
Effective Green, g (s)	20.7		170.0	1.2	49.1	49.1	85.2	133.6			
Actuated g/C Ratio	0.12		1.00	0.01	0.29	0.29	0.50	0.79			
Clearance Time (s)	4.4			4.4	4.9	4.9	5.7	5.7			
Vehicle Extension (s)	2.0			2.0	3.6	3.6	2.0	4.6			
Lane Grp Cap (vph)	215		1583	12	1022	457	1720	2781			
v/s Ratio Prot	0.10			0.00	0.25		0.44	0.39			
v/s Ratio Perm			c0.88			0.13					
v/c Ratio	0.86		0.88	0.42	0.85	0.46	0.87	0.50			
Uniform Delay, d1	73.2		0.0	84.1	57.0	49.6	37.5	6.4			
Progression Factor	1.00		1.00	1.00	1.00	1.00	1.03	0.93			
Incremental Delay, d2	25.9		7.2	8.3	9.0	3.3	6.3	0.6			
Delay (s)	99.1		7.2	92.4	66.0	52.9	45.0	6.6			
Level of Service	F		A	F	E	D	D	A			
Approach Delay (s)		17.9			62.0			26.6		0.0	
Approach LOS		B			E			C		A	

Intersection Summary			
HCM 2000 Control Delay	32.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	170.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	82.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Volume (veh/h)	17	1953	2581	23	3	23
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	18	2123	2805	25	3	25
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		651	1106			
pX, platoon unblocked					0.77	
vC, conflicting volume	2830				3916	948
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2830				4187	948
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	86				0	90
cM capacity (veh/h)	132				1	262

Direction, Lane #	SE 1	SE 2	SE 3	NW 1	NW 2	NW 3	SW 1
Volume Total	18	1061	1061	1122	1122	586	28
Volume Left	18	0	0	0	0	0	3
Volume Right	0	0	0	0	0	25	25
cSH	132	1700	1700	1700	1700	1700	8
Volume to Capacity	0.14	0.62	0.62	0.66	0.66	0.34	3.38
Queue Length 95th (ft)	12	0	0	0	0	0	Err
Control Delay (s)	36.6	0.0	0.0	0.0	0.0	0.0	Err
Lane LOS	E						F
Approach Delay (s)	0.3			0.0			Err
Approach LOS							F

Intersection Summary			
Average Delay	56.7		
Intersection Capacity Utilization	64.0%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations	↑↑↑	↱			↰	↱
Volume (vph)	1467	563	0	0	196	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7	4.0			4.4	4.4
Lane Util. Factor	0.91	1.00			1.00	1.00
Frt	1.00	0.85			1.00	0.85
Flt Protected	1.00	1.00			0.95	1.00
Satd. Flow (prot)	5085	1583			1770	1583
Flt Permitted	1.00	1.00			0.95	1.00
Satd. Flow (perm)	5085	1583			1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1595	612	0	0	213	40
RTOR Reduction (vph)	0	0	0	0	0	19
Lane Group Flow (vph)	1595	612	0	0	213	21
Turn Type	NA	Free			Prot	Perm
Protected Phases	2				4	
Permitted Phases		Free				4
Actuated Green, G (s)	55.6	85.0			18.3	18.3
Effective Green, g (s)	55.6	85.0			18.3	18.3
Actuated g/C Ratio	0.65	1.00			0.22	0.22
Clearance Time (s)	6.7				4.4	4.4
Vehicle Extension (s)	6.1				6.1	6.1
Lane Grp Cap (vph)	3326	1583			381	340
v/s Ratio Prot	c0.31				c0.12	
v/s Ratio Perm		0.39				0.01
v/c Ratio	0.48	0.39			0.56	0.06
Uniform Delay, d1	7.4	0.0			29.8	26.5
Progression Factor	1.00	1.00			1.00	1.00
Incremental Delay, d2	0.5	0.7			3.9	0.2
Delay (s)	7.9	0.7			33.7	26.7
Level of Service	A	A			C	C
Approach Delay (s)	5.9			0.0	32.6	
Approach LOS	A			A	C	

Intersection Summary			
HCM 2000 Control Delay	8.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	11.1
Intersection Capacity Utilization	48.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

APPENDIX H

HORIZON YEAR 2035 WITH PROJECT SYNCHRO WORKSHEETS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	917	843	581	225	802	291	455	461	218	230	303	530
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	4.9	4.4	4.4	4.9	4.4	4.4	4.9	4.4	4.4	5.3	4.4
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00	0.97	1.00	0.88
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	3433	3539	1583	3433	1863	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	3539	1583	3433	3539	1583	3433	1863	2787
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	965	887	612	237	844	306	479	485	229	242	319	558
RTOR Reduction (vph)	0	0	120	0	0	60	0	0	50	0	0	28
Lane Group Flow (vph)	965	887	492	237	844	246	479	485	179	242	319	530
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	3	8	1	7	4	5	1	6	7	5	2	3
Permitted Phases			8			4			6			2
Actuated Green, G (s)	27.6	40.2	56.0	20.2	32.8	45.9	15.8	37.9	58.1	13.1	34.8	62.4
Effective Green, g (s)	27.6	40.2	56.0	20.2	32.8	45.9	15.8	37.9	58.1	13.1	34.8	62.4
Actuated g/C Ratio	0.21	0.31	0.43	0.16	0.25	0.35	0.12	0.29	0.45	0.10	0.27	0.48
Clearance Time (s)	4.4	4.9	4.4	4.4	4.9	4.4	4.4	4.9	4.4	4.4	5.3	4.4
Vehicle Extension (s)	2.0	4.1	2.0	2.0	4.3	2.0	2.0	4.5	2.0	2.0	3.3	2.0
Lane Grp Cap (vph)	728	1094	681	275	892	558	417	1031	707	345	498	1337
v/s Ratio Prot	c0.28	0.25	0.09	0.13	c0.24	0.04	c0.14	c0.14	0.04	0.07	c0.17	0.08
v/s Ratio Perm			0.22			0.11			0.07			0.11
v/c Ratio	1.33	0.81	0.72	0.86	0.95	0.44	1.15	0.47	0.25	0.70	0.64	0.40
Uniform Delay, d1	51.2	41.4	30.6	53.5	47.7	32.2	57.1	37.8	22.4	56.6	42.1	21.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	156.0	4.9	3.2	22.4	18.5	0.2	91.3	1.5	0.1	5.2	6.2	0.1
Delay (s)	207.2	46.3	33.8	76.0	66.3	32.4	148.4	39.4	22.5	61.8	48.3	21.8
Level of Service	F	D	C	E	E	C	F	D	C	E	D	C
Approach Delay (s)		106.2			60.5			79.9			38.0	
Approach LOS		F			E			E			D	

Intersection Summary			
HCM 2000 Control Delay	78.4	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	93.1%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	88	4	113	5	1	4	34	1252	7	24	932	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.9	4.9			4.9		4.4	5.0		4.4	5.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.85			0.95		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1592			1719		1770	3536		1770	3522	
Flt Permitted	0.95	1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1592			1719		1770	3536		1770	3522	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	96	4	123	5	1	4	37	1361	8	26	1013	34
RTOR Reduction (vph)	0	111	0	0	4	0	0	0	0	0	1	0
Lane Group Flow (vph)	96	16	0	0	6	0	37	1369	0	26	1046	0
Turn Type	Split	NA		Split	NA		Prot	NA		Prot	NA	
Protected Phases	8	8		3 4	3 4		1	6		5	2	
Permitted Phases												
Actuated Green, G (s)	15.2	15.2			17.7		6.7	40.8		57.1	91.2	
Effective Green, g (s)	15.2	15.2			17.7		6.7	40.8		57.1	91.2	
Actuated g/C Ratio	0.10	0.10			0.12		0.04	0.27		0.38	0.61	
Clearance Time (s)	4.9	4.9					4.4	5.0		4.4	5.0	
Vehicle Extension (s)	2.0	2.0					2.0	3.7		2.0	3.7	
Lane Grp Cap (vph)	179	161			202		79	961		673	2141	
v/s Ratio Prot	c0.05	0.01			c0.00		c0.02	c0.39		0.01	c0.30	
v/s Ratio Perm												
v/c Ratio	0.54	0.10			0.03		0.47	1.42		0.04	0.49	
Uniform Delay, d1	64.1	61.2			58.6		69.9	54.6		29.2	16.4	
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.5	0.1			0.0		1.6	197.1		0.1	0.8	
Delay (s)	65.6	61.3			58.6		71.5	251.7		29.3	17.2	
Level of Service	E	E			E		E	F		C	B	
Approach Delay (s)		63.2			58.6			247.0			17.5	
Approach LOS		E			E			F			B	

Intersection Summary			
HCM 2000 Control Delay	140.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	24.1
Intersection Capacity Utilization	51.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	1	1	0	54	0	46	134	875	0	7	1077	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.9			4.9		4.4	5.0		4.4	5.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		1.00			0.94		1.00	1.00		1.00	0.99	
Flt Protected		0.98			0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1817			1701		1770	3539		1770	3507	
Flt Permitted		0.90			0.83		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1684			1451		1770	3539		1770	3507	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	1	0	59	0	50	146	951	0	8	1171	75
RTOR Reduction (vph)	0	0	0	0	99	0	0	0	0	0	5	0
Lane Group Flow (vph)	0	2	0	0	10	0	146	951	0	8	1241	0
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		7.8			7.8		36.3	61.7		1.2	26.6	
Effective Green, g (s)		7.8			7.8		36.3	61.7		1.2	26.6	
Actuated g/C Ratio		0.09			0.09		0.43	0.73		0.01	0.31	
Clearance Time (s)		4.9			4.9		4.4	5.0		4.4	5.0	
Vehicle Extension (s)		2.0			2.0		2.0	3.2		2.0	3.2	
Lane Grp Cap (vph)		154			133		755	2568		24	1097	
v/s Ratio Prot							c0.08	c0.27		0.00	c0.35	
v/s Ratio Perm		0.00			c0.01							
v/c Ratio		0.01			0.08		0.19	0.37		0.33	1.13	
Uniform Delay, d1		35.1			35.3		15.2	4.4		41.5	29.2	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.0			0.1		0.6	0.4		3.0	70.7	
Delay (s)		35.1			35.4		15.8	4.8		44.5	99.9	
Level of Service		D			D		B	A		D	F	
Approach Delay (s)		35.1			35.4			6.2			99.5	
Approach LOS		D			D			A			F	

Intersection Summary			
HCM 2000 Control Delay	55.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	14.3
Intersection Capacity Utilization	58.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL2	EBL	EBR	SEL	SET	SER	NWL	NWT	NWR	SWL	SWR
Lane Configurations											
Volume (vph)	224	0	1520	0	796	108	491	882	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4		4.0		4.9	4.9	5.7	5.7			
Lane Util. Factor	1.00		1.00		0.95	1.00	0.97	0.95			
Frt	1.00		0.85		1.00	0.85	1.00	1.00			
Flt Protected	0.95		1.00		1.00	1.00	0.95	1.00			
Satd. Flow (prot)	1770		1583		3539	1583	3433	3539			
Flt Permitted	0.95		1.00		1.00	1.00	0.95	1.00			
Satd. Flow (perm)	1770		1583		3539	1583	3433	3539			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	243	0	1652	0	865	117	534	959	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	78	0	0	0	0	0
Lane Group Flow (vph)	243	0	1652	0	865	39	534	959	0	0	0
Turn Type	Prot		Free	Prot	NA	Perm	Prot	NA			
Protected Phases	4			5	2		1	6			
Permitted Phases			Free			2					
Actuated Green, G (s)	14.1		75.0		25.1	25.1	20.8	50.8			
Effective Green, g (s)	14.1		75.0		25.1	25.1	20.8	50.8			
Actuated g/C Ratio	0.19		1.00		0.33	0.33	0.28	0.68			
Clearance Time (s)	4.4				4.9	4.9	5.7	5.7			
Vehicle Extension (s)	2.0				3.6	3.6	2.0	4.6			
Lane Grp Cap (vph)	332		1583		1184	529	952	2397			
v/s Ratio Prot	0.14				0.24		0.16	0.27			
v/s Ratio Perm			c1.04			0.02					
v/c Ratio	0.73		1.04		0.73	0.07	0.56	0.40			
Uniform Delay, d1	28.7		37.5		22.0	17.0	23.2	5.4			
Progression Factor	1.00		1.00		1.00	1.00	1.05	1.05			
Incremental Delay, d2	7.0		34.9		4.0	0.3	2.4	0.5			
Delay (s)	35.7		72.4		26.0	17.3	26.8	6.1			
Level of Service	D		E		C	B	C	A			
Approach Delay (s)		67.7			24.9			13.5		0.0	
Approach LOS		E			C			B		A	

Intersection Summary			
HCM 2000 Control Delay	39.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.31		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	15.1
Intersection Capacity Utilization	60.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Volume (veh/h)	35	2087	1301	30	29	54
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	38	2268	1414	33	32	59
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		651	1106			
pX, platoon unblocked					0.80	
vC, conflicting volume	1447				2641	488
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1447				2551	488
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	92				0	89
cM capacity (veh/h)	464				16	526

Direction, Lane #	SE 1	SE 2	SE 3	NW 1	NW 2	NW 3	SW 1
Volume Total	38	1134	1134	566	566	315	90
Volume Left	38	0	0	0	0	0	32
Volume Right	0	0	0	0	0	33	59
cSH	464	1700	1700	1700	1700	1700	43
Volume to Capacity	0.08	0.67	0.67	0.33	0.33	0.19	2.08
Queue Length 95th (ft)	7	0	0	0	0	0	236
Control Delay (s)	13.4	0.0	0.0	0.0	0.0	0.0	699.4
Lane LOS	B						F
Approach Delay (s)	0.2			0.0			699.4
Approach LOS							F

Intersection Summary			
Average Delay	16.5		
Intersection Capacity Utilization	69.3%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Volume (vph)	2161	141	0	0	212	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7	4.0			4.4	4.4
Lane Util. Factor	0.91	0.88			1.00	1.00
Frt	1.00	0.85			1.00	0.85
Flt Protected	1.00	1.00			0.95	1.00
Satd. Flow (prot)	5085	2787			1770	1583
Flt Permitted	1.00	1.00			0.95	1.00
Satd. Flow (perm)	5085	2787			1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2349	153	0	0	230	30
RTOR Reduction (vph)	0	0	0	0	0	4
Lane Group Flow (vph)	2349	153	0	0	230	26
Turn Type	NA	Free			Prot	Perm
Protected Phases	2				4	
Permitted Phases		Free				4
Actuated Green, G (s)	49.4	75.0			14.5	14.5
Effective Green, g (s)	49.4	75.0			14.5	14.5
Actuated g/C Ratio	0.66	1.00			0.19	0.19
Clearance Time (s)	6.7				4.4	4.4
Vehicle Extension (s)	6.1				3.0	3.0
Lane Grp Cap (vph)	3349	2787			342	306
v/s Ratio Prot	c0.46				c0.13	
v/s Ratio Perm		0.05				0.02
v/c Ratio	0.70	0.05			0.67	0.08
Uniform Delay, d1	8.1	0.0			28.0	24.8
Progression Factor	1.46	1.00			1.00	1.00
Incremental Delay, d2	0.6	0.0			5.1	0.1
Delay (s)	12.4	0.0			33.2	24.9
Level of Service	B	A			C	C
Approach Delay (s)	11.7			0.0	32.2	
Approach LOS	B			A	C	

Intersection Summary			
HCM 2000 Control Delay	13.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	11.1
Intersection Capacity Utilization	62.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	655	971	560	430	1037	377	606	470	314	261	480	1000
Future Volume (vph)	655	971	560	430	1037	377	606	470	314	261	480	1000
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	4.9	4.4	4.4	4.9	4.4	4.4	4.9	4.4	4.4	5.3	4.4
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00	0.97	1.00	0.88
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	1770	3539	1583	3433	3539	1583	3433	1863	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	1770	3539	1583	3433	3539	1583	3433	1863	2787
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	689	1022	589	453	1092	397	638	495	331	275	505	1053
RTOR Reduction (vph)	0	0	55	0	0	35	0	0	27	0	0	54
Lane Group Flow (vph)	689	1022	534	453	1092	362	638	495	304	275	505	999
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	3	8	1	7	4	5	1	6	7	5	2	3
Permitted Phases			8			4			6			2
Actuated Green, G (s)	18.6	34.1	52.7	24.6	40.1	54.6	18.6	38.2	62.8	14.5	33.7	52.3
Effective Green, g (s)	18.6	34.1	52.7	24.6	40.1	54.6	18.6	38.2	62.8	14.5	33.7	52.3
Actuated g/C Ratio	0.14	0.26	0.41	0.19	0.31	0.42	0.14	0.29	0.48	0.11	0.26	0.40
Clearance Time (s)	4.4	4.9	4.4	4.4	4.9	4.4	4.4	4.9	4.4	4.4	5.3	4.4
Vehicle Extension (s)	2.0	4.1	2.0	2.0	4.3	2.0	2.0	4.5	2.0	2.0	3.3	2.0
Lane Grp Cap (vph)	491	928	641	334	1091	664	491	1039	764	382	482	1121
v/s Ratio Prot	0.20	c0.29	0.12	c0.26	0.31	0.06	c0.19	c0.14	0.08	0.08	c0.27	0.13
v/s Ratio Perm			0.22			0.17			0.12			0.23
v/c Ratio	1.40	1.10	0.83	1.36	1.00	0.54	1.30	0.48	0.40	0.72	1.05	0.89
Uniform Delay, d1	55.7	48.0	34.7	52.7	45.0	28.4	55.7	37.7	21.5	55.8	48.1	36.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	193.4	61.3	8.7	178.7	27.5	0.5	149.1	1.6	0.1	5.3	54.0	8.9
Delay (s)	249.1	109.2	43.4	231.4	72.4	28.8	204.8	39.3	21.6	61.1	102.2	45.1
Level of Service	F	F	D	F	E	C	F	D	C	E	F	D
Approach Delay (s)		134.3			100.6			107.4			63.3	
Approach LOS		F			F			F			E	

Intersection Summary			
HCM 2000 Control Delay	103.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.15		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	109.0%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	72	1	150	16	9	20	67	1597	7	38	1096	108
Future Volume (vph)	72	1	150	16	9	20	67	1597	7	38	1096	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.9	4.9			4.9		4.4	5.0		4.4	5.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.85			0.94		1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1585			1720		1770	3537		1770	3492	
Flt Permitted	0.95	1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1585			1720		1770	3537		1770	3492	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	78	1	163	17	10	22	73	1736	8	41	1191	117
RTOR Reduction (vph)	0	149	0	0	19	0	0	0	0	0	3	0
Lane Group Flow (vph)	78	15	0	0	30	0	73	1744	0	41	1305	0
Turn Type	Split	NA		Split	NA		Prot	NA		Prot	NA	
Protected Phases	8	8		3 4	3 4		1	6		5	2	
Permitted Phases												
Actuated Green, G (s)	14.9	14.9			21.5		11.6	68.8		45.6	102.8	
Effective Green, g (s)	14.9	14.9			21.5		11.6	68.8		45.6	102.8	
Actuated g/C Ratio	0.09	0.09			0.13		0.07	0.40		0.27	0.60	
Clearance Time (s)	4.9	4.9					4.4	5.0		4.4	5.0	
Vehicle Extension (s)	2.0	2.0					2.0	3.7		2.0	3.7	
Lane Grp Cap (vph)	155	138			217		120	1431		474	2111	
v/s Ratio Prot	c0.04	0.01			c0.02		c0.04	c0.49		0.02	c0.37	
v/s Ratio Perm												
v/c Ratio	0.50	0.11			0.14		0.61	1.22		0.09	0.62	
Uniform Delay, d1	74.0	71.4			66.0		77.0	50.6		46.6	21.2	
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.9	0.1			0.1		5.9	105.0		0.4	1.4	
Delay (s)	75.0	71.6			66.1		82.9	155.6		47.0	22.6	
Level of Service	E	E			E		F	F		D	C	
Approach Delay (s)		72.7			66.1			152.7			23.3	
Approach LOS		E			E			F			C	

Intersection Summary			
HCM 2000 Control Delay	95.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	170.0	Sum of lost time (s)	24.1
Intersection Capacity Utilization	76.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	93	1141	24	44	1362	57	7	0	17	144	1	71
Future Volume (vph)	93	1141	24	44	1362	57	7	0	17	144	1	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	5.0		4.4	5.0			4.9			4.9	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	1.00		1.00	0.99			0.91			0.96	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.97	
Satd. Flow (prot)	1770	3528		1770	3518			1663			1723	
Flt Permitted	0.95	1.00		0.95	1.00			0.92			0.78	
Satd. Flow (perm)	1770	3528		1770	3518			1550			1395	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	101	1240	26	48	1480	62	8	0	18	157	1	77
RTOR Reduction (vph)	0	1	0	0	3	0	0	21	0	0	23	0
Lane Group Flow (vph)	101	1265	0	48	1539	0	0	5	0	0	212	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases							4			8		
Actuated Green, G (s)	24.4	49.9		4.1	29.6			17.2			17.2	
Effective Green, g (s)	24.4	49.9		4.1	29.6			17.2			17.2	
Actuated g/C Ratio	0.29	0.58		0.05	0.35			0.20			0.20	
Clearance Time (s)	4.4	5.0		4.4	5.0			4.9			4.9	
Vehicle Extension (s)	2.0	3.2		2.0	3.2			2.0			2.0	
Lane Grp Cap (vph)	505	2059		84	1217			311			280	
v/s Ratio Prot	0.06	c0.36		c0.03	c0.44							
v/s Ratio Perm								0.00			c0.15	
v/c Ratio	0.20	0.61		0.57	1.26			0.02			0.76	
Uniform Delay, d1	23.2	11.6		39.8	27.9			27.4			32.2	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.9	1.4		5.7	125.7			0.0			9.9	
Delay (s)	24.0	12.9		45.6	153.6			27.4			42.1	
Level of Service	C	B		D	F			C			D	
Approach Delay (s)		13.8			150.3			27.4			42.1	
Approach LOS		B			F			C			D	

Intersection Summary			
HCM 2000 Control Delay	83.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	85.5	Sum of lost time (s)	14.3
Intersection Capacity Utilization	75.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL2	EBL	EBR	SEL	SET	SER	NWL	NWT	NWR	SWL	SWR
Lane Configurations											
Traffic Volume (vph)	169	0	1293	5	836	367	1383	1291	0	0	0
Future Volume (vph)	169	0	1293	5	836	367	1383	1291	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4		4.0	4.4	4.9	4.9	5.7	5.7			
Lane Util. Factor	1.00		1.00	1.00	0.95	1.00	0.97	0.95			
Frt	1.00		0.85	1.00	1.00	0.85	1.00	1.00			
Flt Protected	0.95		1.00	0.95	1.00	1.00	0.95	1.00			
Satd. Flow (prot)	1770		1583	1770	3539	1583	3433	3539			
Flt Permitted	0.95		1.00	0.95	1.00	1.00	0.95	1.00			
Satd. Flow (perm)	1770		1583	1770	3539	1583	3433	3539			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	184	0	1405	5	909	399	1503	1403	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	181	0	0	0	0	0
Lane Group Flow (vph)	184	0	1405	5	909	218	1503	1403	0	0	0
Turn Type	Prot		Free	Prot	NA	Perm	Prot	NA			
Protected Phases	4			5	2		1	6			
Permitted Phases			Free			2					
Actuated Green, G (s)	20.5		170.0	1.2	51.1	51.1	83.4	133.8			
Effective Green, g (s)	20.5		170.0	1.2	51.1	51.1	83.4	133.8			
Actuated g/C Ratio	0.12		1.00	0.01	0.30	0.30	0.49	0.79			
Clearance Time (s)	4.4			4.4	4.9	4.9	5.7	5.7			
Vehicle Extension (s)	2.0			2.0	3.6	3.6	2.0	4.6			
Lane Grp Cap (vph)	213		1583	12	1063	475	1684	2785			
v/s Ratio Prot	0.10			0.00	0.26		0.44	0.40			
v/s Ratio Perm			c0.89			0.14					
v/c Ratio	0.86		0.89	0.42	0.86	0.46	0.89	0.50			
Uniform Delay, d1	73.4		0.0	84.1	56.0	48.2	39.2	6.4			
Progression Factor	1.00		1.00	1.00	1.00	1.00	1.04	0.93			
Incremental Delay, d2	27.6		7.8	8.3	8.8	3.2	7.7	0.7			
Delay (s)	101.0		7.8	92.4	64.8	51.4	48.4	6.6			
Level of Service	F		A	F	E	D	D	A			
Approach Delay (s)		18.6			60.8			28.2		0.0	
Approach LOS		B			E			C		A	

Intersection Summary			
HCM 2000 Control Delay	32.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	170.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	84.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Volume (veh/h)	84	1953	2581	58	31	78
Future Volume (Veh/h)	84	1953	2581	58	31	78
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	91	2123	2805	63	34	85
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		651	1106			
pX, platoon unblocked					0.76	
vC, conflicting volume	2868				4080	966
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2868				4413	966
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	29				0	67
cM capacity (veh/h)	128				0	254

Direction, Lane #	SE 1	SE 2	SE 3	NW 1	NW 2	NW 3	SW 1
Volume Total	91	1062	1062	1122	1122	624	119
Volume Left	91	0	0	0	0	0	34
Volume Right	0	0	0	0	0	63	85
cSH	128	1700	1700	1700	1700	1700	1
Volume to Capacity	0.71	0.62	0.62	0.66	0.66	0.37	151.85
Queue Length 95th (ft)	99	0	0	0	0	0	Err
Control Delay (s)	83.4	0.0	0.0	0.0	0.0	0.0	Err
Lane LOS	F						F
Approach Delay (s)	3.4			0.0			Err
Approach LOS							F

Intersection Summary			
Average Delay	230.2		
Intersection Capacity Utilization	72.3%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Traffic Volume (vph)	1475	567	0	0	205	37
Future Volume (vph)	1475	567	0	0	205	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7	4.0			4.4	4.4
Lane Util. Factor	0.91	1.00			1.00	1.00
Frt	1.00	0.85			1.00	0.85
Flt Protected	1.00	1.00			0.95	1.00
Satd. Flow (prot)	5085	1583			1770	1583
Flt Permitted	1.00	1.00			0.95	1.00
Satd. Flow (perm)	5085	1583			1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1603	616	0	0	223	40
RTOR Reduction (vph)	0	0	0	0	0	19
Lane Group Flow (vph)	1603	616	0	0	223	21
Turn Type	NA	Free			Prot	Perm
Protected Phases	2				4	
Permitted Phases		Free				4
Actuated Green, G (s)	55.2	85.0			18.7	18.7
Effective Green, g (s)	55.2	85.0			18.7	18.7
Actuated g/C Ratio	0.65	1.00			0.22	0.22
Clearance Time (s)	6.7				4.4	4.4
Vehicle Extension (s)	6.1				6.1	6.1
Lane Grp Cap (vph)	3302	1583			389	348
v/s Ratio Prot	c0.32				c0.13	
v/s Ratio Perm		0.39				0.01
v/c Ratio	0.49	0.39			0.57	0.06
Uniform Delay, d1	7.6	0.0			29.6	26.2
Progression Factor	1.64	1.00			1.00	1.00
Incremental Delay, d2	0.3	0.4			4.1	0.2
Delay (s)	12.8	0.4			33.7	26.4
Level of Service	B	A			C	C
Approach Delay (s)	9.3			0.0	32.6	
Approach LOS	A			A	C	

Intersection Summary			
HCM 2000 Control Delay	11.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	11.1
Intersection Capacity Utilization	49.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

APPENDIX I

GOVERNMENT CODE SECTION 65915,

Government Code Section 65915

(p) (1) Except as provided in paragraphs (2) and (3), upon the request of the developer, a city, county, or city and county shall not require a vehicular parking ratio, inclusive of handicapped and guest parking, of a development meeting the criteria of subdivisions (b) and (c), that exceeds the following ratios:

(A) Zero to one bedroom: one onsite parking space.

(B) Two to three bedrooms: two onsite parking spaces.

(C) Four and more bedrooms: two and one-half parking spaces.

(2) Notwithstanding paragraph (1), if a development includes the maximum percentage of low- or very low income units provided for in paragraphs (1) and (2) of subdivision (f) and is located within one-half mile of a major transit stop, as defined in subdivision (b) of Section 21155 of the Public Resources Code, and there is unobstructed access to the major transit stop from the development, then, upon the request of the developer, a city, county, or city and county shall not impose a vehicular parking ratio, inclusive of handicapped and guest parking, that exceeds 0.5 spaces per bedroom. For purposes of this subdivision, a development shall have unobstructed access to a major transit stop if a resident is able to access the major transit stop without encountering natural or constructed impediments.

(3) Notwithstanding paragraph (1), if a development consists solely of rental units, exclusive of a manager's unit or units, with an affordable housing cost to lower income families, as provided in Section 50052.5 of the Health and Safety Code, then, upon the request of the developer, a city, county, or city and county shall not impose a vehicular parking ratio, inclusive of handicapped and guest parking, that exceeds the following ratios:

(A) If the development is located within one-half mile of a major transit stop, as defined in subdivision (b) of Section 21155 of the Public Resources Code, and there is unobstructed access to the major transit stop from the development, the ratio shall not exceed 0.5 spaces per unit.

(B) If the development is a for-rent housing development for individuals who are 62 years of age or older that complies with Sections 51.2 and 51.3 of the Civil Code, the ratio shall not exceed 0.5 spaces per unit. The development shall have either paratransit service or unobstructed access, within one-half mile, to fixed bus route service that operates at least eight times per day.

(C) If the development is a special needs housing development, as defined in Section 51312 of the Health and Safety Code, the ratio shall not exceed 0.3 spaces per unit. The development shall have either paratransit service or unobstructed access, within one-half mile, to fixed bus route service that operates at least eight times per day.

(4) If the total number of parking spaces required for a development is other than a whole number, the number shall be rounded up to the next whole number. For purposes of this subdivision, a development may provide on-site parking through tandem parking or uncovered parking, but not through on-street parking.

(5) This subdivision shall apply to a development that meets the requirements of subdivisions (b) and (c), but only at the request of the applicant. An applicant may request parking incentives or concessions beyond those provided in this subdivision pursuant to subdivision (d).

(6) This subdivision does not preclude a city, county, or city and county from reducing or eliminating a parking requirement for development projects of any type in any location.

(7) Notwithstanding paragraphs (2) and (3), if a city, county, city and county, or an independent consultant has conducted an areawide or jurisdictionwide parking study in the last seven years, then the city, county, or city and county may impose a higher vehicular parking ratio not to exceed the ratio described in paragraph (1), based upon substantial evidence found in the parking study, that includes, but is not limited to, an analysis of parking availability, differing levels of transit access, walkability access to transit services, the potential for shared parking, the effect of parking requirements on the cost of market-rate and subsidized developments, and the lower rates of car ownership for low- and very low income individuals, including seniors and special needs individuals. The city, county, or city and county shall pay the costs of any new study. The city, county, or city and county shall make findings, based on a parking study completed in conformity with this paragraph, supporting the need for the higher parking ratio.

APPENDIX J

TRAFFIC SIGNAL WARRANT FOR ROSEWOOD STREET AT MISSION BAY DRIVE

Existing With Project

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet
(Average Traffic Estimate Form)

COUNT DATE Aug. 5, 2015
CALC _____ DATE _____
CHK _____ DATE _____

DIST ____ CO ____ RTE ____ PM ____

Major St: Mission Bay Drive
Minor St: Rosewood Street

Critical Approach Speed _____ mph
Critical Approach Speed _____ mph

Speed limit or critical speed on major street traffic > 40 mph..... ☐ or
In built up area of isolated community of < 10,000 population..... ☐ } RURAL (R)
☒ URBAN (U)

(Based on Estimated Average Daily Traffic - See Note)

URBAN..... ✓ RURAL.....

Minimum Requirements: 56,229 ADT EADT 5,373 ADT

CONDITION A - Minimum Vehicular Volume

Satisfied ✓ Not Satisfied _____

Number of lanes for moving traffic on each approach: Major Street	Minor Street	Vehicles Per Day on Major Street (Total of Both Approaches) Urban	Rural	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only) Urban	Rural
1	1	8,000	5,600	2,400	1,680
2 or More	1	9,600	6,720	2,400	1,680
2 or More	2 or More	9,600	6,720	3,200	2,240
1	2 or More	8,000	5,600	3,200	2,240

CONDITION B - Interruption of Continuous Traffic

Satisfied ✓ Not Satisfied _____

Number of lanes for moving traffic on each approach: Major Street	Minor Street	Vehicles Per Day on Major Street (Total of Both Approaches) Urban	Rural	Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only) Urban	Rural
1	1	12,000	8,400	1,200	850
2 or More	1	14,400	10,080	1,200	850
2 or More	2 or More	14,400	10,080	1,600	1,120
1	2 or More	12,000	8,400	1,600	1,120

Combination of CONDITIONS A + B

Satisfied ✓ Not Satisfied _____

No one condition satisfied, but following conditions fulfilled 80% or more..... _____ A _____ B

2 CONDITIONS 80% | 2 CONDITIONS 80%

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

WEDNESDAY, AUG 5, 2015 CITY: SAN DIEGO - MISSION BAY PROJECT: PTD15-0807-03

Mission Bay Dr. (Rosewood St. to N Mission Bay Dr.)

AM Period	NB		SB		EB	WB		PM Period	NB		SB		EB	WB	
00:00	113		74					12:00	414		402				
00:15	76		65					12:15	452		427				
00:30	78		51					12:30	429		418				
00:45	64	331	44	234			565	12:45	433	1728	406	1653			3381
01:00	56		35					13:00	405		419				
01:15	40		26					13:15	436		404				
01:30	53		35					13:30	413		384				
01:45	39	188	22	118			306	13:45	394	1648	377	1584			3232
02:00	49		29					14:00	431		365				
02:15	31		19					14:15	414		351				
02:30	24		16					14:30	426		344				
02:45	34	138	15	79			217	14:45	473	1744	352	1412			3156
03:00	13		11					15:00	447		368				
03:15	15		18					15:15	468		375				
03:30	19		18					15:30	485		395				
03:45	25	72	24	71			143	15:45	520	1920	416	1554			3474
04:00	21		21					16:00	503		468				
04:15	27		26					16:15	488		451				
04:30	30		44					16:30	519		444				
04:45	66	144	35	126			270	16:45	522	2032	478	1841			3873
05:00	65		65					17:00	568		499				
05:15	86		70					17:15	618		462				
05:30	96		88					17:30	579		484				
05:45	172	419	142	365			784	17:45	556	2321	418	1863			4184
06:00	189		184					18:00	472		404				
06:15	237		212					18:15	492		416				
06:30	297		222					18:30	447		384				
06:45	264	987	305	923			1910	18:45	413	1824	365	1569			3393
07:00	247		318					19:00	438		377				
07:15	217		446					19:15	427		384				
07:30	190		451					19:30	388		391				
07:45	259	913	552	1767			2680	19:45	400	1653	365	1517			3170
08:00	250		448					20:00	358		333				
08:15	296		526					20:15	334		318				
08:30	276		542					20:30	328		284				
08:45	332	1154	449	1965			3119	20:45	304	1324	265	1200			2524
09:00	377		451					21:00	334		242				
09:15	363		468					21:15	317		235				
09:30	422		477					21:30	297		218				
09:45	464	1626	414	1810			3436	21:45	249	1197	222	917			2114
10:00	351		426					22:00	231		198				
10:15	427		435					22:15	215		161				
10:30	345		404					22:30	215		145				
10:45	415	1538	391	1656			3194	22:45	147	808	121	625			1433
11:00	364		396					23:00	157		88				
11:15	415		387					23:15	124		98				
11:30	413		411					23:30	102		91				
11:45	462	1654	423	1617			3271	23:45	81	464	88	365			829
Total Vol.		9164		10731			**19895**			18663		16100			**34763**

Daily Totals

NB	SB	EB	WB	Combined
27827	26831			**54658**

	AM			PM		
Split %	46.1%	53.9%	**36.4%**	53.7%	46.3%	**63.6%**
Peak Hour	11:45	07:45	**09:00**	17:00	16:45	**16:45**
Volume	1757	2068	**3436**	2321	1923	**4210**
P.H.F.	0.95	0.94	**0.96**	0.95	0.96	**0.97**

WEDNESDAY, AUG 5, 2015 CITY: SAN DIEGO - MISSION BAY PROJECT: PTD15-0807-03

Rosewood St. (Mission Bay Dr. to Del Rey St.)

AM Period	NB	SB	EB		WB			PM Period	NB	SB	EB		WB		
00:00			2		0			12:00			5		10		
00:15			2		2			12:15			7		6		
00:30			0		0			12:30			5		5		
00:45			0	4	0	2	6	12:45			6	23	14	35	58
01:00			1		0			13:00			6		16		
01:15			1		2			13:15			6		15		
01:30			3		0			13:30			5		9		
01:45			0	5	0	2	7	13:45			0	17	5	45	62
02:00			0		0			14:00			6		12		
02:15			1		1			14:15			0		21		
02:30			0		0			14:30			6		14		
02:45			0	1	0	1	2	14:45			13	25	7	54	79
03:00			2		2			15:00			2		6		
03:15			0		0			15:15			1		10		
03:30			0		2			15:30			4		4		
03:45			0	2	0	4	6	15:45			3	10	11	31	41
04:00			0		0			16:00			10		5		
04:15			0		0			16:15			8		6		
04:30			0		0			16:30			12		18		
04:45			0	0	0	0		16:45			8	38	11	40	78
05:00			0		0			17:00			15		4		
05:15			0		0			17:15			7		6		
05:30			0		3			17:30			12		4		
05:45			1	1	1	4	5	17:45			4	38	2	16	54
06:00			1		2			18:00			5		6		
06:15			1		0			18:15			2		7		
06:30			0		1			18:30			4		13		
06:45			0	2	0	3	5	18:45			0	11	7	33	44
07:00			1		0			19:00			2		6		
07:15			4		3			19:15			3		6		
07:30			1		6			19:30			1		5		
07:45			3	9	2	11	20	19:45			2	8	5	22	30
08:00			4		4			20:00			4		9		
08:15			2		1			20:15			2		7		
08:30			0		3			20:30			5		3		
08:45			12	18	5	13	31	20:45			3	14	1	20	34
09:00			9		16			21:00			2		3		
09:15			2		2			21:15			1		4		
09:30			0		10			21:30			0		5		
09:45			4	15	4	32	47	21:45			1	4	0	12	16
10:00			1		6			22:00			3		6		
10:15			2		7			22:15			2		2		
10:30			4		5			22:30			0		0		
10:45			10	17	8	26	43	22:45			1	6	2	10	16
11:00			5		13			23:00			1		1		
11:15			7		7			23:15			2		1		
11:30			1		10			23:30			1		2		
11:45			8	21	9	39	60	23:45			1	5	0	4	9
Total Vol.				95		137	**232**					199		322	**521**

Daily Totals

NB	SB	EB	WB	**Combined**
		294	459	**753**

	AM			**PM**		
Split %	40.9%	59.1%	**30.8%**	38.2%	61.8%	**69.2%**
Peak Hour	10:30	11:00	**10:45**	16:15	12:45	**16:15**
Volume	26	39	**61**	43	54	**82**
P.H.F.	0.65	0.75	**0.85**	0.72	0.84	**0.68**

APPENDIX K

SYNCHRO WORKSHEETS FOR PROPOSED MITIGATION

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	35	2074	1197	31	29	53
Future Volume (vph)	35	2074	1197	31	29	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	5.0	5.0		4.4	
Lane Util. Factor	1.00	0.95	0.91		1.00	
Frt	1.00	1.00	1.00		0.91	
Flt Protected	0.95	1.00	1.00		0.98	
Satd. Flow (prot)	1770	3539	5066		1671	
Flt Permitted	0.95	1.00	1.00		0.98	
Satd. Flow (perm)	1770	3539	5066		1671	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	38	2254	1301	34	32	58
RTOR Reduction (vph)	0	0	2	0	53	0
Lane Group Flow (vph)	38	2254	1333	0	37	0
Turn Type	Prot	NA	NA		Prot	
Protected Phases	1	6	2		7	
Permitted Phases						
Actuated Green, G (s)	3.9	63.3	55.0		7.3	
Effective Green, g (s)	3.9	63.3	55.0		7.3	
Actuated g/C Ratio	0.05	0.79	0.69		0.09	
Clearance Time (s)	4.4	5.0	5.0		4.4	
Vehicle Extension (s)	2.0	3.2	3.2		2.0	
Lane Grp Cap (vph)	86	2800	3482		152	
v/s Ratio Prot	0.02	c0.64	0.26		c0.02	
v/s Ratio Perm						
v/c Ratio	0.44	0.81	0.38		0.25	
Uniform Delay, d1	37.0	4.8	5.3		33.8	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	1.3	2.6	0.3		0.3	
Delay (s)	38.3	7.4	5.6		34.1	
Level of Service	D	A	A		C	
Approach Delay (s)		7.9	5.6		34.1	
Approach LOS		A	A		C	

Intersection Summary			
HCM 2000 Control Delay	7.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	13.8
Intersection Capacity Utilization	70.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	85	1941	2374	59	31	76
Future Volume (vph)	85	1941	2374	59	31	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	5.0	5.0		4.4	
Lane Util. Factor	1.00	0.95	0.91		1.00	
Frt	1.00	1.00	1.00		0.90	
Flt Protected	0.95	1.00	1.00		0.99	
Satd. Flow (prot)	1770	3539	5067		1660	
Flt Permitted	0.95	1.00	1.00		0.99	
Satd. Flow (perm)	1770	3539	5067		1660	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	92	2110	2580	64	34	83
RTOR Reduction (vph)	0	0	2	0	75	0
Lane Group Flow (vph)	92	2110	2642	0	42	0
Turn Type	Prot	NA	NA		Prot	
Protected Phases	1	6	2		7	
Permitted Phases						
Actuated Green, G (s)	7.1	63.2	51.7		7.4	
Effective Green, g (s)	7.1	63.2	51.7		7.4	
Actuated g/C Ratio	0.09	0.79	0.65		0.09	
Clearance Time (s)	4.4	5.0	5.0		4.4	
Vehicle Extension (s)	2.0	3.2	3.2		2.0	
Lane Grp Cap (vph)	157	2795	3274		153	
v/s Ratio Prot	0.05	c0.60	c0.52		c0.03	
v/s Ratio Perm						
v/c Ratio	0.59	0.75	0.81		0.27	
Uniform Delay, d1	35.0	4.4	10.5		33.8	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	3.6	1.9	2.2		0.4	
Delay (s)	38.6	6.3	12.7		34.1	
Level of Service	D	A	B		C	
Approach Delay (s)		7.7	12.7		34.1	
Approach LOS		A	B		C	

Intersection Summary			
HCM 2000 Control Delay	11.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	13.8
Intersection Capacity Utilization	69.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	35	2087	1301	30	29	54
Future Volume (vph)	35	2087	1301	30	29	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	5.0	5.0		4.0	
Lane Util. Factor	1.00	0.95	0.91		1.00	
Frt	1.00	1.00	1.00		0.91	
Flt Protected	0.95	1.00	1.00		0.98	
Satd. Flow (prot)	1770	3539	5068		1670	
Flt Permitted	0.95	1.00	1.00		0.98	
Satd. Flow (perm)	1770	3539	5068		1670	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	38	2268	1414	33	32	59
RTOR Reduction (vph)	0	0	3	0	51	0
Lane Group Flow (vph)	38	2268	1444	0	40	0
Turn Type	Prot	NA	NA		Prot	
Protected Phases	1	6	2		7	
Permitted Phases						
Actuated Green, G (s)	2.4	38.4	31.6		7.6	
Effective Green, g (s)	2.4	38.4	31.6		7.6	
Actuated g/C Ratio	0.04	0.70	0.57		0.14	
Clearance Time (s)	4.4	5.0	5.0		4.0	
Vehicle Extension (s)	2.0	3.2	3.2		3.0	
Lane Grp Cap (vph)	77	2470	2911		230	
v/s Ratio Prot	0.02	c0.64	0.29		c0.02	
v/s Ratio Perm						
v/c Ratio	0.49	0.92	0.50		0.17	
Uniform Delay, d1	25.7	7.0	7.0		20.9	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	1.8	6.9	0.6		0.4	
Delay (s)	27.5	13.9	7.6		21.3	
Level of Service	C	B	A		C	
Approach Delay (s)		14.1	7.6		21.3	
Approach LOS		B	A		C	

Intersection Summary			
HCM 2000 Control Delay	11.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	13.4
Intersection Capacity Utilization	70.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	84	1953	2581	58	31	78
Future Volume (vph)	84	1953	2581	58	31	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.4	5.0	5.0		4.4	
Lane Util. Factor	1.00	0.95	0.91		1.00	
Frt	1.00	1.00	1.00		0.90	
Flt Protected	0.95	1.00	1.00		0.99	
Satd. Flow (prot)	1770	3539	5069		1659	
Flt Permitted	0.95	1.00	1.00		0.99	
Satd. Flow (perm)	1770	3539	5069		1659	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	91	2123	2805	63	34	85
RTOR Reduction (vph)	0	0	2	0	77	0
Lane Group Flow (vph)	91	2123	2866	0	42	0
Turn Type	Prot	NA	NA		Prot	
Protected Phases	1	6	2		7	
Permitted Phases						
Actuated Green, G (s)	6.7	63.2	52.1		7.4	
Effective Green, g (s)	6.7	63.2	52.1		7.4	
Actuated g/C Ratio	0.08	0.79	0.65		0.09	
Clearance Time (s)	4.4	5.0	5.0		4.4	
Vehicle Extension (s)	2.0	3.2	3.2		2.0	
Lane Grp Cap (vph)	148	2795	3301		153	
v/s Ratio Prot	0.05	c0.60	c0.57		c0.03	
v/s Ratio Perm						
v/c Ratio	0.61	0.76	0.87		0.27	
Uniform Delay, d1	35.4	4.4	11.2		33.8	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	5.2	2.0	3.4		0.4	
Delay (s)	40.6	6.4	14.6		34.2	
Level of Service	D	A	B		C	
Approach Delay (s)		7.8	14.6		34.2	
Approach LOS		A	B		C	

Intersection Summary			
HCM 2000 Control Delay	12.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	13.8
Intersection Capacity Utilization	73.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

APPENDIX L

ADAPTIVE TRAFFIC CONTROL TEST SYSTEMS EVALUATION, URBAN SYSTEMS ASSOCIATES, JULY 2014

URBAN SYSTEMS ASSOCIATES, INC.

PLANNING & TRAFFIC ENGINEERING, MARKETING & PROJECT SUPPORT

CONSULTANTS TO INDUSTRY AND GOVERNMENT

ADAPTIVE TRAFFIC CONTROL TEST SYSTEM EVALUATION

LUSK BLVD.
SAN DIEGO, CA

7/7/2014

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location where automated decisions are made for signal timing adjustments. These new timings and adjustments are then sent back to the original signal in order to be implemented. These signals simply respond with updated timing after several cycle lengths and are therefore known as "responsive adaptive". Newer technology for the adaptive systems makes decisions based upon data gathered and evaluated every second along that corridor. Signal timing adjustments are made every second on that current signal status. These systems also communicate between signals in order to provide information on future demand to downstream signals. Therefore, a signal takes the information on amount of traffic demand and sends necessary information to signals ahead in the corridor in order to prepare them for upcoming traffic. This system would be referred to as "real-time adaptive".

Changes to ATC systems also come with challenges. According to the U.S. Department of Transportation, "deployment of adaptive signal control systems remains limited in the United States due to agency concerns about cost, installation, and operation requirements; complexity; uncertainty associated with the benefits of these systems; detection requirements; the need for hardware and software upgrades; and the need for additional staff training" (Module 3: Application of ITS to Transportation Management Systems, page 21). All of these concerns bear on the selection and implementation of an ATC system.

Adaptive Traffic Control System Selection

In order to select an ATC system to evaluate locally, a research of available literature was completed. Major research into the field has been completed by Henningson, Dunham and Richardson (HDR) including surveys. An updated Summary and Comparison was completed by HDR in September 2010 which compared several systems including ACS-Lite, InSync, SCATS, SCOOT and Los Angeles ATCS. This survey and report is included in **Appendix A**.

For the initial selection of an ATC system to be evaluated, these reports were examined along with other available literature. Several providers of ATC systems were contacted for additional information and City of San Diego staff was ultimately consulted regarding the selection of a test system. The selection was based on the following criteria including cost, performance, reliability and ease of installation. These criteria are discussed in more detail below.

Cost:

Cost is one of the most important factors when deciding to invest in new technology. According to research including HDR's 2010 study (**Appendix A**), different ATC systems can have significantly different costs. According to HDR, the LA ATCS deployment cost averaged around $78,000 per intersection. This installation included such features as cameras, communication and detection. InSync was found to have a significantly lower cost averaging $25,000-50,000 per intersection depending on the features selected and spare parts inventory needed. **Figure 1** shows a comparison of costs for the InSync system versus the LA ATCS system and other systems. The InSync system showed the lowest average cost per intersection.

Performance:

Performance is also a critical metric to examine when selecting a test system. Although a large part of the evaluation of the test system is a performance evaluation, performance history was used to initially select a system. **Figure 2** compares several systems based on various performance metrics evaluated in the HDR study. Specifically, three performance metrics were noted. First, reduction in travel times are shown with a wide variation in results between the three systems surveyed. Field studies of various systems have shown an improvement in travel times between 6% and 26% depending on technology and time period evaluated. Second, reduction in numbers of stops is shown. Again, there was a wide variation in results with the reduction varying between 15% and 70%. Third, the reduction in delay was evaluated with a variation between 12% and 60% depending on system and time period. Overall, all adaptive systems showed significant improvements. The InSync system seemed to provide the best performance by a wide margin.

Reliability:

Reliability is also a significant consideration in selecting a test system. Without a reliable system, maintenance costs will become significant and system downtime will erode the performance benefits of the system. **Figure 3** shows the hours of maintenance per week and percent of time spent offline for actually deployed systems. As shown, the SCOOT system had the worst reliability and the InSync system showed the best reliability including lowest maintenance.

Other Systems:

Other systems such as the McCain QuicTrac system which were not discussed in the HDR study were also examined. In particular, the QuicTrac system has been implemented in the City of Temecula and City of San Marcos locally. The QuicTrac system is a component of McCain's QuicNet Pro software. This software relies on a central control system. Data is collected by field detectors and fed through the local controllers to the central control computer. This computer then feeds updated traditional timing plans back to the controllers. As a result, the system is entirely dependent on communications to a central computer. This is one of the factors discussed in the HDR survey as being one of the primary concerns in regards to reliability for other systems. Reliance on a central control system has a significant potential to increase downtime of the system with a single point of failure. Additionally, the QuicTrac system relies on detectors already in place which are not optimized for adaptive data needs and do not provide adequate information on queue length and other factors which have the potential to further enhance adaptive operations.

Selection:

A very interesting question was asked in the HDR survey which is informative with regard to ultimate system selection. The question asked was whether survey respondents would install the same system

Figure 3

ATC Reliability

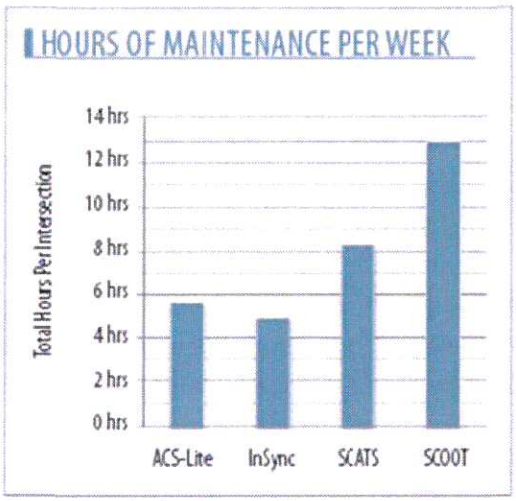
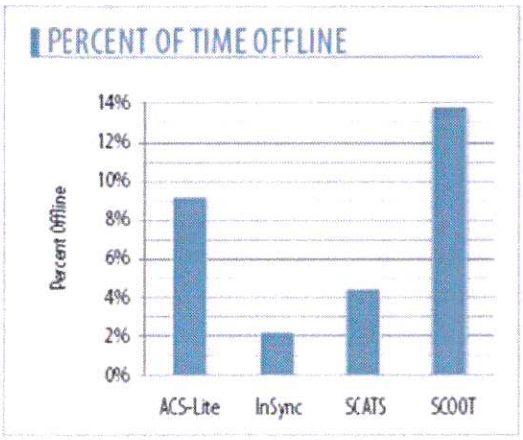


Figure 16: Hours of maintenance per week (per deployed system).



*source – HDR Adaptive Traffic Study 2010

Figure 4

ATC Survey Overview

System	Strengths	Weaknesses
ACS-Lite	**Fastest** installation and fine tuning time of the three systems	High downtime associated with communication
	Second Lowest cost of the three systems	The **Least** operational benefits of the three systems
	Ease of use and configurations	Adaptive software cannot change the cycle length
		Short high volume periods are missed by the system
InSync	**Lowest** cost of the three system	Video detection was commonly noted as a concern
	Lowest overall weekly maintenance of the three systems	Communication was commonly noted as a concern
	Lowest percent offline of three systems	
	Highest operational benefits by a large margin	
SCATS	**Second Highest** operational benefits	**Highest** cost of the three systems
	Second Lowest installation and fine tuning hours per intersection	**Highest** average maintenance per week of the three systems
	Second Lowest percent offline	

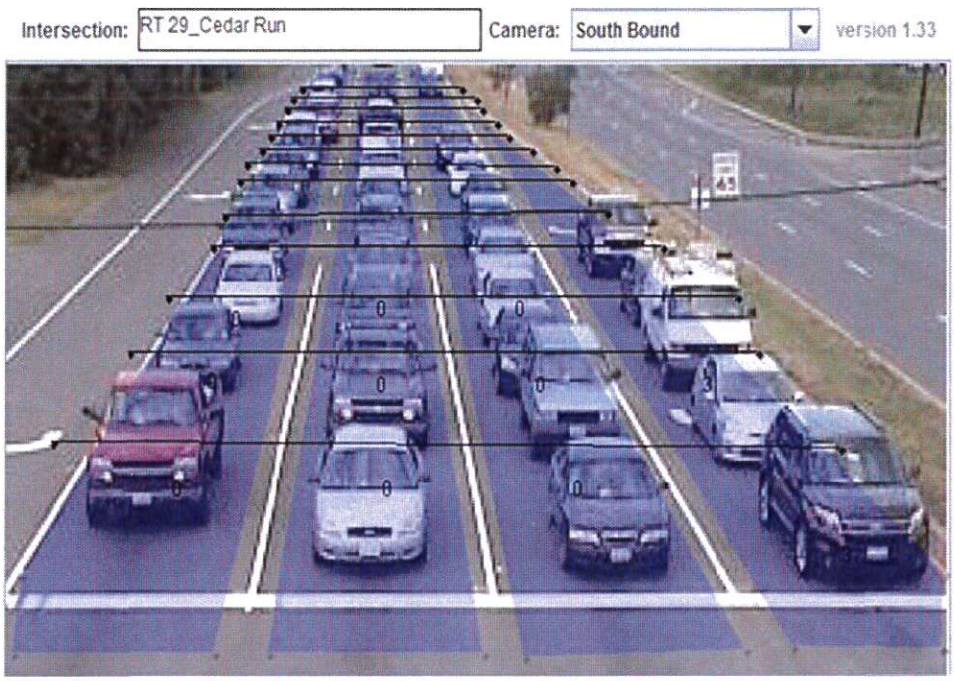
*source – HDR Adaptive Traffic Study 2010

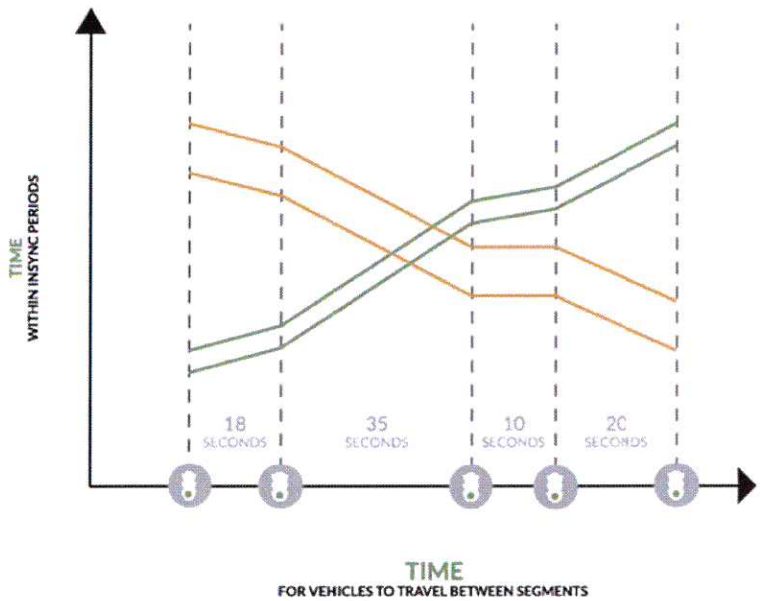
The InSync system operates differently by digitizing traffic signal operations and allowing for real-time adjustments in order to adapt to actual traffic demand rather than historic demand. This eliminates fixed timing plans and allows the system to choose not only the best timing plan but the best sequence in order to serve actual traffic demand. Digital operation allows for greater flexibility and eliminates fixed cycle lengths and fixed timing sequences.

Local Optimization:

Optimization is always a key factor in traffic operations, whether it's local or global optimization. InSync's local optimizer focuses on minimizing summed delay at each individual intersection. This is possible because the system is constantly measuring the volume (number of vehicles) and the delay (time vehicles spend waiting) at each intersection, then making instant decisions about how to best reduce those numbers. InSync uses what they call a greedy algorithm because the finite number of signal states and green time options allow rapid solutions in order to serve real-time traffic demand. Having the inputs of number of vehicles in the queue and their delay, the algorithm considers each possible signalization solution as well as its constraints and objectives as defined by configuration.

In order to keep its math equation accurate and progressing, InSync must count cars quickly and efficiently. This task is taken care of by video detection cameras. Once the cameras are mounted and accessible with a secure Ethernet connection, detection zones are drawn along the contours of each lane and subdivide each detection zone into segments. By counting how many segments have vehicles in them, InSync, will always know, second-by-second, how many vehicles are in each lane and how long they've been waiting there.





*source – rhythmtraffic.com

By anticipating upcoming traffic, InSync is better equipped to prevent speed reductions and allow vehicles to flow more freely which also help save fuel and time.

Part of the global optimization is the system's ability to extend or shorten green tunnels. If there are fewer amounts of traffic approaching an intersection adaptive technology can allow for a shorter amount of green time in order to devote more time to traffic on the side streets. If there are larger amounts of traffic approaching in the corridor, then adaptive technology can increase the green tunnel and prevent congestion at that intersection.

The global optimization also adjusts Period Length. Through the use of traffic responsive technology InSync can adjust the amount of time it takes for one tunnel to go through its cycle to the next time it comes back based on the needs of the surrounding traffic. In other words, the amount of time between green tunnels is optimized in addition to the length of each green tunnel.

Insync Components

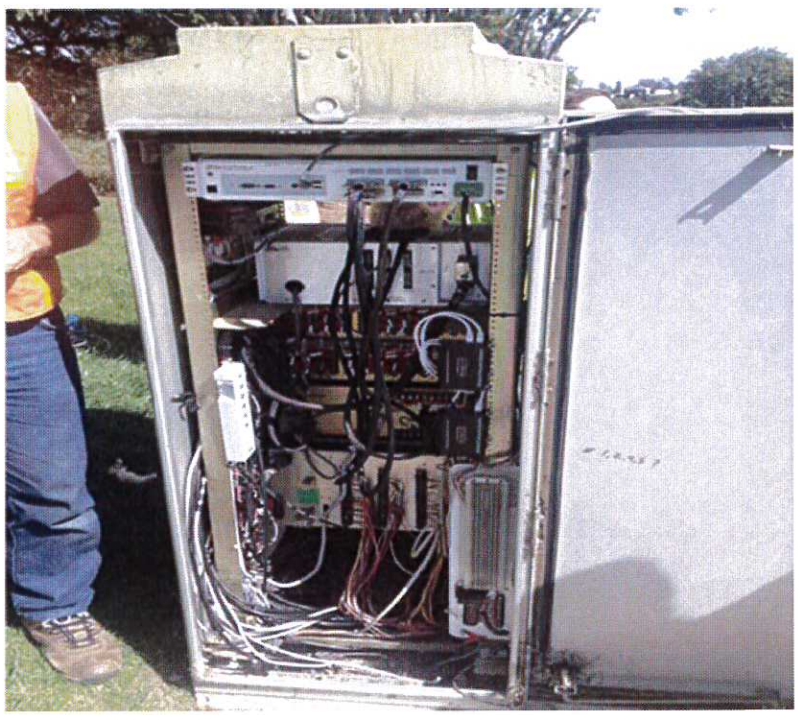
The InSync system is composed of several components. Standard components include an Insync processor, equipment panel, DIN relay and network cameras. Each of these components is nearly universally compatible. InSync produces processors which are compatible with NEMA-style as well as 330s-style controllers. There are a variety of installation options and connection methods. The following diagram shows the overall flow of the InSync architecture. The InSync processor receives inputs from all major types of detection including video, loop and radar. The processer is installed in the

After the existing systems inventory is complete, basic traffic counts were completed and a Synchro model of the corridor was created in order to properly configure the InSync system. Much of this information can be obtained from any recent traffic studies completed in the area. However, for this test system, new counts were obtained. Existing signal timing plans were also obtained to verify existing signal operation.

Next, the parts and testing equipment can be ordered. Rhythm Engineering staff pre-configured and labeled all equipment to be installed in the field. Prior to installation, a representative of Rhythm Engineering was sent to provide deployment training and to do any hands-on troubleshooting of equipment. To ensure seamless operation and redundancy, an additional InSync processor is recommended for every 10 intersections of InSync installation. For the four intersection test system, an extra processor was ordered in order to provide replacement equipment in the City's inventory.

The test system was installed at four intersections on Lusk Boulevard in Mira Mesa. These four intersections were selected in consultation with the City of San Diego. The four intersections are shown in **Figure 5**. The four intersections where the test system was installed include:

- Lusk Boulevard/ Wateridge Circle West
- Lusk Boulevard/Telesis Court
- Lusk Boulevard/ Wateridge Circle East
- Lusk Boulevard/ Pacific Center Boulevard



Installation proceeded with the anticipated level of difficulty. The existing signals had standard loop detection. The InSync-Fusion system was selected for the test system. The Fusion system supplemented the existing detection system with video detection from cameras mounted on the mast arms. This allowed for dual-detection of vehicles and provided the maximum amount of information to the adaptive InSync processor. The video detection also allows for superior remote monitoring and greater operational control through an internet portal called the InSync WebUI. The InSync processor fit in the existing rack with the other controller equipment. The equipment panel was mounted inside on the side of the cabinet. The InSync system interfaced directly with the existing 170E controllers installed at the intersections. The cameras used standard mounts and were mounted in the ordinary manner. Communication was the greatest difficulty. Ultimately, the system was connected through wireless internet technology and a VPN protocol. However, other communication options exist and should be utilized for a more widespread implementation. In particular, a wired connection between signals would be superior.

The Deployment process happened over a 60 day time-period with an additional 30 days of monitoring and fine tuning. Actual installation of the four intersection system happened over a two week period. It is expected that installation time will speed up as installers become familiar with the system. If trenching is necessary to install new conduit due to lack of space, system installation could take longer. It is expected that the InSync system is compatible with nearly all existing signals in the City of San Diego.

Evaluation of Test System

In evaluating the ATC test system, the selection of performance metrics was important. Based on the literature, it was expected that the InSync system would improve travel time and travel speed on the corridor. Additionally, it was expected that the system would decrease fuel consumption, greenhouse gas emissions and the number of stops at intersections. The Lusk Boulevard corridor was selected due to high traffic volumes with highly directional flow. The existing signals operate within capacity but did not function as a coordinated system and were timed independently. Two of the four intersections in the Lusk Boulevard study area, Telesis Court and Pacific Center Boulevard experienced very high turn movements and a significant amount of traffic on at least one of the minor street legs. As a result of these high volumes on turn movements and minor streets, travel time runs were completed not only traveling through the corridor but also to and from minor streets at high volume turn movements.

Methodology:

The test system evaluation focused on the three peak hours with the highest volumes. Each of these peak hours presented a unique challenge for the test system. The peak hours were established based on the existing count data discussed previously. The highest volume hour during the AM, Midday and

Greenhouse gas emissions are another metric which was evaluated. Since the evaluation vehicles varied considerably from the "typical" American vehicle, fuel consumption and greenhouse gas emissions were not measured directly. Instead, a search of U.S. Environmental Protection Agency (EPA) and Federal Highway Administration (FHWA) research and literature was conducted to establish a methodology for estimating fuel consumption and greenhouse gas emissions in the corridor.

For an estimate of greenhouse gas emissions, Carbon Dioxide was used as the primary metric. As discussed by the EPA, carbon dioxide (CO2) is the primary greenhouse gas emitted through human activites". EPA and international research from the Intergovernmental Panel on Climate Change provided a formula for directly converting gasoline consumption to grams of CO2 emitted. Based on this formula and traffic counts obtained as discussed above, an estimate was made of metric tons of CO2 emitted per year for cars traveling through the corridor during the peak hour. The following formula was used for all our calculations of greenhouse gas emissions and was taken from Environmental Protection Agency (EPA).

8,887 grams of CO_2 /gallon of gasoline =8.887 × 10^{-3}

Source:

Federal Register (2010). Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards; Final Rule, page 25,330 (PDF) (407 pp, 5.7MB, About PDF).

Sources:

IPCC (2006). 2006 IPCC Guidelines for National Greenhouse Gas Inventories. Intergovernmental Panel on Climate Change, Geneva, Switzerland

http://www.epa.gov/cleanenergy/energy-resources/refs.html

In order to estimate fuel consumption for the average vehicle traveling in the corridor, FHWA research was consulted. In order to properly estimate fuel consumption, factors such as vehicle miles traveled, signal delay, number of stops and cruise speed need to be taken into account. A commonly used formula developed by FHWA for the TRANSYT 7-F software package was used for this evaluation. The field measurements discussed above were measured and used in the formula to determine average fuel consumption in gallons per trip. The formula can be found below:

F=TotalTravel*k1+TotalDelay*k2+Stops*k3

Where:

K1=.075238-.0015892*Speed+.000015066*Speed^2

K2=.7329

K3=.0000061411*speed^2

Source:

Test System Evaluation Results

As discussed previously, several performance metrics were measured as part of the test system evaluation. These metrics were measured across all three scenarios using identical vehicles and methodology. The field measurement sheets are contained in **Appendix C**. This data was averaged and the results are presented in **Tables 1** thru **3**.

Overall, the data shows significant improvement across the three scenarios with up to a 70% reduction in the number of stops and up to a 24% reduction in travel time through the corridor. This is consistent with the results from the HDR study and showed the anticipated level of improvement. As expected, the Coordinated system also showed an improvement in travel time through the corridor and reduction in the number of stops. However, the benefits from coordination were offset by a corresponding increase in delay on minor-street delay as shown in the data sheets in **Appendix C**. This increase in minor-street delay was alleviated somewhat by the installation of the adaptive system so that the overall intersection delay was significantly improved. The following charts show the results for selected performance metrics.

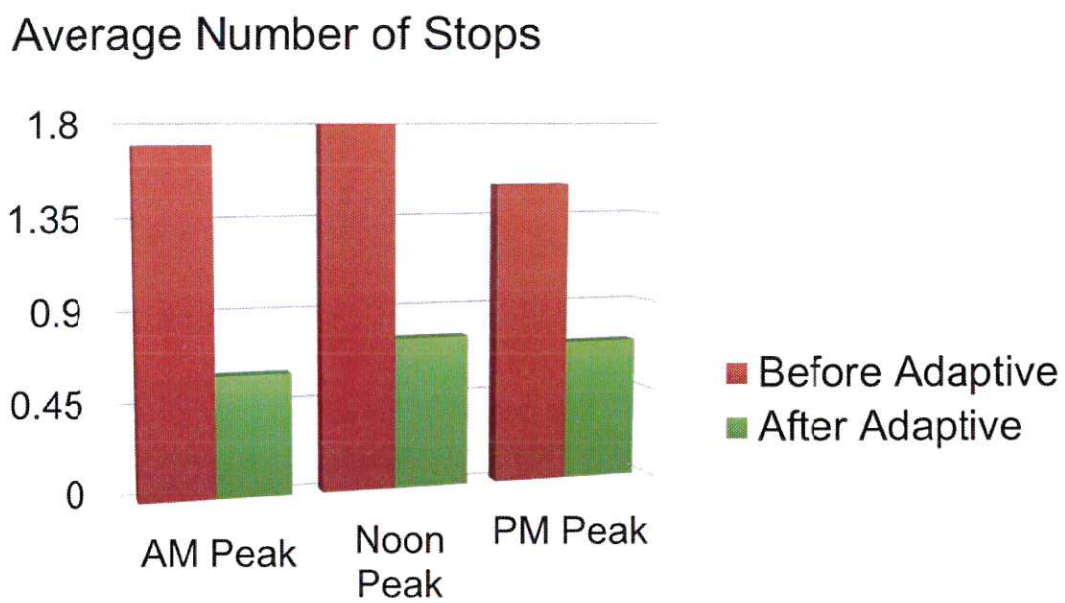


Table 1

LUSK BLVD - ADAPTIVE TRAFFIC CONTROL
Sumary Sheet

AM PEAK HOUR

AM Peak Hour- Eastbound				
Performance Metric	Before Adaptive	Coordinated	After Adaptive	Comparison*
Average number of stops	1.7	1	0.7	58.82%
Maximum time thru corridor	0:02:47	0:02:41	0:02:09	22.75%
Minimum time thru corridor	0:01:28	0:01:27	0:01:22	6.82%
Number of runs with zero stops	1	3	5	500%
Average Travel Time thru corridor	0:01:51	0:02:04	0:01:38	11.61%
Average Travel Speed thru corridor	33.4	33.9	37.6	11.17%
Gas Consumption (Gal./Trip)	0.0616	0.0520	0.0459	25.49%
CO2 Emissions (Metric Tons/Year)	201.13	169.81	149.75	25.55%
AM Peak Hour- Westbound				
Performance Metric	Before Adaptive	Coordinated	After Adaptive	Comparison*
Average number of stops	1.7	1.5	0.5	70.59%
Maximum time thru corridor	0:02:43	0:03:08	0:02:18	15.34%
Minimum time thru corridor	0:01:41	0:01:27	0:01:24	16.83%
Number of runs with zero stops	0	1	5	>500%
Average Travel Time thru corridor	0:02:09	0:02:17	0:01:38	23.99%
Average Travel Speed thru corridor	29.4	27.2	38.7	24.03%
Gas Consumption (Gal./Trip)	0.0663	0.0670	0.0440	33.63%
CO2 Emissions (Metric Tons/Year)	66.96	67.64	45.09	32.66%
AM Peak Hour- Average				
Performance Metric	Before Adaptive	Coordinated	After Adaptive	Comparison*
Average number of stops	1.7	1.25	0.6	64.71%
Maximum time thru corridor	0:02:45	0:02:54	0:02:13	19.09%
Minimum time thru corridor	0:01:35	0:01:27	0:01:23	12.17%
Number of runs with zero stops	0.5	2	5	>500%
Average Travel Time thru corridor	0:02:00	0:02:10	0:01:38	18.27%
Average Travel Speed thru corridor	31.4	30.6	38.2	17.69%
Gas Consumption (Gal./Trip)	0.0640	0.0595	0.0450	29.71%
CO2 Emissions (Metric Tons/Year)	134.05	118.73	97.42	27.32%

*Comparison of conditions After Adaptive to Before Adaptive.

Table 3

LUSK BLVD - ADAPTIVE TRAFFIC CONTROL
Sumary Sheet

PM PEAK HOUR

PM Peak Hour- Eastbound				
Performance Metric	Before Adaptive	Coordinated	After Adaptive	Comparison*
Average number of stops	1.5	1	1	33.33%
Maximum time thru corridor	0:02:41	0:02:41	0:02:16	15.53%
Minimum time thru corridor	0:01:44	0:01:27	0:01:33	10.58%
Number of runs with zero stops	0	3	3	300%
Average Travel Time thru corridor	0:02:08	0:02:04	0:01:54	10.94%
Average Travel Speed thru corridor	28.1	33.9	31.6	11.08%
Gas Consumption (Gal./Trip)	0.0624	0.0409	0.0527	15.54%
CO2 Emissions (Metric Tons/Year)	32.59	21.38	27.53	15.53%
PM Peak Hour- Westbound				
Performance Metric	Before Adaptive	Coordinated	After Adaptive	Comparison*
Average number of stops	1.5	1.5	0.4	73.33%
Maximum time thru corridor	0:02:43	0:03:08	0:02:08	21.47%
Minimum time thru corridor	0:01:41	0:01:27	0:01:22	18.81%
Number of runs with zero stops	0	1	6	>500%
Average Travel Time thru corridor	0:02:08	0:02:17	0:01:38	23.44%
Average Travel Speed thru corridor	29.0	27.2	37.8	23.28%
Gas Consumption (Gal./Trip)	0.0634	0.0554	0.0426	32.81%
CO2 Emissions (Metric Tons/Year)	106.77	93.12	72.92	31.70%
PM Peak Hour- Average				
Performance Metric	Before Adaptive	Coordinated	After Adaptive	Comparison*
Average number of stops	1.5	1.25	0.7	53.33%
Maximum time thru corridor	0:02:42	0:02:54	0:02:12	18.52%
Minimum time thru corridor	0:01:42	0:01:27	0:01:27	14.63%
Number of runs with zero stops	0	2	4.5	>450%
Average Travel Time thru corridor	0:02:08	0:02:10	0:01:46	17.19%
Average Travel Speed thru corridor	28.6	30.6	34.7	17.72%
Gas Consumption (Gal./Trip)	0.0629	0.0482	0.0477	24.24%
CO2 Emissions (Metric Tons/Year)	69.68	57.25	50.23	27.92%

*Comparison of conditions After Adaptive to Before Adaptive.

Priority Development Project
Storm Water Quality Management Plan
FOR
Jefferson Pacific Beach

PTS No. 327976, I.O. No. 24003849

July 15, 2016

Prepared By:
LEPPERT ENGINEERING CORPORATION
5190 GOVERNOR DRIVE, SUITE 205
SAN DIEGO, CA 92122
Job No. PB 39.01-22.15

Prepared For:
JPI Real Estate Acquisitions, LLC
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12250 El Camino Real, S-380
San Diego, CA 92130
Justin.Craig@JPI.com

_____
By: John D. Leppert, RCE 26283
Exp. 3/31/18

_____
Date

_____
Approved by: City of San Diego Date

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ACRONYMS

APN	Assessor's Parcel Number
ASBS	Area of Special Biological Significance
BMP	Best Management Practice
CEQA	California Environmental Quality Act
CGP	Construction General Permit
DCV	Design Capture Volume
DMA	Drainage Management Areas
ESA	Environmentally Sensitive Area
GLU	Geomorphic Landscape Unit
GW	Ground Water
HMP	Hydromodification Management Plan
HSG	Hydrologic Soil Group
HU	Harvest and Use
INF	Infiltration
LID	Low Impact Development
LUP	Linear Underground/Overhead Projects
MS4	Municipal Separate Storm Sewer System
N/A	Not Applicable
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
PDP	Priority Development Project
PE	Professional Engineer
POC	Pollutant of Concern
SC	Source Control
SD	Site Design
SDRWQCB	San Diego Regional Water Quality Control Board
SIC	Standard Industrial Classification
SWPPP	Stormwater Pollutant Protection Plan
SWQMP	Storm Water Quality Management Plan
TMDL	Total Maximum Daily Load
WMAA	Watershed Management Area Analysis
WPCP	Water Pollution Control Program
WQIP	Water Quality Improvement Plan

CERTIFICATION PAGE

Jefferson Pacific Beach
327976

I hereby declare that I am the Engineer in Responsible Charge of design of storm water BMPs for this project, and that I have exercised responsible charge over the design of the project as defined in Section 6703 of the Business and Professions Code, and that the design is consistent with the requirements of the BMP Design Manual, which is based on the requirements of SDRWQCB Order No. R9-2013-0001 as amended by R9-2015-0001 and R9-2015-0100 (MS4 Permit), and subsequent amendments.

I have read and understand that the City Engineer has adopted minimum requirements for managing urban runoff, including storm water, from land development activities, as described in the Storm Water Standards. I certify that this PDP SWQMP has been completed to the best of my ability and accurately reflects the project being proposed and the applicable source control and site design BMPs proposed to minimize the potentially negative impacts of this project's land development activities on water quality. I understand and acknowledge that the plan check review of this PDP SWQMP by the City Engineer is confined to a review and does not relieve me, as the Engineer in Responsible Charge of design of storm water BMPs for this project, of my responsibilities for project design.

_____ _____

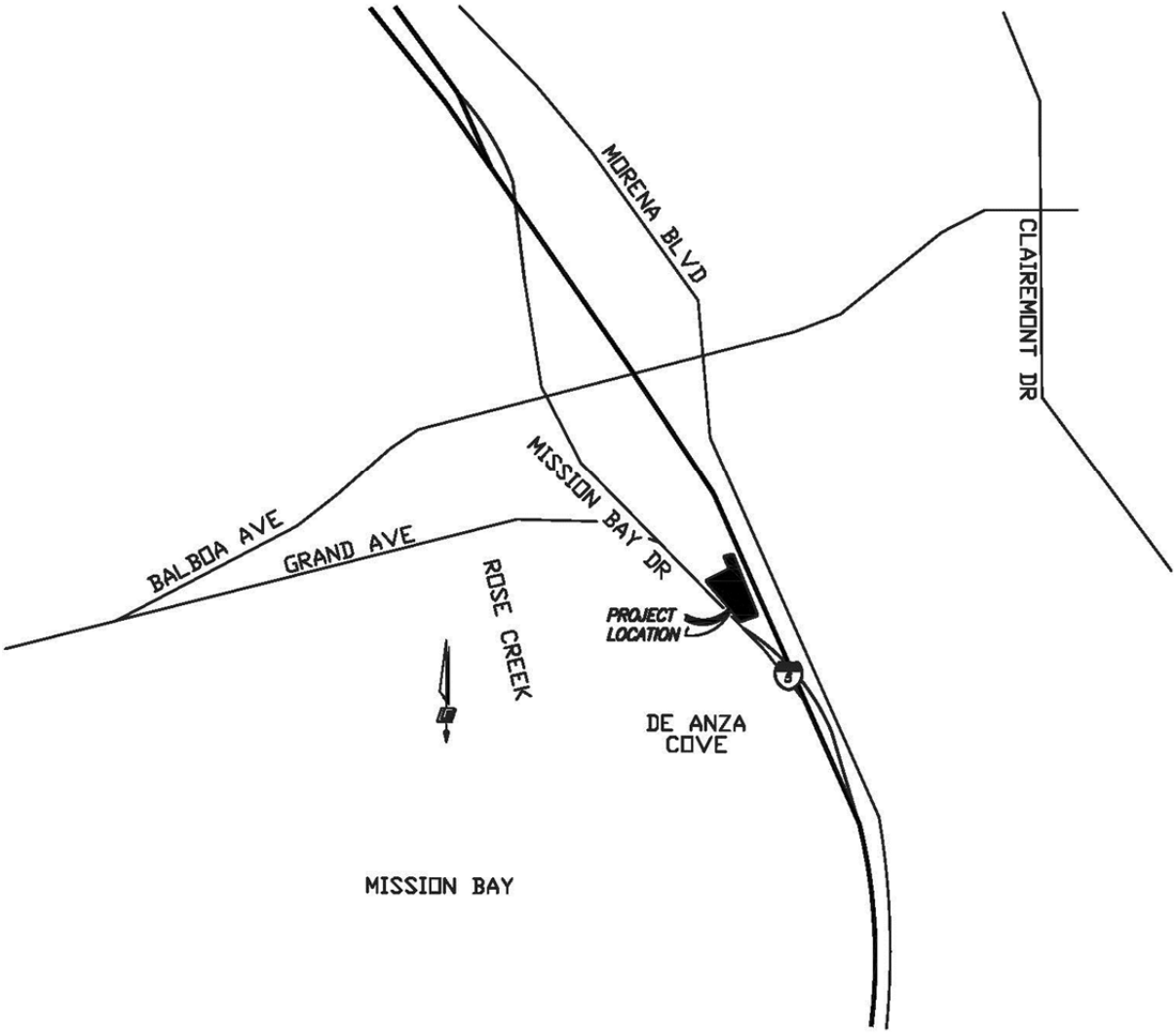
JOHN D. LEPPERT DATE
REGISTERED CIVIL ENGINEER – 26283
Exp. 3/31/18

Use this Table to keep a record of submittals of this SWQMP. Each time the SWQMP is re-submitted, provide the date and status of the project. In last column indicate changes that have been made or indicate if response to plan check comments is included. When applicable, insert response to plan check comments behind this page.

Submittal Number	Date	Project Status	Changes
1		☒ Preliminary Design/ Planning/ CEQA ☐ Final Design	Initial Submittal
2		☒ Preliminary Design/ Planning/ CEQA ☐ Final Design	Incorporate Infiltration Testing
3		☐ Preliminary Design/ Planning/ CEQA ☐ Final Design	
4		☐ Preliminary Design/ Planning/ CEQA ☐ Final Design	

Project Vicinity Map

Jefferson Pacific Beach
327976



THE CITY OF SAN DIEGO
City of San Diego
Development Services
1222 First Ave., MS-302
San Diego, CA 92101
(619) 446-5000

Storm Water Requirements Applicability Checklist

FORM DS-560
FEBRUARY 2016

Project Address: 4275 Mission Bay Drive, San Diego, CA 92109	Project Number *(for City Use Only)*: 327976

SECTION 1. Construction Storm Water BMP Requirements:

All construction sites are required to implement construction BMPs in accordance with the performance standards in the Storm Water Standards Manual. Some sites are additionally required to obtain coverage under the State Construction General Permit (CGP)[1], which is administered by the State Water Resources Control Board.

For all project complete PART A: If project is required to submit a SWPPP or WPCP, continue to PART B.

PART A: Determine Construction Phase Storm Water Requirements.

1. Is the project subject to California's statewide General NPDES permit for Storm Water Discharges Associated with Construction Activities, also known as the State Construction General Permit (CGP)? (Typically projects with land disturbance greater than or equal to 1 acre.)

   ☒ Yes; SWPPP required, skip questions 2-4 ☐ No; next question

2. Does the project propose construction or demolition activity, including but not limited to, clearing, grading, grubbing, excavation, or any other activity that results in ground disturbance and contact with storm water runoff?

   ☐ Yes; WPCP required, skip 3-4 ☐ No; next question

3. Does the project propose routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of the facility? (Projects such as pipeline/utility replacement)

   ☐ Yes; WPCP required, skip 4 ☐ No; next question

4. Does the project only include the following Permit types listed below?
   - Electrical Permit, Fire Alarm Permit, Fire Sprinkler Permit, Plumbing Permit, Sign Permit, Mechanical Permit, Spa Permit.
   - Individual Right of Way Permits that exclusively include only ONE of the following activities: water service, sewer lateral, or utility service.
   - Right of Way Permits with a project footprint less than 150 linear feet that exclusively include only ONE of the following activities: curb ramp, sidewalk and driveway apron replacement, pot holing, curb and gutter replacement, and retaining wall encroachments.

   ☐ Yes; no document required

   Check one of the boxes to the right, and continue to PART B:

   ☒ If you checked "Yes" for question 1, **a SWPPP is REQUIRED. Continue to PART B**

   ☐ If you checked "No" for question 1, and checked "Yes" for question 2 or 3, **a WPCP is REQUIRED.** If the project proposes less than 5,000 square feet of ground disturbance AND has less than a 5-foot elevation change over the entire project area, a Minor WPCP may be required instead. **Continue to PART B.**

   ☐ If you checked "No" for all questions 1-3, and checked "Yes" for question 4 PART B **does not apply and no document is required. Continue to Section 2.**

1. More information on the City's construction BMP requirements as well as CGP requirements can be found at: www.sandiego.gov/stormwater/regulations/index.shtml

PART B: Determine Construction Site Priorit

This prioritization must be completed within this form, noted on the plans, and included in the SWPPP or WPCP. The city reserves the right to adjust the priority of projects both before and after construction. Construction projects are assigned an inspection frequency based on if the project has a "high threat to water quality." The City has aligned the local definition of "high threat to water quality" to the risk determination approach of the State Construction General Permit (CGP). The CGP determines risk level based on project specific sediment risk and receiving water risk. Additional inspection is required for projects within the Areas of Special Biological Significance (ASBS) watershed. **NOTE:** The construction priority does **NOT** change construction BMP requirements that apply to projects; rather, it determines the frequency of inspections that will be conducted by city staff.

Complete PART B and continued to Section 2

1. ☐ **ASBS**
   a. Projects located in the ASBS watershed.

2. ☐ **High Priority**
   a. Projects 1 acre or more determined to be Risk Level 2 or Risk Level 3 per the Construction General Permit and not located in the ASBS watershed.
   b. Projects 1 acre or more determined to be LUP Type 2 or LUP Type 3 per the Construction General Permit and not located in the ASBS watershed.

3. ☒ **Medium Priority**
   a. Projects 1 acre or more but not subject to an ASBS or high priority designation.
   b. Projects determined to be Risk Level 1 or LUP Type 1 per the Construction General Permit and not located in the ASBS watershed.

4. ☐ **Low Priority**
   a. Projects requiring a Water Pollution Control Plan but not subject to ASBS, high, or medium priority designation.

SECTION 2. Permanent Storm Water BMP Requirements.

Additional information for determining the requirements is found in the Storm Water Standards Manual.

PART C: Determine if Not Subject to Permanent Storm Water Requirements.

Projects that are considered maintenance, or otherwise not categorized as "new development projects" or "redevelopment projects" according to the Storm Water Standards Manual are not subject to Permanent Storm Water BMPs.

If "yes" is checked for any number in Part C, proceed to Part F and check "Not Subject to Permanent Storm Water BMP Requirements".

If "no" is checked for all of the numbers in Part C continue to Part D.

1.	Does the project only include interior remodels and/or is the project entirely within an existing enclosed structure and does not have the potential to contact storm water?	☐ Yes ☒ No
2.	Does the project only include the construction of overhead or underground utilities without creating new impervious surfaces?	☐ Yes ☒ No
3.	Does the project fall under routine maintenance? Examples include, but are not limited to: roof or exterior structure surface replacement, resurfacing or reconfiguring surface parking lots or existing roadways without expanding the impervious footprint, and routine replacement of damaged pavement (grinding, overlay, and pothole repair).	☐ Yes ☒ No

PART D: PDP Exempt Requirements.

PDP Exempt projects are required to implement site design and source control BMPs.

If "yes" was checked for any questions in Part D, continue to Part F and check the box labeled "PDP Exempt."

If "no" was checked for all questions in Part D, continue to Part E.

1. Does the project ONLY include new or retrofit sidewalks, bicycle lanes, or trails that:
   - Are designed and constructed to direct storm water runoff to adjacent vegetated areas, or other non-erodible permeable areas? Or;
   - Are designed and constructed to be hydraulically disconnected from paved streets and roads? Or;
   - Are designed and constructed with permeable pavements or surfaces in accordance with the Green Streets guidance in the City's Storm Water Standards manual?

   ☐ Yes; PDP exempt requirements apply ☒ No; next question

2. Does the project ONLY include retrofitting or redeveloping existing paved alleys, streets or roads designed and constructed in accordance with the Green Streets guidance in the City's Storm Water Standards Manual?

   ☐ Yes; PDP exempt requirements apply ☒ No; project not exempt. PDP requirements apply

PART E: Determine if Project is a Priority Development Project (PDP).
Projects that match one of the definitions below are subject to additional requirements including preparation of a Storm Water Quality Management Plan (SWQMP).

If "yes" is checked for any number in PART E, continue to PART F.

If "no" is checked for every number in PART E, continue to PART F and check the box labeled "Standard Development Project".

1.	**New Development that creates 10,000 square feet or more of impervious surfaces collectively over the project site.** This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land.	☒ Yes	☐ No
2.	**Redevelopment project that creates and/or replaces 5,000 square feet or more of impervious surfaces on an existing site of 10,000 square feet or more of impervious surfaces.** This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land.	☒ Yes	☐ No
3.	**New development or redevelopment of a restaurant.** Facilities that sell prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (SIC 5812), and where the land development creates and/or replace 5,000 square feet or more of impervious surface.	☐ Yes	☒ No
4.	**New development or redevelopment on a hillside.** The project creates and/or replaces 5,000 square feet or more of impervious surface (collectively over the project site) and where the development will grade on any natural slope that is twenty-five percent or greater.	☐ Yes	☒ No
5.	**New development or redevelopment of a parking lot that creates and/or replaces 5,000 square feet or more of impervious surface (collectively over the project site).**	☒ Yes	☐ No
6.	**New development or redevelopment of streets, roads, highways, freeways, and driveways.** The project creates and/or replaces 5,000 square feet or more of impervious surface (collectively over the project site).	☐ Yes	☒ No

7. **New development or redevelopment discharging directly to an Environmentally Sensitive Area.** The project creates and/or replaces 2,500 square feet of impervious surface (collectively over project site), and discharges directly to an Environmentally Sensitive Area (ESA). "Discharging directly to" includes flow that is conveyed overland a distance of 200 feet or less from the project to the ESA, or conveyed in a pipe or open channel any distance as an isolated flow from the project to the ESA (i.e. not commingled with flows from adjacent lands). ☐ Yes ☒ No

8. **New development or redevelopment projects of a retail gasoline outlet (RGO) that create and/or replaces 5,000 square feet of impervious surface.** The development project meets the following criteria: (a) 5,000 square feet or more or (b) has a projected Average Daily Traffic (ADT) of 100 or more vehicles per day. ☐ Yes ☒ No

9. **New development or redevelopment projects of an automotive repair shops that creates and/or replaces 5,000 square feet or more of impervious surfaces.** Development projects categorized in any one of Standard Industrial Classification (SIC) codes 5013, 5014, 5541, 7532-7534, or 7536-7539. ☐ Yes ☒ No

10. **Other Pollutant Generating Project.** The project is not covered in the categories above, results in the disturbance of one or more acres of land and is expected to generate pollutants post construction, such as fertilizers and pesticides. This does not include projects creating less than 5,000 sf of impervious surface and where added landscaping does not require regular use of pesticides and fertilizers, such as slope stabilization using native plants. Calculation of the square footage of impervious surface need not include linear pathways that are for infrequent vehicle use, such as emergency maintenance access or bicycle pedestrian use, if they are built with pervious surfaces of if they sheet flow to surrounding pervious surfaces. ☐ Yes ☒ No

PART F: Select the appropriate category based on the outcomes of PART C through PART E.

1. The project is **NOT SUBJECT TO STORM WATER REQUIREMENTS**. ☐
2. The project is a **STANDARD DEVELOPMENT PROJECT**. Site design and source control BMP requirements apply. See the Storm Water Standards Manual for guidance. ☐
3. The project is **PDP EXEMPT**. Site design and source control BMP requirements apply. See the Storm Water Standards Manual for guidance. ☐
4. The project is a **PRIORITY DEVELOPMENT PROJECT**. Site design, source control, and structural pollutant control BMP requirements apply. See the Storm Water Standards Manual for guidance on determining if project requires a hydromodification plan management ☒

Name of Owner or Agent *(Please Print)*: Matt DeVincenzo

Title: Agent for Owner

Signature:

Date: 02/19/2016

Form I-1: Applicability of Permanent, Post-Construction Storm Water BMP Requirements (Storm Water Intake Form for all Development Permit Applications)	Form I-1:

Project Identification

Project Name: Jefferson Pacific Beach	
Permit Application Number: 327976	Date: July 15, 2016

Determination of Requirements

The purpose of this form is to identify permanent, post-construction requirements that apply to the project. This form serves as a short summary of applicable requirements, in some cases referencing separate forms that will serve as the backup for the determination of requirements.

Answer each step below, starting with Step 1 and progressing through each step until reaching "Stop". Refer to BMP Design Manual sections and/or separate forms referenced in each step below.

Step	Answer	Progression
Step 1: Is the project a "development project"? See Section 1.3 of the BMP Design Manual for guidance.	☒ Yes	Go to Step 2.
	☐ No	Stop. Permanent BMP requirements do not apply. No SWQMP will be required. Provide discussion below.
Discussion / justification if the project is not a "development project" (e.g., the project includes only interior remodels within an existing building):		
Step 2: Is the project a Standard Project, Priority Development Project (PDP), or exception to PDP definitions? To answer this item, see Section 1.4 of the BMP Design Manual in its entirety for guidance, AND complete Storm Water Requirements Applicability Checklist.	☐ Standard Project	Stop. Standard Project requirements apply.
	☒ PDP	PDP requirements apply, including PDP SWQMP. Go to Step 3.
	☐ Exception to PDP definitions	Stop. Standard Project requirements apply. Provide discussion and list any additional requirements below.
Discussion / justification, and additional requirements for exceptions to PDP definitions, if applicable:		

Form I-1 Page 2		
Step	**Answer**	**Progression**
Step 3. Is the project subject to earlier PDP requirements due to a prior lawful approval? See Section 1.10 of the BMP Design Manual for guidance.	☐ Yes	Consult the City Engineer to determine requirements. Provide discussion and identify requirements below. Go to Step 4.
	☒ No	BMP Design Manual PDP requirements apply. Go to Step 4.
Discussion / justification of prior lawful approval, and identify requirements (not required if prior lawful approval does not apply):		
Step 4. Do hydromodification control requirements apply? See Section 1.6 of the BMP Design Manual for guidance.	☐ Yes	PDP structural BMPs required for pollutant control (Chapter 5) and hydromodification control (Chapter 6). Go to Step 5.
	☒ No	Stop. PDP structural BMPs required for pollutant control (Chapter 5) only. Provide brief discussion of exemption to hydromodification control below.
Discussion / justification if hydromodification control requirements do not apply: Runoff from the proposed development will discharge to an existing 60" storm drain per Dwg. No. 24034-D and Dwg. No. 1964-D. Dwg. No. 1964-D shows the 60" storm drain discharging directly to Mission Bay at an elevation of 4.05' (U.S.C. & G) or 3.38' (NAVD 88). The May 16, 2012 FEMA FIRM map shows Mission Bay as having a base flood elevation of 6.0' (NAVD 88), therefore, the discharge elevation of the 60" drain is below the 100 yr. floodplain elevation. The peak design flow of the 60" storm drain at a grade of 0.16% is 112 c.f.s. The peak discharge velocity has been calculated to be 5.89 ft/sec. Per City of San Diego Standard Drawing No. SDD-104, no energy dissipator is required (discharge velocity less than 6.0 ft/sec.). Per Node 3 of Figure 1-2 of the current Storm Water Standards, the project is exempt from hydromodification management requirements.		
Step 5. Does protection of critical coarse sediment yield areas apply? See Section 6.2 of the BMP Design Manual for guidance.	☐ Yes	Management measures required for protection of critical coarse sediment yield areas (Chapter 6.2). Stop.
	☐ No	Management measures not required for protection of critical coarse sediment yield areas. Provide brief discussion below. Stop.
Discussion / justification if protection of critical coarse sediment yield areas does not apply:		

Site Information Checklist For PDPs	Form I-3B
Project Summary Information	
Project Name	Jefferson Pacific Beach
Project Address	4275 Mission Bay Drive San Diego, CA 92109
Assessor's Parcel Number(s) (APN(s))	424-362-24 424-380-06 424-380-07
Permit Application Number	327976
Project Watershed	Select One: ☐ San Dieguito River ☐ Penasquitos ☒ Mission Bay ☐ San Diego River ☐ San Diego Bay ☐ Tijuana River
Hydrologic subarea name with Numeric Identifier up to two decimal places (9XX.XX)	Miramar-906.40
Parcel Area (total area of Assessor's Parcel(s) associated with the project)	2.94 Acres (128,241 Square Feet)
Area to be disturbed by the project (Project Area)	2.94 Acres (128,241 Square Feet)
Project Proposed Impervious Area (subset of Project Area)	2.61 Acres (113,653 Square Feet)
Project Proposed Pervious Area (subset of Project Area)	0.33 Acres (14,588 Square Feet)
Note: Proposed Impervious Area + Proposed Pervious Area = Area to be Disturbed by the Project. This may be less than the Parcel Area.	
The proposed increase or decrease in impervious area in the proposed condition as compared to the pre-project condition.	8.0% Decreased Imperviousness

Form I-3B Page 2 of 11

Description of Existing Site Condition and Drainage Patterns

Current Status of the Site (select all that apply):

- ☒ Existing development
- ☐ Previously graded but not built out
- ☐ Agricultural or other non-impervious use
- ☐ Vacant, undeveloped/natural

Description / Additional Information:

The project site is currently a previously developed car dealership with associated buildings, service bays and parking lots.

Existing Land Cover Includes (select all that apply):

- ☐ Vegetative Cover
- ☐ Non-Vegetated Pervious Areas
- ☒ Impervious Areas

Description / Additional Information
The project site cover is primarily composed of the car dealership associated buildings, service bays and parking lots, with minimal on-site landscaping.

Underlying Soil belongs to Hydrologic Soil Group (select all that apply):

- ☐ NRCS Type A
- ☐ NRCS Type B
- ☐ NRCS Type C
- ☒ NRCS Type D

Approximate Depth to Groundwater (GW):

- ☐ GW Depth < 5 feet
- ☒ 5 feet < GW Depth < 10 feet
- ☒ 10 feet < GW Depth < 20 feet
- ☐ GW Depth > 20 feet

Existing Natural Hydrologic Features (select all that apply):

- ☐ Watercourses
- ☐ Seeps
- ☐ Springs
- ☐ Wetlands
- ☒ None

Description / Additional Information:

Form I-3B Page 3 of 11

Description of Existing Site Topography and Drainage:

How is storm water runoff conveyed from the site? At a minimum, this description should answer:

1. Whether existing drainage conveyance is natural or urban;
2. If runoff from offsite is conveyed through the site? If yes, quantification of all offsite drainage areas, design flows, and locations where offsite flows enter the project site and summarize how such flows are conveyed through the site;
3. Provide details regarding existing project site drainage conveyance network, including storm drains, concrete channels, swales, detention facilities, storm water treatment facilities, and natural and constructed channels;
4. Identify all discharge locations from the existing project along with a summary of the conveyance system size and capacity for each of the discharge locations. Provide summary of the pre-project drainage areas and design flows to each of the existing runoff discharge locations.

Description / Additional Information:

Sub-basin A:
This area is an onsite basin consisting of a paved storage lot and a small offsite fill slope along the Caltrans right of way. Drainage from this basin surface flows via gutter to the existing curb inlet located at the north west corner of the project site.

Sub-basin B:
This area is a basin consisting of the landscaped area onsite fronting Rosewood Street and a half width of Rosewood Street itself. Drainage from this basin surface flows via gutter to the existing curb inlet located at the north west corner of the project site.

Sub-basin C:
This area is an onsite basin consisting of a paved storage lot and a portion of the onsite buildings. Drainage from this basin surface flows to an existing onsite grate inlet connected to an existing 54" RCP located in Rosewood Street.

Sub-basin D:
This area is an onsite basin consisting of a paved parking lot and a portion of the onsite buildings. Drainage from this basin surface flows via gutter where it joins the flows from basin F on the south east corner of the project site adjacent to the I-5 off-ramp.

Sub-basin E:
This area is an offsite basin consisting of Mission Bay Dr between the project site and the I-5 off ramp. Drainage from this basin surface flows to the gutter where along the south east corner of the project site.

Sub-basin F:
This area is an onsite basin consisting of a paved parking lot and the remaining portion of the onsite building. Drainage from this basin surface flows off the parking lot edge and down the existing slope before entering the gutter the south east corner of the project site adjacent to the I-5 off-ramp.

Attachment 5 contains drainage calculations and basin maps for the site.

Form I-3B Page 4 of 11
Description of Proposed Site Development and Drainage Patterns
Project Description / Proposed Land Use and/or Activities: The project proposes a two level subterranean parking structure with a total of 365 covered spaces provided. Along with three two-story commercial retail buildings totaling 19,000 s.f. and four four-story residential multifamily buildings constructed on the garage podium. An additional building containing 3 townhome units is provided on the northeast corner of the project which provides a total of 171 multifamily units.
List/describe proposed impervious features of the project (e.g., buildings, roadways, parking lots, courtyards, athletic courts, other impervious features): The project proposes three two-story commercial retail buildings totaling 19,000 s.f. and four four-story residential multifamily buildings constructed on the garage podium. An additional building containing 3 townhome units is provided on the northeast corner of the project. All on-site parking is subterranean or garaged parking spaces.
List/describe proposed pervious features of the project (e.g., landscape areas): Project frontage and ROW areas adjacent to the project consist of landscaping. Onsite pervious areas are primarily over garage podium and consist of raised planters, with some of these planters being bio-filtration BMPs.
Does the project include grading and changes to site topography? ☒ Yes ☐ No Description / Additional Information: The majority of the site will be excavated to a depth of ~10-15' for the construction of the subterranean parking structure.

Form I-3B Page 5 of 11

Does the project include changes to site drainage (e.g., installation of new storm water conveyance systems)?

☒ Yes

☐ No

If yes, provide details regarding the proposed project site drainage conveyance network, including storm drains, concrete channels, swales, detention facilities, storm water treatment facilities, natural and constructed channels, and the method for conveying offsite flows through or around the proposed project site. Identify all discharge locations from the proposed project site along with a summary of the conveyance system size and capacity for each of the discharge locations. Provide a summary of pre and post-project drainage areas and design flows to each of the runoff discharge locations. Reference the drainage study for detailed calculations.

Description / Additional Information:

The proposed project will plumb all of the onsite Partial Retention and Bio-Filtration BMP sub-drains through the garage and to a private cleanout located adjacent to Mission Bay Drive. An 18" RCP pipe will be constructed from the proposed private cleanout to the existing 60" RCP on the South side of Mission Bay Drive. From there it continues through the existing 60" piping to Mission Bay where it is discharged.

Form I-3B Page 6 of 11

Identify whether any of the following features, activities, and/or pollutant source areas will be present (select all that apply):

- ☒ On-site storm drain inlets
- ☒ Interior floor drains and elevator shaft sump pumps
- ☒ Interior parking garages
- ☐ Need for future indoor & structural pest control
- ☒ Landscape/Outdoor Pesticide Use
- ☒ Pools, spas, ponds, decorative fountains, and other water features
- ☐ Food service
- ☒ Refuse areas
- ☐ Industrial processes
- ☐ Outdoor storage of equipment or materials
- ☐ Vehicle and Equipment Cleaning
- ☐ Vehicle/Equipment Repair and Maintenance
- ☐ Fuel Dispensing Areas
- ☒ Loading Docks
- ☒ Fire Sprinkler Test Water
- ☐ Miscellaneous Drain or Wash Water
- ☐ Plazas, sidewalks, and parking lots
- ☐ Large Trash Generating Facilities
- ☐ Animal Facilities
- ☐ Plant Nurseries and Garden Centers
- ☐ Automotive-related Uses

Description / Additional Information:

Onsite storm drain inlets

- The proposed development will utilize onsite inlets will be stamped/marked with "No dumping! Flows to Bay." or similar.

Interior floor drains and elevator shaft pumps

- The proposed development will utilize interior floor drains and elevator shaft pumps that will be plumbed to sanitary sewer.

Interior parking garage

- The proposed development will utilize interior parking garage drains that will be plumbed to sanitary sewer.

Landscape/Outdoor Pesticide use

- The proposed development will utilize pest resistant and drought tolerant plant species selected for the site's soil/climate.
- Designing Irrigation Systems for individual area requirements to minimize runoff.
- Utilize rain shutoff devices.

Pool, spas, ponds, decorative fountains, and other water features

- Pool overflow will be plumbed to the sanitary sewer according to local requirements.

Refuse areas

- All refuse areas provided on-site are enclosed within the subterranean garage.

Loading dock

- The proposed loading dock will be covered and loading dock drain will be plumbed to the sanitary sewer.

Fire sprinkler test water

- The proposed development will incorporate fire sprinklers that will discharge into the sanitary sewer during routine maintenance.

Form I-3B Page 7 of 11
Identification and Narrative of Receiving Water
Narrative describing flow path from discharge location(s), through urban storm conveyance system, to receiving creeks, rivers, and lagoons and ultimate discharge location to Pacific Ocean (or bay, lagoon, lake or reservoir, as applicable) The project site runoff discharges to an existing 60" RCP located across Mission Bay Dr from the project site. From there the runoff travels through approximately 750' of pipe where it is joined by several other flows from the Mission Bay Park parking lot located adjacent to Mission Bay, before discharging directly into Mission Bay a total of 750' feet from the project's outfall.
Provide a summary of all beneficial uses of receiving waters downstream of the project discharge locations. Mission Bay has a listed beneficial use of "Water contact recreation".
Identify all ASBS (areas of special biological significance) receiving waters downstream of the project discharge locations. There are no ASBS receiving waters downstream of the project location.
Provide distance from project outfall location to impaired or sensitive receiving waters. The project site runoff travels a total of 750' feet from the project's outfall to Mission Bay, where it discharges. Mission Bay Shoreline at De Anza Cove is impaired for enterococcus; fecal coliform and total coliform, per the 2012 California 303(d) List of Water Quality Segments.
Summarize information regarding the proximity of the permanent, post-construction storm water BMPs to the City's Multi-Habitat Planning Area and environmentally sensitive lands There are no MHPA or ESA areas adjacent to the project or its BMPs.

Form I-3B Page 8 of 11

Identification of Receiving Water Pollutants of Concern

List any 303(d) impaired water bodies within the path of storm water from the project site to the Pacific Ocean (or bay, lagoon, lake or reservoir, as applicable), identify the pollutant(s)/stressor(s) causing impairment, and identify any TMDLs and/or Highest Priority Pollutants from the WQIP for the impaired water bodies:

303(d) Impaired Water Body	Pollutant(s)/Stressor(s)	TMDLs/ WQIP Highest Priority Pollutant
Mission Bay Shoreline, at De Anza Cove	Enterococcus	Expected Completion Date 2019
Mission Bay Shoreline, at De Anza Cove	Fecal Coliform	Expected Completion Date 2019
Mission Bay Shoreline, at De Anza Cove	Total Coliform	Expected Completion Date 2019

Identification of Project Site Pollutants*

*Identification of project site pollutants is only required if flow-thru treatment BMPs are implemented onsite in lieu of retention or biofiltration BMPs (note the project must also participate in an alternative compliance program unless prior lawful approval to meet earlier PDP requirements is demonstrated)

Identify pollutants expected from the project site based on all proposed use(s) of the site (see BMP Design Manual Appendix B.6):

Pollutant	Not Applicable to the Project Site	Expected from the Project Site	Also a Receiving Water Pollutant of Concern
Sediment	☐	☒	☐
Nutrients	☐	☒	☐
Heavy Metals	☐	☒	☐
Organic Compounds	☒	☐	☐
Trash & Debris	☐	☒	☐
Oxygen Demanding Substances	☐	☒	☐
Oil & Grease	☐	☒	☐
Bacteria & Viruses	☒	☐	☒
Pesticides	☐	☒	☐

Form I-3B Page 9 of 11

Hydromodification Management Requirements

Do hydromodification management requirements apply (see Section 1.6 of the BMP Design Manual)?

- ☐ Yes, hydromodification management flow control structural BMPs required.
- ☒ No, the project will discharge runoff directly to existing underground storm drains discharging directly to water storage reservoirs, lakes, enclosed embayment, or the Pacific Ocean.
- ☐ No, the project will discharge runoff directly to conveyance channels whose bed and bank are concrete-lined all the way from the point of discharge to water storage reservoirs, lakes, enclosed embayment, or the Pacific Ocean.
- ☐ No, the project will discharge runoff directly to an area identified as appropriate for an exemption by the WMAA for the watershed in which the project resides.

Description / Additional Information (to be provided if a 'No' answer has been selected above):

The project site runoff discharges to an existing 60" RCP located across Mission Bay Dr from the project site. From there the runoff travels through approximately 750' of pipe where it is is joined by several other flows before discharging directly into Mission Bay a total of 750' feet from the discharge point.

Critical Coarse Sediment Yield Areas*
***This Section only required if hydromodification management requirements apply**

Based on the maps provided within the WMAA, do potential critical coarse sediment yield areas exist within the project drainage boundaries?

- ☐ Yes
- ☐ No, No critical coarse sediment yield areas to be protected based on WMAA maps

If yes, have any of the optional analyses presented in Section 6.2 of the BMP Design Manual been performed?

- ☐ 6.2.1 Verification of Geomorphic Landscape Units (GLUs) Onsite
- ☐ 6.2.2 Downstream Systems Sensitivity to Coarse Sediment
- ☐ 6.2.3 Optional Additional Analysis of Potential Critical Coarse Sediment Yield Areas Onsite
- ☐ No optional analyses performed, the project will avoid critical coarse sediment yield areas identified based on WMAA maps

If optional analyses were performed, what is the final result?

- ☐ No critical coarse sediment yield areas to be protected based on verification of GLUs onsite
- ☐ Critical coarse sediment yield areas exist but additional analysis has determined that protection is not required. Documentation attached in Attachment 8 of the SWQMP.
- ☐ Critical coarse sediment yield areas exist and require protection. The project will implement management measures described in Sections 6.2.4 and 6.2.5 as applicable, and the areas are identified on the SWQMP Exhibit.

Discussion / Additional Information:

Form I-3B Page 10 of 11
Flow Control for Post-Project Runoff*   ***This Section only required if hydromodification management requirements apply**
List and describe point(s) of compliance (POCs) for flow control for hydromodification management (see Section 6.3.1). For each POC, provide a POC identification name or number correlating to the project's HMP Exhibit and a receiving channel identification name or number correlating to the project's HMP Exhibit.
Has a geomorphic assessment been performed for the receiving channel(s)?   ☐ No, the low flow threshold is 0.1Q2 (default low flow threshold)   ☐ Yes, the result is the low flow threshold is 0.1Q2   ☐ Yes, the result is the low flow threshold is 0.3Q2   ☐ Yes, the result is the low flow threshold is 0.5Q2   If a geomorphic assessment has been performed, provide title, date, and preparer:
Discussion / Additional Information: (optional)

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Other Site Requirements and Constraints

When applicable, list other site requirements or constraints that will influence storm water management design, such as zoning requirements including setbacks and open space, or local codes governing minimum street width, sidewalk construction, allowable pavement types, and drainage requirements.

Mission Bay Drive has wider than standard ROW distance, which makes siting structural BMPs outside of the ROW especially difficult. The structural BMP design will likely necessitate a reduced square footage requirement, while still providing the required pollutant control. Additionally proprietary Bio-filtration may be chosen in Final design to accommodate the requirement since they can be sited beneath impervious areas.

The townhouse area is similarly constrained in that existing City easements prevent the applicant from utilizing many options due to the site design being constrained by existing utilities within the easements. Again a proprietary Bio-filtration BMP may be needed to accommodate the pollutant control requirements.

Optional Additional Information or Continuation of Previous Sections As Needed

This space provided for additional information or continuation of information from previous sections as needed.

Source Control BMP Checklist for All Development Projects	Form I-4

Project Identification

Project Name: Jefferson Pacific Beach

Permit Application Number: 327976

Source Control BMPs

All development projects must implement source control BMPs SC-1 through SC-6 where applicable and feasible. See Chapter 4 and Appendix E of the BMP Design Manual for information to implement source control BMPs shown in this checklist.

Answer each category below pursuant to the following.

- "Yes" means the project will implement the source control BMP as described in Chapter 4 and/or Appendix E of the BMP Design Manual. Discussion / justification is not required.
- "No" means the BMP is applicable to the project but it is not feasible to implement. Discussion / justification must be provided.
- "N/A" means the BMP is not applicable at the project site because the project does not include the feature that is addressed by the BMP (e.g., the project has no outdoor materials storage areas). Discussion / justification may be provided.

Source Control Requirement	Applied?		
SC-1 Prevention of Illicit Discharges into the MS4	☒ Yes	☐ No	☐ N/A
Discussion / justification if SC-1 not implemented: Manage A/C condensate • The proposed development will direct condensate into landscaped areas wherever feasible.			
SC-2 Storm Drain Stenciling or Signage	☒ Yes	☐ No	☐ N/A
Discussion / justification if SC-2 not implemented: Onsite storm drain inlets • The proposed development will utilize onsite inlets will be stamped/marked with "No dumping! Flows to Bay." or similar.			
SC-3 Protect Outdoor Materials Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☐ Yes	☐ No	☒ N/A
Discussion / justification if SC-3 not implemented:			
SC-4 Protect Materials Stored in Outdoor Work Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☐ Yes	☐ No	☒ N/A
Discussion / justification if SC-4 not implemented:			
SC-5 Protect Trash Storage Areas from Rainfall, Run-On, Runoff, and Wind	☒ Yes	☐ No	☐ N/A
Discussion / justification if SC-5 not implemented: Refuse areas • All refuse areas provided on-site are enclosed within the subterranean garage.			

Form I-4 Page 2 of 2			
Source Control Requirement	**Applied?**		
SC-6 Additional BMPs Based on Potential Sources of Runoff Pollutants (must answer for each source listed below)			
☒ On-site storm drain inlets	☒ Yes	☐ No	☐ N/A
☒ Interior floor drains and elevator shaft sump pumps	☒ Yes	☐ No	☐ N/A
☒ Interior parking garages	☒ Yes	☐ No	☐ N/A
☐ Need for future indoor & structural pest control	☐ Yes	☐ No	☒ N/A
☒ Landscape/Outdoor Pesticide Use	☒ Yes	☐ No	☐ N/A
☒ Pools, spas, ponds, decorative fountains, and other water features	☒ Yes	☐ No	☐ N/A
☐ Food service	☐ Yes	☐ No	☒ N/A
☒ Refuse areas	☒ Yes	☐ No	☐ N/A
☐ Industrial processes	☐ Yes	☐ No	☒ N/A
☐ Outdoor storage of equipment or materials	☐ Yes	☐ No	☒ N/A
☐ Vehicle and Equipment Cleaning	☐ Yes	☐ No	☒ N/A
☐ Vehicle/Equipment Repair and Maintenance	☐ Yes	☐ No	☒ N/A
☐ Fuel Dispensing Areas	☐ Yes	☐ No	☒ N/A
☐ Loading Docks	☐ Yes	☐ No	☒ N/A
☒ Fire Sprinkler Test Water	☒ Yes	☐ No	☐ N/A
☐ Miscellaneous Drain or Wash Water	☐ Yes	☐ No	☒ N/A
☒ Plazas, sidewalks, and parking lots	☒ Yes	☐ No	☐ N/A
☐ SC-6A: Large Trash Generating Facilities	☐ Yes	☐ No	☒ N/A
☐ SC-6B: Animal Facilities	☐ Yes	☐ No	☒ N/A
☐ SC-6C: Plant Nurseries and Garden Centers	☐ Yes	☐ No	☒ N/A
☐ SC-6D: Automotive-related Uses	☐ Yes	☐ No	☒ N/A

Discussion / justification if SC-6 not implemented. Clearly identify which sources of runoff pollutants are discussed. Justification must be provided for all "No" answers shown above.

Site Design BMP Checklist for All Development Projects	Form I-5

Site Design BMPs

All development projects must implement site design BMPs SD-1 through SD-8 where applicable and feasible. See Chapter 4 and Appendix E of the BMP Design Manual (Part 1 of Storm Water Standards) for information to implement site design BMPs shown in this checklist.

Answer each category below pursuant to the following.

- "Yes" means the project will implement the site design BMP as described in Chapter 4 and/or Appendix E of the BMP Design Manual. Discussion / justification is not required.
- "No" means the BMP is applicable to the project but it is not feasible to implement. Discussion / justification must be provided.
- "N/A" means the BMP is not applicable at the project site because the project does not include the feature that is addressed by the BMP (e.g., the project site has no existing natural areas to conserve). Discussion / justification may be provided.

A site map with implemented site design BMPs must be included at the end of this checklist.

Site Design Requirement	Applied?		
SD-1 Maintain Natural Drainage Pathways and Hydrologic Features	☐ Yes	☐ No	☒ N/A
Discussion / justification if SD-1 not implemented: The site is previously developed and as such has no natural areas to conserve. Trees are proposed as a part of the landscaping. But no storm water credits are being taken for their implementation.			
1-1 Are existing natural drainage pathways and hydrologic features mapped on the site map?	☐ Yes	☐ No	☒ N/A
1-2 Are trees implemented? If yes, are they shown on the site map?	☒ Yes	☐ No	☐ N/A
1-3 Implemented trees meet the design criteria in SD-1 Fact Sheet (e.g. soil volume, maximum credit, etc.)?	☐ Yes	☐ No	☒ N/A
1-4 Is tree credit volume calculated using Appendix B.2.2.1 and SD-1 Fact Sheet in Appendix E?	☐ Yes	☐ No	☒ N/A
SD-2 Have natural areas, soils and vegetation been conserved?	☐ Yes	☐ No	☒ N/A
Discussion / justification if SD-2 not implemented: There are no natural areas/vegetation to conserve as the site is >95% impervious in its existing condition.			

Form I-5 Page 2 of 4			
Site Design Requirement	Applied?		
SD-3 Minimize Impervious Area	☒ Yes	☐ No	☐ N/A
Discussion / justification if SD-3 not implemented:			
SD-4 Minimize Soil Compaction	☒ Yes	☐ No	☐ N/A
Discussion / justification if SD-4 not implemented:			
SD-5 Impervious Area Dispersion	☒ Yes	☐ No	☐ N/A
Discussion / justification if SD-5 not implemented:			
5-1 Is the pervious area receiving runon from impervious area identified on the site map?	☒ Yes	☐ No	☐ N/A
5-2 Does the pervious area satisfy the design criteria in SD-5 Fact Sheet in Appendix E (e.g. maximum slope, minimum length, etc.)	☒ Yes	☐ No	☐ N/A
5-3 Is impervious area dispersion credit volume calculated using Appendix B.2.1.1 and SD-5 Fact Sheet in Appendix E?	☐ Yes	☒ No	☐ N/A

Form I-5 Page 3 of 4			
Site Design Requirement	Applied?		
SD-6 Runoff Collection	☐ Yes	☒ No	☐ N/A
Discussion / justification if SD-6 not implemented: The proposed development is located within the Coastal zone, limiting structure height and design requirements. Due to this a green-roof will not be proposed for this project. Rain barrels are proposed for the townhouse portion of the site where feasible to collect runoff for onsite use after a storm event.			
6a-1 Are green roofs implemented in accordance with design criteria in SD-6A Fact Sheet? If yes, are they shown on the site map?	☐ Yes	☐ No	☒ N/A
6a-2 Is green roof credit volume calculated using Appendix B.2.1.2 and SD-6A Fact Sheet in Appendix E?	☐ Yes	☐ No	☒ N/A
6b-1 Are permeable pavements implemented in accordance with design criteria in SD-6B Fact Sheet? If yes, are they shown on the site map?	☐ Yes	☐ No	☒ N/A
6b-2 Is permeable pavement credit volume calculated using Appendix B.2.1.3 and SD-6B Fact Sheet in Appendix E?	☐ Yes	☐ No	☒ N/A
SD-7 Landscaping with Native or Drought Tolerant Species	☒ Yes	☐ No	☐ N/A
Discussion / justification if SD-7 not implemented:			
SD-8 Harvesting and Using Precipitation	☒ Yes	☐ No	☐ N/A
Discussion / justification if SD-8 not implemented:			
8-1 Are rain barrels implemented in accordance with design criteria in SD-8 Fact Sheet? If yes, are they shown on the site map?	☒ Yes	☐ No	☐ N/A
8-2 Is rain barrel credit volume calculated using Appendix B.2.2.2 and SD-8 Fact Sheet in Appendix E?	☐ Yes	☒ No	☐ N/A

Form I-5 Page 4 of 4
Insert Site Map with all site design BMPs identified:
Please see Attachment 1 and 4 for the site map and exhibits demonstrating the BMP implementation.

Summary of PDP Structural BMPs	Form I-6
Project Identification	
Project Name: Jefferson Pacific Beach	
Permit Application Number 327976	
PDP Structural BMPs	
All PDPs must implement structural BMPs for storm water pollutant control (see Chapter 5 of the BMP Design Manual). Selection of PDP structural BMPs for storm water pollutant control must be based on the selection process described in Chapter 5. PDPs subject to hydromodification management requirements must also implement structural BMPs for flow control for hydromodification management (see Chapter 6 of the BMP Design Manual). Both storm water pollutant control and flow control for hydromodification management can be achieved within the same structural BMP(s). PDP structural BMPs must be verified by the City at the completion of construction. This includes requiring the project owner or project owner's representative to certify construction of the structural BMPs (complete Form DS-563). PDP structural BMPs must be maintained into perpetuity (see Chapter 7 of the BMP Design Manual). Use this form to provide narrative description of the general strategy for structural BMP implementation at the project site in the box below. Then complete the PDP structural BMP summary information sheet (page 3 of this form) for each structural BMP within the project (copy the BMP summary information page as many times as needed to provide summary information for each individual structural BMP).	
Describe the general strategy for structural BMP implementation at the site. This information must describe how the steps for selecting and designing storm water pollutant control BMPs presented in Section 5.1 of the BMP Design Manual were followed, and the results (type of BMPs selected). For projects requiring hydromodification flow control BMPs, indicate whether pollutant control and flow control BMPs are integrated or separate. Storm Water Pollutant Control BMP Selection was done using Figures 5-1 & 5-2 "Storm Water Standards BMP Selection Flow Chart" from the City of San Diego BMP Design Manual, dated June 2016. See I-6 sheet 2 & 3 for a summary of each step in the flow chart: (Continue on page 2 as necessary.)	

Form I-6 Page 2 of 6

(Continued from page 1)

DMA-6:

Step 1: Evaluate at DMA Scale
- There is one DMA onsite to account for, see Attachment 4.

Step 1A: Is the DMA "Self-mitigating" or "De Minimis" or "Self-retaining"
- DMAs is not "Self-mitigating" or "De Minimis" or "Self-retaining"

Step 1B: Adjust runoff factor to account for site design BMPs and estimate DCV
- DCV calculation performed using Worksheet B.2-1, see Attachment 1e.

Step 2: Is Harvest and Use Feasible
- No, Harvest and Use is not feasible, see calculations in Attachment 1c, based on Worksheet B.3-.1

Step 3: Step 3: Is Infiltration Feasible?
- Yes, partial infiltration is feasible, see Attachment 1d.

Step 3 A&B: Partial Infiltration Condition
- Proceed to Step 3C

Step 3C: Compute Sizing Requirement
- Permeable Pavement (INF-3) is the selected BMP;
- Sizing performed using Worksheet B.4-1: Simple Sizing Method for Infiltration BMPs.

Step 4: Can the BMP be designed for the remaining DCV?
- Yes, the design can incorporate sufficient permeable pavement to fully infiltrate the DCV.

Step 4A:
- The Permeable Pavement facility has been sized to the required volume.

Step 6 & 7: The project is "Compliant with Pollutant Control BMP Sizing Requirements".

DMA-2-3, 10-11, 16, 29 & 33

Step 1: Evaluate at DMA Scale
- There are seven DMAs onsite to account for, see Attachment 4.

Step 1A: Is the DMA "Self-mitigating" or "De Minimis" or "Self-retaining"
- DMAs are not "Self-mitigating" or "De Minimis" or "Self-retaining"

Step 1B: Adjust runoff factor to account for site design BMPs and estimate DCV
- DCV calculation performed using Worksheet B.2-1, see Attachment 1e.

Step 2: Is Harvest and Use Feasible
- No, Harvest and Use is not feasible, see calculations in Attachment 1c, based on Worksheet B.3-1.

Step 3: Step 3: Is Infiltration Feasible?
- Yes, partial infiltration is feasible, see Attachment 1d.

Step 3 A&B: Partial Infiltration Condition
- Proceed to Step 3C

Step 3C: Compute Sizing Requirement
- Large footprint Partial Retention with Biofiltration (PR-1) are selected BMP
- Initial sizing performed using 3% ,minimum, surface area per PR-1 fact sheet.

Step 4: Can the BMP be designed for the remaining DCV?
- Yes, based a surface sizing of 3% of the tributary area the BMPs will treat the remaining DCV, see calculations in 1e based on Worksheet B.5-1.

Step 4A:
- The Partial Retention with Biofiltration facilities have been sized based on the PR-1 fact sheets.

Step 6 & 7: The project is "Compliant with Pollutant Control BMP Sizing Requirements".

Form I-6 Page 3 of 6

(Continued from page 2)

DMA-1 and DMA-5

Step 1: Evaluate at DMA Scale
- There are two DMAs onsite to account for, see Attachment 4.

Step 1A: Is the DMA "Self-mitigating" or "De Minimis" or "Self-retaining"
- DMAs are "Self-mitigating" or "De Minimis" or "Self-retaining"
    - The project is "Compliant with Pollutant Control BMP Sizing Requirements"

DMA-4:

This DMA is part of the site's source control (SC-6) which is the runoff produced from the parking garage entrance. Runoff from this area will be plumbed to the sanitary system, however the area is included in the DCV calculation for the overall site treatment requirement.

DMA-7-9, 12-15, 17-28, 30-32, 34-36

Step 1: Evaluate at DMA Scale
- There are 25 DMAs onsite to account for, see Attachment 4.

Step 1A: Is the DMA "Self-mitigating" or "De Minimis" or "Self-retaining"
- DMAs are not "Self-mitigating" or "De Minimis" or "Self-retaining"

Step 1B: Adjust runoff factor to account for site design BMPs and estimate DCV
- DCV calculation performed using Worksheet B.2-1, see Attachment 1e.

Step 2: Is Harvest and Use Feasible
- No, Harvest and Use is not feasible, see calculations in Attachment 1c, based on Worksheet B.3-1.

Step 3: Step 3: Is Infiltration Feasible?
- No infiltration is infeasible because of geologic hazards/site contamination, see Attachment 1d.

Step 3 A&B: No Infiltration Condition
- Proceed to Step 3C

Step 3C: Compute Sizing Requirement
- Large footprint Biofiltration (BF-1) are selected BMP
- Initial sizing performed using 3% ,minimum, surface area per BF-1 fact sheet.

Step 4: Can the BMP be designed for the remaining DCV?
- Yes, based a surface sizing of 3% of the tributary area the BMPs will treat the remaining DCV, see calculations in 1e based on Worksheet B.5-1.

Step 4A:
- The biofiltration facilities have been sized based on the BF-1 fact sheets.

Step 6 & 7: The project is "Compliant with Pollutant Control BMP Sizing Requirements".

Form I-6 Page 4 of 6	
Structural BMP Summary Information (Copy this page as needed to provide information for each individual proposed structural BMP)	
Structural BMP ID No. DMA-6	
Construction Plan Sheet No. N/A	
Type of structural BMP: ☐ Retention by harvest and use (HU-1) ☐ Retention by infiltration basin (INF-1) ☐ Retention by bioretention(INF-2) ☒ Retention by permeable pavement (INF-3) ☐ Partial retention by biofiltration with partial retention (PR-1) ☐ Biofiltration (BF-1) ☐ Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide BMP type/description in discussion section below) ☐ Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below) ☐ Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion section below) ☐ Detention pond or vault for hydromodification management ☐ Other (describe in discussion section below)	
Purpose: ☒ Pollutant control only ☐ Hydromodification control only ☐ Combined pollutant control and hydromodification control ☐ Pre-treatment/forebay for another structural BMP Other (describe in discussion section below)	
Who will certify construction of this BMP? Provide name and contact information for the party responsible to sign BMP verification form DS-563	To be determined based upon final design.
Who will be the final owner of this BMP?	To be determined based upon final design.
Who will maintain this BMP into perpetuity?	To be determined based upon final design.
What is the funding mechanism for maintenance?	To be determined based upon final design.

Form I-6 Page 5 of 6	
Structural BMP Summary Information (Copy this page as needed to provide information for each individual proposed structural BMP)	
Structural BMP ID No. DMA-2-3, 10-11, 16, 29 & 33	
Construction Plan Sheet No. N/A	
Type of structural BMP: ☐ Retention by harvest and use (HU-1) ☐ Retention by infiltration basin (INF-1) ☐ Retention by bioretention(INF-2) ☐ Retention by permeable pavement (INF-3) ☒ Partial retention by biofiltration with partial retention (PR-1) ☐ Biofiltration (BF-1) ☐ Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide BMP type/description in discussion section below) ☐ Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below) ☐ Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion section below) ☐ Detention pond or vault for hydromodification management ☐ Other (describe in discussion section below)	
Purpose: ☒ Pollutant control only ☐ Hydromodification control only ☐ Combined pollutant control and hydromodification control ☐ Pre-treatment/forebay for another structural BMP Other (describe in discussion section below)	
Who will certify construction of this BMP? Provide name and contact information for the party responsible to sign BMP verification form DS-563	To be determined based upon final design.
Who will be the final owner of this BMP?	To be determined based upon final design.
Who will maintain this BMP into perpetuity?	To be determined based upon final design.
What is the funding mechanism for maintenance?	To be determined based upon final design.

Form I-6 Page 6 of 6	
Structural BMP Summary Information (Copy this page as needed to provide information for each individual proposed structural BMP)	
Structural BMP ID No. DMA-7-9, 12-15, 17-28, 30-32, 34-36	
Construction Plan Sheet No. N/A	
Type of structural BMP: ☐ Retention by harvest and use (HU-1) ☐ Retention by infiltration basin (INF-1) ☐ Retention by bioretention(INF-2) ☐ Retention by permeable pavement (INF-3) ☐ Partial retention by biofiltration with partial retention (PR-1) ☒ Biofiltration (BF-1) ☐ Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide BMP type/description in discussion section below) ☐ Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below) ☐ Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion section below) ☐ Detention pond or vault for hydromodification management ☐ Other (describe in discussion section below)	
Purpose: ☒ Pollutant control only ☐ Hydromodification control only ☐ Combined pollutant control and hydromodification control ☐ Pre-treatment/forebay for another structural BMP Other (describe in discussion section below)	
Who will certify construction of this BMP? Provide name and contact information for the party responsible to sign BMP verification form DS-563	To be determined based upon final design.
Who will be the final owner of this BMP?	To be determined based upon final design.
Who will maintain this BMP into perpetuity?	To be determined based upon final design.
What is the funding mechanism for maintenance?	To be determined based upon final design.

THE CITY OF SAN DIEGO
City of San Diego
Development Services
1222 First Ave., MS-501
San Diego, CA 92101
(619) 236-5500

Permanent BMP Construction

Self Certification Form

FORM
DS-563
FEBRUARY 2013

Date Prepared: _____ Project No.: _____

Project Applicant: _____ Phone: _____

Project Address: _____

Project Engineer: _____ Phone: _____

The purpose of this form is to verify that the site improvements for the project, identified above, have been constructed in conformance with the approved Standard Urban Storm Water Mitigation Plan (SUSMP) documents and drawings.

This form must be completed by the engineer and submitted prior to final inspection of the construction permit. Completion and submittal of this form is required for all new development and redevelopment projects in order to comply with the City's Storm Water ordinances and NDPES Permit Order No. R9-2007-0001. Final inspection for occupancy and/or release of grading or public improvement bonds may be delayed if this form is not submitted and approved by the City of San Diego.

CERTIFICATION:
As the professional in responsible charge for the design of the above project, I certify that I have inspected all constructed Low Impact Development (LID) site design, source control and treatment control BMP's required per the approved SUSMP and Construction Permit No. _____; and that said BMP's have been constructed in compliance with the approved plans and all applicable specifications, permits, ordinances and Order No. R9-2007-0001 of the San Diego Regional Water Quality Control Board.

I understand that this BMP certification statement does not constitute an operation and maintenance verification.

Signature: _____

Date of Signature: _____

Printed Name: _____

Title: _____

Phone No. _____

Engineer's Stamp

Clear Form

Attachment 1

Backup for PDP Pollutant Control BMPs

Items included in this attachment:

Attachment Sequence	Contents	Checklist
Attachment 1a	**DMA Exhibit (Required)** **See DMA Exhibit Checklist.**	**Included**
Attachment 1b	Tabular summary of DMAs showing DMA ID matching DMA Exhibit, DMA Area, and DMA Type (Required)* *Provide table in this Attachment OR on DMA Exhibit in Attachment 1a	☒ Included on DMA exhibit in Attachment 1a ☐ Included as Attachment 1b, separate from DMA Exhibit
Attachment 1c	**Form I-7, Harvest and Use Feasibility Screening Checklist (Required unless the entire project will use infiltration BMPs)** **Refer to Appendix B.3-1 of the BMP design manual to complete Form I-7.**	☒ **Included** ☐ **Not included because the entire project will use infiltration BMPs**
Attachment 1d	Form I-8, Categorization of infiltration feasibility condition (Required unless the project will use harvest and use BMPs) Refer to Appendices C and D of the BMP design manual to complete Form I-8.	☒ Included ☐ Not included because the entire project will use harvest and use BMPs
Attachment 1e	**Pollutant Control BMP Design Worksheets/ Calculations (Required)** **Refer to Appendices B and E of the BMP design manual for structural pollutant control BMP design guidelines**	☒ **Included**

The DMA Exhibit must identify:

- ☐ Underlying hydrologic soil group
- ☐ Approximate depth to groundwater
- ☐ Existing natural hydrologic features (watercourses, seeps, springs, wetlands) Critical coarse sediment yield areas to be protected
- ☐ Existing topography and impervious areas
- ☐ Existing and proposed site drainage network and connections to drainage offsite
- ☐ Proposed grading
- ☐ Proposed impervious features
- ☐ Proposed design features and surface treatments used to minimize imperviousness
- ☐ Drainage management area (DMA) boundaries, DMA ID numbers, and DMA areas (square footage or acreage), and DMA type (i.e., drains to BMP, self-retaining, or self-mitigating)
- ☐ Potential pollutant source areas and corresponding required source controls (see Chapter 4, Appendix E.1, and Form I-3B)
- ☐ Structural BMPs (identify location, type of BMP, and size/detail)

BMP NOTES:

INTRODUCTION

RUNOFF CONVEYED AND DISCHARGED BY MUNICIPAL STORM WATER SYSTEMS HAS BEEN IDENTIFIED BY LOCAL, REGIONAL, AND NATIONAL RESEARCH PROGRAMS AS ONE OF THE PRINCIPAL CAUSES OF WATER QUALITY PROBLEMS IN URBAN AREAS SUCH AS THE CITY OF SAN DIEGO. THIS RUNOFF POTENTIALLY CONTAINS A HOST OF POLLUTANTS INCLUDING TRASH, DEBRIS, BACTERIA, VIRUSES, OIL, GREASE, SEDIMENTS, NUTRIENTS, METALS, AND TOXIC CHEMICALS. THESE CONTAMINANTS CAN ADVERSELY AFFECT THE BENEFICIAL USES OF RECEIVING CREEKS, COASTAL WATERS, ASSOCIATED WILDLIFE HABITAT, AND PUBLIC HEALTH. URBAN RUNOFF POLLUTION IS A PROBLEM DURING RAINY SEASONS AND ALSO
THROUGHOUT THE YEAR DUE TO URBAN WATER USES THAT DISCHARGE NON-STORM WATER RUNOFF VIA DRY WEATHER FLOWS TO THE STORM WATER CONVEYANCE SYSTEM.

THE MUNICIPAL STORM WATER NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM PERMIT (MUNICIPAL PERMIT), ISSUED ON JANUARY 24, 2007 TO THE CITY OF SAN DIEGO, REQUIRES THE DEVELOPMENT AND IMPLEMENTATION OF STORM WATER REGULATIONS ADDRESSING STORM WATER POLLUTION ISSUES IN DEVELOPMENT PLANNING AND CONSTRUCTION ASSOCIATED WITH PRIVATE AND PUBLIC DEVELOPMENT.

THE PURPOSE OF THIS PLAN, WITH RESPECT TO THE PROPOSED DEVELOPMENT, IS TO COMPLY WITH THE MUNICIPAL PERMIT, AND THE MODEL STANDARD URBAN STORM WATER MITIGATION PLAN (SUSMP) APPROVED BY THE REGIONAL BOARD ON MARCH 4, 2009 FOR THE IMPLEMENTATION OF PERMANENT AND CONSTRUCTION STORM WATER BMP REQUIREMENTS.

I. DETERMINATION OF STANDARD AND PRIORITY STORM WATER BMP REQUIREMENTS:

A) MATRIX TO DETERMINE IF PROJECT IS EXEMPT FROM PERMANENT STORM WATER BMP REQUIREMENTS:

DOES ANY OF THE FOLLOWING APPLY TO THE PROPOSED DEVELOPMENT.	YES	NO
1. THE PROJECT IS NOT A DEVELOPMENT PROJECT AS DEFINED BY THE STORM WATER STANDARDS MANUAL.		X
2. THE PROJECT IS ONLY THE CONSTRUCTION OF UNDERGROUND OR OVERHEAD LINEAR UTILITIES.		X
3. THE PROJECT QUALIFIES AS ROUTINE MAINTENANCE.		X
4. THE PROJECT ONLY INSTALLS SIDEWALKS, BIKE LANES, OR PEDESTRIAN RAMPS ON AND EXISTING ROAD, AND DOES NOT CHANGE DRAINAGE PATTERN.		X

B) MATRIX TO DETERMINE PRIORITY PROJECT PERMANENT STORM WATER BMP REQUIREMENTS:

DOES THE PROJECT MEET THE DEFINITION OF ONE OR MORE OF THE PRIORITY PROJECT CATEGORIES AS DEFINED IN THE STORM WATER STANDARDS?	YES	NO
1. RESIDENTIAL DEVELOPMENT OF 10 OR MORE UNITS.	X	
2. COMMERCIAL DEVELOPMENT AND SIMILIAR NON-RESIDENTIAL DEVELOPMENTS > 1 ACRE.	X	
3. HEAVY INDUSTRIAL DEVELOPMENT > 1 ACRE.		X
4. AUTOMOTIVE REPAIR SHOP.		X
5. RESTAURANT.		X
6. HILLSIDE DEVELOPMENT GREATER THAN 5,000 SQUARE FEET.		X
7. PROJECT WITHIN, DIRECTLY ADJACENT TO OR DISCHARGING TO RECEIVING WATERS WITHIN WATER QUALITY SENSITIVE AREAS.		X
8. PARKING LOT GREATER THAN OR EQUAL TO 5,000 SQ. FT. WITH AT LEAST 15 PARKING SPACES AND POTENTIALLY EXPOSED TO URBAN RUNOFF.		X
9. STREETS, ROADS, HIGHWAYS, AND FREEWAYS THAT WOULD CREATE A NEW PAVED SURFACE THAT IS 5,000 SQ. FT. OR GREATER.		X
10. RETAIL GASOLINE OUTLETS.		X
11. SIGNIFICANT REDEVELOPMENT.	X	
12. OTHER POLLUTANT GENERATING PROJECT.		X

C) DETERMINE WHETHER PROJECT IS EXEMPT, STANDARD OR A PRIORITY DESIGNATION:

1. IF "YES" IS CHECKED FOR ANY LINE IN PART A, THEN CHECK THIS BOX: ☐ EXEMPT PROJECT
2. IF "NO" IS CHECKED FOR ALL LINES IN PART A AND PART B, THEN CHECK THIS BOX: ☐ STANDARD DEVELOPMENT PROJECT
3. IF "NO" IS CHECKED FOR ALL LINES IN PART A, AND "YES" IS CHECKED FOR AT LEAST ONE OF THE ITEMS IN PART B, THEN CHECK THIS BOX: ☒ PRIORITY DEVELOPMENT PROJECT

II. DETERMINATION OF CONSTRUCTION STORM WATER BMP REQUIREMENTS:

D) DETERMINATION OF CONSTRUCTION PHASE STORM WATER REQUIREMENT:

WOULD THE PROJECT MEET ANY OF THESE CRITERIA DURING CONSTRUCTION?	YES	NO
1. IS THE PROJECT SUBJECT TO CALIFORNIA'S STATEWIDE GENERAL NPDES PERMIT FOR STORM WATER DISCHARGES ASSOCIATED WITH CONSTRUCTION ACTIVITIES?	X	
2. DOES THE PROJECT PROPOSE GRADING OR SOIL DISTURBANCE?	X	
3. WOULD STORM WATER OR URBAN RUNOFF HAVE THE POTENTIAL TO CONTACT ANY PORTION OF THE CONSTRUCTION AREA, INCLUDING WASHING AND STAGING AREAS?	X	
4. WOULD THE PROJECT USE ANY CONSTRUCTION MATERIALS THAT COULD NEGATIVELY AFFECT WATER QUALITY IF DISCHARGED FROM THE SITE (SUCH AS, PAINTS, SOLVENTS, CONCRETE, AND STUCCO)?	X	

5. CHECK THIS BOX IF "YES" IS CHECKED FOR LINE 1 ABOVE. ☒ SWPPP REQUIRED
6. CHECK THIS BOX IF "NO" IS CHECKED FOR LINE 1, AND "YES" IS CHECKED FOR ANY LINE 2-4: ☐ WPCP REQUIRED
7. CHECK THIS BOX IF "NO" IS CHECKED FOR ALL LINES 1-4: ☐ NO DOCUMENT REQUIRED

E) DETERMINATION OF CONSTRUCTION SITE PRIORITY:

☐ 1. HIGH PRIORITY

A) PROJECTS WHERE THE SITE IS 50 ACRES OR MORE AND GRADING WILL OCCUR DURING THE WET SEASON.

B) PROJECTS 1 ACRE OR MORE AND TRIBUTARY TO AN IMPAIRED WATER BODY FOR SEDIMENT (e.g. PENASQUITOS WATERSHED).

C) PROJECTS 1 ACRE OR MORE WITHIN OR DIRECTLY ADJACENT TO OR DISCHARGING DIRECTLY TO A COASTAL LAGOON OR OTHER RECEIVING WATER WITHIN A WATER QUALITY SENSITIVE AREA.

D) PROJECTS SUBJECT TO PHASED GRADING OR ADVANCED TREATMENT REQUIREMENTS.

☒ 2. MEDIUM PRIORITY

1) PROJECTS 1 ACRE OR MORE BUT NOT SUBJECT TO HIGH PRIORITY DESIGNATION.

☐ 3. LOW PRIORITY

1) PROJECTS REQUIRING A WATER POLLUTION CONTROL PLAN BUT NOT SUBJECT TO A MEDIUM OR HIGH PRIORITY DESIGNATION.

III. IDENTIFICATION OF POLLUTANTS

A) PROJECT CATEGORY: ATTACHED RESIDENTIAL DEVELOPMENT

1) POLLUTANTS OF CONCERN:

a. SEDIMENTS
b. NUTRIENTS
c. HEAVY METALS
d. TRASH & DEBRIS
e. OXYGEN DEMANDING SUBSTANCES
f. OIL & GREASE
g. BACTERIA & VIRUSES
h. PESTICIDES

LEGEND

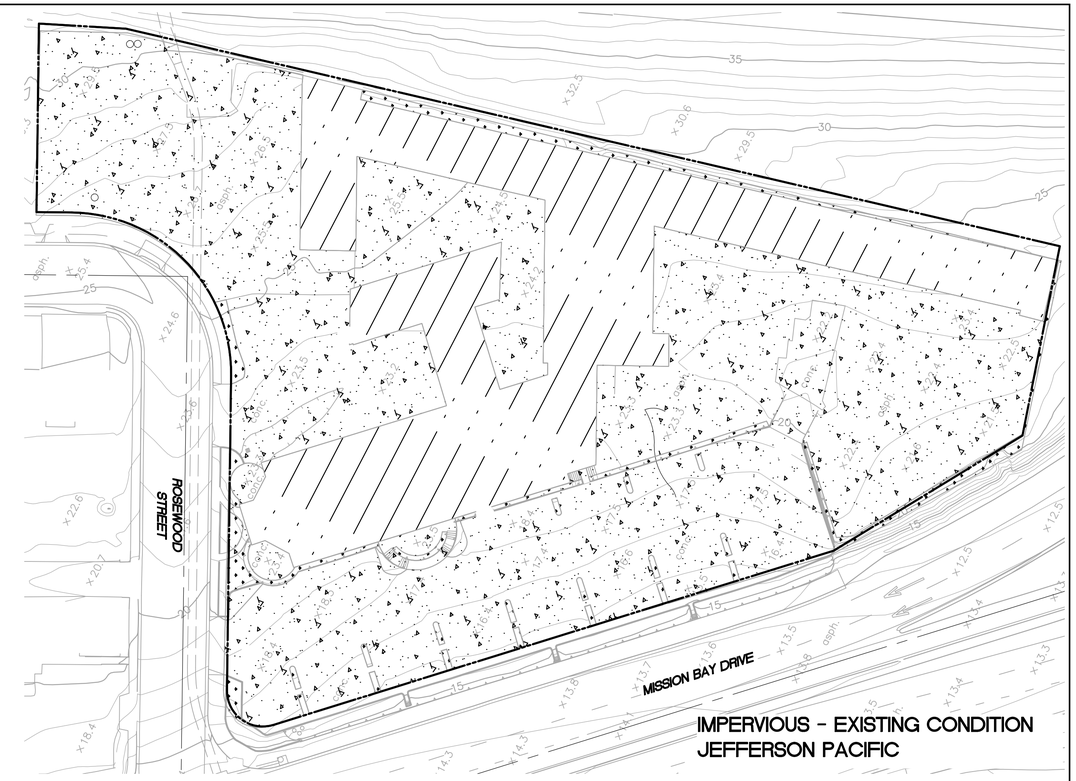
SUBDIVISION BOUNDARY
PROPOSED STORM DRAIN
EXISTING STORM DRAIN
EX. BUILDING AREA
EX. IMPERVIOUS A.C./P.C.C.
EX. PERVIOUS
PERVIOUS (SD-4)
PERMEABLE PAVEMENT (INF-3)
BIO-FILTRATION W/ PARTIAL RETENTION (PR-1)
BIO-FILTRATION (BF-1)

GEOCON LEGEND

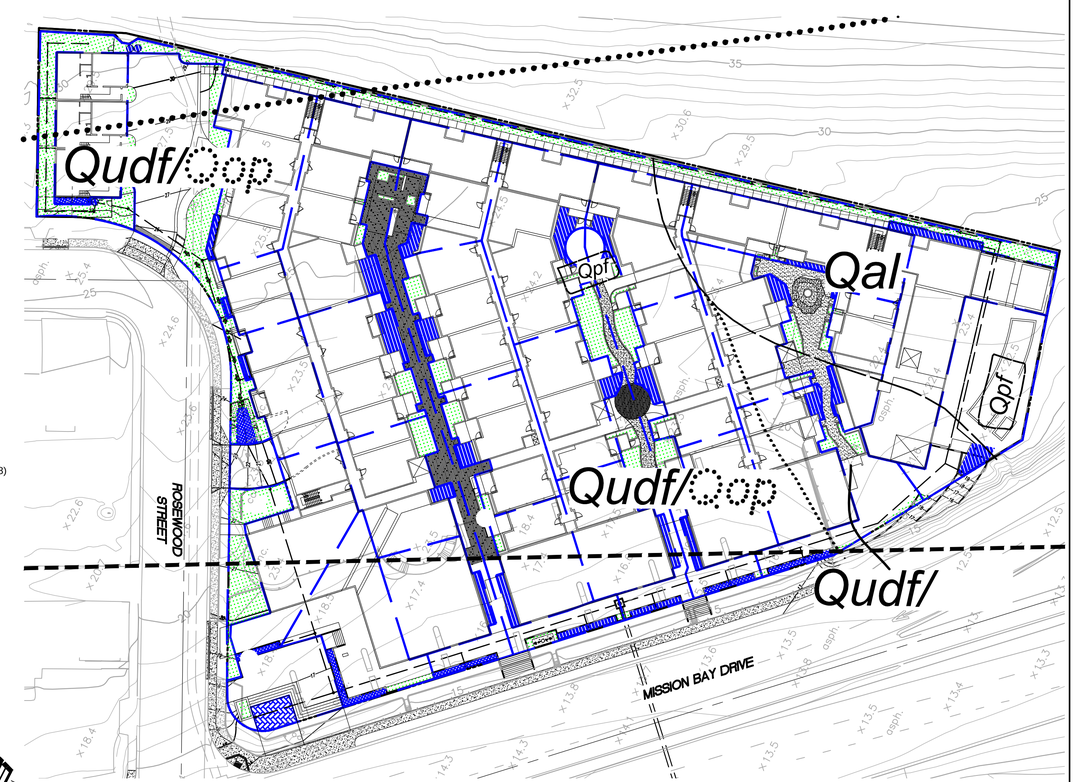
Qpf .....PREVIOUSLY PLACED FILL
Qudf .....UNDOCUMENTED FILL
Qal .....ALLUVIUM
Qop .....OLD PARALIC DEPOSITS (Dotted Where Buried)
.....APPROX. LOCATION OF MAPPED BURIED POTENTIALLY ACTIVE FAULT (Kennedy & Tan, 2008)
.....APPROX. LOCATION OF GEOLOGIC CONTACT (Dotted Where Buried)

	Impervious		Pervious	
	Area (sf)	%	Area (sf)	%
Pre-Project	123,684	96.4	4,557	3.6
Post-Project	113,653	88.6	14,588	11.4

*The project is HMP exempt



IMPERVIOUS - EXISTING CONDITION
JEFFERSON PACIFIC



40 0 40 80
1" = 40'

DMA EXHIBIT - PROPOSED CONDITION
SHEET 1 OF 2
JEFFERSON PACIFIC

NO.	DATE	BY	DESCRIPTION	NO.	DATE	BY	DESCRIPTION
6				12			
5				11			
4	07/15/2016	MFD	CLIENT/AGENCY REVISIONS	10			
3	02/19/2016	MFD	AGENCY REVISIONS	9			
2	11/30/2015	MFD	CLIENT REVISIONS	8			
1	08/17/2015	MFD	ORIGINAL	7			

Leppert Engineering CORPORATION
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APPROVED BY ENGINEER OF WORK
REGISTRATION R C E 26283
FILE CODE PB 39.01-22.15
DATE

PREPARATION AND REVISION LOG

FIELD PERMEAMETER INFILTRATION TEST RESULTS

Test No.	Geologic Unit	Test Depth (Feet, Below Grade)	Fines-Content[1] [Clay Content[2]] (%)	Field-Saturated Hydraulic Conductivity, K_{sat} (Inch/Hour)	Worksheet[3] Saturated Hydraulic Conductivity, K_{sat} (Inch/Hour)
P-1	Qop	3.8	65 [16]	0.47	0.24
P-2	Qudf	3.9	76 [23]	0.01	>0.01
P-4	Qop	3.2	71 [25]	0.01	>0.01
P-5	Qop	2.7	66 [26]	0.36	0.18
P-6	Qop	8.0	82 [27]	0.03	0.02
P-7	Qop	7.4	70 [17]	1.10	0.55
P-8	Qop	5.5	--	0.58	0.29
P-9	Qop	5.5	--	0.29	0.15

[1] Percent finer than the #200 Sieve.
[2] Percent finer than the 0.002 mm.
[3] Using a factor of safety of 2 for Worksheet C.4-1.

PROPOSED TREATMENT CALCULATIONS

BASIN	AREA (sf)	C FACTOR	Soil Type	Slope (%)	Provide Area (ft^2)	BMP Type
DMA-01	2232	0.10	"D"	≥5%	2232	Self Mitigating (SD-4)
DMA-05	1614	0.10	"D"	≥5%	1614	Self Mitigating (SD-4)

BASIN	AREA (sf)	C FACTOR	Soil Type	Slope (%)	Provide Area (ft^2)	BMP Type
DMA-04	694	0.90	"D"	≥5%	694	Source Control (SC-6)

BASIN	AREA (sf)	C FACTOR	Soil Type	Slope (%)	Provide Area (ft^2)	BMP Type
DMA-06	2382	0.90	"D"	≥5%	346	Permeable Pavement (INF-3)

BASIN	AREA (sf)	C FACTOR	Soil Type	Req'd Area (ft^2)	Provide Area (ft^2)	BMP Type
DMA-02	3295	0.90	"D"	89	89	Partial Retention (PR-1)
DMA-03	6646	0.90	"D"	179	179	Partial Retention (PR-1)
DMA-10	4157	0.90	"D"	112	112	Partial Retention (PR-1)
DMA-11	4042	0.90	"D"	109	109	Partial Retention (PR-1)
DMA-16	2885	0.90	"D"	78	78	Partial Retention (PR-1)
DMA-29	2694	0.90	"D"	73	73	Partial Retention (PR-1)
DMA-33	4405	0.90	"D"	119	119	Partial Retention (PR-1)

BASIN	AREA (sf)	C FACTOR	Soil Type	Req'd Area (ft^2)	Provide Area (ft^2)	BMP Type
DMA-07	4406	0.90	"D"	119	119	Biofiltration (BF-1)
DMA-08	1390	0.90	"D"	38	38	Biofiltration (BF-1)
DMA-09	2585	0.90	"D"	70	70	Biofiltration (BF-1)
DMA-12	5556	0.90	"D"	150	150	Biofiltration (BF-1)
DMA-13	3737	0.90	"D"	101	101	Biofiltration (BF-1)
DMA-14	3364	0.90	"D"	91	91	Biofiltration (BF-1)
DMA-15	2941	0.90	"D"	79	79	Biofiltration (BF-1)
DMA-17	2989	0.90	"D"	81	81	Biofiltration (BF-1)
DMA-18	3713	0.90	"D"	100	100	Biofiltration (BF-1)
DMA-19	3348	0.90	"D"	90	90	Biofiltration (BF-1)
DMA-20	2837	0.90	"D"	77	77	Biofiltration (BF-1)
DMA-21	3040	0.90	"D"	82	82	Biofiltration (BF-1)
DMA-22	5047	0.90	"D"	136	136	Biofiltration (BF-1)
DMA-23	3312	0.90	"D"	89	89	Biofiltration (BF-1)
DMA-24	3241	0.90	"D"	88	88	Biofiltration (BF-1)
DMA-25	2888	0.90	"D"	78	78	Biofiltration (BF-1)
DMA-26	3418	0.90	"D"	92	92	Biofiltration (BF-1)
DMA-27	3457	0.90	"D"	93	93	Biofiltration (BF-1)
DMA-28	2966	0.90	"D"	80	80	Biofiltration (BF-1)
DMA-30	4271	0.90	"D"	115	115	Biofiltration (BF-1)
DMA-31	3431	0.90	"D"	93	93	Biofiltration (BF-1)
DMA-32	3643	0.90	"D"	98	98	Biofiltration (BF-1)
DMA-34	2185	0.90	"D"	59	59	Biofiltration (BF-1)
DMA-35	5963	0.90	"D"	161	161	Biofiltration (BF-1)
DMA-36	8585	0.90	"D"	232	232	Biofiltration (BF-1)

NO.	DATE	BY	DESCRIPTION
6			
5			
4	07/15/2016	MFD	CLIENT/AGENCY REVISIONS
3	02/19/2016	MFD	AGENCY REVISIONS
2	11/30/2015	MFD	CLIENT REVISIONS
1	08/17/2015	MFD	ORIGINAL

NO.	DATE	BY	DESCRIPTION
12			
11			
10			
9			
8			
7			

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APPROVED BY ENGINEER OF WORK
REGISTRATION R C E 26283
FILE CODE PB 39.01-22.15
DATE

PREPARATION AND REVISION LOG

DMA EXHIBIT - PROPOSED CONDITION
SHEET 2 OF 2
JEFFERSON PACIFIC

Harvest and Use Feasibility Checklist	Form I-7

1. Is there a demand for harvested water (check all that apply) at the project site that is reliably present during the wet season?

☒ Toilet and urinal flushing

☐ Landscape irrigation

☐ Other:_____

2. If there is a demand; estimate the anticipated average wet season demand over a period of 36 hours. Guidance for planning level demand calculations for toilet/urinal flushing and landscape irrigation is provided in Section B.3.2.
[Provide a summary of calculations here]

1) Population RM-3-8 = 2.4/DU

2) Total population = 171 DU * 2.4/DU = 410.4 residents

3) Total 24 hr demand = 410.4 * 9.3 gal/day = 3,817 gal/day

4) 36 hr demand = 3,817 gal * 1.5 = 5,725 gal = 765.3 CF

5) Demand = 765.3 CF / 4,495 CF = 0.17

3. Calculate the DCV using worksheet B-2.1.
DCV = _____ (cubic feet)

3a. Is the 36 hour demand greater than or equal to the DCV?	3b. Is the 36 hour demand greater than 0.25DCV but less than the full DCV?	3c. Is the 36 hour demand less than 0.25DCV?
☐ Yes / ☒ No	☐ Yes / ☒ No	☒ Yes
Harvest and use appears to be feasible. Conduct more detailed evaluation and sizing calculations to confirm that DCV can be used at an adequate rate to meet drawdown criteria.	Harvest and use may be feasible. Conduct more detailed evaluation and sizing calculations to determine feasibility. Harvest and use may only be able to be used for a portion of the site, or (optionally) the storage may need to be upsized to meet long term capture targets while draining in longer than 36 hours.	Harvest and use is considered to be infeasible.

Is harvest and use feasible based on further evaluation?

☐ Yes, refer to Appendix E to select and size harvest and use BMPs.

☒ No, select alternate BMPs.

Categorization of Infiltration Feasibility Condition		Form I-8	
Part 1 - Full Infiltration Feasibility Screening Criteria Would infiltration of the full design volume be feasible from a physical perspective without any undesirable consequences that cannot be reasonably mitigated?			
Criteria	Screening Question	Yes	No
1	Is the estimated reliable infiltration rate below proposed facility locations greater than 0.5 inches per hour? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.	☐	☒
Provide basis: The results of the infiltration tests (inches per hour after a factor of safety of 2 is applied) are as follows: P-1 –0.24; P-2 – >0.01; P-4 – >0.01; P-5 – 0.18; P-6 – 0.02; P-7 – 0.55; P-8 – 0.29; P-9 – 0.15. P-7 through P-9 are in the same general vicinity of each other and possess an average of about 0.33 inches per hour (after applying the factor of safety of 2). Therefore, the property does not possess an area with an infiltration rate of 0.5 or greater (after applying the factor of safety of 2). Full infiltration should not be performed on the property but partial infiltration can be incorporated into the design and construction of the property. The infiltration rate is equal to the saturated hydraulic conductivity based on the discussion in the County of Riverside manual. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
2	Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.	☐	☒
Provide basis: Based on the results of the infiltration testing, infiltration rates greater than 0.5 inches per hour should not be allowed on the property. The rates are highly variable and the existing materials are fine-grained that limit the infiltration rate. The site in underlain by previously placed fill, undocumented fill, alluvium and Old Paralic Deposits. Partial infiltration should be considered on the property and liners will be required on the sidewalls of the storm water devices. Setbacks within a minimum distance of 50 feet will be required adjacent to slopes. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			

Form I-8 Page 2 of 4			
Criteria	Screening Question	Yes	No
3	Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of groundwater contamination (shallow water table, storm water pollutants or other factors) that cannot be mitigated to an acceptable level? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	☐	☒
Provide basis: Based on the results of the infiltration testing, infiltration rates greater than 0.5 inches per hour should not be allowed on the property. The rates are highly variable and the existing materials are fine-grained that limit the infiltration rate. Infiltration should be limited to an elevation of 18 feet above MSL and within the Old Paralic Deposits. This elevation is 10 feet above the historic high groundwater elevation. The historic high groundwater elevation of 8 feet MSL should be used in our analyses based on the discussion in Section C.4.1. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
4	Can infiltration greater than 0.5 inches per hour be allowed without causing potential water balance issues such as change of seasonality of ephemeral streams or increased discharge of contaminated groundwater to surface waters? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	☐	☒
Provide basis: Based on the results of the infiltration testing, infiltration rates greater than 0.5 inches per hour should not be allowed on the property. The rates are highly variable and the existing materials are fine-grained that limit the infiltration rate. We do not expect infiltration will cause water balance issues such as seasonality of ephemeral streams or increased discharge of contaminated groundwater to surface waters. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
Part 1 Result*	If all answers to rows 1 - 4 are "Yes" a full infiltration design is potentially feasible. The feasibility screening category is Full Infiltration		☐
	If any answer from row 1-4 is "No", infiltration may be possible to some extent but would not generally be feasible or desirable to achieve a "full infiltration" design. Proceed to Part 2		☒

Form I-8 Page 3 of 4			
Part 2 – Partial Infiltration vs. No Infiltration Feasibility Screening Criteria Would infiltration of water in any appreciable amount be physically feasible without any negative consequences that cannot be reasonably mitigated?			
Criteria	Screening Question	Yes	No
5	Do soil and geologic conditions allow for infiltration in any appreciable rate or volume? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.	☒	☐
Provide basis: The results of the infiltration tests (inches per hour after a factor of safety of 2 is applied) are as follows: P-1 –0.24; P-2 – >0.01; P-4 – >0.01; P-5 – 0.18; P-6 – 0.02; P-7 – 0.55; P-8 – 0.29; P-9 – 0.15. P-7 through P-9 are in the same general vicinity of each other and possess an average of about 0.67 inches per hour or 0.33 inches per hour after applying the factor of safety of 2. Partial infiltration can be incorporated into the design and construction of the property. The infiltration rate is equal to the saturated hydraulic conductivity based on the discussion in the County of Riverside manual. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			
6	Can Infiltration in any appreciable quantity be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.	☒	☐
Provide basis: Based on the comprehensive evaluation presented in the geotechnical documents dated September 11, 2015 and June 3, 2016, partial infiltration can be incorporated in to the design of the property. As discussed in the geotechnical documents, liners on the sidewalls and setback due to existing slopes and utilities will be required. Setbacks within a minimum distance of 50 feet will be required adjacent to slopes. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			

Form I-8 Page 4 of 4			
Criteria	Screening Question	Yes	No
7	Can Infiltration in any appreciable quantity be allowed without posing significant risk for groundwater related concerns (shallow water table, storm water pollutants or other factors)? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	☒	☐
Provide basis: Based on the comprehensive evaluation presented in the geotechnical documents dated September 11, 2015 and June 3, 2016, partial infiltration can be incorporated in to the design of the property. However, the bottom of the infiltration devices in some areas will be within a distance of 10 feet of the groundwater elevation. We understand storm water devices are typically designed at a depth of at least 10 feet above the groundwater table to prevent contamination migration. However, the groundwater in this area is likely considered non-beneficial use due to the proximity of the site to the San Diego Bay. Storm water infiltration should not occur within areas of known contamination as evaluated by SCS Engineers. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			
8	Can infiltration be allowed without violating downstream water rights? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	☒	☐
Provide basis: We did not provide a study regarding water rights due to the project elevation, proximity to Mission Bay, and lack of on-site streams (ephemeral or otherwise). However, these rights are not typical in the San Diego area. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			
Part 2 Result*	If all answers from row 1-4 are yes then partial infiltration design is potentially feasible. The feasibility screening category is Partial Infiltration.		☒
	If any answer from row 5-8 is no, then infiltration of any volume is considered to be infeasible within the drainage area. The feasibility screening category is No Infiltration.		☐

DMA-06 DCV AND REQUIRED VOLUME REDUCTION SUMMARY

Worksheet B.2-1 DCV

Design Capture Volume		Worksheet B.2-1		
1	85th percentile 24-hr storm depth from Figure B.1-1	d=	0.52	inches
2	Area tributary to BMP (s)	A=	0.05	acres
3	Area weighted runoff factor (estimate using Appendix B.1.1 and B.2.1)	C=	0.90	unitless
4	Trees Credit Volume	TCV=	0	cubic-feet
5	Rain barrels Credit Volume	RCV=	0	cubic-feet
6	Calculate DCV = (3630 x C x d x A) – TCV - RCV	DCV=	93	cubic-feet

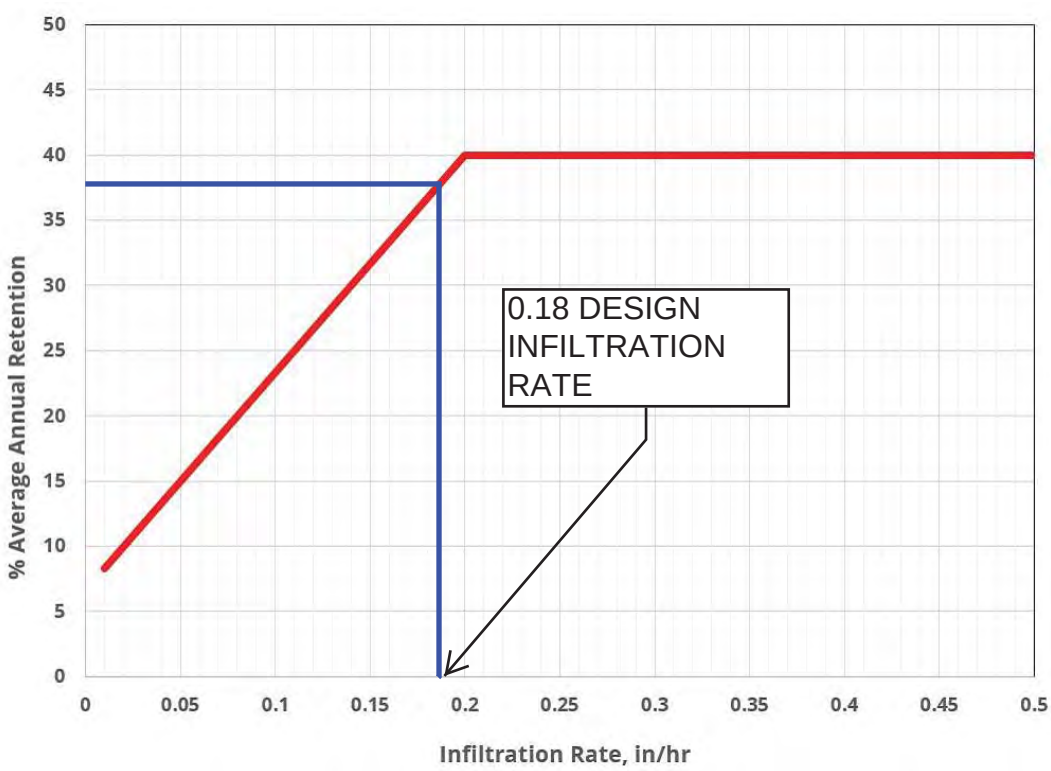
1) Area Weighted Runoff Factor

Surfaces	Area(ac)	Factor
Roof & PCC	0.05	.9

C= 0.90

2) Design Capture Volume

DCV = [(3630 * 0.90 * 0.52 * 0.05) - 0 - 0 = 93 CF



Worksheet B.4-1: Simple Sizing Method for Infiltration BMPs (DMA-6)

Simple Sizing Method for Infiltration BMPs		Worksheet B.4-1		
1	DCV (Worksheet B-2.1)	DCV=	93	cubic-feet
2	Estimated design infiltration rate (Worksheet D.5-1)	K_{design}=	0.18	in/hr
3	Available BMP surface area	A_{BMP}=	346	sq-ft
4	Average effective depth in the BMP footprint (DCV/A_{BMP})	D_{avg}=	0.27	feet
5	Drawdown time, T (D_{avg}*12/K_{design})	T=	17.92	hours
6	Provide alternative calculation of drawdown time, if needed.			

Note:

1. Drawdown time must be less than 36 hours. This criterion was set to achieve average annual capture of 80% to account for back to back storms (See rationale in Section B.4.3). In order to use a different drawdown time, BMPs should be sized using the percent capture method (Section B.4.2).
2. The average effective depth calculation should account for any aggregate/media in the BMP. For example, 4 feet of stone at a porosity of
3. This method may overestimate drawdown time for BMPs that drain through both the bottom and walls of the system.
4. BMP specific calculations of drawdown time may be provided that account for BMP-specific geometry.

DMA-2 DCV AND REQUIRED VOLUME REDUCTION SUMMARY

Worksheet B.2-1 DCV

Design Capture Volume		Worksheet B.2-1		
1	85th percentile 24-hr storm depth from Figure B.1-1	d=	0.52	inches
2	Area tributary to BMP (s)	A=	0.08	acres
3	Area weighted runoff factor (estimate using Appendix B.1.1 and B.2.1)	C=	0.90	unitless
4	Trees Credit Volume	TCV=	0	cubic-feet
5	Rain barrels Credit Volume	RCV=	0	cubic-feet
6	Calculate DCV = (3630 x C x d x A) – TCV - RCV	DCV=	129	cubic-feet

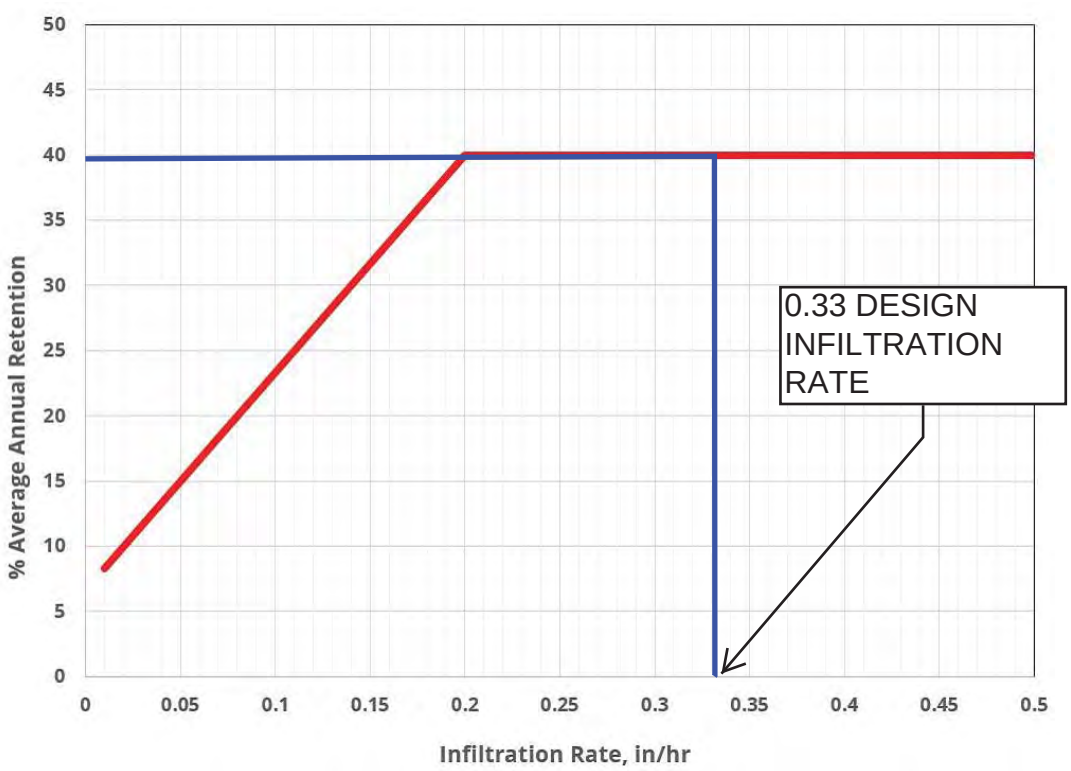
1) Area Weighted Runoff Factor

Surfaces	Area(ac)	Factor
Roof & PCC	0.08	.9

C= 0.90

2) Design Capture Volume

DCV = [(3630 * 0.90 * 0.52 * 0.08) - 0 - 0 = 129 CF



Worksheet B.5-1: Simple Sizing Method for Biofiltration BMPs (DMA-2)

Simple Sizing Method for Biofiltration BMPs		Worksheet B.5-1 (Page 1 of 2)	
1	Remaining DCV after implementing retention BMPs	129	cubic-feet
Partial Retention			
2	Infiltration rate from Worksheet D.5-1 if partial infiltration is feasible	0.33	in/hr.
3	Allowable drawdown time for aggregate storage below the underdrain	36	hours
4	Depth of runoff that can be infiltrated [Line 2 x Line 3]	11.88	inches
5	Aggregate pore space	0.40	in/in
6	Required depth of gravel below the underdrain [Line 4/ Line 5]	29.7	inches
7	Assumed surface area of the biofiltration BMP	89	sq-ft
8	Media retained pore storage	0.1	in/in
9	Volume retained by BMP [[Line 4 + (Line 12 x Line 8)]/12] x Line 7	101	cubic-feet
10	DCV that requires biofiltration [Line 1 – Line 9]	28	cubic-feet
BMP Parameters			
11	Surface Ponding [6 inch minimum, 12 inch maximum]	12	inches
12	Media Thickness [18 inches minimum], also add mulch layer thickness to this line for sizing calculations	18	inches
13	Aggregate Storage above underdrain invert (12 inches typical) – use 0 inches for sizing if the aggregate is not over the entire bottom surface area	6	inches
14	Freely drained pore storage	0.2	in/in
15	Media filtration rate to be used for sizing (5 in/hr. with no outlet control; if the filtration rate is controlled by the outlet use the outlet controlled rate which will be less than 5 in/hr.)	5	in/hr.
Baseline Calculations			
16	Allowable Routing Time for sizing	6	hours
17	Depth filtered during storm [Line 15 x Line 16]	30	inches
18	Depth of Detention Storage [Line 11 + (Line 12 x Line 14) + (Line 13 x Line 5)]	18	inches
19	Total Depth Treated [Line 17 + Line 18]	48	inches

Note: Line 7 is used to estimate the amount of volume retained by the BMP. Update assumed surface area in Line 7 until its equivalent to the required biofiltration footprint (either Line 21 or Line 23)

Worksheet B.5-1: Simple Sizing Method for Biofiltration BMPs (DMA-2)

Simple Sizing Method for Biofiltration BMPs		Worksheet B.5-1 (Page 2 of 2)	
Option 1 – Biofilter 1.5 times the DCV			
20	Required biofiltered volume [1.5 x Line 10]	41	cubic- feet
21	Required Footprint [Line 20/ Line 19] x 12	10	sq-ft
Option 2 - Store 0.75 of remaining DCV in pores and ponding			
22	Required Storage (surface + pores) Volume [0.75 x Line 10]	21	cubic- feet
23	Required Footprint [Line 22/ Line 18] x 12	14	sq-ft
Footprint of the BMP			
24	Area draining to the BMP	3,295	sq-ft
25	Adjusted Runoff Factor for drainage area (Refer to Appendix B.1 and B.2)	0.9	
26	BMP Footprint Sizing Factor (Default 0.03 or an alternative minimum footprint sizing factor from Worksheet B.5-2, Line 11)	0.03	
27	Minimum BMP Footprint [Line 24 x Line 25 x Line 26]	89	sq-ft
28	Footprint of the BMP = Maximum(Minimum(Line 21, Line 23), Line 27)	89	sq-ft
Check for Volume Reduction [Not applicable for No Infiltration Condition]			
29	Calculate the fraction of DCV retained in the BMP [Line 9/Line 1]	0.79	unitless
30	Minimum required fraction of DCV retained for partial infiltration condition	0.375	unitless
31	Is the retained DCV ≥ 0.375? If the answer is no increase the footprint sizing factor in Line 26 until the answer is yes for this criterion.	☐ Yes	☐ No

Note:

1. Line 7 is used to estimate the amount of volume retained by the BMP. Update assumed surface area in Line 7 until its equivalent to the required biofiltration footprint (either Line 21 or Line 23)
2. The DCV fraction of 0.375 is based on a 40% average annual percent capture and a 36-hour drawdown time.
3. The increase in footprint for volume reduction can be optimized using the approach presented in Appendix B.5.2. The optimized footprint cannot be smaller than the alternative minimum footprint sizing factor from Worksheet B.5.2.
4. If the proposed biofiltration BMP footprint is smaller than the alternative minimum footprint sizing factor from Worksheet B.5-2, but satisfies Option 1 or Option 2 sizing, it is considered a compact biofiltration BMP and may be allowed at the discretion of the City Engineer, if it meets the requirements in Appendix F.

DMA-10 & DMA-11 DCV AND REQUIRED VOLUME REDUCTION SUMMARY

Worksheet B.2-1 DCV

Design Capture Volume		Worksheet B.2-1		
1	85th percentile 24-hr storm depth from Figure B.1-1	d=	0.52	inches
2	Area tributary to BMP (s)	A=	0.19	acres
3	Area weighted runoff factor (estimate using Appendix B.1.1 and B.2.1)	C=	0.90	unitless
4	Trees Credit Volume	TCV=	0	cubic-feet
5	Rain barrels Credit Volume	RCV=	0	cubic-feet
6	Calculate DCV = (3630 x C x d x A) – TCV - RCV	DCV=	320	cubic-feet

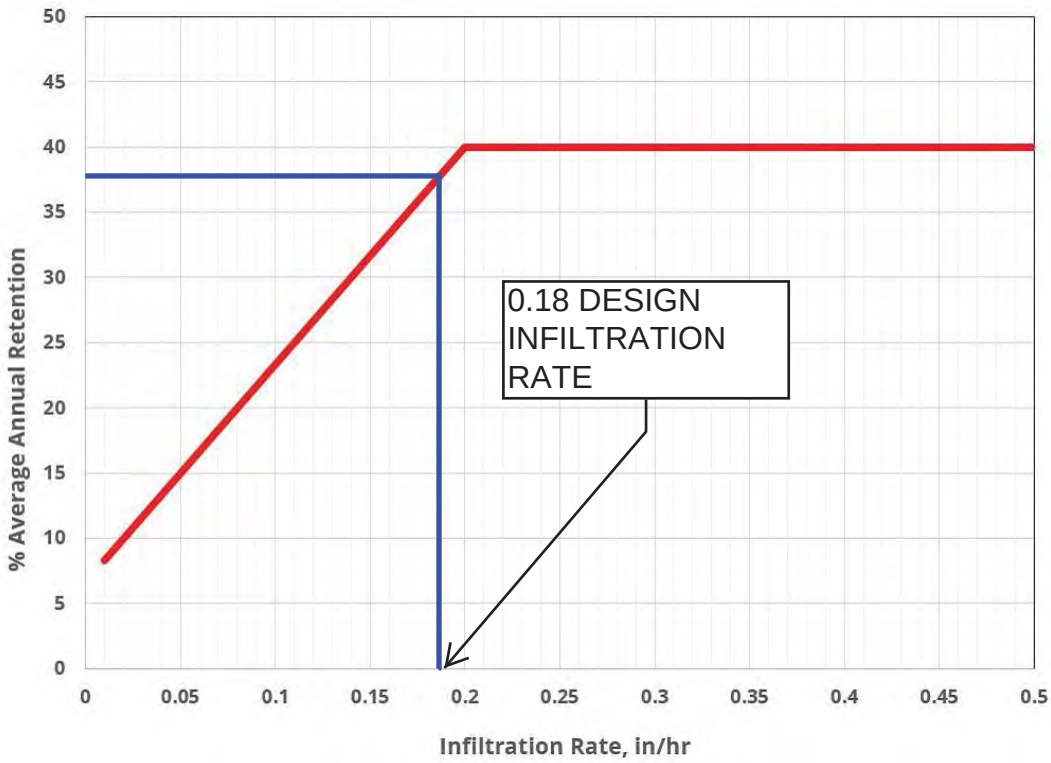
1) Area Weighted Runoff Factor

Surfaces	Area(ac)	Factor
Roof & PCC	0.19	.9

C= 0.90

2) Design Capture Volume

DCV = [(3630 * 0.90 * 0.52 * 0.19) - 0 - 0 = 320 CF



Worksheet B.5-1: Simple Sizing Method for Biofiltration BMPs (DMA-10, 11)

Simple Sizing Method for Biofiltration BMPs		Worksheet B.5-1 (Page 1 of 2)	
1	Remaining DCV after implementing retention BMPs	320	cubic-feet
Partial Retention			
2	Infiltration rate from Worksheet D.5-1 if partial infiltration is feasible	0.18	in/hr.
3	Allowable drawdown time for aggregate storage below the underdrain	36	hours
4	Depth of runoff that can be infiltrated [Line 2 x Line 3]	6.48	inches
5	Aggregate pore space	0.40	in/in
6	Required depth of gravel below the underdrain [Line 4/ Line 5]	16.2	inches
7	Assumed surface area of the biofiltration BMP	221	sq-ft
8	Media retained pore storage	0.1	in/in
9	Volume retained by BMP [[Line 4 + (Line 12 x Line 8)]/12] x Line 7	152	cubic-feet
10	DCV that requires biofiltration [Line 1 – Line 9]	168	cubic-feet
BMP Parameters			
11	Surface Ponding [6 inch minimum, 12 inch maximum]	12	inches
12	Media Thickness [18 inches minimum], also add mulch layer thickness to this line for sizing calculations	18	inches
13	Aggregate Storage above underdrain invert (12 inches typical) – use 0 inches for sizing if the aggregate is not over the entire bottom surface area	6	inches
14	Freely drained pore storage	0.2	in/in
15	Media filtration rate to be used for sizing (5 in/hr. with no outlet control; if the filtration rate is controlled by the outlet use the outlet controlled rate which will be less than 5 in/hr.)	5	in/hr.
Baseline Calculations			
16	Allowable Routing Time for sizing	6	hours
17	Depth filtered during storm [Line 15 x Line 16]	30	inches
18	Depth of Detention Storage [Line 11 + (Line 12 x Line 14) + (Line 13 x Line 5)]	18	inches
19	Total Depth Treated [Line 17 + Line 18]	48	inches

Note: Line 7 is used to estimate the amount of volume retained by the BMP. Update assumed surface area in Line 7 until its equivalent to the required biofiltration footprint (either Line 21 or Line 23)

Worksheet B.5-1: Simple Sizing Method for Biofiltration BMPs (DMA-10, 11)

Simple Sizing Method for Biofiltration BMPs		Worksheet B.5-1 (Page 2 of 2)	
Option 1 – Biofilter 1.5 times the DCV			
20	Required biofiltered volume [1.5 x Line 10]	251	cubic- feet
21	Required Footprint [Line 20/ Line 19] x 12	63	sq-ft
Option 2 - Store 0.75 of remaining DCV in pores and ponding			
22	Required Storage (surface + pores) Volume [0.75 x Line 10]	126	cubic- feet
23	Required Footprint [Line 22/ Line 18] x 12	84	sq-ft
Footprint of the BMP			
24	Area draining to the BMP	8,199	sq-ft
25	Adjusted Runoff Factor for drainage area (Refer to Appendix B.1 and B.2)	0.9	
26	BMP Footprint Sizing Factor (Default 0.03 or an alternative minimum footprint sizing factor from Worksheet B.5-2, Line 11)	0.03	
27	Minimum BMP Footprint [Line 24 x Line 25 x Line 26]	221	sq-ft
28	Footprint of the BMP = Maximum(Minimum(Line 21, Line 23), Line 27)	221	sq-ft
Check for Volume Reduction [Not applicable for No Infiltration Condition]			
29	Calculate the fraction of DCV retained in the BMP [Line 9/Line 1]	0.48	unitless
30	Minimum required fraction of DCV retained for partial infiltration condition	0.375	unitless
31	Is the retained DCV ≥ 0.375? If the answer is no increase the footprint sizing factor in Line 26 until the answer is yes for this criterion.	☐ Yes	☐ No

Note:

1. Line 7 is used to estimate the amount of volume retained by the BMP. Update assumed surface area in Line 7 until its equivalent to the required biofiltration footprint (either Line 21 or Line 23)
2. The DCV fraction of 0.375 is based on a 40% average annual percent capture and a 36-hour drawdown time.
3. The increase in footprint for volume reduction can be optimized using the approach presented in Appendix B.5.2. The optimized footprint cannot be smaller than the alternative minimum footprint sizing factor from Worksheet B.5.2.
4. If the proposed biofiltration BMP footprint is smaller than the alternative minimum footprint sizing factor from Worksheet B.5-2, but satisfies Option 1 or Option 2 sizing, it is considered a compact biofiltration BMP and may be allowed at the discretion of the City Engineer, if it meets the requirements in Appendix F.

DMA-03 & DMA-16 DCV AND REQUIRED VOLUME REDUCTION SUMMARY

Worksheet B.2-1 DCV

Design Capture Volume		Worksheet B.2-1		
1	85th percentile 24-hr storm depth from Figure B.1-1	d=	0.52	inches
2	Area tributary to BMP (s)	A=	0.22	acres
3	Area weighted runoff factor (estimate using Appendix B.1.1 and B.2.1)	C=	0.90	unitless
4	Trees Credit Volume	TCV=	0	cubic-feet
5	Rain barrels Credit Volume	RCV=	0	cubic-feet
6	Calculate DCV = (3630 x C x d x A) – TCV - RCV	DCV=	372	cubic-feet

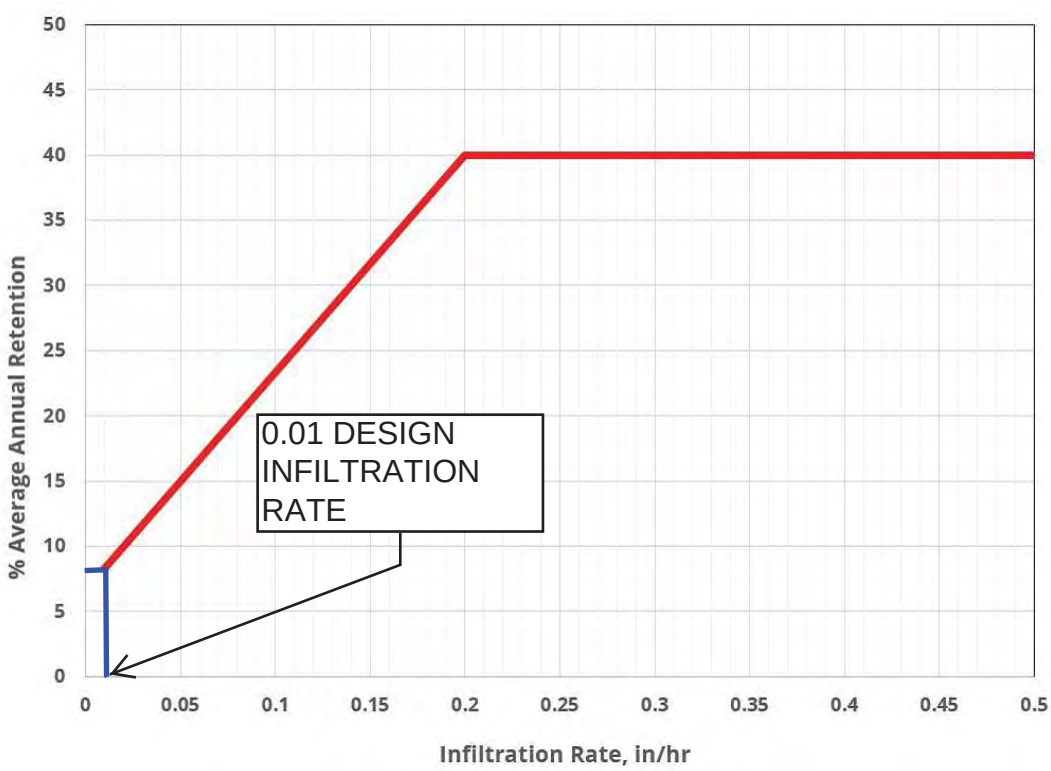
1) Area Weighted Runoff Factor

Surfaces	Area(ac)	Factor
Roof & PCC	0.22	.9

C= 0.90

2) Design Capture Volume

DCV = [(3630 * 0.90 * 0.52 * 0.22) - 0 - 0 = 372 CF



Worksheet B.5-1: Simple Sizing Method for Biofiltration BMPs (DMA-3, 16)

Simple Sizing Method for Biofiltration BMPs		Worksheet B.5-1 (Page 1 of 2)	
1	Remaining DCV after implementing retention BMPs	372	cubic-feet
Partial Retention			
2	Infiltration rate from Worksheet D.5-1 if partial infiltration is feasible	0.01	in/hr.
3	Allowable drawdown time for aggregate storage below the underdrain	36	hours
4	Depth of runoff that can be infiltrated [Line 2 x Line 3]	0.36	inches
5	Aggregate pore space	0.40	in/in
6	Required depth of gravel below the underdrain [Line 4/ Line 5]	0.9	inches
7	Assumed surface area of the biofiltration BMP	257	sq-ft
8	Media retained pore storage	0.1	in/in
9	Volume retained by BMP [[Line 4 + (Line 12 x Line 8)]/12] x Line 7	46	cubic-feet
10	DCV that requires biofiltration [Line 1 – Line 9]	326	cubic-feet
BMP Parameters			
11	Surface Ponding [6 inch minimum, 12 inch maximum]	12	inches
12	Media Thickness [18 inches minimum], also add mulch layer thickness to this line for sizing calculations	18	inches
13	Aggregate Storage above underdrain invert (12 inches typical) – use 0 inches for sizing if the aggregate is not over the entire bottom surface area	16	inches
14	Freely drained pore storage	0.2	in/in
15	Media filtration rate to be used for sizing (5 in/hr. with no outlet control; if the filtration rate is controlled by the outlet use the outlet controlled rate which will be less than 5 in/hr.)	5	in/hr.
Baseline Calculations			
16	Allowable Routing Time for sizing	6	hours
17	Depth filtered during storm [Line 15 x Line 16]	30	inches
18	Depth of Detention Storage [Line 11 + (Line 12 x Line 14) + (Line 13 x Line 5)]	22	inches
19	Total Depth Treated [Line 17 + Line 18]	52	inches

Note: Line 7 is used to estimate the amount of volume retained by the BMP. Update assumed surface area in Line 7 until its equivalent to the required biofiltration footprint (either Line 21 or Line 23)

Worksheet B.5-1: Simple Sizing Method for Biofiltration BMPs (DMA-3, 16)

Simple Sizing Method for Biofiltration BMPs		Worksheet B.5-1 (Page 2 of 2)	
Option 1 – Biofilter 1.5 times the DCV			
20	Required biofiltered volume [1.5 x Line 10]	489	cubic- feet
21	Required Footprint [Line 20/ Line 19] x 12	113	sq-ft
Option 2 - Store 0.75 of remaining DCV in pores and ponding			
22	Required Storage (surface + pores) Volume [0.75 x Line 10]	244	cubic- feet
23	Required Footprint [Line 22/ Line 18] x 12	133	sq-ft
Footprint of the BMP			
24	Area draining to the BMP	9,531	sq-ft
25	Adjusted Runoff Factor for drainage area (Refer to Appendix B.1 and B.2)	0.9	
26	BMP Footprint Sizing Factor (Default 0.03 or an alternative minimum footprint sizing factor from Worksheet B.5-2, Line 11)	0.03	
27	Minimum BMP Footprint [Line 24 x Line 25 x Line 26]	257	sq-ft
28	Footprint of the BMP = Maximum(Minimum(Line 21, Line 23), Line 27)	257	sq-ft
Check for Volume Reduction [Not applicable for No Infiltration Condition]			
29	Calculate the fraction of DCV retained in the BMP [Line 9/Line 1]	0.12	unitless
30	Minimum required fraction of DCV retained for partial infiltration condition	0.375	unitless
31	Is the retained DCV ≥ 0.375? If the answer is no increase the footprint sizing factor in Line 26 until the answer is yes for this criterion.	☐ Yes	☐ No

Note:

1. Line 7 is used to estimate the amount of volume retained by the BMP. Update assumed surface area in Line 7 until its equivalent to the required biofiltration footprint (either Line 21 or Line 23)
2. The DCV fraction of 0.375 is based on a 40% average annual percent capture and a 36-hour drawdown time.
3. The increase in footprint for volume reduction can be optimized using the approach presented in Appendix B.5.2. The optimized footprint cannot be smaller than the alternative minimum footprint sizing factor from Worksheet B.5.2.
4. If the proposed biofiltration BMP footprint is smaller than the alternative minimum footprint sizing factor from Worksheet B.5-2, but satisfies Option 1 or Option 2 sizing, it is considered a compact biofiltration BMP and may be allowed at the discretion of the City Engineer, if it meets the requirements in Appendix F.

DMA-29 & DMA-33 DCV AND REQUIRED VOLUME REDUCTION SUMMARY

Worksheet B.2-1 DCV

Design Capture Volume		Worksheet B.2-1		
1	85th percentile 24-hr storm depth from Figure B.1-1	d=	0.52	inches
2	Area tributary to BMP (s)	A=	0.16	acres
3	Area weighted runoff factor (estimate using Appendix B.1.1 and B.2.1)	C=	0.90	unitless
4	Trees Credit Volume	TCV=	0	cubic-feet
5	Rain barrels Credit Volume	RCV=	0	cubic-feet
6	Calculate DCV = (3630 x C x d x A) – TCV - RCV	DCV=	277	cubic-feet

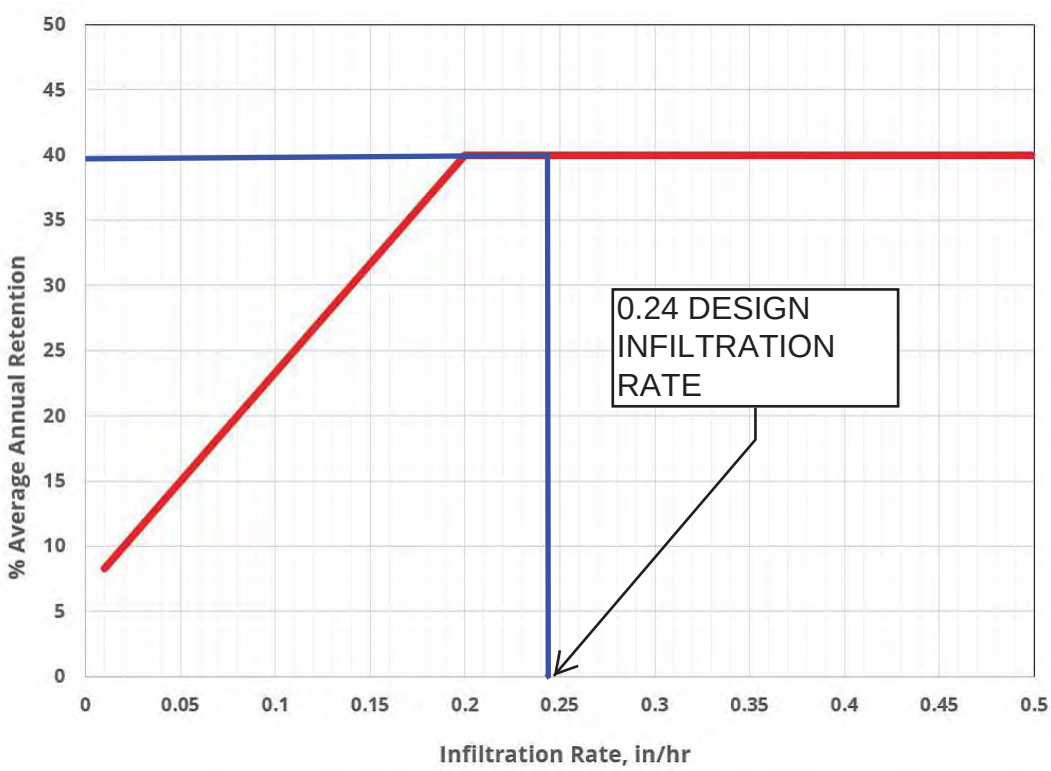
1) Area Weighted Runoff Factor

Surfaces	Area(ac)	Factor
Roof & PCC	0.16	.9

C= 0.90

2) Design Capture Volume

DCV = [(3630 * 0.90 * 0.52 * 0.16) - 0 - 0 = 277 CF



Worksheet B.5-1: Simple Sizing Method for Biofiltration BMPs (DMA-29, 33)

Simple Sizing Method for Biofiltration BMPs		Worksheet B.5-1 (Page 1 of 2)	
1	Remaining DCV after implementing retention BMPs	277	cubic-feet
Partial Retention			
2	Infiltration rate from Worksheet D.5-1 if partial infiltration is feasible	0.24	in/hr.
3	Allowable drawdown time for aggregate storage below the underdrain	36	hours
4	Depth of runoff that can be infiltrated [Line 2 x Line 3]	8.64	inches
5	Aggregate pore space	0.40	in/in
6	Required depth of gravel below the underdrain [Line 4/ Line 5]	21.6	inches
7	Assumed surface area of the biofiltration BMP	192	sq-ft
8	Media retained pore storage	0.1	in/in
9	Volume retained by BMP [[Line 4 + (Line 12 x Line 8)]/12] x Line 7	167	cubic-feet
10	DCV that requires biofiltration [Line 1 – Line 9]	110	cubic-feet
BMP Parameters			
11	Surface Ponding [6 inch minimum, 12 inch maximum]	12	inches
12	Media Thickness [18 inches minimum], also add mulch layer thickness to this line for sizing calculations	18	inches
13	Aggregate Storage above underdrain invert (12 inches typical) – use 0 inches for sizing if the aggregate is not over the entire bottom surface area	6	inches
14	Freely drained pore storage	0.2	in/in
15	Media filtration rate to be used for sizing (5 in/hr. with no outlet control; if the filtration rate is controlled by the outlet use the outlet controlled rate which will be less than 5 in/hr.)	5	in/hr.
Baseline Calculations			
16	Allowable Routing Time for sizing	6	hours
17	Depth filtered during storm [Line 15 x Line 16]	30	inches
18	Depth of Detention Storage [Line 11 + (Line 12 x Line 14) + (Line 13 x Line 5)]	18	inches
19	Total Depth Treated [Line 17 + Line 18]	48	inches

Note: Line 7 is used to estimate the amount of volume retained by the BMP. Update assumed surface area in Line 7 until its equivalent to the required biofiltration footprint (either Line 21 or Line 23)

Worksheet B.5-1: Simple Sizing Method for Biofiltration BMPs (DMA-29, 33)

Simple Sizing Method for Biofiltration BMPs		Worksheet B.5-1 (Page 2 of 2)	
Option 1 – Biofilter 1.5 times the DCV			
20	Required biofiltered volume [1.5 x Line 10]	165	cubic- feet
21	Required Footprint [Line 20/ Line 19] x 12	41	sq-ft
Option 2 - Store 0.75 of remaining DCV in pores and ponding			
22	Required Storage (surface + pores) Volume [0.75 x Line 10]	82	cubic- feet
23	Required Footprint [Line 22/ Line 18] x 12	55	sq-ft
Footprint of the BMP			
24	Area draining to the BMP	7,099	sq-ft
25	Adjusted Runoff Factor for drainage area (Refer to Appendix B.1 and B.2)	0.9	
26	BMP Footprint Sizing Factor (Default 0.03 or an alternative minimum footprint sizing factor from Worksheet B.5-2, Line 11)	0.03	
27	Minimum BMP Footprint [Line 24 x Line 25 x Line 26]	192	sq-ft
28	Footprint of the BMP = Maximum(Minimum(Line 21, Line 23), Line 27)	192	sq-ft
Check for Volume Reduction [Not applicable for No Infiltration Condition]			
29	Calculate the fraction of DCV retained in the BMP [Line 9/Line 1]	0.60	unitless
30	Minimum required fraction of DCV retained for partial infiltration condition	0.375	unitless
31	Is the retained DCV ≥ 0.375? If the answer is no increase the footprint sizing factor in Line 26 until the answer is yes for this criterion.	☐ Yes	☐ No

Note:

1. Line 7 is used to estimate the amount of volume retained by the BMP. Update assumed surface area in Line 7 until its equivalent to the required biofiltration footprint (either Line 21 or Line 23)
2. The DCV fraction of 0.375 is based on a 40% average annual percent capture and a 36-hour drawdown time.
3. The increase in footprint for volume reduction can be optimized using the approach presented in Appendix B.5.2. The optimized footprint cannot be smaller than the alternative minimum footprint sizing factor from Worksheet B.5.2.
4. If the proposed biofiltration BMP footprint is smaller than the alternative minimum footprint sizing factor from Worksheet B.5-2, but satisfies Option 1 or Option 2 sizing, it is considered a compact biofiltration BMP and may be allowed at the discretion of the City Engineer, if it meets the requirements in Appendix F.

DMA-7-9, 12-15, 17-28, 30-32, 34-36 DCV AND REQUIRED VOLUME REDUCTION

Design Capture Volume		Worksheet B.2-1		
1	85th percentile 24-hr storm depth from Figure B.1-1	d=	0.52	inches
2	Area tributary to BMP (s)	A=	2.12	acres
3	Area weighted runoff factor (estimate using Appendix B.1.1 and B.2.1)	C=	0.9	unitless
4	Trees Credit Volume	TCV=	0	cubic-feet
5	Rain barrels Credit Volume	RCV=		cubic-feet
6	Calculate DCV = (3630 x C x d x A) – TCV - RCV	DCV=	3,600	cubic-feet

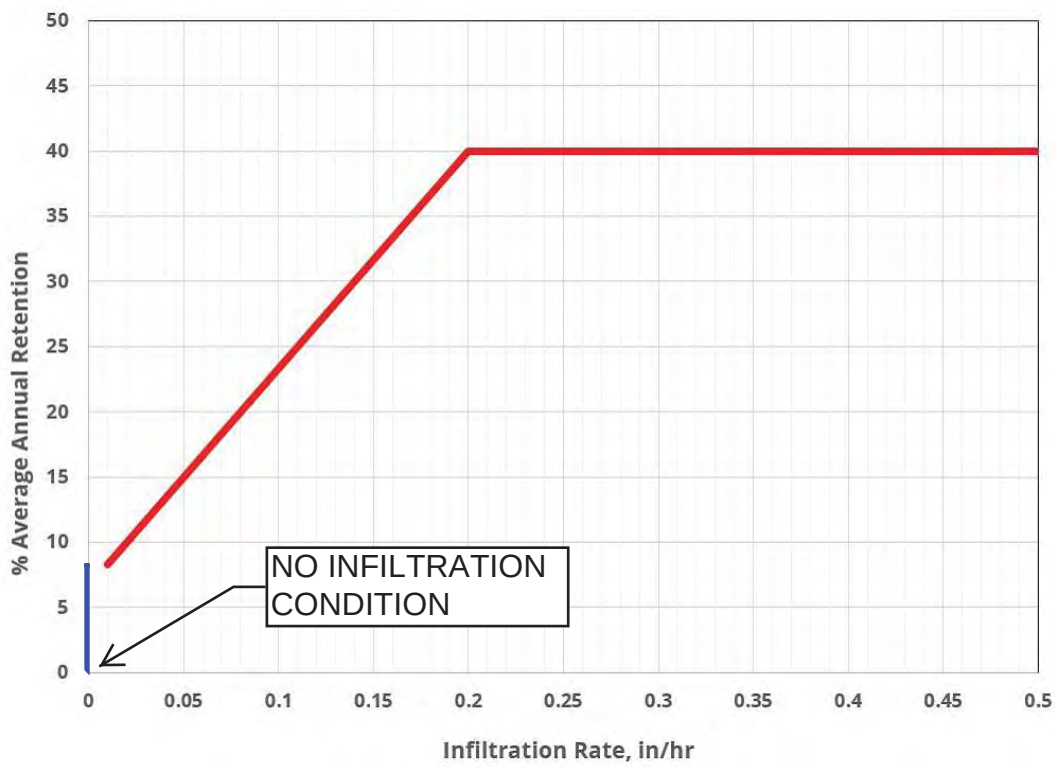
1) Area Weighted Runoff Factor

Surfaces	Area(ac)	Factor
Roof & PCC	0.08	.9

C= 0.90

2) Design Capture Volume

DCV = [(3630 * 0.90 * 0.52 * 2.12) - 0 - 0 = 3,600 CF



Worksheet B.5-1: Simple Sizing Method for Biofiltration BMPs
(DMA-7-9, 12-15, 17-28, 30-32, 34-36)

Simple Sizing Method for Biofiltration BMPs		Worksheet B.5-1 (Page 1 of 2)	
1	Remaining DCV after implementing retention BMPs	3,600	cubic-feet
Partial Retention			
2	Infiltration rate from Worksheet D.5-1 if partial infiltration is feasible	0	in/hr.
3	Allowable drawdown time for aggregate storage below the underdrain	36	hours
4	Depth of runoff that can be infiltrated [Line 2 x Line 3]	0	inches
5	Aggregate pore space	0.40	in/in
6	Required depth of gravel below the underdrain [Line 4/ Line 5]	0	inches
7	Assumed surface area of the biofiltration BMP	2,492	sq-ft
8	Media retained pore storage	0.1	in/in
9	Volume retained by BMP [[Line 4 + (Line 12 x Line 8)]/12] x Line 7	374	cubic-feet
10	DCV that requires biofiltration [Line 1 – Line 9]	3,226	cubic-feet
BMP Parameters			
11	Surface Ponding [6 inch minimum, 12 inch maximum]	12	inches
12	Media Thickness [18 inches minimum], also add mulch layer thickness to this line for sizing calculations	18	inches
13	Aggregate Storage above underdrain invert (12 inches typical) – use 0 inches for sizing if the aggregate is not over the entire bottom surface area	0	inches
14	Freely drained pore storage	0.2	in/in
15	Media filtration rate to be used for sizing (5 in/hr. with no outlet control; if the filtration rate is controlled by the outlet use the outlet controlled rate which will be less than 5 in/hr.)	5	in/hr.
Baseline Calculations			
16	Allowable Routing Time for sizing	6	hours
17	Depth filtered during storm [Line 15 x Line 16]	30	inches
18	Depth of Detention Storage [Line 11 + (Line 12 x Line 14) + (Line 13 x Line 5)]	15.6	inches
19	Total Depth Treated [Line 17 + Line 18]	45.6	inches

Note: Line 7 is used to estimate the amount of volume retained by the BMP. Update assumed surface area in Line 7 until its equivalent to the required biofiltration footprint (either Line 21 or Line 23)

Worksheet B.5-1: Simple Sizing Method for Biofiltration BMPs

(DMA-7-9, 12-15, 17-28, 30-32, 34-36)

Simple Sizing Method for Biofiltration BMPs		Worksheet B.5-1 (Page 2 of 2)	
Option 1 – Biofilter 1.5 times the DCV			
20	Required biofiltered volume [1.5 x Line 10]	4,839	cubic- feet
21	Required Footprint [Line 20/ Line 19] x 12	1,274	sq-ft
Option 2 - Store 0.75 of remaining DCV in pores and ponding			
22	Required Storage (surface + pores) Volume [0.75 x Line 10]	2,420	cubic- feet
23	Required Footprint [Line 22/ Line 18] x 12	1,861	sq-ft
Footprint of the BMP			
24	Area draining to the BMP	92,313	sq-ft
25	Adjusted Runoff Factor for drainage area (Refer to Appendix B.1 and B.2)	0.9	
26	BMP Footprint Sizing Factor (Default 0.03 or an alternative minimum footprint sizing factor from Worksheet B.5-2, Line 11)	0.03	
27	Minimum BMP Footprint [Line 24 x Line 25 x Line 26]	2,492	sq-ft
28	Footprint of the BMP = Maximum(Minimum(Line 21, Line 23), Line 27)	2,492	sq-ft
Check for Volume Reduction [Not applicable for No Infiltration Condition]			
29	Calculate the fraction of DCV retained in the BMP [Line 9/Line 1]	0.10	unitless
30	Minimum required fraction of DCV retained for partial infiltration condition	0.375	unitless
31	Is the retained DCV ≥ 0.375? If the answer is no increase the footprint sizing factor in Line 26 until the answer is yes for this criterion.	☐ Yes	☐ No

Note:

1. Line 7 is used to estimate the amount of volume retained by the BMP. Update assumed surface area in Line 7 until its equivalent to the required biofiltration footprint (either Line 21 or Line 23)
2. The DCV fraction of 0.375 is based on a 40% average annual percent capture and a 36-hour drawdown time.
3. The increase in footprint for volume reduction can be optimized using the approach presented in Appendix B.5.2. The optimized footprint cannot be smaller than the alternative minimum footprint sizing factor from Worksheet B.5.2.
4. If the proposed biofiltration BMP footprint is smaller than the alternative minimum footprint sizing factor from Worksheet B.5-2, but satisfies Option 1 or Option 2 sizing, it is considered a compact biofiltration BMP and may be allowed at the discretion of the City Engineer, if it meets the requirements in Appendix F.

1	**Biofiltration BMPs shall be allowed to be used only as described in the BMP selection process based on a documented feasibility analysis.** Intent: This manual defines a specific prioritization of pollutant treatment BMPs, where BMPs that retain water (retained includes evapotranspired, infiltrated, and/or harvested and used) must be used before considering BMPs that have a biofiltered discharge to the MS4 or surface waters. Use of a biofiltration BMP in a manner in conflict with this prioritization (i.e., without a feasibility analysis justifying its use) is not permitted, regardless of the adequacy of the sizing and design of the system.	
x	The project applicant has demonstrated that it is not technically feasible to retain the full DCV onsite.	Document feasibility analysis and findings in SWQMP per Appendix C.
2	**Biofiltration BMPs must be sized using acceptable sizing methods.** Intent: The MS4 Permit and this manual defines specific sizing methods that must be used to size biofiltration BMPs. Sizing of biofiltration BMPs is a fundamental factor in the amount of storm water that can be treated and also influences volume and pollutant retention processes.	
x	The project applicant has demonstrated that biofiltration BMPs are sized to meet one of the biofiltration sizing options available (Appendix B.5).	Submit sizing worksheets (Appendix B.5) or other equivalent documentation with the SWQMP.
3	**Biofiltration BMPs must be sited and designed to achieve maximum feasible infiltration and evapotranspiration.** Intent: Various decisions about BMP placement and design influence how much water is retained via infiltration and evapotranspiration. The MS4 Permit requires that biofiltration BMPs achieve maximum feasible retention (evapotranspiration and infiltration) of storm water volume.	
x	The biofiltration BMP is sited to allow for maximum infiltration of runoff volume based on the feasibility factors considered in site planning efforts. It is also designed to maximize evapotranspiration through the use of amended media and plants (biofiltration designs without amended media and plants may be permissible; see Item 5).	Document site planning and feasibility analyses in SWQMP per Section 5.4.
x	For biofiltration BMPs categorized as "Partial Infiltration Condition," the infiltration storage depth in the biofiltration design has been selected to drain in 36 hours (+/-25%) or an alternative value shown to maximize infiltration on the site.	Included documentation of estimated infiltration rate per Appendix D; provide calculations using Appendix B.4 and B.5 to show that the infiltration storage depth meets this criterion. Note, depths that are too shallow or too deep may not be acceptable.

x	For biofiltration BMP locations categorized as "Partial Infiltration Condition," the infiltration storage is over the entire bottom of the biofiltration BMP footprint.	Document on plans that the infiltration storage covers the entire bottom of the BMP (i.e., not just underdrain trenches); or an equivalent footprint elsewhere on the site.
x	For biofiltration BMP locations categorized as "Partial Infiltration Condition," the sizing factor used for the infiltration storage area is not less than the minimum biofiltration BMP sizing factors calculated using Worksheet B.5.1.	Provide a table that compares the minimum sizing factor per Worksheet B.5.1 to the provided sizing factor. Note: The infiltration storage area could be a separate storage feature located downstream of the biofiltration BMP, not necessarily within the same footprint.
x	An impermeable liner or other hydraulic restriction layer is only used when needed to avoid geotechnical and/or subsurface contamination issues in locations identified as "No Infiltration Condition."	If using an impermeable liner or hydraulic restriction layer, provide documentation of feasibility findings per Appendix C that recommend the use of this feature.
☐	The use of "compact" biofiltration BMP design[8] is permitted only in conditions identified as "No Infiltration Condition" and where site-specific documentation demonstrates that the use of larger footprint biofiltration BMPs would be infeasible.	Provide documentation of feasibility findings that recommend no infiltration is feasible. Provide site-specific information to demonstrate that a larger footprint biofiltration BMP would not be feasible.
4	**Biofiltration BMPs must be designed with a hydraulic loading rate to maximize pollutant retention, preserve pollutant control processes, and minimize potential for pollutant washout.** Intent: Various decisions about biofiltration BMP design influence the degree to which pollutants are retained. The MS4 Permit requires that biofiltration BMPs achieve maximum feasible retention of storm water pollutants.	

[8]Compact biofiltration BMPs are defined as features with infiltration storage footprint less than the minimum sizing factors required to achieve 40% volume retention. Note that if a biofiltration BMP is accompanied by an infiltrating area downstream that has a footprint equal to at least the minimum sizing factors calculated using Worksheet B.5.1 assuming a partial infiltration condition, then it is not considered to be a compact biofiltration BMP for the purpose of Item 4 of the checklist. For potential configurations with a higher rate biofiltration BMP upstream of an larger footprint infiltration area, the BMP would still need to comply with Item 5 of this checklist for pollutant treatment effectiveness.

x	Media selected for the biofiltration BMP meets minimum quality and material specifications per Appendix F.4 or County LID Manual, including the maximum allowable design filtration rate and minimum thickness of media.	Provide documentation that media meets the specifications in Appendix F.4 or County LID Manual.
	OR	
☐	Alternatively, for proprietary designs and custom media mixes not meeting the media specifications contained in Appendix F.4 or County LID Manual, field scale testing data are provided to demonstrate that proposed media meets the pollutant treatment performance criteria in Section F.1 below.	Provide documentation of performance information as described in Section F.1.
☐	To the extent practicable, filtration rates are outlet controlled (e.g., via an underdrain and orifice/weir) instead of controlled by the infiltration rate of the media.	Include outlet control in designs or provide documentation of why outlet control is not practicable.
x	The water surface drains to at least 12 inches below the media surface within 24 hours from the end of storm event flow to preserve plant health and promote healthy soil structure.	Include calculations to demonstrate that drawdown rate is adequate. Surface ponding drawdown time greater than 24-hours but less than 96 hours may be allowed at the discretion of the City Engineer if certified by a landscape architect or agronomist.
☐	If nutrients are a pollutant of concern, design of the biofiltration BMP follows nutrient-sensitive design criteria.	Follow specifications for nutrient sensitive design in Fact Sheet BF-2. Or provide alternative documentation that nutrient treatment is addressed and potential for nutrient release is minimized.
x	Media gradation calculations demonstrate that migration of media between layers will be prevented and permeability will be preserved.	Follow specification for choking layer in Fact Sheet PR-1 or BF-1. Or include calculations to demonstrate that choking layer is appropriately specified.
5	**Biofiltration BMPs must be designed to promote appropriate biological activity to support and maintain treatment processes.** Intent: Biological processes are an important element of biofiltration performance and longevity.	

x	Plants have been selected to be tolerant of project climate, design ponding depths and the treatment media composition.	Provide documentation justifying plant selection. Refer to the plant list in Appendix E.20.
x	Plants have been selected to minimize irrigation requirements.	Provide documentation describing irrigation requirements for establishment and long term operation.
x	Plant location and growth will not impede expected long-term media filtration rates and will enhance long term infiltration rates to the extent possible.	Provide documentation justifying plant selection. Refer to the plant list in Appendix E.20.
☐	If plants are not part of the biofiltration design, other biological processes are supported as needed to sustain treatment processes (e.g., biofilm in a subsurface flow wetland).	For biofiltration designs without plants, describe the biological processes that will support effective treatment and how they will be sustained. Refer to Appendix F.3
6	**Biofiltration BMPs must be designed with a hydraulic loading rate to prevent erosion, scour, and channeling within the BMP.** Intent: Erosion, scour, and/or channeling can disrupt treatment processes and reduce biofiltration effectiveness.	
x	Scour protection has been provided for both sheet flow and pipe inflows to the BMP, where needed.	Provide documentation of scour protection as described in Fact Sheets PR-1 or BF-1 or approved equivalent.
x	Where scour protection has not been provided, flows into and within the BMP are kept to non-erosive velocities.	Provide documentation of design checks for erosive velocities as described in Fact Sheets PR-1 or BF-1 or approved equivalent.
☐	For proprietary BMPs, the BMP is used in a manner consistent with manufacturer guidelines and conditions of its third-party certification[9] (i.e., maximum tributary area, maximum inflow velocities, etc., as applicable).	Provide copy of manufacturer recommendations and conditions of third-party certification.

[9]Certifications or verifications issued by the Washington Technology Acceptance Protocol-Ecology program and the New Jersey Corporation for Advanced Technology programs are typically accompanied by a set of guidelines regarding appropriate design and maintenance conditions that would be consistent with the certification/verification

7	**Biofiltration BMP must include operations and maintenance design features and planning considerations for continued effectiveness of pollutant and flow control functions.** Intent: Biofiltration BMPs require regular maintenance in order provide ongoing function as intended. Additionally, it is not possible to foresee and avoid potential issues as part of design; therefore plans must be in place to correct issues if they arise.	
☐	The biofiltration BMP O&M plan describes specific inspection activities, regular/periodic maintenance activities and specific corrective actions relating to scour, erosion, channeling, media clogging, vegetation health, and inflow and outflow structures.	Include O&M plan with project submittal as described in Chapter 7.
☐	Adequate site area and features have been provided for BMP inspection and maintenance access.	Illustrate maintenance access routes, setbacks, maintenance features as needed on project water quality plans.
☐	For proprietary biofiltration BMPs, the BMP maintenance plan is consistent with manufacturer guidelines and conditions of its third-party certification (i.e., maintenance activities, frequencies).	Provide copy of manufacturer recommendations and conditions of third-party certification.

Attachment 2

Backup for PDP Hydromodification Control Measures

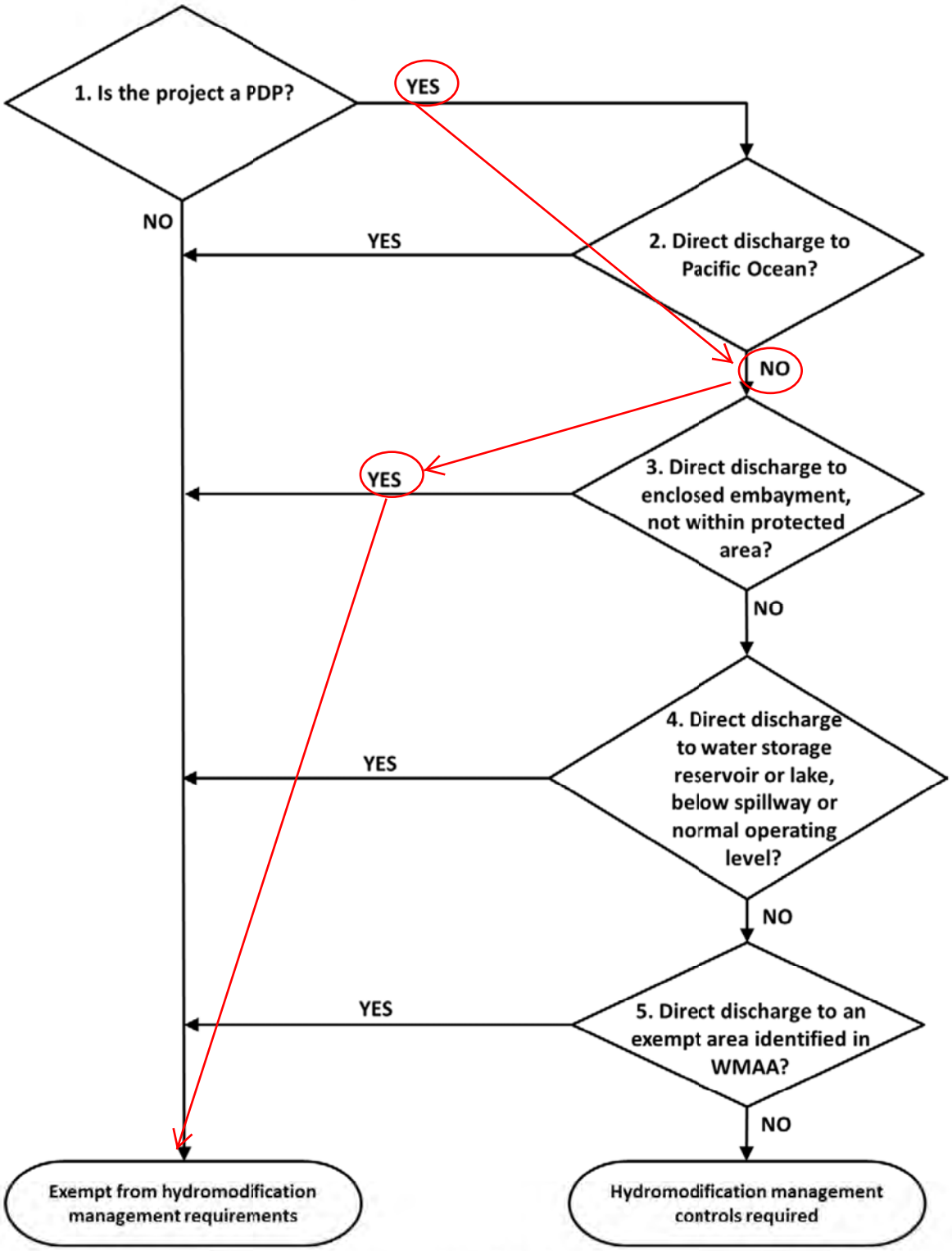
☒ Mark this box if this attachment is empty because the project is exempt from PDP hydromodification management requirements.

Items included in this attachment:

Attachment Sequence	Contents	Checklist
Attachment 2a	**Hydromodification management exhibit (Required)**	☐ **Included** **See hydromodification management exhibit Checklist.**
Attachment 2b	Management of critical coarse sediment yield areas (WMAA Exhibit is required, additional analyses are optional) See Section 6.2 of the BMP Design Manual.	☐ Exhibit showing project drainage boundaries marked on WMAA critical coarse sediment yield area map (Required) Optional analyses for critical coarse sediment yield area determination ☐ 6.2.1 Verification of geomorphic landscape units onsite ☐ 6.2.2 Downstream systems sensitivity to coarse sediment ☐ 6.2.3 Optional additional analysis of potential critical coarse sediment yield areas onsite
Attachment 2c	**Geomorphic assessment of receiving channels (Optional)** **See section 6.3.4 of the BMP design manual.**	☐ **Not performed** ☐ **Included** ☐ **Submitted as a separate stand-alone document**
Attachment 2d	Flow control facility design and structural BMP drawdown calculations (Required) Overflow design summary for each structural BMP See Chapter 6 and Appendix G of the BMP Design Manual	☐ Included ☐ Submitted as a separate stand-alone document
Attachment 2e	**Vector Control Plan** **(Required when structural BMPs will not drain in 96 hours)**	☐ **Included** ☐ **Not required because BMPs will drain in less than 96 hours**

The Hydromodification Management Exhibit must identify:

- ☐ Underlying hydrologic soil group
- ☐ Approximate depth to groundwater
- ☐ Existing natural hydrologic features (watercourses, seeps, springs, wetlands)
- ☐ Critical coarse sediment yield areas to be protected
- ☐ Existing topography
- ☐ Existing and proposed site drainage network and connections to drainage offsite
- ☐ Proposed grading
- ☐ Proposed impervious features
- ☐ Proposed design features and surface treatments used to minimize imperviousness
- ☐ Point(s) of Compliance (POC) for Hydromodification Management
- ☐ Existing and proposed drainage boundary and drainage area to each POC (when necessary, create separate exhibits for pre-development and post-project conditions)
- ☐ Structural BMPs for hydromodification management (identify location, type of BMP, and size/detail)



*Direct discharge refers to an uninterrupted hardened conveyance system; Note to be used in conjunction with Node Descriptions.

Figure 1-2. Applicability of Hydromodification Management BMP Requirements

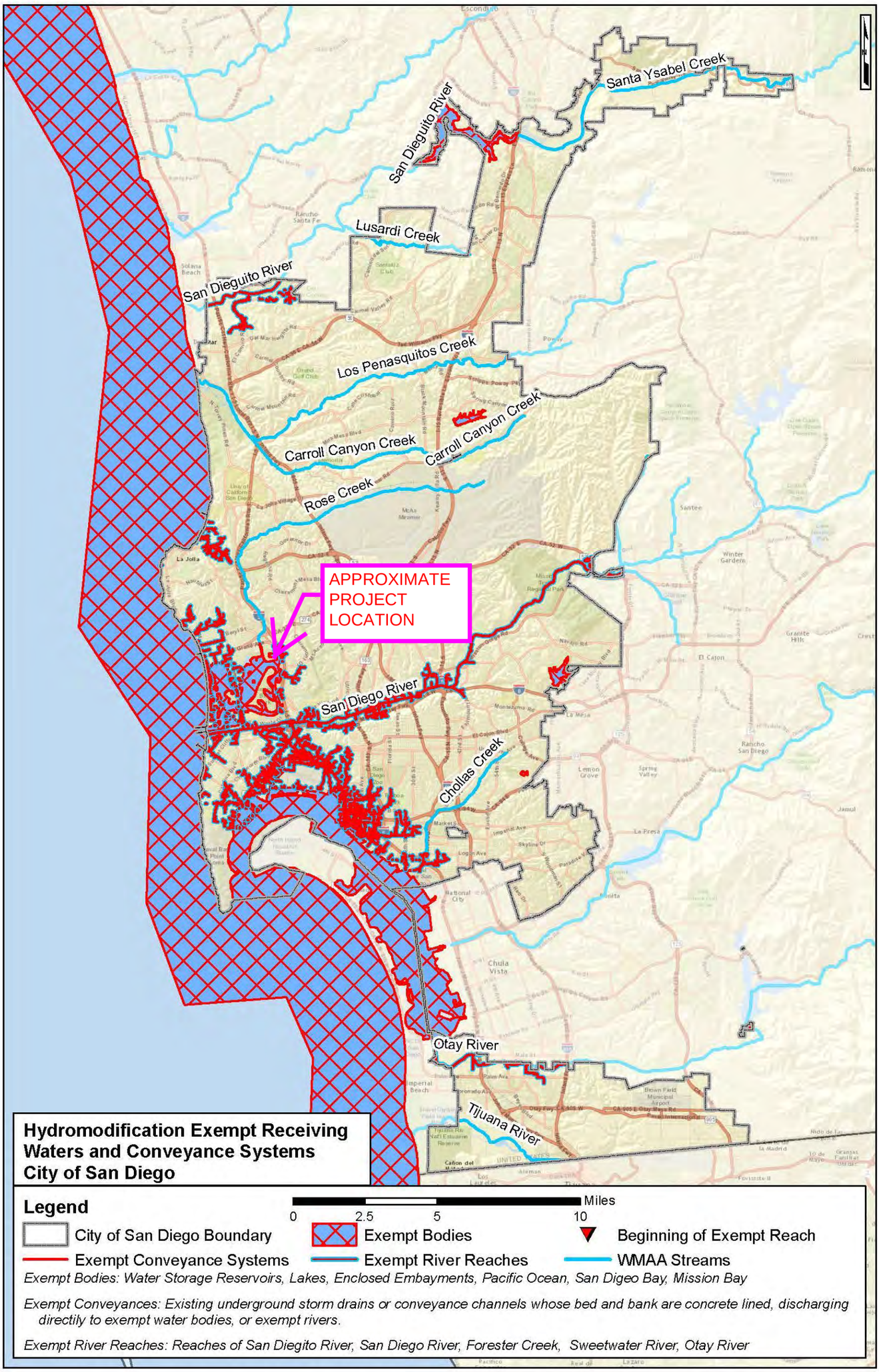


Figure H-G.2-2 Hydromodification Exempt Areas

NO.	DATE	BY	DESCRIPTION	NO.	DATE	BY	DESCRIPTION
6				12			
5				11			
4				10			
3				9			
2				8			
1	07/15/2016	MFD	ORIGINAL	7			

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Phone: (858) 597-2001 Fax: (858) 597-2009

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REGISTRATION R C E 26283

FILE CODE PB 39.01-22.15

DATE

PREPARATION AND REVISION LOG

100 0 100 200

1" = 100'

HMP EXHIBIT
SHEET 1 OF 1
JEFFERSON PACIFIC

Attachment 3

Structural BMP Maintenance Information

Items included in this attachment:

Attachment Sequence	Contents	Checklist
Attachment 3a	Structural BMP maintenance thresholds and actions (Required)	☒ Included (See structural BMP maintenance information checklist.)
Attachment 3b	Maintenance agreement (Form DS-3247) (when applicable)	☐ Included ☒ Not Applicable

Preliminary Design/Planning/CEQA level submittal:

- **Attachment 3a must identify:**

☒ Typical maintenance indicators and actions for proposed structural BMP(s) based on Section 7.7 of the BMP Design Manual

- Attachment 3b is not required for preliminary design / planning / CEQA level submittal.

Final Design level submittal:

Attachment 3a must identify:

☐ Specific maintenance indicators and actions for proposed structural BMP(s). This shall be based on Section 7.7 of the BMP Design Manual and enhanced to reflect actual proposed components of the structural BMP(s)
☐ How to access the structural BMP(s) to inspect and perform maintenance
☐ Features that are provided to facilitate inspection (e.g., observation ports, cleanouts, silt posts, or other features that allow the inspector to view necessary components of the structural BMP and compare to maintenance thresholds)
☐ Manufacturer and part number for proprietary parts of structural BMP(s) when applicable.
☐ Maintenance thresholds specific to the structural BMP(s), with a location-specific frame of reference (e.g., level of accumulated materials that triggers removal of the materials, to be identified based on viewing marks on silt posts or measured with a survey rod with respect to a fixed benchmark within the BMP)
☐ Recommended equipment to perform maintenance
☐ When applicable, necessary special training or certification requirements for inspection and maintenance personnel such as confined space entry or hazardous waste management

Attachment 3b: For private entity operation and maintenance, Attachment 3b must include a Storm Water Management and Discharge Control Maintenance Agreement (Form DS-3247). The following information must be included in the exhibits attached to the maintenance agreement:

☐ Vicinity map
☐ Site design BMPs for which DCV reduction is claimed for meeting the pollutant control obligations.
☐ BMP and HMP location and dimensions
☐ BMP and HMP specifications/cross section/model
☐ Maintenance recommendations and frequency
☐ LID features such as (permeable paver and LS location, dim, SF).

Table 7-2. Maintenance Indicators and Actions for Vegetated BMPs

Typical Maintenance Indicator(s) for Vegetated BMPs	Maintenance Actions
Accumulation of sediment, litter, or debris	Remove and properly dispose of accumulated materials, without damage to the vegetation.
Poor vegetation establishment	Re-seed, re-plant, or re-establish vegetation per original plans.
Overgrown vegetation	Mow or trim as appropriate, but not less than the design height of the vegetation per original plans when applicable (e.g. a vegetated swale may require a minimum vegetation height).
Erosion due to concentrated irrigation flow	Repair/re-seed/re-plant eroded areas and adjust the irrigation system.
Erosion due to concentrated storm water runoff flow	Repair/re-seed/re-plant eroded areas, and make appropriate corrective measures such as adding erosion control blankets, adding stone at flow entry points, or minor re-grading to restore proper drainage according to the original plan. If the issue is not corrected by restoring the BMP to the original plan and grade, the City Engineer shall be contacted prior to any additional repairs or reconstruction.
Standing water in vegetated swales	Make appropriate corrective measures such as adjusting irrigation system, removing obstructions of debris or invasive vegetation, loosening or replacing top soil to allow for better infiltration, or minor re-grading for proper drainage. If the issue is not corrected by restoring the BMP to the original plan and grade, the City Engineer shall be contacted prior to any additional repairs or reconstruction.
Standing water in bioretention, biofiltration with partial retention, or biofiltration areas, or flow-through planter boxes for longer than 96 hours following a storm event*	Make appropriate corrective measures such as adjusting irrigation system, removing obstructions of debris or invasive vegetation, clearing underdrains (where applicable), or repairing/replacing clogged or compacted soils.
Obstructed inlet or outlet structure	Clear obstructions.
Damage to structural components such as weirs, inlet or outlet structures	Repair or replace as applicable.
*These BMPs typically include a surface ponding layer as part of their function which may take 96 hours to drain following a storm event.	

Attachment 4

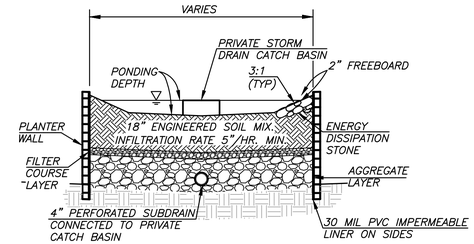
Permanent Storm Water BMP Plan

The BMP plan must identify:

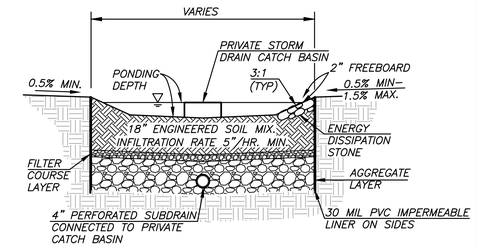
- ☐ Structural BMP(s) with ID numbers matching Form I-6 Summary of PDP Structural BMPs
- ☐ The grading and drainage design shown on the plans must be consistent with the delineation of DMAs shown on the DMA exhibit
- ☐ Details and specifications for construction of structural BMP(s)
- ☐ Signage indicating the location and boundary of structural BMP(s) as required by the City Engineer
- ☐ How to access the structural BMP(s) to inspect and perform maintenance
- ☐ Features that are provided to facilitate inspection (e.g., observation ports, cleanouts, silt posts, or other features that allow the inspector to view necessary components of the structural BMP and compare to maintenance thresholds)
- ☐ Manufacturer and part number for proprietary parts of structural BMP(s) when applicable
- ☐ Maintenance thresholds specific to the structural BMP(s), with a location-specific frame of reference (e.g., level of accumulated materials that triggers removal of the materials, to be identified based on viewing marks on silt posts or measured with a survey rod with respect to a fixed benchmark within the BMP) Recommended equipment to perform maintenance
- ☐ When applicable, necessary special training or certification requirements for inspection and maintenance personnel such as confined space entry or hazardous waste management
- ☐ Include landscaping plan sheets showing vegetation requirements for vegetated structural
- ☐ BMP(s) All BMPs must be fully dimensioned on the plans
- ☐ When proprietary BMPs are used, site specific cross section with outflow, inflow and model number shall be provided. Brochure photocopies are not allowed.

LEGEND

- SUBDIVISION BOUNDARY
- DMA LIMITS
- PROPOSED STORM DRAIN
- EXISTING STORM DRAIN
- BMP DESIGNATION
- DMA DESIGNATION
- PERVIOUS (SD-4)
- PERMEABLE PAVEMENT (INF-3)
- BIO-FILTRATION W/ PARTIAL RETENTION (PR-1)
- BIO-FILTRATION (BF-1)



PR DETAIL ~ BIOFILTRATION W/ PARTIAL RETENTION PLANTER



PR DETAIL ~ BIOFILTRATION W/ PARTIAL RETENTION BASIN
NO SCALE

IV. STANDARD/PRIORITY PERMANENT BEST MANAGEMENT PRACTICES (BMP'S)

LOW IMPACT DESIGN (LID) BMP'S:

1. MINIMIZE IMPERVIOUS FOOTPRINT THROUGH EFFICIENT DESIGN, INCORPORATING MULTI-LEVEL RESIDENTIAL BUILDINGS, INDOOR PARKING, SHARED DRIVEWAYS AND MINIMUM WIDTHS ON IMPERVIOUS SURFACES (SD-3)
2. LANDSCAPE AREAS TO BE MULCHED (SD-4)
3. DRAIN SIDEWALKS TO ADJACENT LANDSCAPING (SD-5)
4. USE OF PEST RESISTANT AND DROUGHT TOLERANT LANDSCAPING (SD-7)
5. UTILIZE RAINBARRELS (SD-8)

SOURCE CONTROL BMP'S:

6. DRAIN A/C CONDENSATE TO LANDSCAPE AREAS (SC-1)
7. STENCIL OR STAMP ALL STORM DRAIN INLETS WITH WARNINGS TO DISCOURAGE "ILLEGAL" DUMPING OR DISCHARGE INTO THE STORM DRAIN SYSTEM (SC-2)
8. DESIGN TRASH STORAGE AREAS TO REDUCE POLLUTION CONTRIBUTION (SC-5)
9. INTERIOR PARKING GARAGE DRAINS PLUMBED TO SANITARY SYSTEM (SC-6)

TREATMENT CONTROL BMP'S:

10. USE OF PERMEABLE PAVEMENT TO INFILTRATE RUNOFF (INF-3)
11. USE OF BIOFILTRATION WITH PARTIAL RETENTION TO FILTER RUNOFF (PR-1)
12. USE OF LARGE FOOTPRINT BIOFILTRATION TO FILTER RUNOFF (BF-1)

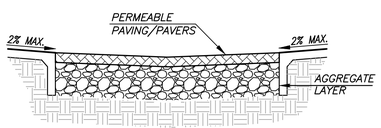
V. CONSTRUCTION STORM WATER BMP PERFORMANCE STANDARDS

A) A STORM WATER POLLUTION PREVENTION PLAN (SWPPP) WILL BE REQUIRED PRIOR TO THE ISSUANCE OF ANY CONSTRUCTION PERMITS FOR THE PROJECT.

B) THE PERMITEE OR DESIGNEE SHALL INCORPORATE ANY CONSTRUCTION BEST MANAGEMENT PRACTICES (BMP'S) NECESSARY TO COMPLY WITH CHAPTER 14, ARTICLE 2, DIVISION 1 (GRADING REGULATIONS) OF THE LAND DEVELOPMENT CODE, INTO THE CONSTRUCTION PLANS AND/OR SPECIFICATIONS, SATISFACTORY TO THE CITY ENGINEER, PRIOR TO THE ISSUANCE OF ANY CONSTRUCTION PERMITS.

VI. IMPLEMENTATION AND MAINTENANCE REQUIREMENTS

A) THE PERMITEE OR DESIGNEE SHALL EXECUTE A MAINTENANCE AGREEMENT FOR ONGOING PERMANENT BMP MAINTENANCE, SATISFACTORY TO THE CITY ENGINEER, PRIOR TO THE ISSUANCE OF ANY CONSTRUCTION PERMITS FOR THE PROJECT.



NF DETAIL ~ PERMEABLE PAVEMENT

BF DETAIL ~ BIOFILTRATION BASIN
NO SCALE

DETAILED CONNECTION AND DISCHARGE POINTS FOR ALL DMAs AND BMPs TO BE PROVIDED ON FINAL DESIGN LEVEL DRAWINGS AND/OR BUILDING PLANS AS APPROPRIATE.

NO.	DATE	BY	DESCRIPTION	NO.	DATE	BY	DESCRIPTION
6				12			
5				11			
4				10			
3				9			
2	07/15/2016	MFD	CLIENT/AGENCY REVISIONS	8			
1	02/19/2016	MFD	ORIGINAL	7			

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Phone: (858) 597-2001 Fax: (858) 597-2009

APPROVED BY ENGINEER OF WORK — REGISTRATION R C E 26283
FILE CODE PB 39.01-22.15 — DATE

PREPARATION AND REVISION LOG

BMP PLAN - PROPOSED CONDITION
SHEET 1 OF 1
JEFFERSON PACIFIC

Attachment 5

Drainage Study

DRAINAGE STUDY
FOR
Jefferson Pacific Beach

PTS No. 327976, I.O. No. 24003849
July 15, 2016

Prepared By:
LEPPERT ENGINEERING CORPORATION
5190 GOVERNOR DRIVE, SUITE 205
SAN DIEGO, CA 92122
Job No. PB 39.01-22.15

Prepared For:
JPI Real Estate Acquisitions, LLC
C/O Justin Craig
12250 El Camino Real, S-380
San Diego, CA 92130
Justin.Craig@JPI.com

_____
By: John D. Leppert, RCE 26283
Exp. 3/31/18

_____
Date

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Purpose 1
Project Location 1
Project Description 1
Method of Calculation 1
Existing Condition 1
Proposed Condition 3
Conclusions 4

Exhibits

EXHIBIT "A" – Location Map
EXHIBIT "B" – Existing Condition Drainage Basin Map
EXHIBIT "C" – Existing Condition SSA Analysis Results
EXHIBIT "D" – Proposed Condition Drainage Basin Map
EXHIBIT "E" – Proposed Condition SSA Analysis

Appendices

APPENDIX I – Rational Method: City of San Diego Drainage Design Manual
APPENDIX II – Design Runoff: City of San Diego Drainage Design Manual
APPENDIX III – Runoff Coefficients: City of San Diego Drainage Design Manual
APPENDIX IV – Rainfall Intensity-Duration-Frequency Curves: City of San Diego Drainage Design Manual
APPENDIX V – Existing Improvement Plans

Drainage Study
Jefferson Pacific Beach
July 15, 2016

Purpose

The purpose of this drainage study is to estimate the quantity of storm water runoff from the proposed development of the Jefferson Pacific Beach site, determine sizing of proposed storm drains, and confirm adequacy of existing storm drains. All water quality analysis will be accomplished in the SWQMP for this proposed development.

Project Location

The proposed project is located in Pacific Beach, which falls under the Miramar Hydrologic Area (Hydrologic Sub-area 906.40) of the Peñasquitos Hydrologic unit. The project site is on the southeast corner of the intersection of Mission Bay Dr. & Rosewood St. just southwest of interstate 5, in the City of San Diego (see Exhibit A).

Project Description

The project proposes a two level subterranean parking structure with a total of 365 covered spaces provided. Along with three two-story commercial retail buildings totaling 19,000 s.f. and four four-story residential multifamily buildings constructed on the garage podium. An additional building containing 3 townhome units is provided on the northeast corner of the project which provides a total of 171 multifamily units.

Method of Calculation

This study calculates the total runoff from the site using the guidelines set forth in the City of San Diego's Drainage Design Manual, dated April 1984 (see Appendix II – Design Runoff: City of San Diego Drainage Design Manual). The specific method used is the Rational Formula for watersheds under 0.5 square miles(see Appendix I – Rational Method: City of San Diego Drainage Design Manual). A 100 year storm event was used for the analysis. Per the City of San Diego Drainage Design Manual, for tributary areas less than one square mile the storm drain system shall be designed so that the combination of storm drain system capacity and overflow will be able to carry the 100-year frequency storm without damage to or flooding of adjacent existing buildings or potential building sites, and Type D soil shall be used for all areas (see Appendix III– Runoff Coefficients: City of San Diego Drainage Design Manual).

Autodesk Storm and Sanitary Analysis was used for the storm analysis. Autodesk Storm and Sanitary Analysis is a link-node based model that performs hydrology, hydraulic, and water quality analysis of storm water and wastewater drainage systems, including sewage treatment plants and water quality control devices. A link represents a hydraulic element (i.e., a pipe, channel, pump, standpipe, culvert, or weir) that transports flow and constituents. A node can represent the junction of two or more links, a storm drain catch basin inlet, the location of a flow or pollutant input into the system, or a storage element (such as a detention pond, retention pond, settling pond, or lake).

Drainage basin boundaries, flow patterns, and topographic elevations are shown on the drainage basin maps located in the map pockets (see Exhibit B – Existing Condition Drainage Basin Map & Exhibit D – Proposed Condition Basin Map).

Existing Condition

The project site located at 4275 Mission Bay Dr. San Diego, CA 92109 is currently a previously developed car dealership with associated buildings, service bays and parking lots on a 2.9 acre site designated by APNs 424-380-06, 424-380-07 & 424-362-24. The site is bound by Rosewood St. and Del Rey St. to the

north and northwest, Mission Bay Dr. to the southwest and Interstate 5 to the east and southeast. All of the surrounding parcels are developed primarily as multifamily housing.

A total of six sub-basins with three outfalls were analyzed. The sub-basin summary below describes each of the sub-basins and Exhibit B – Existing Condition Drainage Basin Map shows the basin boundaries.

Per the City of San Diego Drainage Design Manual, a developed condition runoff coefficient of 0.95 was chosen for this analysis, which corresponds to a site use for high-density industrial developments.

Sub-basin A:
This area is an onsite basin consisting of a paved storage lot. A small existing retaining wall along the North property line diverts runoff around the site from a small fill slope along the Caltrans right of way. Drainage from this basin surface flows via gutter to the existing curb inlet located at the north west corner of the project site.

Sub-basin B:
This area is a basin consisting of the landscaped area onsite fronting Rosewood Street and a half width of Rosewood Street itself. Drainage from this basin surface flows via gutter to the existing curb inlet located at the north west corner of the project site.

Sub-basin C:
This area is an onsite basin consisting of a paved storage lot and a portion of the onsite buildings. Drainage from this basin surface flows to an existing onsite grate inlet connected to an existing 54" RCP located in Rosewood Street.

Sub-basin D:
This area is an onsite basin consisting of a paved parking lot and a portion of the onsite buildings. Drainage from this basin surface flows via gutter where it joins the flows from basin F on the south east corner of the project site adjacent to the I-5 off-ramp.

Sub-basin E:
This area is an offsite basin consisting of Mission Bay Dr between the project site and the I-5 off ramp. Drainage from this basin surface flows to the gutter where along the south east corner of the project site.

Sub-basin F:
This area is an onsite basin consisting of a paved parking lot and the remaining portion of the onsite building. Drainage from this basin surface flows off the parking lot edge and down the existing slope before entering the gutter the south east corner of the project site adjacent to the I-5 off-ramp.

Time of Concentration calculations for each subbasin are tabulated below:

Basin	Acres	C	Length (ft)	Upper Elev. (ft)	Lower Elev. (ft)	Slope (%)	Tc (min)
A	0.2	0.95	150	31	25	4.0%	2.1
B	0.3	0.95	275	25	13.5	4.2%	2.8
C	1.2	0.95	260	31	23	3.1%	3.0
D	1.3	0.95	255	21	15	2.4%	3.2
E	0.6	0.95	320	15	12	0.9%	4.9
F	0.3	0.95	125	24	21	2.4%	2.3

Since all sub-basins have a time of concentration less than 5 minutes, a minimum time of concentration of 5 minutes was used. Intensity values were determined using the City of San Diego Drainage Design Manual Rainfall Intensity Duration Frequency Curves (see Appendix IV).

These flows and the storm drain system we're placed in SSA for analysis. No existing flows are available for any of the adjacent pipe segments, so this analysis will be focused on the comparison of the existing to proposed runoff total. Results from the analysis can be found in Exhibit C-Existing Condition SSA Analysis Results.

The results of the analysis are included as Exhibit C. The peak runoffs discharged from each of the existing outfalls are:

- Out-01 = 8.27 cfs
- Out-02 = 1.42 cfs
- Out-03 = 4.75 cfs
- Total = 14.44 cfs

Proposed Condition

The proposed condition analysis analyzes three basins as shown on Exhibit D-Proposed Condition Basin Map. This drainage study will assume a flow through condition on all Water Quality treatment utilizing the main bypass for sizing of the storm drain pipes, the individual treatment will be discussed in the SWQMP for this project.

Per the City of San Diego Drainage Design Manual, a developed condition runoff coefficient of 0.70 was chosen for this analysis, which corresponds to a multi-family residential use. This runoff coefficient was utilized for all onsite basins. For off-site basin areas the same runoff coefficients as the existing condition were used.

For all sub-basins within the site the time of concentration is assumed to be less than 5 minutes due to onsite area drains and roof drains, so the minimum time of concentration of 5 minutes was used. Intensity values were determined using the City of San Diego Drainage Design Manual Rainfall Intensity Duration Frequency Curves (see Appendix IV).

Runoff calculations for each sub-basin are tabulated below:

Basin	Acres	C	Length (ft)	Upper Elev. (ft)	Lower Elev. (ft)	Slope (%)	Tc (min)
A	0.4	0.95	275	25	13.5	4.2%	2.8
B	2.9	0.70	N/A	N/A	N/A	N/A	N/A
C	0.7	0.95	320	15	12	0.9%	4.9

There are three total outfall locations in the proposed condition. Outfall one and two are the same as in the existing condition. Outfall three is where all site runoff will be plumbed to an existing 60" RCP with an outfall to Mission Bay. Results from the analysis can be found in Exhibit E-Proposed Condition SSA Analysis Results.

The results of the analysis are included as Exhibit E. The peak runoffs discharged from each of the proposed outfalls are:

- Out-01 = 2.79 cfs
- Out-02 = 1.23 cfs
- Out-03 = 8.41 cfs
- Total = 12.43 cfs

Conclusions

As compared to the existing condition, the proposed project decreases the peak runoff from the site. This is due to there being a decreased site imperviousness with the revised proposed use. The peak flow is reduced from 14.44 cfs existing to 12.43 cfs proposed, a reduction of 2.01 cfs. Since the total site runoff is reduced in the proposed condition, no further downstream analysis is required.

The proposed storm drains will be sized as indicated in the Autodesk Storm and Sanitary Analysis results to provide adequate capacity.

The project discharge point is a connection to an existing storm drain system which will be compliant with the City of San Diego's current storm water standards manual, as regulated by the MS4 permit. The connection point is downstream of any nearby potential jurisdictional waters of the US, and as such there is no need for any 401/404 permits for the project.

EXHIBIT “A” – Location Map

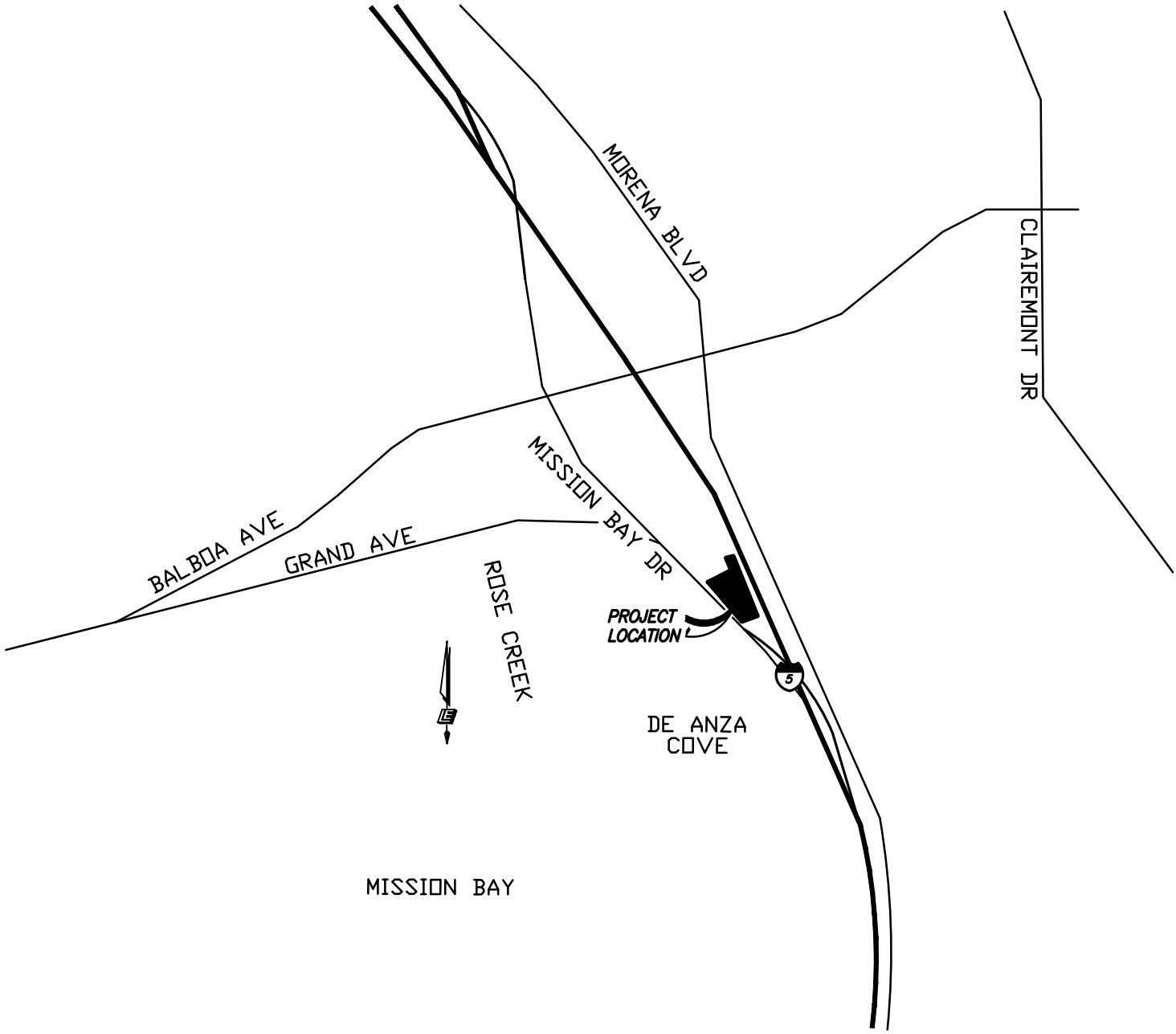

MORENA BLVD
CLAIREMONT DR
MISSION BAY DR
BALBOA AVE
GRAND AVE
ROSE CREEK
PROJECT LOCATION
5
DE ANZA COVE
MISSION BAY

EXHIBIT “B” – Existing Condition Drainage Basin Map

ASSESSOR'S PARCEL NUMBER:

424–380–06, 424–380–07 & 424–362–24

LEGAL DESCRIPTION

PARCEL 1:

LOT 1 OF VISTA DE ANZA, IN THE CITY OF SAN DIEGO, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 5881, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, MAY 9, 1967, TOGETHER WITH THAT PORTION OF THE SOUTHERLY 25.00 FEET OF ROSEWOOD, ADJOINING SAID LOT 1 ON NORTHWEST, AS VACATED AND CLOSED TO PUBLIC USED BY RESOLUTION NO. 193278, RECORDED MARCH 29, 1968 AS INSTRUMENT NO. 52879, OF OFFICIAL RECORDS.

PARCEL 2:

THAT PORTION OF MARINE TERRACE, ACCORDING TO MAP THEREOF NO. 1477, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, OCTOBER 7, 1912 AND THAT PORTION OF LOT 1 OF EUREKA LEMON TRACT, IN THE CITY OF SAN DIEGO, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 753, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, MAY 19, 1893, DESCRIBED AS FOLLOWS:

BEGINNING AT THE MOST NORTHERLY CORNER OF SAID LOT 1; THENCE ALONG THE FOLLOWING NUMBERED COURSES: –1– ALONG THE NORTHWESTERLY LINE OF SAID LOT 1, SOUTH 62°41'45" WEST210 28 FEET BEING ALSO ALONG THE SOUTHEASTERLY LINE OF ROSEWOOD STREET, AS SHOWN ON THE MAP NO. 964 OF STEPHEN'S ADDITION FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, NOVEMBER 9, 1905, –2– LEAVING SAID NORTHWESTERLY LINE OF SAID LOT 1, SOUTH 14°56'38" EAST, 235.58 FEET TO THE TRUE POINT OF BEGINNING; –3– CONTINUING ALONG LAST SAID COURSE, SOUTH 14°56'38" EAST 263.32 FEET; –4– SOUTH 73°03'05" WEST 108 FEET; –5– NORTH 59°27'01" WEST 123.63 FEET TO A POINT ON THE NORTHEASTERLY LINE OF PACIFIC HIGHWAY DISTANT THEREON SOUTH 45°20'10" EAST 382 FEET FROM THE INTERSECTION OF SAID NORTHEASTERLY LINE OF PACIFIC HIGHWAY, WITH SAID SOUTHEASTERLY LINE OF ROSEWOOD STREET; –6– ALONG SAID NORTHEASTERLY LINE OF PACIFIC HIGHWAY, NORTH 45°20'10" WEST 140 FEET; THENCE LEAVING SAID NORTHEASTERLY LINE OF PACIFIC HIGHWAY, NORTH 62°41'45" EAST 271.72 FEET TO THE TRUE POINT OF BEGINNING.

NOTE: SAID LAND IS NOW SHOWN ON PARCEL MAP NO. 1172, FILED IN THE RECORDERS OFFICE OF SAN DIEGO COUNTY ON 12–18–72.

PARCEL 3:

LOTS 21 AND 22, BLOCK 6 STEPHEN'S ADDITION, ACCORDING TO MAP THEREOF NO. 964, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, NOVEMBER 9, 1905 TOGETHER WITH THAT PORTION OF FORMER ROSEWOOD STREET, NOW VACATED AND CLOSED TO PUBLIC USE, AS WOULD REVERT TO SAID PROPERTY BY OPERATION OF LAW.

EXCEPTING THEREFROM THOSE PORTIONS THEREOF DESCRIBED IN DEEDS TO THE STATE OF CALIFORNIA RECORDED DECEMBER 18, 1952 IN BOOK 4690, PAGE 374, OF OFFICIAL RECORDS AND FEBRUARY 15 1966 AS INSTRUMENT NO. 26568, OF OFFICIAL RECORDS OF SAID SAN DIEGO COUNTY.

NOTE: SAID LAND IS NOW SHOWN AS PARCEL "C" OF PARCEL MAP NO. 1958, FILED IN THE RECORDERS OFFICE OF SAN DIEGO COUNTY ON 10–04–73.

LEGEND

PROPERTY BOUNDARY

STORM DRAIN

BASIN / AREA — ZZ / 0.00 AC.

NODE NO. — #

BASIN LIMITS

CURB INLET

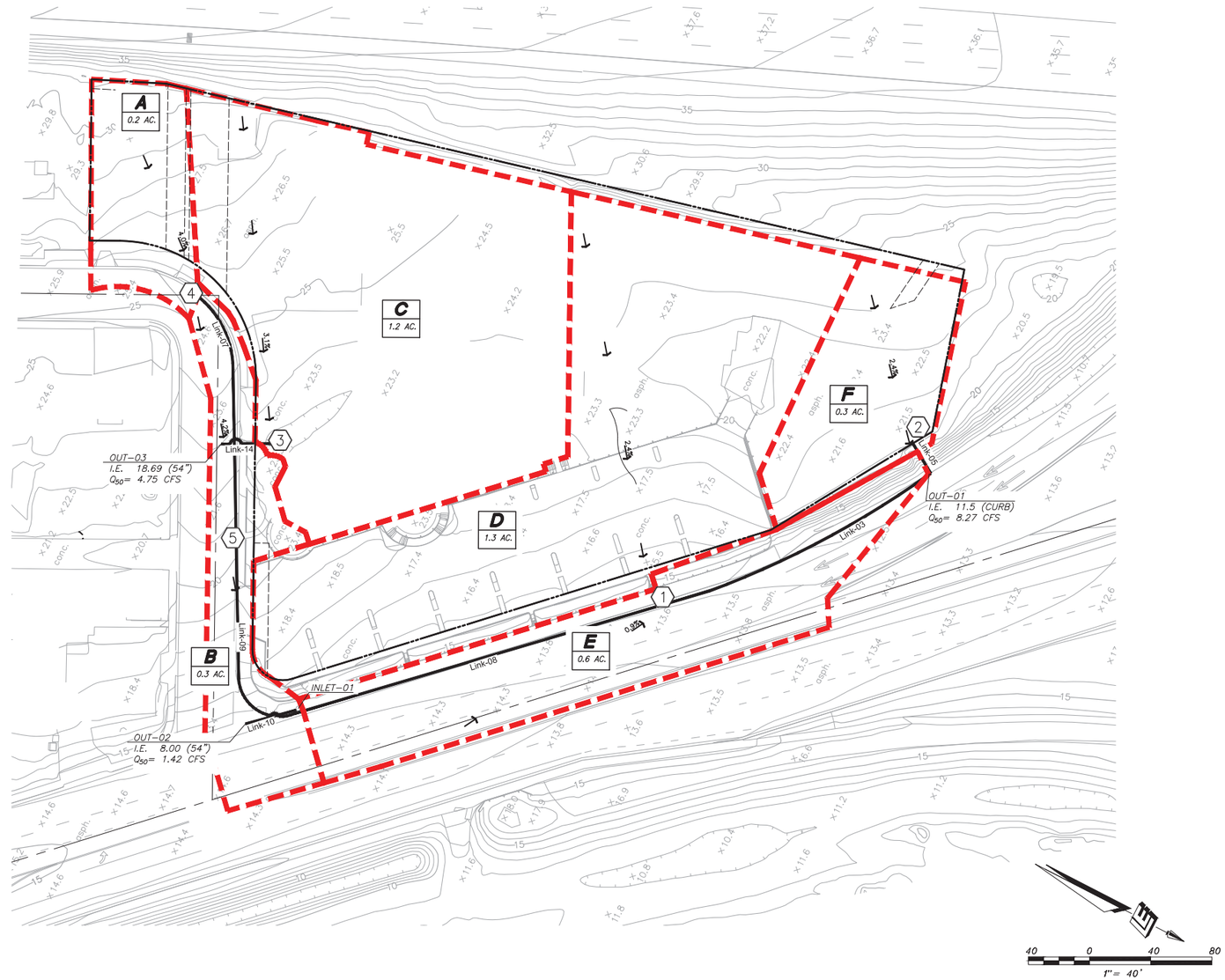
CLEANOUT

GRATE INLET

OVERLAND FLOW — 1%

Jefferson Pacific Beach Existing Condition Hydrology Summary

Basin	Acres	C	Length (ft)	Upper Elev. (ft)	Lower Elev. (ft)	Slope (%)	Tc (min)	Intensity (in/hr)	Q_{50} (cfs)
A	0.2	0.95	150	31	25	4.0%	2.1	4.20	0.80
B	0.3	0.95	275	25	13.5	4.2%	2.8	4.20	1.20
C	1.2	0.95	200	31	23	3.1%	3.0	4.20	4.79
D	1.3	0.95	255	21	15	2.4%	4.2	4.20	5.19
E	0.6	0.95	320	15	12	0.9%	4.9	4.20	2.39
F	0.3	0.95	125	24	21	2.4%	2.3	4.20	1.20



NO.	DATE	BY	DESCRIPTION	NO.	DATE	BY	DESCRIPTION
6				12			
5				11			
4				10			
3	07/15/2016	MFD	EXISTING CONDITION REVISIONS	9			
2	11/30/2015	MFD	CLIENT REVISIONS	8			
1	09/15/2015	MFD	ORIGINAL	7			

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Phone: (858) 597–2001 Fax: (858) 597–2009

APPROVED BY ENGINEER OF WORK — REGISTRATION R C E 26283

FILE CODE PB 39.01–22.15 — DATE

PREPARATION AND REVISION LOG

JEFFERSON PACIFIC BEACH
EXISTING DRAINAGE MAP

EXHIBIT “C” – Existing Condition SSA Analysis Results

Project Description

File Name	SSA Analysis - Existing.SPF

Project Options

Flow Units	CFS
Elevation Type	Elevation
Hydrology Method	Rational
Time of Concentration (TOC) Method	User-Defined
Link Routing Method	Kinematic Wave
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	NO

Analysis Options

Start Analysis On	Sep 04, 2015	00:00:00
End Analysis On	Sep 05, 2015	00:00:00
Start Reporting On	Sep 04, 2015	00:00:00
Antecedent Dry Days	0	days
Runoff (Dry Weather) Time Step	0 01:00:00	days hh:mm:ss
Runoff (Wet Weather) Time Step	0 00:05:00	days hh:mm:ss
Reporting Time Step	0 00:05:00	days hh:mm:ss
Routing Time Step	30	seconds

Number of Elements

	Qty
Rain Gages	0
Subbasins	6
Nodes	9
Junctions	5
Outfalls	3
Flow Diversions	0
Inlets	1
Storage Nodes	0
Links	7
Channels	5
Pipes	2
Pumps	0
Orifices	0
Weirs	0
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

Return Period	50 year(s)

Subbasin Summary

SN	Subbasin ID	Area (ac)	Weighted Runoff Coefficient	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	A	0.20	0.9500	0.35	0.33	0.07	0.80	0 00:05:00
2	B	0.30	0.9500	0.35	0.33	0.10	1.20	0 00:05:00
3	C	1.20	0.9500	0.35	0.33	0.40	4.79	0 00:05:00
4	D	1.30	0.9500	0.35	0.33	0.43	5.19	0 00:05:00
5	E	0.60	0.9500	0.35	0.33	0.20	2.39	0 00:05:00
6	F	0.30	0.9500	0.35	0.33	0.10	1.20	0 00:05:00

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft²)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	Jun-01	Junction	12.50	13.00	0.00	0.00	0.00	7.58	13.82	0.00	0.18	0 00:00	0.00	0.00
2	Jun-02	Junction	20.50	21.00	0.00	0.00	0.00	1.20	20.55	0.00	0.95	0 00:00	0.00	0.00
3	Jun-03	Junction	20.00	22.50	0.00	0.00	0.00	4.79	20.58	0.00	1.92	0 00:00	0.00	0.00
4	Jun-04	Junction	25.00	25.50	0.00	0.00	0.00	0.80	25.06	0.00	0.44	0 00:00	0.00	0.00
5	Jun-05	Junction	20.00	20.50	0.00	0.00	0.00	0.71	20.06	0.00	0.44	0 00:00	0.00	0.00
6	Out-01	Outfall	11.50					8.27	11.81					
7	Out-02	Outfall	8.00					1.42	10.98					
8	Out-03	Outfall	18.69					4.75	19.26					

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Reported Condition
1	Link-10	Pipe	Inlet-01	Out-02	40.00	10.90	10.50	1.0000	18.000	0.0210	1.42	6.50	0.22	2.95	0.48	0.32	0.00	Calculated
2	Link-14	Pipe	Jun-03	Out-03	29.00	20.00	18.69	4.5200	12.000	0.0130	4.75	7.57	0.63	10.19	0.58	0.58	0.00	Calculated
3	Link-03	Channel	Jun-01	Out-01	160.00	13.50	11.50	1.2500	6.000	0.0320	7.18	15.35	0.47	2.48	0.31	0.62	0.00	
4	Link-05	Channel	Jun-02	Out-01	25.00	20.50	11.50	36.0000	12.000	0.0300	1.18	178.22	0.01	3.98	0.05	0.05	0.00	
5	Link-07	Channel	Jun-04	Jun-05	157.40	25.00	20.00	3.1800	6.000	0.0320	0.71	23.09	0.03	1.89	0.06	0.11	0.00	
6	Link-08	Channel	Inlet-01	Jun-01	275.65	13.40	12.50	0.3300	6.000	0.0320	0.09	9.23	0.01	0.62	0.02	0.04	0.00	
7	Link-09	Channel	Jun-05	Inlet-01	132.00	20.00	13.00	5.3000	6.000	0.0320	0.68	29.83	0.02	1.44	0.05	0.10	0.00	

Inlet Summary

SN	Element ID	Inlet Manufacturer	Manufacturer Part Number	Inlet Location	Number of Inlets	Catchbasin Invert Elevation (ft)	Max (Rim) Elevation (ft)	Initial Water Elevation (ft)	Ponded Area (ft^2)	Peak Flow (cfs)	Peak Flow Intercepted by Inlet (cfs)	Peak Flow Bypassing Inlet (cfs)	Inlet Efficiency during Peak Flow (%)	Allowable Spread (ft)	Max Gutter Spread during Peak Flow (ft)	Max Gutter Water Elev. during Peak Flow (ft)
1	Inlet-01	FHWA HEC-22 GENERIC	N/A	On Grade	1	10.90	13.90	0.00	N/A	1.20	1.03	0.17	85.93	10.00	6.64	14.12

Junction Input

SN	Element ID	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Ground/Rim (Max) Offset (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Surcharge Elevation (ft)	Surcharge Depth (ft)	Ponded Area (ft^2)	Minimum Pipe Cover (in)
1	Jun-01	12.50	13.00	0.50	0.00	-12.50	0.00	-13.00	0.00	0.00
2	Jun-02	20.50	21.00	0.50	0.00	-20.50	0.00	-21.00	0.00	0.00
3	Jun-03	20.00	22.50	2.50	0.00	-20.00	0.00	-22.50	0.00	0.00
4	Jun-04	25.00	25.50	0.50	0.00	-25.00	0.00	-25.50	0.00	0.00
5	Jun-05	20.00	20.50	0.50	0.00	-20.00	0.00	-20.50	0.00	0.00

Junction Results

SN	Element ID	Peak Inflow (cfs)	Peak Lateral Inflow (cfs)	Max HGL Elevation Attained (ft)	Max HGL Depth Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Average HGL Elevation Attained (ft)	Average HGL Depth Attained (ft)	Time of Max HGL Occurrence (days hh:mm)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	Jun-01	7.58	7.58	13.82	1.32	0.00	0.18	13.50	1.00	0 00:05	0 00:00	0.00	0.00
2	Jun-02	1.20	1.20	20.55	0.05	0.00	0.95	20.50	0.00	0 00:05	0 00:00	0.00	0.00
3	Jun-03	4.79	4.79	20.58	0.58	0.00	1.92	20.00	0.00	0 00:05	0 00:00	0.00	0.00
4	Jun-04	0.80	0.80	25.06	0.06	0.00	0.44	25.00	0.00	0 00:05	0 00:00	0.00	0.00
5	Jun-05	0.71	0.00	20.06	0.06	0.00	0.44	20.00	0.00	0 00:06	0 00:00	0.00	0.00

Channel Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Shape	Height (ft)	Width (ft)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow (cfs)	Flap Gate
1	Link-03	160.00	13.50	1.00	11.50	0.00	2.00	1.2500	Rectangular	0.500	10.000	0.0320	0.2000	0.5000	0.0000	0.00	No
2	Link-05	25.00	20.50	0.00	11.50	0.00	9.00	36.0000	Trapezoidal	1.000	8.000	0.0300	0.2000	0.6000	0.0000	0.00	No
3	Link-07	157.40	25.00	0.00	20.00	0.00	5.00	3.1800	Rectangular	0.500	5.000	0.0320	0.2000	0.5000	0.0000	0.00	No
4	Link-08	275.65	13.40	2.50	12.50	0.00	0.90	0.3300	Rectangular	0.500	5.000	0.0320	0.2000	0.5000	0.0000	0.00	No
5	Link-09	132.00	20.00	0.00	13.00	2.10	7.00	5.3000	Rectangular	0.500	5.000	0.0320	0.2000	0.5000	0.0000	0.00	No

Channel Results

SN	Element ID	Peak Flow (cfs)	Time of Peak Flow Occurrence (days hh:mm)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Travel Time (min)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Froude Number	Reported Condition
1	Link-03	7.18	0 00:05	15.35	0.47	2.48	1.08	0.31	0.62	0.00		
2	Link-05	1.18	0 00:05	178.22	0.01	3.98	0.10	0.05	0.05	0.00		
3	Link-07	0.71	0 00:06	23.09	0.03	1.89	1.39	0.06	0.11	0.00		
4	Link-08	0.09	0 00:10	9.23	0.01	0.62	7.41	0.02	0.04	0.00		
5	Link-09	0.68	0 00:07	29.83	0.02	1.44	1.53	0.05	0.10	0.00		

Pipe Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Pipe Shape	Pipe Diameter or Height (in)	Pipe Width (in)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow (cfs)	Flap Gate	No. of Barrels
1	Link-10	40.00	10.90	0.00	10.50	2.50	0.40	1.0000	CIRCULAR	18.000	18.000	0.0210	0.2000	0.6000	0.0000	0.00	No	1
2	Link-14	29.00	20.00	0.00	18.69	0.00	1.31	4.5200	CIRCULAR	12.000	12.000	0.0130	0.2000	0.5000	0.0000	0.00	No	1

Pipe Results

SN	Element ID	Peak Flow (cfs)	Time of Peak Flow Occurrence (days hh:mm)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Travel Time (min)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Froude Number	Reported Condition
1	Link-10	1.42	0 00:06	6.50	0.22	2.95	0.23	0.48	0.32	0.00		Calculated
2	Link-14	4.75	0 00:05	7.57	0.63	10.19	0.05	0.58	0.58	0.00		Calculated

Inlet Input

SN	Element ID	Inlet Manufacturer	Manufacturer Part Number	Inlet Location	Number of Inlets	Catchbasin Invert Elevation (ft)	Max (Rim) Elevation (ft)	Inlet Depth (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Ponded Area (ft²)	Grate Clogging Factor (%)
1	Inlet-01	FHWA HEC-22 GENERIC	N/A	On Grade	1	10.90	13.90	3.00	0.00	0.00	N/A	0.00

Inlet Results

SN	Element ID	Peak Flow (cfs)	Peak Lateral Inflow (cfs)	Peak Flow Intercepted by Inlet (cfs)	Peak Flow Bypassing Inlet (cfs)	Inlet Efficiency during Peak Flow (%)	Max Gutter Spread during Peak Flow (ft)	Max Gutter Water Elev. during Peak Flow (ft)	Max Gutter Water Depth during Peak Flow (ft)	Time of Max Depth Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	Inlet-01	1.20	1.20	1.03	0.17	85.93	6.64	14.12	0.22	0 00:07	0.00	0.00

EXHIBIT “D” – Proposed Condition Drainage Basin Map

ASSESSOR'S PARCEL NUMBER:

424-380-06, 424-380-07 & 424-362-24

LEGAL DESCRIPTION

PARCEL 1:

LOT 1 OF VISTA DE ANZA, IN THE CITY OF SAN DIEGO, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 5881, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, MAY 9, 1967, TOGETHER WITH THAT PORTION OF THE SOUTHERLY 25.00 FEET OF ROSEWOOD, ADJOINING SAID LOT 1 ON NORTHWEST, AS VACATED AND CLOSED TO PUBLIC USED BY RESOLUTION NO. 193278, RECORDED MARCH 29, 1968 AS INSTRUMENT NO. 52879, OF OFFICIAL RECORDS.

PARCEL 2:

THAT PORTION OF MARINE TERRACE, ACCORDING TO MAP THEREOF NO. 1477, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, OCTOBER 7, 1912 AND THAT PORTION OF LOT 1 OF EUREKA LEMON TRACT, IN THE CITY OF SAN DIEGO, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 753, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, MAY 19, 1893, DESCRIBED AS FOLLOWS:

BEGINNING AT THE MOST NORTHERLY CORNER OF SAID LOT 1; THENCE ALONG THE FOLLOWING NUMBERED COURSES: -1- ALONG THE NORTHWESTERLY LINE OF SAID LOT 1, SOUTH 62°41'45" WEST210 28 FEET BEING ALSO ALONG THE SOUTHEASTERLY LINE OF ROSEWOOD STREET, AS SHOWN ON THE MAP NO. 964 OF STEPHEN'S ADDITION FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, NOVEMBER 9, 1905, -2- LEAVING SAID NORTHWESTERLY LINE OF SAID LOT 1, SOUTH 14°56'38" EAST, 235.58 FEET TO THE TRUE POINT OF BEGINNING; -3- CONTINUING ALONG LAST SAID COURSE, SOUTH 14°56'38" EAST 263.32 FEET; -4- SOUTH 73°03'05" WEST 108 FEET; -5- NORTH 59°27'01" WEST 123.63 FEET TO A POINT ON THE NORTHEASTERLY LINE OF PACIFIC HIGHWAY DISTANT THEREON SOUTH 45°20'10" EAST 382 FEET FROM THE INTERSECTION OF SAID NORTHEASTERLY LINE OF PACIFIC HIGHWAY, WITH SAID SOUTHEASTERLY LINE OF ROSEWOOD STREET; -6- ALONG SAID NORTHEASTERLY LINE OF PACIFIC HIGHWAY, NORTH 45°20'10" WEST 140 FEET; THENCE LEAVING SAID NORTHEASTERLY LINE OF PACIFIC HIGHWAY, NORTH 62°41'45" EAST 271.72 FEET TO THE TRUE POINT OF BEGINNING.

NOTE: SAID LAND IS NOW SHOWN ON PARCEL MAP NO. 1172, FILED IN THE RECORDERS OFFICE OF SAN DIEGO COUNTY ON 12-18-72.

PARCEL 3:

LOTS 21 AND 22, BLOCK 6 STEPHEN'S ADDITION, ACCORDING TO MAP THEREOF NO. 964, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, NOVEMBER 9, 1905 TOGETHER WITH THAT PORTION OF FORMER ROSEWOOD STREET, NOW VACATED AND CLOSED TO PUBLIC USE, AS WOULD REVERT TO SAID PROPERTY BY OPERATION OF LAW.

EXCEPTING THEREFROM THOSE PORTIONS THEREOF DESCRIBED IN DEEDS TO THE STATE OF CALIFORNIA RECORDED DECEMBER 18, 1952 IN BOOK 4690, PAGE 374, OF OFFICIAL RECORDS AND FEBRUARY 15 1966 AS INSTRUMENT NO. 26568, OF OFFICIAL RECORDS OF SAID SAN DIEGO COUNTY.

NOTE: SAID LAND IS NOW SHOWN AS PARCEL "C" OF PARCEL MAP NO. 1958, FILED IN THE RECORDERS OFFICE OF SAN DIEGO COUNTY ON 10-04-73.

LEGEND

PROPERTY BOUNDARY

STORM DRAIN

BASIN / AREA — 0.00 AC.

NODE NO.

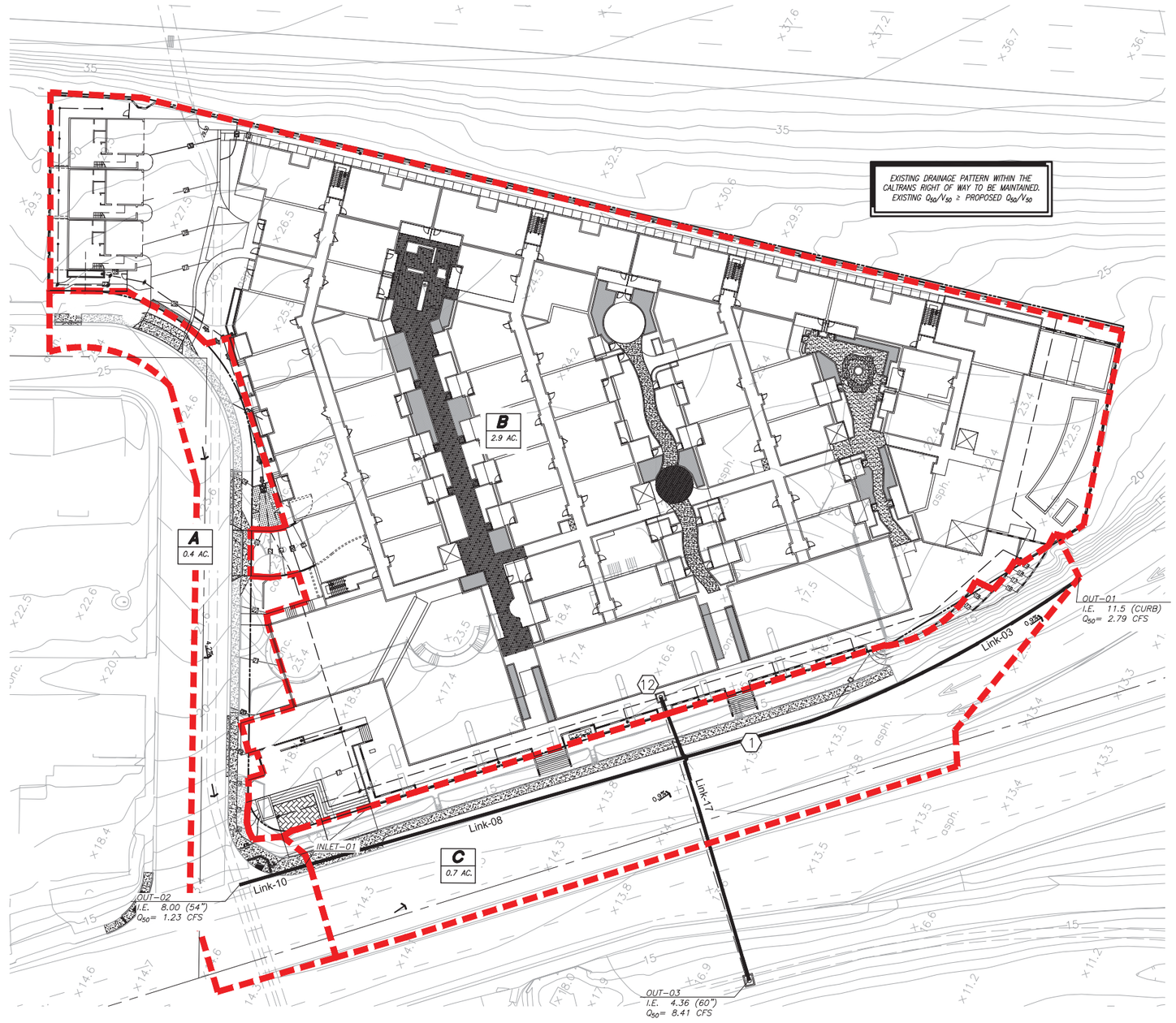
BASIN LIMITS

CURB INLET

CLEANOUT

GRATE INLET

OVERLAND FLOW



30 0 30 60

1" = 30'

Jefferson Pacific Beach Proposed Condition Hydrology Summary

Basin	Acres	C	Length (ft)	Upper Elev. (ft)	Lower Elev. (ft)	Slope (%)	Tc (min)	Intensity (in/hr)	Q_{50} (cfs)
A	0.4	0.95	275	25	13.5	4.2%	2.8	4.20	1.60
B	2.9	0.70	N/A	N/A	N/A	N/A	N/A	4.20	8.53
C	0.7	0.95	320	15	12	0.9%	4.9	4.20	2.79

NO.	DATE	BY	DESCRIPTION
6			
5			
4	07/15/2016	MFD	EXISTING CONDITION REVISIONS
3	02/19/2016	MFD	AGENCY REVISIONS
2	11/30/2015	MFD	CLIENT REVISIONS
1	08/17/2015	MFD	ORIGINAL

NO.	DATE	BY	DESCRIPTION
12			
11			
10			
9			
8			
7			

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APPROVED BY ENGINEER OF WORK

REGISTRATION R C E 26283

FILE CODE PB 39.01-22.15

DATE

PREPARATION AND REVISION LOG

JEFFERSON PACIFIC BEACH
PROPOSED DRAINAGE MAP

EXHIBIT “E” – Proposed Condition SSA Analysis

Project Description

File Name	SSA Analysis - Proposed.SPF

Project Options

Flow Units	CFS
Elevation Type	Elevation
Hydrology Method	Rational
Time of Concentration (TOC) Method	User-Defined
Link Routing Method	Kinematic Wave
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	NO

Analysis Options

Start Analysis On	Sep 04, 2015	00:00:00
End Analysis On	Sep 05, 2015	00:00:00
Start Reporting On	Sep 04, 2015	00:00:00
Antecedent Dry Days	0	days
Runoff (Dry Weather) Time Step	0 01:00:00	days hh:mm:ss
Runoff (Wet Weather) Time Step	0 00:05:00	days hh:mm:ss
Reporting Time Step	0 00:05:00	days hh:mm:ss
Routing Time Step	30	seconds

Number of Elements

	Qty
Rain Gages	0
Subbasins	3
Nodes	6
Junctions	2
Outfalls	3
Flow Diversions	0
Inlets	1
Storage Nodes	0
Links	4
Channels	2
Pipes	2
Pumps	0
Orifices	0
Weirs	0
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

Return Period	50 year(s)

Subbasin Summary

SN	Subbasin ID	Area (ac)	Weighted Runoff Coefficient	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	A	0.40	0.9500	0.35	0.33	0.13	1.60	0 00:05:00
2	B	2.90	0.7000	0.35	0.25	0.71	8.53	0 00:05:00
3	C	0.70	0.9500	0.35	0.33	0.23	2.79	0 00:05:00

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft²)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	Jun-01	Junction	12.50	13.00	0.00	0.00	0.00	0.16	12.56	0.00	0.44	0 00:00	0.00	0.00
2	Jun-12	Junction	7.89	13.50	0.00	0.00	0.00	8.53	8.64	0.00	4.86	0 00:00	0.00	0.00
3	Out-01	Outfall	11.50					2.79	11.53					
4	Out-02	Outfall	8.00					1.23	10.94					
5	Out-03	Outfall	4.36					8.41	5.10					

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Reported Condition
1	Link-10	Pipe	Inlet-01	Out-02	40.00	10.90	10.50	1.0000	18.000	0.0210	1.23	6.50	0.19	3.88	0.44	0.29	0.00	Calculated
2	Link-17	Pipe	Jun-12	Out-03	131.50	7.89	4.36	2.6800	18.000	0.0130	8.41	17.21	0.49	12.87	0.74	0.49	0.00	Calculated
3	Link-03	Channel	Jun-01	Out-01	160.00	12.50	11.50	0.6300	6.000	0.0320	0.12	10.85	0.01	0.44	0.03	0.06	0.00	
4	Link-08	Channel	Inlet-01	Jun-01	275.65	13.40	12.50	0.3300	6.000	0.0320	0.16	4.62	0.04	1.03	0.06	0.11	0.00	

Inlet Summary

SN	Element ID	Inlet Manufacturer	Manufacturer Part Number	Inlet Location	Number of Inlets	Catchbasin Invert Elevation (ft)	Max (Rim) Elevation (ft)	Initial Water Elevation (ft)	Ponded Area (ft^2)	Peak Flow (cfs)	Peak Flow Intercepted by Inlet (cfs)	Peak Flow Bypassing Inlet (cfs)	Inlet Efficiency during Peak Flow (%)	Allowable Spread (ft)	Max Gutter Spread during Peak Flow (ft)	Max Gutter Water Elev. during Peak Flow (ft)
1	Inlet-01	FHWA HEC-22 GENERIC	N/A	On Grade	1	10.90	13.90	0.00	N/A	1.60	1.24	0.36	77.47	10.00	7.61	14.14

Junction Input

SN	Element ID	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Ground/Rim (Max) Offset (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Surcharge Elevation (ft)	Surcharge Depth (ft)	Ponded Area (ft^2)	Minimum Pipe Cover (in)
1	Jun-01	12.50	13.00	0.50	0.00	-12.50	0.00	-13.00	0.00	0.00
2	Jun-12	7.89	13.50	5.61	0.00	-7.89	0.00	-13.50	0.00	0.00

Junction Results

SN	Element ID	Peak Inflow (cfs)	Peak Lateral Inflow (cfs)	Max HGL Elevation Attained (ft)	Max HGL Depth Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Average HGL Elevation Attained (ft)	Average HGL Depth Attained (ft)	Time of Max HGL Occurrence (days hh:mm)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	Jun-01	0.16	0.00	12.56	0.06	0.00	0.44	12.50	0.00	0 00:07	0 00:00	0.00	0.00
2	Jun-12	8.53	8.53	8.64	0.75	0.00	4.86	7.89	0.00	0 00:05	0 00:00	0.00	0.00

Channel Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Shape	Height (ft)	Width (ft)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow (cfs)	Flap Gate
1	Link-03	160.00	12.50	0.00	11.50	0.00	1.00	0.6300	Rectangular	0.500	10.000	0.0320	0.2000	0.5000	0.0000	0.00	No
2	Link-08	275.65	13.40	2.50	12.50	0.00	0.90	0.3300	Rectangular	0.500	5.000	0.0320	0.2000	0.5000	0.0000	0.00	No

Channel Results

SN	Element ID	Peak Flow (cfs)	Time of Peak Flow Occurrence (days hh:mm)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Travel Time (min)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Froude Number	Reported Condition
1	Link-03	0.12	0 00:12	10.85	0.01	0.44	6.06	0.03	0.06	0.00		
2	Link-08	0.16	0 00:07	4.62	0.04	1.03	4.46	0.06	0.11	0.00		

Pipe Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Pipe Shape	Pipe Diameter or Height (in)	Pipe Width (in)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow (cfs)	Flap Gate	No. of Barrels
1	Link-10	40.00	10.90	0.00	10.50	2.50	0.40	1.0000	CIRCULAR	18.000	18.000	0.0210	0.2000	0.6000	0.0000	0.00	No	1
2	Link-17	131.50	7.89	0.00	4.36	0.00	3.53	2.6800	CIRCULAR	18.000	18.000	0.0130	0.2000	0.5000	0.0000	0.00	No	1

Pipe Results

SN	Element ID	Peak Flow (cfs)	Time of Peak Flow Occurrence (days hh:mm)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Travel Time (min)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Froude Number	Reported Condition
1	Link-10	1.23	0 00:05	6.50	0.19	3.88	0.17	0.44	0.29	0.00		Calculated
2	Link-17	8.41	0 00:05	17.21	0.49	12.87	0.17	0.74	0.49	0.00		Calculated

Inlet Input

SN	Element ID	Inlet Manufacturer	Manufacturer Part Number	Inlet Location	Number of Inlets	Catchbasin Invert Elevation (ft)	Max (Rim) Elevation (ft)	Inlet Depth (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Ponded Area (ft²)	Grate Clogging Factor (%)
1	Inlet-01	FHWA HEC-22 GENERIC	N/A	On Grade	1	10.90	13.90	3.00	0.00	0.00	N/A	0.00

Inlet Results

SN	Element ID	Peak Flow (cfs)	Peak Lateral Inflow (cfs)	Peak Flow Intercepted by Inlet (cfs)	Peak Flow Bypassing Inlet (cfs)	Inlet Efficiency during Peak Flow (%)	Max Gutter Spread during Peak Flow (ft)	Max Gutter Water Elev. during Peak Flow (ft)	Max Gutter Water Depth during Peak Flow (ft)	Time of Max Depth Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	Inlet-01	1.60	1.60	1.24	0.36	77.47	7.61	14.14	0.24	0 00:05	0.00	0.00

APPENDIX I – Rational Method: City of San Diego Drainage Design Manual

APPENDIX I

RATIONAL METHOD

Watersheds Less than 0.5 Square Mile

Method of Computing Runoff

Use the Rational Formula Q = CIA where:

Q is the peak rate of flow in cubic feet per second.

C is a runoff coefficient expressed as that percentage of rainfall which becomes surface runoff.

I is the average rainfall intensity in inches per hour for a storm duration equal to the time of concentration (T_c) of the contributing drainage area.

A is the drainage area in acres tributary to design point.

(1) Runoff Coefficient, C

Appendix I-A lists the estimated coefficients for urban areas.

For urban areas select an appropriate coefficient for each type of land use from Table, 2, Appendix I-A. Multiply this coefficient by the percentage of the total area included in that class. The sum of the products for all land uses in San Diego County is the weighted runoff coefficient.

(2) Rainfall Intensity, I

Intensity - duration - frequency curves applicable to all areas within San Diego County are given in Appendix I-B.

(3) Time of Concentration, Tc

The time of concentration is the time required for runoff to flow from the most remote part of the watershed to the outlet point under consideration.

APPENDIX II – Design Runoff: City of San Diego Drainage Design Manual

HYDROLOGY (1-102)

1-102.1 GENERAL

The design discharge depends upon many variables. Some of the more important are duration and intensity of rainfall, storm frequency, ground cover, the size, imperviousness and slope and shape of the drainage area.

1-102.2 DESIGN RUNOFF

Design runoff shall be based upon the following:

(1) Within floodplain and floodplain fringe areas as defined by the Federal Emergency Management Agency (FEMA), the runoff criteria shall be based upon a 100-year frequency storm.

(2) For all drainage channels and storm drain systems, which will convey drainage from a tributary area equal to and greater than one (1) square mile, the runoff criteria shall be based upon a 100-year frequency storm.

(3) For tributary areas under one (1) square mile:

(a) The storm drain system shall be designed so that the combination of storm drain system capacity and overflow will be able to carry the 100-year frequency storm without damage to or flooding of adjacent existing buildings or potential building sites.

(b) The runoff criteria for the underground storm drain system shall be based upon a 50-year frequency storm.

(4) Type D soil shall be used for all areas.

1-102.3 DESIGN RUNOFF METHODS

A. The designer should check with Floodplain Management/Beach Erosion Section, Transportation Design Division, Engineering and Development Department, to determine if there are established storm discharge flows.

B. If no established storm discharge flows are available, the applicable methods shown in Appendix 1, 2, or 3 shall be used.

APPENDIX III – Runoff Coefficients: City of San Diego Drainage Design Manual

TABLE 2

RUNOFF COEFFICIENTS (RATIONAL METHOD)

DEVELOPED AREAS (URBAN)

Land Use	Coefficient, C Soil Type (1)
	D
Residential:	
Single Family	.55
Multi-Units	.70
Mobile Homes	.65
Rural (lots greater than 1/2 acre)	.45
Commercial (2) 80% Impervious	.85
Industrial (2) 90% Impervious	.95

NOTES:

(1) Type D soil to be used for all areas.

(2) Where actual conditions deviate significantly from the tabulated imperviousness values of 80% or 90%, the values given for coefficient C, may be revised by multiplying 80% or 90% by the ratio of actual imperviousness to the tabulated imperviousness. However, in no case shall the final coefficient be less than 0.50. For example: Consider commercial property on D soil.

Actual imperviousness = 50%

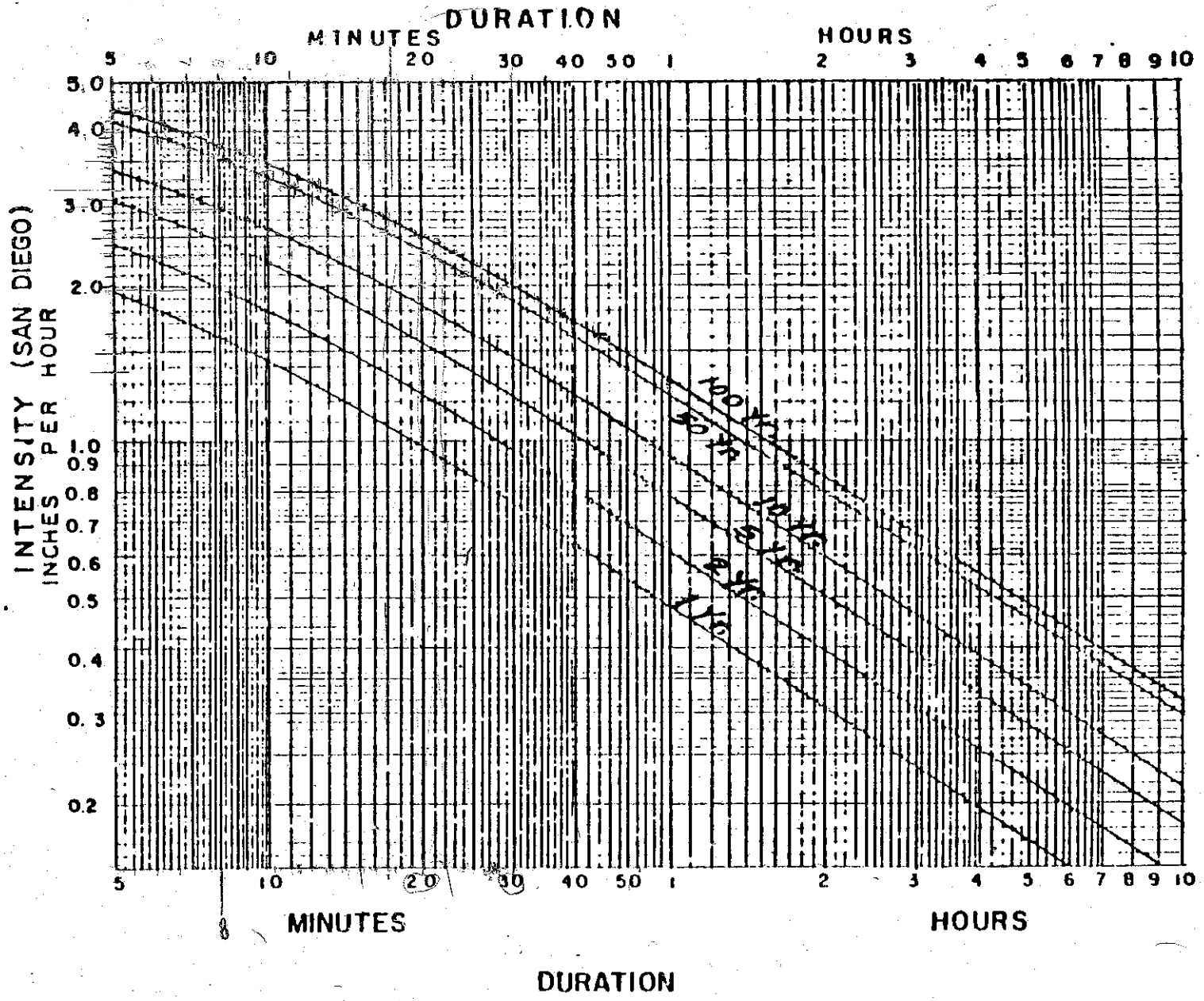
Tabulated imperviousness = 80%

Revised C $= \frac{50}{80} \times 0.85 = 0.53$

APPENDIX IV – Rainfall Intensity-Duration-Frequency Curves: City of San Diego Drainage Design Manual

ELEV.	FACTOR
0–1500	1.00
1500–3000	1.25
3000–4000	1.42
4000–5000	1.60
5000–6000	1.70
DESERT	1.25

To obtain correct intensity, multiply intensity on chart by factor for design elevation.



RAINFALL

INTENSITY-DURATION-FREQUENCY

CURVES

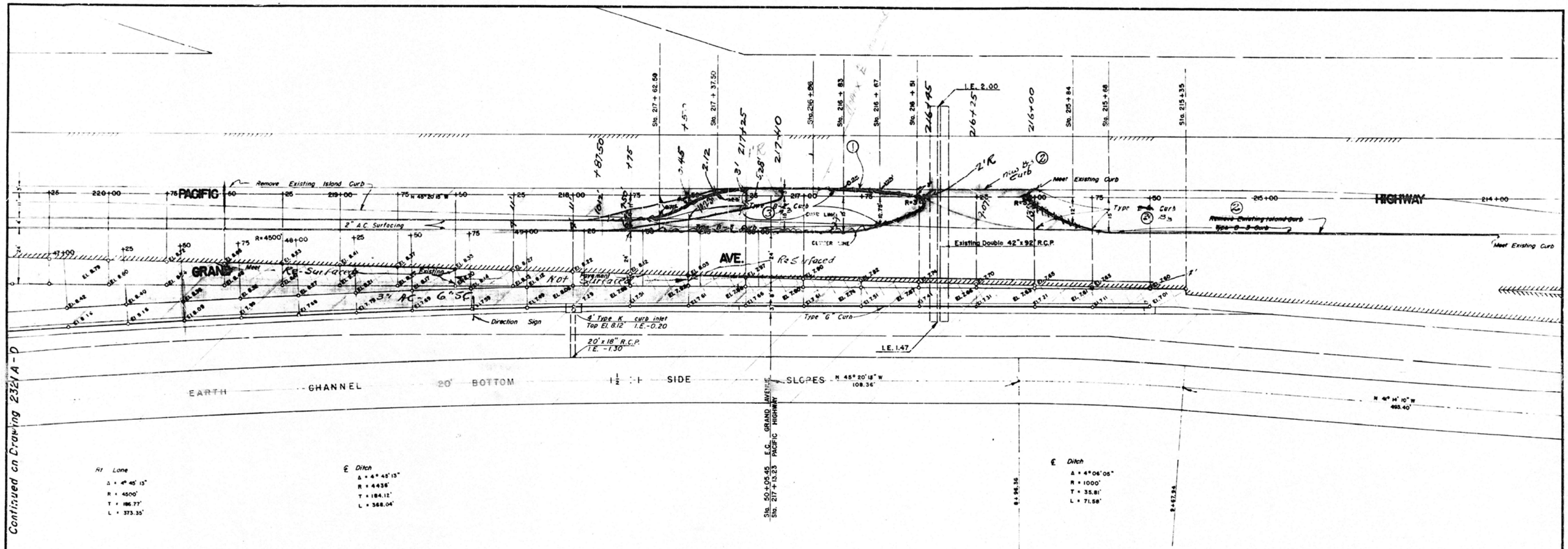
for

COUNTY OF SAN DIEGO

APPENDIX

I-B

APPENDIX V – Existing Improvement Plans



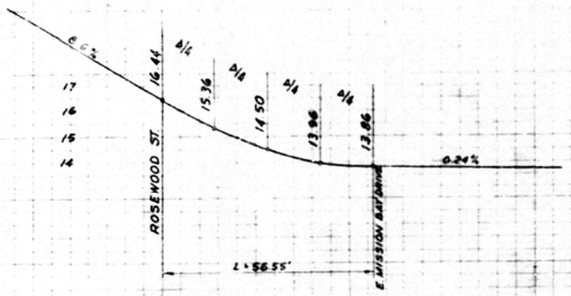
FOR SHEET 10 SEE DRWG 2561-D

REDUCED PLAN

SHEET 9	CITY OF SAN DIEGO ENGINEERING DEPARTMENT — 6 SHEETS
	GRAND AVENUE
APPROVED	CITY MANAGER — DATE 11/19/64
DRAWN BY MEEHAN / TRACED BY BAARSON	CHECKED — DATE — DRAWING NUMBER 2321 B - D

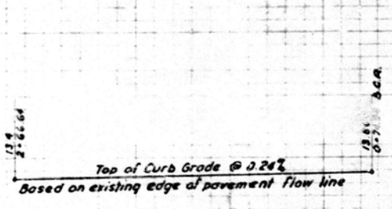
WATER DEPARTMENT
SEWER DEPARTMENT
DRAINAGE
FIELD CHECK
OFFICE CHECK
PLANNING COMMISSION
GRADES

CONSTRUCTION RECORD



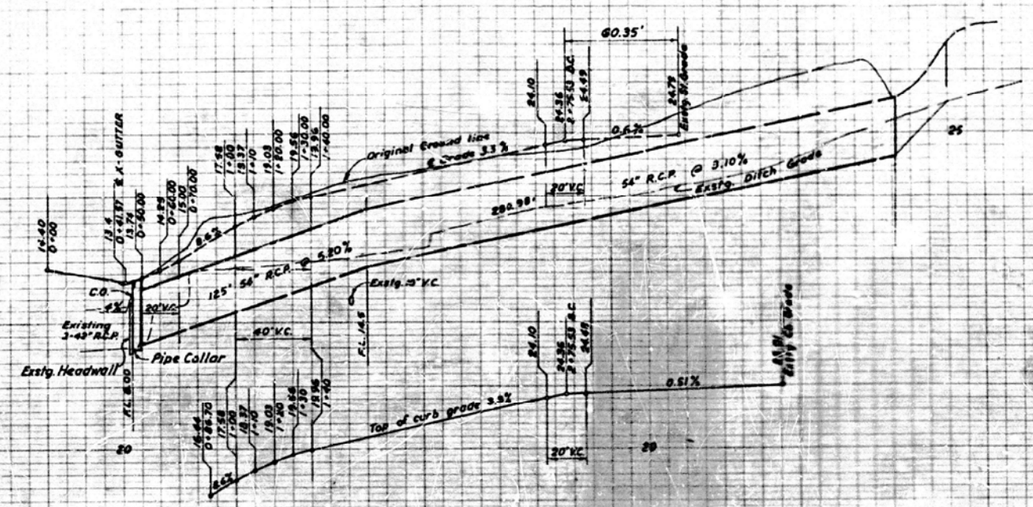
CURB RETURN PROFILE

Scale 1" = 20' Horiz. 3' Vert.



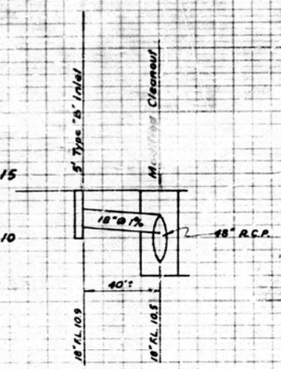
PROFILE OF EAST MISSION BAY DRIVE

Scale 1" = 40' Horiz. 6' Vert.



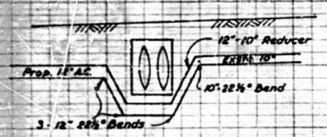
PROFILE OF ROSEWOOD STREET

Scale: 1" = 40' Horiz. 6' Vert.



DETAIL OF INLET CONNECTION

Scale: 1" = 40' Horiz. 6' Vert.



DETAIL OF WATERMAIN CROSSING STORM DRAIN

Scale: 1" = 40' Horiz. 6' Vert.

WORK TO BE DONE

THE IMPROVEMENTS CONSIST OF THE FOLLOWING WORK TO BE DONE ACCORDING TO THESE PLANS AND THE FOLLOWING STANDARD DRAWINGS AND SPECIFICATIONS OF THE CITY OF SAN DIEGO

IMPROVEMENTS	STD. DWGS.	SYMBOL
STREET TREES		
GRADING PER SCHEDULE F		
PAVING		
TYPE "G" CURB & GUTTER (6")	G-45-65	
SIDEWALKS	G-4-66, G-53-65	
SEWER LATERALS (4")	S-22-62	
COPPER WATER SERVICE (2")	W-2-65, W-60-65	
TYPE "B" CURB INLETS	D-6-66	
C.M.P.C. STORM DRAIN	D-3-55	18" C.M.P.C.
MODIFIED CURTAIN WALL		
CONC. CROSS GUTTER	G-35-65	
48" R.C.P. STORM DRAIN	D-3-55, D-21-64	C.O.
MODIFIED CLEANOUT	D-10-62	
CONC. CUTOFF WALL	S-6-59	
PIPE COLLAR	D-14-55	
PIPE FITTINGS - TYLER		
STREET LIGHT SYSTEM	E-71-66T	
12" A.C. WATERMAIN JOHNS-MANVILLE	W-6-59, W-10-55, W-61-60	
FIRE HYDRANT GREENBURG	W-14-65, W-17-65	F.H.
EXISTING WORKE	P-1-56	
(2) CITY CONTROL MONUMENTS	M-21-66T	

SPECIFICATIONS

PART I, FILED APRIL 9, 1958, INCLUDING AMENDMENTS, FILED APRIL 8, 1959 AND NOV. 29, 1962 AND SECTION 1, FILED OCT. 26, 1961, PART II FILED MARCH 4, 1966. SPECIAL CONDITIONS P-18, REVISED NOV. 21, 1966, HERETO ATTACHED, PART II, FILED DEC. 14, 1966

REFERENCE DRAWINGS

1153-D, 12383-D, 12254-4-D

SITE DEVELOPMENT

GRADING AS SHOWN ON DWGS.

WATER NOTES

THE COST OF WATER MAIN CONNECTIONS, AS SHOWN HEREON, WILL BE AS FOLLOWS:

CONN. NO. 1 = $460.00

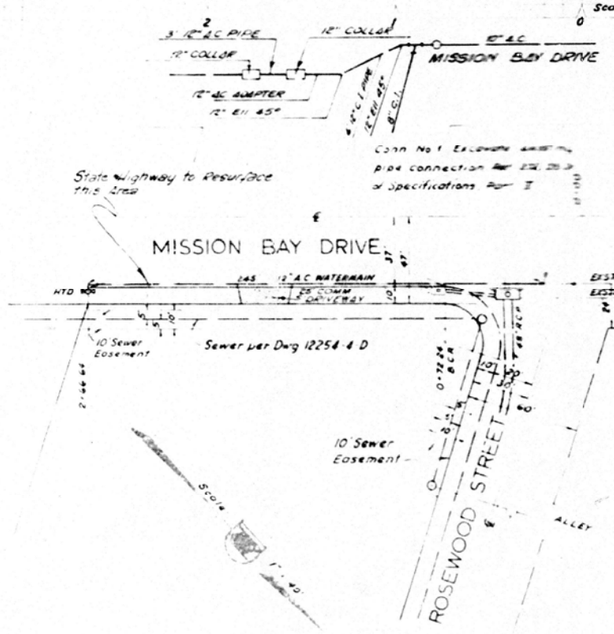
NOTE

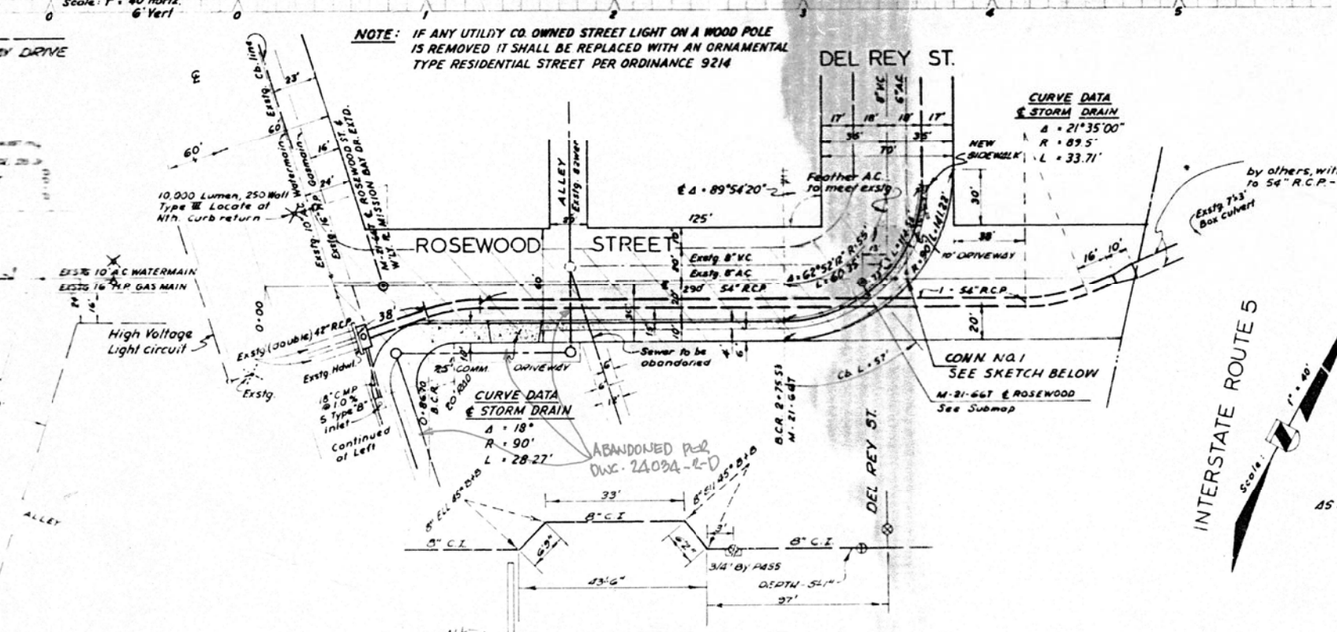
PRIOR TO MIXING WITH SAND & WATER, ALL MINERAL AGGREGATE USED FOR THE PRODUCTION OF CEMENT TREATED BASE SHALL HAVE A SAND EQUIVALENT OF NOT LESS THAN 30, WHEN TESTED BY CALIFORNIA DIVISION OF HIGHWAYS TEST METHOD NO. CALIF. 217

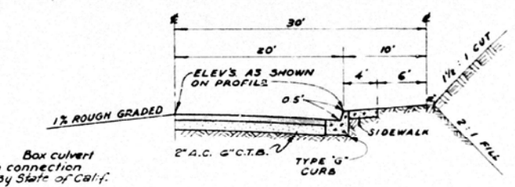
BENCH MARK

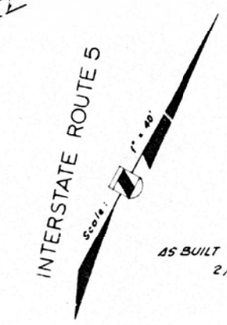
SE BRASS PLUG AT EAST MISSION BAY DRIVE AND GLENDORA STREET.

ELEV. 15.528 M.S.L. DATUM.









AS BUILT WORK COMPLETED 2/16/68

DON NASLAND
ENGINEERING & SURVEYS
LAND PLANNING
2120 UNIVERSITY AVENUE, SAN DIEGO
295-6373

Don Nasland
DON NASLAND R.C.E. 16174

PRIVATE CONTRACT

PLANS FOR THE IMPROVEMENT OF ROSEWOOD ST. & E. MISSION BAY DRIVE POR. OF VISTA DE ANZA SUBDIVISION

CITY OF SAN DIEGO, CALIFORNIA
ENGINEERING DEPARTMENT
SHEET 1 OF 2 SHEETS

W.O. NO. 77252

ACT. ASST. CITY ENGINEER — DATE 4-10-67 — DIVISION HEAD

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL				
2" REVISED SIDEWALK TO 4' WIDE	JULY 1967 D.W.		7-28-67	
AS BUILT	DON NASLAND	R.E. HAZARD	3-18-68	4-18-68

DIRECTOR ENG. WORK — CONTROL CHIEF ENGINEER 4-18-67

230-1703
LAMBERT COORD. — DATES

CONTRACTOR R.E. HAZARD CONTG. Co. DATE STARTED 6-14-67
INSPECTOR W. RASULIS DATE COMPLETED 2-16-68

12709-1-D

Don Nasland Job No. 1030-67

AS BUILT

ATTACHMENT 6

GEOTECHNICAL AND GROUNDWATER INVESTIGATION REPORT

Project No. G1592-11-03
July 5, 2016

JPI Real Estate Acquisition, LLC
12250 El Camino Real, Suite 380
San Diego, California 92130

Attention: Mr. Justin Craig

Subject: RESPONSE TO CITY COMMENTS
JEFFERSON PB
4275 EAST MISSION BAY DRIVE
SAN DIEGO, CALIFORNIA

References:

1. *Infiltration Investigation, Jefferson PB, 4275 Mission Bay Drive, San Diego, California*, prepared by Geocon Incorporated, dated June 3, 2016 (Project No. G1592-11-03).

2. *Geotechnical Investigation, Guy Hill Property, 4275 East Mission Bay Drive, San Diego, California, prepared by Geocon Incorporated, dated September 11, 2015 (Project No. G1592-52-03)*.

3. *Cycle Issues, Guy Hill Cadillac, San Diego, California*, prepared by the City of San Diego, dated June 27, 2016 (Project No. 327976).

Dear Mr. Craig:

We prepared this letter to address review comments provided by the City of San Diego LDR-Geology dated June 10, 2016 regarding the storm water management investigation for the subject site. The city's comments are listed herein with the Geocon response immediately following.

Comment 22: *The following comments pertain to the revised Worksheet C.4-1: Criteria 1: An infiltration rate of greater than 0.5 inches per hour was determined for one test location on site. The box should be marked yes.*

Response: We performed additional infiltration tests within the northeastern area of the property (at locations P-8 and P-9 shown on Figure 2). The updated Geologic Map presents the locations of the additional tests. Table 1 presents the updated results of the infiltration tests. The updated field test data are also included herein. We adjusted the infiltration rates to be equal to the saturated hydraulic conductivity test results based on the discussion in the County of Riverside *Design Handbook for Low Impact Development Best Management Practices.*

TABLE 1
FIELD PERMEAMETER INFILTRATION TEST RESULTS

Test No.	Geologic Unit	Test Depth (Feet, Below Grade)	Fines-Content[1] [Clay Content[2]] (%)	Field-Saturated Hydraulic Conductivity, k_{sat} (Inch/Hour)	Worksheet[3] Saturated Hydraulic Conductivity, k_{sat} (Inch/Hour)
P-1	Qop	3.8	65 [16]	0.47	0.24
P-2	Qudf	3.9	76 [23]	0.01	>0.01
P-4	Qop	3.2	71 [25]	0.01	>0.01
P-5	Qop	2.7	66 [26]	0.36	0.18
P-6	Qop	8.0	82 [27]	0.03	0.02
P-7	Qop	7.4	70 [17]	1.10	0.55
P-8	Qop	5.5	--	0.58	0.29
P-9	Qop	5.5	--	0.29	0.15

[1] Percent finer than the #200 Sieve.
[2] Percent finer than the 0.002 mm.
[3] Using a factor of safety of 2 for Worksheet C.4-1.

Based on the additional infiltration testing in the northeast area, the existing soil should be considered to possess an infiltration rate of less than 0.5 inches per hour after applying the allowed factor of safety of 2. Therefore, Criteria 1 on Worksheet C.4-1 should remain a "No". The updated worksheet also presents the additional infiltration test results.

Comment 23: *Criteria 3: Clarify if infiltration greater than 0.5 inches per hour in the area of P-7 can be allowed without increasing the risk of groundwater contamination that cannot be mitigated to an acceptable level.*

Response: See revised worksheet.

Comment 24: *Criteria 4: Address if infiltration greater than 0.5 inches per hour can be allowed without affecting seasonality of ephemeral streams. Address if infiltration greater than 0.5 inches per hour can be allowed without increasing discharge of contaminated groundwater to surface water.*

Response: See revised worksheet.

Comment 25: *Criteria 5: Consider listing/summarizing the infiltration test rates.*

Response: See revised worksheet.

If you have any questions regarding this response, or if we may be of further service, please contact the undersigned at your convenience.

Very truly yours,

GEOCON INCORPORATED

John Hoobs
CEG 1524

Shawn Foy Weedon
GE 2714

JH:SFW:dmc

Attachments: Geologic Map, Figure 2
Worksheet C.4-1
Aardvark Permeameter Data Analysis

(e-mail) Addressee
(e-mail) Leppert Engineering
Attention: Mr. Norm Kasubuchi

JEFFERSON PB
SAN DIEGO, CALIFORNIA

0' 30' 60' 90' 120'

SCALE 1"=60' (on 11x17)

GEOCON LEGEND

- Qpf .....PREVIOUSLY PLACED FILL
- Qudf .....UNDOCUMENTED FILL
- Qal .....ALLUVIUM
- Qop .....OLD PARALIC DEPOSITS (Dotted Where Buried)
- B-4 .....APPROX. LOCATION OF EXPLORATORY BORING (Geocon, 2014)
- B-2 .....APPROX. LOCATION OF PREVIOUS BORING (Geocon, 2004)
- P-9 .....APPROX. LOCATION OF INFILTRATION TEST
- FT-7 .....APPROX. LOCATION OF FAULT TRENCH
- FT-1 .....APPROX. LOCATION OF PREVIOUS FAULT TRENCH (Geocon, 2004)
- (9') .....APPROX. DEPTH OF FILL (In Feet)
- B B' .....APPROX. LOCATION OF GEOLOGIC CROSS SECTION
- .....APPROX. LOCATION OF MAPPED BURIED POTENTIALLY ACTIVE FAULT (Kennedy & Tan, 2008)
- .....APPROX. LOCATION OF GEOLOGIC CONTACT (Dotted Where Buried)
- .....APPROX. AREAS WHERE TPH IMPACTED SOIL MAY BE ENCOUNTERED

GEOCON INCORPORATED

GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121 - 2974
PHONE 858 558-6900 - FAX 858 558-6159

PROJECT NO. G1592 - 11 - 03
FIGURE 2
DATE 07 - 05 - 2016

GEOLOGIC MAP

Ladrillono

Plotted:07/05/2016 9:10AM | By:ALVIN LADRILLONO | File Location:Y:\PROJECTS\G1592-11-03 (Guy Hill Property - Update)\SHEETS\G1592-11-03 Geo Map (Upd 07-05-2016).dwg

GEOCON

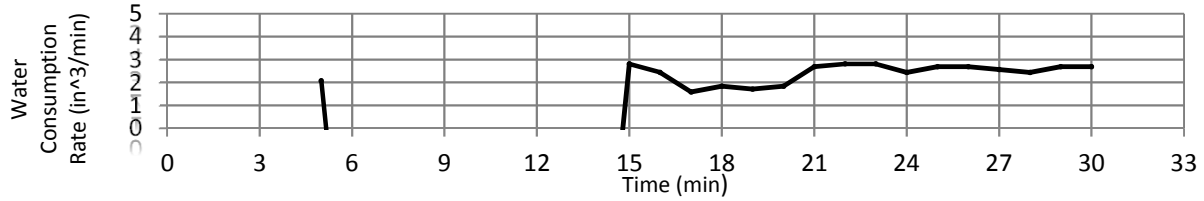
Aardvark Permeameter Data Analysis

Project Name:	PB Jefferson	Date:	5/13/2016
Project Number:	G1592-11-03	By:	LR
Borehole Location:	P1	Ref. EL:	20.00
		Bottom EL:	16.17

Borehole Diameter (2r):	8.00	in			
Borehole Depth (H):	3.83	ft	Wetted Area:	199.84	in^2
Distance Between Reservoir & Top of Borehole:	2.00	ft			
Depth to Water Table (s):	13.00	ft			
Height APM Raised from Bottom:	2.25	in			

Distance Between Resevoir and APM (D):	5.04	ft
Head Height (h):	5.95	in
Distance Between Constant Head and Water Table (L):	115.99	in

Reading	Time (min)	Time Elapsed (min)	Reservoir Water Weight (g)	Resevoir Water Weight (lbs)	Interval Water Consumption (lbs)	Total Water Consumption (lbs)	*Water Consumption Rate (in^3/min)
1	0.00		2944	6.49			
2	5.00	5.00	2774	6.12	0.37	0.37	2.08
3	10.00	5.00	8004	17.65	-11.53	-11.16	-63.92
4	15.00	5.00	7774	17.14	0.51	-10.65	2.81
5	16.00	1.00	7734	17.05	0.09	-10.56	2.44
6	17.00	1.00	7708	16.99	0.06	-10.50	1.59
7	18.00	1.00	7678	16.93	0.07	-10.44	1.83
8	19.00	1.00	7650	16.87	0.06	-10.37	1.71
9	20.00	1.00	7620	16.80	0.07	-10.31	1.83
10	21.00	1.00	7576	16.70	0.10	-10.21	2.69
11	22.00	1.00	7530	16.60	0.10	-10.11	2.81
12	23.00	1.00	7484	16.50	0.10	-10.01	2.81
13	24.00	1.00	7444	16.41	0.09	-9.92	2.44
14	25.00	1.00	7400	16.31	0.10	-9.82	2.69
15	26.00	1.00	7356	16.22	0.10	-9.73	2.69
16	27.00	1.00	7314	16.12	0.09	-9.63	2.57
17	28.00	1.00	7274	16.04	0.09	-9.55	2.44
18	29.00	1.00	7230	15.94	0.10	-9.45	2.69
19	30.00	1.00	7186	15.84	0.10	-9.35	2.69
				Steady Flow Rate, Q (in^3/min):			2.69
				Steady Flow Rate, Q (in^3/hr):			161.33



Field-Saturated Hydraulic Conductivity:

Case 1: L/h > 3 K_{sat} = 0.008 in/min 0.48 in/hr

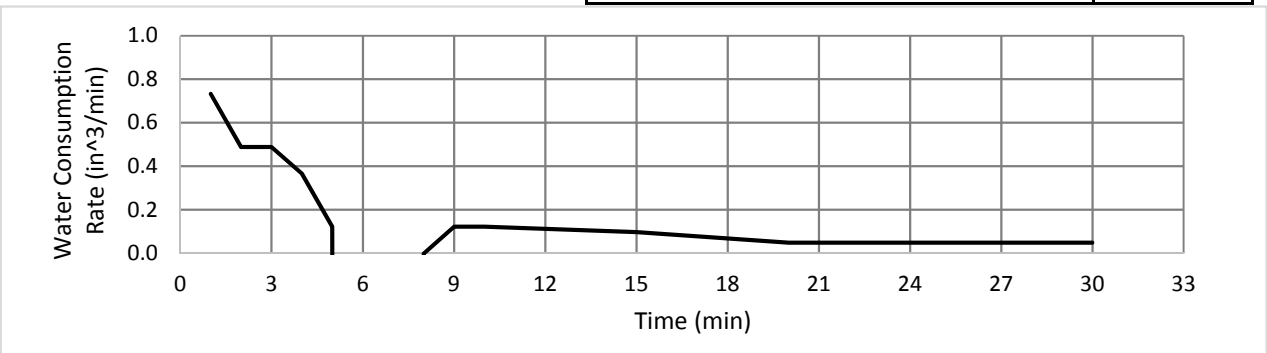
GEOCON

Aardvark Permeameter Data Analysis

Project Name:	PB Jefferson	Date:	5/13/2016
Project Number:	G1592-11-03	By:	LR
Borehole Location:	P2	Ref. EL:	21.00
		Bottom EL:	17.08

Borehole Diameter (2r):	8.00	in			
Borehole Depth (H):	3.92	ft	Wetted Area:	193.67	in^2
Distance Between Reservoir & Top of Borehole:	2.00	ft			
Depth to Water Table (s):	14.00	ft			
Height APM Raised from Bottom:	2.00	in			
Distance Between Resevoir and APM (D):	5.15	ft			
Head Height (h):	5.71	in			
Distance Between Constant Head and Water Table (L):	126.67	in			

Reading	Time (min)	Time Elapsed (min)	Reservoir Water Weight (g)	Resevoir Water Weight (lbs)	Interval Water Consumption (lbs)	Total Water Consumption (lbs)	*Water Consumption Rate (in^3/min)
1	0.00		3692	8.14			
2	1.00	1.00	3680	8.11	0.03	0.03	0.73
3	2.00	1.00	3672	8.10	0.02	0.04	0.49
4	3.00	1.00	3664	8.08	0.02	0.06	0.49
5	4.00	1.00	3658	8.06	0.01	0.07	0.37
6	5.00	1.00	3656	8.06	0.00	0.08	0.12
7	7.00	2.00	7870	17.35	-9.29	-9.21	-128.76
8	8.00	1.00	7870	17.35	0.00	-9.21	0.00
9	9.00	1.00	7868	17.35	0.00	-9.21	0.12
10	10.00	1.00	7866	17.34	0.00	-9.20	0.12
11	15.00	5.00	7858	17.32	0.02	-9.18	0.10
12	20.00	5.00	7854	17.32	0.01	-9.18	0.05
13	25.00	5.00	7850	17.31	0.01	-9.17	0.05
14	30.00	5.00	7846	17.30	0.01	-9.16	0.05
						Steady Flow Rate, Q (in^3/min):	0.05
						Steady Flow Rate, Q (in^3/hr):	2.93



Field-Saturated Hydraulic Conductivity:

Case 1: L/h > 3 K_{sat} = 0.0002 in/min 0.01 in/hr

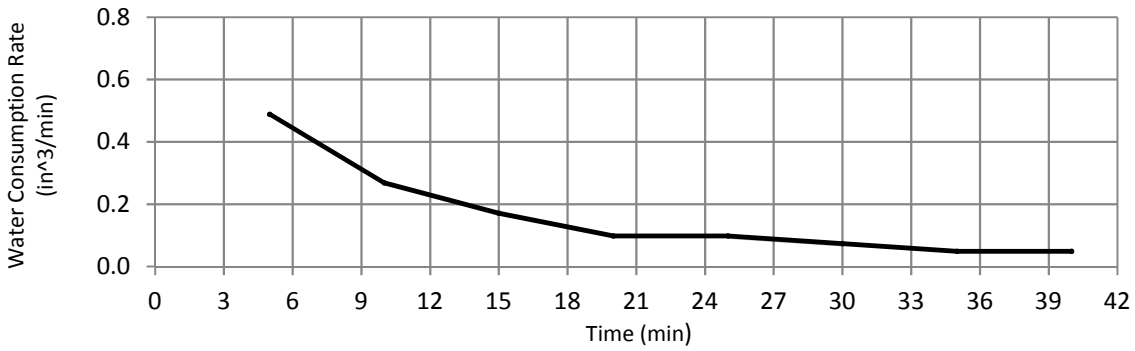
GEOCON

Aardvark Permeameter Data Analysis

Project Name:	PB Jefferson	Date:	5/13/2016
Project Number:	G1592-11-03	By:	LR
Borehole Location:	P4	Ref. EL:	18.50
		Bottom EL:	15.33

Borehole Diameter (2r):	8.00	in			
Borehole Depth (H):	3.17	ft	Wetted Area:	192.92	in^2
Distance Between Reservoir & Top of Borehole:	2.00	ft			
Depth to Water Table (s):	11.50	ft			
Height APM Raised from Bottom:	2.00	in			
Distance Between Resevoir and APM (D):	4.40	ft			
Head Height (h):	5.68	in			
Distance Between Constant Head and Water Table (L):	105.64	in			

Reading	Time (min)	Time Elapsed (min)	Reservoir Water Weight (g)	Resevoir Water Weight (lbs)	Interval Water Consumption (lbs)	Total Water Consumption (lbs)	*Water Consumption Rate (in^3/min)
1	0.00		3808	8.40			
2	5.00	5.00	3768	8.31	0.09	0.09	0.49
3	10.00	5.00	3746	8.26	0.05	0.14	0.27
4	15.00	5.00	3732	8.23	0.03	0.17	0.17
5	20.00	5.00	3724	8.21	0.02	0.19	0.10
6	25.00	5.00	3716	8.19	0.02	0.20	0.10
7	30.00	5.00	3710	8.18	0.01	0.22	0.07
8	35.00	5.00	3706	8.17	0.01	0.22	0.05
9	40.00	5.00	3702	8.16	0.01	0.23	0.05
						Steady Flow Rate, Q (in^3/min):	0.05
						Steady Flow Rate, Q (in^3/hr):	2.93



Field-Saturated Hydraulic Conductivity:

Case 1: L/h > 3 K_{sat} = 0.0002 in/min 0.01 in/hr

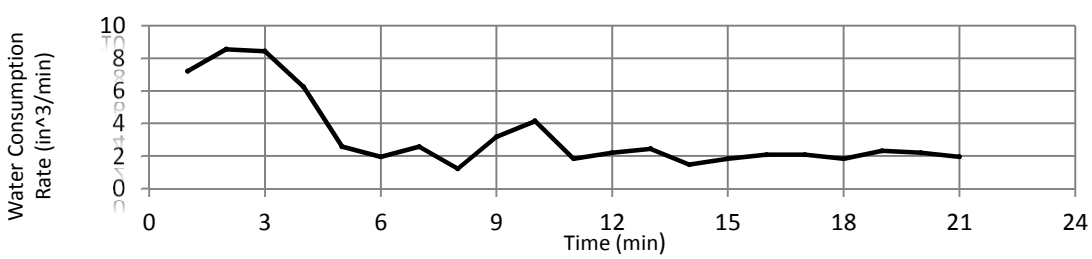
GEOCON

Aardvark Permeameter Data Analysis

Project Name:	PB Jefferson	Date:	5/13/2016
Project Number:	G1592-11-03	By:	LR
Borehole Location:	P5	Ref. EL:	19.00
		Bottom EL:	16.33

Borehole Diameter (2r):	8.00	in			
Borehole Depth (H):	2.67	ft	Wetted Area:	192.42	in^2
Distance Between Reservoir & Top of Borehole:	2.00	ft			
Depth to Water Table (s):	12.00	ft			
Height APM Raised from Bottom:	2.00	in			
Distance Between Resevoir and APM (D):	3.90	ft			
Head Height (h):	5.66	in			
Distance Between Constant Head and Water Table (L):	117.62	in			

Reading	Time (min)	Time Elapsed (min)	Reservoir Water Weight (g)	Resevoir Water Weight (lbs)	Interval Water Consumption (lbs)	Total Water Consumption (lbs)	*Water Consumption Rate (in^3/min)
1	0.00		5336	11.76			
2	1.00	1.00	5218	11.50	0.26	0.26	7.21
3	2.00	1.00	5078	11.20	0.31	0.57	8.56
4	3.00	1.00	4940	10.89	0.30	0.87	8.43
5	4.00	1.00	4838	10.67	0.22	1.10	6.23
6	5.00	1.00	4796	10.57	0.09	1.19	2.57
7	6.00	1.00	4764	10.50	0.07	1.26	1.96
8	7.00	1.00	4722	10.41	0.09	1.35	2.57
9	8.00	1.00	4702	10.37	0.04	1.40	1.22
10	9.00	1.00	4650	10.25	0.11	1.51	3.18
11	10.00	1.00	4582	10.10	0.15	1.66	4.16
12	11.00	1.00	4552	10.04	0.07	1.73	1.83
13	12.00	1.00	4516	9.96	0.08	1.81	2.20
14	13.00	1.00	4476	9.87	0.09	1.90	2.44
15	14.00	1.00	4452	9.81	0.05	1.95	1.47
16	15.00	1.00	4422	9.75	0.07	2.02	1.83
17	16.00	1.00	4388	9.67	0.07	2.09	2.08
18	17.00	1.00	4354	9.60	0.07	2.16	2.08
19	18.00	1.00	4324	9.53	0.07	2.23	1.83
20	19.00	1.00	4286	9.45	0.08	2.31	2.32
21	20.00	1.00	4250	9.37	0.08	2.39	2.20
22	21.00	1.00	4218	9.30	0.07	2.46	1.96
					Steady Flow Rate, Q (in^3/min):		1.96
					Steady Flow Rate, Q (in^3/hr):		117.33



Field-Saturated Hydraulic Conductivity:

Case 1: L/h > 3	K_{sat} =	0.006	in/min	0.37	in/hr

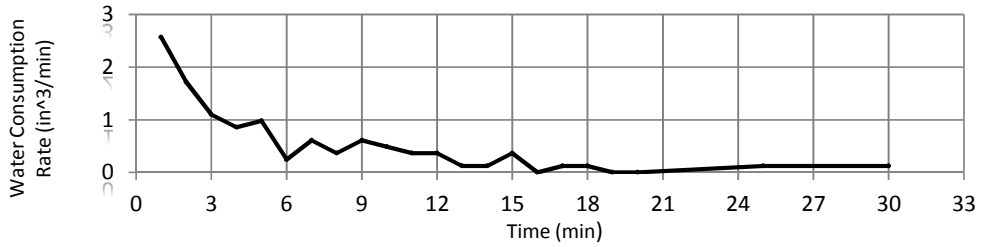
GEOCON

Aardvark Permeameter Data Analysis

Project Name:	PB Jefferson	Date:	5/13/2016
Project Number:	G1592-11-03	By:	LR
Borehole Location:	P6	Ref. EL:	19.00
		Bottom EL:	11.00

Borehole Diameter (2r):	8.00	in			
Borehole Depth (H):	8.00	ft	Wetted Area:	198.28	in^2
Distance Between Reservoir & Top of Borehole:	2.50	ft			
Depth to Water Table (s):	17.00	ft			
Height APM Raised from Bottom:	2.00	in			
Distance Between Resevoir and APM (D):	9.73	ft			
Head Height (h):	5.89	in			
Distance Between Constant Head and Water Table (L):	113.89	in			

Reading	Time (min)	Time Elapsed (min)	Reservoir Water Weight (g)	Resevoir Water Weight (lbs)	Interval Water Consumption (lbs)	Total Water Consumption (lbs)	*Water Consumption Rate (in^3/min)
1	0.00		4016	8.85			
2	1.00	1.00	3974	8.76	0.09	0.09	2.57
3	2.00	1.00	3946	8.70	0.06	0.15	1.71
4	3.00	1.00	3928	8.66	0.04	0.19	1.10
5	4.00	1.00	3914	8.63	0.03	0.22	0.86
6	5.00	1.00	3898	8.59	0.04	0.26	0.98
7	6.00	1.00	3894	8.58	0.01	0.27	0.24
8	7.00	1.00	3884	8.56	0.02	0.29	0.61
9	8.00	1.00	3878	8.55	0.01	0.30	0.37
10	9.00	1.00	3868	8.53	0.02	0.33	0.61
11	10.00	1.00	3860	8.51	0.02	0.34	0.49
12	11.00	1.00	3854	8.50	0.01	0.36	0.37
13	12.00	1.00	3848	8.48	0.01	0.37	0.37
14	13.00	1.00	3846	8.48	0.00	0.37	0.12
15	14.00	1.00	3844	8.47	0.00	0.38	0.12
16	15.00	1.00	3838	8.46	0.01	0.39	0.37
17	16.00	1.00	3838	8.46	0.00	0.39	0.00
18	17.00	1.00	3836	8.46	0.00	0.40	0.12
19	18.00	1.00	3834	8.45	0.00	0.40	0.12
20	19.00	1.00	3834	8.45	0.00	0.40	0.00
21	20.00	1.00	3834	8.45	0.00	0.40	0.00
22	25.00	5.00	3824	8.43	0.02	0.42	0.12
23	30.00	5.00	3814	8.41	0.02	0.45	0.12
				Steady Flow Rate, Q (in^3/min):			0.12
				Steady Flow Rate, Q (in^3/hr):			7.33



Field-Saturated Hydraulic Conductivity:

Case 1: L/h > 3 K_{sat} = 0.0004 in/min 0.02 in/hr

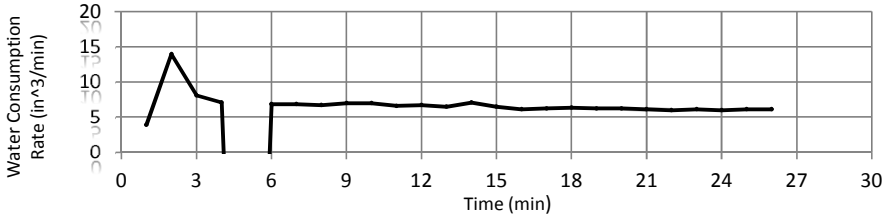
GEOCON

Aardvark Permeameter Data Analysis

Project Name:	PB Jefferson	Date:	5/13/2016
Project Number:	G1592-11-03	By:	LR
Borehole Location:	P7	Ref. EL:	28.00
		Bottom EL:	20.58

Borehole Diameter (2r):	8.00	in			
Borehole Depth (H):	7.42	ft	Wetted Area:	197.19	in^2
Distance Between Reservoir & Top of Borehole:	2.00	ft			
Depth to Water Table (s):	21.00	ft			
Height APM Raised from Bottom:	2.00	in			
Distance Between Resevoir and APM (D):	8.65	ft			
Head Height (h):	5.85	in			
Distance Between Constant Head and Water Table (L):	168.81	in			

Reading	Time (min)	Time Elapsed (min)	Reservoir Water Weight (g)	Resevoir Water Weight (lbs)	Interval Water Consumption (lbs)	Total Water Consumption (lbs)	*Water Consumption Rate (in^3/min)
1	0.00		4854	10.70			
2	1.00	1.00	4790	10.56	0.14	0.14	3.91
3	2.00	1.00	4562	10.06	0.50	0.64	13.93
4	3.00	1.00	4430	9.77	0.29	0.93	8.07
5	4.00	1.00	4314	9.51	0.26	1.19	7.09
6	5.00	1.00	5664	12.49	-2.98	-1.79	-82.50
7	6.00	1.00	5552	12.24	0.25	-1.54	6.84
8	7.00	1.00	5440	11.99	0.25	-1.29	6.84
9	8.00	1.00	5330	11.75	0.24	-1.05	6.72
10	9.00	1.00	5216	11.50	0.25	-0.80	6.97
11	10.00	1.00	5102	11.25	0.25	-0.55	6.97
12	11.00	1.00	4994	11.01	0.24	-0.31	6.60
13	12.00	1.00	4884	10.77	0.24	-0.07	6.72
14	13.00	1.00	4778	10.53	0.23	0.17	6.48
15	14.00	1.00	4662	10.28	0.26	0.42	7.09
16	15.00	1.00	4556	10.04	0.23	0.66	6.48
17	16.00	1.00	4456	9.82	0.22	0.88	6.11
18	17.00	1.00	4354	9.60	0.22	1.10	6.23
19	18.00	1.00	4250	9.37	0.23	1.33	6.36
20	19.00	1.00	4148	9.14	0.22	1.56	6.23
21	20.00	1.00	4046	8.92	0.22	1.78	6.23
22	21.00	1.00	3946	8.70	0.22	2.00	6.11
23	22.00	1.00	3848	8.48	0.22	2.22	5.99
24	23.00	1.00	3748	8.26	0.22	2.44	6.11
25	24.00	1.00	3650	8.05	0.22	2.65	5.99
26	25.00	1.00	3550	7.83	0.22	2.87	6.11
27	26.00	1.00	3450	7.61	0.22	3.10	6.11
						Steady Flow Rate, Q (in^3/min):	6.11
						Steady Flow Rate, Q (in^3/hr):	366.66



Field-Saturated Hydraulic Conductivity:

Case 1: L/h > 3 K_{sat} = 0.02 in/min 1.10 in/hr

GEOCON

Aardvark Permeameter Data Analysis

Project Name:	Guy Hill	Date:	7/1/2016
Project Number:	G1592-11-03	By:	JML
Borehole Location:	P-8	Ref. EL (feet, MSL):	25.0
		Bottom EL (feet, MSL):	19.5

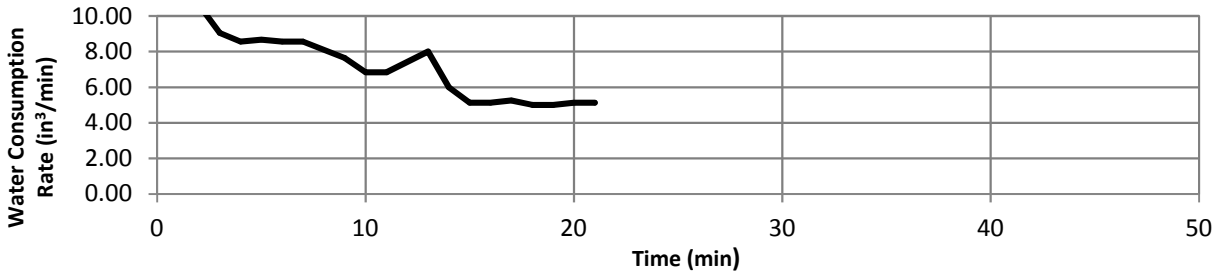
Borehole Diameter (inches):	4.00
Borehole Depth, **H** (feet):	5.50
Distance Between Reservoir & Top of Borehole (feet):	2.50
Depth to Water Table, **s** (feet):	10
Height APM Raised from Bottom (inches):	8.00

Wetted Area, **A** (in^2): 160.46

Distance Between Resevoir and APM, **D** (feet):	6.73
Head Height, **h** (inches):	11.77
Distance Between Constant Head and Water Table, **L** (inches):	66

Reading	Time (min)	Time Elapsed (min)	Reservoir Water Weight (g)	Resevoir Water Weight (lb)	Interval Water Consumption (lb)	Total Water Consumption (lb)	Water Consumption Rate (in^3/min)
1	0.00		9000	19.84			
2	1.00	1.00	8362	18.44	1.41	1.41	38.99
3	2.00	1.00	8188	18.05	0.38	1.79	10.63
4	3.00	1.00	8040	17.73	0.33	2.12	9.04
5	4.00	1.00	7900	17.42	0.31	2.43	8.56
6	5.00	1.00	7758	17.10	0.31	2.74	8.68
7	6.00	1.00	7618	16.79	0.31	3.05	8.56
8	7.00	1.00	7478	16.49	0.31	3.36	8.56
9	9.00	2.00	7228	15.94	0.55	3.91	7.64
10	10.00	1.00	7116	15.69	0.25	4.15	6.84
11	11.00	1.00	7004	15.44	0.25	4.40	6.84
12	13.00	2.00	6742	14.86	0.58	4.98	8.01
13	14.00	1.00	6644	14.65	0.22	5.19	5.99
14	15.00	1.00	6560	14.46	0.19	5.38	5.13
15	16.00	1.00	6476	14.28	0.19	5.56	5.13
16	17.00	1.00	6390	14.09	0.19	5.75	5.26
17	18.00	1.00	6308	13.91	0.18	5.93	5.01
18	19.00	1.00	6226	13.73	0.18	6.12	5.01
19	20.00	1.00	6142	13.54	0.19	6.30	5.13
20	21.00	1.00	6058	13.36	0.19	6.49	5.13
21							
22							
23							
24							
25							
26							
27							
28							

Steady Flow Rate, Q (in^3/min):	5.13
Steady Flow Rate, Q (in^3/hr):	307.99



Field-Saturated Hydraulic Conductivity

Case 1: L/h > 3 K_{sat} = 9.61E-03 in/min 0.58 in/hr

GEOCON

Aardvark Permeameter Data Analysis

Project Name:	Guy Hill	Date:	7/1/2016
Project Number:	G1592-11-03	By:	JML
Borehole Location:	P-9	Ref. EL (feet, MSL):	26.0
		Bottom EL (feet, MSL):	20.5

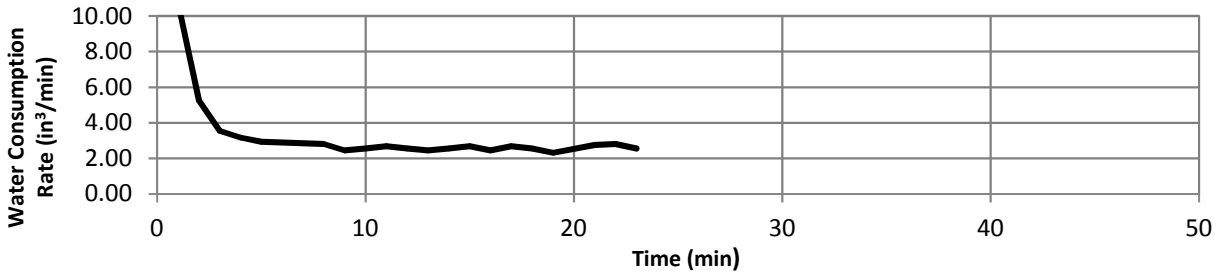
Borehole Diameter (inches):	4.00
Borehole Depth, **H** (feet):	5.50
Distance Between Reservoir & Top of Borehole (feet):	2.50
Depth to Water Table, **s** (feet):	10
Height APM Raised from Bottom (inches):	8.00

Wetted Area, **A** (in^2): 160.46

Distance Between Resevoir and APM, **D** (feet):	6.73
Head Height, **h** (inches):	11.77
Distance Between Constant Head and Water Table, **L** (inches):	66

Reading	Time (min)	Time Elapsed (min)	Reservoir Water Weight (g)	Resevoir Water Weight (lb)	Interval Water Consumption (lb)	Total Water Consumption (lb)	Water Consumption Rate (in^3/min)
1	0.00		9000	19.84			
2	1.00	1.00	8824	19.45	0.39	0.39	10.76
3	2.00	1.00	8738	19.26	0.19	0.58	5.26
4	3.00	1.00	8680	19.14	0.13	0.71	3.54
5	4.00	1.00	8628	19.02	0.11	0.82	3.18
6	5.00	1.00	8580	18.92	0.11	0.93	2.93
7	8.00	3.00	8442	18.61	0.30	1.23	2.81
8	9.00	1.00	8402	18.52	0.09	1.32	2.44
9	10.00	1.00	8360	18.43	0.09	1.41	2.57
10	11.00	1.00	8316	18.33	0.10	1.51	2.69
11	12.00	1.00	8274	18.24	0.09	1.60	2.57
12	13.00	1.00	8234	18.15	0.09	1.69	2.44
13	14.00	1.00	8192	18.06	0.09	1.78	2.57
14	15.00	1.00	8148	17.96	0.10	1.88	2.69
15	16.00	1.00	8108	17.88	0.09	1.97	2.44
16	17.00	1.00	8064	17.78	0.10	2.06	2.69
17	18.00	1.00	8022	17.69	0.09	2.16	2.57
18	19.00	1.00	7984	17.60	0.08	2.24	2.32
19	21.00	2.00	7894	17.40	0.20	2.44	2.75
20	22.00	1.00	7848	17.30	0.10	2.54	2.81
21	23.00	1.00	7806	17.21	0.09	2.63	2.57
22							
23							
24							
25							
26							
27							
28							

Steady Flow Rate, Q (in^3/min):	2.57
Steady Flow Rate, Q (in^3/hr):	154.0



Field-Saturated Hydraulic Conductivity

Case 1: L/h > 3 K_{sat} = 4.80E-03 in/min 0.29 in/hr

Categorization of Infiltration Feasibility Condition			Worksheet C.4-1
Part 1 - Full Infiltration Feasibility Screening Criteria **Would infiltration of the full design volume be feasible from a physical perspective without any undesirable consequences that cannot be reasonably mitigated?**			
Criteria	Screening Question	Yes	No
1	**Is the estimated reliable infiltration rate below proposed facility locations greater than 0.5 inches per hour?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.		X
Provide basis: The results of the infiltration tests (inches per hour after a factor of safety of 2 is applied) are as follows: P-1 – 0.24; P-2 – >0.01; P-4 – >0.01; P-5 – 0.18; P-6 – 0.02; P-7 – 0.55; P-8 – 0.29; P-9 – 0.15. P-7 through P-9 are in the same general vicinity of each other and possess an average of about 0.33 inches per hour (after applying the factor of safety of 2). Therefore, the property does not possess an area with an infiltration rate of 0.5 or greater (after applying the factor of safety of 2). Full infiltration should not be performed on the property but partial infiltration can be incorporated into the design and construction of the property. The infiltration rate is equal to the saturated hydraulic conductivity based on the discussion in the County of Riverside manual.			
2	**Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.		X
Provide basis: Based on the results of the infiltration testing, infiltration rates greater than 0.5 inches per hour should not be allowed on the property. The rates are highly variable and the existing materials are fine-grained that limit the infiltration rate. The site in underlain by previously placed fill, undocumented fill, alluvium and Old Paralic Deposits. Partial infiltration should be considered on the property and liners will be required on the sidewalls of the storm water devices. Setbacks within a minimum distance of 50 feet will be required adjacent to slopes. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			

Worksheet C.4-1 Page 2 of 4			
Criteria	Screening Question	**Yes**	**No**
3	**Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of groundwater contamination (shallow water table, storm water pollutants or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.		X
Provide basis: Based on the results of the infiltration testing, infiltration rates greater than 0.5 inches per hour should not be allowed on the property. The rates are highly variable and the existing materials are fine-grained that limit the infiltration rate. Infiltration should be limited to an elevation of 18 feet above MSL and within the Old Paralic Deposits. This elevation is 10 feet above the historic high groundwater elevation. The historic high groundwater elevation of 8 feet MSL should be used in our analyses based on the discussion in Section C.4.1. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
4	**Can infiltration greater than 0.5 inches per hour be allowed without causing potential water balance issues such as change of seasonality of ephemeral streams or increased discharge of contaminated groundwater to surface waters?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.		X
Provide basis: Based on the results of the infiltration testing, infiltration rates greater than 0.5 inches per hour should not be allowed on the property. The rates are highly variable and the existing materials are fine-grained that limit the infiltration rate. We do not expect infiltration will cause water balance issues such as seasonality of ephemeral streams or increased discharge of contaminated groundwater to surface waters. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
Part 1 Result*	If all answers to rows 1 - 4 are "**Yes**" a full infiltration design is potentially feasible. The feasibility screening category is **Full Infiltration** If any answer from row 1-4 is "**No**", infiltration may be possible to some extent but would not generally be feasible or desirable to achieve a "full infiltration" design. Proceed to Part 2		No

*To be completed using gathered site information and best professional judgment considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by the City to substantiate findings.

Worksheet C.4-1 Page 3 of 4

Part 2 – Partial Infiltration vs. No Infiltration Feasibility Screening Criteria

Would infiltration of water in any appreciable amount be physically feasible without any negative consequences that cannot be reasonably mitigated?

Criteria	Screening Question	Yes	No
5	**Do soil and geologic conditions allow for infiltration in any appreciable rate or volume?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.	X	

Provide basis:

The results of the infiltration tests (inches per hour after a factor of safety of 2 is applied) are as follows: P-1 – 0.24; P-2 – >0.01; P-4 – >0.01; P-5 – 0.18; P-6 – 0.02; P-7 – 0.55; P-8 – 0.29; P-9 – 0.15.

P-7 through P-9 are in the same general vicinity of each other and possess an average of about 0.67 inches per hour or 0.33 inches per hour after applying the factor of safety of 2. Partial infiltration can be incorporated into the design and construction of the property.

The infiltration rate is equal to the saturated hydraulic conductivity based on the discussion in the County of Riverside manual.

6	**Can Infiltration in any appreciable quantity be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level**? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.	X	

Provide basis:

Based on the comprehensive evaluation presented in the geotechnical documents dated September 11, 2015 and June 3, 2016, partial infiltration can be incorporated in to the design of the property. As discussed in the geotechnical documents, liners on the sidewalls and setback due to existing slopes and utilities will be required. Setbacks within a minimum distance of 50 feet will be required adjacent to slopes.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.

Worksheet C.4-1 Page 4 of 4			
Criteria	Screening Question	**Yes**	**No**
7	**Can Infiltration in any appreciable quantity be allowed without posing significant risk for groundwater related concerns (shallow water table, storm water pollutants or other factors)?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
Provide basis: Based on the comprehensive evaluation presented in the geotechnical documents dated September 11, 2015 and June 3, 2016, partial infiltration can be incorporated in to the design of the property. However, the bottom of the infiltration devices in some areas will be within a distance of 10 feet of the groundwater elevation. We understand storm water devices are typically designed at a depth of at least 10 feet above the groundwater table to prevent contamination migration. However, the groundwater in this area is likely considered non-beneficial use due to the proximity of the site to the San Diego Bay. Storm water infiltration should not occur within areas of known contamination as evaluated by SCS Engineers. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			
8	**Can infiltration be allowed without violating downstream water rights**? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
Provide basis: We did not provide a study regarding water rights due to the project elevation, proximity to Mission Bay, and lack of on-site streams (ephemeral or otherwise). However, these rights are not typical in the San Diego area. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			
Part 2 Result*	If all answers from row 1-4 are yes then partial infiltration design is potentially feasible. The feasibility screening category is **Partial Infiltration.** If any answer from row 5-8 is no, then infiltration of any volume is considered to be **infeasible** within the drainage area. The feasibility screening category is **No Infiltration.**		Partial Infiltration

*To be completed using gathered site information and best professional judgment considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by the City to substantiate findings.

GEOTECHNICAL INVESTIGATION

GUY HILL PROPERTY
4275 EAST MISSION BAY DRIVE
SAN DIEGO, CALIFORNIA

GEOCON
INCORPORATED

GEOTECHNICAL
ENVIRONMENTAL
MATERIALS

PREPARED FOR

JPI REAL ESTATE ACQUISITION, LLC
SAN DIEGO, CALIFORNIA

SEPTEMBER 11, 2015
PROJECT NO. G1592-11-03

GEOCON
INCORPORATED
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS

Project No. G1592-11-03
September 11, 2015

JPI Real Estate Acquisition, LLC
12250 El Camino Real, Suite 380
San Diego, California 92130

Attention: Mr. David Todd

Subject: GEOTECHNICAL INVESTIGATION
GUY HILL PROPERTY
4275 EAST MISSION BAY DRIVE
SAN DIEGO, CALIFORNIA

Dear Mr. Todd:

In accordance with your authorization, we have prepared this geotechnical investigation report for the proposed mixed-used development located in the Pacific Beach community of San Diego, California. The accompanying report presents the findings of our study, and our conclusions and recommendations pertaining to the geotechnical aspects of proposed design and construction. Based on the results of our investigation, it is our opinion that the site can be developed as proposed provided the recommendations of this report are followed and implemented during design and construction. We also retained the services of Mr. Tom Rockwell a renowned Neo-tectonic and Quaternary geologist to review selected field trenches and this report.

If you have any questions regarding this report, or if we may be of further service, please contact the undersigned.

Very truly yours,

GEOCON INCORPORATED

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(3/del) Addressee

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GEOTECHNICAL INVESTIGATION

1. PURPOSE AND SCOPE

This report presents the results of our geotechnical investigation for the proposed mixed-use residential and commercial development located at 4275 East Mission Bay Drive in the Pacific Beach community of the City of San Diego, California (see Vicinity Map, Figure 1). The purpose of the investigation is to evaluate subsurface soil and geologic conditions underlying the area of proposed development and, based on conditions encountered, provide conclusions and recommendations pertaining to the geotechnical aspects of proposed design and construction.

The scope of our investigation included subsurface exploration and fault trenching, laboratory testing, engineering analyses, and the preparation of this report. As a part of our investigation, we have reviewed aerial photographs, published geologic maps, published geologic reports (see List of References), and a previous geotechnical report related to the property.

Our current field investigation performed for the Guy Hill Property included drilling four small diameter auger borings to a maximum depth of 36 feet and excavating six fault trenches. We previously excavated two small diameter borings and one fault trench at the site in 2003. Appendix A presents a discussion of the current field investigation and logs of the borings and trench. The approximate locations of the current and previous exploratory excavations are presented on the Geologic Map (Figure 2). We performed laboratory tests on soil samples obtained from the current exploratory excavations to evaluate pertinent physical and chemical properties for engineering analysis. Appendix B presents the results of the laboratory testing. The previous boring logs, fault trench log, and results of previous laboratory data are presented in Appendix C.

As a part of this geotechnical investigation, we reviewed the following documents:

1. *Geotechnical Investigation, Guy Hill Automobile Dealership, 4275 East Mission Bay Drive, San Diego, California*, prepared by Geocon Incorporated, dated January 7, 2004 (Project No. 07210-22-01).

2. *DRAFT Street Level/ Site Plan and Site Sections + Elevation, Guy Hill Cadillac Site, 4275 Mission bay Drive, San Diego, California,* prepared by Carrier Johnson, dated October 15, 2014.

Project Design Consultants provided the topographic information and Carrier Johnson provided the site plan used during our field investigation and for the preparation of the Geologic Map. References to elevations presented in this report are based on the referenced topographic information. Geocon does not practice in the field of land surveying and is not responsible for the accuracy of such topographic information.

2. SITE AND PROJECT DESCRIPTION

The project site is located on the east side of Mission Bay Drive, south of Rosewood Street and Del Rey Street, and west of Interstate 5 in the City of San Diego, California. Three parcels combine to form a triangular shaped property which is 2.944 acres in size and is bound by Rosewood and Del Rey Streets and a vacant lot used for storage to the north, Mission Bay Drive to the west, and Caltrans right-of-way to the south and east. The majority of the site is currently occupied by existing retail buildings with associated driveways, parking and storage areas. Vehicle access to the property is provided from two driveway entrances off Rosewood Street. The existing buildings and associated improvements will be demolished prior to construction. Several large utilities are located adjacent to Rosewood Street and cross the property in the northeast portion of the site contained within a City of San Diego easement and an abandoned VCP sewer line crossing the property within an easement shown on Figure 2. The property generally slopes to the west with existing elevations ranging from about 31 feet above Mean Sea Level (MSL) at the northeast corner of the site to 16 feet MSL along the western property boundary.

Information concerning the proposed development was furnished by the client and project design team. The proposed development of the site will consist of the construction of four, 3-story mixed use residential and retail buildings over two levels of subterranean parking. The development will also include several structures at-grade, including a commercial gym/retail facility, a commercial/tech hub facility, leasing office building, and a residential building consisting of 3 townhomes. Additional site improvements include a driveway at the north end of the site to give access to the at-grade townhomes, a pool terrace, a large landscaping area, and underground utilities.

The proposed subterranean parking garage will extend below the mixed use residential and retail buildings and portions of the commercial gym/retail facility and commercial/tech hub facility with a garage finish floor elevation of 4.5 feet above MSL. The limits of the proposed subterranean level are indicated on the Geologic Map (see Figure 2). The proposed first floor elevation of the planned structures is approximately 15 feet above MSL. Based on the preliminary plans, cuts up to 25 feet will be required to achieve proposed grades for the subterranean parking structure.

The locations and descriptions provided herein are based on our review of previous geotechnical reports prepared for the property, observations during our field investigation, discussions with project personnel, and our understanding of the project. Significant changes in the design, location or elevation of any structure, as outlined in this report, should be reviewed by this office.

3. REGIONAL GEOLOGIC SETTING

The site is located in the coastal plain within the southern portion of the Peninsular Ranges Geomorphic Province of southern California. The Peninsular Ranges is a geologic and geomorphic

province that extends from the Imperial Valley to the Pacific Ocean and from the Transverse Ranges to the north and into Baja California to the south. The coastal plain of San Diego County is underlain by a thick sequence of relatively undisturbed and non-conformable sedimentary rocks that thicken to the west and range in age from late Cretaceous through late Pleistocene with intermittent deposition. The sedimentary units are deposited on bedrock Cretaceous to Jurassic age igneous and metavolcanic rocks. Geomorphically, the coastal plain is characterized by a series of twenty-one, stair-stepped Pleistocene-age marine to non-marine terraces that young to the west with a maximum width of roughly 14 miles in the central and southern portions of the county. The oldest terrace sequence is called Very Old Paralic Deposits and consists of 13 wave cut terraces that range in elevation from about 666 feet above MSL to 223 feet above MSL from east to west and range in age from 1,525 ka to 510 ka. A younger sequence of terraces known as Old Paralic Deposits consist of 8 wave cut terraces that range in elevation from 203 feet to 20 feet above MSL from east to west and range in age from 450 ka to 45 ka. The sequences of both terraces were formed as sea level lowered and/or the landform was uplifted.

The sedimentary rocks within the coastal plain were subsequently dissected after deposition in the late Pleistocene by west flowing rivers that drain the Peninsular Ranges located to the east. The coastal plain is a relatively stable block that is dissected by relatively few faults consisting of the potentially active La Nacion Fault Zone and the active Rose Canyon Fault Zone. The Peninsular Ranges Province is also dissected by the Elsinore Fault Zone that is associated with and sub-parallel to the San Andreas Fault Zone, which is the plate boundary between the Pacific and North American Plates.

The project site is located on the western portion of the coastal plain. Sedimentary materials make up the geologic unit encountered on the site and consist of late Pleistocene-age Old Paralic Deposits Unit 6 (formerly known as part of the Bay Point Formation) as indicated by Kennedy and Tan, 2008. The Old Paralic Deposits Unit 6 is shallow marine and non-marine estuarine and colluvium sediments composed of weakly cemented sandstone, siltstone and claystone. This unit is in excess of 36 feet thick at the site and was encountered to at least an elevation of -12.5 feet below MSL. The unit has been reported to be over 100 feet thick north of the downtown area and was deposited unconformably on the late Pliocene to early Pleistocene-age San Diego Formation, which typically consist of poorly cemented sandstones.

The regional geology in the site area is predominately controlled by the active Rose Canyon Fault Zone (RCFZ) which transitions from a strike slip fault to the north of the property in an offshore submarine environment in La Jolla Cove and then located east of the site as a strike slip fault and then transitions to several faults that have oblique movements of both strike slip and normal faulting to the south from the downtown San Diego area and onward to the south. The San Diego Bay was created as a down dropped block within this fault zone and Mount Soledad to the north was formed as a

pressure ridge causing uplift. The RCFZ zone branches into three segments through Coronado Island. The RCFZ comprises a complex system of many sub-parallel fault traces that are both active and potentially active and form a zone that can be ½ -mile to 3-miles wide. The RCFZ has been reported to have an average annual slip rate on the order of 0.04 inches per year (Lindvall and Rockwell, 1999). The zone of faulting north of the downtown area is poorly defined but is thought to be within a relatively narrow zone roughly parallel of the I-5 corridor. Some of the fault segments are concealed as they are covered by younger unfaulted sediments.

4. GEOLOGIC MATERIALS

Our field investigation indicates that the site is underlain by previously placed fill, undocumented fill and alluvium overlying Pleistocene-age Old Paralic Deposits. The occurrence, distribution, and description of each unit encountered are shown on the Geologic Map (Figure 2) and the boring and trench logs in Appendix A and C. Figures 3 and 4 present Geologic Cross-Sections showing the approximate underlying geology conditions. The soil and geologic units encountered at the site are discussed herein in order of increasing age.

4.1 Previously Placed Fill (Qpf)

Previously placed fill is associated with the backfilling of the excavations resulted from removal of the underground tanks in 1993 and 2005. We encountered one of these locations during excavation of TF4, within the central portion of the site. The material consisted of dense, moist, very dark gray, sandy gravel. Previously placed fill is considered suitable to receive additional fill or structures, however, according to the proposed development plans, this material would be removed during excavation for the subterranean parking.

4.2 Undocumented Fill (Qudf)

We encountered undocumented fill underlying the site to depths ranging from 2.5 to 12 feet below existing grade during our field investigation. We expect the fill depth ranges from 2 to 5 feet over a majority of the site. The deeper fill encountered in our recent Boring B-4, the 2004 Boring B-2 and fault trenches is likely associated with trench backfill for an existing VCP sewer line traversing the site. The remaining fill over the site is likely associated with previous grading for the development of the site. The fill generally consists of loose to medium dense, olive to dark brown, clayey, fine to medium sand and firm, sandy clay. The undocumented fill is considered unsuitable for support of the planned development and will require remedial grading. The undocumented fill can be reused as new fill, provided it is generally free of trash and debris, for the planned grading and backfill operations.

4.3 Alluvium (Qal)

Alluvial deposits were encountered in fault Trenches TF-5 through TF-7, within the southern portion of the site with thicknesses ranging from 3 to 9 feet. This material is associated with an old drainage that existed in this area prior to site grading. A review of the aerial photographs of 1928 and 1953, clearly show the location of the drainage. The alluvium consists of medium dense, moist, light brown, silty sand with occasional gravel beds. This material is not suitable to receive structural fill or settlement sensitive structures and if not removed during excavation for the proposed garage, it should be removed and replaced as compacted fill

4.4 Old Paralic Deposits (Qop)

Late Pleistocene-age Old Paralic Deposits Unit 6 underlies the surficial soils to the maximum depth explored of approximately 36 feet or an elevation of at least -12.5 feet below MSL. The Old Paralic Deposits consist of interbedded layers of stiff to very stiff clay and silt and dense to very dense silty to clayey sand. This geologic unit generally has a "low" to "medium" expansion potential (expansion index of 21 to 90) and adequate shear strengths. The Old Paralic Deposits are considered suitable for support of the planned development.

4.5 San Diego Formation (Tsd)

We did not encounter the late Pliocene to early Pleistocene-age San Diego Formation and we do not expect it to be encountered during the site construction. However, we opine the San Diego Formation exists below the Old Paralic Deposits Unit 6 and is at least 75 feet below existing surface grades. The San Diego Formation likely consists of silty sandstone with local interbeds of gravel and cobble.

5. GROUNDWATER

We encountered groundwater during the drilling operations to a depth varying from 12 to 20 feet across the site at the locations of our borings. Table 5 summarizes the depths to groundwater and elevations of groundwater we encountered in our borings.

TABLE 5
GROUNDWATER DEPTHS, ELEVATIONS ENCOUNTERED DURING CURRENT SITE INVESTIGATION

Boring	Approximate Elevation at top of Boring (feet, MSL))	Depth to Groundwater (feet)	Elevation of Groundwater (feet, MSL)
B-1	26	20.4	+5.6
B-2	17.5	13.5	+4.0
B-3	17	12.0	+5.0
B-4	23.5	17.7	+5.8

We expect some variations of the levels of groundwater may occur due to tidal influences. Based on measured groundwater elevations, we expect groundwater will be above the planned finished floor elevation of the subterranean garage. Therefore, dewatering will likely be necessary for construction and maintenance of the structure. A dewatering contractor should be retained to design a dewatering system for this project. The project is located about 1,000 feet from the northern tip of De Anza Cove of Fiesta Bay; therefore, the groundwater may be considered brackish.

A review of groundwater level data provided on the State Water Resources Control Board GeoTracker website indicates that the groundwater level measured in July of 2014 was approximately +7.5 feet above MSL at groundwater monitoring wells located approximately 625 feet northwest of the project site.

Based on our site investigation and the data obtained from the GeoTracker website, we recommend a groundwater elevation of +8 feet above MSL be used for the design of the project. The approximate groundwater elevation encountered in our borings and the design groundwater elevation are shown on Geologic Cross Sections A-A′ and B-B′ presented on Figures 3 and 4.

It is not uncommon for groundwater or seepage conditions to develop where none previously existed. Groundwater elevations vary and are affected by seasonal precipitation, irrigation, tidal variations, and land use, among other factors. Proper surface drainage will be important to future performance of the project. During the rainy season, perched water conditions are likely to develop and may require special consideration to minimize construction difficulties

6. GEOLOGIC HAZARDS

6.1 Literature Review

Our review of the *City of San Diego Seismic Safety Study Geologic Hazards and Faults Tile 25* indicates that the site vicinity is assigned a *Geologic Hazard Category 31,* indicating a high liquefaction potential, shallow groundwater, and the presence of hydraulic fills. In addition, a *Geologic Hazard Category 11* is also shown on the property indicating Active, Alquist-Priolo Earthquake Fault Zone. The geologic hazards in the vicinity of the site as mapped in the *City of San Diego Seismic Safety Study Geologic Hazards and Faults Tile 25* is presented on Figure 5, Geologic Hazards Map. The central and eastern portion of the site is located within a city of San Diego Special Studies Zone. The plan shows that a buried potentially active, northwest trending fault is located on the northeast portion of the site. In addition, a second buried sub-parallel potentially active fault is located roughly 185 feet to the east along Interstate 5. The main active fault trace within the RCFZ is located roughly 1,250 feet east of the site and is shown as a dashed line on the city map. The on-site

buried fault trace shown on the city map projects northwest and becomes dashed within sediments of the San Diego Formation roughly 4,450 feet to the northwest.

According to the California Geological Survey *Alquist-Priolo Earthquake Fault Zone Map, La Jolla Quadrangle,* effective November 1, 1991, the site is located within an Earthquake Fault Special Studies Zone due to the presence of the RZFZ. The state map shows the active fault trace within the RCFZ roughly 1,250 feet east of the site. The regional special studies zone in the vicinity of the site is presented on Figure 6, titled Special Studies Zones Map. The active fault segment is mapped as dashed and queried east of the site on the state map. A small dashed fault segment roughly 400 feet south of the site is shown on this map and is roughly 700 feet long and projects northwest underneath Interstate 5. Another northwest trending dashed fault trace is located roughly 1,100 feet northwest of the site and generally projects toward the site. No fault traces are shown on the site according to this state map.

We also reviewed stereo-paired aerial photographs from 1928 and 1953 to study and identify geomorphic features that may indicate the presence of faulting at the site. The area of the site was generally undeveloped in 1953 with Rosewood and Del Rey Streets present to the north. The site was a broad gently west sloping area with three west flowing small drainages and small west trending ridgelines. The drainage channels and ridgelines are generally linear with no features indicative of active faulting. In addition, the area to the east along the active trace does not express the fault trace well likely due to the long interval of recurrence of the fault trace with a low average slip rate of 0.04 inch per year. Any former feature that may have formed at the time of active faulting would not be well expressed and/or retained today at the surface due to erosion. Roughly 4 miles south of the site in the area of Washington Street and Interstate 5, a pressure ridge and closed depression is present, which are typical features related to active faulting, and are more prevalent on older photos on the active trace of the RCFZ. The project site does not show features that are related to active faulting.

6.2 Site Geology and Faulting

The California Geological Survey geologic map for the La Jolla Quadrangle (prepared by Kennedy and Tan, 2008) has mapped the site as dredged fill at existing grade. Based on our field investigation, we did not encounter dredged fill. The shallow undocumented fill we encountered is likely associated with the grading and development of the site. The regional geology in the vicinity of the site is shown on Figure 7, Regional Geologic Map. The closest mapped geologic unit is Qop Unit 6, which is indicated as late Pleistocene age Old Paralic Deposits Unit 6, which corresponds with the Nestor Terrace. This is consistent with our field investigation as we encountered Old Paralic Deposits to an elevation of about 12 below MSL or a maximum depth of 36 feet below existing grade in Boring B-4. A buried dotted fault segment of the RCFZ is mapped on this state map on the northeast portion of the site indicating it is below the Old Paralic Deposits Unit 6 that has an age of roughly 120 thousand years before present (ka BP). This buried fault extends to the northwest and becomes exposed at the

surface roughly 4,450 to the northwest within the late Pliocene to early Pleistocene-age San Diego Formation. Further to the northwest, the fault offsets and separates the San Diego Formation and Eocene-age Ardath Shale. This buried fault has likely not moved in the last 120,000 years and was likely formed during initial RCFZ movement during the Tertiary age. This fault is likely not being used anymore to relieve stresses likely due to changes in the regional stress regime. Therefore, this fault segment should be considered potentially active as it has offset the San Diego Formation but not the Old Paralic Deposits Unit 6. This would indicate its last movement would be bracketed between 2 million and 120,000 years. The active trace of the RCFZ has been mapped on the east side of Interstate 5 roughly 1,250 feet east of the eastern boundary of the site where it has offset and separates Tertiary-age Scripps Formation and Ardath Shale.

6.3 Soil Stratigraphy

The degree of soil profile formation is used by Quaternary geologists and geomorphologists to estimate the age of the faulted or unfaulted materials. In the Southern California Coastal areas, marine terraces typically present a stable surface which soils have formed. One of the most prominent terrace deposits is associated with the high sea level that occurred approximately 120, 000 years ago, during Stage 5e (Quaternary chronology based on oxigene isotopes). The Old Paralic Deposits Unit 6 corresponds with this unit. Subsequent to formation, the exposed surface becomes subject to weathering and soil formation. The soil profile encountered in our fault trenches is relatively well developed and preserved. Three primary subunits have been logged overlaying the sandy clay bed of the Old Paralic Deposits. The upper unit (2A) represents A horizon that consists of dark brown, silty sand with abundant pores and trace of organic matter. The E horizon (2E) which is essentially lighter color and less porosity overlays the moderately developed argillic B horizon (2B). This unit consists of dark brown, sandy clay and clayey sand with thin to moderately thick clay films. Except in Fault Trench FT-5, located within the southern portion of the site where the 2B soil profile was entirely removed by erosion, this soil profile is present, continuous and undisrupted.

6.4 On-Site Faulting Evaluation

We performed seven fault trenches on the site to provide confirmation that the buried fault, as shown on the Kennedy and Tan 2008 geologic map, is not located within the upper portion of the Old Paralic Deposits. Two fault trenches were excavated in previous phases of study and five are the result of our recent explorations. The fault trench logs are provided in Appendix A, Figures A-5 and A-6 and Appendix C (Figure C-1).

Fault Trench 1 (FT-1) was excavated in 2004. The trench was approximately 42 feet long and 10 to 12 feet deep. The trench log shows undocumented fill as part of an old trench backfill associated with a 36 to 48 inch diameter VCP pipe in the area. The geologic unit encountered was logged as two

distinct and continuous layers of the Bay Point Formation (former name of the Old Paralic Deposits). No sign of disruption was evident.

Fault Trench 2 (FT-2) was excavated in 2014. The trench was approximately 100 feet long with a maximum depth of approximately 9 ½ feet. It was placed directly over the mapped location of the buried fault on the northeast portion of the site. The trench was excavated into the upper portion of the Old Paralic Deposits. The Old Paralic Deposits were continuous and unbroken with no faulting features observed.

Fault Trench 3 (FT-3) was located within the northern portion of the site with an approximate length of 170 feet and depth ranging from 8 to 10 feet. Below a thin layer of undocumented fill, we encountered a relatively well developed soil horizon, consisting of A and E horizons (2A and 2E) with argillic (secondary clay formation) of the B horizon (2B). The A and H horizons were cut and removed during the grading of the site. The very stiff, moist to wet sandy clay layer of the Very Old Paralic Deposits (3A) was encountered at the depth of approximately 2 feet at the eastern portion of the trench to 5 feet in the western section was continuous, uniform and undisrupted. Vertical cracks with sand infill and no vertical displacement were observed on top of this bed. These cracks can be attributed to lateral extension. The underlying clayey sandstone layers are also undisrupted and continuous.

Fault Trench 4 (FT-4) was excavated in the central portion of the site. The trench was approximately 100 feet long with the depth ranging from 7 to 10 feet. Up to 3 feet of fill was encountered in the western part of the trench. The fill becomes thinner east ward. In this trench the A horizon is mostly removed during grading, except the middle portion of the trench. The B horizon found to be continues and uniform. The sandy clay bed of the Old Paralic Deposits was encountered at a depth of 5 feet in the western end of the trench to approximately 2 feet at the east side. This bed is continues, uniform and undisrupted. In the middle section of the trench, we encountered a large body of compacted base material that was associated with an underground tank removal in 1993.

Fault Trench 5 (FT-5) is located within the southeastern portion of the site. The trench was approximately 48 feet long and 10 to 12 feet deep. Soil profile was missing in this trench. Deposition of a relatively thick alluvium is the evidence of an ancient creek in this area. Two distinct layers of Holocene age alluvium, approximately 8 feet thick overlay the sandy clay layer of the Old Paralic Deposits. (3A). This layer is continues, uniform and undisrupted. We encountered a large body of undocumented fill within the eastern end of the trench. It appears this fill is associated with the old VCP pipe backfill. We did not detect any pipe in the trench.

Fault Trench 6 (FT-6) was excavated within the east central portion of the site, with an approximate length of 86 feet and a maximum depth of 14 feet. Although the area is covered by 2 to

6 feet of alluvium, the soil profile is relatively well developed with distinct A, E and B horizons (2A, 2E and 2B). The sandy clay bed of the Old Paralic Deposits (3A) was relatively thick, nearly horizontal, and undisrupted.

Fault Trench (FT-7) is located in the southwestern portion of the site. The trench was approximately 68 feet long with the average depth of 14 feet. Below approximately 2 feet of feel, we encountered 4 to 6 feet of alluvium, which is associated with the old drainage that existed in this area prior to development. The soil profile is partially preserved, however, undisrupted and continues. The sandy clay layer of the Old Paralic Deposits is approximately 3 to 5 feet thick, continuous, and uniform.

The recent fault trench excavations were also observed by Dr. Thomas Rockwell of San Diego State University, an expert in local geology and faulting to provide a second opinion for logging our fault trenches and perform report review. Three of the trenches were also observed by Mr. James Quinn, the senior engineering geologist with the City of San Diego.

With the excavation of seven trenches throughout the site, we have covered not only the potential of encountering any north-south trending faults, but also from the northeast and northwest directions. To correlate the information obtained from the fault trenches, we have used the top of the sandy clay layer of the Old Paralic Deposits that was common in all trenches. This layer is near horizontal and not disrupted by faults.

As previously stated, the Old Paralic Deposits is at least 36 feet thick and is likely as much as 75 to 100 feet thick based on reported thicknesses north of the downtown area. Based on our review of the Kennedy and Tan 2008 geologic map, presuming this buried fault segment exists, it does not offset the Old Paralic Deposits and would not be observed until encountering the San Diego Formation at least 75 feet below existing ground surface. Therefore it is our opinion, based on the review of the geologic data and our fault trenching, that building setbacks will not be required from this potentially active buried fault trace located on the site.

6.5 Seismicity

According to the computer program *EZ-FRISK* (Version 7.62), 6 known active faults are located within a search radius of 50 miles from the midpoint of the project alignment. We used the 2008 USGS fault database to evaluate the fault parameters. The nearest known active fault is the Newport-Inglewood – Rose Canyon fault system, located approximately 0.2 miles from the site, and is the dominant source of potential ground motion. Earthquakes that might occur on the Newport Inglewood – Rose Canyon Fault or other faults within the southern California and northern Baja California area are potential generators of significant ground motion at the site. The estimated

deterministic maximum earthquake magnitude and peak ground acceleration for the Newport Inglewood – Rose Canyon Fault are 7.5 and 0.53g, respectively. Table 6.5.1 lists the estimated maximum earthquake magnitude and peak ground acceleration for the most dominant faults in relationship to the site location. We calculated peak ground acceleration (PGA) using Boore-Atkinson (2008) NGA USGS2008, Campbell-Bozorgnia (2008) NGA USGS 2008, and Chiou-Youngs (2007) NGA USGS 2008 acceleration-attenuation relationships.

TABLE 6.5.1
DETERMINISTIC SPECTRA SITE PARAMETERS

Fault Name	Distance from Site (miles)	Maximum Earthquake Magnitude (Mw)	Peak Ground Acceleration		
			Boore-Atkinson 2008 (g)	Campbell-Bozorgnia 2008 (g)	Chiou-Youngs 2007 (g)
Newport-Inglewood	0.2	7.5	0.53	0.42	0.60
Rose Canyon	0.2	6.9	0.52	0.42	0.58
Coronado Bank	14	7.4	0.23	0.17	0.21
Palos Verdes Connected	14	7.7	0.25	0.18	0.24
Elsinore	39	7.9	0.15	0.09	0.12

We used the computer program *EZ-FRISK* to perform a probabilistic seismic hazard analysis. The computer program *EZ-FRISK* operates under the assumption that the occurrence rate of earthquakes on each mappable Quaternary fault is proportional to the faults slip rate. The program accounts for fault rupture length as a function of earthquake magnitude, and site acceleration estimates are made using the earthquake magnitude and distance from the site to the rupture zone. The program also accounts for uncertainty in each of following: (1) earthquake magnitude, (2) rupture length for a given magnitude, (3) location of the rupture zone, (4) maximum possible magnitude of a given earthquake, and (5) acceleration at the site from a given earthquake along each fault. By calculating the expected accelerations from considered earthquake sources, the program calculates the total average annual expected number of occurrences of site acceleration greater than a specified value. We utilized acceleration-attenuation relationships suggested by Boore-Atkinson (2008) NGA USGS 2008, Campbell-Bozorgnia (2008) NGA USGS 2008, and Chiou-Youngs (2007) NGA USGS 2008 in the analysis. Table 6.5.2 presents the site-specific probabilistic seismic hazard parameters including acceleration-attenuation relationships and the probability of exceedence.

TABLE 6.5.2
PROBABILISTIC SEISMIC HAZARD PARAMETERS

Probability of Exceedence	Peak Ground Acceleration		
	Boore-Atkinson, 2007 (g)	Campbell-Bozorgnia, 2008 (g)	Chiou-Youngs, 2007 (g)
2% in a 50 Year Period	0.66	0.52	0.71
5% in a 50 Year Period	0.42	0.35	0.44
10% in a 50 Year Period	0.28	0.24	0.27

The California Geologic Survey (CGS) has a program that calculates the ground motion for a 10 percent of probability of exceedence in 50 years based on an average of several attenuation relationships. Table 6.5.3 presents the calculated results from the Probabilistic Seismic Hazards Mapping Ground Motion Page from the CGS website.

TABLE 6.5.3
PROBABILISTIC SITE PARAMETERS FOR SELECTED FAULTS
CALIFORNIA GEOLOGIC SURVEY

Calculated Acceleration (g) Firm Rock	Calculated Acceleration (g) Soft Rock	Calculated Acceleration (g) Alluvium
0.28	0.30	0.34

While listing peak accelerations is useful for comparison of potential effects of fault activity in a region, other considerations are important in seismic design, including the frequency and duration of motion and the soil conditions underlying the site. Seismic design of the structure should be evaluated in accordance with the California Building Code (CBC) or other applicable guidelines.

6.6 Liquefaction

The City of San Diego Seismic Safety Study, Geologic Hazards and Faults, Grid Tile 25 defines the site with a Hazard Category 31*: Liquefaction – High Potential – Shallow Groundwater, major drainages, hydraulic fills.* Liquefaction typically occurs when a site is located in a zone with seismic activity, onsite soils are cohesionless or silt/clay with low plasticity, groundwater is encountered within 50 feet of the surface, and soil densities are less than about 70 percent of the maximum dry densities. If the four previous criteria are met, a seismic event could result in a rapid pore water pressure increase from the earthquake-generated ground accelerations. Due to the age and the dense nature of the underlying Old Paralic Deposits, liquefaction potential for the site is considered very low.

6.7 Landslides

We did not observe evidence of ancient landslide deposits at the site during the geotechnical investigation or during our review of aerial photographs. In addition, there are no known landslides near the site, nor is the site in the path of any known or potential landslides.

6.8 Seiches and Tsunamis

Seiches are caused by the movement of an inland body of water due to the movement from seismic forces. The potential of seiches to occur is considered to be very low due to the absence of a nearby inland body of water.

A tsunami is a series of long-period waves generated in the ocean by a sudden displacement of large volumes of water. Causes of tsunamis include underwater earthquakes, volcanic eruptions, or offshore slope failures. The first order driving force for locally generated tsunamis offshore southern California is expected to be tectonic deformation from large earthquakes (Legg, *et al.*, 2002). The largest tsunami effect recorded in San Diego since 1950 was May 22, 1960 which had a maximum run-up amplitude of 2.1 feet (0.7 meters) [URS, 2004]. Wave heights and run-up elevations from tsunamis along the San Diego Coast have historically fallen within the normal range of the tides. The State of California Tsunami Inundation Map for Emergency Planning (CGS, 2009) does not show the property within a tsunami inundation zone. The site is located approximately 1,000 feet from the northern tip of De Anza Cove of Fiesta Bay at an elevation of approximately 16 to 30 feet above Mean Sea Level. Therefore, the risk of tsunamis affecting the site is negligible.

7. CONCLUSIONS AND RECOMMENDATIONS

7.1 General

7.1.1 It is our opinion that neither soil nor geologic conditions were encountered during the investigation that would preclude the construction of the proposed development provided the recommendations presented herein are followed and implemented during design and construction.

7.1.2 We expect approximately 2 to 5 feet of undocumented fill is present on a majority of the site and locally to depths of 12 feet. Deeper fills exist within the existing abandoned sewer line trench zone and may exist within other utility easements and other portions of the site not directly explored. Alluvial soils present in the southern portion of the site may extend to depths of 7 feet. Future demolitions of the existing structures and below ground improvements which occupy the site will likely disturb the upper 2 to 3 feet of site soil. In addition, removal of the abandoned sewer line will extend up to about 15 feet below grade.

7.1.3 Relatively soft saturated soil may be encountered within the garage level excavation bottoms due to the existing groundwater. Operation of rubber tire equipment on the exposed subgrade soil may cause excessive disturbance of the soil, and equipment may sink and become stuck in the soft soil. Excavation activities to establish the finished subgrade elevation must be conducted carefully and methodically to avoid excessive disturbance to the subgrade. Stabilization of the bottom of the excavation may be required in order to provide a firm working surface upon which heavy equipment can operate. Dewatering and temporary lowering of the groundwater table can improve the stability of the bottom of the excavation if properly maintained throughout the construction operations. Recommendations for bottom stabilization and earthwork are provided herein.

7.1.4 The soil near and below the groundwater table is currently very moist to saturated. The grading contractor should be aware that the existing soil will likely require some spreading and drying activities in order to achieve proper compaction.

7.1.5 Based on the results of our exploratory borings, we expect groundwater will be encountered during the excavation of the subterranean levels. Due to the depth of the proposed subterranean parking level and the potential for seasonal fluctuation in the groundwater levels, temporary dewatering measures will be required to mitigate groundwater seepage during excavation and construction. We understand that the portion of the proposed structure that extends below the depth of groundwater will be designed for hydrostatic pressure.

7.1.6 The utilization of a hydrostatic design (fully waterproofed bathtub) may generate uplift forces as a result of the water table which could actually lift or float the structure unless the building is sufficiently heavy to resist buoyancy forces. Temporary dewatering must be maintained during construction until the building loads are heavy enough to resist the buoyant forces. If the buoyant forces are greater than the weight of the structure, permanent anchoring of the mat will be required to prevent the building from lifting. The project structural engineer should determine if the proposed structure is sufficiently heavy to resist buoyant forces after constructed using a design groundwater elevation of 8 feet above MSL.

7.1.7 Due to the nature of the proposed design and intent for a subterranean level, permanent waterproofing of subterranean walls and slabs should be installed. Particular care should be taken in the design and installation of waterproofing to avoid moisture problems, or actual water seepage into the structure through any normal shrinkage cracks which may develop in the concrete walls, floor slab, foundations and/or construction joints. The design and inspection of the waterproofing is not the responsibility of the geotechnical engineer. A waterproofing consultant should be retained in order to recommend a product or method, which would provide protection to subterranean walls, floor slabs and foundations. In addition, an experienced waterproofing inspector should be retained to check proper installation of the system during construction.

7.1.8 We expect shoring will be required where excavations for the subterranean garage are up against or in close proximity to the property line or existing improvements. We expect a temporary soldier pile shoring and tie-back system will be utilized during the grading operations.

7.1.9 Based on the presence of shallow groundwater at the site, infiltration of storm water into the ground is not consider feasible and should not be incorporated into the design for this development.

7.1.10 Once the structural plans are completed, Geocon should review for conformance with the recommendations of this report.

7.1.11 Once the shoring plans are completed, Geocon should review for conformance with the recommendations of this report. It is our opinion that if the shoring plans are prepared in conformance with the recommendations of this report, adjacent properties will not be impacted by the proposed development and settlement will not impact adjacent improvements.

7.2 Soil and Excavation Characteristics

7.2.1 The existing soil can be excavated with light to moderate effort using conventional heavy-duty grading equipment. Moderate slumping and caving should be anticipated in unshored excavations, especially where saturated or granular soils are encountered.

7.2.2 The soil encountered in the field investigation is considered to be "expansive" (expansion index [EI] of greater than 20) as defined by 2013 California Building Code (CBC) Section 1803.5.3. Table 7.2 presents soil classifications based on the expansion index. We expect a majority of the soil encountered possess a "very low" to "medium" expansion potential (expansion index of 90 or less).

TABLE 7.2
EXPANSION CLASSIFICATION BASED ON EXPANSION INDEX

Expansion Index (EI)	Expansion Classification	2013 CBC Expansion Classification
0 – 20	Very Low	Non-Expansive
21 – 50	Low	Expansive
51 – 90	Medium	
91 – 130	High	
Greater Than 130	Very High	

7.2.3 We performed laboratory tests on samples of the site materials to evaluate the percentage of water-soluble sulfate content. Results from the laboratory water-soluble sulfate content tests are presented in Appendix B and indicate that the on-site materials at the locations tested possess "Not Applicable" and "S0" sulfate exposure to concrete structures as defined by 2013 CBC Section 1904 and ACI 318-11 Sections 4.2 and 4.3. The presence of water-soluble sulfates is not a visually discernible characteristic; therefore, other soil samples from the site could yield different concentrations. Additionally, over time landscaping activities (i.e., addition of fertilizers and other soil nutrients) may affect the concentration.

7.2.4 We tested samples for water-soluble chloride, potential of hydrogen (pH) and resistivity laboratory tests to aid in evaluating the corrosion potential to subsurface structures. Appendix B presents the laboratory test results

7.2.5 Geocon Incorporated does not practice in the field of corrosion engineering. Therefore, further evaluation by a corrosion engineer may be performed if improvements susceptible to corrosion are planned.

7.3 Seismic Design Criteria

7.3.1 We used the computer program *U.S. Seismic Design Maps*, provided by the USGS. Table 7.3.1 summarizes site-specific design criteria obtained from the 2013 California Building Code (CBC; Based on the 2012 International Building Code [IBC] and ASCE 7-10), Chapter 16 Structural Design Section 1613 Earthquake Loads. The short spectral response uses a period of 0.2 second. The proposed structures should be designed using Site Class D. We evaluated the Site Class based on the discussion in Section 1613.3.2 of the 2013 CBC and Table 20.3-1 of ASCE 7-10. The values presented in Table 7.3.1 are for the risk-targeted maximum considered earthquake (MCE_R).

TABLE 7.3.1
2013 CBC SEISMIC DESIGN PARAMETERS

Parameter	Value	2013 CBC Reference
Site Class	D	Section 1613.3.2
MCE_R Ground Motion Spectral Response Acceleration – Class B (short), S_S	1.261g	Figure 1613.3.1(1)
MCE_R Ground Motion Spectral Response Acceleration – Class B (1 sec), S_1	0.487g	Figure 1613.3.1(2)
Site Coefficient, F_A	1.000	Table 1613.3.3(1)
Site Coefficient, F_V	1.513	Table 1613.3.3(2)
Site Class Modified MCE_R Spectral Response Acceleration (short), S_{MS}	1.261g	Section 1613.3.3 (Eqn 16-37)
Site Class Modified MCE_R Spectral Response Acceleration (1 sec), S_{M1}	0.737g	Section 1613.3.3 (Eqn 16-38)
5% Damped Design Spectral Response Acceleration (short), S_{DS}	0.841g	Section 1613.3.4 (Eqn 16-39)
5% Damped Design Spectral Response Acceleration (1 sec), S_{D1}	0.492g	Section 1613.3.4 (Eqn 16-40)

7.3.2 Table 7.3.2 presents additional seismic design parameters for projects located in Seismic Design Categories of D through F in accordance with ASCE 7-10 for the mapped maximum considered geometric mean (MCE_G).

TABLE 7.3.2
2013 CBC SITE ACCELERATION DESIGN PARAMETERS

Parameter	Value	ASCE 7-10 Reference
Site Class	D	Section 1613.3.2 (2013 CBC)
Mapped MCE_G Peak Ground Acceleration, PGA	0.572	Figure 22-7
Site Coefficient, F_{PGA}	1.000	Table 11.8-1
Site Class Modified MCE_G Peak Ground Acceleration, PGA_M	0.572	Section 11.8.3 (Eqn 11.8-1)

7.3.3 Conformance to the criteria in Tables 7.3.1 and 7.3.2 for seismic design does not constitute any kind of guarantee or assurance that significant structural damage or ground failure will not occur if a large earthquake occurs. The primary goal of seismic design is to protect life, not to avoid all damage, since such design may be economically prohibitive.

7.4 Temporary Dewatering

7.4.1 Temporary dewatering will be necessary for this project to maintain a safe working environment during excavation and construction activities associated with the proposed subterranean levels. Based on the groundwater elevations encountered during our site investigation and the groundwater encountered in nearby monitoring wells, we recommend a temporary dewatering system be designed for a groundwater elevation of 8 feet MSL. We expect groundwater seepage will emanate from the sandy layers within the Old Paralic Deposits.

7.4.2 A qualified dewatering consultant should be retained to assess flow rates during the design phase of the project. Temporary dewatering consisting of perimeter wells with interior well points may not be completely effective due to the presence of fine grained soil and inability of a well to produce groundwater draw-down in its vicinity. If wells are ineffective, the water may be collected and controlled within the excavation through the use of gravel filled trenches (French drains). The number and locations of the French drains can be adjusted during excavation activities as necessary to collect and control encountered seepage. The French drains will then direct the collected seepage to a sump where it will be pumped out of the excavation. If soft soil is encountered that could not support the planned construction equipment, a gravel blanket will be required for stabilization. This gravel blanket may also be utilized for dewatering purposes as necessary.

7.4.3 We performed hydraulic conductivity laboratory testing on two undisturbed in-situ soil samples collected below the groundwater table at the site. The hydraulic conductivity test

results can be used by a qualified dewatering consultant for the design of dewatering at the site. Table 7.4 presents the hydraulic conductivity laboratory results.

TABLE 7.4
SUMMARY OF LABORATORY HYDRAULIC CONDUCTIVITY RESULTS
ASTM D 5084

Sample No.	Depth (feet)	Geologic Unit (Soil Type)	Dry Density (pcf)	Moisture Content (%)		Average Permeability at 20° C (in/hr)	Average Permeability at 20° C (cm/sec)
				Initial	Final		
B1-8	21-22	Qop	114.3	17.3	17.9	3.64E-03	2.57E-06
B2-5	14-18	Qop	119.4	14.9	16.4	3.22E-05	2.27E-08

7.5 Grading

7.5.1 Earthwork grading should be observed, and compacted fill tested by representatives of Geocon. The existing fill, alluvium, and Old Paralic Deposits encountered during exploration are suitable for re-use as an engineered fill, provided any encountered oversize material (greater than 6 inches) and any encountered deleterious debris is removed.

7.5.2 A preconstruction conference should be held at the site prior to the beginning of grading operations with the city inspector, owner, contractor, civil engineer and geotechnical engineer in attendance. Special soil handling requirements can be discussed at that time.

7.5.3 Grading should commence with the removal of existing vegetation and existing improvements from the area to be graded. We should observe the base of the excavation once a clean excavation bottom has been established. Deleterious debris such as wood and root structures should be exported from the site and should not be mixed with the fill soil. Asphalt grindings and concrete should not be mixed with the fill soils unless approved by the Geotechnical Engineer. Existing underground improvements planned for removal should be excavated and the resulting depressions properly backfilled in accordance with the procedures described herein.

7.5.4 In the areas outside of the subterranean garage, the undocumented fill and alluvium within the planned improvement areas should be removed and replaced with properly compacted fill. We expect the foundations for the structures outside of the parking garage limits will be embedded into the Old Paralic Deposits. The limits of removal of existing fill should be checked by the Geocon representative during site grading activities.

7.5.5 The existing soil can be removed to finish grade within the area of the planned subterranean garage. Excavation and processing of Old Paralic Deposit soils is not required within the proposed subterranean parking levels unless unsuitable soil is encountered or if excessively disturbed by the grading contractor. Depending on the depth to groundwater at the time of construction, periodic watering of the exposed soil may be required to maintain the moisture content of the soil and prevent drying back and/or desiccation.

7.5.6 We should observe the grading operations during the excavation for the planned subterranean garage. Specifically, we will observe the sidewall excavations across the project to confirm the absence of faulting during the grading operations. Therefore, we should be onsite prior to the placement of wood lagging for the temporary shoring.

7.5.7 Since a temporary long term dewatering system will likely be required for excavation of the proposed subterranean parking garage, subgrade stabilization may be necessary and can be accomplished by placing a one-foot thick layer of washed, angular ¾-inch gravel atop a stabilization fabric (Mirafi 600X or equivalent), subsequent to subgrade approval. This procedure should be conducted in sections until the entire excavation bottom has been blanketed by fabric and gravel. In order to prevent excessive disturbance to a soft subgrade, track mounted equipment should be used to perform the gravel spreading operations. Heavy equipment may operate upon the gravel once it has been placed. The gravel should be compacted to a dense state utilizing track equipment or a drum roller. The placement of gravel at the subgrade level should be coordinated with the temporary dewatering of the site. The gravel and fabric system will function as both a permeable material for any necessary dewatering procedures, as well as a stable material upon which heavy equipment may operate. It is recommended that the grading contractor meet with the Geotechnical Engineer to discuss this procedure in more detail.

7.5.8 Where temporary dewatering is not required, subgrade stabilization may be achieved by placing three- to six-inch diameter crushed angular rock into the soft excavation bottom. The use of crushed concrete will also be acceptable. Rock generated from crushing operations of on-site concrete can be used. The crushed rock should be spread thinly across the excavation bottom and pressed into the soils by track rolling or wheel rolling with heavy equipment

7.5.9 Fill and backfill soil should be placed in horizontal loose layers with a maximum thickness of approximately 6 to 8 inches thick, moisture conditioned to a moisture content near to slightly above optimum moisture content, and properly compacted to a dry density of at least 90 percent of the laboratory maximum dry density in accordance with ASTM D 1557. The upper 12 inches of subgrade soil underlying pavement should compacted to a dry density of

at least 95 percent of the laboratory maximum dry density near to slightly above optimum moisture content shortly before paving operations.

7.5.10 Utility trenches should be properly backfilled in accordance with the requirements of the Green Book (latest edition) and the City of San Diego requirements. The use of gravel within utility trenches below the groundwater table and below an elevation of 8 feet above MSL is not acceptable unless used in conjunction with filter fabric. The trench backfill may be derived from onsite soil or approved import soil, compacted as necessary, until the required compaction is obtained. The use of minimum 2-sack slurry is also acceptable. Prior to placing any bedding materials or pipes, the excavation bottom must be observed and approved by a representative of Geocon.

7.6 Temporary Excavation Slopes, Shoring, and Tiebacks

7.6.1 The recommendations included herein are provided for stable excavations. It is the responsibility of the contractor to provide a safe excavation during the construction of the proposed project.

7.6.2 Temporary excavations should be made in conformance with OSHA requirements. The undocumented fill should be considered a type C soil and the Old Paralic Deposits can be considered a Type B soil (Type C soil if seepage or groundwater is encountered) in accordance with OSHA requirements. In general, special shoring requirements will not be necessary if temporary excavations will be less than 4 feet in height and do not have seepage. Temporary excavations greater than 4 feet in height, however, should be sloped back at an appropriate inclination. These excavations should not be allowed to become saturated or to dry out. Surcharge loads should not be permitted to a distance equal to the height of the excavation from the top of the excavation. The top of the excavation should be a minimum of 15 feet from the edge of existing improvements. Excavations steeper than those recommended or closer than 15 feet from an existing surface improvement should be shored in accordance with applicable OSHA codes and regulations.

7.6.3 The design of temporary shoring is governed by soil and groundwater conditions, and by the depth and width of the excavated area. Continuous support of the excavation face can be provided by a system of soldier piles and wood lagging. Excavations exceeding 15 feet may require soil nails, tieback anchors, or internal bracing to provide additional wall restraint. A qualified shoring contractor should be contacted to provide a design for temporary shoring.

7.6.4 We expect groundwater will be encountered during construction. The shoring contractor should be prepared to encounter groundwater during the drilling operations for the soldier pile installation. Soldier piles placed below the water level may require the use of a tremie to place the concrete into the bottom of the hole as instructed by the project shoring engineer. A tremie should consist of a rigid, water-tight tube having a diameter of not less than 6 inches with a hopper at the top. The tube should be equipped with a device that will close the discharge end and prevent water from entering the tube while it is being charged with concrete. The tremie should be supported so as to permit free movement of the discharge end over the entire top surface of the work and to permit rapid lowering when necessary to retard or stop the flow of concrete. The discharge end should be closed at the start of the work to prevent water entering the tube and should be entirely sealed at all times, except when the concrete is being placed. The tremie tube should be kept full of concrete. The flow should be continuous until the work is completed and the resulting concrete seal should be monolithic and homogeneous. The tip of the tremie tube should always be kept about 5 feet below the surface of the concrete and definite steps and safeguards should be taken to insure that the tip of the tremie tube is never raised above the surface of the concrete.

7.6.5 Casing or drilling mud may be required since caving may occur in the saturated soils. If casing is used, extreme care should be employed so that the pile is not pulled apart as the casing is withdrawn. At no time should the distance between the surface of the concrete and the bottom of the casing be less than five feet. Continuous observation of the drilling and pouring of the piles by the Geotechnical Engineer (a representative of Geocon), is required.

7.6.6 In general, ground conditions are moderately suited for soldier pile and tieback anchor wall construction techniques. If cohesionless sands or groundwater is encountered, some raveling/caving may result along the unsupported portions of excavations. The excavations may require the use of drilling mud or steel casing to properly install the temporary shoring components. The recommendations presented herein assume that groundwater will not be loading the active portion of the temporary shoring but will be affect the passive portion of the shoring. We should be contacted if different conditions exist.

7.6.7 Temporary shoring with a level backfill should be designed using a lateral pressure envelope acting on the back of the shoring and applying pressures for a triangular, rectangular, or trapezoidal distribution as presented on Figure 8. The pressures are a function of H_D and H_W, where H_D is the height of the wall above groundwater, and H_W is the height of the wall below groundwater. Triangular distribution should be used for cantilevered shoring and, the trapezoidal and rectangular distribution should be used for multi-braced systems such as tieback anchors and rakers. The project shoring engineer

should determine the applicable soil distribution for the design of the temporary shoring system. Additional lateral earth pressure due to the surcharging effects of adjacent structures or traffic loads should be considered, where appropriate, during design of the shoring system.

7.6.8 Passive soil pressure resistance for embedded portions of soldier piles can be based upon an equivalent passive soil fluid weight of 150D + 500 where D is the depth of embedment, in feet (resulting in pounds per square foot), as shown on Figure 9. The passive resistance can be assumed to act over a width of three pile diameters. Typically, soldier piles are embedded a minimum of 0.5 times the maximum height of the excavation (this depth is to include footing excavations) if tieback anchors are not employed. The project structural engineer should determine the actual embedment depth.

7.6.9 Drilled shafts for the soldier piles should be observed by Geocon Incorporated prior to the placement of steel reinforcement to check that the exposed soil conditions are similar to those expected and that footing excavations have been extended to the appropriate bearing strata, and design depths. If unexpected soil conditions are encountered, foundation modifications may be required

7.6.10 Lateral movement of shoring is associated with vertical ground settlement outside of the excavation. Therefore, it is essential that the soldier pile and tieback system allow very limited amounts of lateral displacement. Earth pressures acting on a lagging wall can cause movement of the shoring toward the excavation and result in ground subsidence outside of the excavation. Consequently, horizontal movements of the shoring wall should be accurately monitored and recorded during excavation and anchor construction.

7.6.11 Survey points should be established at the top of the pile on at least 20 percent of the soldier piles. An additional point located at an intermediate point between the top of the pile and the base of the excavation should be monitored on at least 20 percent of the piles if tieback anchors will be used. These points should be monitored on a weekly basis during excavation work and on a monthly basis thereafter until the permanent support system is constructed.

7.6.12 The shoring system should be designed to limit horizontal soldier pile movement to a maximum of 1 inch. The amount of horizontal deflection can be assumed to be essentially zero along the Active Zone and Effective Zone boundary. The magnitude of movement for intermediate depths and distances from the shoring wall can be linearly interpolated. The project civil and/or shoring engineer should determine the allowable amount of horizontal movement associated with the shoring system that could affect existing utilities and

structures, if present. In addition, the project civil and/or shoring engineer should evaluate the existing utilities and improvements and provide a conclusion regarding the ability of the utilities and improvements to withstand the expected lateral and vertical movement associated with the planned excavation.

7.6.13 If a raker system is employed, the rakers should not be inclined steeper than 1:1 (horizontal to vertical) to provide an excavation to the raker foundation system with an inclination less than 1:1. A shallow or deep foundation system can be used for the raker system. We should be contacted if a raker system is planned.

7.6.14 Tieback anchors employed in shoring should be designed such that anchors fully penetrate the Active Zone behind the shoring. The Active Zone can be considered the wedge of soil from the face of the shoring to a plane extending upward from the base of the excavation at a 32-degree angle from vertical, as shown on Figure 10. Normally, tieback anchors are contractor-designed and installed, and there are numerous anchor construction methods available. Non-shrinkage grout should be used for the construction of the tieback anchors.

7.6.15 Experience has shown that the use of pressure grouting during formation of the bonded portion of the anchor will increase the soil-grout bond stress. A pressure grouting tube should be installed during the construction of the tieback. Post grouting should be performed if adequate capacity cannot be obtained by other construction methods.

7.6.16 Anchor capacity is a function of construction method, depth of anchor, batter, diameter of the bonded section, and the length of the bonded section. Anchor capacity should be evaluated using a cohesion value of 500 psf and a friction angle of 27 degrees.

7.6.17 Grout should only be placed in the tieback anchor's bonded section prior to testing. Tieback anchors should be proof-tested to at least 130 percent of the anchor's design working load. Following a successful proof test, the tieback anchors should be locked off at 80 percent of the allowable working load or in accordance with the project shoring engineer. Tieback anchor test failure criteria should be established in project plans and specifications. The tieback anchor test failure criteria should be based upon a maximum allowable displacement at 130 percent of the anchor's working load (anchor creep) and a maximum residual displacement within the anchor following stressing. Tieback anchor stressing should only be conducted after sufficient hydration has occurred within the grout. Tieback anchors that fail to meet project specified test criteria should be replaced or additional anchors should be constructed.

7.6.18 Lagging should keep pace with excavation and tieback anchor construction. The excavation should not be advanced deeper than three feet below the bottom of lagging at any time. These unlagged gaps of up to three feet should only be allowed to stand for short periods of time in order to decrease the probability of soil instability and should never be unsupported overnight. Backfilling should be conducted when necessary between the back of lagging and excavation sidewalls to reduce sloughing in this zone and all voids should be filled by the end of each day. Further, the excavation should not be advanced further than four feet below a row of tiebacks prior to those tiebacks being proof tested and locked off.

7.6.19 If tieback anchors are employed, an accurate survey of existing utilities and other underground structures adjacent to the shoring wall should be conducted. The survey should include both locations and depths of existing utilities. Locations of anchors should be adjusted as necessary during the design and construction process to accommodate the existing and proposed utilities.

7.6.20 The condition of existing buildings, streets, sidewalks, and other structures/improvements around the perimeter of the planned excavation should be documented prior to the start of shoring and excavation work. Special attention should be given to documenting existing cracks or other indications of differential settlement within these adjacent structures, pavements and other improvements. Underground utilities sensitive to settlement should be videotaped prior to construction to check the integrity of pipes. In addition, monitoring points should be established indicating location and elevation around the excavation and upon existing buildings. These points should be monitored on a weekly basis during excavation work and on a monthly basis thereafter. Inclinometers should be installed and monitored behind any shoring sections that will be advanced deeper than 30 feet below the existing ground surface.

7.7 Shallow Foundation and Concrete Slab-On-Grade Recommendations

7.7.1 The proposed structures outside the planned subterranean garage area can be supported on a shallow foundation system founded in the Old Paralic Deposits. We expect the proposed structures include portions of the commercial tech/hub, gym/retail structures, leasing building and the townhomes at-grade Foundations for the structures should consist of continuous strip footings and/or isolated spread footings. Continuous footings should be at least 12 inches wide and extend at least 24 inches below lowest adjacent pad grade or 6 inches into the Old Paralic Deposits, whichever results in a deeper foundation. Isolated spread footings should have a minimum width of 2 feet and should also extend at least 24 inches below lowest adjacent pad grade or 6 inches into the Old Paralic Deposits, whichever results in a deeper foundation. Steel reinforcement for continuous footings

should consist of at least four No. 5 steel reinforcing bars placed horizontally in the footings, two near the top and two near the bottom. Steel reinforcement for the spread footings should be designed by the project structural engineer. A wall/column footing dimension detail is presented in Figure 11. In addition, footings should be deepened such that the bottom outside edge of the footing is at least 7 feet horizontally from the face of the slope.

7.7.2 The recommendations herein are based on soil characteristics only (EI of 90 or less) and are not intended to replace reinforcement required for structural considerations.

7.7.3 The recommended allowable bearing capacity for foundations with minimum dimensions described herein is 4,000 pounds per square foot (psf) for footings bearing in compacted fill. The allowable soil bearing pressure may be increased by an additional 500 psf for each additional foot of depth and 300 psf for each additional foot of width, to a maximum allowable bearing capacity of 8,000 psf for compacted fill. The values presented herein are for dead plus live loads and may be increased by one-third when considering transient loads due to wind or seismic forces.

7.7.4 We estimate the total and differential settlements under the imposed allowable loads to be about ½ inch based on a 5-foot square footing.

7.7.5 Concrete floor slabs should possess a thickness of at least 5 inches and reinforced with a minimum of No. 4 steel reinforcing bars at 18 inches on center in both horizontal directions. The structural engineer should design the steel required for the planned loading conditions.

7.7.6 Slabs that may receive moisture-sensitive floor coverings or may be used to store moisture-sensitive materials should be underlain by a vapor retarder. The vapor retarder design should be consistent with the guidelines presented in the American Concrete Institute's (ACI) *Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials* (ACI 302.2R-06). In addition, the membrane should be installed in accordance with manufacturer's recommendations and ASTM requirements and installed in a manner that prevents puncture. The vapor retarder used should be specified by the project architect or developer based on the type of floor covering that will be installed and if the structure will possess a humidity controlled environment. It is common in the southern California area to use a Stego 10-mil product as the vapor retarder.

7.7.7 The bedding sand thickness should be determined by the project foundation engineer, architect, and/or developer. It is common to have 3 to 4 inches of sand for 5-inch thick

slabs in the southern California region. However, we should be contacted to provide recommendations if the bedding sand is thicker than 6 inches. The foundation design engineer should provide appropriate concrete mix design criteria and curing measures to assure proper curing of the slab by reducing the potential for rapid moisture loss and subsequent cracking and/or slab curl. We suggest that the foundation design engineer present the concrete mix design and proper curing methods on the foundation plans. It is critical that the foundation contractor understands and follows the recommendations presented on the foundation plans.

7.7.8 Foundation excavations should be observed by the geotechnical engineer (a representative of Geocon Incorporated) prior to the placement of reinforcing steel to check that the exposed soil conditions are similar to those expected and that they have been extended to the appropriate bearing strata. If unexpected soil conditions are encountered, foundation modifications may be required.

7.7.9 Special subgrade presaturation is not deemed necessary prior to placing concrete; however, the exposed foundation and slab subgrade soil should be moisturized to maintain a moist condition as would be expected in any such concrete placement.

7.7.10 Where buildings or other improvements are planned near the top of a slope steeper than 3:1 (horizontal to vertical), special foundations and/or design considerations are recommended due to the tendency for lateral soil movement to occur.

- Building footings should be deepened such that the bottom outside edge of the footing is at least 7 feet horizontally from the face of the slope.
- If swimming pools are planned, Geocon Incorporated should be contacted for a review of specific site conditions.
- Although other improvements, which are relatively rigid or brittle, such as concrete flatwork or masonry walls, may experience some distress if located near the top of a slope, it is generally not economical to mitigate this potential. It may be possible, however, to incorporate design measures that would permit some lateral soil movement without causing extensive distress. Geocon Incorporated should be consulted for specific recommendations.

7.7.11 The foundation and concrete slab-on-grade recommendations are based on soil support characteristics only. The project structural engineer should evaluate the structural requirements of the concrete slabs for supporting expected loads.

7.7.12 Concrete slabs should be provided with adequate construction joints and/or expansion joints to control unsightly shrinkage cracking. The design of joints should consider criteria of the American Concrete Institute when establishing crack-control spacing.

7.7.13 The recommendations of this report are intended to reduce the potential for cracking of slabs due to expansive soil (if present), differential settlement of existing soil or soil with varying thicknesses. However, even with the incorporation of the recommendations presented herein, foundations, stucco walls, and slabs-on-grade placed on such conditions may still exhibit some cracking due to soil movement and/or shrinkage. The occurrence of concrete shrinkage cracks is independent of the supporting soil characteristics. Their occurrence may be reduced and/or controlled by limiting the slump of the concrete, proper concrete placement and curing, and by the placement of crack control joints at periodic intervals, in particular, where re-entrant slab corners occur.

7.7.14 Where exterior flatwork abuts the structure at entrant or exit areas, the exterior slab should be dowelled into the structure's foundation stemwall. This recommendation is intended to reduce the potential for differential elevations that could result from differential settlement or minor heave of the flatwork. Dowelling details should be designed by the project structural engineer.

7.7.15 Geocon Incorporated should be consulted to provide additional design parameters as required by the structural engineer.

7.8 Mat Foundation Recommendations

7.8.1 We understand the proposed subterranean garage structure may be supported on a mat foundation due to the presence of the existing groundwater. A mat foundation consists of a thick, rigid concrete mat that allows the entire footprint of the structure to carry building loads and helps prevent water infiltration due to the existing groundwater. In addition, the mat can tolerate significantly greater differential movements such as those associated with expansive soils or differential settlement. We expect the mat foundation would be supported in the Old Paralic Deposits.

7.8.2 The allowable bearing capacity can be taken as 1,000 pounds per square foot (psf) in Old Paralic Deposits. The modulus of subgrade reaction for design of the mat can range from 200 to 300 pounds per cubic inch (pci) for the Old Paralic Deposits. These values should be modified as necessary using standard equations for mat size. We expect total and differential settlements to be ½ inch, respectively, under static loads.

7.8.3 The foundation and retaining walls should be designed for hydrostatic pressure using a groundwater elevation of about 8 feet above MSL.

7.8.4 A mat foundation system will allow the structure to settle with the ground and should have sufficient rigidity to allow the structure to move as a single unit.

7.8.5 Foundation and bottom excavations should be observed by the Geotechnical Engineer (a representative of Geocon Incorporated) prior to the placement of reinforcing steel and concrete to observe that the exposed soil conditions are consistent with those expected and have been extended to appropriate bearing strata. If expected soil conditions are encountered, foundation modifications may be required.

7.9 Concrete Flatwork

7.9.1 Exterior concrete flatwork not subject to vehicular traffic should be constructed in accordance with the recommendations herein. Slab panels should be a minimum of 4 inches thick and, when in excess of 8 feet square, should be reinforced with 6 x 6 - W2.9/W2.9 (6 x 6 - 6/6) welded wire mesh or No. 3 reinforcing bars spaced at least 18 inches center-to-center in both directions to reduce the potential for cracking. In addition, concrete flatwork should be provided with crack control joints to reduce and/or control shrinkage cracking. Crack control spacing should be determined by the project structural engineer based upon the slab thickness and intended usage. Criteria of the American Concrete Institute (ACI) should be taken into consideration when establishing crack control spacing. Subgrade soil for exterior slabs not subjected to vehicle loads should be compacted in accordance with criteria presented in the grading section prior to concrete placement. Subgrade soil should be properly compacted and the moisture content of subgrade soil should be checked prior to placing concrete.

7.9.2 Even with the incorporation of the recommendations within this report, the exterior concrete flatwork has a likelihood of experiencing some uplift due to expansive soil beneath grade; therefore, the steel reinforcement should overlap continuously in flatwork to reduce the potential for vertical offsets within flatwork. Additionally, flatwork should be structurally connected to the curbs, where possible, to reduce the potential for offsets between the curbs and the flatwork.

7.9.3 Where exterior flatwork abuts the structure at entrant or exit points, the exterior slab should be dowelled into the structure's foundation stemwall. This recommendation is intended to reduce the potential for differential elevations that could result from differential settlement

or minor heave of the flatwork. Dowelling details should be designed by the project structural engineer.

7.9.4 The recommendations presented herein are intended to reduce the potential for cracking of slabs and foundations as a result of differential movement. However, even with the incorporation of the recommendations presented herein, foundations and slabs-on-grade will still crack. The occurrence of concrete shrinkage cracks is independent of the soil supporting characteristics. Their occurrence may be reduced and/or controlled by limiting the slump of the concrete, the use of crack control joints and proper concrete placement and curing. Literature provided by the Portland Concrete Association (PCA) and American Concrete Institute (ACI) present recommendations for proper concrete mix, construction, and curing practices, and should be incorporated into project construction.

7.10 Preliminary Pavement Recommendations

7.10.1 We calculated the preliminary flexible pavement sections in general conformance with the *Caltrans Method of Flexible Pavement Design* (Highway Design Manual, Section 608.4) using an estimated Traffic Index (TI) of 5.5 and 7.0 for parking areas and driveways, respectively. The project civil engineer and owner should review the pavement designations to determine appropriate locations for pavement thickness. The final pavement sections for the proposed driveway should be based on the R-Value of the subgrade soils encountered at final subgrade elevation. Based on our experience with similar soil, we used R-Values of 10 and 78 for the subgrade soil and base materials, respectively, for the purposes of this preliminary analysis. Preliminary flexible pavement sections are presented in Table 7.10.1.

TABLE 7.10.1
PRELIMINARY FLEXIBLE PAVEMENT SECTION

Location	Assumed Traffic Index	Assumed Subgrade R-Value	Asphalt Concrete (inches)	Class 2 Aggregate Base (inches)
Parking Areas	5.5	10	4	8
Driveways	7.0	10	4	15

7.10.2 The upper 12 inches of the subgrade soil should be compacted to a dry density of at least 95 percent of the laboratory maximum dry density near to slightly above optimum moisture content beneath pavement sections shortly before paving.

7.10.3 Base materials should conform to Section 26-1.028 of the *Standard Specifications for The State of California Department of Transportation (Caltrans)* with a ¾-inch maximum size aggregate. Base materials should be compacted to a dry density of at least 95 percent of the laboratory maximum dry density near to slightly above optimum moisture content. The asphalt concrete should conform to Section 203-6 of the *Standard Specifications for Public Works Construction (Greenbook)*. Asphalt concrete should be compacted to a density of at least 95 percent of the laboratory Hveem density in accordance with ASTM D 2726.

7.10.4 A rigid Portland cement concrete (PCC) pavement section can be placed within driveway apron entrances, trash truck areas, fire lanes, and cross-gutters. The concrete pad for the trash truck should be large enough to accommodate all the wheels during loading. We calculated the rigid pavement section in general conformance with the procedure recommended by the American Concrete Institute report ACI 330R-08 *Guide for Design and Construction of Concrete Parking Lots* using the parameters presented in Table 7.10.2.

TABLE 7.10.2
RIGID PAVEMENT DESIGN PARAMETERS

Design Parameter	Design Value
Modulus of subgrade reaction, k	50 pci
Modulus of rupture for concrete, M_R	500 psi
Traffic Category, TC	A and C
Average daily truck traffic, ADTT	10 and 100

7.10.5 Based on the criteria presented herein, the PCC pavement sections should have a minimum thickness as presented in Table 7.10.3.

TABLE 7.10.3
RIGID PAVEMENT RECOMMENDATIONS

Location	Portland Cement Concrete (inches)
Automobile Parking Areas (TC=A)	6.5
Driveways, Aprons, Trash Truck Loading Areas, Fire Lanes, and Cross-Gutters (TC=C)	7.5

7.10.6 The PCC pavement should be placed over subgrade soil that is compacted to a dry density of at least 95 percent of the laboratory maximum dry density near to slightly above optimum moisture content. This pavement section is based on a minimum concrete compressive strength of approximately 3,000 psi (pounds per square inch). Base materials

will not be required beneath concrete improvements including cross-gutters, driveway aprons, curb and gutters, and sidewalks.

7.10.7 A thickened edge or integral curb should be constructed on the outside of concrete slabs subjected to wheel loads. The thickened edge should be 1.2 times the slab thickness or a minimum thickness of 2 inches, whichever results in a thicker edge, and taper back to the recommended slab thickness 4 feet behind the face of the slab (e.g., a 7.5-inch-thick slab would have a 9.5-inch-thick edge). Reinforcing steel will not be necessary within the concrete for geotechnical purposes with the possible exception of dowels at construction joints as discussed herein.

7.10.8 To control the location and spread of concrete shrinkage cracks, crack-control joints (weakened plane joints) should be included in the design of the concrete pavement slab. Crack-control joints should not exceed 30 times the slab thickness with a maximum spacing of 15 feet for the 6.5 - and 7.5-inch-thick slabs (e.g., a 7.5-inch-thick slab would have a 15-foot spacing pattern), and should be sealed with an appropriate sealant to prevent the migration of water through the control joint to the subgrade materials. The depth of the crack-control joints should be determined by the referenced ACI report.

7.10.9 To provide load transfer between adjacent pavement slab sections, a butt-type construction joint should be constructed. The butt-type joint should be thickened by at least 20 percent at the edge and taper back at least 4 feet from the face of the slab. As an alternative to the butt-type construction joint, dowelling can be used between construction joints for pavements of 7 inches or thicker. As discussed in the referenced ACI guide, dowels should consist of smooth, 1-inch-diameter reinforcing steel 14 inches long embedded a minimum of 6 inches into the slab on either side of the construction joint. Dowels should be located at the midpoint of the slab, spaced at 12 inches on center and lubricated to allow joint movement while still transferring loads. In addition, tie bars should be installed at the as recommended in Section 3.8.3 of the referenced ACI guide. The structural engineer should provide other alternative recommendations for load transfer.

7.10.10 The performance of pavement is highly dependent on providing positive surface drainage away from the edge of the pavement. Ponding of water on or adjacent to the pavement will likely result in pavement distress and subgrade failure to proposed improvements. Drainage from landscaped areas should be directed to controlled drainage structures. Landscape areas adjacent to the edge of asphalt pavements are not recommended due to the potential for surface or irrigation water to infiltrate the underlying permeable aggregate base and cause distress. Where such a condition cannot be avoided, consideration should be given to incorporating measures that will significantly reduce the potential for subsurface water

migration into the aggregate base. If planter islands are planned, the perimeter curb should extend at least 6 inches below the level of the base materials.

7.11 Retaining Walls

7.11.1 Non-building retaining and site walls should be founded on properly compacted fill or Old Paralic Deposits. The foundations should have a minimum depth and width of 12 inches below finish pad subgrade and may be designed for an allowable soil bearing pressure of 2,000 psf.

7.11.2 Retaining walls not restrained at the top and having a level backfill surface should be designed for an active soil pressure equivalent to the pressure exerted by a fluid density of 40 pounds per cubic foot (pcf). Where the backfill will be inclined at 2:1 (horizontal to vertical), an active soil pressure of 55 pcf is recommended. Soil with an expansion index (EI) of greater than 90 should not be used as backfill material behind retaining walls.

7.11.3 Unrestrained walls are those that are allowed to rotate more than 0.001H (where H equals the height of the retaining portion of the wall) at the top of the wall. Where walls are restrained from movement at the top, an additional uniform (rectangular) pressure of 7H psf and 13H psf should be added to the active soil pressure where the planned walls are 8 feet or less and the portion of walls over 8 feet, respectively. The recommendations presented herein are for walls with a height of 15 feet or less. For retaining walls subject to vehicular loads within a horizontal distance equal to two-thirds the wall height, a surcharge equivalent to 2 feet of fill soil should be added.

7.11.4 The use of drainage openings through the base of the wall (weep holes) is not recommended where the seepage could be a nuisance or otherwise adversely affect the property adjacent to the base of the wall. The recommendations herein assume a properly compacted granular (EI of 90 or less) free-draining backfill material with no hydrostatic forces or imposed surcharge load. Figure 12 presents a typical soldier pile wall drainage detail. Figure 13 presents a typical retaining wall drain detail. If conditions different than those described are expected, or if specific drainage details are desired, Geocon Incorporated should be contacted for additional recommendations.

7.11.5 The structural engineer should determine the seismic design category for the project in accordance with Section 1613 of the CBC. If the project possesses a seismic design category of D, E, or F, retaining walls that support more than 6 feet of backfill should be designed with seismic lateral pressure in accordance with Section 18.3.5.12 of the 2013 CBC. The seismic load is dependent on the retained height where H is the height of the

wall, in feet, and the calculated loads result in pounds per square foot (psf) exerted at the base of the wall and zero at the top of the wall. A seismic load of 16H should be used for design. We used the peak ground acceleration adjusted for Site Class effects, PGA_M, of 0.572g calculated from ASCE 7-10 Section 11.8.3 and applied a pseudo-static coefficient of 0.33.

7.11.6 Unrestrained walls will move laterally when backfilled and loading is applied. The amount of lateral deflection is dependent on the wall height, the type of soil used for backfill, and loads acting on the wall. The retaining walls and improvements above the retaining walls should be designed to incorporate an appropriate amount of lateral deflection as determined by the structural engineer.

7.12 Lateral Loading

7.12.1 To resist lateral loads, a passive pressure exerted by an equivalent fluid weight of 350 pounds per cubic foot (pcf) should be used for the design of footings or shear keys poured neat in compacted fill. The passive pressure assumes a horizontal surface extending at least 5 feet, or three times the surface generating the passive pressure, whichever is greater. The upper 12 inches of material in areas not protected by floor slabs or pavement should not be included in design for passive resistance.

7.12.2 If friction is to be used to resist lateral loads, an allowable coefficient of friction between soil and concrete of 0.4 should be used for design.

7.13 Elevator Pit Design

7.13.1 The elevator pit slab and retaining wall should be designed by the project structural engineer. As a minimum the slab-on-grade should be at least 5 inches thick and reinforced with No. 4 steel reinforcing bars placed 18 inches on center in both horizontal directions, positioned near the slab midpoint. Elevator pit walls may be designed in accordance with the recommendations in the *Retaining Wall Design* section of this report as well as account for potentially being below the groundwater table. The elevator pit should be structurally supported either indirectly or directly by the mat and pile foundation system.

7.13.2 Additional active pressure should be added for a surcharge condition due to sloping ground, vehicular traffic or adjacent foundations and should be designed for each condition as the project progresses. Once the design becomes more finalized, an addendum letter can be prepared addressing specific surcharge conditions throughout the project, if necessary.

7.13.3 If retaining wall drainage is to be provided, the drainage system should be designed in accordance with the *Retaining Wall Drainage* section of this report.

7.13.4 The elevator pit walls and slab should be properly waterproofed to prevent excessive moisture inside of the elevator pit.

7.14 Elevator Piston

7.14.1 If a plunger-type elevator piston is installed for this project, a deep drilled excavation will be required. The drilled excavation should not situated immediately adjacent to a foundation or shoring pile, or the drilled excavation could compromise the existing foundation or pile support, especially if the drilling is performed subsequent to the foundation or pile construction.

7.14.2 Casing may be required if caving is experienced in the drilled excavation, especially if the excavation is conducted below the groundwater level. The contractor should be prepared to use casing and should have it readily available at the commencement of drilling activities. The contractor should also be prepared to mitigate buoyant forces since the casing will be below the groundwater level. Continuous observation of the drilling and installation of the elevator piston by the Geotechnical Engineer (a representative of Geocon, Inc.) is required.

7.14.3 The annular space between the piston casing and drilled excavation wall should be filled with a minimum of 1½-sack slurry pumped from the bottom up. As an alternative, pea gravel may be utilized. The use of soil to backfill the annular space is not acceptable.

7.15 Surface Drainage

7.15.1 Proper surface drainage is critical to the future performance of the project. Uncontrolled infiltration of irrigation excess and storm runoff into the soils can adversely affect the performance of the planned improvements. Saturation of a soil can cause it to lose internal shear strength and increase its compressibility, resulting in a change in the original designed engineering properties. Proper drainage should be maintained at all times.

7.15.2 Site drainage should be collected and controlled in non-erosive drainage devices. Drainage should not be allowed to pond anywhere on the site, and especially not against any foundation or retaining wall. The site should be graded and maintained such that surface drainage is directed away from structures in accordance with 2013 CBC 1804.3 or other applicable standards. In addition, drainage should not be allowed to flow uncontrolled over any descending slope. Discharge from downspouts, roof drains and scuppers are not recommended onto unprotected soils within five feet of the building perimeter. Planters

which are located adjacent to foundations should be sealed to prevent moisture intrusion into the soils providing foundation support. Landscape irrigation is not recommended within five feet of the building perimeter footings except when enclosed in protected planters.

7.15.3 Positive site drainage should be provided away from structures, pavement, and the tops of slopes to swales or other controlled drainage structures. The building pad and pavement areas should be fine graded such that water is not allowed to pond.

7.15.4 Landscaping planters immediately adjacent to paved areas are not recommended due to the potential for surface or irrigation water to infiltrate the pavement's subgrade and base course. Either a subdrain, which collects excess irrigation water and transmits it to drainage structures, or an impervious above-grade planter boxes should be used. In addition, where landscaping is planned adjacent to the pavement, it is recommended that consideration be given to providing a cutoff wall along the edge of the pavement that extends at least 12 inches below the base material.

7.15.5 We understand the property may incorporate storm water management devices that promote water storage but not water infiltration. The existing and planned soil conditions are not conducive to water infiltration and infiltration should not be allowed due to the shallow groundwater elevation. Water storage devices can be installed to reduce the velocity and amount of water entering the storm drain system but liners will be required if water in contact with soil. Distress may be caused to planned improvements and properties located hydrologically downstream if water infiltrates the soil. The distress depends on the amount of water to be detained, its residence time, soil permeability, and other factors. We have not performed a hydrogeology study at the site. If infiltration of storm water runoff was incorporated into the project design, downstream properties may be subjected to seeps, springs, slope instability, raised groundwater, movement of foundations and slabs, or other undesirable impacts as a result of this water infiltration.

7.16 Grading and Foundation Plan Review

7.16.1 Grading, foundation, and shoring plans should be reviewed by the Geocon to verify that the plans have been prepared in substantial conformance with the recommendations of this report and to provide additional analyses or recommendations, if necessary.

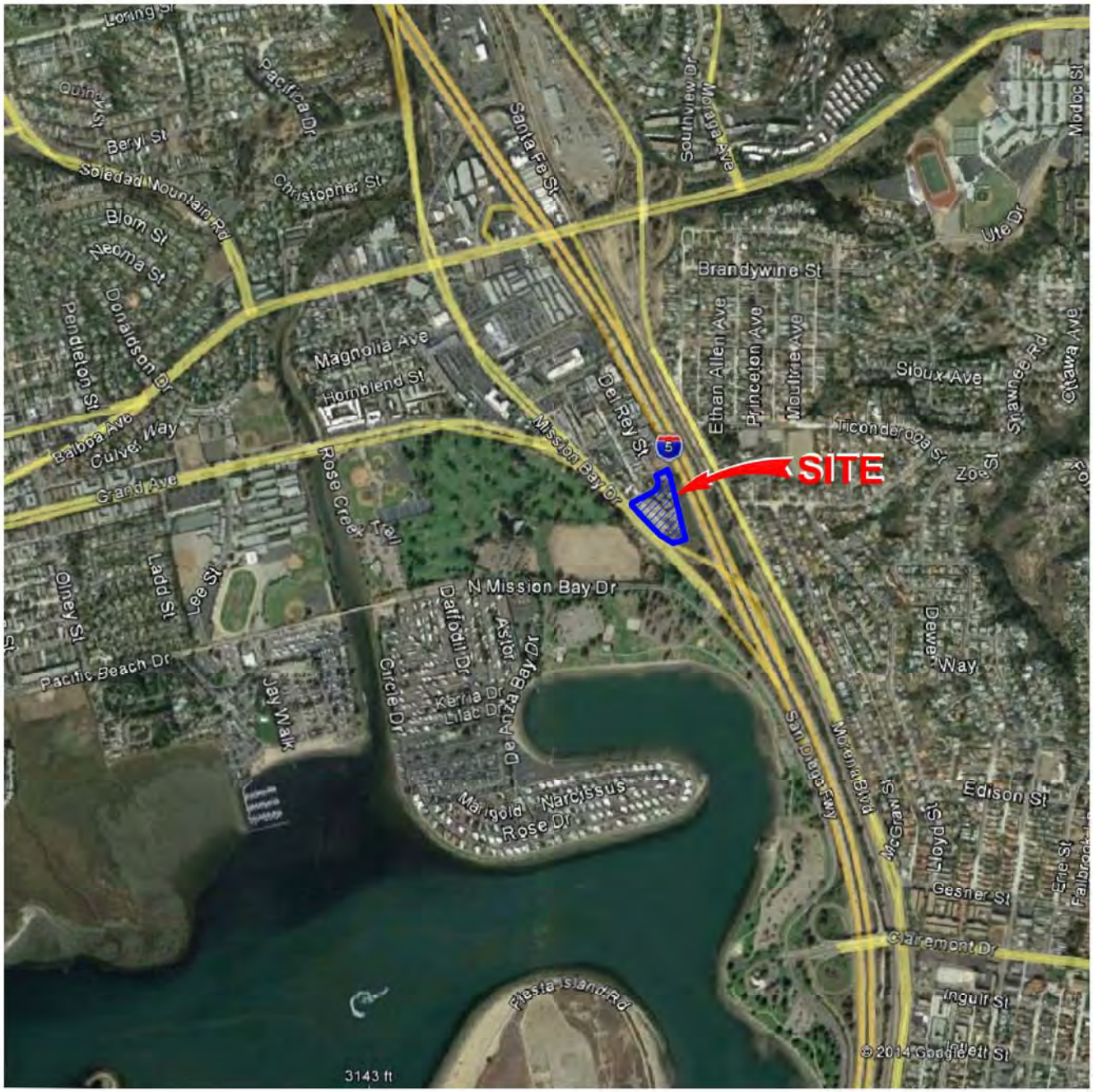
LIMITATIONS AND UNIFORMITY OF CONDITIONS

1. The firm that performed the geotechnical investigation for the project should be retained to provide testing and observation services during construction to provide continuity of geotechnical interpretation and to check that the recommendations presented for geotechnical aspects of site development are incorporated during site grading, construction of improvements, and excavation of foundations. If another geotechnical firm is selected to perform the testing and observation services during construction operations, that firm should prepare a letter indicating their intent to assume the responsibilities of project geotechnical engineer of record. A copy of the letter should be provided to the regulatory agency for their records. In addition, that firm should provide revised recommendations concerning the geotechnical aspects of the proposed development, or a written acknowledgement of their concurrence with the recommendations presented in our report. They should also perform additional analyses deemed necessary to assume the role of Geotechnical Engineer of Record.

2. The recommendations of this report pertain only to the site investigated and are based upon the assumption that the soil conditions do not deviate from those disclosed in the investigation. If any variations or undesirable conditions are encountered during construction, or if the proposed construction will differ from that anticipated herein, Geocon Incorporated should be notified so that supplemental recommendations can be given. The evaluation or identification of the potential presence of hazardous or corrosive materials was not part of the scope of services provided by Geocon Incorporated.

3. This report is issued with the understanding that it is the responsibility of the owner or his representative to ensure that the information and recommendations contained herein are brought to the attention of the architect and engineer for the project and incorporated into the plans, and the necessary steps are taken to see that the contractor and subcontractors carry out such recommendations in the field.

4. The findings of this report are valid as of the date of this report. However, changes in the conditions of a property can occur with the passage of time, whether they be due to natural processes or the works of man on this or adjacent properties. In 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. Therefore, this report is subject to review and should not be relied upon after a period of three years.



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VICINITY MAP

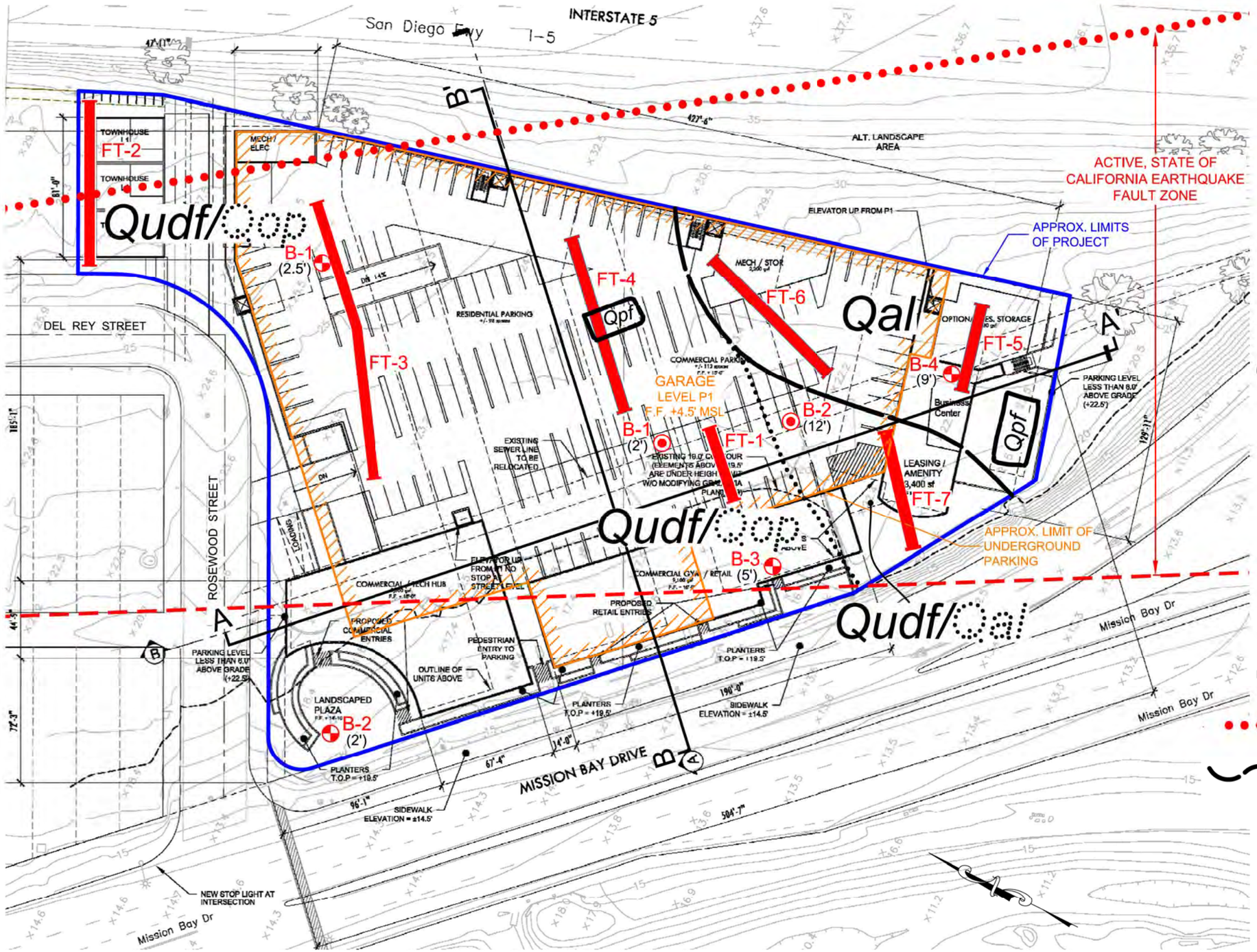
GUY HILL PROPERTY
SAN DIEGO, CALIFORNIA

DATE 09 - 11 - 2015	PROJECT NO. G1592 - 11 - 03	FIG. 1

Ladrillono

Y:\PROJECTS\G1592-11-03 Guy Hill Property\DETAILS\G1592-11-03 Vic Map.dwg

GUY HILL PROPERTY
SAN DIEGO, CALIFORNIA



GEOCON LEGEND

- Qpf .....PREVIOUSLY PLACED FILL
- Qudf .....UNDOCUMENTED FILL
- Qal .....ALLUVIUM
- Qop .....OLD PARALIC DEPOSITS (Dotted Where Buried)
- B-4 .....APPROX. LOCATION OF EXPLORATORY BORING (Geocon, 2014)
- B-2 .....APPROX. LOCATION OF PREVIOUS BORING (Geocon, 2004)
- FT-7 .....APPROX. LOCATION OF FAULT TRENCH
- FT-1 .....APPROX. LOCATION OF PREVIOUS FAULT TRENCH (Geocon, 2004)
- (9') .....APPROX. DEPTH OF FILL (In Feet)
- B B' .....APPROX. LOCATION OF GEOLOGIC CROSS SECTION
- .....APPROX. LOCATION OF MAPPED BURIED POTENTIALLY ACTIVE FAULT (Kennedy & Tan, 2008)
- .....APPROX. LOCATION OF GEOLOGIC CONTACT (Dotted Where Buried)

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PROJECT NO. G1592 - 11 - 03
FIGURE 2
DATE 09 - 11 - 2015

GEOLOGIC MAP

Ladrillono

Plotted:09/11/2015 11:17AM | By:RUBEN AGUILAR | File Location:Y:\PROJECTS\G1592-11-03 Guy Hill Property\SHEETS\G1592-11-03 GeoMap (UPD-082715).dwg

GUY HILL PROPERTY
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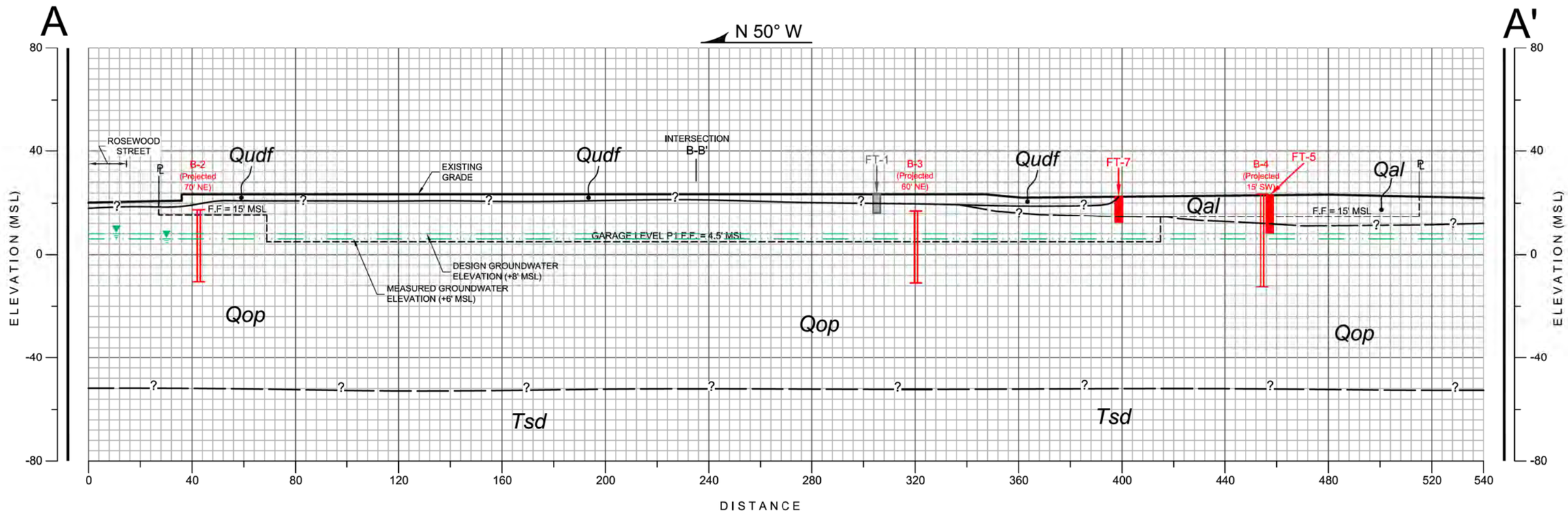

GEOLOGIC CROSS-SECTION A-A'

SCALE: 1" = 40' (Vert. = Horiz.)

GEOCON LEGEND

Qudf .....UNDOCUMENTED FILL

Qal .....ALLUVIUM

Qop .....OLD PARALIC DEPOSITS

Tsd .....SAN DIEGO FORMATION

.....APPROX. LOCATION OF GEOLOGIC CONTACT (Queried Where Uncertain)

B-3 .....APPROX. LOCATION OF EXPLORATORY BORING

FT-7 .....APPROX. LOCATION OF FAULT TRENCH

FT-1 .....APPROX. LOCATION OF PREVIOUS FAULT TRENCH (Geocon, 2004)

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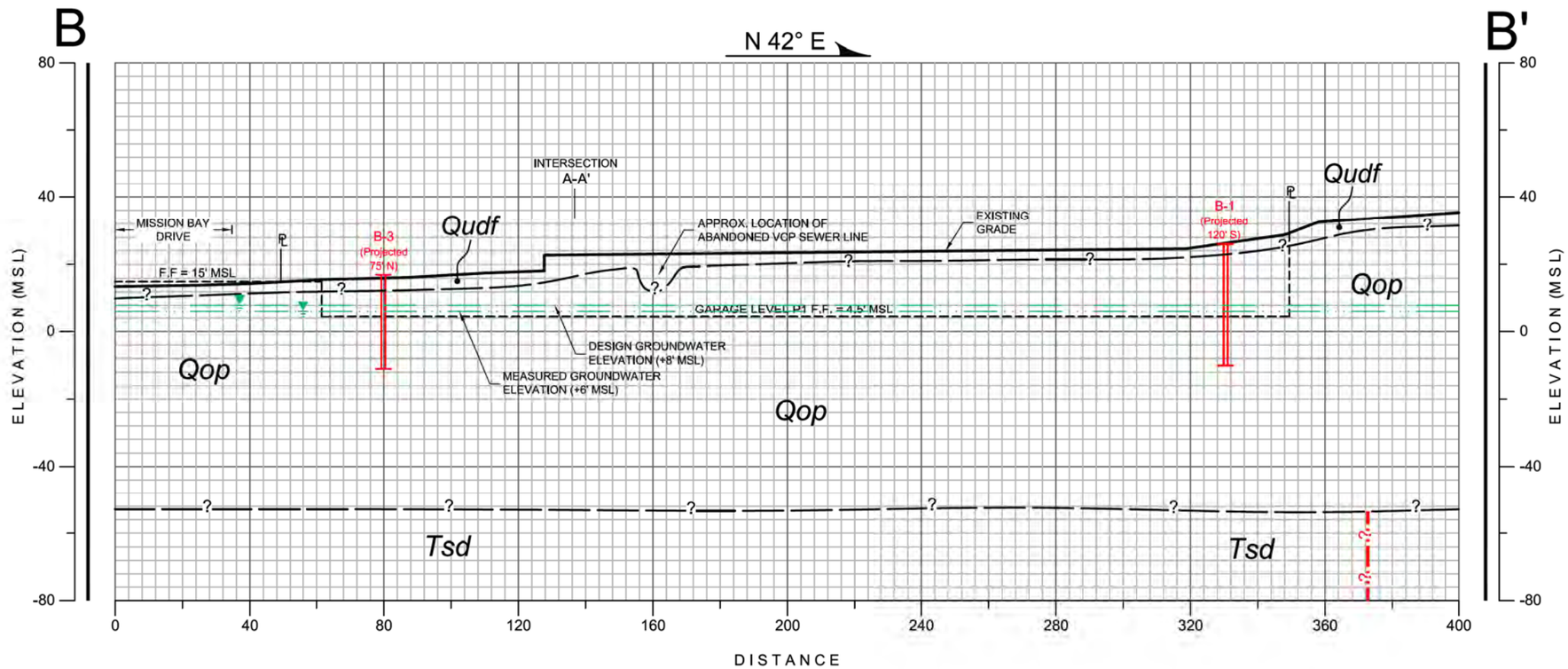
PROJECT NO. G1592 - 11 - 03
FIGURE 3
DATE 09 - 11 - 2015

GUY HILL PROPERTY
SAN DIEGO, CALIFORNIA



GEOLOGIC CROSS-SECTION B-B'

SCALE: 1" = 40' (Vert. = Horiz.)

GEOCON LEGEND

Qudf .....UNDOCUMENTED FILL

Qop .....OLD PARALIC DEPOSITS

Tsd .....SAN DIEGO FORMATION

.....APPROX. LOCATION OF GEOLOGIC CONTACT (Queried Where Uncertain)

B-3 .....APPROX. LOCATION OF EXPLORATORY BORING

.....APPROX. LOCATION OF BURIED POTENTIALLY ACTIVE FAULT

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PROJECT NO. G1592 - 11 - 03
FIGURE 4
DATE 09 - 11 - 2015

GUY HILL PROPERTY
SAN DIEGO, CALIFORNIA

Geologic Hazard Categories

FAULT ZONES

- 11 Active, Alquist-Priolo Earthquake Fault Zone
- 12 Potentially Active, Inactive, Presumed Inactive, or Activity Unknown

SLIDE-PRONE FORMATIONS

- 25 Ardath: neutral or favorable geologic structure

LIQUEFACTION

- 31 High Potential -- shallow groundwater major drainages, hydraulic fills
- 32 Low Potential -- fluctuating groundwater minor drainages

OTHER TERRAIN

- 51 Level mesas -- underlain by terrace deposits and bedrock nominal risk
- 52 Other level areas, gently sloping to steep terrain, favorable geologic structure, Low risk
- 53 Level or sloping terrain, unfavorable geologic structure, Low to moderate risk
- 54 Steeply sloping terrain, unfavorable or fault controlled geologic structure, Moderate risk

FAULTS

- Fault
- Inferred Fault
- Concealed Fault
- Shear Zone

N

NOT TO SCALE

SOURCE : CITY OF SAN DIEGO (2008)

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GEOLOGIC HAZARD MAP

PROJECT NO. G1592 - 11 - 03
FIGURE 5
DATE 09 - 11 - 2015

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Plotted:09/11/2015 11:27AM | By:RUBEN AGUILAR | File Location:Y:\PROJECTS\G1592-11-03 Guy Hill Property\DETAILS\G1592-11-03 Geo Hazard Map.dwg

GUY HILL PROPERTY
SAN DIEGO, CALIFORNIA

MAP EXPLANATION

Active Faults

1905 C — Faults considered to have been active during Holocene time and to have a relatively high potential for surface rupture; solid line where accurately located, long dash where approximately located, short dash where inferred, dotted where concealed; query (?) indicates additional uncertainty. Evidence of historic offset indicated by year of earthquake-associated event or C for displacement caused by creep or possible creep.

Special Studies Zone Boundaries

These are delineated as straight-line segments that connect encircled turning points so as to define special studies zone segments.

Seaward projection of zone boundary.

N

NOT TO SCALE

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PROJECT NO. G1592 - 11 - 03
FIGURE 6
DATE 09 - 11 - 2015

SOURCE : STATE OF CALIFORNIA, SPECIAL STUDIES ZONE, LA JOLLA QUADRANGLE (1991)

SPECIAL STUDIES ZONE MAP

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Plotted:09/11/2015 11:29AM | By:RUBEN AGUILAR | File Location:Y:\PROJECTS\G1592-11-03 Guy Hill Property\DETAILS\G1592-11-03 Special Study Zone Map.dwg

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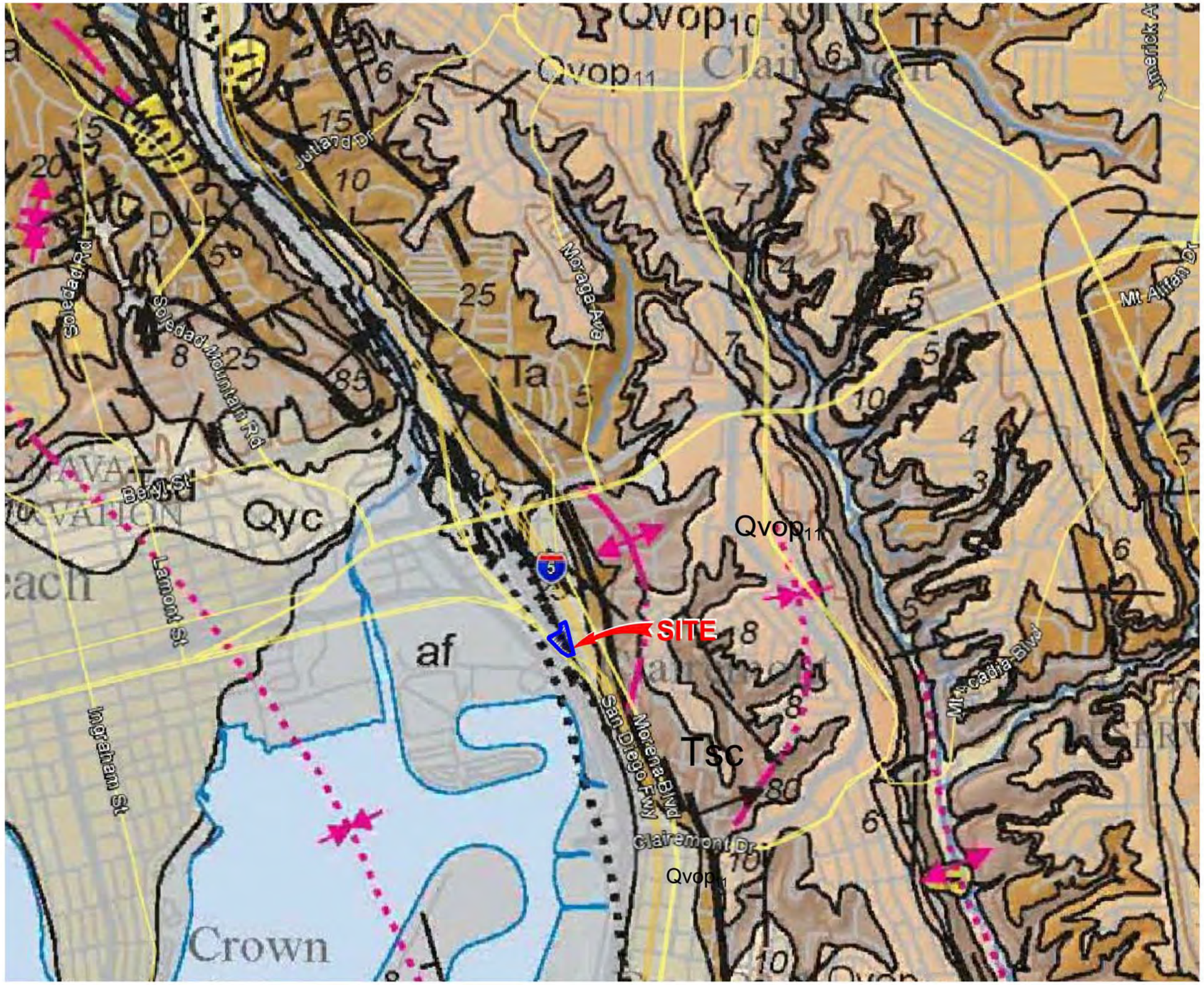
SAN DIEGO, CALIFORNIA



MAP UNITS

- af — Artificial fill (late Holocene)
- Qyc — Young colluvial deposits (Holocene and late Pleistocene)
- Qop — Old paralic deposits, undivided (late to middle Pleistocene)
- Qvop — Very old paralic deposits, undivided (middle to early Pleistocene)
- Tsdcg, Tsd, Tsdss — San Diego Formation (early Pleistocene and late Pliocene)
  - Tsd - undivided
  - Tsdcg - transitional marine and nonmarine pebble and cobble conglomerate
  - Tsdss - marine sandstone
- Tscu, Tsc — Scripps Formation (middle Eocene)
  - Tscu - upper unit
- Ta — Ardath Shale (middle Eocene)

70 U D — Fault - Solid where accurately located; dashed where approximately located; dotted where concealed. U = upthrown block, D = downthrown block. Arrow and number indicate direction and angle of dip of fault plane.

Anticline - Solid where accurately located; dashed where approximately located; dotted where concealed. Arrow indicates direction of axial plunge.

Syncline - Solid where accurately located; dotted where concealed. Arrow indicates direction of axial plunge.

QLs? — Landslide - Arrows indicate principal direction of movement. Queried where existence is questionable.

Strike and dip of beds

70 — Inclined

Faults

U D — Fault - Solid where well defined; dashed where approximately located; short dash where inferred; dotted where concealed; queried where uncertain. Where fault offsets sea floor, age symbol is shown on bar on downthrown side. Where age was determined, age symbol is shown astride fault and relative offset, if known, is shown by "D" and "U" on downthrown and upthrown sides. Ages of faults are indicated as follows:

- ⊠ cuts strata of Holocene age
- ■ cuts strata of late Quaternary age
- ◪ cuts strata of Quaternary age
- △ cuts Miocene or older strata

Fault zone - Area of extensively sheared rock within a zone defined by multiple faults.

Folds

Anticline - Solid where well defined; short dash where inferred.

Syncline - Solid where well defined; short dash where inferred.

N
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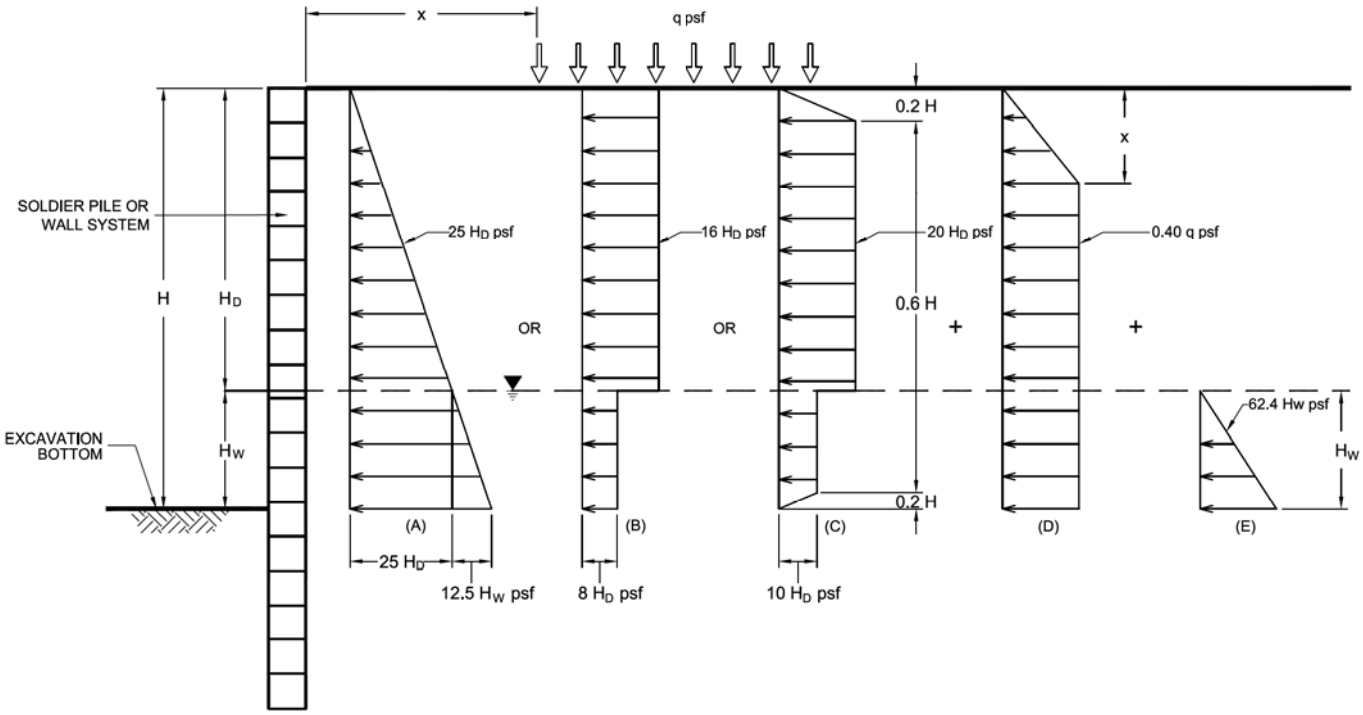
PROJECT NO. G1592 - 11 - 03
FIGURE 7
DATE 09 - 11 - 2015

SOURCE : USGS, KENNEDY & TAN, SAN DIEGO QUADRANGLE (2008)

REGIONAL GEOLOGIC MAP

Ladrillono

Plotted:09/11/2015 11:28AM | By:RUBEN AGUILAR | File Location:Y:\PROJECTS\G1592-11-03 Guy Hill Property\DETAILS\G1592-11-03 Regional Geo Map.dwg



NOTE: DIMENSIONS H, H_D, AND H_W ARE MEASURED IN FEET

(A).....TRIANGULAR DISTRIBUTION

(B).....RECTANGULAR DISTRIBUTION

(C).....TRAPIZOIDAL DISTRIBUTION

(D).....SURCHARGE DISTRIBUTION

(E).....WATER PRESSURE

▼.....APPROX. GROUNDWATER TABLE

NO SCALE

LATERAL ACTIVE PRESSURES FOR VERTICAL EXCAVATIONS

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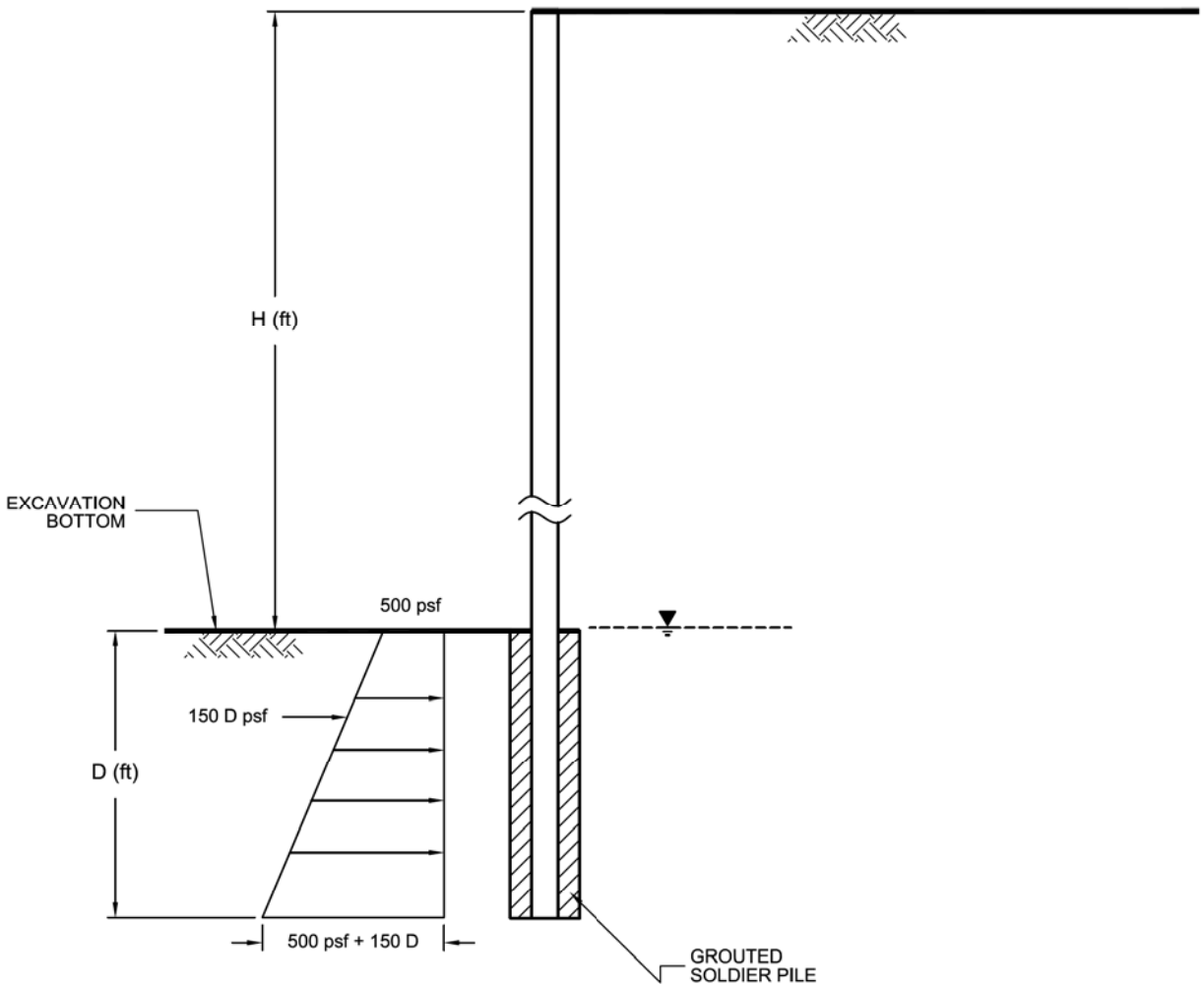
GUY HILL PROPERTY
SAN DIEGO, CALIFORNIA

LR / AML		DSK/GTYPD	DATE 09 - 11 - 2015	PROJECT NO. G1592 - 11 - 03	FIG. 8

Y:/PROJECTS/G1592-11-03 Guy Hill Property/DETAILS/LAPFVE1.dwg



NO SCALE

RECOMMENDED GROUTED SOLDIER PILE PRESSURE DISTRIBUTION

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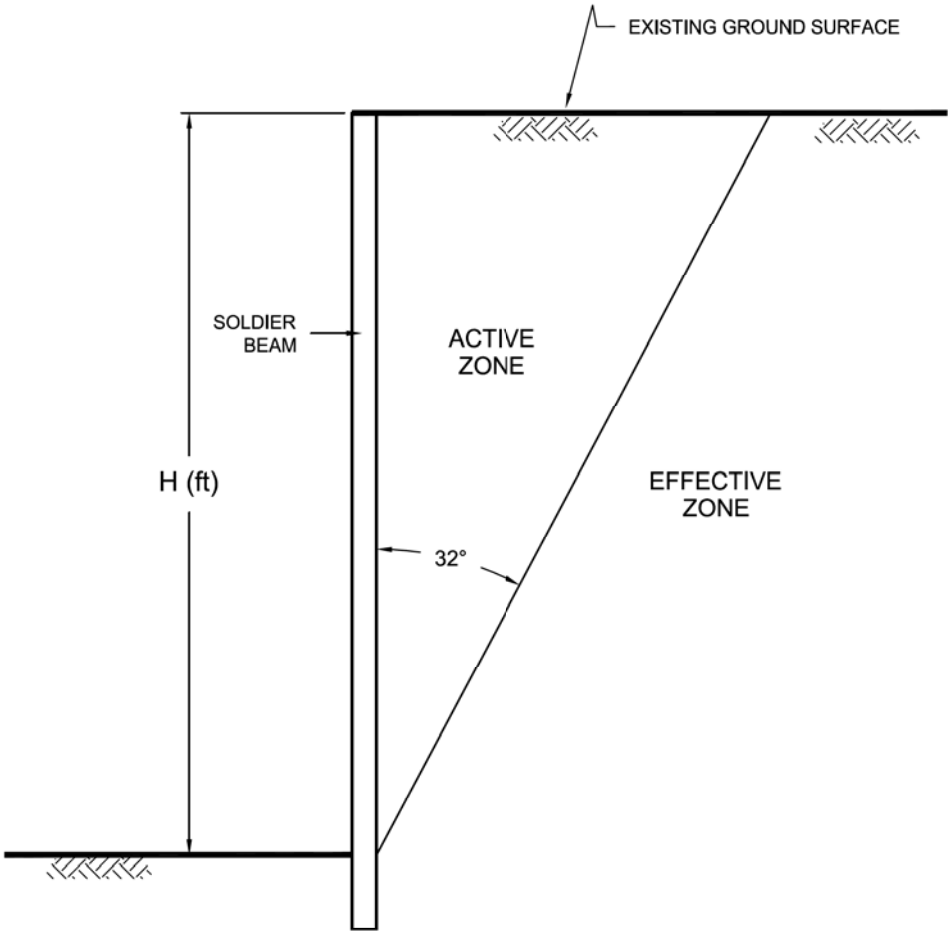
LR / AML		DSK/GTYPD	DATE 09 - 11 - 2015	PROJECT NO. G1592 - 11 - 03	FIG. 9

RGSPPD



NO SCALE

RECOMMENDED EFFECTIVE ZONE FOR TIEBACK ANCHORS

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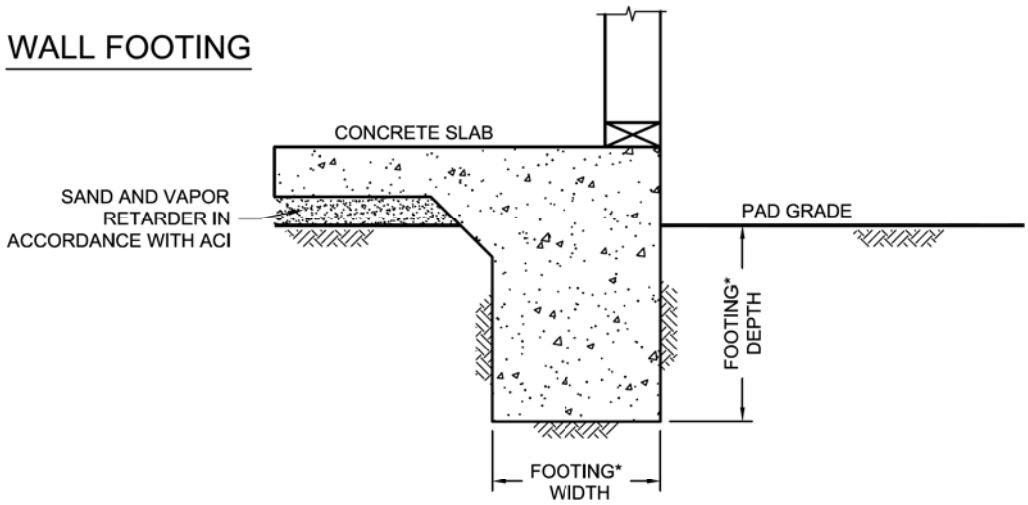
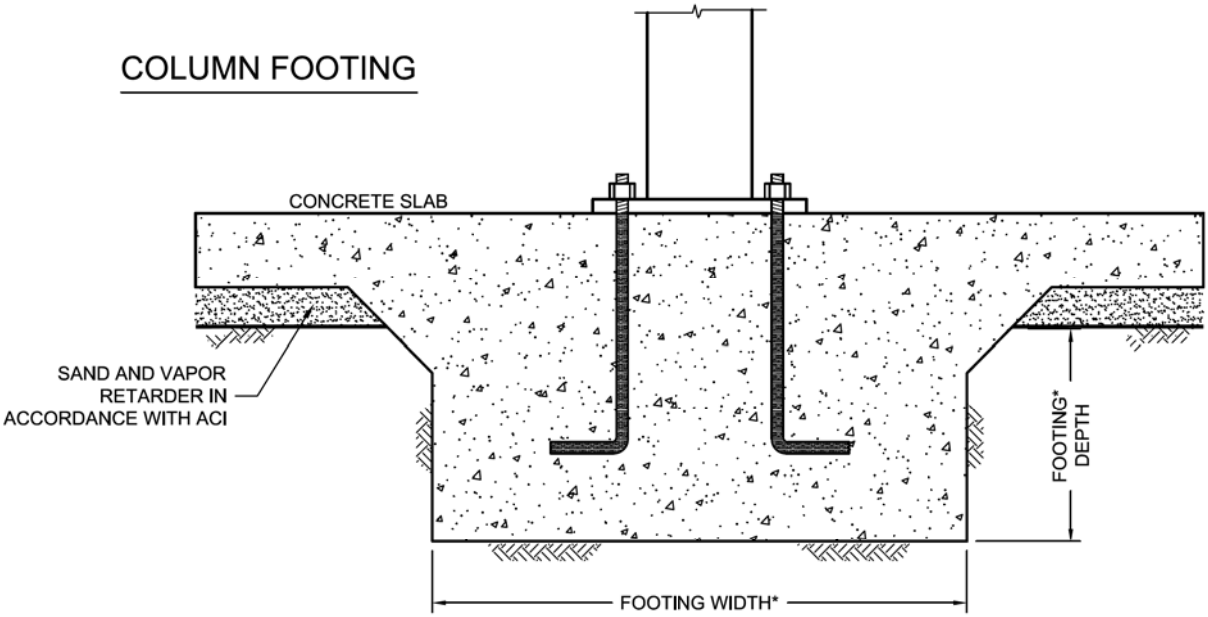
LR / AML		DSK/E0000	DATE 09 - 11 - 2015	PROJECT NO. G1592 - 11 - 03	FIG. 10

E:/TYP/REZTA.DWG/aml

WALL FOOTING



COLUMN FOOTING



NO SCALE

*....SEE REPORT FOR FOUNDATION WIDTH AND DEPTH RECOMMENDATION

WALL / COLUMN FOOTING DIMENSION DETAIL

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RM / AML		DSK/GTYPD	DATE 09 - 11 - 2015	PROJECT NO. G1592 - 11 - 03	FIG. 11

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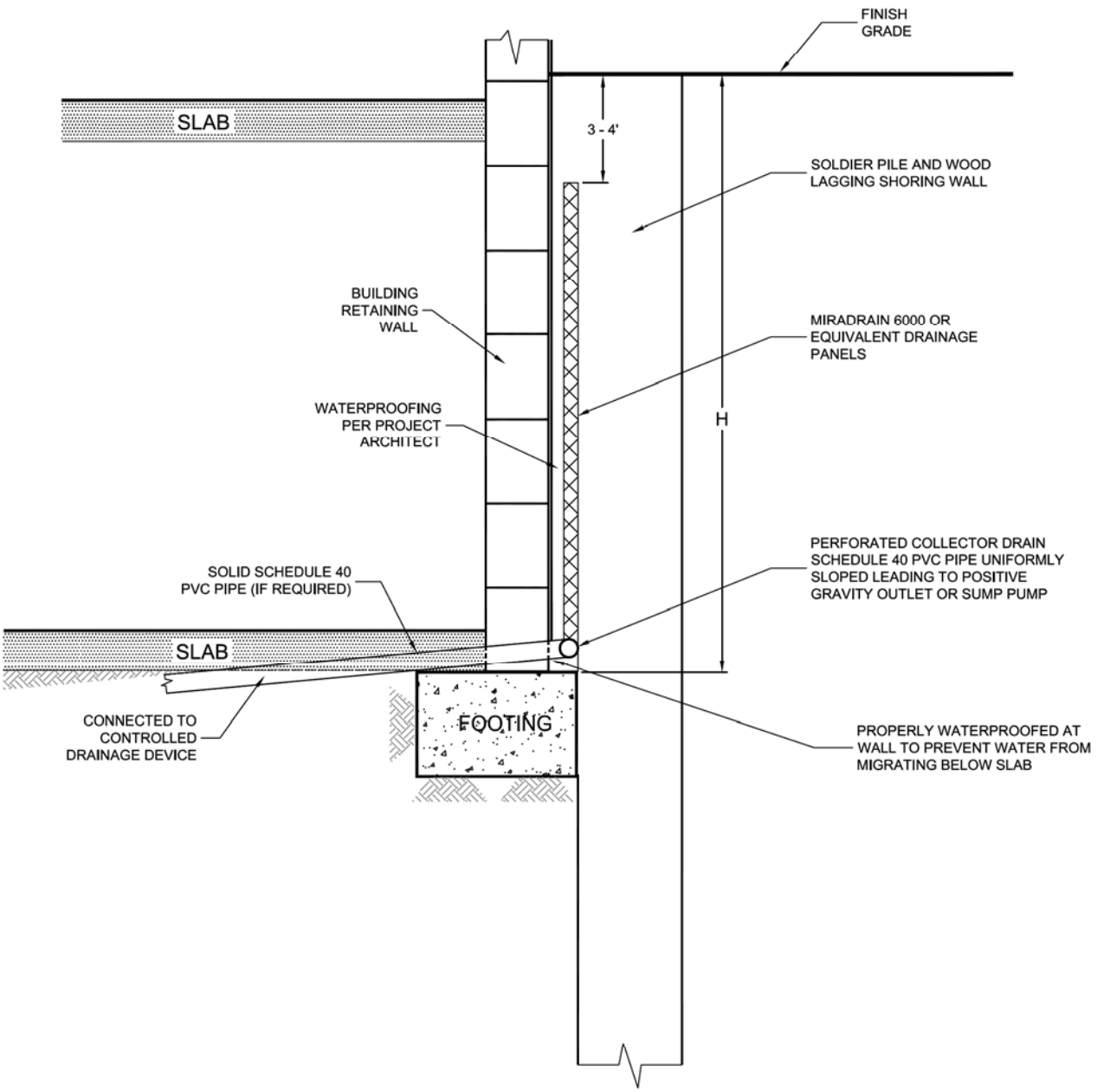

NO SCALE

SOLDIER PILE WALL DRAINAGE DETAIL

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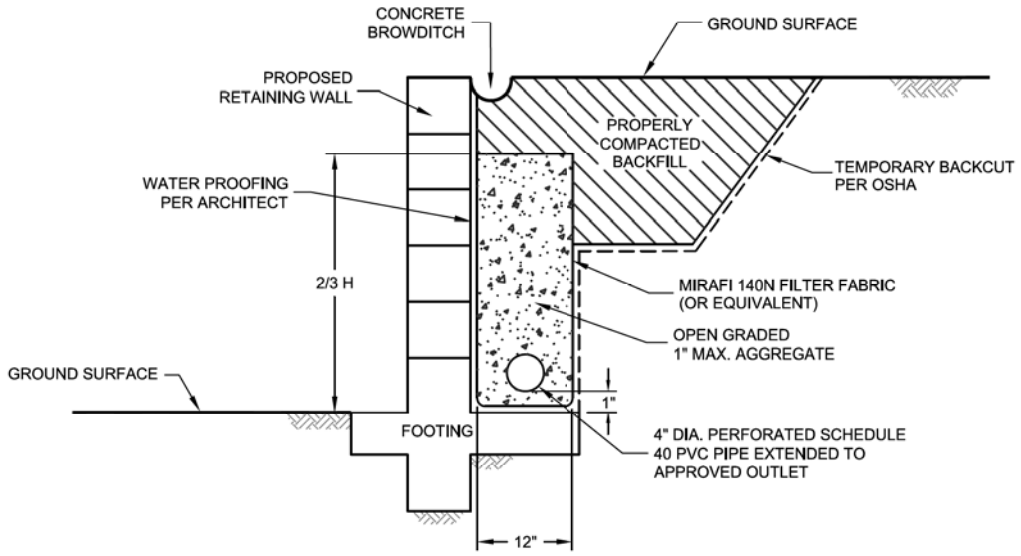
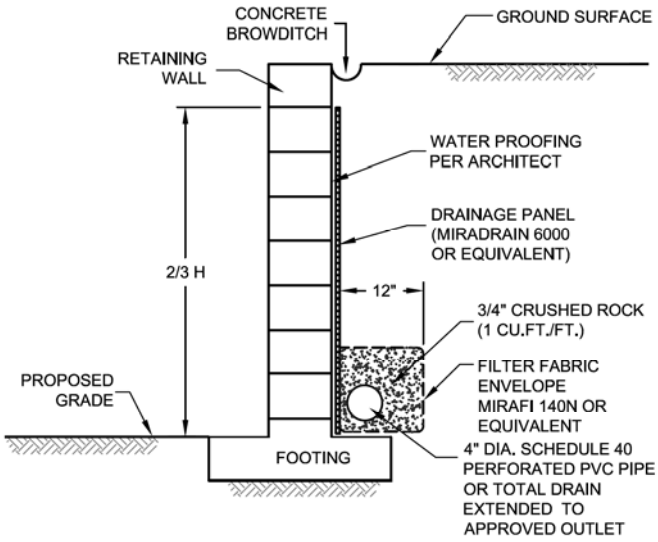
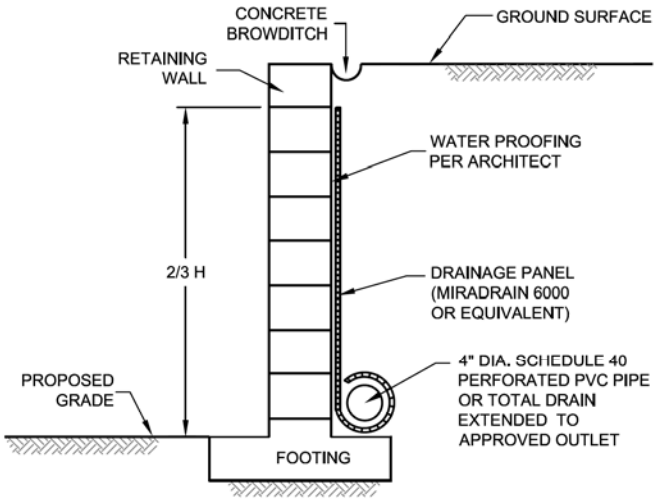
LR / AML		DSK/GTYPD	DATE 09 - 11 - 2015	PROJECT NO. G1592 - 11 - 03	FIG. 12

COLFOOT2.DWG/aml







NOTE :

DRAIN SHOULD BE UNIFORMLY SLOPED TO GRAVITY OUTLET OR TO A SUMP WHERE WATER CAN BE REMOVED BY PUMPING

NO SCALE

TYPICAL RETAINING WALL DRAIN DETAIL

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GUY HILL PROPERTY
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RM / AML		DSK/GTYPD	DATE 09 - 11 - 2015	PROJECT NO. G1592 - 11 - 03	FIG. 13

RWDD7A

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APPENDIX A

APPENDIX A

FIELD INVESTIGATION

We performed the field investigation on October 16 and 17, 2014, and August 17 through 24, 2015 consisting of the excavation of four small-diameter borings and six exploratory fault trenches. The approximate locations of the excavations are shown on the Geologic Map, Figure 2. We located the exploratory borings and trenches in the field using a measuring tape and/or existing landmarks; therefore, actual boring and trench locations may vary slightly. We drilled the small diameter borings to a maximum depth of 36 feet using a CME 55 truck-mounted drill rig equipped with 8-inch diameter hollow stem augers. The trenches were excavated with a John Deere 410G backhoe. As drilling and excavation of the trenches proceeded, we logged and sampled the soil and geologic conditions encountered.

We obtained soil samples during our boring excavations using a California split-spoon sampler and a Standard Penetration Test (SPT) sampler. Both samplers are driven to obtain soil samples. The California sampler has an inside diameter of 2.5 inches and an outside diameter of 2.875 inches. Up to 18 rings, 2.4 inches in diameter and 1 inch in height are placed inside the sampler. The SPT sampler has an inside diameter of 1.5 inches and an outside diameter of 2 inches. We retained ring samples at appropriate intervals in moisture-tight containers and transported them to the laboratory for testing. We also collected bulk samples from the borings for laboratory testing. The type of sample is noted on the exploratory boring logs.

For the standard penetration test (SPT), the sampler was driven 18 inches into the bottom of the excavations with the use of an automatic hammer and the use of A-rods. The California sampler was driven 12 inches into the bottom of the excavation. The sampler is connected to the A rods and driven into the bottom of the excavation using a 140-pound hammer with a 30-inch drop. Blow counts are recorded for every 6 inches the sampler is driven. The penetration resistances shown on the boring logs are shown in terms of blows per foot. The values indicated on the boring logs are the sum of the last 12 inches of the sampler if driven 18 inches. If the sampler was not driven for 18 inches, an approximate value is calculated in term of blows per foot or the final 6-inch interval is reported. These values are not to be taken as SPT N-values, adjustments have not been applied.

We visually examined, classified and logged the soil conditions encountered in the excavations in general accordance with the Unified Soil Classification System (USCS). Logs of the exploratory borings and fault trench are presented on Figures A-1 through A-6. The logs depict the general soil and geologic conditions encountered and the depth at which samples were obtained

The County of San Diego Department of Environmental Health issued a permit for geotechnical borings and is shown after the boring logs in this appendix.

PROJECT NO. G1592-11-03

BORING B 1

ELEV. (MSL.) **26'** DATE COMPLETED **10-16-2014**

EQUIPMENT **IR A-300** BY: **L. RODRIGUEZ**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B1-1			SC	**4" ASPHALT CONCRETE**			
2					**UNDOCUMENTED FILL (Qudf)** Medium dense, damp to moist, reddish brown, Clayey, fine SAND			
	B1-2			CL	**OLD PARALIC DEPOSITS (Qop)** Hard, moist, dark brown, Sandy CLAY; micaceous	64	118.3	13.5
4								
6	B1-3				-Becomes olive brown to dark brown	81	120.5	13.6
8								
10	B1-4			SC	Dense, damp, olive to yellowish brown, Clayey, fine to medium SAND; micaceous	74	121.0	10.4
12								
14								
16	B1-5				-Becomes very dense; thin layers of fine to coarse sand	80/11"	119.3	9.0
18	B1-6							
	B1-7			SM/ML	Dense, moist, olive to yellowish brown, Silty, fine SAND to Sandy SILT	50	109.8	18.6
20			▼		-Groundwater at +5.6' MSL at 10:00 am			
	B1-8			SM	Very dense, very moist, olive to yellowish brown, Silty, fine to medium SAND; trace angular gravel up to 1" diameter; micaceous	75/10"	114.3	17.3
22								
24	B1-9			SC/CL	Dense to hard, very moist, olive to yellowish brown, Clayey, fine SAND to Sandy CLAY	70	117.5	16.6
26	B1-10			CL	Stiff, very moist, olive to yellowish brown, Sandy CLAY	25	110.4	19.1
28								

Figure A-1,
Log of Boring B 1, Page 1 of 2

G1592-11-03.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1592-11-03

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING B 1** ELEV. (MSL.) **26'** DATE COMPLETED **10-16-2014** EQUIPMENT **IR A-300** BY: **L. RODRIGUEZ**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
30								
	B1-11					32	108.4	21.7
32								
34								
	B1-12				-Becomes wet	40	110.9	19.2
36					BORING TERMINATED AT 36 FEET Groundwater encountered at 20.5 feet Backfilled with 12.6 ft³ bentonite grout slurry			

Figure A-1,
Log of Boring B 1, Page 2 of 2

G1592-11-03.GPJ

SAMPLE SYMBOLS			
	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1592-11-03

BORING B 2

ELEV. (MSL.) **17.5'** DATE COMPLETED **10-16-2014**

EQUIPMENT **IR A-300** BY: **L. RODRIGUEZ**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					5" **CONCRETE**			
				SC	**UNDOCUMENTED FILL (Qudf)** Medium dense, moist, dark brown, Clayey, fine to medium SAND; trace gravel			
2				SC/CL	**OLD PARALIC DEPOSITS (Qop)** Dense, damp to moist, olive to yellowish brown, Clayey, fine to medium SAND to Sandy CLAY; micaceous			
4								
6	B2-1					50	118.6	13.4
8	B2-2				-Becomes very dense	89/11"	120.9	12.3
10	B2-3				-Becomes dense	66	119.4	14.9
12								
14	B2-4		▼	CL	Very stiff, moist to wet, dark olive brown, Sandy CLAY; micaceous -Groundwater at +4.0' MSL at 2:55 pm	58	114.6	16.6
16								
18	B2-5			ML	Very stiff, moist to wet, dark olive brown, Sandy SILT; micaceous	52	115.9	16.5
20								
22	B2-6				-Becomes stiff, olive to yellowish brown	33	102.4	22.5
24								
26								
28					-No recovery	28		
					BORING TERMINATED AT 28 FEET Groundwater encountered at 13.5 feet Backfilled with 9.8 ft³ bentonite grout slurry			

Figure A-2,
Log of Boring B 2, Page 1 of 1

G1592-11-03.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1592-11-03

BORING B 3

ELEV. (MSL.) **17.0'** DATE COMPLETED **10-17-2014**

EQUIPMENT **IR A-300** BY: **L. RODRIGUEZ**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B3-1			SM	**7" CONCRETE**			
					UNDOCUMENTED FILL (Qudf) Medium dense, moist, olive brown, Silty, fine to medium SAND			
2	B3-2			CL	Very stiff, moist, dark brown, Sandy CLAY	49	119.3	14.2
4								
6	B3-3			SC/CL	**OLD PARALIC DEPOSITS (Qop)** Dense to very stiff, moist, dark olive to yellowish brown, Clayey, fine to medium SAND to Sandy CLAY; micaceous	52	118.4	15.1
8	B3-4					42	119.6	14.5
10	B3-5			CL	Very stiff, moist to wet, dark olive to yellowish brown, Sandy CLAY; micaceous	42	116.5	15.5
12	B3-6		▼		-Groundwater at +5.0' MSL at 10:00 am			
14	B3-7					46	108.8	19.4
16	B3-8			SM	Medium dense, wet, dark olive to yellowish brown, Silty, fine SAND; micaceous	33	111.1	20.1
18					-No recovery	37		
20								
22					-No recovery	37		
24								
26								
28	B3-9			CL	Very stiff, wet, olive to yellowish brown, Sandy CLAY	28		
					BORING TERMINATED AT 28 FEET Groundwater encountered at 12 feet Backfilled with 9.8 ft³ bentonite grout slurry			

Figure A-3,
Log of Boring B 3, Page 1 of 1

G1592-11-03.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1592-11-03

BORING B 4

ELEV. (MSL.) **23.5'** DATE COMPLETED **10-16-2014**

EQUIPMENT **IR A-300** BY: **L. RODRIGUEZ**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B4-1			CL	6" **ASPHALT CONCRETE**			
					UNDOCUMENTED FILL (Qudf) Firm, damp to moist, dark olive to reddish brown, Sandy CLAY; trace gravel			
2								
4								
6	B4-2			SC/CL	Medium dense, moist, olive to yellowish brown, Clayey, fine SAND to Sandy CLAY	19	111.5	15.9
8								
10	B4-3			CL	**OLD PARALIC DEPOSITS (Qop)** Very stiff, moist, dark olive brown, Sandy CLAY; micaceous	53	115.7	15.5
12								
14								
16	B4-4 B4-5				-Becomes olive to yellowish brown; sand content increases	40	110.9	18.4
18	B4-6		▼		-Groundwater at +5.8' MSL at 12:50 pm	62	111.3	19.0
20								
22	B4-7			CL/SC	Stiff, wet, dark olive to yellowish brown, Sandy CLAY to Clayey fine SAND	27	106.7	20.3
24								
26	B4-8				-Becomes very stiff	41	113.8	17.4
28								

Figure A-4,
Log of Boring B 4, Page 1 of 2

G1592-11-03.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

BORING B 4

ELEV. (MSL.) **23.5'** DATE COMPLETED **10-16-2014**

EQUIPMENT **IR A-300** BY: **L. RODRIGUEZ**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
30	B4-9			SC	Dense, moist to wet, olive to yellowish brown, Clayey, fine SAND; micaceous	56	109.3	19.2
32								
34								
36	B4-10			CL	Very stiff, very moist to wet, olive to yellowish brown, Sandy CLAY; micaceous	41	111.8	18.9

BORING TERMINATED AT 36 FEET
Groundwater encountered at 17.75 feet
Backfilled with 12.6 ft³ bentonite grout slurry

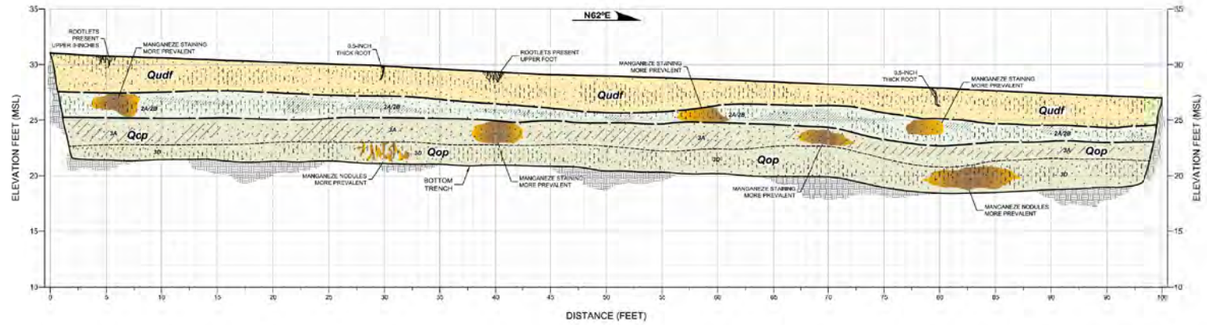
Figure A-4,
Log of Boring B 4, Page 2 of 2

G1592-11-03.GPJ

SAMPLE SYMBOLS

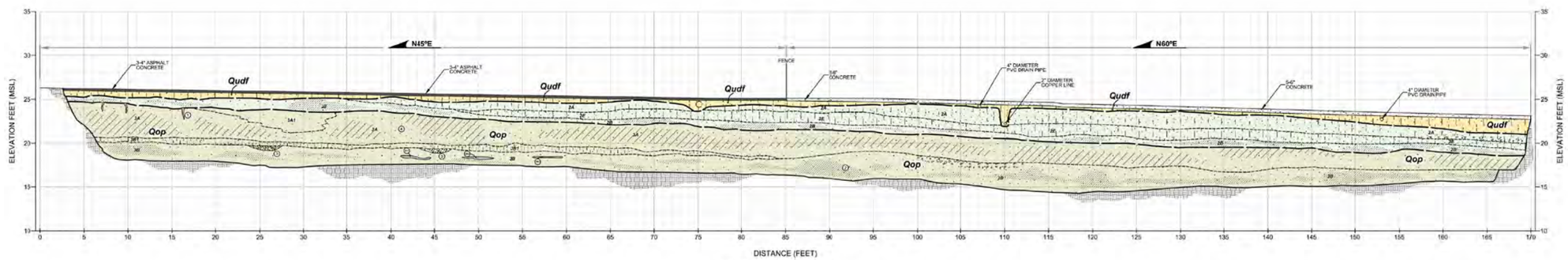
- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.



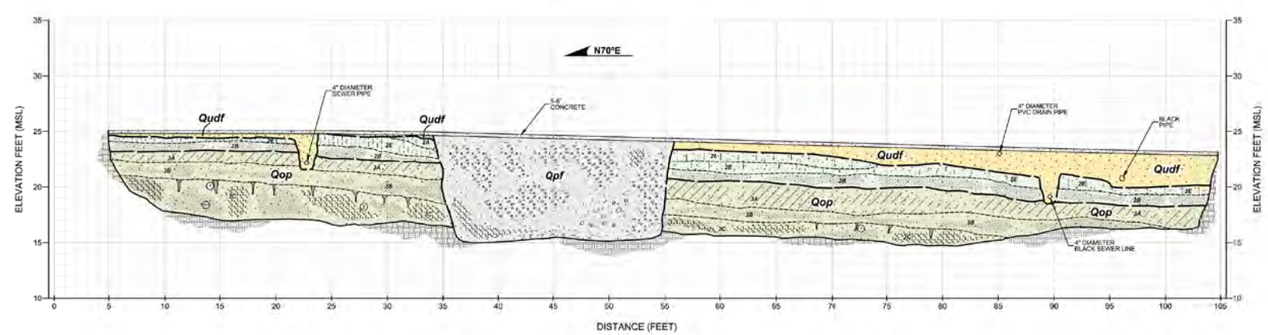
FAULT TRENCH FT-2

SCALE: 1" = 5' (Vert. = Horiz.)



FAULT TRENCH FT-3

SCALE: 1" = 5' (Vert. = Horiz.)



FAULT TRENCH FT-4

SCALE: 1" = 5' (Vert. = Horiz.)

GECCON LEGEND

Qpf — **PREVIOUSLY PLACED FILL**
Dense, wet, very dark gray, SAND and GRAVEL (backfill above contaminated soils, [illegible])

Qudf — **UNDOCUMENTED FILL**
Medium dense, damp to moist, dark gray, Silty, fine to medium SAND (road gravel [illegible])

Qal — **ALLUVIUM**
Qal1...Medium dense, moist, light brown, Silty, fine SAND, [illegible] (Qal1 [illegible])
Qal2...Medium dense, moist to wet, brown, Silty, fine to medium SAND with little clay, [illegible], some calcium carbonate veinlets

SOIL PROFILE
2A...Loose to medium dense, moist, dark brown, Silty, fine SAND, abundant rootlets, fine manganese nodules, bioturbation (SM)
2B...Medium dense, dark brown, Clayey, fine to medium SAND, moderately developed argillic horizon (SC)
3B...Medium dense, moist, light brown, Silty, fine SAND, [illegible] (SM)

Qop — **OLD PARALIC DEPOSITS**
3A...Very stiff, moist, dark grayish brown, Sandy CLAY, [illegible] (CL)
3B...Very dense, moist, dark grayish brown to greenish brown, Clayey, fine SAND, [illegible] (SC)
3C...Very dense, moist, dark grayish brown, [illegible] (SC)
3E1...Dense, very moist, olive brown, Clayey SAND, [illegible]
3E1...Light greenish brown, Silty SAND 4 to 6" thick
3E2...Clay rich lenses
3C1...Olive brown, Silty SAND lens
3D...Brown, moist, mottled reddish brown to light brown, Silty, fine SAND, [illegible]

(1) VERTICAL FRACTURES-No vertical displacement; brown sand infill
(2) FAINT BEDDING
(3) Small channel, light brown, coarse SAND
(4) Calcium carbonate nodules
(5) Calcium carbonate; pebble size nodules and veinlets

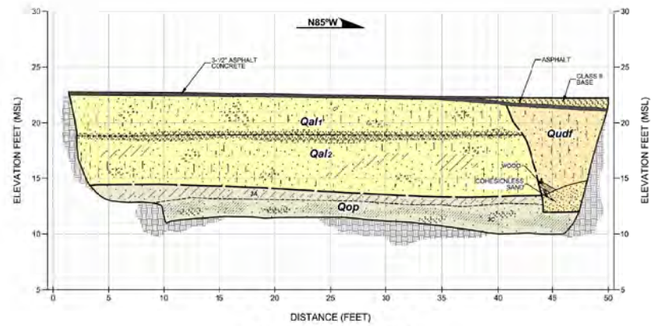
APPROX. LOCATION OF GEOLOGIC CONTACT
APPROX. LOCATION OF INTERFORMATIONAL CONTACT

FAULT TRENCHES

GUY HILL PROPERTY
SAN DIEGO, CALIFORNIA

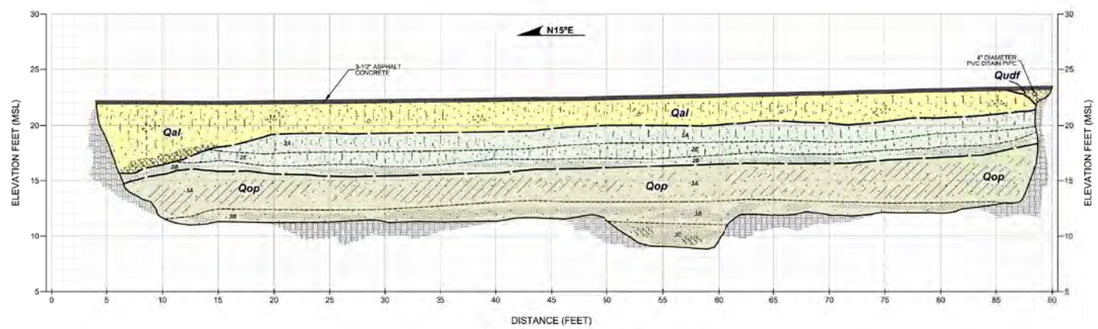
GEOCON INCORPORATED
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS
6960 FLANDERS DRIVE SAN DIEGO, CALIFORNIA 92121 - 2774
PHONE 858 558-6900 FAX 858 558-6159

SCALE 1" = 5'	DATE 09 - 11 - 2015	
PROJECT NO. G1592 - 11 - 03		FIGURE A-5
SHEET 1 OF 1		



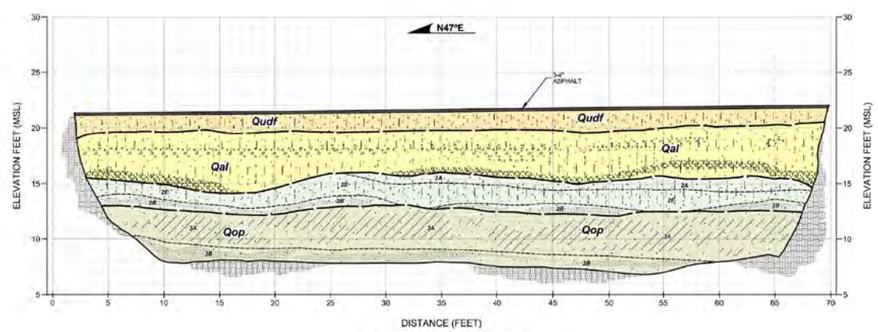
FAULT TRENCH FT-5

SCALE: 1" = 5' (Vert. = Horiz.)



FAULT TRENCH FT-6

SCALE: 1" = 5' (Vert. = Horiz.)



FAULT TRENCH FT-7

SCALE: 1" = 5' (Vert. = Horiz.)

GEOCON LEGEND

Qpf — **PREVIOUSLY PLACED FILL**
Dense, wet, very dark gray, SAND and GRAVEL, (backfill of the underground tanks, extracted in 1993)

Qudf — **UNDOCUMENTED FILL**
Medium dense, damp to moist, dark gray, Silty, fine to medium SAND; trace gravel (SM)

Qal — **ALLUVIUM**
Qal1...Medium dense, moist, light brown, Silty, fine SAND; fine carbon flakes; a layer of gravel; abundant pinholes
Qal2...Medium dense, moist to wet, brown, Silty, fine to medium SAND with little clay; less pinholes; some calcium carbonate varnish

SOIL PROFILE
2A...Loose to medium dense, moist, dark brown, Silty, fine SAND; abundant pinholes, fine manganese nodules, bioturbation (SM)
2B...Medium dense, dark brown, Clayey, fine to medium SAND; moderately developed argillic horizon (SC)
2E...Medium dense, exotic light brown, Silty, fine SAND; less pinholes (SM)

Qop — **OLD PARALIC DEPOSITS**
3A...Very stiff, moist, light grayish brown, Sandy CLAY; mottled orange and light gray (CL)
3B...Very dense, moist, dark grayish brown to grayish brown, Clayey, fine SAND; firm staining (SC)
3C...Very dense, moist, dark grayish brown, mottled orange and green, Clayey SAND; some fine gravel (SC)
3A1...Dense, very moist, olive brown, Clayey SAND; friable staining, rare 1 mm
3B1...Light greenish brown, Silty SAND 4 to 5' thick
3B2...Clay bit lenses
3C1...Olive brown, Silty SAND lense
3D...Dense, moist, mottled reddish brown to light brown, Silty, fine SAND; some manganese nodules, bioturbation, massive with no stratification (SM)

1. VERTICAL FRACTURES (No vertical displacement in lower sandstone)
2. FAINT BEDDING
3. Small channel, light brown, Loose SAND
4. Calcium carbonate nodules
5. Calcium carbonate pebble size nodules and veinlets

APPROX. LOCATION OF GEOLOGIC CONTACT

APPROX. LOCATION OF INTERFORMATIONAL CONTACT

FAULT TRENCHES

GUY HILL PROPERTY
SAN DIEGO, CALIFORNIA

GEOCON INCORPORATED
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS
9484 FLANDERS DRIVE SAN DIEGO, CALIFORNIA 92121-2724
PHONE 858 558-6900 FAX 858 558-6159

SCALE 1" = 5'	DATE 09 - 11 - 2015	
PROJECT NO. G1592 - 11 - 03		FIGURE A-6
SHEET 1 OF 1		

PERMIT #LMWP-001324
A.P.N. #424-380-06
EST #H103045 HMD

COUNTY OF SAN DIEGO
DEPARTMENT OF ENVIRONMENTAL HEALTH
LAND AND WATER QUALITY DIVISION
MONITORING WELL PROGRAM

SOIL BORING CONSTRUCTION PERMIT

SITE NAME: GUY HILL CADILLAC INC.

SITE ADDRESS: 4275 MISSION BAY DR., SAN DIEGO CA 92109

PERMIT FOR: **FOUR BORINGS**

PERMIT APPROVAL DATE: OCTOBER 13, 2014

PERMIT EXPIRES ON: FEBRUARY 9, 2015

RESPONSIBLE PARTY: CAMDEN

PERMIT CONDITIONS:

1. All borings must be sealed from the bottom of the boring to the ground surface with an approved sealing material as specified in California Well Standards Bulletin 74-90, Part III, Section 19.D. **Drill cuttings are not an acceptable fill material.**

2. All borings must be properly destroyed within 24 hours of drilling.

3. Placement of any sealing material at a depth greater than 30 feet must be done using the tremie method.

4. All water and soil resulting from the activities covered by this permit must be managed, stored and disposed of as specified in the SAM Manual in Section 5, E- 4. (**http://www.sdcounty.ca.gov/deh/water/sam_manual.html** In addition, drill cuttings must be properly handled and disposed in compliance with the Stormwater Best Management Practices of the local jurisdiction.

5. Within 60 days of completing work, submit a well construction report, including all well and/or boring logs and laboratory data to the Well Permit Desk. This report must include all items required by the SAM Manual, Section 5, Pages 6 & 7.

6. This office must be given 48-hour notice of any drilling activity on this site and advanced notification of drilling cancellation. Please contact the Well Permit Desk at (858) 505-6688.

NOTE: **This permit does not constitute approval of a work plan as defined in Section 2722 of Article 11 of C.C.R., Title 23. Work plans are required for all unauthorized release investigations in San Diego County.**

APPROVED BY: _____ DATE: 10.13.2014
AMELIA CESEÑA

APPENDIX B

APPENDIX B

LABORATORY TESTING

We performed laboratory tests in accordance with the current, generally accepted test methods of the American Society for Testing and Materials (ASTM) or other suggested procedures. We tested selected samples for their in-place dry density and moisture content, maximum dry density and optimum moisture content, direct shear strength, expansion index, water-soluble sulfate content, water-soluble chloride ion content, potential of hydrogen (pH) and resistivity, hydraulic conductivity, and gradation characteristics. The results of our laboratory tests are presented in Tables B-I through B-VII and Figures B-1 through B-5.

TABLE B-I
SUMMARY OF LABORATORY MAXIMUM DRY DENSITY AND OPTIMUM MOISTURE CONTENT TEST RESULTS
ASTM D 1557

Sample No.	Description	Maximum Dry Density (pcf)	Optimum Moisture Content (% dry wt.)
B4-1	Dark olive brown, Sandy CLAY (Qudf)	127.4	9.8

TABLE B-II
SUMMARY OF LABORATORY DIRECT SHEAR TEST RESULTS
ASTM D 3080

Sample No.	Depth (feet)	Geologic Unit (Soil Type)	Dry Density (pcf)	Moisture Content (%)		Unit Peak [Ultimate[1]] Cohesion (psf)	Angle of Peak [Ultimate[1]] Shear Resistance (degrees)
				Initial	Final		
B1-9	23.5–24.5	Qop (SC/CL)	117.5	16.6	16.8	920 [675]	29 [28]
B2-3	10-11	Qop (SC/CL)	119.4	14.9	16.4	1520 [1170]	26 [26]
B3-8	15-16	Qop (SM)	111.1	20.1	19.3	620 [515]	30 [27]
B4-3	10-11	Qop (CL)	115.7	15.5	17.4	650 [650]	26 [26]

[1] Ultimate at end of test at 0.2 inch deflection

TABLE B-III
SUMMARY OF LABORATORY EXPANSION INDEX TEST RESULTS
ASTM D 4829

Sample No.	Moisture Content (%)		Dry Density (pcf)	Expansion Index	CBC Expansion Classification	Soil Expansion Classification
	Before Test	After Test				
B3-6 (Qop–CL)	10.4	20.0	110.2	50	Expansive	Low
B4-1 (Qudf-CL)	9.1	16.8	114.4	28	Expansive	Low

TABLE B-IV
SUMMARY OF LABORATORY WATER-SOLUBLE SULFATE TEST RESULTS
CALIFORNIA TEST NO. 417

Sample No.	Water-Soluble Sulfate (%)	Sulfate Severity	Sulfate Class
B3-6	0.048	Not Applicable	S0
B4-1	0.006	Not Applicable	S0

TABLE B-V
SUMMARY OF LABORATORY CHLORIDE ION CONTENT TEST RESULTS
AASHTO TEST NO. T 291

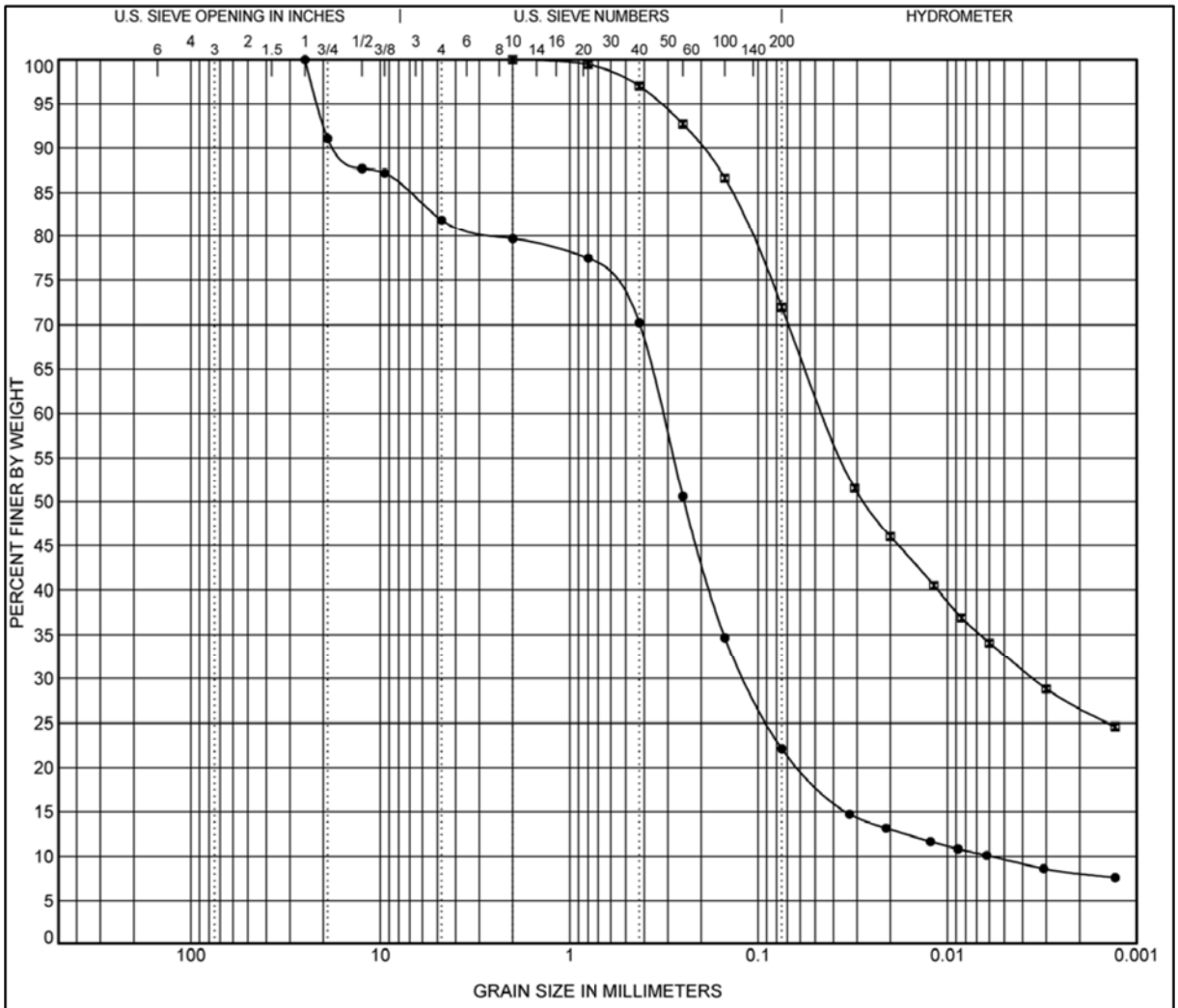
Sample No.	Chloride Ion Content, PPM (%)
B3-6	795 (0.080)
B4-1	426 (0.043)

TABLE B-VI
SUMMARY OF LABORATORY POTENTIAL OF HYDROGEN (PH) AND RESISTIVITY TEST RESULTS
CALIFORNIA TEST METHOD 643

Sample No.	pH	Minimum Resistivity (ohm-centimeters)
B3-6	7.5	450
B4-1	7.8	1,500

TABLE B-VII
SUMMARY OF LABORATORY HYDRAULIC CONDUCTIVITY RESULTS
ASTM D 5084

Sample No.	Depth (feet)	Geologic Unit	Dry Density (pcf)	Moisture Content (%)		Average Permeability at 20° C (in/hr)	Average Permeability at 20° C (cm/sec)
				Initial	Final		
B1-8	21-22	Qop	114.3	17.3	17.9	3.64E-03	2.57E-06
B2-5	14-18	Qop	119.4	14.9	16.4	3.22E-05	2.27E-08



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Sample No.	Classification	LL	PL	PI	Cc	Cu
●	B1-8 (21')	(SM) Silty SAND el and trace clay				7.04	54.5
⊠	B2-5 (17')	(ML) Sandy SILT CLAY					

	Sample No.	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B1-8 (21')	25	0.322	0.116	0.006	18.1	59.8	12.5	9.6
⊠	B2-5 (17')	2	0.045	0.004		0.0	28.0	39.3	32.7

GEOCON
INCORPORATED
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121 - 2974
PHONE 858 558-6900 - FAX 858 558-6159

GRADATION CURVE

GUY HILL PROPERTY
SAN DIEGO, CALIFORNIA

LR / AML		DSK/GTYPD	DATE 09 - 11 - 2015	PROJECT NO. G1592 - 11 - 03	FIG. B1

Ladrillono

Y:\PROJECTS\G1592-11-03 Guy Hill Property\DETAILS\Gradation Curve.dwg

SAMPLE NO.: B1-9
DEPTH OF SAMPLE 23.5'

Test Data			
Load	1 K	3 K	5 K
INITIAL			
Water Content	16.3%	17.5%	15.9%
Dry Density (pcf)	118.7	115.1	118.8
Saturation*	109.6%	105.9%	107.4%
Height (inches)	1	1	1
AFTER TEST			
Water Content	16.7%	18.2%	15.4%
Dry Density (pcf)	116.5	114.5	121.0
FAILURE			
Normal Stress (psf)	952	2084	4346
Ultimate Stress (psf)	1386	1456	3071
Peak Stress (psf)	1625	1805	3410
Rate (in/min)	0.010	0.010	0.010

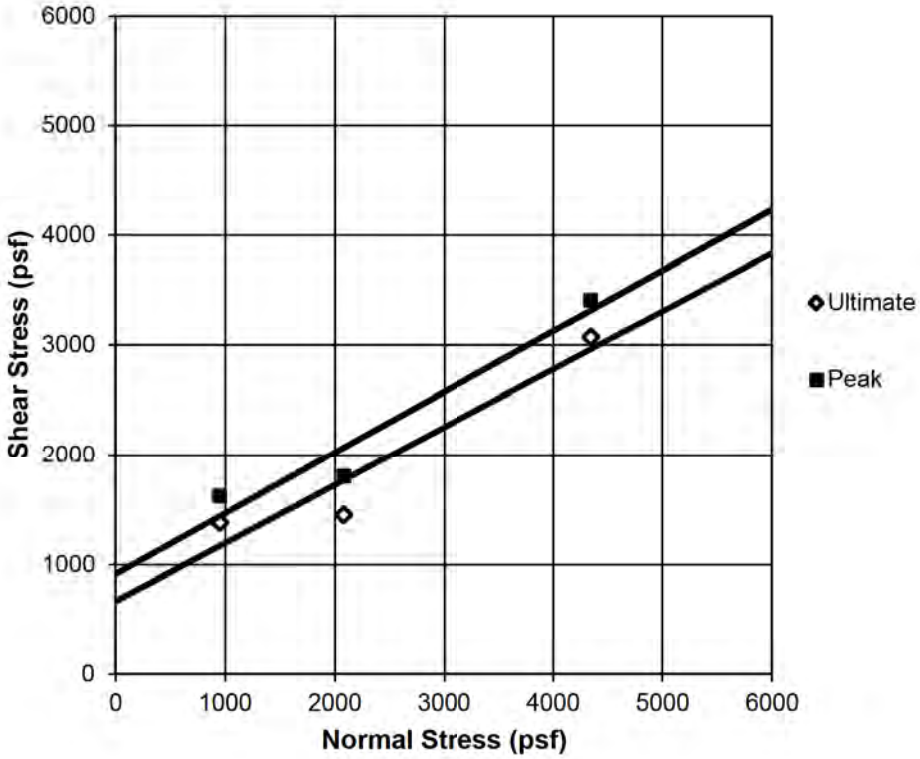
*Degree of saturation calculated with a specific gravity of 2.65

Results	
ϕ (Ultimate)	28 degrees
ϕ (Peak)	29 degrees
c (Ultimate)	675 psf
c (Peak)	920 psf

DATE: 10/21/2014
DESCRIPTION: Qop (SC/CL)

☑ Natural

☐ Remold



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SW/LR

DIRECT SHEAR TEST DATA

GUY HILL PROPERTY
4275 EAST MISSION BAY DRIVE
SAN DIEGO, CALIFORNIA

PROJECT NO. G1592-11-02 | FIG. B-2

SAMPLE NO.: B2-3
DEPTH OF SAMPLE 10'

Test Data			
Load	1 K	3 K	5 K
INITIAL			
Water Content	15.1%	15.1%	14.4%
Dry Density (pcf)	119.7	119.2	119.4
Saturation*	104.6%	103.0%	98.9%
Height (inches)	1	1	1
AFTER TEST			
Water Content	17.0%	16.4%	15.9%
Dry Density (pcf)	113.8	115.7	120.6
FAILURE			
Normal Stress (psf)	952	2084	4346
Ultimate Stress (psf)	1436	2533	3240
Peak Stress (psf)	1645	2852	3250
Rate (in/min)	0.010	0.010	0.010

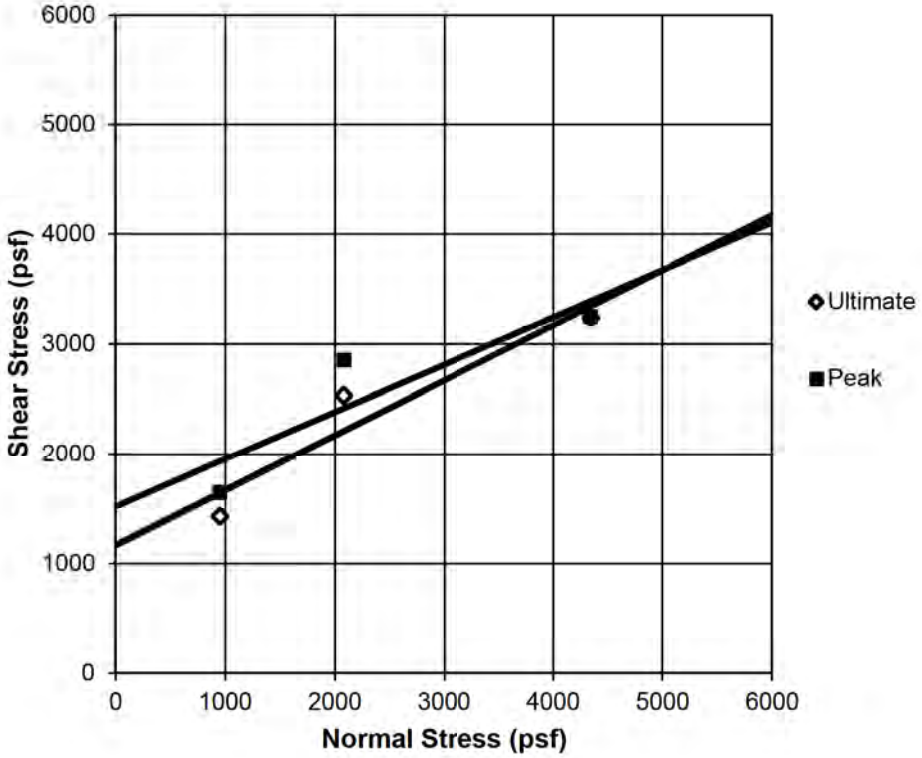
*Degree of saturation calculated with a specific gravity of 2.65

Results	
ϕ (Ultimate)	26 degrees
ϕ (Peak)	26 degrees
c (Ultimate)	1170 psf
c (Peak)	1520 psf

DATE: 10/21/2014
DESCRIPTION: Qop (SC/CL)

☑ Natural

☐ Remold



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SW/LR

DIRECT SHEAR TEST DATA

GUY HILL PROPERTY
4275 EAST MISSION BAY DRIVE
SAN DIEGO, CALIFORNIA

PROJECT NO. G1592-11-02 | FIG. B-3

SAMPLE NO.: B3-8
DEPTH OF SAMPLE 15'

Test Data			
Load	1 K	3 K	5 K
INITIAL			
Water Content	20.0%	19.8%	20.4%
Dry Density (pcf)	111.6	112.5	109.2
Saturation*	109.7%	111.5%	105.0%
Height (inches)	1	1	1
AFTER TEST			
Water Content	19.7%	18.7%	19.5%
Dry Density (pcf)	111.3	112.4	111.5
FAILURE			
Normal Stress (psf)	952	2084	4346
Ultimate Stress (psf)	917	1705	2692
Peak Stress (psf)	1037	2024	3071
Rate (in/min)	0.010	0.010	0.010

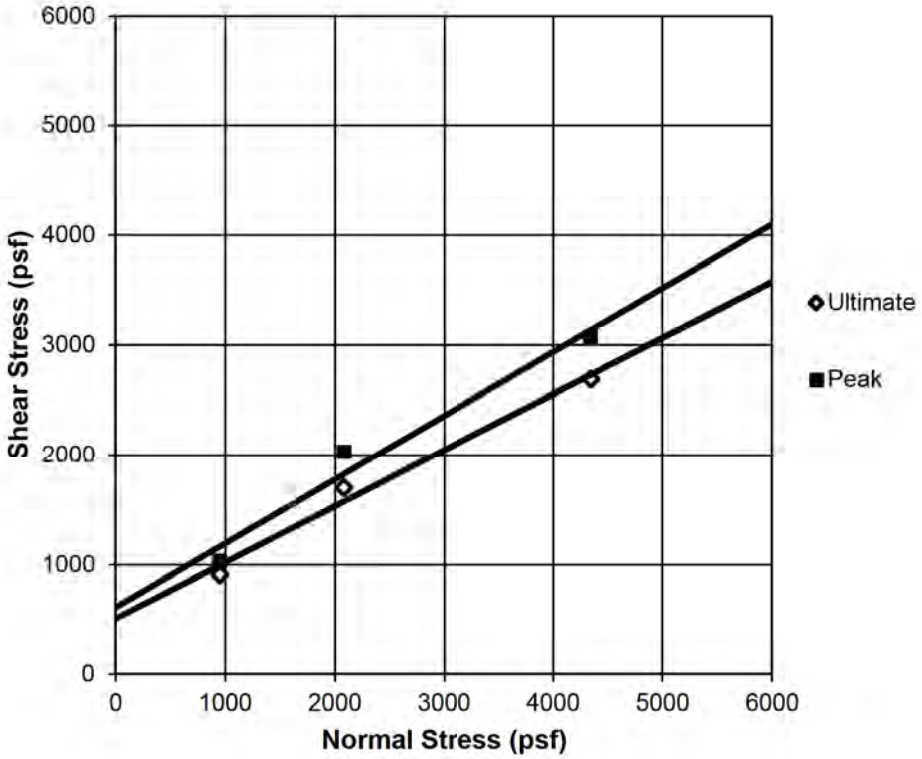
*Degree of saturation calculated with a specific gravity of 2.65

Results	
ϕ (Ultimate)	27 degrees
ϕ (Peak)	30 degrees
c (Ultimate)	515 psf
c (Peak)	620 psf

DATE: 10/21/2014
DESCRIPTION: Qop (SM)

☑ Natural

☐ Remold



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SW/LR

DIRECT SHEAR TEST DATA

GUY HILL PROPERTY
4275 EAST MISSION BAY DRIVE
SAN DIEGO, CALIFORNIA

PROJECT NO. G1592-11-02 | FIG. B-4

SAMPLE NO.: B4-3
DEPTH OF SAMPLE 10'

Test Data			
Load	1 K	3 K	5 K
INITIAL			
Water Content	15.6%	15.4%	15.5%
Dry Density (pcf)	115.0	117.6	114.4
Saturation*	94.4%	99.9%	91.9%
Height (inches)	1	1	1
AFTER TEST			
Water Content	17.5%	17.2%	17.4%
Dry Density (pcf)	113.2	117.5	115.9
FAILURE			
Normal Stress (psf)	952	2084	4346
Ultimate Stress (psf)	1147	1615	2772
Peak Stress (psf)	1147	1615	2772
Rate (in/min)	0.010	0.010	0.010

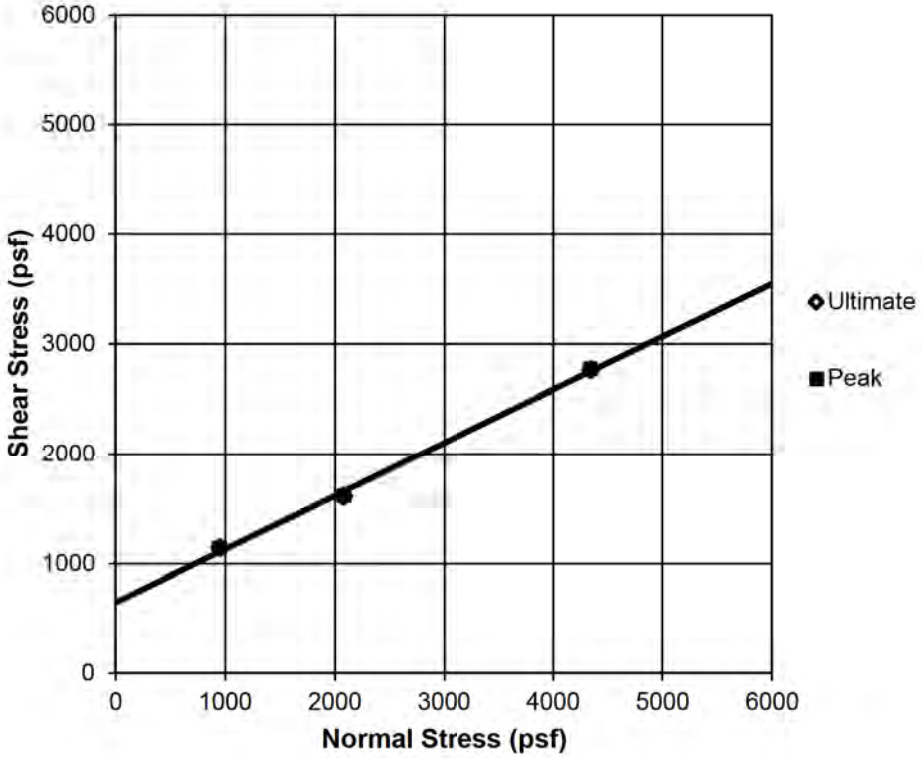
*Degree of saturation calculated with a specific gravity of 2.65

Results	
ϕ (Ultimate)	26 degrees
ϕ (Peak)	26 degrees
c (Ultimate)	650 psf
c (Peak)	650 psf

DATE: 10/21/2014
DESCRIPTION: Qop (CL)

☑ Natural

☐ Remold



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SW/LR

DIRECT SHEAR TEST DATA

GUY HILL PROPERTY
4275 EAST MISSION BAY DRIVE
SAN DIEGO, CALIFORNIA

PROJECT NO. G1592-11-02 | FIG. B-5

APPENDIX C

APPENDIX C

LOGS OF EXPLORATORY EXCAVATIONS AND LABORATORY DATA

FROM PREVIOUS GEOTECHNICAL INVESTIGATION:

GEOTECHNICAL INVESTIGATION, GUY HILL AUTOMOBILE DEALERSHIP, 4275 EAST MISSION BAY DRIVE, SAN DIEGO, CALIFORNIA, **PREPARED BY GEOCON INC.**
DATED JANUARY 7, 2004

FOR

GUY HILL PROPERTY
4275 MISSION BAY DRIVE
SAN DIEGO, CALIFORNIA

PROJECT NO. G1592-11-03

PROJECT NO. 07210-22-01

BORING B 1

ELEV. (MSL.) 23' MSL DATE COMPLETED 12-06-2003

EQUIPMENT 8 INCH HOLLOW STEM AUGER

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B1-3			SM-ML	**UNDOCUMENTED FILL** Loose to medium dense, olive brown SILT, to fine to medium SAND, with some GRAVEL			
2	B1-1			SM-ML	**BAY POINT FORMATION** Medium dense, moist, olive brown, Sandy SILT to very fine SAND; pinhole porosity	49	117.0	15.2
4								
6	B1-2					52	116.5	14.8
8				CL-ML	Very stiff to hard, moist, dark brown to dark olive brown, fine Sandy CLAY to Clayey SILT; some medium to coarse sand			
10	B1-4					46	112.4	15.4
12				ML	Medium dense, moist, olive to grayish brown, fine Sandy SILT; mottled coloration, some iron and manganese oxide staining			
14								
16	B1-5				- Thin layer of very moist, Silty SAND	33	111.5	17.2
18				CL	Very stiff, moist, dark grayish to olive brown, Silty CLAY, with fine SAND			

BORING TERMINATED AT 19.9 FEET
No groundwater encountered
Backfilled on 12-06-2003

Figure A-1,
Log of Boring B 1, Page 1 of 1

07210-22-01.GPJ

SAMPLE SYMBOLS

- SAMPLING UNSUCCESSFUL
- STANDARD PENETRATION TEST
- DRIVE SAMPLE (UNDISTURBED)
- DISTURBED OR BAG SAMPLE
- CHUNK SAMPLE
- WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 07210-22-01

BORING B 2

ELEV. (MSL.) 23' MSL DATE COMPLETED 12-06-2003

EQUIPMENT 8 INCH HOLLOW STEM AUGER

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0								
2	B2-1			SM-ML	**UNDOCUMENTED FILL** Loose, moist, olive brown, SILT to fine to medium SAND; some scattered gravel	18	111.7	14.4
4					**BAY POINT FORMATION** Medium dense, damp, brown to olive gray, fine to medium Sandy SILT			
6	B2-2			ML		19		
8				CL-ML	Stiff to hard, moist, dark brown to mottled dark olive brown, fine, Sandy, Silty CLAY to Clayey SILT; trace gravel, some manganese oxide and carbonate mineralization			
10	B2-3			ML	Medium dense, moist, olive to reddish brown, fine Sandy SILT, with CLAY	17		
12								
14				CL	Very stiff to hard, moist, dark grayish brown to dark olive gray, Silty CLAY; thinly laminated, iron oxide staining			
16	B2-4			SM-ML	Dense, moist, olive to slightly reddish brown, fine, Silty SAND to Sandy SILT; iron and manganese oxide staining	56	118.0	14.8
18				CL	Very stiff, moist, dark brown, Silty CLAY; fine laminations - Increasingly moist; locally soft - Minor seepage			
					BORING TERMINATED AT 19.9 FEET Minor seepage at 19 feet Backfilled on 12-06-2003			

Figure A-2,
Log of Boring B 2, Page 1 of 1

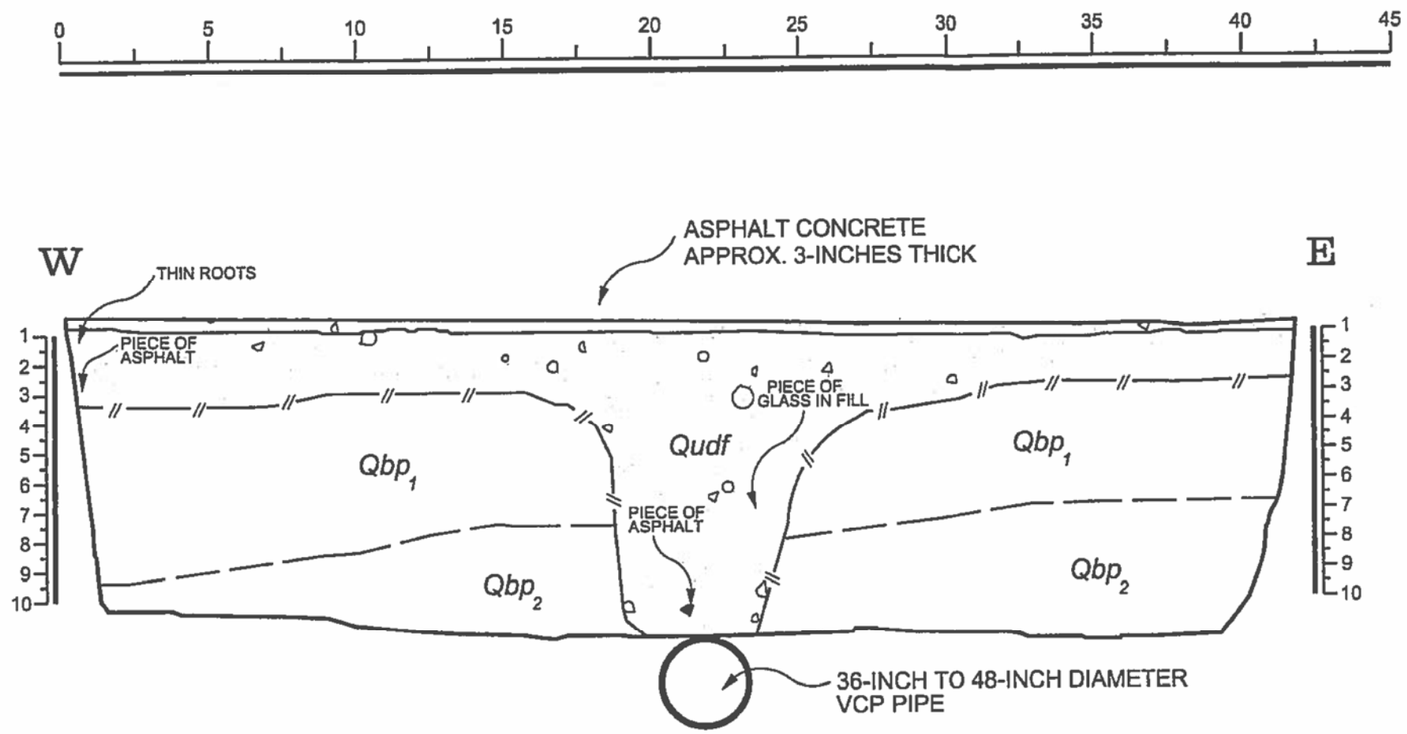
07210-22-01.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◧ ... STANDARD PENETRATION TEST
- ◪ ... CHUNK SAMPLE
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GUY HILL AUTOMOBILE DEALERSHIP
4275 EAST MISSION BAY DRIVE
SAN DIEGO, CALIFORNIA



GEOCON LEGEND

UNDOCUMENTED FILL *Qudf*

Loose to medium dense, moist, dark grayish to dark olive and reddish brown, Silty and Clayey, fine to medium SAND and Sandy to Clayey SILT; scattered pieces of glass and asphalt, appears moderately well compacted, occurs as thin, relatively uniform layer 2 - 3 feet thick; between approx. 18 to 26 feet occurs as trench backfill to full depth of trench, thin roots in upper foot at west end of trench, gravel to small cobbles scattered throughout

BAY POINT FORMATION *Qbp*

Qbp_1 Medium dense to dense, damp to moist, brown to light olive and reddish brown, Silty fine SAND to Sandy SILT; pinhole porosity throughout, some medium to coarse sand grains, massive and relatively uniform, very weakly cemented, locally contains somewhat blocky texture

Qbp_2 Dense to hard, moist, dark grayish brown, very fine, Sandy SILT to Silty CLAY; weakly laminated, locally mottled with olive to reddish brown, some pinhole porosity; unit occurs as continuous layer with gradational upper contact, thickens towards the east

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PROJECT NO. 07210 - 22 - 01
FIGURE A-3
DATE 01-07-2004

FAULT TRENCH T - 1

APPENDIX B

LABORATORY TESTING

Laboratory tests were performed in accordance with generally accepted test methods of the American Society for Testing and Materials (ASTM) or other suggested procedures. Selected soil samples were tested for their in-place dry density and moisture content, maximum dry density and optimum moisture content, shear strength, expansion, pH and resistivity, and water-soluble sulfate characteristics.

The results of our laboratory tests are presented on Tables B-I through B-V. The in-place dry density and moisture content results are indicated on the exploratory boring logs.

TABLE B-I
SUMMARY OF LABORATORY MAXIMUM DRY DENSITY AND OPTIMUM MOISTURE CONTENT TEST RESULTS ASTM D 1557-00

Sample No.	Description	Maximum Dry Density (pcf)	Optimum Moisture Content (% dry wt.)
B1-3	Dark brown, Clayey, SAND with trace gravel	128.4	9.5

TABLE B-II
SUMMARY OF LABORATORY DIRECT SHEAR TEST RESULTS ASTM D 3080-98

Sample No.	Dry Density (pcf)	Moisture Content (%)	Unit Cohesion (psf)	Angle of Shear Resistance (degrees)
B1-1	117.0	15.2	693	40
B2-1	111.7	14.4	619	32

TABLE B-III
SUMMARY OF LABORATORY EXPANSION INDEX TEST RESULTS
ASTM D 4829-95

Sample No.	Moisture Content		Dry Density (pcf)	Expansion Index
	Before Test (%)	After Test (%)		
B1-4	10.4	16.9	110.4	16

TABLE B-IV
SUMMARY OF LABORATORY WATER-SOLUBLE SULFATE TEST RESULTS
CALIFORNIA TEST NO. 417

Sample No.	Water-Soluble Sulfate (%)	Classification
B1-3	0.038	Negligible

TABLE B-V
SUMMARY OF LABORATORY POTENTIAL OF HYDROGEN (pH) AND RESISTIVITY TEST RESULTS
CALIFORNIA TEST NO. 643

Sample No.	pH	Resistivity (ohm-centimeters)	Corrosive Rating
B1-3	7.8	1690	Severely Corrosive

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DRAINAGE STUDY
FOR
Jefferson Pacific Beach

PTS No. 327976, I.O. No. 24003849
February 19, 2016

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3/3/2016
Date

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EXHIBIT "B" – Existing Condition Drainage Basin Map
EXHIBIT "C" – Existing Condition SSA Analysis Results
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EXHIBIT "E" – Proposed Condition SSA Analysis

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APPENDIX IV – Rainfall Intensity-Duration-Frequency Curves: City of San Diego Drainage Design Manual
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Drainage Study
Jefferson Pacific Beach
February 19, 2016

Purpose

The purpose of this drainage study is to estimate the quantity of storm water runoff from the proposed development of the Jefferson Pacific Beach site, determine sizing of proposed storm drains, and confirm adequacy of existing storm drains. All water quality analysis will be accomplished in the SWQMP for this proposed development.

Project Location

The proposed project is located in Pacific Beach, which falls under the Miramar Hydrologic Area (Hydrologic Sub-area 906.40) of the Peñasquitos Hydrologic unit. The project site is on the southeast corner of the intersection of Mission Bay Dr. & Rosewood St. just southwest of interstate 5, in the City of San Diego (see Exhibit A).

Project Description

The project proposes a two level subterranean parking structure with a total of 365 covered spaces provided. Along with three two-story commercial retail buildings totaling 19,000 s.f. and four four-story residential multifamily buildings constructed on the garage podium. An additional building containing 3 townhome units is provided on the northeast corner of the project which provides a total of 171 multifamily units.

Method of Calculation

This study calculates the total runoff from the site using the guidelines set forth in the City of San Diego's Drainage Design Manual, dated April 1984 (see Appendix II – Design Runoff: City of San Diego Drainage Design Manual). The specific method used is the Rational Formula for watersheds under 0.5 square miles(see Appendix I – Rational Method: City of San Diego Drainage Design Manual). A 100 year storm event was used for the analysis. Per the City of San Diego Drainage Design Manual, for tributary areas less than one square mile the storm drain system shall be designed so that the combination of storm drain system capacity and overflow will be able to carry the 100-year frequency storm without damage to or flooding of adjacent existing buildings or potential building sites, and Type D soil shall be used for all areas (see Appendix III– Runoff Coefficients: City of San Diego Drainage Design Manual).

Autodesk Storm and Sanitary Analysis was used for the storm analysis. Autodesk Storm and Sanitary Analysis is a link-node based model that performs hydrology, hydraulic, and water quality analysis of storm water and wastewater drainage systems, including sewage treatment plants and water quality control devices. A link represents a hydraulic element (i.e., a pipe, channel, pump, standpipe, culvert, or weir) that transports flow and constituents. A node can represent the junction of two or more links, a storm drain catch basin inlet, the location of a flow or pollutant input into the system, or a storage element (such as a detention pond, retention pond, settling pond, or lake).

Drainage basin boundaries, flow patterns, and topographic elevations are shown on the drainage basin maps located in the map pockets (see Exhibit B – Existing Condition Drainage Basin Map & Exhibit D – Proposed Condition Basin Map).

Existing Condition

The project site located at 4275 Mission Bay Dr. San Diego, CA 92109 is currently a previously developed car dealership with associated buildings, service bays and parking lots on a 2.9 acre site designated by APNs 424-380-06, 424-380-07 & 424-362-24. The site is bound by Rosewood St. and Del Rey St. to the

north and northwest, Mission Bay Dr. to the southwest and Interstate 5 to the east and southeast. All of the surrounding parcels are developed primarily as multifamily housing.

A total of six sub-basins with three outfalls were analyzed. The sub-basin summary below describes each of the sub-basins and Exhibit B – Existing Condition Drainage Basin Map shows the basin boundaries.

Per the City of San Diego Drainage Design Manual, a developed condition runoff coefficient of 0.95 was chosen for this analysis, which corresponds to a site use for high-density industrial developments.

Sub-basin A:
This area is an onsite basin consisting of a paved storage lot and a small fill slope along the Caltrans right of way. Drainage from this basin surface flows via gutter to the existing curb inlet located at the north west corner of the project site. A 'C' factor of .95 was used for this basin.

Sub-basin B:
This area is a basin consisting of the landscaped area onsite fronting Rosewood Street and a portion of Rosewood Street itself. Drainage from this basin surface flows via gutter to the existing curb inlet located at the north west corner of the project site. A 'C' factor of .95 was used for this basin.

Sub-basin C:
This area is an onsite basin consisting of a paved storage lot and a portion of the onsite buildings. Drainage from this basin surface flows to an existing onsite grate inlet connected to an existing 54" RCP located in Rosewood Street. A 'C' factor of .95 was used for this basin.

Sub-basin D:
This area is an onsite basin consisting of a paved parking lot and a portion of the onsite buildings. Drainage from this basin surface flows via gutter where it joins the flows from basin F on the south east corner of the project site adjacent to the I-5 off-ramp. A 'C' factor of .95 was used for this basin.

Sub-basin E:
This area is an offsite basin consisting of Mission Bay Dr between the project site and the I-5 off ramp. Drainage from this basin surface flows to the gutter where along the south east corner of the project site. A 'C' factor of .95 was used for this basin.

Sub-basin F:
This area is an onsite basin consisting of a paved parking lot and the remaining portion of the onsite building. Drainage from this basin surface flows off the parking lot edge and down the existing slope before entering the gutter the south east corner of the project site adjacent to the I-5 off-ramp. A 'C' factor of .95 was used for this basin.

Time of Concentration calculations for each subbasin are tabulated below:

Basin	Acres	C	Length (ft)	Upper Elev. (ft)	Lower Elev. (ft)	Slope (%)	Tc (min)
A	0.2	0.95	150	31	25	4.0%	2.1
B	0.3	0.95	275	25	13.5	4.2%	2.8
C	1.3	0.95	260	31	23	3.1%	3.0
D	1.3	0.95	255	21	15	2.4%	3.2
E	0.6	0.95	320	15	12	0.9%	4.9
F	0.3	0.95	125	24	21	2.4%	2.3

Since all sub-basins have a time of concentration less than 5 minutes, a minimum time of concentration of 5 minutes was used. Intensity values were determined using the City of San Diego Drainage Design Manual Rainfall Intensity Duration Frequency Curves (see Appendix IV).

These flows and the storm drain system we're placed in SSA for analysis. No existing flows are available for any of the adjacent pipe segments, so this analysis will be focused on the comparison of the existing to proposed runoff total. Results from the analysis can be found in Exhibit C-Existing Condition SSA Analysis Results.

The results of the analysis are included as Exhibit C. The peak runoffs discharged from each of the existing outfalls are:

- Out-01 = 8.27 cfs
- Out-02 = 1.42 cfs
- Out-03 = 5.15 cfs
- Total = 14.84 cfs

Proposed Condition

The proposed condition analysis analyzes four basins as shown on Exhibit D-Proposed Condition Basin Map. This drainage study will assume a flow through condition on all Water Quality treatment utilizing the main bypass for sizing of the storm drain pipes, the individual treatment will be discussed in the SWQMP for this project.

Per the City of San Diego Drainage Design Manual, a developed condition runoff coefficient of 0.70 was chosen for this analysis, which corresponds to a multi-family residential use. This runoff coefficient was utilized for all onsite basins. For off-site basin areas the same runoff coefficients as the existing condition were used.

For all sub-basins within the site the time of concentration is assumed to be less than 5 minutes due to onsite area drains and roof drains, so the minimum time of concentration of 5 minutes was used. Intensity values were determined using the City of San Diego Drainage Design Manual Rainfall Intensity Duration Frequency Curves (see Appendix IV).

Runoff calculations for each sub-basin are tabulated below:

Basin	Acres	C	Length (ft)	Upper Elev. (ft)	Lower Elev. (ft)	Slope (%)	Tc (min)
A	0.1	0.45	52	38	30	15.4%	3.4
B	0.4	0.95	275	25	13.5	4.2%	2.8
C	2.9	0.70	N/A	N/A	N/A	N/A	N/A
D	0.7	0.95	320	15	12	0.9%	4.9

There are three total outfall locations in the proposed condition. Outfall one and two are the same as in the existing condition. Outfall three is where all site runoff will be plumbed to an existing 60" RCP with an outfall to Mission Bay. Results from the analysis can be found in Exhibit E-Proposed Condition SSA Analysis Results.

The results of the analysis are included as Exhibit E. The peak runoffs discharged from each of the proposed outfalls are:

- Out-01 = 2.79 cfs
- Out-02 = 1.23 cfs
- Out-03 = 8.37 cfs
- Total = 12.39 cfs

Conclusions

As compared to the existing condition, the proposed project decreases the peak runoff from the site. This is due to there being a decreased site imperviousness with the revised proposed use. The peak flow is reduced from 14.84 cfs existing to 12.39 cfs proposed, a reduction of 2.45 cfs. Since the total site runoff is reduced in the proposed condition, no further downstream analysis is required.

The proposed storm drains will be sized as indicated in the Autodesk Storm and Sanitary Analysis results to provide adequate capacity.

The project discharge point is a connection to an existing storm drain system which will be compliant with the City of San Diego's current storm water standards manual, as regulated by the MS4 permit. The connection point is downstream of any nearby potential jurisdictional waters of the US, and as such there is no need for any 401/404 permits for the project.

EXHIBIT “A” – Location Map

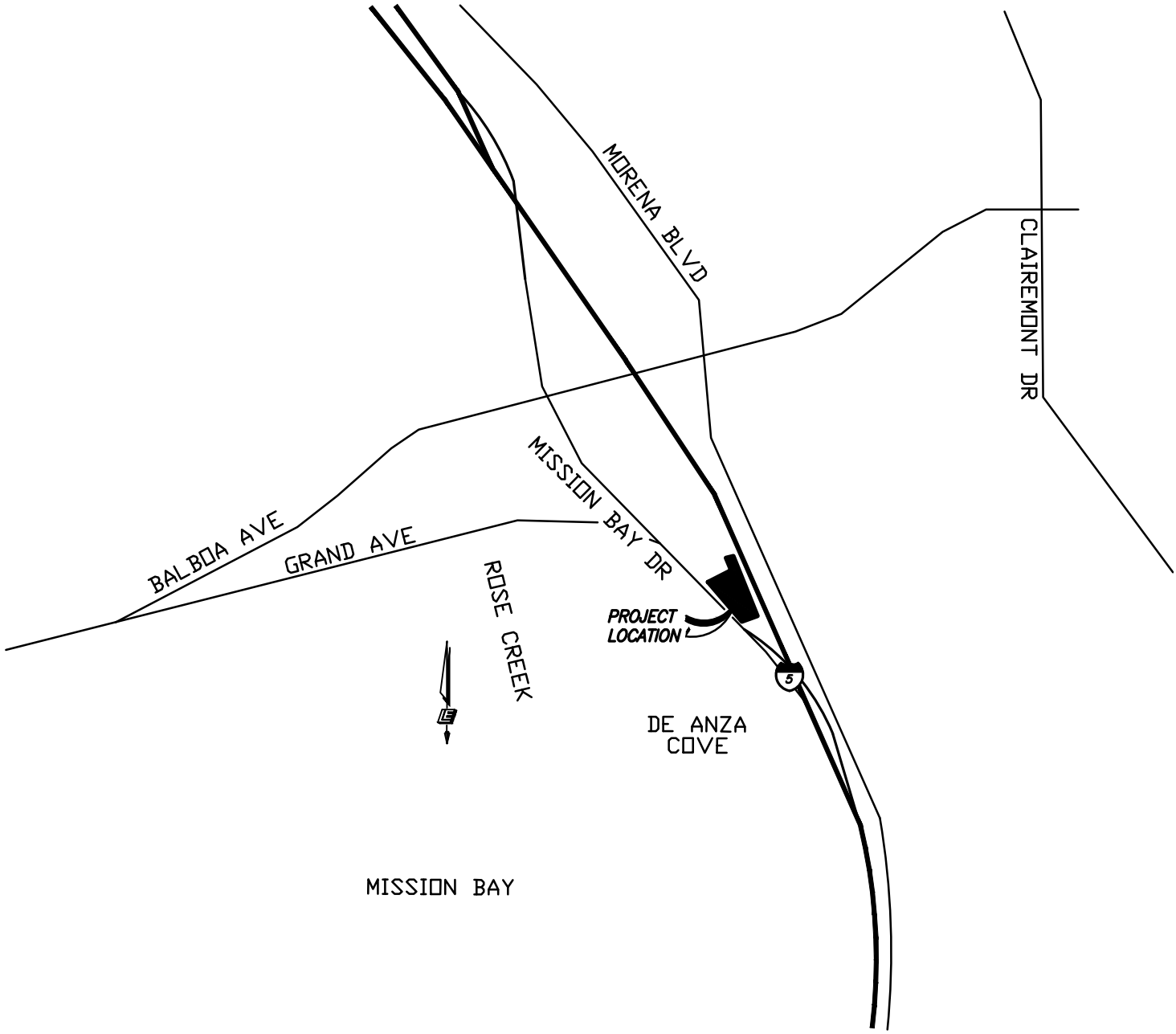

MORENA BLVD
CLAIREMONT DR
MISSION BAY DR
BALBOA AVE
GRAND AVE
ROSE CREEK
PROJECT LOCATION
5
DE ANZA COVE
MISSION BAY

EXHIBIT “B” – Existing Condition Drainage Basin Map

ASSESSOR'S PARCEL NUMBER:

424-380-06, 424-380-07 & 424-362-24

LEGAL DESCRIPTION

PARCEL 1:

LOT 1 OF VISTA DE ANZA, IN THE CITY OF SAN DIEGO, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 5881, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, MAY 9, 1967, TOGETHER WITH THAT PORTION OF THE SOUTHERLY 25.00 FEET OF ROSEWOOD, ADJOINING SAID LOT 1 ON NORTHWEST, AS VACATED AND CLOSED TO PUBLIC USED BY RESOLUTION NO. 193278, RECORDED MARCH 29, 1968 AS INSTRUMENT NO. 52879, OF OFFICIAL RECORDS.

PARCEL 2:

THAT PORTION OF MARINE TERRACE, ACCORDING TO MAP THEREOF NO. 1477, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, OCTOBER 7, 1912 AND THAT PORTION OF LOT 1 OF EUREKA LEMON TRACT, IN THE CITY OF SAN DIEGO, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 753, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, MAY 19, 1893, DESCRIBED AS FOLLOWS:

BEGINNING AT THE MOST NORTHERLY CORNER OF SAID LOT 1; THENCE ALONG THE FOLLOWING NUMBERED COURSES: -1- ALONG THE NORTHWESTERLY LINE OF SAID LOT 1, SOUTH 62°41'45" WEST210 28 FEET BEING ALSO ALONG THE SOUTHEASTERLY LINE OF ROSEWOOD STREET, AS SHOWN ON THE MAP NO. 964 OF STEPHEN'S ADDITION FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, NOVEMBER 9, 1905, -2- LEAVING SAID NORTHWESTERLY LINE OF SAID LOT 1, SOUTH 14°56'38" EAST, 235.58 FEET TO THE TRUE POINT OF BEGINNING; -3- CONTINUING ALONG LAST SAID COURSE, SOUTH 14°56'38" EAST 263.32 FEET; -4- SOUTH 73°03'05" WEST 108 FEET; -5- NORTH 59°27'01" WEST 123.63 FEET TO A POINT ON THE NORTHEASTERLY LINE OF PACIFIC HIGHWAY DISTANT THEREON SOUTH 45°20'10" EAST 382 FEET FROM THE INTERSECTION OF SAID NORTHEASTERLY LINE OF PACIFIC HIGHWAY, WITH SAID SOUTHEASTERLY LINE OF ROSEWOOD STREET; -6- ALONG SAID NORTHEASTERLY LINE OF PACIFIC HIGHWAY, NORTH 45°20'10" WEST 140 FEET; THENCE LEAVING SAID NORTHEASTERLY LINE OF PACIFIC HIGHWAY, NORTH 62°41'45" EAST 271.72 FEET TO THE TRUE POINT OF BEGINNING.

NOTE: SAID LAND IS NOW SHOWN ON PARCEL MAP NO. 1172, FILED IN THE RECORDERS OFFICE OF SAN DIEGO COUNTY ON 12-18-72.

PARCEL 3:

LOTS 21 AND 22, BLOCK 6 STEPHEN'S ADDITION, ACCORDING TO MAP THEREOF NO. 964, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, NOVEMBER 9, 1905 TOGETHER WITH THAT PORTION OF FORMER ROSEWOOD STREET, NOW VACATED AND CLOSED TO PUBLIC USE, AS WOULD REVERT TO SAID PROPERTY BY OPERATION OF LAW.

EXCEPTING THEREFROM THOSE PORTIONS THEREOF DESCRIBED IN DEEDS TO THE STATE OF CALIFORNIA RECORDED DECEMBER 18, 1952 IN BOOK 4690, PAGE 374, OF OFFICIAL RECORDS AND FEBRUARY 15 1966 AS INSTRUMENT NO. 26568, OF OFFICIAL RECORDS OF SAID SAN DIEGO COUNTY.

NOTE: SAID LAND IS NOW SHOWN AS PARCEL "C" OF PARCEL MAP NO. 1958, FILED IN THE RECORDERS OFFICE OF SAN DIEGO COUNTY ON 10-04-73.

LEGEND

PROPERTY BOUNDARY

STORM DRAIN

BASIN / AREA — ZZ / 0.00 AC.

NODE NO. — #

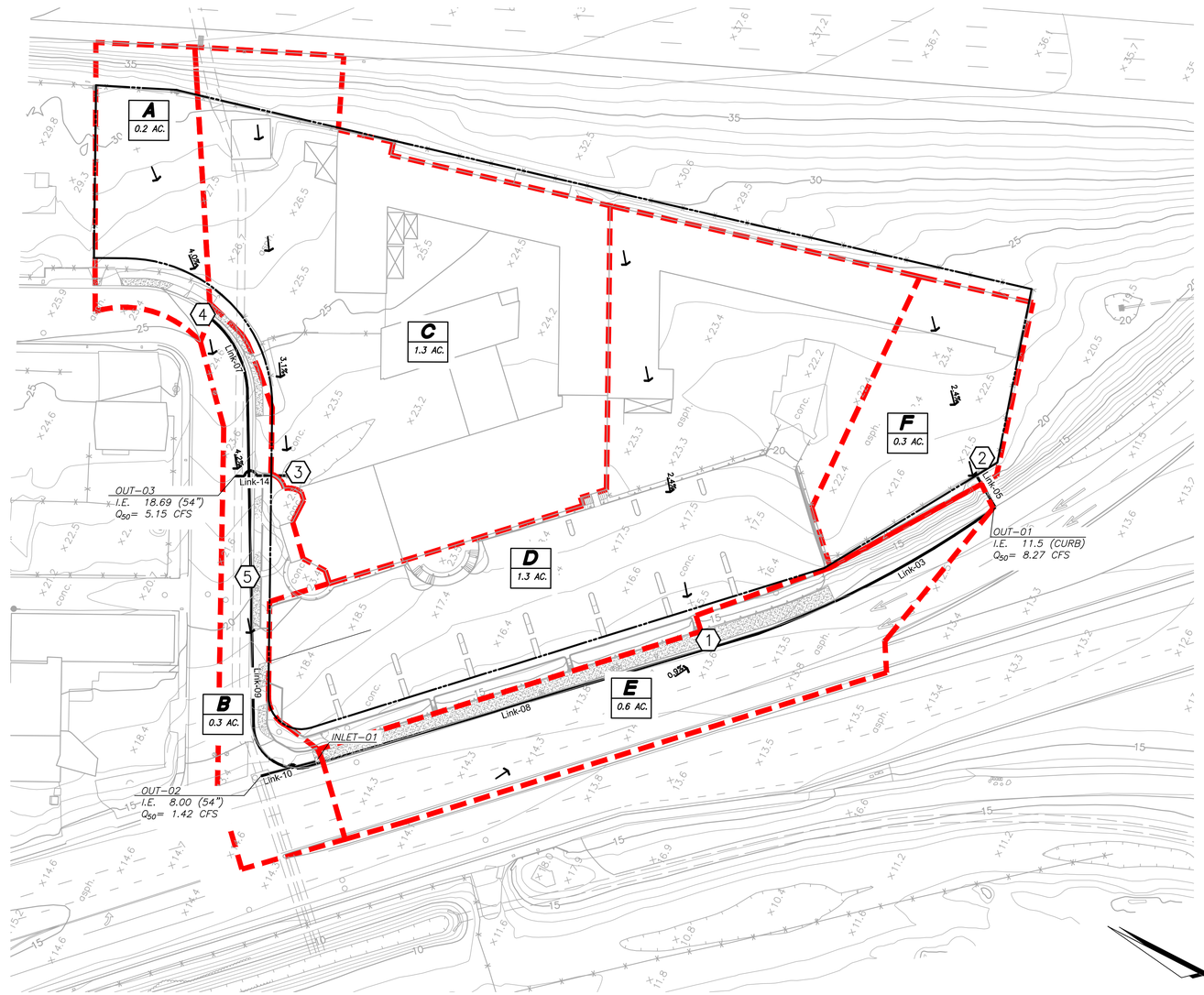
BASIN LIMITS

CURB INLET

CLEANOUT

GRATE INLET

OVERLAND FLOW — 1%



Jefferson Pacific Beach Existing Condition Hydrology Summary

Basin	SF	Acres	C	Length (ft)	Upper Elev. (ft)	Lower Elev. (ft)	Slope (%)	Tc (min)	Intensity (in/hr)	Q_{50} (cfs)
A	10843	0.2	0.95	150	31	25	4.0%	2.1	4.20	0.80
B	13892	0.3	0.95	275	25	13.5	4.2%	2.8	4.20	1.20
C	56347	1.3	0.95	260	31	23	3.1%	3.0	4.20	5.19
D	54933	1.3	0.95	255	21	15	2.4%	3.2	4.20	5.19
E	24630	0.6	0.95	320	15	12	0.9%	4.9	4.20	2.39
F	13281	0.3	0.95	125	24	21	2.4%	2.3	4.20	1.20

NO.	DATE	BY	DESCRIPTION
6			
5			
4			
3			
2	11/30/2015	MFD	CLIENT REVISIONS
1	09/15/2015	MFD	ORIGINAL

NO.	DATE	BY	DESCRIPTION
12			
11			
10			
9			
8			
7			

Leppert Engineering CORPORATION
5190 Governor Drive, Suite 205, San Diego, Ca. 92122-2848
Phone: (858) 597-2001 Fax: (858) 597-2009

APPROVED BY ENGINEER OF WORK — REGISTRATION R C E 26283

FILE CODE PB 39.01-22.15 — DATE

PREPARATION AND REVISION LOG

JEFFERSON PACIFIC BEACH
EXISTING DRAINAGE MAP

EXHIBIT “C” – Existing Condition SSA Analysis Results

Project Description

File Name	SSA Analysis - Existing.SPF

Project Options

Flow Units	CFS
Elevation Type	Elevation
Hydrology Method	Rational
Time of Concentration (TOC) Method	User-Defined
Link Routing Method	Kinematic Wave
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	NO

Analysis Options

Start Analysis On	Sep 04, 2015	00:00:00
End Analysis On	Sep 05, 2015	00:00:00
Start Reporting On	Sep 04, 2015	00:00:00
Antecedent Dry Days	0	days
Runoff (Dry Weather) Time Step	0 01:00:00	days hh:mm:ss
Runoff (Wet Weather) Time Step	0 00:05:00	days hh:mm:ss
Reporting Time Step	0 00:05:00	days hh:mm:ss
Routing Time Step	30	seconds

Number of Elements

	Qty
Rain Gages	0
Subbasins	6
Nodes	9
Junctions	5
Outfalls	3
Flow Diversions	0
Inlets	1
Storage Nodes	0
Links	7
Channels	5
Pipes	2
Pumps	0
Orifices	0
Weirs	0
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

Return Period	50 year(s)

Subbasin Summary

SN	Subbasin ID	Area (ac)	Weighted Runoff Coefficient	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	A	0.20	0.9500	0.35	0.33	0.07	0.80	0 00:05:00
2	B	0.30	0.9500	0.35	0.33	0.10	1.20	0 00:05:00
3	C	1.30	0.9500	0.35	0.33	0.43	5.19	0 00:05:00
4	D	1.30	0.9500	0.35	0.33	0.43	5.19	0 00:05:00
5	E	0.60	0.9500	0.35	0.33	0.20	2.39	0 00:05:00
6	F	0.30	0.9500	0.35	0.33	0.10	1.20	0 00:05:00

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft²)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	Jun-01	Junction	12.50	13.00	0.00	0.00	0.00	7.58	13.82	0.00	0.18	0 00:00	0.00	0.00
2	Jun-02	Junction	20.50	21.00	0.00	0.00	0.00	1.20	20.55	0.00	0.95	0 00:00	0.00	0.00
3	Jun-03	Junction	20.00	22.50	0.00	0.00	0.00	5.19	20.61	0.00	1.89	0 00:00	0.00	0.00
4	Jun-04	Junction	25.00	25.50	0.00	0.00	0.00	0.80	25.06	0.00	0.44	0 00:00	0.00	0.00
5	Jun-05	Junction	20.00	20.50	0.00	0.00	0.00	0.71	20.06	0.00	0.44	0 00:00	0.00	0.00
6	Out-01	Outfall	11.50					8.27	11.81					
7	Out-02	Outfall	8.00					1.42	10.98					
8	Out-03	Outfall	18.69					5.15	19.30					

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Reported Condition
1	Link-10	Pipe	Inlet-01	Out-02	40.00	10.90	10.50	1.0000	18.000	0.0210	1.42	6.50	0.22	2.95	0.48	0.32	0.00	Calculated
2	Link-14	Pipe	Jun-03	Out-03	29.00	20.00	18.69	4.5200	12.000	0.0130	5.15	7.57	0.68	10.37	0.61	0.61	0.00	Calculated
3	Link-03	Channel	Jun-01	Out-01	160.00	13.50	11.50	1.2500	6.000	0.0320	7.18	15.35	0.47	2.48	0.31	0.62	0.00	
4	Link-05	Channel	Jun-02	Out-01	25.00	20.50	11.50	36.0000	12.000	0.0300	1.18	178.22	0.01	3.98	0.05	0.05	0.00	
5	Link-07	Channel	Jun-04	Jun-05	157.40	25.00	20.00	3.1800	6.000	0.0320	0.71	23.09	0.03	1.89	0.06	0.11	0.00	
6	Link-08	Channel	Inlet-01	Jun-01	275.65	13.40	12.50	0.3300	6.000	0.0320	0.09	9.23	0.01	0.62	0.02	0.04	0.00	
7	Link-09	Channel	Jun-05	Inlet-01	132.00	20.00	13.00	5.3000	6.000	0.0320	0.68	29.83	0.02	1.44	0.05	0.10	0.00	

Inlet Summary

SN	Element ID	Inlet Manufacturer	Manufacturer Part Number	Inlet Location	Number of Inlets	Catchbasin Invert Elevation (ft)	Max (Rim) Elevation (ft)	Initial Water Elevation (ft)	Ponded Area (ft^2)	Peak Flow (cfs)	Peak Flow Intercepted by Inlet (cfs)	Peak Flow Bypassing Inlet (cfs)	Inlet Efficiency during Peak Flow (%)	Allowable Spread (ft)	Max Gutter Spread during Peak Flow (ft)	Max Gutter Water Elev. during Peak Flow (ft)
1	Inlet-01	FHWA HEC-22 GENERIC	N/A	On Grade	1	10.90	13.90	0.00	N/A	1.20	1.03	0.17	85.93	10.00	6.64	14.12

Junction Input

SN	Element ID	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Ground/Rim (Max) Offset (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Surcharge Elevation (ft)	Surcharge Depth (ft)	Ponded Area (ft^2)	Minimum Pipe Cover (in)
1	Jun-01	12.50	13.00	0.50	0.00	-12.50	0.00	-13.00	0.00	0.00
2	Jun-02	20.50	21.00	0.50	0.00	-20.50	0.00	-21.00	0.00	0.00
3	Jun-03	20.00	22.50	2.50	0.00	-20.00	0.00	-22.50	0.00	0.00
4	Jun-04	25.00	25.50	0.50	0.00	-25.00	0.00	-25.50	0.00	0.00
5	Jun-05	20.00	20.50	0.50	0.00	-20.00	0.00	-20.50	0.00	0.00

Junction Results

SN	Element ID	Peak Inflow (cfs)	Peak Lateral Inflow (cfs)	Max HGL Elevation Attained (ft)	Max HGL Depth Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Average HGL Elevation Attained (ft)	Average HGL Depth Attained (ft)	Time of Max HGL Occurrence (days hh:mm)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	Jun-01	7.58	7.58	13.82	1.32	0.00	0.18	13.50	1.00	0 00:05	0 00:00	0.00	0.00
2	Jun-02	1.20	1.20	20.55	0.05	0.00	0.95	20.50	0.00	0 00:05	0 00:00	0.00	0.00
3	Jun-03	5.19	5.19	20.61	0.61	0.00	1.89	20.00	0.00	0 00:05	0 00:00	0.00	0.00
4	Jun-04	0.80	0.80	25.06	0.06	0.00	0.44	25.00	0.00	0 00:05	0 00:00	0.00	0.00
5	Jun-05	0.71	0.00	20.06	0.06	0.00	0.44	20.00	0.00	0 00:06	0 00:00	0.00	0.00

Channel Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Shape	Height (ft)	Width (ft)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow (cfs)	Flap Gate
1	Link-03	160.00	13.50	1.00	11.50	0.00	2.00	1.2500	Rectangular	0.500	10.000	0.0320	0.2000	0.5000	0.0000	0.00	No
2	Link-05	25.00	20.50	0.00	11.50	0.00	9.00	36.0000	Trapezoidal	1.000	8.000	0.0300	0.2000	0.6000	0.0000	0.00	No
3	Link-07	157.40	25.00	0.00	20.00	0.00	5.00	3.1800	Rectangular	0.500	5.000	0.0320	0.2000	0.5000	0.0000	0.00	No
4	Link-08	275.65	13.40	2.50	12.50	0.00	0.90	0.3300	Rectangular	0.500	5.000	0.0320	0.2000	0.5000	0.0000	0.00	No
5	Link-09	132.00	20.00	0.00	13.00	2.10	7.00	5.3000	Rectangular	0.500	5.000	0.0320	0.2000	0.5000	0.0000	0.00	No

Channel Results

SN	Element ID	Peak Flow (cfs)	Time of Peak Flow Occurrence (days hh:mm)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Travel Time (min)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Froude Number	Reported Condition
1	Link-03	7.18	0 00:05	15.35	0.47	2.48	1.08	0.31	0.62	0.00		
2	Link-05	1.18	0 00:05	178.22	0.01	3.98	0.10	0.05	0.05	0.00		
3	Link-07	0.71	0 00:06	23.09	0.03	1.89	1.39	0.06	0.11	0.00		
4	Link-08	0.09	0 00:10	9.23	0.01	0.62	7.41	0.02	0.04	0.00		
5	Link-09	0.68	0 00:07	29.83	0.02	1.44	1.53	0.05	0.10	0.00		

Pipe Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Pipe Shape	Pipe Diameter or Height (in)	Pipe Width (in)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow (cfs)	Flap Gate	No. of Barrels
1	Link-10	40.00	10.90	0.00	10.50	2.50	0.40	1.0000	CIRCULAR	18.000	18.000	0.0210	0.2000	0.6000	0.0000	0.00	No	1
2	Link-14	29.00	20.00	0.00	18.69	0.00	1.31	4.5200	CIRCULAR	12.000	12.000	0.0130	0.2000	0.5000	0.0000	0.00	No	1

Pipe Results

SN	Element ID	Peak Flow (cfs)	Time of Peak Flow Occurrence (days hh:mm)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Travel Time (min)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Froude Number	Reported Condition
1	Link-10	1.42	0 00:06	6.50	0.22	2.95	0.23	0.48	0.32	0.00		Calculated
2	Link-14	5.15	0 00:05	7.57	0.68	10.37	0.05	0.61	0.61	0.00		Calculated

Inlet Input

SN	Element ID	Inlet Manufacturer	Manufacturer Part Number	Inlet Location	Number of Inlets	Catchbasin Invert Elevation (ft)	Max (Rim) Elevation (ft)	Inlet Depth (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Ponded Area (ft²)	Grate Clogging Factor (%)
1	Inlet-01	FHWA HEC-22 GENERIC	N/A	On Grade	1	10.90	13.90	3.00	0.00	0.00	N/A	0.00

Inlet Results

SN	Element ID	Peak Flow (cfs)	Peak Lateral Inflow (cfs)	Peak Flow Intercepted by Inlet (cfs)	Peak Flow Bypassing Inlet (cfs)	Inlet Efficiency during Peak Flow (%)	Max Gutter Spread during Peak Flow (ft)	Max Gutter Water Elev. during Peak Flow (ft)	Max Gutter Water Depth during Peak Flow (ft)	Time of Max Depth Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	Inlet-01	1.20	1.20	1.03	0.17	85.93	6.64	14.12	0.22	0 00:07	0.00	0.00

EXHIBIT “D” – Proposed Condition Drainage Basin Map

ASSESSOR'S PARCEL NUMBER:

424-380-06, 424-380-07 & 424-362-24

LEGAL DESCRIPTION

PARCEL 1:

LOT 1 OF VISTA DE ANZA, IN THE CITY OF SAN DIEGO, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 5881, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, MAY 9, 1967, TOGETHER WITH THAT PORTION OF THE SOUTHERLY 25.00 FEET OF ROSEWOOD, ADJOINING SAID LOT 1 ON NORTHWEST, AS VACATED AND CLOSED TO PUBLIC USED BY RESOLUTION NO. 193278, RECORDED MARCH 29, 1968 AS INSTRUMENT NO. 52879, OF OFFICIAL RECORDS.

PARCEL 2:

THAT PORTION OF MARINE TERRACE, ACCORDING TO MAP THEREOF NO. 1477, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, OCTOBER 7, 1912 AND THAT PORTION OF LOT 1 OF EUREKA LEMON TRACT, IN THE CITY OF SAN DIEGO, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 753, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, MAY 19, 1893, DESCRIBED AS FOLLOWS:

BEGINNING AT THE MOST NORTHERLY CORNER OF SAID LOT 1; THENCE ALONG THE FOLLOWING NUMBERED COURSES: -1- ALONG THE NORTHWESTERLY LINE OF SAID LOT 1, SOUTH 62°41'45" WEST210 28 FEET BEING ALSO ALONG THE SOUTHEASTERLY LINE OF ROSEWOOD STREET, AS SHOWN ON THE MAP NO. 964 OF STEPHEN'S ADDITION FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, NOVEMBER 9, 1905, -2- LEAVING SAID NORTHWESTERLY LINE OF SAID LOT 1, SOUTH 14°56'38" EAST, 235.58 FEET TO THE TRUE POINT OF BEGINNING; -3- CONTINUING ALONG LAST SAID COURSE, SOUTH 14°56'38" EAST 263.32 FEET; -4- SOUTH 73°03'05" WEST 108 FEET; -5- NORTH 59°27'01" WEST 123.63 FEET TO A POINT ON THE NORTHEASTERLY LINE OF PACIFIC HIGHWAY DISTANT THEREON SOUTH 45°20'10" EAST 382 FEET FROM THE INTERSECTION OF SAID NORTHEASTERLY LINE OF PACIFIC HIGHWAY, WITH SAID SOUTHEASTERLY LINE OF ROSEWOOD STREET; -6- ALONG SAID NORTHEASTERLY LINE OF PACIFIC HIGHWAY, NORTH 45°20'10" WEST 140 FEET; THENCE LEAVING SAID NORTHEASTERLY LINE OF PACIFIC HIGHWAY, NORTH 62°41'45" EAST 271.72 FEET TO THE TRUE POINT OF BEGINNING.

NOTE: SAID LAND IS NOW SHOWN ON PARCEL MAP NO. 1172, FILED IN THE RECORDERS OFFICE OF SAN DIEGO COUNTY ON 12-18-72.

PARCEL 3:

LOTS 21 AND 22, BLOCK 6 STEPHEN'S ADDITION, ACCORDING TO MAP THEREOF NO. 964, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, NOVEMBER 9, 1905 TOGETHER WITH THAT PORTION OF FORMER ROSEWOOD STREET, NOW VACATED AND CLOSED TO PUBLIC USE, AS WOULD REVERT TO SAID PROPERTY BY OPERATION OF LAW.

EXCEPTING THEREFROM THOSE PORTIONS THEREOF DESCRIBED IN DEEDS TO THE STATE OF CALIFORNIA RECORDED DECEMBER 18, 1952 IN BOOK 4690, PAGE 374, OF OFFICIAL RECORDS AND FEBRUARY 15 1966 AS INSTRUMENT NO. 26568, OF OFFICIAL RECORDS OF SAID SAN DIEGO COUNTY.

NOTE: SAID LAND IS NOW SHOWN AS PARCEL "C" OF PARCEL MAP NO. 1958, FILED IN THE RECORDERS OFFICE OF SAN DIEGO COUNTY ON 10-04-73.

LEGEND

PROPERTY BOUNDARY

STORM DRAIN

BASIN / AREA — 0.00 AC.

NODE NO.

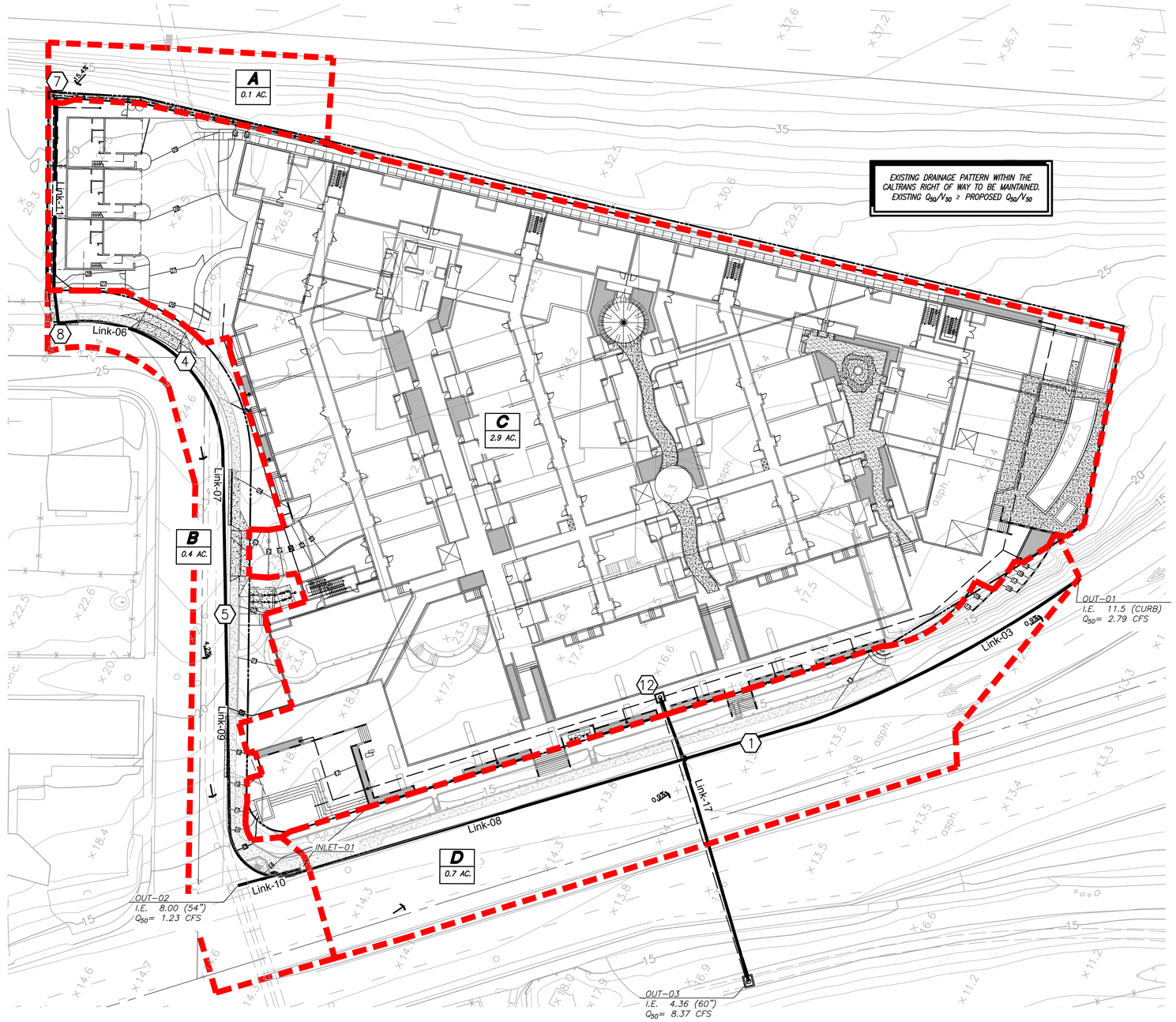
BASIN LIMITS

CURB INLET

CLEANOUT

GRATE INLET

OVERLAND FLOW



30 0 30 60

1"= 30'

Jefferson Pacific Beach Proposed Condition Hydrology Summary

Basin	Acres	C	Length (ft)	Upper Elev. (ft)	Lower Elev. (ft)	Slope (%)	Tc (min)	Intensity (in/hr)	Q_{50} (cfs)
A	0.1	0.45	52	38	30	15.4%	3.4	4.20	0.19
B	0.4	0.95	275	25	13.5	4.2%	2.8	4.20	1.60
C	2.9	0.70	N/A	N/A	N/A	N/A	N/A	4.20	8.53
D	0.7	0.95	320	15	12	0.9%	4.9	4.20	2.79

NO.	DATE	BY	DESCRIPTION
6			
5			
4			
3	02/19/2016	MFD	AGENCY REVISIONS
2	11/30/2015	MFD	CLIENT REVISIONS
1	08/17/2015	MFD	ORIGINAL

NO.	DATE	BY	DESCRIPTION
12			
11			
10			
9			
8			
7			

Leppert Engineering CORPORATION
5190 Governor Drive, Suite 205, San Diego, Ca. 92122-2848
Phone: (858) 597-2001 Fax: (858) 597-2009

APPROVED BY ENGINEER OF WORK — REGISTRATION R C E 26283

FILE CODE PB 39.01-22.15 — DATE

PREPARATION AND REVISION LOG

JEFFERSON PACIFIC BEACH
PROPOSED DRAINAGE MAP

EXHIBIT “E” – Proposed Condition SSA Analysis

Project Description

File Name	SSA Analysis - Proposed.SPF

Project Options

Flow Units	CFS
Elevation Type	Elevation
Hydrology Method	Rational
Time of Concentration (TOC) Method	User-Defined
Link Routing Method	Kinematic Wave
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	NO

Analysis Options

Start Analysis On	Sep 04, 2015	00:00:00
End Analysis On	Sep 05, 2015	00:00:00
Start Reporting On	Sep 04, 2015	00:00:00
Antecedent Dry Days	0	days
Runoff (Dry Weather) Time Step	0 01:00:00	days hh:mm:ss
Runoff (Wet Weather) Time Step	0 00:05:00	days hh:mm:ss
Reporting Time Step	0 00:05:00	days hh:mm:ss
Routing Time Step	30	seconds

Number of Elements

	Qty
Rain Gages	0
Subbasins	4
Nodes	10
Junctions	6
Outfalls	3
Flow Diversions	0
Inlets	1
Storage Nodes	0
Links	8
Channels	5
Pipes	3
Pumps	0
Orifices	0
Weirs	0
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

Return Period	50 year(s)

Subbasin Summary

SN	Subbasin ID	Area (ac)	Weighted Runoff Coefficient	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	A	0.10	0.4500	0.35	0.16	0.02	0.19	0 00:05:00
2	B	0.40	0.9500	0.35	0.33	0.13	1.60	0 00:05:00
3	C	2.90	0.7000	0.35	0.25	0.71	8.53	0 00:05:00
4	D	0.70	0.9500	0.35	0.33	0.23	2.79	0 00:05:00

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft²)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	Jun-01	Junction	12.50	13.00	0.00	0.00	0.00	0.16	12.56	0.00	0.44	0 00:00	0.00	0.00
2	Jun-04	Junction	25.00	25.50	0.00	0.00	0.00	0.16	25.05	0.00	0.45	0 00:00	0.00	0.00
3	Jun-05	Junction	20.00	20.50	0.00	0.00	0.00	0.14	20.03	0.00	0.47	0 00:00	0.00	0.00
4	Jun-07	Junction	24.00	28.00	0.00	0.00	0.00	0.19	27.18	0.00	0.82	0 00:00	0.00	0.00
5	Jun-08	Junction	26.00	25.50	0.00	0.00	0.00	0.18	26.18	0.00	0.49	0 00:00	0.00	0.00
6	Jun-12	Junction	5.75	13.50	0.00	0.00	0.00	8.53	6.59	0.00	6.91	0 00:00	0.00	0.00
7	Out-01	Outfall	11.50					2.79	11.53					
8	Out-02	Outfall	8.00					1.23	10.94					
9	Out-03	Outfall	4.36					8.37	5.19					

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Reported Condition
1	Link-10	Pipe	Inlet-01	Out-02	40.00	10.90	10.50	1.0000	18.000	0.0210	1.23	6.50	0.19	2.84	0.44	0.29	0.00	Calculated
2	Link-11	Pipe	Jun-07	Jun-08	104.50	27.00	26.00	0.9600	8.000	0.0130	0.18	1.18	0.15	4.24	0.18	0.26	0.00	Calculated
3	Link-17	Pipe	Jun-12	Out-03	131.50	5.75	4.36	1.0600	24.000	0.0130	8.37	23.26	0.36	9.78	0.83	0.41	0.00	Calculated
4	Link-03	Channel	Jun-01	Out-01	160.00	12.50	11.50	0.6300	6.000	0.0320	0.12	10.85	0.01	0.44	0.03	0.06	0.00	
5	Link-06	Channel	Jun-08	Jun-04	85.00	26.00	25.00	1.1800	6.000	0.0320	0.16	7.02	0.02	0.72	0.05	0.10	0.00	
6	Link-07	Channel	Jun-04	Jun-05	157.40	25.00	20.00	3.1800	6.000	0.0320	0.14	11.54	0.01	0.94	0.03	0.07	0.00	
7	Link-08	Channel	Inlet-01	Jun-01	275.65	13.40	12.50	0.3300	6.000	0.0320	0.16	4.62	0.04	1.03	0.06	0.11	0.00	
8	Link-09	Channel	Jun-05	Inlet-01	132.00	20.00	13.00	5.3000	6.000	0.0320	0.13	14.91	0.01	0.99	0.03	0.05	0.00	

Inlet Summary

SN	Element ID	Inlet Manufacturer	Manufacturer Part Number	Inlet Location	Number of Inlets	Catchbasin Invert Elevation (ft)	Max (Rim) Elevation (ft)	Initial Water Elevation (ft)	Ponded Area (ft^2)	Peak Flow (cfs)	Peak Flow Intercepted by Inlet (cfs)	Peak Flow Bypassing Inlet (cfs)	Inlet Efficiency during Peak Flow (%)	Allowable Spread (ft)	Max Gutter Spread during Peak Flow (ft)	Max Gutter Water Elev. during Peak Flow (ft)
1	Inlet-01	FHWA HEC-22 GENERIC	N/A	On Grade	1	10.90	13.90	0.00	N/A	1.60	1.24	0.36	77.47	10.00	7.61	14.14

Junction Input

SN	Element ID	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Ground/Rim (Max) Offset (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Surcharge Elevation (ft)	Surcharge Depth (ft)	Ponded Area (ft^2)	Minimum Pipe Cover (in)
1	Jun-01	12.50	13.00	0.50	0.00	-12.50	0.00	-13.00	0.00	0.00
2	Jun-04	25.00	25.50	0.50	0.00	-25.00	0.00	-25.50	0.00	0.00
3	Jun-05	20.00	20.50	0.50	0.00	-20.00	0.00	-20.50	0.00	0.00
4	Jun-07	24.00	28.00	4.00	0.00	-24.00	0.00	-28.00	0.00	0.00
5	Jun-08	26.00	25.50	-0.50	0.00	-26.00	0.00	-25.50	0.00	0.00
6	Jun-12	5.75	13.50	7.75	0.00	-5.75	0.00	-13.50	0.00	0.00

Junction Results

SN	Element ID	Peak Inflow (cfs)	Peak Lateral Inflow (cfs)	Max HGL Elevation Attained (ft)	Max HGL Depth Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Average HGL Elevation Attained (ft)	Average HGL Depth Attained (ft)	Time of Max HGL Occurrence (days hh:mm)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	Jun-01	0.16	0.00	12.56	0.06	0.00	0.44	12.50	0.00	0 00:07	0 00:00	0.00	0.00
2	Jun-04	0.16	0.00	25.05	0.05	0.00	0.45	25.00	0.00	0 00:06	0 00:00	0.00	0.00
3	Jun-05	0.14	0.00	20.03	0.03	0.00	0.47	20.00	0.00	0 00:08	0 00:00	0.00	0.00
4	Jun-07	0.19	0.19	27.18	3.18	0.00	0.82	27.00	3.00	0 00:05	0 00:00	0.00	0.00
5	Jun-08	0.18	0.00	26.18	0.18	0.00	0.49	26.00	0.00	0 00:05	0 00:00	0.00	0.00
6	Jun-12	8.53	8.53	6.59	0.84	0.00	6.91	5.75	0.00	0 00:05	0 00:00	0.00	0.00

Channel Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Shape	Height (ft)	Width (ft)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow (cfs)	Flap Gate
1	Link-03	160.00	12.50	0.00	11.50	0.00	1.00	0.6300	Rectangular	0.500	10.000	0.0320	0.2000	0.5000	0.0000	0.00	No
2	Link-06	85.00	26.00	0.00	25.00	0.00	1.00	1.1800	Rectangular	0.500	5.000	0.0320	0.2000	0.5000	0.0000	0.00	No
3	Link-07	157.40	25.00	0.00	20.00	0.00	5.00	3.1800	Rectangular	0.500	5.000	0.0320	0.2000	0.5000	0.0000	0.00	No
4	Link-08	275.65	13.40	2.50	12.50	0.00	0.90	0.3300	Rectangular	0.500	5.000	0.0320	0.2000	0.5000	0.0000	0.00	No
5	Link-09	132.00	20.00	0.00	13.00	2.10	7.00	5.3000	Rectangular	0.500	5.000	0.0320	0.2000	0.5000	0.0000	0.00	No

Channel Results

SN	Element ID	Peak Flow (cfs)	Time of Peak Flow Occurrence (days hh:mm)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Travel Time (min)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Froude Number	Reported Condition
1	Link-03	0.12	0 00:12	10.85	0.01	0.44	6.06	0.03	0.06	0.00		
2	Link-06	0.16	0 00:06	7.02	0.02	0.72	1.97	0.05	0.10	0.00		
3	Link-07	0.14	0 00:08	11.54	0.01	0.94	2.79	0.03	0.07	0.00		
4	Link-08	0.16	0 00:07	4.62	0.04	1.03	4.46	0.06	0.11	0.00		
5	Link-09	0.13	0 00:10	14.91	0.01	0.99	2.22	0.03	0.05	0.00		

Pipe Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Pipe Shape	Pipe Diameter or Height (in)	Pipe Width (in)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow (cfs)	Flap Gate	No. of Barrels
1	Link-10	40.00	10.90	0.00	10.50	2.50	0.40	1.0000	CIRCULAR	18.000	18.000	0.0210	0.2000	0.6000	0.0000	0.00	No	1
2	Link-11	104.50	27.00	3.00	26.00	0.00	1.00	0.9600	CIRCULAR	8.040	8.040	0.0130	0.2000	0.7000	0.0000	0.00	No	1
3	Link-17	131.50	5.75	0.00	4.36	0.00	1.39	1.0600	CIRCULAR	24.000	24.000	0.0130	0.2000	0.5000	0.0000	0.00	No	1

Pipe Results

SN	Element ID	Peak Flow (cfs)	Time of Peak Flow Occurrence (days hh:mm)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Travel Time (min)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Froude Number	Reported Condition
1	Link-10	1.23	0 00:05	6.50	0.19	2.84	0.23	0.44	0.29	0.00		Calculated
2	Link-11	0.18	0 00:05	1.18	0.15	4.24	0.41	0.18	0.26	0.00		Calculated
3	Link-17	8.37	0 00:05	23.26	0.36	9.78	0.22	0.83	0.41	0.00		Calculated

Inlet Input

SN	Element ID	Inlet Manufacturer	Manufacturer Part Number	Inlet Location	Number of Inlets	Catchbasin Invert Elevation (ft)	Max (Rim) Elevation (ft)	Inlet Depth (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Ponded Area (ft²)	Grate Clogging Factor (%)
1	Inlet-01	FHWA HEC-22 GENERIC	N/A	On Grade	1	10.90	13.90	3.00	0.00	0.00	N/A	0.00

Inlet Results

SN	Element ID	Peak Flow (cfs)	Peak Lateral Inflow (cfs)	Peak Flow Intercepted by Inlet (cfs)	Peak Flow Bypassing Inlet (cfs)	Inlet Efficiency during Peak Flow (%)	Max Gutter Spread during Peak Flow (ft)	Max Gutter Water Elev. during Peak Flow (ft)	Max Gutter Water Depth during Peak Flow (ft)	Time of Max Depth Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	Inlet-01	1.60	1.60	1.24	0.36	77.47	7.61	14.14	0.24	0 00:10	0.00	0.00

APPENDIX I – Rational Method: City of San Diego Drainage Design Manual

APPENDIX I

RATIONAL METHOD

Watersheds Less than 0.5 Square Mile

Method of Computing Runoff

Use the Rational Formula Q = CIA where:

Q is the peak rate of flow in cubic feet per second.

C is a runoff coefficient expressed as that percentage of rainfall which becomes surface runoff.

I is the average rainfall intensity in inches per hour for a storm duration equal to the time of concentration (T_c) of the contributing drainage area.

A is the drainage area in acres tributary to design point.

(1) Runoff Coefficient, C

Appendix I-A lists the estimated coefficients for urban areas.

For urban areas select an appropriate coefficient for each type of land use from Table, 2, Appendix I-A. Multiply this coefficient by the percentage of the total area included in that class. The sum of the products for all land uses in San Diego County is the weighted runoff coefficient.

(2) Rainfall Intensity, I

Intensity - duration - frequency curves applicable to all areas within San Diego County are given in Appendix I-B.

(3) Time of Concentration, Tc

The time of concentration is the time required for runoff to flow from the most remote part of the watershed to the outlet point under consideration.

APPENDIX II – Design Runoff: City of San Diego Drainage Design Manual

HYDROLOGY (1-102)

1-102.1 GENERAL

The design discharge depends upon many variables. Some of the more important are duration and intensity of rainfall, storm frequency, ground cover, the size, imperviousness and slope and shape of the drainage area.

1-102.2 DESIGN RUNOFF

Design runoff shall be based upon the following:

(1) Within floodplain and floodplain fringe areas as defined by the Federal Emergency Management Agency (FEMA), the runoff criteria shall be based upon a 100-year frequency storm.

(2) For all drainage channels and storm drain systems, which will convey drainage from a tributary area equal to and greater than one (1) square mile, the runoff criteria shall be based upon a 100-year frequency storm.

(3) For tributary areas under one (1) square mile:

(a) The storm drain system shall be designed so that the combination of storm drain system capacity and overflow will be able to carry the 100-year frequency storm without damage to or flooding of adjacent existing buildings or potential building sites.

(b) The runoff criteria for the underground storm drain system shall be based upon a 50-year frequency storm.

(4) Type D soil shall be used for all areas.

1-102.3 DESIGN RUNOFF METHODS

A. The designer should check with Floodplain Management/Beach Erosion Section, Transportation Design Division, Engineering and Development Department, to determine if there are established storm discharge flows.

B. If no established storm discharge flows are available, the applicable methods shown in Appendix 1, 2, or 3 shall be used.

APPENDIX III – Runoff Coefficients: City of San Diego Drainage Design Manual

TABLE 2

RUNOFF COEFFICIENTS (RATIONAL METHOD)

DEVELOPED AREAS (URBAN)

Land Use	Coefficient, C Soil Type (1)
	D
Residential:	
Single Family	.55
Multi-Units	.70
Mobile Homes	.65
Rural (lots greater than 1/2 acre)	.45
Commercial (2) 80% Impervious	.85
Industrial (2) 90% Impervious	.95

NOTES:

(1) Type D soil to be used for all areas.

(2) Where actual conditions deviate significantly from the tabulated imperviousness values of 80% or 90%, the values given for coefficient C, may be revised by multiplying 80% or 90% by the ratio of actual imperviousness to the tabulated imperviousness. However, in no case shall the final coefficient be less than 0.50. For example: Consider commercial property on D soil.

Actual imperviousness = 50%

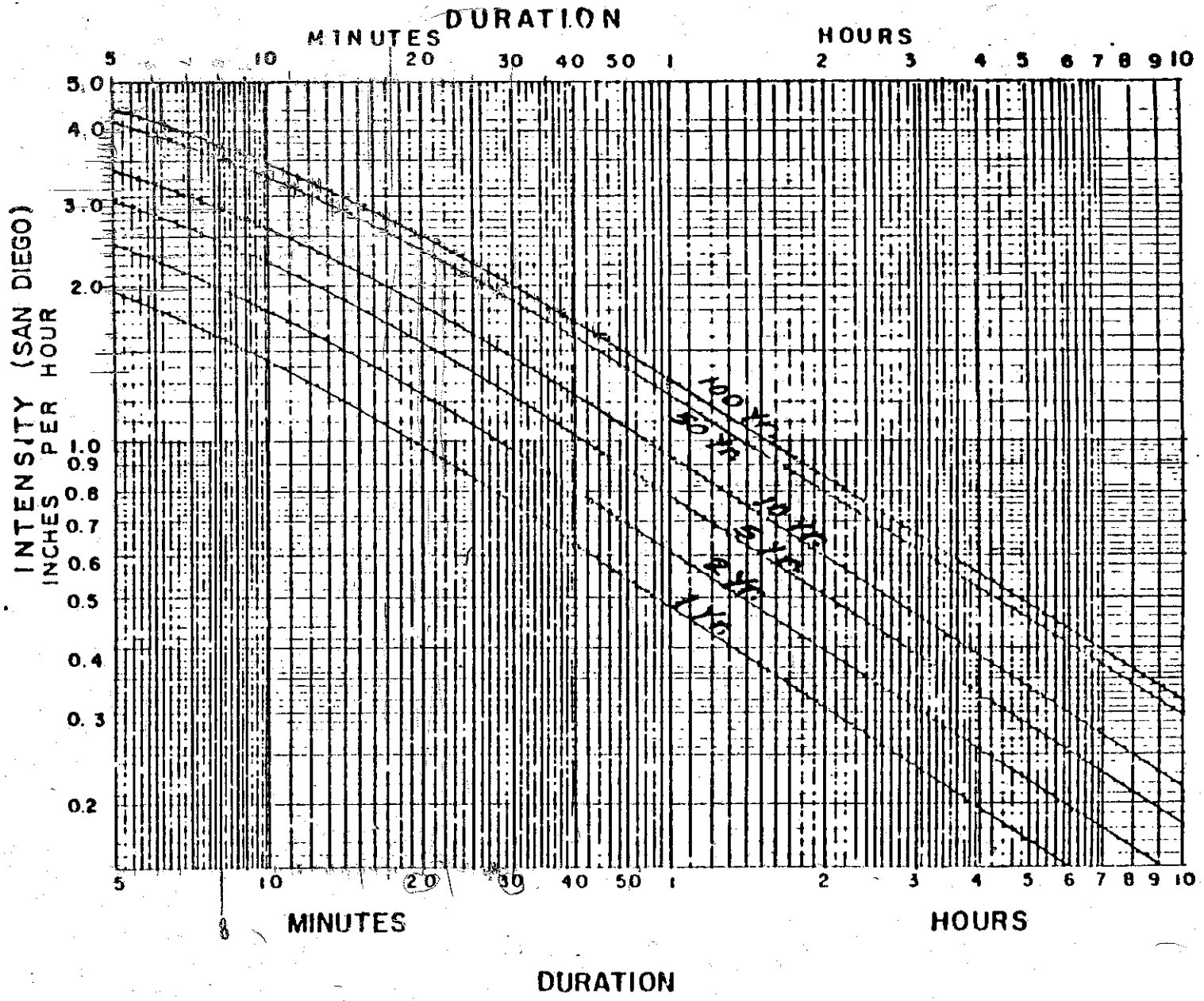
Tabulated imperviousness = 80%

Revised C $= \frac{50}{80} \times 0.85 = 0.53$

APPENDIX IV – Rainfall Intensity-Duration-Frequency Curves: City of San Diego Drainage Design Manual

ELEV.	FACTOR
0–1500	1.00
1500–3000	1.25
3000–4000	1.42
4000–5000	1.60
5000–6000	1.70
DESERT	1.25

To obtain correct intensity, multiply intensity on chart by factor for design elevation.



RAINFALL

INTENSITY-DURATION-FREQUENCY

CURVES

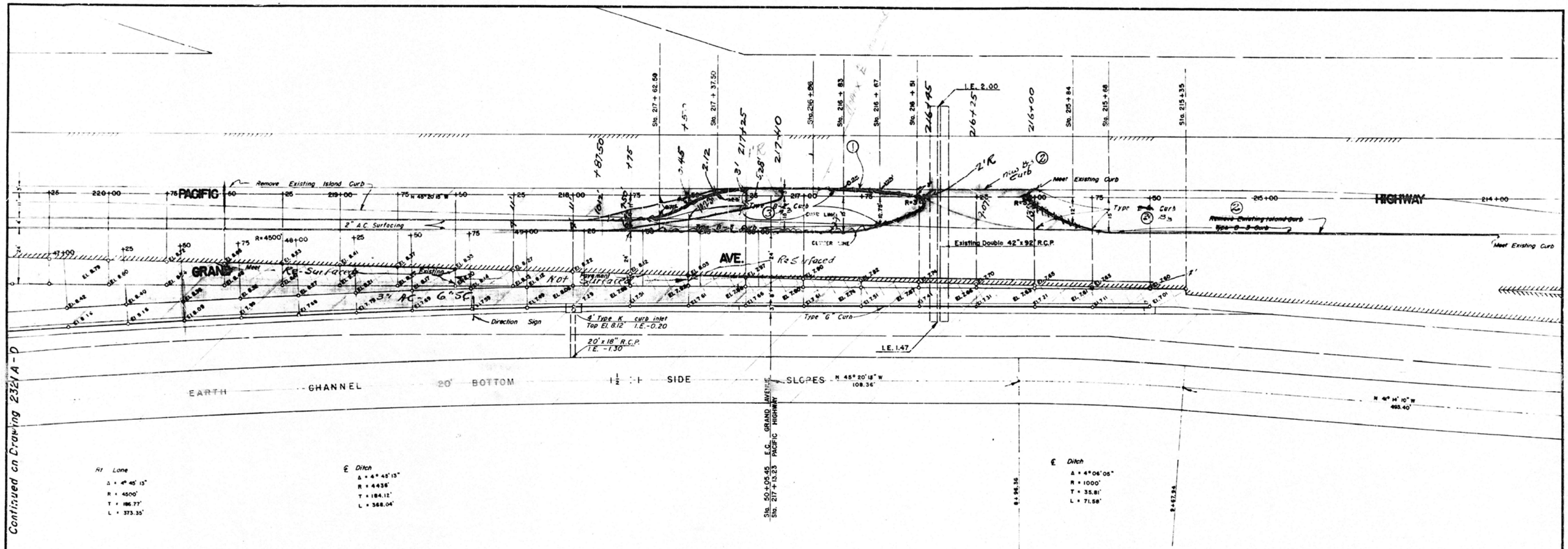
for

COUNTY OF SAN DIEGO

APPENDIX

I-B

APPENDIX V – Existing Improvement Plans



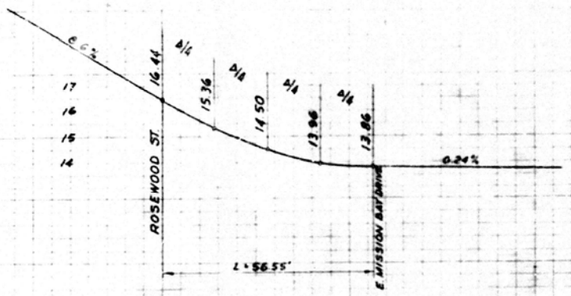
FOR SHEET 10 SEE DRWG 2561-D

REDUCED PLAN

SHEET 9	CITY OF SAN DIEGO ENGINEERING DEPARTMENT — 6 SHEETS
	GRAND AVENUE
APPROVED	CITY MANAGER — DATE 11/19/54
DRAWN BY MEEHAN / TRACED BY BAARSON / CHECKED BY / FIELD BOOKS	DRAWING NUMBER 2321 B - D

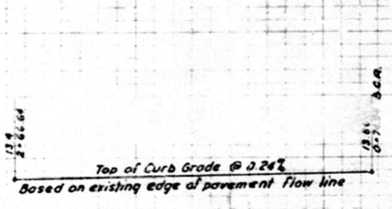
WATER DEPARTMENT
SEWER DEPARTMENT
DRAINAGE
FIELD CHECK
OFFICE CHECK
PLANNING COMMISSION
GRADES

CONSTRUCTION RECORD



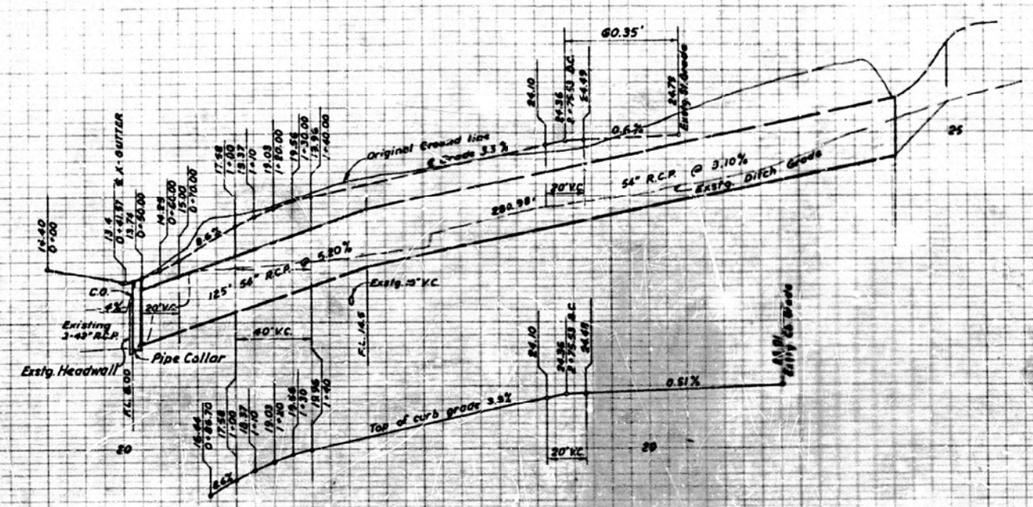
CURB RETURN PROFILE

Scale 1" = 20' Horiz. 3' Vert.



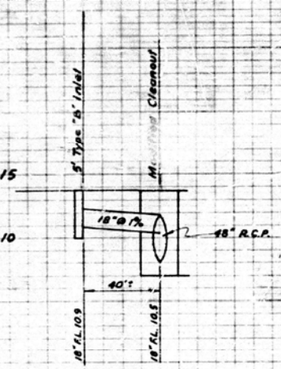
PROFILE OF EAST MISSION BAY DRIVE

Scale 1" = 40' Horiz. 6' Vert.



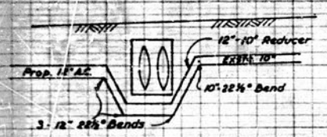
PROFILE OF ROSEWOOD STREET

Scale: 1" = 40' Horiz. 6' Vert.



DETAIL OF INLET CONNECTION

Scale: 1" = 40' Horiz. 6' Vert.



DETAIL OF WATERMAIN CROSSING STORM DRAIN

Scale: 1" = 40' Horiz. 6' Vert.

WORK TO BE DONE

THE IMPROVEMENTS CONSIST OF THE FOLLOWING WORK TO BE DONE ACCORDING TO THESE PLANS AND THE FOLLOWING STANDARD DRAWINGS AND SPECIFICATIONS OF THE CITY OF SAN DIEGO

IMPROVEMENTS	STD. DWGS.	SYMBOL
STREET TREES		
GRADING PER SCHEDULE F		
PAVING		
TYPE "G" CURB & GUTTER (6")	G-45-65	
SIDEWALKS	G-4-66, G-53-65	
SEWER LATERALS (4")	S-22-62	
COPPER WATER SERVICE (2")	W-2-65, W-60-65	
TYPE "B" CURB INLETS	D-6-66	
C.M.P.C. STORM DRAIN	D-3-55	18" C.M.P.C.
MODIFIED CURTAIN WALL		
CONC. CROSS GUTTER	G-35-65	
48" R.C.P. STORM DRAIN	D-3-55, D-21-64	C.O.
MODIFIED CLEANOUT	D-10-62	
CONC. CUTOFF WALL	S-6-59	
PIPE COLLAR	D-14-55	
PIPE FITTINGS - TYLER		
STREET LIGHT SYSTEM	E-71-66T	
12" A.C. WATERMAIN JOHNS-MANVILLE	W-6-59, W-10-55, W-61-60	
FIRE HYDRANT GREENBURG	W-14-65, W-17-65	F.H.
EXISTING WORKE	P-1-56	
(2) CITY CONTROL MONUMENTS	M-21-66T	

SPECIFICATIONS

PART I, FILED APRIL 9, 1958, INCLUDING AMENDMENTS, FILED APRIL 8, 1959 AND NOV. 29, 1962 AND SECTION 1, FILED OCT. 26, 1961, PART II FILED MARCH 4, 1966. SPECIAL CONDITIONS P-18, REVISED NOV. 21, 1966, HERETO ATTACHED, PART II, FILED DEC. 14, 1966

REFERENCE DRAWINGS

1153-D, 12383-D, 12254-4-D

SITE DEVELOPMENT

GRADING AS SHOWN ON DWGS.

WATER NOTES

THE COST OF WATER MAIN CONNECTIONS, AS SHOWN HEREON, WILL BE AS FOLLOWS:

CONN. NO. 1 = $460.00

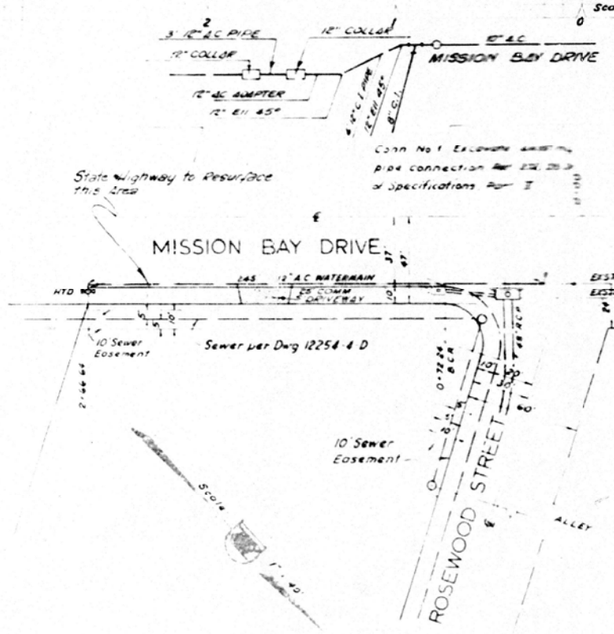
NOTE

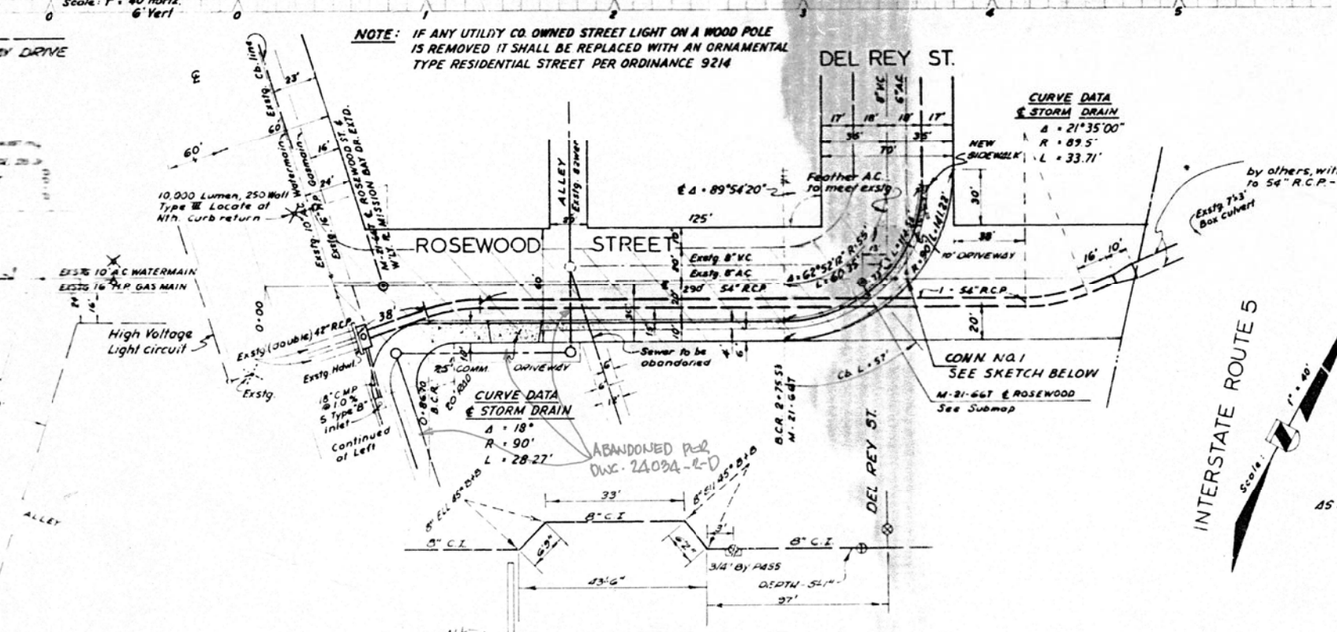
PRIOR TO MIXING WITH SAND & WATER, ALL MINERAL AGGREGATE USED FOR THE PRODUCTION OF CEMENT TREATED BASE SHALL HAVE A SAND EQUIVALENT OF NOT LESS THAN 30, WHEN TESTED BY CALIFORNIA DIVISION OF HIGHWAYS TEST METHOD NO. CALIF. 217

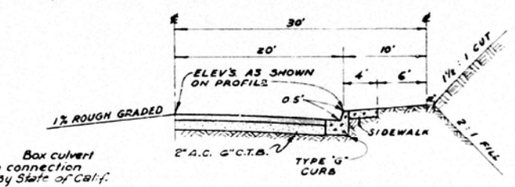
BENCH MARK

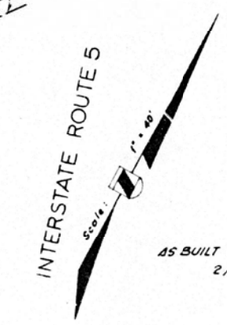
SE BRASS PLUG AT EAST MISSION BAY DRIVE AND GLENDORA STREET.

ELEV. 15.528 M.S.L. DATUM.









AS BUILT WORK COMPLETED 2/16/68

DON NASLAND
ENGINEERING & SURVEYS
LAND PLANNING
2120 UNIVERSITY AVENUE, SAN DIEGO
295-6373

Don Nasland
DON NASLAND R.C.E. 16174

PRIVATE CONTRACT

PLANS FOR THE IMPROVEMENT OF ROSEWOOD ST. & E. MISSION BAY DRIVE POR. OF VISTA DE ANZA SUBDIVISION

CITY OF SAN DIEGO, CALIFORNIA
ENGINEERING DEPARTMENT
SHEET 1 OF 2 SHEETS

W.O. NO. 77252

ACT. ASST. CITY ENGINEER — DATE 4-10-67 — DIVISION HEAD

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL				
2" REVISED SIDEWALK TO 4' WIDE	JULY 1967 D.W.		7-28-67	
AS BUILT	DON NASLAND	R.E. HAZARD	3-18-68	4-18-68

DIRECTOR ENG. WORK — CONTROL CHIEF ENGINEER 4-18-67

230-1703
LAMBERT COORD. — DATES

CONTRACTOR R.E. HAZARD CONTG. Co. DATE STARTED 6-14-67
INSPECTOR W. RASULIS DATE COMPLETED 2-16-68

12709-1-D

Don Nasland Job No. 1030-67

AS BUILT

March 3, 2016

JPI Companies
12250 El Camino Real, Suite 380
San Diego, California 92130

Attention: David Todd, Vice President Development

Subject: **4275 Mission Bay Drive**
San Diego, California
Exterior Envelope Acoustical Design
VA Project No. 5449-004

Dear David:

Veneklasen Associates (VA) has completed our review of the 4275 Mission Bay Drive project located in San Diego, California. This report represents the results of our findings.

1.0 INTRODUCTION

This study was conducted to determine the impact of the exterior noise sources on the 4275 Mission Bay Drive project in San Diego, California. VA's scope of work included calculating the exterior noise levels impacting the site, determining the method, if any, required to reduce the interior and exterior sound levels to meet the applicable code requirements of the State of California and the City of San Diego.

The project consists of a 4-level, 171-unit residential building with amenity spaces and commercial/retail space. The project is bounded by Mission Bay Drive to the west, the I-5 Freeway to the east, and Rosewood Street to the north.

2.0 NOISE CRITERIA

CNEL (Community Noise Equivalent Level) is the 24-hour equivalent (average) sound pressure level in which the evening (7 pm–10 pm) and nighttime (10 pm – 7 am) noise is weighted by adding 5 and 10 dB, respectively, to the hourly level. Since this is a 24-hour metric, short-duration noise events (truck pass-byes, buses, trains, etc.) are not as prominent in the analysis.

2.1 Residential – California Building Code Title 24

The State of California Building Code (CBC) Part 2, Title 24, CCR, Appendix 12, "Sound Transmission Control" and the City of San Diego Noise Element state that *interior CNEL* values for residential land uses are not to exceed 45 CNEL in any habitable room.

2.2 Residential – San Diego General Plan Noise Element

Section NE-A.4 requires an acoustical study consistent with Acoustical Study Guidelines (Table NE-4) for proposed developments in areas where the existing or future noise level exceeds or would exceed the "compatible" noise level thresholds as indicated on the Land Use – Noise Compatibility Guidelines (Table NE-3), so that appropriate noise mitigation measures can be included in the project design to meet the noise guideline goals.

2.3 CALGreen – Non-Residential

Section 5.507.4.2 of the 2013 California Green Building Code stipulates that for buildings exposed to a noise level of 65 dB or more when measured as a 1-hour Equivalent Sound Level (Leq), the building façade, including walls, windows, and roofs, shall provide enough sound insulation so that the interior sound level from exterior sources does not exceed 50 dBA during any hour of operation. This applies to non-residential spaces such as retail space, leasing, and amenities.

3.0 EXTERIOR NOISE ENVIRONMENT

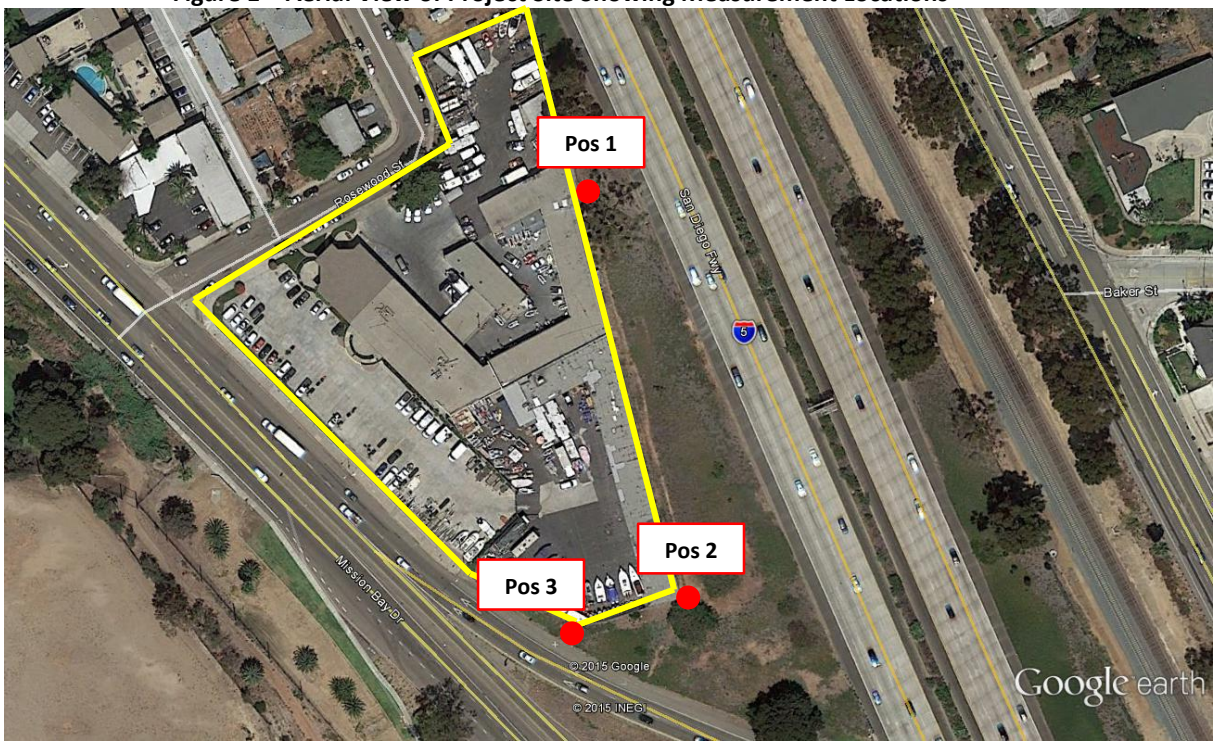
3.1 Noise Measurements

Traffic on the surrounding roadways is the primary source of noise affecting the site. VA visited the site on Thursday, July 30, 2015 to measure the sound levels on the site. Table 1 and Figure 1 show the location and summary of the long-term measurements. The CNEL levels were calculated from the short-term measurements.

Table 1 – Measured Sound Levels

Location	Leq, dBA	CNEL
Position 1	73	76
Position 2	67	69
Position 3	73	75

Figure 1 – Aerial View of Project Site Showing Measurement Locations



3.2 Computer Modeling

VA utilized the Federal Highway Administration's Traffic Noise Modeling software in order to predict vehicular noise levels at various locations. The primary purpose of the computer model was to determine how the noise environment will change due to traffic and site changes.

Traffic counts for local streets were obtained from the California Department of Transportation and from the San Diego Association of Governments (SANDAGs website).

Table 2 – Roadway Information

Roadway	Speed	ADT (year 2035)
I-5	65	195,900
I-5 Off ramp	45	21,300
Mission Bay Drive	35	57,200

3.3 Overall Exterior Exposure

Based on the computer model and measurements, VA calculated the noise level at different locations across the project site. To simplify the presentation of the exterior noise levels, VA has separated the site into locations based on the sound exposure and required mitigation. The predicted sound levels at each zone, shown color-coded in Figure 2, are listed in Table 3 below.

Table 3 – Exterior Noise Levels

Location	Floor	CNEL
Zone A	All	79
Zone B	All	70-72
Remaining Residential Units	All	60-65

Figure 2 – Noise Zones

4.0 INTERIOR NOISE CALCULATION

4.1 Exterior Façade Construction

VA assumes the exterior wall assemblies will be composed of stucco over shear panel per structural on single stud and a single layer of 5/8 inch Type 'X' gypsum board on the inside.

At some locations an upgraded exterior wall is required. The wall constructions used for the analysis are shown in Table 4.

Table 4 – Wall Assemblies

Assembly	Construction
Standard	3-coat Stucco, plywood, studs, batt insulation, 1 layer gypsum board
Upgraded	3-coat Stucco, plywood, studs, batt insulation, Resilient Channel, 1 layers gypsum board

VA utilized the window (glass, frame and seals) assemblies shown in Appendix I.

VA's calculations included the roof path, but this was insignificant in the interior noise level calculated.

4.2 Interior Average Noise Level (CBC Title 24) – Residential

VA calculated the interior average noise level within the residential units given the predicted noise environment and the exterior façade construction described above. As described in Section 2.1, the code requirement for interior noise level is 45 CNEL at habitable residential spaces.

Detailed plans were not available and VA based the calculations based on typical dimensions for units of this type. The window area used in the calculation for residential units was the percentage indicated in Table 5 with the remainder being exterior wall area for the room exposed. If the window area differs from this, the glazing requirements may change. Table 5 shows the glazing required for all windows and glass doors to meet the minimum City and State code requirements using this assumption. The predicted interior CNEL noise levels are based on the glazing assemblies (glass, frame and seals) as described in Appendix I.

As noted in Table 5 below, residences in Zone A should receive an upgraded wall construction defined in Table 4.

Table 5 – Calculated Interior CNEL Noise Levels - Residential

Location	Exterior Noise Level, CNEL	Window/Door Area	Window/ Door Rating	Exterior Wall	Interior Noise Level, CNEL	Code Requirement
Zone A Option 1	79	15%	STC 38	Upgraded	45	CBC
Zone A Option 2	79	25%	STC 40	Upgraded	45	CBC
Zone A Option 3	79	30%	STC 41	Upgraded	45	CBC
Zone A Option 4	79	40%	STC 42	Upgraded	45	CBC
Zone B Option 1	70-72	40%	STC 34	Standard	43-45	CBC
Zone B Option 2	70-72	50%	STC 37	Standard	43-45	CBC
Remaining Residential Units	60 – 65	40%	STC 30	Standard	< 45	CBC

4.3 Interior Average Noise Level (San Diego General Plan Noise Element) – Residential

As directed by NE-A4 in the San Diego Genera Plan, an acoustical study was performed consistent with Table NE-4 of the San Diego Noise Element as follows:

Table 6 – Acoustical Study Guidelines per Table NE-4 of San Diego Noise Element

Directive	Response
Provide noise level measurements to describe existing local conditions and the predominant noise sources	See Section 3.1 See Table 1 See Figure 1
Measure existing single event noise levels (SENEL, SEL, or Time Above) within airport influence areas.	Not applicable
Estimate existing and projected noise levels (CNEL) and compare them to levels on Table NE-2*.	See Table 5 See Figure 1
Recommend appropriate mitigation measures to achieve acceptable noise levels on Table NE-2*.	
Estimate noise exposure levels with recommended mitigation measures.	

Directive	Response
Describe a post-project assessment to evaluate the effectiveness of the proposed mitigation measures.	Verification of incorporation of elements within this report from contractor. Post-construction long-term monitoring measurement within dwellings in each zone. Compare measurement results to predicted interior CNEL levels.

* Table NE-2 lists several regulations with which to comply. Only the CEQA and CBC Title 24 regulations apply to this project.

4.4 Mechanical Ventilation Requirement - Residential

Because the windows and doors must be kept closed to meet the noise requirements, mechanical ventilation may be required for all units. Please check with the California Mechanical Code for more information.

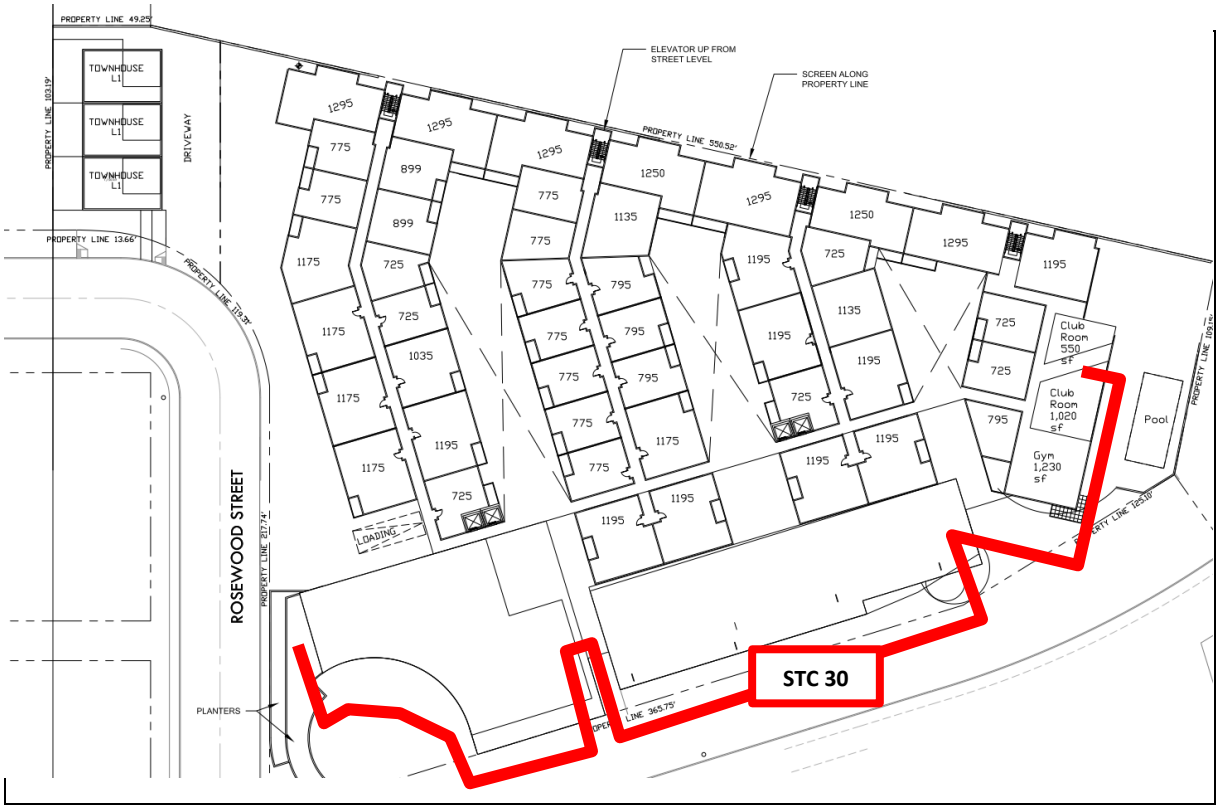
4.5 CALGreen – Non-Residential

In a similar manner, VA calculated the noise level within Retail, Leasing, amenity areas and other non-residential spaces. An assessment of the loudest hour was not measured directly for this project, therefore, VA utilized the CNEL noise level to base the calculations on as CNEL levels are generally higher than the loudest Leq level. The results are shown in Table 6 below.

Sample calculations are included in the appendices.

Table 7 – Calculated Interior Noise Levels at Non-residential areas

Location	Exterior Noise Level, CNEL	Window/ Door Rating	Interior Noise Level, CNEL	Code Requirement
Zone B Non-Residential	70-72	STC 30	< 50	CALGreen



4.6 Exterior Average Noise Level (San Diego General Plan Noise Element) – Residential

Per Table NE-3 of the San Diego General Plan Noise Element, indicates that the exterior areas of use are Conditionally Compatible up to 70 CNEL (Table NE-3). Berms or noise barriers could be utilized to reduce existing and future predicted outdoor noise exposure. Based on our analysis a barrier located as shown in Figure 2 should be a height of 10 feet from the height of the pool deck to meet the Conditionally Compatible goal. The barrier can step down to 8 feet high at 60 feet from the intersection at the corner of the site. For the townhomes, the height must be 10 feet above the pad height of the townhome. The barriers moving away from the freeway can step down 8 feet at second townhome (protected). These barriers can be constructed of material that has a minimum density of 2.5 pounds per square foot.

5.0 SUMMARY

The following summarizes the acoustical items recommended to satisfy the noise criteria as described in this report.

Residential

- An exterior wall for the buildings as described in section 4.1 is installed for the project.
- A standard roof assembly is used for the roof system.
- Windows and doors with minimum STC ratings as shown in Table 5 and satisfying the requirements in Appendix I (Table 8) are required.
- Mechanical ventilation, or other means of natural ventilation, is required for all units that does not compromise the acoustical isolation.

- Figure 2 shows the locations of exterior walls to meet the Conditionally Compatible goals set forth in the Noise Element. Section 4.6 provides the height and extent of the barriers.

Non-Residential

- To meet CALGreen requirements at non-residential spaces, the STC ratings shown in Table 6 and satisfying the requirements in Appendix I are required.

Various noise mitigation methods may be utilized to satisfy the noise criteria described in this report. Mitigation methods that deviate from requirements should be reviewed by the acoustical consultant.

We trust this information is satisfactory. If you have any questions or comments regarding this report, please do not hesitate to contact us.

Sincerely,
Veneklasen Associates, Inc.

Richard H. Silva
Senior Associate

John LoVerde
Principal

APPENDIX I – GLAZING AND WALL REQUIREMENTS

In order to meet the predicted interior noise levels described in Section 4.0, the glazing shall meet the following requirements:

Table 8 – Acoustical Glazing Requirements: Minimum Octave Band Transmission Loss and STC Rating

STC Rating	Nominal Thickness	Minimum Transmission Loss Octave Band Center Frequency (Hz)						Min. STC Rating
		125	250	500	1000	2000	4000	
STC 42	Storm (triple glazed)	27	32	37	43	49	51	**42**
STC 41	1-1/16” dual	26	32	39	42	44	48	**41**
STC 40	1-1/16” dual	25	31	38	41	43	47	**40**
STC 38	1-1/8” dual	22	29	35	39	41	43	**38**
STC 37	1-1/16” dual	24	24	32	43	42	44	**37**
STC 34	1” dual	22	21	31	37	38	38	**34**
STC 30	1” dual	21	19	28	35	37	32	**30**

The transmission loss values in the table above can likely be met with the following glazing assemblies:

1. STC 42: 3/16” monolithic – 11/16” airspace – 1/8” monolithic – 2” airspace – 3/16” storm
2. STC 41: 3/16” laminated – 5/8” airspace – 1/4” laminated
3. STC 40: 3/16” laminated – 5/8” airspace – 1/4” laminated
4. STC 38: 1/4" monolithic – 5/8” airspace – 1/4” laminated
5. STC 37: 3/16” monolithic – 5/8” airspace – 1/4" laminated
6. STC 34: 1/4" monolithic – 1/2” airspace – 1/4” monolithic
7. STC 30: 1/8” monolithic – 3/4” airspace – 1/8” monolithic

However, it should be noted that an assembly’s frame and seals may limit the performance of the overall system. The assemblies given above are provided as a basis of design, but regardless of construction, the octave band transmission loss of the particular system selected must meet the minimum values in Table 7 above. Similarly, it is permissible to use an alternate assembly construction if it meets the transmission loss requirements. Note that the systems shall not be selected on the basis of STC rating alone.

Acoustical test reports should be provided for review by the design team to ensure compliance with glazing acoustical performance requirements. The tests shall be performed on the entire assembly, including frame and seals.

As noted in Table 4, corner residences in Zone A should receive an upgraded wall construction in addition to the STC rated windows to achieve an indoor noise level of 45 dBA. This wall should be composed of stucco/exterior finish on 1/2” plywood, 2’x4’ single stud, resilient channel and one layer of 5/8 inch type ‘x’ gypsum board on the inside.

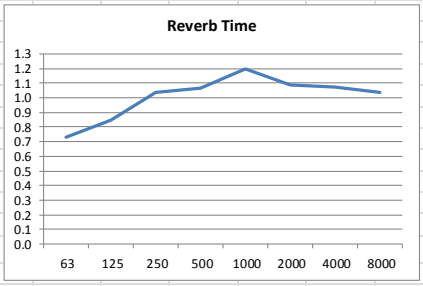
APPENDIX II – SAMPLE CALCULATIONS

Project Name: **TDI - 4275 Mission Bay**

Plan: Commercial Space

Receiving Room Absorption

		Location	Material	Code	Area
Length	30				
Width	40	Ceiling	1" Gypboard	22	1200
Height	12.0	Floor	Linoleum of Concrete	3	1200
		Walls	1" Gypboard	22	1488
Volume	14400	Furnishings	Furnishings	100	500
F/C area	1200	Glazing	1/4" Glass	48	192
Wall area	1680				
			Total Surface Area(ft^2) =		4580



Total Interior Level: **41.3**

(excluding 63 Hz): 41.2

	63	125	250	500	1000	2000	4000	8000	dBA
Room Constant	1073	919	735	712	629	692	692	676	

Exterior Noise Level

Level	Source type	63	125	250	500	1000	2000	4000	8000	dBA
72.0	Bay Measurements - Loc B Average	70.2	66.6	62.3	66.2	69.8	64.2	54.7	48.3	**72.0**
	<N/A>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
	<N/A>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
CNEL, LDN, or average:	**Total**	70.2	66.6	62.3	66.2	69.8	64.2	54.7	48.3	**72.0**

Exterior Assemblies

	Area	Assembly Type	63	125	250	500	1000	2000	4000	8000	dBA
			Average Interior Levels								
Wall	288	VA Typical Wall (stucco,2x4ws,5/8gyp) wyle	50.5	37.6	27.2	23.3	22.4	12.4	-0.1	-6.4	**28.9**
Glazing	192	WEAL STC 30-31 no lam average	49.0	44.3	43.0	39.0	36.4	28.0	21.8	0.0	**41.1**
		<N/A>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
		<N/A>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
		<N/A>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
% glazing:	40	**Total**	**52.8**	**45.2**	**43.1**	**39.1**	**36.5**	**28.1**	**21.9**	**-6.4**	**41.3**
		A-weighted	26.8	29.2	34.1	36.1	36.5	29.1	22.9	-7.4	

APPENDIX III– GLOSSARY OF ACOUSTICAL TERMS

Term	Definition
Absorption	A property of material referring to how much sound it absorbs (as opposed to reflecting). In the context of this report, absorption refers to the total quantity of absorption within the receiving space. Absorption is measure in sabins.
A-weighting (dBA)	The sound pressure level in decibels as measured in an A-weighting filter network. The A-weighting de-emphasizes the low frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
Decibel (dB)	A unit describing the amplitude of sound equivalent to 20 times the logarithm, to the base 10, of the ratio of the pressure of the sound to the reference pressure of 20 μPa. Used to quantify sound pressure levels.
Equivalent Sound Level (Leq)	The time-weighted average noise level during the stated measurement period.
Sabin	A unit used to describe absorption within a space. One sabin is equal to the absorption of a one-square-foot open window.
Sound Pressure Level (SPL)	The amplitude of sound when compared to the reference sound pressure level of 20 μPa. SPL is measured in dB.
Sound Transmission Class (STC)	A single-number metric used to describe the transmission loss performance of a material or assembly across the frequency spectrum. It is intended for use primarily when speech is the noise source.
Transmission Loss (TL)	A measure of the reduction in sound level as a sound wave passes through a material. The higher the transmission loss, the better the material's sound insulating properties.

APPENDIX IV – ACOUSTICAL CALCULATION METHODS

Decibel Addition

Decibels are based on a logarithmic scale; defined as the logarithmic ratio between a measured sound pressure level and a reference sound pressure level. When decibels are added, they are not combined arithmetically, but logarithmically. Decibels are added according to the following equation.

$$\boldsymbol{SPL_{tot} = 10log\left(10^{\left(SPL_1/10\right)}\right) + 10log\left(10^{\left(SPL_2/10\right)}\right)}$$

Where:
SPL_{tot} = Total Sound Pressure Level (dB or dBA)
SPL_1, SPL_2 = Sound Pressure Level 1, 2 (dB or dBA)

A-Weighting

A-weighting a spectrum is completed by applying standardized weighting factors to a frequency spectrum, either in octave bands or third-octave bands. These resultant A-weighted levels are summed using decibel addition to generate the overall A-weighted level, noted as dBA. In a report, spectral data is typically presented un-weighted, and the overall level is presented with A-weighting.

The octave band A-weighting correction factors are shown in the table below:

	Octave Band Center Frequency (Hz)							
	63	125	250	500	1000	2000	4000	8000
A-weighting Correction Factor (dB)	-26	-16	-9	-3	0	+1	+1	-1

Acoustical Shielding

The presence of adjacent buildings or facades, changes in terrain, parapets, and other similar barriers provide acoustical shielding, reducing the sound level incident on the exterior facades. Common locations where acoustical shielding occurs include, but are not limited to, the roof, the back, and sides of the building that are not directly facing the noise source.

Acoustical shielding due to building geometry can be separated into two categories: reduction due to reduced area of exposure (side of a building), and shielding from barriers (such as a parapet or sound wall).

Reduction as a result of reduced area of exposure is calculated according to the following equation:

$$\boldsymbol{\Delta SPL = 10\log_{10}\left(\frac{\theta_{exp}}{180}\right)}$$

Where:
ΔSPL = Change in Sound Pressure Level (dB)
θ_{exp} = Angle of exposure (degrees)

Acoustical Attenuation due to Distance

Sound pressure level reduction due to distance is calculated according to the following equation:

$$SPL_2 = SPL_1 + C_S \log\left(\frac{r_2}{r_1}\right)$$

Where:
SPL_1 = Sound Pressure Level at Location 1 (dB or dBA)
SPL_2 = Sound Pressure Level at Location 2 (dB or dBA)
C_S = Source Coefficient; 20 for point source, 10 for a line source
r_1 = Location 1 distance from source (ft.)
r_2 = Location 2 distance from source (ft.)

In some situations, the C_S value is between 10 and 20; selection of this number is an engineering judgment based on the relationship between the source and receiver as well as the type of source.

Interior Noise Calculation

The interior noise calculation takes into account the exterior noise level, the transmission loss of the glazing (including glass, frame, and seals), wall, and roof/ceiling systems, the finishes within the space, and noise exposure due to building geometry and acoustic shielding. The interior sound level is calculated using the equation:

$$SPL_I = SPL_E + 10\,log_{10}(A) - 10log_{10}(R) - TL + 6$$

Where:
SPL_I = the Interior Sound Pressure Level (dB or dBA)
SPL_E = Exterior Sound Pressure Level (dB or dBA)
A = Surface Area exposed to Exterior Noise (sq.ft.)
R = Room Absorption Coefficient (sabins)
TL = Sound Transmission Loss of Exterior Façade Assembly (dB)

This calculation is performed for each exposed façade individually. The total interior sound level is found by using decibel addition to sum the sound level from all exposed facades.

Greenhouse Gas Emissions Analysis for the Mission Bay Drive Mixed-Use Project (Jefferson Pacific Beach) City of San Diego, California

Prepared for:

JPI Real Estate Acquisition LLC
12250 El Camino Real, Suite 380
San Diego, California 92130
Contact: Justin Craig, 858-369-5684

Prepared by:

DUDEK
605 Third Street
Encinitas, California 92024
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JUNE 2016

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SUMMARY

The proposed 4275 Mission Bay Drive Mixed-Use project (project) entails development of residential and commercial retail and office land uses in the Pacific Beach community in the City of San Diego (City), California. The project is also referred to as the "Guy Hill Cadillac project", as the site was operated and still zoned and developed for automobile sales and service, as well as the "Jefferson Pacific Beach project". This report estimates greenhouse gas (GHG) emissions generated during construction and operation of the project and evaluates the project's potential effect on global climate change as requested by the City's Development Services staff during the project's land development review.

The project includes demolition of the existing structures and development of residential units over commercial and parking. The proposed structure will include 172 residential units totaling approximately 200,000 square feet gross floor area and 15,500 square feet of commercial retail and office space. The majority of the on-site parking will be provided in a parking structure at street-level which would positioned away from viewers. Additional subterranean parking would be provided. Parking amenities will total approximately 144,000 square feet, including space for utilities and storage.

The project is designed to be a Transit Oriented Development (TOD). The project's TOD and sustainable design characteristics include mixed-use land use development, high-density residential development and inclusion of affordable housing, site placement within an urbanized area near jobs and the City's downtown, and incorporation of features that encourage alternative modes of transportation, specifically pedestrian and bicycle travel, and bus transit, to reduce vehicle travel. In addition, the project is intended to enhance the existing neighborhood by providing a social gathering place and an outdoor area available for public use.

The City of San Diego has not established official thresholds of significance for GHG emissions; however, the City has provided interim guidance for assessing the potential for a project to result in a significant cumulative impact to climate change as a result of project-generated GHG emissions under the California Environmental Quality Act (CEQA). The City's interim guidance includes a screening threshold of 900 metric tons carbon dioxide equivalent (MT CO_2E) per year. The City requires that projects analyze emissions associated with both construction and operation, where construction emissions are amortized over a 30-year "project life" and then added to the estimated annual operational emissions.

Project-generated construction and operational GHG emissions were estimated using the California Emission Estimator Model (CalEEMod). Construction of the proposed project would result in GHG emissions associated with use of off-road construction equipment, on-road hauling

and vendor (material delivery) trucks, and worker vehicles. The total estimated GHG emissions generated during three-years of project construction would be approximately 1,318 MT CO_2E. Estimated project-generated construction emissions annualized over 30 years would be approximately 44 MT CO_2E per year.

Operation of the proposed project would result in GHG emissions from vehicular traffic, area sources (landscape maintenance), electricity use, natural gas consumption, water supply and wastewater generation, and solid waste. For purposes of determining the existing baseline conditions pursuant to CEQA Guidelines Section 15125, and consistent with SANDAG's long term projections for the project site, the GHG analysis includes GHG emissions attributable to traffic generated by the existing car dealership land use. Taking into consideration baseline conditions, as well as project design features, including the TOD characteristics previously discussed and the on-site solar energy system, the estimated annual operational project-generated emissions and amortized construction emissions above baseline conditions would be approximately 865 MT CO_2E per year. Therefore, the project's annual GHG emissions would be below the City's 900 MT CO_2E per year screening threshold and impacts would be **less than significant**.

In December 2015, the City adopted a Climate Action Plan (CAP) (City of San Diego 2015a). With implementation of the CAP, the City aims to reduce emissions 15% below the baseline to approximately 11.1 MMT CO_2E by 2020, 40% below the baseline to approximately 7.8 MMT CO_2E by 2030, and 50% below the baseline to approximately 6.5 MMT CO_2E by 2035. The City has identified the following five strategies to reduce GHG emissions to achieve the 2020 and 2035 targets: 1) energy and water efficient buildings; 2) clean and renewable energy; 3) bicycling, walking, transit, and land use; 4) zero waste (gas and waste management); and, 5) climate resiliency. An evaluation of the project's potential to conflict with the applicable strategies, goals, actions, and targets of the CAP was provided for disclosure. It is anticipated that the project would not conflict with the draft CAP goals applicable to the proposed land uses and the project would not impede the City's ability to implement the actions identified in the CAP to achieve the CAP's targets and associated GHG emission reductions.

The project would support achievement of the Executive Order's (EO) near-term 2020 goal (as codified in Assembly Bill (AB) 32) and the long-term 2050 goal through the project's TOD design and sustainability design features that would be implemented as part of the project. The project would result in the demolition of older, inefficient structures and the construction of a newer, energy-efficient structure and associated improvements. The proposed mixed-use development is intended to enhance the Pacific Beach neighborhood and would develop residences within close proximity to the San Diego downtown job center. Additionally, the project would be built approximately 0.4 mile from the planned Mid-Coast Balboa Avenue trolley station (approximately a 10 to 15 minute walking distance). The trolley station is

anticipated to be operational in 2019. Moreover, the higher-density infill development nature of the project would support the overarching intent of the San Diego Association of Governments (SANDAG) Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) by improving pedestrian and bicycle access to nearby locations, encouraging non-motorized modes of travel, and thus, reducing vehicle trips and vehicle miles travelled to and from the site. The project's TOD design and incorporation of sustainability design features would ensure that the project would not conflict with plans, policies, and initiatives designed to reduce GHG emissions. Therefore, this impact would **be less than significant**.

1 INTRODUCTION

1.1 Report Purpose

The purpose of this report is to evaluate the potential greenhouse gas (GHG) emissions impacts during construction and operation of the proposed mixed-use residential and commercial development at 4275 Mission Bay Drive in the City of San Diego (City), California. The project is also referred to as the "Guy Hill Cadillac project", as the site was operated and is still zoned and developed for automobile sales and service uses, as well as the "Jefferson Pacific Beach project".

This report has been prepared to satisfy the City's Development Services staff request for project information during Land Development Review (LDR)-Planning Review. The City of San Diego indicated that a GHG report that would analyze the GHG emissions resulting from construction activities and operation of the project is required. Consistent with City's request, this report estimates GHG emissions generated during construction (short-term emissions) and the five primary sources of GHG emissions during operation (long-term emissions): vehicular traffic, generation of electricity, natural gas consumption/combustion, solid waste generation and water usage (specifically, the energy used to supply, distribute, and treat water and wastewater).

Impacts are evaluated for their significance based on the City of San Diego's August guidance memorandum entitled *Addressing GHG Emissions from Projects Subject to CEQA* and Appendix G of the California Environmental Quality Act (CEQA) Guidelines.

1.2 Regional and Local Setting

The proposed project is located at 4275 Mission Bay Drive in the Pacific Beach community of the City. This project site area totals approximately 3 acres within includes three parcels: Assessor Parcel Numbers (APNs) 424-380-06-00, 424-380-07-00, and 424-362-24-00. The proposed project site is located in the San Diego Air Basin (SDAB), and is under the jurisdiction of the San Diego Air Pollution Control District (SDAPCD) (see Figures 1, 2 and 3).

The project site is bounded by Mission Bay Drive to the west and south, Rosewood Street to the north, and the Interstate 5 freeway to the east. In a regional setting, the proposed project is approximately 0.25 miles north of De Anza Cove of Mission Bay, approximately 6.40 miles northwest of downtown San Diego, approximately 2.65 miles east of the Pacific Ocean, approximately 3.00 miles south of California State Route 52, and just west of the neighboring community of Clairemont.

The project site is located within the Community Commercial (CC)-4-2 zone[1], the Coastal Height Limitation Overlay Zone, the Coastal Overlay Zone, the Parking Impact Overlay Zone (Coastal), and the Pacific Beach Community Plan and Local Coastal Program Land Use Plan. The property was originally developed as a car dealership and it is still zoned CC-4-2. That zone permits all forms of vehicle sales, rentals, repairs and maintenance uses as a matter of right. The property also still includes the physical improvements, such as the showroom, the freeway oriented sign and service bays, needed to operate a car dealership on site.

1.2 Project Description

The proposed project entails redevelopment of an auto dealership and service property with residential and commercial space. The project includes demolition of the existing structures and development of residential units over commercial and parking, and three townhome units. The proposed structure will include 172 residential units totaling approximately 200,000 square feet gross floor area and 15,500 square feet of commercial retail space. Per San Diego Municipal Code (SDMC) 156.0309(a) (e), the project qualifies for a 35% density bonus and is proposing 11% low income housing (14 units), which allows for the proposed 172 units.

A ground-level and subterranean parking structure will total approximately 144,000 square feet, including space for utilities and storage.

The proposed project is designed to be a Transit Oriented Development (TOD). The project site location in an urbanized area and incorporation of project features that encourage alternative modes of vehicle transportation (e.g., pedestrian, bicycle, and bus) are key elements of the project's TOD characteristics. Additional TOD and sustainable design features include:

- Bicycle parking – The project will include bicycle parking spaces in multiple locations and exterior sitting areas in front of the retail spaces. Bicycle racks will be visible and easily accessible from East Mission Bay Drive and Rosewood Street.
- Motorcycle parking – Approximately 25 designated motorcycle parking spaces are proposed.
- Near bus transit – The proposed project is located less than four blocks from the bus stop, which is anticipated to take approximately 10 to 15 minutes to walk. This is an advantage for proposed residents by promoting the use of public transportation rather than automobiles.

[1] Zone CC-4-2 is intended to accommodate development with high intensity, strip commercial characteristics, allowing heavy commercial uses and residential uses.

- Pedestrian enhancements – The project will include a terraced plaza, pedestrian access, articulation of façades by the use of material diversification, and landscapes along East Mission Bay Drive to enhance streetscape and provide a better pedestrian experience.

- Affordable housing – The project includes 14 affordable housing units.

- High-density development – The density of the project is estimated to be approximately 58.5 dwelling units per acre (172 dwelling units/2.94 acres).

- Service to nearby businesses and outdoor seating – The proposed development can service the adjacent motel and nearby business with a small restaurant or small retail/eatery shops and new outdoor seating areas will be provided. Tenants from existing commercial/retail locations currently have to drive to get food or to have a nice public space to have their lunches. The proposed exterior sitting areas will promote gathering without the use of automobiles.

- Neighborhood enhancement – The proposed plaza is intended to be a focal point that will benefit the community and the surrounding businesses by providing a space for social events, art displays, entertainment landscape (for shade and shadow), and potentially a water element. The proposed development is intended to improve the neighborhood by the use of attractive materials and engaging architectural design.

- Adaptive Traffic Signalization – The project proposes to provide Adaptive Traffic Signalization at six nearby intersection signals. Adaptive signal control technology adjusts the timing of red, yellow and green lights to accommodate changing traffic patterns and eases traffic congestion. Potential benefits include improving travel time reliability by progressively moving vehicles through green lights and reducing congestion by creating a smoother traffic flow.

The following discretionary permits are required at the indicated decision process:

- A Coastal Development Permit (CDP, Process 2, Staff level decision-maker) per SDMC Section 126.0702 for the development in the Coastal Overlay Zone; and

- A Neighborhood Development Permit (NDP, Process 2, Staff level decision-maker) is required where a project proposes privately owned structures within the public right of way.

2 Existing Conditions

This section includes a brief summary of the greenhouse effect and global climate change, emission inventories at the national and state levels, and potential changes to the global climate system and to California.

2.1 The Greenhouse Effect and Greenhouse Gases

Climate change refers to any significant change in measures of climate, such as temperature, precipitation, or wind, lasting for an extended period (decades or longer).

Gases that trap heat in the atmosphere are often called "greenhouse gases" (GHGs). The greenhouse effect traps heat in the troposphere through a threefold process as follows: Short-wave radiation emitted by the Sun is absorbed by the Earth; the Earth emits a portion of this energy in the form of long-wave radiation; and GHGs in the upper atmosphere absorb this long-wave radiation and emit it into space and toward the Earth. This "trapping" of the long-wave (thermal) radiation emitted back toward the Earth is the underlying process of the greenhouse effect. Principal GHGs include CO_2, methane (CH_4), nitrous oxide (N_2O), ozone (O_3), and water vapor (H_2O). Some GHGs, such as CO_2, CH_4, and N_2O, occur naturally and are emitted to the atmosphere through natural processes and human activities. Of these gases, CO_2 and CH_4 are emitted in the greatest quantities from human activities. Emissions of CO_2 are largely byproducts of fossil fuel combustion, whereas CH_4 results mostly from off-gassing associated with agricultural practices and landfills. Man-made GHGs, which have a much greater heat-absorption potential than CO_2, include fluorinated gases, such as hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF_6), and nitrogen trifluoride (NF_3), which are associated with certain industrial products and processes (Climate Action Team [CAT] 2006).

The greenhouse effect is a natural process that contributes to regulating the earth's temperature. Without it, the temperature of the Earth would be about 0°F (−18°C) instead of its present 57°F (14°C). Global climate change concerns are focused on whether human activities are leading to an enhancement of the greenhouse effect (National Climatic Data Center 2015).

The effect each GHG has on climate change is measured as a combination of the mass of its emissions and the potential of a gas or aerosol to trap heat in the atmosphere, known as its "global warming potential" (GWP). GWP varies between GHGs; for example, the GWP of CH_4 is 21, and the GWP of N_2O is 310. Total GHG emissions are expressed as a function of how

much warming would be caused by the same mass of CO_2. Thus, GHG gas emissions are typically measured in terms of pounds or tons of "CO_2 equivalent" (CO_2E).[2]

2.2 Contributions to Greenhouse Gas Emissions

In 2013, total U.S. GHG emissions were 6,673.0 million metric tons (MMT) CO_2E. Total U.S. emissions have increased by 5.9% from 1990 to 2013, and emissions increased from 2012 to 2013 by 2.0% (127.9 MMT CO_2E). The increase from 2012 to 2013 was due to an increase in the carbon intensity of fuels consumed to generate electricity due to an increase in coal consumption, with decreased natural gas consumption. Additionally, relatively cool winter conditions led to an increase in fuels for the residential and commercial sectors for heating. In 2013 there also was an increase in industrial production across multiple sectors resulting in increases in industrial sector emissions. Lastly, transportation emissions increased because of a small increase in vehicle miles traveled (VMT) and fuel use across on-road transportation modes. Since 1990, U.S. emissions have increased at an average annual rate of 0.3%. The primary GHG emitted by human activities in the U.S. was CO_2, representing approximately 82.5% of total GHG emissions. The largest source of CO_2, and of overall GHG emissions, was fossil-fuel combustion, which accounted for approximately 93.7% of CO_2 emissions in 2013 (EPA 2015).

According to the 2015 GHG inventory data compiled by CARB for the California Greenhouse Gas Inventory for 2000–2013, California emitted 459 MMT CO_2E of GHGs, including emissions resulting from out-of-state electrical generation (CARB 2015a). The primary contributors to GHG emissions in California are transportation, industry, electric power production from both in-state and out-of-state sources, agriculture, and other sources, which include commercial and residential activities. These primary contributors to California's GHG emissions and their relative contributions in 2013 are presented in Table 1, Greenhouse Gas Sources in California.

[2] The CO_2E for a gas is derived by multiplying the mass of the gas by the associated GWP, such that metric tons of CO_2E = (metric tons of a GHG) × (GWP of the GHG). CalEEMod assumes that the GWP for CH_4 is 21, which means that emissions of 1 metric ton of CH_4 are equivalent to emissions of 21 metric tons of CO_2, and the GWP for N_2O is 310, based on the Intergovernmental Panel on Climate Change (IPCC) Second Assessment Report. Although the IPCC has released subsequent Assessment Reports with updated GWPs, California Air Resources Board (CARB) reporting and other statewide documents utilize the GWP in the IPCC Second Assessment Report. As such, it is appropriate to use the hardwired GWP values in CalEEMod from the IPCC Second Assessment Report.

Table 1
Greenhouse Gas Sources in California

Source Category	Annual GHG Emissions (MMT CO_2E)	% of Total[a]
Agriculture	36.21	7.8%
Commercial uses	15.42	3.4%
Electricity generation	90.45 [b]	19.6%
Industrial uses	92.68	20.2%
Recycling and waste	8.87	1.9%
Residential uses	28.11	6.1%
Transportation	169.02	36.8%
High GWP substances	18.50	4.0%
Totals[c]	459.3	100%

Source: CARB 2015a.
[a] Percentage of total has been rounded.
[b] Includes emissions associated with imported electricity, which account for 39.99 MMT CO_2E annually.
[c] Totals may not sum due to rounding.

The City of San Diego community-wide GHG emissions baseline inventory in 2010 was estimated to be 13,019,591 MT CO_2E (City of San Diego 2015a). Transportation is the largest contributor to the emissions, accounting for 54% of the City's 2010 total, followed by electricity at 24% of the emissions. Accounting for future population and economic growth, the City projects GHG emissions of 14,067,316 MT CO_2E in 2020 and 16,427,118 MT CO_2E in 2035 (City of San Diego 2015a).

2.3 Potential Effects of Human Activity on Climate Change

According to CARB, some of the potential impacts in California of global warming may include loss in snow pack, sea level rise, more extreme heat days per year, more high O_3 days, more large forest fires, and more drought years (CARB 2006). Several recent studies have attempted to explore the possible negative consequences that climate change, if left unchecked, could have in California. These reports acknowledge that climate scientists' understanding of the complex global climate system, and the interplay of the various internal and external factors that affect climate change, remains too limited to yield scientifically valid conclusions on such a localized scale. Substantial work has been done at the international and national level to evaluate climatic impacts, but far less information is available on regional and local impacts.

The primary effect of global climate change has been a rise in average global tropospheric temperature of 0.2°C (0.36°F) per decade, determined from meteorological measurements worldwide between 1990 and 2005. Some risks of global climate change are considerable even at 1°C global mean temperature increase above pre-industrial levels. These risks include threats to

unique and threatened systems, increase in frequency of extreme weather events, and ocean acidification (IPCC 2014).

Although climate change is driven by global atmospheric conditions, climate change impacts are felt locally. Climate change is already affecting California: average temperatures have increased, leading to more extreme hot days and fewer cold nights; shifts in the water cycle have been observed, with less winter precipitation falling in the form of snow, and both snowmelt and rainwater running off earlier in the year; sea levels have risen; and wildland fires are becoming more frequent and intense due to dry seasons that start earlier and end later (CAT 2010a). Climate change modeling using 2000 emission rates shows that further warming would occur, which would induce further changes in the global climate system during the current century. Changes to the global climate system and ecosystems and to California would include, but would not be limited to, the following:

- The loss of sea ice and mountain snowpack resulting in higher sea levels and higher sea surface evaporation rates with a corresponding increase in tropospheric water vapor due to the atmosphere's ability to hold more water vapor at higher temperatures (IPCC 2007). The annual mean Arctic sea ice extent decreased over the period 1979 to 2012, with a rate that was very likely in the range 3.5 to 4.1% per decade (IPCC 2014).
- A rise in global average sea level primarily due to thermal expansion and melting of glaciers and ice caps and the Greenland and Antarctic ice sheets. Over the period 1901-2010, global mean sea level rose by 0.19 [0.17 to 0.21] meters (IPCC 2014)
- Changes in weather that includes widespread changes in precipitation, ocean salinity, and wind patterns, and more energetic aspects of extreme weather including droughts, heavy precipitation, heat waves, extreme cold, and the intensity of tropical cyclones (IPCC 2014)
- A decline of Sierra snowpack, which accounts for approximately half of the surface water storage in California, by 70% to as much as 90% over the next 100 years (CAT 2006)
- An increase in the number of days conducive to O_3 formation by 25% to 85% (depending on the future temperature scenario) in high O_3 areas of Los Angeles and the San Joaquin Valley by the end of the 21st century (CAT 2006)
- High potential for erosion of California's coastlines and sea water intrusion into the Delta and levee systems due to the rise in sea level (CAT 2010b).

3 REGULATORY SETTING

This section discusses the key federal and state regulatory efforts that could apply to development of the proposed Mission Bay Mixed-Use project.

3.1 Federal

Massachusetts vs. EPA

On April 2, 2007, in *Massachusetts v. EPA*, the Supreme Court directed the U.S. Environmental Protection Agency (EPA) Administrator to determine whether GHG emissions from new motor vehicles cause or contribute to air pollution that may reasonably be anticipated to endanger public health or welfare, or whether the science is too uncertain to make a reasoned decision. In making these decisions, the EPA Administrator is required to follow the language of Section 202(a) of the Clean Air Act (CAA). On December 7, 2009, the Administrator signed a final rule with two distinct findings regarding GHGs under Section 202(a) of the CAA:

- The Administrator found that elevated concentrations of GHGs—CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6—in the atmosphere threaten the public health and welfare of current and future generations. This is referred to as the "endangerment finding."
- The Administrator further found the combined emissions of GHGs—CO_2, CH_4, N_2O, and HFCs—from new motor vehicles and new motor vehicle engines contribute to the GHG air pollution that endangers public health and welfare. This is referred to as the "cause or contribute finding."

These two findings were necessary to establish the foundation for regulation of GHGs from new motor vehicles as air pollutants under the CAA.

Energy Independence and Security Act

On December 19, 2007, President Bush signed the Energy Independence and Security Act of 2007. Among other key measures, the Act would do the following, which would aid in the reduction of national GHG emissions:

1. Increase the supply of alternative fuel sources by setting a mandatory Renewable Fuel Standard (RFS) requiring fuel producers to use at least 36 billion gallons of biofuel in 2022.
2. Set a target of 35 miles per gallon (mpg) for the combined fleet of cars and light trucks by model year 2020 and directs National Highway Traffic Safety Administration (NHTSA) to establish a fuel economy program for medium- and heavy-duty trucks and create a separate fuel economy standard for work trucks.

3. Prescribe or revise standards affecting regional efficiency for heating and cooling products and procedures for new or amended standards, energy conservation, energy efficiency labeling for consumer electronic products, residential boiler efficiency, electric motor efficiency, and home appliances.

EPA and NHTSA Joint Rule for Vehicle Standards

On April 1, 2010, the EPA and NHTSA announced a joint final rule to establish a national program consisting of new standards for light-duty vehicles model years 2012 through 2016. The joint rule is intended to reduce GHG emissions and improve fuel economy. The EPA approved the first-ever national GHG emissions standards under the CAA, and NHTSA approved Corporate Average Fuel Economy (CAFE) standards under the Energy Policy and Conservation Act (75 FR 25324–25728). The final rule became effective on July 6, 2010 (75 FR 25324–25728).

The EPA's GHG standards require new passenger cars, light-duty trucks, and medium-duty passenger vehicles to meet an estimated combined average emissions level of 250 grams of CO_2 per mile in model year 2016, equivalent to 35.5 mpg if the automotive industry were to meet this CO_2 level through fuel economy improvements alone. The CAFE standards for passenger cars and light trucks will be phased in between 2012 and 2016, with the final standards equivalent to 37.8 mpg for passenger cars and 28.8 mpg for light trucks, resulting in an estimated combined average of 34.1 mpg. The rules will simultaneously reduce GHG emissions, improve energy security, increase fuel savings, and provide clarity and predictability for manufacturers.

In August 2012, the EPA and NHTSA approved a second round of GHG and CAFE standards for model years 2017 and beyond (77 FR 62624–63200). These standards will reduce motor vehicle GHG emissions to 163 grams of CO_2 per mile, which is equivalent to 54.5 mpg if this level were achieved solely through improvements in fuel efficiency, for cars and light-duty trucks by model year 2025. A portion of these improvements, however, will likely be made through reductions in air conditioning leakage and through use of alternative refrigerants, which would not contribute to fuel economy. The regulations also include targeted incentives to encourage early adoption and introduction into the marketplace of advanced technologies to dramatically improve vehicle performance, including the following:

- Incentives for electric vehicles, plug-in hybrid electric vehicles, and fuel cells vehicles;
- Incentives for hybrid technologies for large pickups and for other technologies that achieve high fuel economy levels on large pickups;
- Incentives for natural gas vehicles; and

- Credits for technologies with potential to achieve real-world GHG reductions and fuel economy improvements that are not captured by the standards test procedures.

3.2 State

Assembly Bill 1493

In a response to the transportation sector accounting for more than half of California's CO_2 emissions, AB 1493 (Pavley) was enacted on July 22, 2002. AB 1493 required CARB to set GHG emission standards for passenger vehicles, light-duty trucks, and other vehicles determined by the state board to be vehicles whose primary use is noncommercial personal transportation in the state. The bill required that CARB set GHG emission standards for motor vehicles manufactured in 2009 and all subsequent model years. CARB adopted the standards in September 2004. When fully phased in, the near-term (2009–2012) standards will result in a reduction of about 22% in GHG emissions compared to the emissions from the 2002 fleet, while the mid-term (2013–2016) standards will result in a reduction of about 30%.

Before these regulations could go into effect, the EPA had to grant California a waiver under the federal CAA, which ordinarily preempts state regulation of motor vehicle emission standards. The waiver was granted by Lisa Jackson, the EPA Administrator, on June 30, 2009. On March 29, 2010, the CARB Executive Officer approved revisions to the motor vehicle GHG standards to harmonize the state program with the national program for 2012–2016 model years (see "EPA and NHTSA Joint Final Rule for Vehicle Standards" above). The revised regulations became effective on April 1, 2010.

Executive Order S-1-07

Issued on January 18, 2007, Executive Order S-1-07 sets a declining Low Carbon Fuel Standard (LCFS) for GHG emissions measured in CO_2E gram per unit of fuel energy sold in California. The target of the LCFS is to reduce the carbon intensity of California passenger vehicle fuels by at least 10% by 2020. The carbon intensity measures the amount of GHG emissions in the lifecycle of a fuel, including extraction/feedstock production, processing, transportation, and final consumption, per unit of energy delivered. CARB adopted the implementing regulation in April 2009. The regulation is expected to increase the production of biofuels, including those from alternative sources such as algae, wood, and agricultural waste. In addition, the LCFS would drive the availability of plug-in hybrid, battery electric, and fuel-cell power motor vehicles. The LCFS is anticipated to replace 20% of the fuel used in motor vehicles with alternative fuels by 2020.

Executive Order S-3-05

In June 2005, Governor Schwarzenegger established California's GHG emissions reduction targets in Executive Order S-3-05. The Executive Order established the following goals: GHG emissions should be reduced to 2000 levels by 2010; GHG emissions should be reduced to 1990 levels by 2020; and GHG emissions should be reduced to 80% below 1990 levels by 2050. The California EPA secretary is required to coordinate efforts of various agencies to collectively and efficiently reduce GHGs. The CAT is responsible for implementing global warming emissions reduction programs. Representatives from several state agencies comprise the CAT. The CAT fulfilled its report requirements through the March 2006 *Climate Action Team Report* to the governor and the legislature (CAT 2006).

The 2009 *Climate Action Team Biennial Report* (CAT 2010c), published in April 2010, expands on the policy outlined in the 2006 assessment. The 2009 report provides new information and scientific findings regarding the development of new climate and sea level projections using new information and tools that have recently become available and evaluates climate change within the context of broader social changes, such as land use changes and demographics. The 2009 report also identifies the need for additional research in several different aspects that affect climate change in order to support effective climate change strategies. The aspects of climate change determined to require future research include vehicle and fuel technologies, land use and smart growth, electricity and natural gas, energy efficiency, renewable energy and reduced carbon energy sources, low GHG technologies for other sectors, carbon sequestration, terrestrial sequestration, geologic sequestration, economic impacts and considerations, social science, and environmental justice.

Subsequently, the 2010 *Climate Action Team Report to Governor Schwarzenegger and the California Legislature* (CAT 2010a) reviews past climate action milestones including voluntary reporting programs, GHG standards for passenger vehicles, the LCFS, a statewide renewable energy standard, and the cap-and-trade program. Additionally, the 2010 report includes a cataloguing of recent research and ongoing projects; mitigation and adaptation strategies identified by sector (e.g., agriculture, biodiversity, electricity, and natural gas); actions that can be taken at the regional, national, and international levels to mitigate the adverse effects of climate change; and today's outlook on future conditions.

Assembly Bill 32

In furtherance of the goals established in Executive Order S-3-05, the legislature enacted AB 32 (Núñez and Pavley), the California Global Warming Solutions Act of 2006, which Governor Schwarzenegger signed on September 27, 2006. The GHG emissions limit is equivalent to the 1990 levels, which are to be achieved by 2020.

CARB has been assigned to carry out and develop the programs and requirements necessary to achieve the goals of AB 32. Under AB 32, CARB must adopt regulations requiring the reporting and verification of statewide GHG emissions. This program will be used to monitor and enforce compliance with the established standards. CARB is also required to adopt rules and regulations to achieve the maximum technologically feasible and cost-effective GHG emission reductions. AB 32 allows CARB to adopt market-based compliance mechanisms to meet the specified requirements. Finally, CARB is ultimately responsible for monitoring compliance and enforcing any rule, regulation, order, emission limitation, emission reduction measure, or market-based compliance mechanism adopted.

The first action under AB 32 resulted in the adoption of a report listing early action GHG emission reduction measures on June 21, 2007. The early actions include three specific GHG control rules. On October 25, 2007, CARB approved an additional six early action GHG reduction measures under AB 32. The three original early action regulations meeting the narrow legal definition of "discrete early action GHG reduction measures" include:

1. A LCFS to reduce the "carbon intensity" of California fuels.
2. Reduction of refrigerant losses from motor vehicle air conditioning system maintenance to restrict the sale of "do-it-yourself" automotive refrigerants.
3. Increased CH_4 capture from landfills to require broader use of state-of-the-art CH_4 capture technologies.

The additional six early action regulations, which were also considered "discrete early action GHG reduction measures," consist of:

1. Reduction of aerodynamic drag, and thereby fuel consumption, from existing trucks and trailers through retrofit technology.
2. Reduction of auxiliary engine emissions of docked ships by requiring port electrification.
3. Reduction of PFCs from the semiconductor industry.
4. Reduction of propellants in consumer products (e.g., aerosols, tire inflators, and dust removal products).
5. Requirements that all tune-up, smog check, and oil change mechanics ensure proper tire inflation as part of overall service in order to maintain fuel efficiency.
6. Restriction on the use of SF_6 from non-electricity sectors if viable alternatives are available.

As required under AB 32, on December 6, 2007, CARB approved the 1990 GHG emissions inventory, thereby establishing the emissions limit for 2020. The 2020 emissions limit was set at

427 MMT CO_2E. In addition to the 1990 emissions inventory, CARB also adopted regulations requiring mandatory reporting of GHGs for large facilities that account for 94% of GHG emissions from industrial and commercial stationary sources in California. About 800 separate sources fall under the new reporting rules and include electricity generating facilities, electricity retail providers and power marketers, oil refineries, hydrogen plants, cement plants, cogeneration facilities, and other industrial sources that emit CO_2 in excess of specified thresholds.

On December 11, 2008, CARB approved the *Climate Change Proposed Scoping Plan: A Framework for Change* (Scoping Plan; CARB 2008) to achieve the goals of AB 32. The Scoping Plan establishes an overall framework for the measures that will be adopted to reduce California's GHG emissions. The Scoping Plan evaluates opportunities for sector-specific reductions, integrates all CARB and CAT early actions and additional GHG reduction measures by both entities, identifies additional measures to be pursued as regulations, and outlines the role of a cap-and-trade program.

The key elements of the Scoping Plan include:

- Expanding and strengthening existing energy efficiency programs as well as building and appliance standards;
- Achieving a statewide renewables energy mix of 33%;
- Developing a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system and caps sources contributing 85% of California's GHG emissions;
- Establishing targets for transportation-related GHG emissions for regions throughout California, and pursuing policies and incentives to achieve those targets;
- Adopting and implementing measures pursuant to existing state laws and policies, including California's clean car standards, goods movement measures, and the LCFS; and
- Creating targeted fees, including a public goods charge on water use, fees on high global warming potential gases, and a fee to fund the administrative costs of the State of California's long term commitment to AB 32 implementation.

The First Update to the Climate Change Scoping Plan (Scoping Plan Update) was approved by the CARB Board on May 22, 2014. The Scoping Plan Update builds upon the initial Scoping Plan with new strategies and recommendations. The update identifies opportunities to leverage existing and new funds to further drive GHG emission reductions through strategic planning and targeted low carbon investments. The update defines CARB's climate change priorities for the next five years and sets the groundwork to reach California's long-term climate goals set

forth in Executive Orders S-3-05 and B-16-2012. The update highlights California's progress toward meeting the near-term 2020 GHG emission reduction goals defined in the initial Scoping Plan. These efforts were pursued to achieve the near-term 2020 goal and have created a framework for ongoing climate action that can be built upon to maintain and continue economic sector-specific reductions beyond 2020, as required by AB 32. The Scoping Plan Update identifies nine key focus areas or sectors (energy, transportation, agriculture, water, waste management, and natural and working lands), along with short-lived climate pollutants, green buildings, and the cap-and-trade program (CARB 2014). The update also recommends that a statewide mid-term target and mid-term and long-term sector targets be established toward meeting the 2050 goal established by Executive Order S-3-05 to reduce California's GHG emissions to 80% below 1990 levels, although no specific recommendations are made.

Assembly Bill 900

On September 27, 2011, Governor Jerry Brown signed AB 900, the "Jobs and Economic Improvement Through Environmental Leadership Act." Under AB 900, specific projects may be qualified for expedited and streamlined environmental review under CEQA. As stated in Section 21183, a project that is identified as an "environmental leadership project" under AB 900 may be certified for streamlining if the project applicant invests $100,000,000 in the State of California following construction, creates high-wage jobs, would not result in any net additional GHG emissions from employee transportation, and mitigation measures identified under environmental review become conditions of approval for the project, among others.

Executive Order B-30-15

On April 29, 2015, Governor Jerry Brown issued an executive order which identified an interim GHG reduction target in support of targets previously identified under S-3-05 and AB 32. Executive Order B-30-15 set an interim target goal of reducing GHG emissions to 40% below 1990 levels by 2030 to keep California on its trajectory toward meeting or exceeding the long-term goal of reducing GHG emissions to 80% below 1990 levels by 2050 as set forth in S-3-05. To facilitate achievement of this goal, B-30-15 calls for an update to CARB's Scoping Plan to express the 2030 target in terms of MMT CO_2E. The Executive Order also calls for state agencies to continue to develop and implement GHG emission reduction programs in support of the reduction targets. Sector-specific agencies in transportation, energy, water and forestry will be required to prepare GHG reduction plans by September 2015, followed by a report on actions taken in relation to these plans in June 2016. The Executive Order does not require local agencies to take any action to meet the new interim GHG reduction threshold. It is important to note that Executive Order B-30-15 was not adopted by a public agency through a public review process that requires analysis pursuant to CEQA Guidelines section 15064.4

and that it has not been subsequently validated by a statute as an official GHG reduction target of the State of California. The Executive Order itself states it is "not intended to create, and does not, create any rights of benefits, whether substantive or procedural, enforceable at law or in equity, against the State of California, its agencies, departments, entities, officers employees, or any other person."

Executive Order S-14-08

On November 17, 2008, Governor Schwarzenegger issued Executive Order S-14-08. This Executive Order focuses on the contribution of renewable energy sources to meet the electrical needs of California while reducing the GHG emissions from the electrical sector. The governor's order requires that all retail suppliers of electricity in California serve 33% of their load with renewable energy by 2020. Furthermore, the order directs state agencies to take appropriate actions to facilitate reaching this target. The Resources Agency, through collaboration with the California Energy Commission (CEC) and California Department of Fish and Wildlife (CDFW; formerly California Department of Fish and Game), is directed to lead this effort. Pursuant to a Memorandum of Understanding between the CEC and CDFW creating the Renewable Energy Action Team, these agencies will create a "one-stop" process for permitting renewable energy power plants.

Executive Order S-21-09

On September 15, 2009, Governor Schwarzenegger issued Executive Order S-21-09. This Executive Order directed CARB to adopt a regulation consistent with the goal of Executive Order S-14-08 by July 31, 2010. CARB is further directed to work with the California Public Utilities Commission (CPUC) and CEC to ensure that the regulation builds upon the Renewable Portfolio Standard (RPS) program and is applicable to investor-owned utilities, publicly owned utilities, direct access providers, and community choice providers. Under this order, CARB is to give the highest priority to those renewable resources that provide the greatest environmental benefits with the least environmental costs and impacts on public health and can be developed the most quickly in support of reliable, efficient, cost-effective electricity system operations. On September 23, 2010, CARB adopted regulations to implement a "Renewable Electricity Standard," which would achieve the goal of the Executive Order with the following intermediate and final goals: 20% for 2012–2014, 24% for 2015–2017, 28% for 2018–2019, and 33% for 2020 and beyond. Under the regulation, wind; solar; geothermal; small hydroelectric; biomass; ocean wave, thermal, and tidal; landfill and digester gas; and biodiesel would be considered sources of renewable energy. The regulation would apply to investor-owned utilities and public (municipal) utilities.

Senate Bill 97

In August 2007, the legislature enacted SB 97 (Dutton), which directs the Governor's Office of Planning and Research (OPR) to develop guidelines under CEQA for the mitigation of GHG emissions. OPR was tasked to develop proposed guidelines by July 1, 2009, and the California Natural Resources Agency (CNRA) directed to adopt guidelines by January 1, 2010.

On June 19, 2008, OPR issued a technical advisory as interim guidance regarding the analysis of GHG emissions in CEQA documents (OPR 2008). The advisory indicated that a project's GHG emissions, including those associated with vehicular traffic, energy consumption, water usage, and construction activities, should be identified and estimated. The advisory further recommended that the lead agency determine significance of the impacts and impose all mitigation measures that are necessary to reduce GHG emissions to a less than significant level.

On April 13, 2009, OPR submitted to the CNRA its proposed amendments to the state CEQA Guidelines relating to GHG emissions. On July 3, 2009, the CNRA commenced the Administrative Procedure Act rulemaking process for certifying and adopting the proposed amendments, starting the public comment period.

The CNRA adopted CEQA Guidelines Amendments on December 30, 2009, and transmitted them to the Office of Administrative Law on December 31, 2009. On February 16, 2010, the Office of Administrative law completed its review and filed the amendments with the secretary of state. The amendments became effective on March 18, 2010. The amended guidelines establish several new CEQA requirements concerning the analysis of GHGs, including the following:

- Requiring a lead agency to "make a good faith effort, based to the extent possible on scientific and factual data, to describe, calculate or estimate the amount of greenhouse gas emissions resulting from a project" (Section 15064.4(a));
- Providing a lead agency with the discretion to determine whether to use quantitative or qualitative analysis or performance standards to determine the significance of GHG emissions resulting from a particular project (Section 15064.4(a));
- Requiring a lead agency to consider the following factors when assessing the significant impacts from GHG emissions on the environment;
- The extent to which the project may increase or reduce GHG emissions as compared to the existing environmental setting;

- Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project;
- The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions (Section 15064.4(b)); and
- Allowing lead agencies to consider feasible means of mitigating the significant effects of GHG emissions, including reductions in emissions through the implementation of project features or off-site measures, including offsets that are not otherwise required (Section 15126.4(c)).

The amended guidelines also establish two new guidance questions regarding GHG emissions in the Environmental Checklist set forth in CEQA Guidelines Appendix G:

- Would the project generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment?
- Would the project conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs?

The adopted amendments do not establish a GHG emission threshold, and instead allow a lead agency to develop, adopt, and apply its own thresholds of significance or those developed by other agencies or experts.[3] The CNRA also acknowledges that a lead agency may consider compliance with regulations or requirements implementing AB 32 in determining the significance of a project's GHG emissions.[4]

Senate Bill 1078

Approved by former governor Davis in September 2002, SB 1078 (Sher) established the RPS program, which requires an annual increase in renewable generation by the utilities equivalent to at least 1% of sales, with an aggregate goal of 20% by 2017. This goal was subsequently accelerated, requiring utilities to obtain 20% of their power from renewable sources by 2010 (see SB 107 and Executive Orders S-14-08 and S-21-09.)

[3] "The CEQA Guidelines do not establish thresholds of significance for other potential environmental impacts, and SB 97 did not authorize the development of a statement threshold as part of this CEQA Guidelines update. Rather, the proposed amendments recognize a lead agency's existing authority to develop, adopt and apply their own thresholds of significance or those developed by other agencies or experts" (CNRA 2009, p. 84).

[4] "A project's compliance with regulations or requirements implementing AB 32 or other laws and policies is not irrelevant. Section 15064.4(b)(3) would allow a lead agency to consider compliance with requirements and regulations in the determination of significance of a project's greenhouse gas emissions" (CNRA 2009, p. 100).

Senate Bill 107

Approved by former governor Schwarzenegger on September 26, 2006, SB 107 (Simitian) requires investor-owned utilities such as Pacific Gas and Electric, Southern California Edison, and San Diego Gas and Electric, to generate 20% of their electricity from renewable sources by 2010. Previously, state law required that this target be achieved by 2017 (see SB 1078).

Senate Bill 1368

In September 2006, Governor Schwarzenegger signed SB 1368, which requires the CEC to develop and adopt regulations for GHG emissions performance standards for the long-term procurement of electricity by local publicly owned utilities. These standards must be consistent with the standards adopted by the CPUC. This effort will help protect energy customers from financial risks associated with investments in carbon-intensive generation by allowing new capital investments in power plants whose GHG emissions are as low or lower than new combined-cycle natural gas plants, by requiring imported electricity to meet GHG performance standards in California, and by requiring that the standards be developed and adopted in a public process.

Senate Bill 375

In August 2008, the legislature passed and on September 30, 2008, Governor Schwarzenegger signed SB 375 (Steinberg), which addresses GHG emissions associated with the transportation sector through regional transportation and sustainability plans. Regional GHG reduction targets for the automobile and light-truck sector for 2020 and 2035, as determined by CARB, are required to consider the emission reductions associated with vehicle emission standards (see SB 1493), the composition of fuels (see Executive Order S-1-07), and other CARB-approved measures to reduce GHG emissions. Regional metropolitan planning organizations (MPOs) will be responsible for preparing a Sustainable Communities Strategy (SCS) within their Regional Transportation Plan (RTP). The goal of the SCS is to establish a development plan for the region, which, after considering transportation measures and policies, will achieve, if feasible, the GHG reduction targets. If a SCS is unable to achieve the GHG reduction target, an MPO must prepare an Alternative Planning Strategy demonstrating how the GHG reduction target would be achieved through alternative development patterns, infrastructure, or additional transportation measures or policies. SB 375 provides incentives for streamlining CEQA requirements by substantially reducing the requirements for “transit priority projects,” as specified in SB 375, and eliminating the analysis of the impacts of certain residential projects on global warming and the growth-inducing impacts of those projects when the projects are consistent with the SCS or Alternative Planning Strategy.

On September 23, 2010, CARB adopted the SB 375 targets for the regional MPOs. The targets for the San Diego Association of Governments (SANDAG) are a 7% reduction in emissions per capita by 2020 and a 13% reduction by 2035 as established in SANDAG's RTP (SANDAG 2011a). Achieving these goals through adoption of a SCS will be the responsibility of the MPOs. The In November 2014, SANDAG lost a 2-1 Fourth District Court of Appeal decision, which deemed the environmental review of the RTP inadequate under CEQA regarding GHG emissions because it did not analyze the RTP against Executive Order S-3-05 as discussed previously. SANDAG has appealed the decision to the Supreme Court.

Senate Bill X1 2

On April 12, 2011, Governor Jerry Brown signed SB X1 2 in the First Extraordinary Session, which would expand the RPS by establishing a goal of 20% of the total electricity sold to retail customers in California per year, by December 31, 2013, and 33% by December 31, 2020, and in subsequent years. Under the bill, a renewable electrical generation facility is one that uses biomass, solar thermal, photovoltaic, wind, geothermal, fuel cells using renewable fuels, small hydroelectric generation of 30 megawatts or less, digester gas, municipal solid waste conversion, landfill gas, ocean wave, ocean thermal, or tidal current and that meets other specified requirements with respect to its location. In addition to the retail sellers covered by SB 107, SB X1 2 adds local publicly owned electric utilities to the RPS. By January 1, 2012, the CPUC is required to establish the quantity of electricity products from eligible renewable energy resources to be procured by retail sellers in order to achieve targets of 20% by December 31, 2013; 25% by December 31, 2016; and 33% by December 31, 2020. The statute also requires that the governing boards for local publicly owned electric utilities establish the same targets, and the governing boards would be responsible for ensuring compliance with these targets. The CPUC will be responsible for enforcement of the RPS for retail sellers, while the CEC and CARB will enforce the requirements for local publicly owned electric utilities.

California Air Pollution Control Officers Association

The California Air Pollution Control Officers Association (CAPCOA) is the association of Air Pollution Control Officers representing all 35 air quality agencies throughout California. CAPCOA is not a regulatory body, but has been an active organization in providing guidance in addressing the CEQA significance of GHG emissions and climate change as well as other air quality issues.

Pacific Coast Action Plan on Climate and Energy

On October 28, 2013, on the occasion of the fourth annual Leaders' Forum of the Pacific Coast Collaborative the governors of California, Oregon, Washington, and British Columbia signed

into action the Pacific Coast Action Plan on Climate and Energy. The plan calls for the four governments to harmonize 2050 targets for GHG reductions and develop mid-term targets needed to support long-term reduction goals. The collaboration will take actions to expand the use of zero-emission vehicles, aiming for 10% of new public and private vehicle purchases by 2016. Markets are to be transformed for energy efficiency and lead the way to "net-zero" buildings. The plan also calls for the cooperation with national and sub-national governments around the world to press for an international agreement on climate change in 2015.

Title 24 of the California Code of Regulations

Title 24 of the California Code of Regulations was established in 1978 and serves to enhance and regulate California's building standards. While not initially promulgated to reduce GHG emissions, Part 6 of Title 24 specifically establishes energy efficiency standards for residential and non-residential buildings constructed in the State of California in order to reduce energy demand and consumption. Part 6 is updated periodically to incorporate and consider new energy efficiency technologies and methodologies. The most recent amendments, referred to as the 2013 standards, became effective on July 1, 2014. Buildings constructed in accordance with the 2013 standards will use 25% less energy for lighting, heating, cooling, ventilation, and water heating than the 2008 standards. Additionally, the standards will save 200 million gallons of water per year and avoid 170,500 tons of GHG emissions per year (CEC 2012).

Title 24 also includes Part 11, known as California's Green Building Standards (CALGreen). The CALGreen standards took effect in January 2011, and instituted mandatory minimum environmental performance standards for all ground-up, new construction of commercial, low-rise residential and state-owned buildings, as well as schools and hospitals. The mandatory standards require:

- 20% mandatory reduction in indoor water use;
- 50% of construction and demolition waste must be diverted from landfills;
- Mandatory inspections of energy systems to ensure optimal working efficiency; and
- Low-pollutant emitting exterior and interior finish materials, such as paints, carpets, vinyl flooring and particle boards.

The CALGreen standards also include voluntary efficiency measures that are provided at two separate tiers and implemented per the discretion of local agencies and applicants. CALGreen's Tier 1 standards call for a 15% improvement in energy requirements; more strict water conservation, 65% diversion of construction and demolition waste, 10% recycled content in

building materials, 20% permeable paving, 20% cement reduction, and cool/solar reflective roofs. CALGreen's more rigorous Tier 2 standards call for a 30% improvement in energy requirements, more strict water conservation, 75% diversion of construction and demolition waste, 15% recycled content in building materials, 30% permeable paving, 30% cement reduction, and cool/solar reflective roofs.

3.3 Local

City of San Diego

On January 29, 2002, the San Diego City Council unanimously approved the San Diego Sustainable Community Program. Actions identified include:

1. Participation in the Cities for Climate Protection (CCP) program coordinated through the International Council of Local Environmental Initiatives (ICLEI);

2. Establishment of a 15% GHG reduction goal set for 2010, using 1990 as a baseline; and

3. Direction to use the recommendations of a scientific Ad Hoc Advisory Committee as a means to improve the GHG Emission Reduction Action Plan within the City organization and to identify additional community actions.

In 2005, the City released a Climate Protection Action Plan. This report includes many of the recommendations provided by the Ad Hoc Advisory Committee and City staff. By implementing these recommendations the City could directly address the challenges relating to mitigation for State and Federal Ozone Standards non-attainment (with associated health benefits) and enhanced economic prosperity, specifically related to the tourism and agricultural sectors.

The Climate Protection Action Plan evaluated citywide GHG emissions, particularly three contentions: 1) the GHG projection in 2010 resulting from no action taken to curb emissions; 2) the GHG Emission reductions due to City of San Diego actions implemented between 1990 and 2003; and, 3) the GHG reductions needed by 2010 to achieve 15% reduction. The Climate Protection Action Plan does not recommend or require specific strategies or measures for projects within the City to reduce emissions.

In December 2015, the City adopted its final Climate Action Plan (CAP) (City of San Diego 2015a). A Program Environmental Impact Report (PEIR) was prepared for the City's Draft CAP, which was certified in December 2015. With implementation of the CAP, the City aims to reduce emissions 15% below the baseline to approximately 11.1 MMT CO_2E by 2020, 40% below the baseline to approximately 7.8 MMT CO_2E by 2030, and 50% below the baseline to

approximately 6.5 MMT CO_2E by 2035. With implementation of the CAP, it is anticipated that the City would exceed its reduction target by 1.3 MMT CO_2E in 2020, 176,528 MT CO_2E in 2030, and 127,135 MT CO_2E in 2035. The CAP relies on significant City and regional actions, continued implementation of federal and state mandates, and five local strategies with associated action steps for target attainment. The City has identified the following five strategies to reduce GHG emissions to achieve the 2020 and 2035 targets:

1. Energy and water efficient buildings;
2. Clean and renewable energy;
3. Bicycling, walking, transit, and land use;
4. Zero waste (gas and waste management); and
5. Climate resiliency.

Implementation of the CAP is divided into three actions:

- Early Actions (Adoption of the CAP-December 31, 2017),
- Mid-Term Actions (January 1, 2018-December 31, 2020), and
- Longer-Term Actions (2021-2035).

The CAP contains five chapters: Background, Reducing Emissions, Implementation and Monitoring, Social Equity and Job Creation, and Adaptation. The 2015 CAP demonstrates to San Diego businesses and residents that the City acknowledges the existing and potential impacts of a changing climate and is committed to keeping it in the forefront of decision-making. Successful implementation of the CAP will: 1) Prepare for anticipated climate change impacts in the coming decades, 2) Help the State of California achieve its reduction target by contributing the City's fair share of GHG reductions, and 3) Have a positive impact on the regional economy.

Through 2020, the CAP meets the requirements set forth in CEQA Guidelines section 15183.5, whereby a lead agency (e.g., the City of San Diego) may analyze and mitigate the significant effects of GHG emissions at a programmatic level, such as in a general plan, a long range development plan, or a separate plan to reduce GHG emissions. Once the CAP CEQA tiering mechanism is adopted, as individual projects are proposed, if eligible, project-specific environmental documents may tier from and/or incorporate by reference the CAP's programmatic review of GHG impacts in their cumulative impacts analysis. However, the CAP, as currently adopted, does not meet a qualified plan under CEQA to be used for tiering.

The CAP is in the process of being amended to include a Consistency Review Checklist, which is intended to provide a streamlined review process for the GHG emissions analysis of proposed new development projects that are subject to discretionary review and trigger environmental review pursuant to CEQA. A draft Checklist was developed based upon the 2020 GHG emissions projections according to AB 32; however, the Checklist was not included in the adopted Final CAP. The City is currently in the process of finalizing the Checklist. After the Checklist if finalized, the City may modify the Checklist in the event of changes in the law, scientific discovery, new factual data that alters the common application of the measures or for any other reason deemed necessary by the City. The CAP will only serve as a tiering document for CEQA purposes through 2020, at which time the City will update the CAP. As the CAP Checklist is currently not adopted, the proposed project cannot tier from the CAP Checklist.

4 THRESHOLDS OF SIGNIFICANCE

4.1 Governor's Office of Planning and Research Guidance

The OPR Technical Advisory titled *CEQA and Climate Change: Addressing Climate Change through California Environmental Quality Act (CEQA) Review* states that "public agencies are encouraged but not required to adopt thresholds of significance for environmental impacts. Even in the absence of clearly defined thresholds for GHG emissions, the law requires that such emissions from CEQA projects must be disclosed and mitigated to the extent feasible whenever the lead agency determines that the project contributes to a significant, cumulative climate change impact" (OPR 2008). Furthermore, the advisory document indicates that "in the absence of regulatory standards for GHG emissions or other scientific data to clearly define what constitutes a 'significant impact,' individual lead agencies may undertake a project-by-project analysis, consistent with available guidance and current CEQA practice" (OPR 2008).

4.2 Cumulative Nature of Climate Change

Global climate change is a cumulative impact; a project participates in this potential impact through its incremental contribution combined with the cumulative increase of all other sources of GHGs. There are currently no established thresholds for assessing whether the GHG emissions of a project in the South Central Coast Air Basin, such as the project, would be considered a cumulatively considerable contribution to global climate change; however, all reasonable efforts should be made to minimize a project's contribution to global climate change.

While the project would result in emissions of GHGs during construction and operation, no guidance exists to indicate what level of GHG emissions would be considered substantial enough to result in a significant adverse impact on global climate. However, it is generally believed that an individual project is of insufficient magnitude by itself to influence climate change or result in a substantial contribution to the global GHG inventory as scientific uncertainty regarding the significance a project's individual and cumulative effects on global climate change remains.

Thus, GHG impacts are recognized as exclusively cumulative impacts; there are no non-cumulative GHG emission impacts from a climate change perspective (CAPCOA 2008). This approach is consistent with that recommended by the CNRA, which noted in its Public Notice for the proposed CEQA amendments that the evidence before it indicates that in most cases, the impact of GHG emissions should be considered in the context of a cumulative impact, rather than a project-level impact (CNRA 2009a). Similarly, the *Final Statement of Reasons for Regulatory Action on the CEQA Amendments* confirm that an EIR or other environmental document must analyze the incremental contribution of a project to GHG levels and determine

whether those emissions are cumulatively considerable (CNRA 2009b). Accordingly, further discussion of the project's GHG emissions and their impact on global climate are addressed below.

4.3 CEQA Guidelines

With respect to GHG emissions, the CEQA Guidelines state in Section 15064.4(a) that lead agencies should "make a good faith effort, to the extent possible on scientific and factual data, to describe, calculate or estimate" GHG emissions. The CEQA Guidelines note that an agency may identify emissions by either selecting a "model or methodology" to quantify the emissions or by relying on "qualitative analysis or other performance based standards" (14 CCR 15000 et seq.). Section 15064.4(b) provides that the lead agency should consider the following when assessing the significance of impacts from GHG emissions on the environment:

1. The extent a project may increase or reduce GHG emissions as compared to the existing environmental setting.

2. Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project.

3. The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions (14 CCR 15064.4(b)).

In addition, Section 15064.7(c) of the CEQA Guidelines specifies that "[w]hen adopting thresholds of significance, a lead agency may consider thresholds of significance previously adopted or recommended by other public agencies, or recommended by experts, provided the decision of the lead agency to adopt such thresholds is supported by substantial evidence" (14 CCR 15064.7(c)). Similarly, the revisions to Appendix G, Environmental Checklist Form, which is often used as a basis for lead agencies' selection of significance thresholds, do not prescribe specific thresholds. Rather, the CEQA Guidelines establish two new CEQA thresholds related to GHGs, and these will therefore be used to discuss significance of project impacts:

- Would the project generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment?

- Would the project conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs?

Accordingly, the CEQA Guidelines do not prescribe specific methodologies for performing an assessment, do not establish specific thresholds of significance, and do not mandate specific mitigation measures. Rather, the CEQA Guidelines emphasize the lead agency's discretion to determine the appropriate methodologies and thresholds of significance consistent with the manner in which other impact areas are handled in CEQA (14 CCR 15000 et seq.).

4.4 Local Guidance

The City provided the following comments and guidance for the project's GHG emissions analysis in L64A-003B Cycle Issues Draft, which are provided below (City of San Diego 2015b):

- On December 30, 2009, the CNRA adopted revisions to the State CEQA Guidelines to address analysis and mitigation pursuant to SB 97 related to the effects of GHG emissions. These amendments became effective on March 18, 2010 and require public agencies to review environmental impacts of proposed projects for GHG. Because the City of San Diego does not currently have adopted thresholds of significance for GHG, screening criteria based on project types is being used to determine if a GHG analysis will be required.

- Five project type categories are identified in the City's screening criteria that would generate 900 metric tons of GHG emissions per year and would require a GHG analysis: Single family residential (50 units +), apartments/condominiums (70 units +), general commercial/office space (35,000 SF), retail space (11,000 SF) and Supermarket/grocery space (6,300 SF). Based upon the project description, if a project exceeds the threshold, a GHG report would be required which would analyze the GHG emission resulting from construction activities and operation of the project.

- The GHG analysis should include, but is not limited to, the five primary sources of GHG emissions: vehicular traffic, generation of electricity, natural gas consumption/combustion, solid waste generation and water usage.

To determine the significance of the proposed project's GHG emissions, the above-listed guidance and the City of San Diego's Scoping Letter for the proposed project was utilized (City of San Diego 2012). With respect to GHG emissions, the Scoping Letter recommends the use of the thresholds established in Appendix G of the CEQA Guidelines (outlined in 4.3, CEQA Guidelines).

As stated in the City's comments, the City of San Diego has not established official thresholds of significance for GHG emissions; however, the City has adopted a screening threshold of 900

metric tons CO_2E per year based on the approach outlined in the CAPCOA report *CEQA & Climate Change* (CAPCOA 2008). Under this interim guidance, any project exceeding 900 metric tons CO_2E per year would have potentially significant impacts. The City requires that projects analyze emissions associated with both construction and operation, where construction emissions are amortized over a 30-year "project life" and then included with the operational emissions.

On November 30, 2015, the California Supreme Court decided the case of *Center for Biological Diversity v. California Department of Fish and Wildlife*, 62 Cal. 4th 204 (2015), concerning the approvals of the Newhall Ranch Project, a large land development project in northwest Los Angeles County (Newhall Ranch case).[5] The decision addressed several issues including the ruling as it relates to the Court's determination that the Department of Fish and Wildlife, the lead agency that certified the EIR and approved the project, abused its discretion by determining that the project's GHG impacts would have no significant impact, because this conclusion was not supported by a "reasoned explanation based on substantial evidence."[6] *Id*. at 213. (City of San Diego City Attorney 2016). The Newhall Ranch case permits lead agencies to rely upon screening thresholds like the one used in this report.

[5] A petition for a rehearing has been filed and the Court has extended the time for granting or denying the rehearing to February 26, 2016.

[6] "Substantial evidence" can be summarized as enough relevant information and reasonable inferences from the information that a fair argument can be made to support a conclusion, even if other conclusions could also be reached. CEQA Guidelines § 15384(a). Substantial evidence includes facts, reasonable assumptions based on facts, and expert opinion supported by facts. CEQA Guidelines § 15384(b).

5 ANALYSIS METHODOLOGY AND ASSUMPTIONS

5.1 Baseline Conditions

Guy Hill originally developed the property as a car dealership, which included an automobile show room and repair facility (including a body shop and service bays), in 1967. Guy Hill Cadillac and Mossy Toyota operated the property as a new and/or used car dealership for 40 years from 1967 to 2007. From 2008 to the present time the site has been in use by multiple tenants primarily for the purpose of both marine and automotive vehicle rentals, sales, storage and repair. For example, pursuant to a lease with San Diego Motorsports that commenced in 2012 and is still in place, the property has been primarily used for jet ski, U-Haul and jet boat rentals, marine and automobile vehicle repair and outdoor storage. However, the property is still zoned CC-4-2. The CC-4-2 zone permits all forms of vehicle sales, rentals, repairs and maintenance uses as a matter of right. The property also still includes the physical improvements, such as the showroom, the freeway-oriented pylon sign, the large vehicle parking areas and the service bays, needed to operate a car dealership on site. Further, as car dealerships tend to locate in areas with other existing car dealerships (e.g. Mission Valley and the National City Mile of Cars), it bears noting that car dealerships such as Mossy Toyota, Pacific Nissan, Mossy Ford and a number of others exist in the vicinity of the project. Thus, the project site and its improvements could still be used for an automobile dealership without further discretionary action by the City.

For purposes of determining the existing baseline conditions pursuant to CEQA Guidelines Section 15125, GHG is different from some other CEQA impact areas in its regional, national and international scope. The nature of GHG impacts means the GHG baseline determination should look to available regional analysis from SANDAG about long term regional growth and traffic projections.

SANDAG's long term regional projections (Series 12) identify the Guy Hill Cadillac site as being an Auto Commercial use (same as Mossy Toyota and Pacific Nissan) through 2050. Specifically, the applicable Traffic Analysis Zone (TAZ) map for the area where the project is located, along with SANDAG's Trip Generation by Land Use Zone chart for that TAZ, include the project site in the three properties that make up the approximately 10.5 acres of Auto Commercial. These SANDAG Series 12 regional projections serve as a basis for regional GHG emission projections and long term planning regarding the same, including mobile GHG emissions analyzed and projected in the City’s Climate Action Plan adopted in December 2015. The Climate Action Plan, the City's guidance document for complying with AB 32 and other GHG requirements, includes GHG emissions attributable to an Automobile Commercial use at the project site. Therefore, consistent with the City’s use of SANDAG Series

12 growth projections as the basis for GHG emissions projections provided in the Climate Action Plan, the baseline GHG conditions for purposes of this report also includes that same Automobile Commercial use, a car dealership, for the project site. That baseline GHG analysis of a car dealership includes GHG emissions attributable to traffic using the traffic generation rates identified in the City's Trip Generation Manual (City of San Diego 2003), the accepted source of traffic generation rates for projects within the City. The City's trip generation rates for a car dealership are also the same as those used by SANDAG. Thus the site's current temporary, interim uses which include jet ski rentals, office space and vehicle storage do not reflect the GHG emission projections used by SANDAG and the City. Additional information about the baseline GHG emissions for each category of GHG emissions is included in Section 5.3 – Project Operation.

5.2 Project Construction

Emissions from the construction phase of the project were estimated using the California Emission Estimator Model (CalEEMod), Version 2013.2.2, available online (www.caleemod.com).

For purposes of estimating project emissions, and based on information provided by the applicant and CalEEMod default values, it is assumed that construction of the project will commence in March 2017 and will last approximately 24 months, ending in February 2019. The analysis contained herein is based on the following assumptions (duration of phase is approximate):

- Demolition – 1 month (March 2017);
- Grading – 2 months (April 2017 – May 2017);
- Building Construction – 19 months (June 2017 – December 2018);
- Paving – 1 month (December 2018); and
- Application of Architectural Coatings – 2 months (January 2019 – February 2019).

It was assumed that the demolition phase would entail demolition of approximately 36,475 square feet of structures and export of demolition material offsite. During the grading phase, it was assumed that 50,100 cubic yards of material would be excavated and exported offsite. The CalEEMod default values for haul truck capacity (20 cubic yard truck capacity during demolition and 16 cubic yard truck capacity during grading) and one-way haul truck trip distance of 20 miles was assumed. CalEEMod default values for vendor (delivery) truck trips during building construction and worker trips during all construction phases was assumed.

The variety of construction equipment and vehicle trips assumed for estimating construction emissions of the project is based on information provided by the applicant and CalEEMod default values and is shown in Table 2, Construction Scenario Assumptions. For this analysis, it was assumed that heavy construction equipment will operate 5 days a week (22 days per month) during project construction.

Table 2
Construction Scenario Assumptions

Construction Phase	Average Daily Workers	Average Daily Vendor Trucks	Total Haul Trucks	Equipment	Quantity	Usage Hours
Demolition	8	0	166	Concrete/Industrial Saws	1	8
				Excavators	3	8
				Rubber Tired Dozers	2	8
Grading	8	0	7,250	Bore/Drill Rigs	1	8
				Excavators	1	8
				Graders	1	8
				Rubber Tired Loaders	1	8
				Skid Steer Loaders	1	8
				Tractors/Loaders/Backhoes	1	8
Building Construction	96	46	0	Cranes	1	7
				Forklifts	3	8
				Generator Sets	1	8
				Tractors/Loaders/Backhoes	3	7
				Welders	1	8
Paving	8	0	0	Pavers	2	8
				Paving Equipment	2	8
				Rollers	2	8
Architectural Coating	19	0	0	Air Compressors	1	6

Refer to Appendix A for additional information.

5.3 Project Operation

As previously described in Section 1.2, Project Description, the project includes residential and commercial retail land uses and associated parking. The mid-rise apartment land use was assumed in CalEEMod for the proposed 172 residences consisting of approximately 200,000

square feet. The strip mall land use was assumed to represent the commercial retail land use, consisting of approximately 7,500 square feet. The general office building land use was assumed for commercial office space, consisting of approximately 8,000 square feet. The above-ground and subterranean parking structure, and utility storage area square footage was analyzed in CalEEMod as an enclosed parking structure with elevator.

Vehicular Traffic

The proposed project would result in GHG emissions associated with the vehicular traffic generated by the proposed project. The proposed project's traffic report study by Urban Systems Associated, Inc. (Urban Systems 2016a) estimates that the proposed residences would generate an average daily trip rate of 6 trips per dwelling unit, the mixed-use retail land use will generate approximately 72 trips per 1,000 square feet, and the general office building land use will generate approximately 31 trips per 1,000 square feet based on the City of San Diego Trip Generation manual (City of San Diego 2003). Accordingly, the proposed 172 residences would result in approximately 1,032 trips per day, the 15,500 square feet of mixed-use commercial retail space would result in approximately 540 trips per day, and the commercial office space would result in approximately 250 trips per day for a total of 1,822 trips per day (Urban Systems 2016a). The proposed parking land uses would not generate trips. In addition, the CalEEMod analysis identifies the GHG baseline emissions attributable to the vehicle trips of a car dealership operation at the property. For purposes of the GHG baseline, the vehicle trips associated with those operations are conservatively estimated to be an average of approximately 883 trips per day (2.94 acres × 300 trips per acre) (Urban Systems 2016b; City of San Diego 2003; SANDAG 2002).

CalEEMod was used to estimate daily emissions from proposed vehicular sources. CalEEMod default data, including temperature, trip characteristics, variable start information, emissions factors, and trip distances, were conservatively used for the model inputs. Project-related traffic was assumed to include a mixture of vehicles in accordance with the model outputs for traffic. Emission factors representing the vehicle mix and emissions for 2019 were used to estimate emissions associated with full buildout of the proposed project.

Area Sources

CalEEMod was also used to estimate emissions from the car dealership building and the proposed project's area sources, which includes operation of gasoline-powered landscape maintenance equipment, which produce minimal GHG emissions.

Energy

The estimation of operational energy emissions was based on CalEEMod land use defaults and units or total area (i.e., square footage) of the car dealership building and the proposed project. Annual natural gas and electricity emissions were estimated using the emissions factors for San Diego Gas and Electric, which would be the energy source provider for the project. For the purposes of this analysis, even though the existing building was constructed in 1967, the CalEEMod analysis conservatively used the 2005 California Building Energy Efficiency Standards (Title 24, Part 6, of the California Code of Regulations) to estimate baseline emissions. For purposes of a conservative analysis, the project analysis was conducted as if the proposed project would operate under the currently-adopted 2013 Title 24 standards. The above methodology was applied to both natural gas and electricity use as described below.

Natural Gas

CalEEMod was used to estimate emissions from the natural gas combustion. The default energy input ratios for Title 24 and non-Title 24 natural gas consumption as provided in CalEEMod were utilized for the car dealership and the proposed project.

Electricity

The generation of electricity through combustion of fossil fuels typically results in emissions of CO_2 and, to a smaller extent, CH_4 and N_2O. Annual electricity emissions were estimated using CalEEMod. The default energy input ratios for Title 24 and non-Title 24 electricity consumption as provided in CalEEMod were utilized for the car dealership and the proposed project.

Water Supply

Supply, conveyance, treatment, and distribution of water for the project requires the use of electricity, which would result in associated indirect GHG emissions. Similarly, wastewater generated by the proposed project requires the use of electricity for conveyance and treatment, along with GHG emissions generated during wastewater treatment. Water consumption estimates for both indoor and outdoor water use and associated electricity consumption from water use and wastewater generation as estimated using CalEEMod default values for the car dealership and the proposed project.

Solid Waste

The proposed project would generate solid waste and would therefore result in CO_2E emissions associated with landfill off-gassing. CalEEMod default values for solid waste

generation were used to estimate GHG emissions associated with solid waste for the car dealership and the proposed project.

Refer to Appendix A for additional information.

6 IMPACT ANALYSIS

6.1 Generation of GHG Emissions

Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

Construction

Construction of the proposed project would result in GHG emissions, which are primarily associated with use of off-road construction equipment, on-road hauling and vendor (material delivery) trucks, and worker vehicles. GHG emissions associated with temporary construction activity were quantified using the CalEEMod. A detailed depiction of the construction schedule—including information regarding phasing, equipment utilized during each phase, haul trucks, vendor trucks, and worker vehicles—is included in Section 5.1, Analysis Methodology, Project Construction, of this report. On-site sources of GHG emissions include off-road equipment, and off-site sources include hauling and vendor trucks and worker vehicles. Emissions from on-site and off-site sources are combined for the purposes of this analysis; a breakdown of emissions by source is provided in Appendix A.

Table 3, Estimated Annual Construction Greenhouse Gas Emissions, presents construction emissions for the project in 2017, 2018, and 2019 from on-site and off-site emission sources.

Table 3
Estimated Annual Construction Greenhouse Gas Emissions

Year	MT CO_2	MT CH_4	MT N_2O	MT CO_2E
2017	679	0.08	0.00	680
2018	624	0.09	0.00	626
2019	11	0.00	0.00	11
Total	1,314	0.17	0.00	1,318
Annualized Construction Emissions				*44*

Notes: See Appendix A for detailed results.
MT CO_2 – metric tons carbon dioxide; MT CH_4 – metric tons methane; MT N_2O – metric tons nitrous oxide; MT CO_2E – metric tons carbon dioxide equivalent

As shown in Table 3, the estimated GHG emissions generated during project construction would be approximately 680 MT CO_2E in 2017, 626 MT CO_2E in 2018, and 11 MT CO_2E in 2019, for a total of approximately 1,318 MT CO_2E. Estimated project-generated construction emissions annualized over 30 years would be approximately 44 MT CO_2E per year. Because there is no

separate GHG threshold for construction, the evaluation of significance is discussed in the operational emissions analysis below.

Operational

Operation of the proposed project would result in GHG emissions from vehicular traffic, area sources (landscape maintenance), electrical generation, natural gas consumption, water supply (including wastewater generation), and solid waste.

The following project design features that would reduce project-generated GHG emissions were analyzed in CalEEMod:

Transportation:

- Increased density – approximately 58.5 dwelling units per acre
- Mixed use development/increase diversity
- Improvement of destination accessibility – 7.6 miles to downtown/job center
- Increase transit accessibility – 0.29 miles to transit station (nearest bus stop at corner of Grand Avenue and Mission Bay Drive). Additionally, the planned Balboa Avenue trolley station would be within a 2,000 foot radius of the project site.
- Integration of below market rate housing – 14 affordable housing units

Area Sources:

- No hearth

Energy:

- Exceed 2008 Title 24 standards – 25% improvement (compliance with 2013 Title 24 standards)
- Renewable Portfolio Standard – adjustment of CO_2 intensity factor to reflect current San Diego Gas and Electric renewable energy usage (24% renewable energy sources)

Water/Wastewater:

- Application of water conservation strategy: 25% reduction in overall water use per Executive Order B-29-15.

Solid Waste:

- Institute Recycling and Composting Services – 75% diversion rate consistent with AB 341 (Chesbro, Chapter 476, Statutes of 2011) (25% increase from the solid waste diversion requirements of AB 939, Integrated Waste Management Act)

The estimated operational project-generated GHG emissions from area sources, energy usage, motor vehicles, solid waste generation, water supply, and wastewater treatment, considering the project design features, in 2019 (i.e., first full year of project operation) are shown in Table 4, Estimated Annual Operational Greenhouse Gas Emissions.

Table 4
Estimated Annual Operational Project Greenhouse Gas Emissions

	MT CO_2	MT CH_4	MT N_2O	MT CO_2E
Area Sources	2	0.00	0.00	2
Energy	415	0.02	0.00	416
Mobile Sources	1,208	0.05	0.00	1,209
Solid Waste	5	0.28	0.00	11
Water Supply and Wastewater	48	0.01	0.00	51
Total	1,678	0.37	0.01	1,689
Amortized Construction Emissions	N/A			44
Operation + Amortized Construction Total	N/A			1,733
Baseline Operational Emissions	N/A			(650)
Energy Offset from Solar PV Installations	N/A			(218)
Net Increase in Emissions	N/A			865
Screening Threshold of 900 MT CO_2E Exceeded?				*No*

Notes: See Appendix A for detailed results.
MT CO_2 – metric tons carbon dioxide; MT CH_4 – metric tons methane; MT N_2O – metric tons nitrous oxide; MT CO_2E – metric tons carbon dioxide equivalent

As shown in Table 4, estimated annual project-generated GHG emissions in 2019 would be approximately 1,689 MT CO_2E per year as a result of project operations without the on-site solar. Vehicles traveling to and from the project land uses would be the primary source of project-generated GHG emissions. Estimated annual operational project-generated emissions and amortized project construction emissions of 44 MT CO_2E per year would be approximately 1,733 MT CO_2E per year. The project design feature providing for installation of a solar photovoltaic system on the project site was estimated to offset GHG emissions by approximately 218 MT CO_2E per year (Adroit Energy 2016). Further, consistent with CEQA Section 15125, baseline GHG emissions associated with the car dealership use was estimated to be approximately 650 MT CO_2E per year.

As shown in Table 4, the net increase in GHG emissions would be approximately 865 CO_2E per year; therefore, the project would be below the City's 900 CO_2E per year screening threshold and would not result in a potentially significant impact.

As the proposed project would not result in significant impacts, mitigation is not required.

6.2 Conflict with an Applicable Plan

Would the project conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

As discussed in Section 3.3, Regulatory Setting – Local, the City has taken steps to address climate change impacts at a local level. In 2002, the City Council adopted the San Diego Sustainable Community Program, which established a partnership with the Cities for Climate Protection Campaign, a program administered by ICLEI – Local Governments for Sustainability. The Sustainable Community Program established a GHG reduction goal of 15% below 1990 levels by the year 2010. Actions to be taken to achieve this goal are outlined in the City's Climate Protection Action Plan, which was adopted in 2005. The City has continued to reduce its share of GHG emissions through fuel efficiency, energy conservation, use of renewable energy, and use of CH_4 gas (biogas) to generate electricity. In December 2015, the City adopted the final CAP and a PEIR for the CAP was certified. As previously discussed, according to the City's CAP, to achieve its proportional share of the state reduction targets for 2020 (AB 32) and 2050 (EO S-3-05), the City has developed implementation strategies and aims to reduce emissions 15% below the baseline to approximately 11.1 MMT CO_2E by 2020, 40% below the baseline to approximately 7.8 MMT CO_2E by 2030, and 50% below the baseline to approximately 6.5 MMT CO_2E by 2035 (City of San Diego 2015a). The CAP currently does not meet the requirements set forth in CEQA Guidelines section 15183.5, whereby a lead agency may analyze and mitigate the significant effects of GHG emissions at a programmatic level, and tiering from the CAP is not yet permitted because the CEQA tiering mechanism (i.e., CAP Checklist) is not yet adopted.

Although the CAP Checklist has not yet been adopted, a brief analysis of the project's potential to conflict with the applicable strategies, goals, actions, and targets of the CAP is provided herein for disclosure purposes. The CAP's first strategy is aimed at energy and water efficient buildings. The City's goals under strategy 1 include reducing residential building and municipal energy consumption, and reducing daily per capita water consumption. Actions to reduce energy consumption include consideration of a residential Energy Conservation and Disclosure Ordinance and a Municipal Energy Strategy and Implementation Plan. Actions related to water efficiency include implementing new water rates and billing structure, consideration of a Water

Conservation and Disclosure Ordinance, and implementation of an Outdoor Landscaping Ordinance requiring weather-based irrigation controllers.

Strategy 1 actions are directed at City staff and City Council to adopt ordinances, plans, and supporting City requirements to achieve the City's targets. The project would not conflict with the City's ability to implement the actions identified in the CAP to meet the required city-wide GHG reductions.

Strategy 2 focuses on clean and renewable energy. Strategy 2 goals of transitioning to 100% renewable energy on the city-wide electrical grid by 2035, increasing municipal zero emissions vehicles, and converting existing diesel municipal solid waste collection trucks to compressed natural gas or other alternative low emissions fuels would be implemented by the City and would not apply to implementation of the project. At this time, the potential measure of requiring new residential and non-residential construction to install a conduit for future photovoltaics and electric vehicle charging stations has not been proposed by City staff or adopted by City Council. However, the project proposes to install an on-site solar system as a project feature.

Strategy 3 outlines goals and actions related to bicycling, walking, transit, and land use. Strategy 3 goals include increasing the use of mass transit, increasing commuter walking and bicycling opportunities, reducing vehicle fuel consumption, and promoting effective land use to reduce vehicle miles traveled. The project would be consistent with many of the goals and supporting measures under strategy 3 as the project is a mixed-use, mixed-income, in-fill development project that would promote bicycling and walking as a means of local travel and commute. Additionally, the project site is located near both an existing bus transit station and future trolley station. In addition to the numerous TOD design elements, an advanced, real-time adaptive traffic control system would be installed at six intersections on Mission Bay Drive as described in the Traffic Impact Analysis Report prepared for the proposed project (Urban Systems 2016a). The six intersections include Garnet Avenue and Mission Bay Drive, Magnolia Avenue and Mission Bay Drive, Bunker Hill Street and Mission Bay Drive, Grand Avenue and Mission Bay Drive, Rosewood Street and Mission Bay Drive, and Mission Bay Drive and North Mission Bay Drive. This adaptive signal system would increase traffic flow and reduce congestion on local roadways, thereby reducing overall fuel consumption. These improvements would be consistent with the Pacific Beach Community Plan Circulation Element goals, as well as the City of San Diego Traffic Signal Communications Master Plan.

Moreover, the proposed project would help reduce congestion through compliance with the City's Transportation Demand Management (TDM) strategy, which is designed to reduce single occupant vehicle trips during the AM and PM peak weekday hours. Since most commuting and congestion occur during weekday peak periods, TDM seeks to shift commuters to transportation

modes other than cars as well as reduce peak hour trips by encouraging commuting in on-peak periods and other strategies. The project proposes to incorporate the following TDM measures:

- Bulletin boards in central locations that encourage alternative transportation programs.
- Suggest tenants implement telecommute and staggered work hours to avoid peak hour traffic.
- Appoint a TDM coordinator for the tenants to facilitate publication and distribution of information as well as ensure it remains current.
- Provide informational quarterly newsletters to tenants discussing Ride-Link and other tools for carpooling, bicycling, and alternative modes of transportation.
- Provide bike lockers provided on site.
- Offer 1 month MTS regional pass per unit at move-in.

In summary, project's infill location, TOD design, implementation of the proposed adaptive signal control system and TDM measures are intended to reduce vehicle miles traveled and associated vehicle fuel consumption, and are thus consistent with the Strategy 3 goals, actions, and supporting measures.

Strategy 4, which focuses on zero waste, includes the goal of diverting solid waste and capturing landfill CH_4 gas emissions and capturing CH_4 gas from wastewater treatment. Both of the strategy 4 goals would be implemented by various City departments and the project would not conflict with implementation of the actions required to meet the City's targets. In addition, the project will not interfere with the goal of diverting 75% of the solid waste by 2020 consistent with statewide goals. The fifth and last strategy relates to climate resiliency and includes the goal of increasing tree canopy coverage. The action under this goal includes consideration of a city-wide Urban Tree Planting Program, which would incorporate water conservation measures and prioritization of drought-tolerant and native trees and plantings in areas with recycled water. The project would not conflict with the City's actions to increase tree canopy coverage through a planting program and supporting measures. In summary, the project would not conflict with the goals applicable to the proposed land uses and the project would not impede the City's ability to implement the actions identified in the draft CAP to achieve the CAP's targets and associated GHG emission reductions.

The City's General Plan also includes various policies that address conservation with the goal of reducing GHG emissions by increased energy efficiency and increased use of alternative forms of transportation, among others, including policies outlined in the General Plan's Conservation Element. Specifically, Table CE-1, Issues Related to Climate Change Addressed in the General Plan, of the Conservation Element lists specific policies identified in the various elements of the General Plan that affect climate change. Consistent with policies included in Table CE-1 of the

General Plan related to Land Use and Community Planning and Mobility, the proposed project would be constructed as an infill development project located on a previously built up parcel; thus, development of the project would not require greenfield development, substantial infrastructure expansions or additional land resources. Additionally, as an infill project located within the Pacific Beach community, the project would promote walkability and use of bicycle facilities currently provided by the City of San Diego to local venues, shops and the beach, reducing the need for automobile use by future residents of the project.

The Scoping Plan, approved by CARB on December 12, 2008, provides a framework for actions to reduce California's GHG emissions and requires CARB and other state agencies to adopt regulations and other initiatives to reduce GHGs. As such, the Scoping Plan is not directly applicable to specific projects. Relatedly, in the Final Statement of Reasons for the Amendments to the CEQA Guidelines, the CNRA observed that "[t]he [Scoping Plan] may not be appropriate for use in determining the significance of individual projects because it is conceptual at this stage and relies on the future development of regulations to implement the strategies identified in the Scoping Plan" (CNRA 2009). Under the Scoping Plan, however, there are several state regulatory measures aimed at the identification and reduction of GHG emissions. CARB and other state agencies have adopted many of the measures identified in the Scoping Plan. Most of these measures focus on area source emissions (e.g., energy usage, high-GWP GHGs in consumer products) and changes to the vehicle fleet (i.e., hybrid, electric, and more fuel-efficient vehicles) and associated fuels (e.g., LCFS), among others. The proposed project will comply with all applicable regulations adopted in furtherance of the Scoping Plan to the extent required by law.

As discussed in Section 3.2.2, State, Executive Order S-3-05 established a goal to reduce statewide GHG emissions to the 1990 level by 2020, and to reduce statewide GHG emissions to 80% below the 1990 level by 2050.[7] The Executive Orders do not require the City to set a specific numeric method in order to demonstrate that a project meets the state's 2030 and 2050 GHG emissions reduction targets as expressed in EOs S-3-05 and E-30-15 and the City has not yet done so. The proposed project, however, would support achievement of the Executive Order's near-term 2020 goal (as codified in AB 32) and the long-term 2050 goal through the project's in-fill, mixed-use, TOD design and a number of sustainability design features that would be implemented as part of the project, as described in Section 1.2, Project Description. Moreover, the project would result in the demolition of older, inefficient structures and the construction of a newer, energy-efficient structure and associated

[7] In adopting AB 32, the legislature did not adopt the 2050 horizon-year goal from Executive Order No. S-3-05, and in the 2013-2014 legislative session, the legislature rejected bills proposing to enact the Executive Order's 2050 goal (*Cleveland National Forest Foundation v. SANDAG* 2014; *Professional Engineers in California Government et al. v. Schwarzenegger and Chiang* 2010; OPR 2004).

improvements.[8] The proposed mixed-use development is intended to enhance the Pacific Beach neighborhood the project is located within and would develop residences within close proximity to the San Diego downtown, University City and Sorrento Valley job centers. In addition, CARB notes in the First Update to the Scoping Plan that "California is on track to meet the near-term 2020 greenhouse gas limit and is well positioned to maintain and continue reductions beyond 2020 as required by AB 32" (CARB 2014). Accordingly, the project would not interfere with State's trajectory in meeting the 2020, 2030, and 2050 GHG emissions reduction targets set forth in AB 32, EO B-30-15 and EO S-3-05.

At the regional level, SANDAG's RTP/SCS has been adopted for the purpose of reducing GHG emissions attributable to passenger vehicles in the San Diego region. Although the EIR for SANDAG's 2050 RTP/SCS is still pending before the California Supreme Court, SANDAG recently adopted the next iteration of its RTP/SCS in accordance with statutorily-mandated timelines. More specifically, in October 2015, SANDAG adopted *San Diego Forward: The Regional Plan*. Like the 2050 RTP/SCS, this planning document meets ARB's 2020 and 2035 reduction targets for the region. While the RTP/SCS does not regulate land use or supersede the exercise of land use authority by SANDAG's member jurisdictions (i.e., the City), the RTP/SCS is a relevant regional reference document for purposes of evaluating the intersection of land use and transportation patterns and the corresponding GHG emissions. The RTP/SCS is not directly applicable to the proposed project because the underlying purpose of the RTP/SCS is to provide direction and guidance on future regional growth (i.e., the location of new residential and non-residential land uses) and transportation patterns throughout the City and greater San Diego County, as stipulated under SB 375. CARB has recognized that the approved RTP/SCS is consistent with SB 375 (CARB 2015c).

The proposed project would maintain the existing commercial retail land use component, but would be designed to service the existing surrounding neighborhoods by providing a space for social events, art displays, and entertainment and potentially including a small restaurant or small retail/eatery shops. In addition, there would be an overall energy improvement of on-site facilities by demolishing older, less efficient buildings and constructing newer, more efficient structures. The project would also add a residential component to the site creating a mixed-use environment and enhancing pedestrian and bicycle-mobility, as well as providing residences near jobs and bus transit to various job centers. Additionally, the higher-density infill development nature of the project would support the overarching intent of the RTP/SCS by improving pedestrian and

[8] CARB, in its 2008 Scoping Plan, determined that retrofitting existing state, school, residential, and commercial buildings could achieve a reduction of 20 MMT of CO_2E by 2020. The importance of retrofitting existing buildings was recognized via the enactment of AB 758 in 2009 as well (CARB 2015b). The project's proposal to create a more energy-efficient infill residential project is consistent with the state's recognition that the relative inefficiencies of existing structures.

bicycle access to nearby locations, encouraging non-motorized modes of travel, and thus, reducing vehicle trips and vehicle miles travelled to and from the site. For reasons outlined above, the project would support the goals and policies of the RTP/SCS.

Finally, the SDAPCD has not adopted GHG reduction measures that would apply to the GHG emissions associated with the proposed project.

As evaluated in 6.1, Generation of GHG Emissions, the proposed project would not exceed the City's screening threshold for the purposes of analyzing the significance of GHG emissions under CEQA. Further, as disclosed in Section 6.2, implementation of the project does not conflict with plans, policies or regulations adopted for the purposes of reducing GHG emissions. Therefore, project impacts would be less than significant and no mitigation is required.

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APPENDIX A

CalEEMod Output Files – Baseline and Proposed Project Emissions Estimates

APPENDIX B

Solar Offset Information

GEOCON
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GEOTECHNICAL
ENVIRONMENTAL
MATERIALS

GEOTECHNICAL INVESTIGATION

GUY HILL PROPERTY
4275 EAST MISSION BAY DRIVE
SAN DIEGO, CALIFORNIA

PREPARED FOR

JPI REAL ESTATE ACQUISITION, LLC
SAN DIEGO, CALIFORNIA

SEPTEMBER 11, 2015
PROJECT NO. G1592-11-03

GEOCON
INCORPORATED
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS

Project No. G1592-11-03
September 11, 2015

JPI Real Estate Acquisition, LLC
12250 El Camino Real, Suite 380
San Diego, California 92130

Attention: Mr. David Todd

Subject: GEOTECHNICAL INVESTIGATION
GUY HILL PROPERTY
4275 EAST MISSION BAY DRIVE
SAN DIEGO, CALIFORNIA

Dear Mr. Todd:

In accordance with your authorization, we have prepared this geotechnical investigation report for the proposed mixed-used development located in the Pacific Beach community of San Diego, California. The accompanying report presents the findings of our study, and our conclusions and recommendations pertaining to the geotechnical aspects of proposed design and construction. Based on the results of our investigation, it is our opinion that the site can be developed as proposed provided the recommendations of this report are followed and implemented during design and construction. We also retained the services of Mr. Tom Rockwell a renowned Neo-tectonic and Quaternary geologist to review selected field trenches and this report.

If you have any questions regarding this report, or if we may be of further service, please contact the undersigned.

Very truly yours,

GEOCON INCORPORATED

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GEOTECHNICAL INVESTIGATION

1. PURPOSE AND SCOPE

This report presents the results of our geotechnical investigation for the proposed mixed-use residential and commercial development located at 4275 East Mission Bay Drive in the Pacific Beach community of the City of San Diego, California (see Vicinity Map, Figure 1). The purpose of the investigation is to evaluate subsurface soil and geologic conditions underlying the area of proposed development and, based on conditions encountered, provide conclusions and recommendations pertaining to the geotechnical aspects of proposed design and construction.

The scope of our investigation included subsurface exploration and fault trenching, laboratory testing, engineering analyses, and the preparation of this report. As a part of our investigation, we have reviewed aerial photographs, published geologic maps, published geologic reports (see List of References), and a previous geotechnical report related to the property.

Our current field investigation performed for the Guy Hill Property included drilling four small diameter auger borings to a maximum depth of 36 feet and excavating six fault trenches. We previously excavated two small diameter borings and one fault trench at the site in 2003. Appendix A presents a discussion of the current field investigation and logs of the borings and trench. The approximate locations of the current and previous exploratory excavations are presented on the Geologic Map (Figure 2). We performed laboratory tests on soil samples obtained from the current exploratory excavations to evaluate pertinent physical and chemical properties for engineering analysis. Appendix B presents the results of the laboratory testing. The previous boring logs, fault trench log, and results of previous laboratory data are presented in Appendix C.

As a part of this geotechnical investigation, we reviewed the following documents:

1. *Geotechnical Investigation, Guy Hill Automobile Dealership, 4275 East Mission Bay Drive, San Diego, California*, prepared by Geocon Incorporated, dated January 7, 2004 (Project No. 07210-22-01).

2. *DRAFT Street Level/ Site Plan and Site Sections + Elevation, Guy Hill Cadillac Site, 4275 Mission bay Drive, San Diego, California*, prepared by Carrier Johnson, dated October 15, 2014.

Project Design Consultants provided the topographic information and Carrier Johnson provided the site plan used during our field investigation and for the preparation of the Geologic Map. References to elevations presented in this report are based on the referenced topographic information. Geocon does not practice in the field of land surveying and is not responsible for the accuracy of such topographic information.

2. SITE AND PROJECT DESCRIPTION

The project site is located on the east side of Mission Bay Drive, south of Rosewood Street and Del Rey Street, and west of Interstate 5 in the City of San Diego, California. Three parcels combine to form a triangular shaped property which is 2.944 acres in size and is bound by Rosewood and Del Rey Streets and a vacant lot used for storage to the north, Mission Bay Drive to the west, and Caltrans right-of-way to the south and east. The majority of the site is currently occupied by existing retail buildings with associated driveways, parking and storage areas. Vehicle access to the property is provided from two driveway entrances off Rosewood Street. The existing buildings and associated improvements will be demolished prior to construction. Several large utilities are located adjacent to Rosewood Street and cross the property in the northeast portion of the site contained within a City of San Diego easement and an abandoned VCP sewer line crossing the property within an easement shown on Figure 2. The property generally slopes to the west with existing elevations ranging from about 31 feet above Mean Sea Level (MSL) at the northeast corner of the site to 16 feet MSL along the western property boundary.

Information concerning the proposed development was furnished by the client and project design team. The proposed development of the site will consist of the construction of four, 3-story mixed use residential and retail buildings over two levels of subterranean parking. The development will also include several structures at-grade, including a commercial gym/retail facility, a commercial/tech hub facility, leasing office building, and a residential building consisting of 3 townhomes. Additional site improvements include a driveway at the north end of the site to give access to the at-grade townhomes, a pool terrace, a large landscaping area, and underground utilities.

The proposed subterranean parking garage will extend below the mixed use residential and retail buildings and portions of the commercial gym/retail facility and commercial/tech hub facility with a garage finish floor elevation of 4.5 feet above MSL. The limits of the proposed subterranean level are indicated on the Geologic Map (see Figure 2). The proposed first floor elevation of the planned structures is approximately 15 feet above MSL. Based on the preliminary plans, cuts up to 25 feet will be required to achieve proposed grades for the subterranean parking structure.

The locations and descriptions provided herein are based on our review of previous geotechnical reports prepared for the property, observations during our field investigation, discussions with project personnel, and our understanding of the project. Significant changes in the design, location or elevation of any structure, as outlined in this report, should be reviewed by this office.

3. REGIONAL GEOLOGIC SETTING

The site is located in the coastal plain within the southern portion of the Peninsular Ranges Geomorphic Province of southern California. The Peninsular Ranges is a geologic and geomorphic

province that extends from the Imperial Valley to the Pacific Ocean and from the Transverse Ranges to the north and into Baja California to the south. The coastal plain of San Diego County is underlain by a thick sequence of relatively undisturbed and non-conformable sedimentary rocks that thicken to the west and range in age from late Cretaceous through late Pleistocene with intermittent deposition. The sedimentary units are deposited on bedrock Cretaceous to Jurassic age igneous and metavolcanic rocks. Geomorphically, the coastal plain is characterized by a series of twenty-one, stair-stepped Pleistocene-age marine to non-marine terraces that young to the west with a maximum width of roughly 14 miles in the central and southern portions of the county. The oldest terrace sequence is called Very Old Paralic Deposits and consists of 13 wave cut terraces that range in elevation from about 666 feet above MSL to 223 feet above MSL from east to west and range in age from 1,525 ka to 510 ka. A younger sequence of terraces known as Old Paralic Deposits consist of 8 wave cut terraces that range in elevation from 203 feet to 20 feet above MSL from east to west and range in age from 450 ka to 45 ka. The sequences of both terraces were formed as sea level lowered and/or the landform was uplifted.

The sedimentary rocks within the coastal plain were subsequently dissected after deposition in the late Pleistocene by west flowing rivers that drain the Peninsular Ranges located to the east. The coastal plain is a relatively stable block that is dissected by relatively few faults consisting of the potentially active La Nacion Fault Zone and the active Rose Canyon Fault Zone. The Peninsular Ranges Province is also dissected by the Elsinore Fault Zone that is associated with and sub-parallel to the San Andreas Fault Zone, which is the plate boundary between the Pacific and North American Plates.

The project site is located on the western portion of the coastal plain. Sedimentary materials make up the geologic unit encountered on the site and consist of late Pleistocene-age Old Paralic Deposits Unit 6 (formerly known as part of the Bay Point Formation) as indicated by Kennedy and Tan, 2008. The Old Paralic Deposits Unit 6 is shallow marine and non-marine estuarine and colluvium sediments composed of weakly cemented sandstone, siltstone and claystone. This unit is in excess of 36 feet thick at the site and was encountered to at least an elevation of -12.5 feet below MSL. The unit has been reported to be over 100 feet thick north of the downtown area and was deposited unconformably on the late Pliocene to early Pleistocene-age San Diego Formation, which typically consist of poorly cemented sandstones.

The regional geology in the site area is predominately controlled by the active Rose Canyon Fault Zone (RCFZ) which transitions from a strike slip fault to the north of the property in an offshore submarine environment in La Jolla Cove and then located east of the site as a strike slip fault and then transitions to several faults that have oblique movements of both strike slip and normal faulting to the south from the downtown San Diego area and onward to the south. The San Diego Bay was created as a down dropped block within this fault zone and Mount Soledad to the north was formed as a

pressure ridge causing uplift. The RCFZ zone branches into three segments through Coronado Island. The RCFZ comprises a complex system of many sub-parallel fault traces that are both active and potentially active and form a zone that can be ½ -mile to 3-miles wide. The RCFZ has been reported to have an average annual slip rate on the order of 0.04 inches per year (Lindvall and Rockwell, 1999). The zone of faulting north of the downtown area is poorly defined but is thought to be within a relatively narrow zone roughly parallel of the I-5 corridor. Some of the fault segments are concealed as they are covered by younger unfaulted sediments.

4. GEOLOGIC MATERIALS

Our field investigation indicates that the site is underlain by previously placed fill, undocumented fill and alluvium overlying Pleistocene-age Old Paralic Deposits. The occurrence, distribution, and description of each unit encountered are shown on the Geologic Map (Figure 2) and the boring and trench logs in Appendix A and C. Figures 3 and 4 present Geologic Cross-Sections showing the approximate underlying geology conditions. The soil and geologic units encountered at the site are discussed herein in order of increasing age.

4.1 Previously Placed Fill (Qpf)

Previously placed fill is associated with the backfilling of the excavations resulted from removal of the underground tanks in 1993 and 2005. We encountered one of these locations during excavation of TF4, within the central portion of the site. The material consisted of dense, moist, very dark gray, sandy gravel. Previously placed fill is considered suitable to receive additional fill or structures, however, according to the proposed development plans, this material would be removed during excavation for the subterranean parking.

4.2 Undocumented Fill (Qudf)

We encountered undocumented fill underlying the site to depths ranging from 2.5 to 12 feet below existing grade during our field investigation. We expect the fill depth ranges from 2 to 5 feet over a majority of the site. The deeper fill encountered in our recent Boring B-4, the 2004 Boring B-2 and fault trenches is likely associated with trench backfill for an existing VCP sewer line traversing the site. The remaining fill over the site is likely associated with previous grading for the development of the site. The fill generally consists of loose to medium dense, olive to dark brown, clayey, fine to medium sand and firm, sandy clay. The undocumented fill is considered unsuitable for support of the planned development and will require remedial grading. The undocumented fill can be reused as new fill, provided it is generally free of trash and debris, for the planned grading and backfill operations.

4.3 Alluvium (Qal)

Alluvial deposits were encountered in fault Trenches TF-5 through TF-7, within the southern portion of the site with thicknesses ranging from 3 to 9 feet. This material is associated with an old drainage that existed in this area prior to site grading. A review of the aerial photographs of 1928 and 1953, clearly show the location of the drainage. The alluvium consists of medium dense, moist, light brown, silty sand with occasional gravel beds. This material is not suitable to receive structural fill or settlement sensitive structures and if not removed during excavation for the proposed garage, it should be removed and replaced as compacted fill

4.4 Old Paralic Deposits (Qop)

Late Pleistocene-age Old Paralic Deposits Unit 6 underlies the surficial soils to the maximum depth explored of approximately 36 feet or an elevation of at least -12.5 feet below MSL. The Old Paralic Deposits consist of interbedded layers of stiff to very stiff clay and silt and dense to very dense silty to clayey sand. This geologic unit generally has a “low” to “medium” expansion potential (expansion index of 21 to 90) and adequate shear strengths. The Old Paralic Deposits are considered suitable for support of the planned development.

4.5 San Diego Formation (Tsd)

We did not encounter the late Pliocene to early Pleistocene-age San Diego Formation and we do not expect it to be encountered during the site construction. However, we opine the San Diego Formation exists below the Old Paralic Deposits Unit 6 and is at least 75 feet below existing surface grades. The San Diego Formation likely consists of silty sandstone with local interbeds of gravel and cobble.

5. GROUNDWATER

We encountered groundwater during the drilling operations to a depth varying from 12 to 20 feet across the site at the locations of our borings. Table 5 summarizes the depths to groundwater and elevations of groundwater we encountered in our borings.

TABLE 5
GROUNDWATER DEPTHS, ELEVATIONS ENCOUNTERED DURING CURRENT SITE INVESTIGATION

Boring	Approximate Elevation at top of Boring (feet, MSL))	Depth to Groundwater (feet)	Elevation of Groundwater (feet, MSL)
B-1	26	20.4	+5.6
B-2	17.5	13.5	+4.0
B-3	17	12.0	+5.0
B-4	23.5	17.7	+5.8

We expect some variations of the levels of groundwater may occur due to tidal influences. Based on measured groundwater elevations, we expect groundwater will be above the planned finished floor elevation of the subterranean garage. Therefore, dewatering will likely be necessary for construction and maintenance of the structure. A dewatering contractor should be retained to design a dewatering system for this project. The project is located about 1,000 feet from the northern tip of De Anza Cove of Fiesta Bay; therefore, the groundwater may be considered brackish.

A review of groundwater level data provided on the State Water Resources Control Board GeoTracker website indicates that the groundwater level measured in July of 2014 was approximately +7.5 feet above MSL at groundwater monitoring wells located approximately 625 feet northwest of the project site.

Based on our site investigation and the data obtained from the GeoTracker website, we recommend a groundwater elevation of +8 feet above MSL be used for the design of the project. The approximate groundwater elevation encountered in our borings and the design groundwater elevation are shown on Geologic Cross Sections A-A′ and B-B′ presented on Figures 3 and 4.

It is not uncommon for groundwater or seepage conditions to develop where none previously existed. Groundwater elevations vary and are affected by seasonal precipitation, irrigation, tidal variations, and land use, among other factors. Proper surface drainage will be important to future performance of the project. During the rainy season, perched water conditions are likely to develop and may require special consideration to minimize construction difficulties

6. GEOLOGIC HAZARDS

6.1 Literature Review

Our review of the *City of San Diego Seismic Safety Study Geologic Hazards and Faults Tile 25* indicates that the site vicinity is assigned a *Geologic Hazard Category 31*, indicating a high liquefaction potential, shallow groundwater, and the presence of hydraulic fills. In addition, a *Geologic Hazard Category 11* is also shown on the property indicating Active, Alquist-Priolo Earthquake Fault Zone. The geologic hazards in the vicinity of the site as mapped in the *City of San Diego Seismic Safety Study Geologic Hazards and Faults Tile 25* is presented on Figure 5, Geologic Hazards Map. The central and eastern portion of the site is located within a city of San Diego Special Studies Zone. The plan shows that a buried potentially active, northwest trending fault is located on the northeast portion of the site. In addition, a second buried sub-parallel potentially active fault is located roughly 185 feet to the east along Interstate 5. The main active fault trace within the RCFZ is located roughly 1,250 feet east of the site and is shown as a dashed line on the city map. The on-site

buried fault trace shown on the city map projects northwest and becomes dashed within sediments of the San Diego Formation roughly 4,450 feet to the northwest.

According to the California Geological Survey *Alquist-Priolo Earthquake Fault Zone Map, La Jolla Quadrangle,* effective November 1, 1991, the site is located within an Earthquake Fault Special Studies Zone due to the presence of the RZFZ. The state map shows the active fault trace within the RCFZ roughly 1,250 feet east of the site. The regional special studies zone in the vicinity of the site is presented on Figure 6, titled Special Studies Zones Map. The active fault segment is mapped as dashed and queried east of the site on the state map. A small dashed fault segment roughly 400 feet south of the site is shown on this map and is roughly 700 feet long and projects northwest underneath Interstate 5. Another northwest trending dashed fault trace is located roughly 1,100 feet northwest of the site and generally projects toward the site. No fault traces are shown on the site according to this state map.

We also reviewed stereo-paired aerial photographs from 1928 and 1953 to study and identify geomorphic features that may indicate the presence of faulting at the site. The area of the site was generally undeveloped in 1953 with Rosewood and Del Rey Streets present to the north. The site was a broad gently west sloping area with three west flowing small drainages and small west trending ridgelines. The drainage channels and ridgelines are generally linear with no features indicative of active faulting. In addition, the area to the east along the active trace does not express the fault trace well likely due to the long interval of recurrence of the fault trace with a low average slip rate of 0.04 inch per year. Any former feature that may have formed at the time of active faulting would not be well expressed and/or retained today at the surface due to erosion. Roughly 4 miles south of the site in the area of Washington Street and Interstate 5, a pressure ridge and closed depression is present, which are typical features related to active faulting, and are more prevalent on older photos on the active trace of the RCFZ. The project site does not show features that are related to active faulting.

6.2 Site Geology and Faulting

The California Geological Survey geologic map for the La Jolla Quadrangle (prepared by Kennedy and Tan, 2008) has mapped the site as dredged fill at existing grade. Based on our field investigation, we did not encounter dredged fill. The shallow undocumented fill we encountered is likely associated with the grading and development of the site. The regional geology in the vicinity of the site is shown on Figure 7, Regional Geologic Map. The closest mapped geologic unit is Qop Unit 6, which is indicated as late Pleistocene age Old Paralic Deposits Unit 6, which corresponds with the Nestor Terrace. This is consistent with our field investigation as we encountered Old Paralic Deposits to an elevation of about 12 below MSL or a maximum depth of 36 feet below existing grade in Boring B-4. A buried dotted fault segment of the RCFZ is mapped on this state map on the northeast portion of the site indicating it is below the Old Paralic Deposits Unit 6 that has an age of roughly 120 thousand years before present (ka BP). This buried fault extends to the northwest and becomes exposed at the

surface roughly 4,450 to the northwest within the late Pliocene to early Pleistocene-age San Diego Formation. Further to the northwest, the fault offsets and separates the San Diego Formation and Eocene-age Ardath Shale. This buried fault has likely not moved in the last 120,000 years and was likely formed during initial RCFZ movement during the Tertiary age. This fault is likely not being used anymore to relieve stresses likely due to changes in the regional stress regime. Therefore, this fault segment should be considered potentially active as it has offset the San Diego Formation but not the Old Paralic Deposits Unit 6. This would indicate its last movement would be bracketed between 2 million and 120,000 years. The active trace of the RCFZ has been mapped on the east side of Interstate 5 roughly 1,250 feet east of the eastern boundary of the site where it has offset and separates Tertiary-age Scripps Formation and Ardath Shale.

6.3 Soil Stratigraphy

The degree of soil profile formation is used by Quaternary geologists and geomorphologists to estimate the age of the faulted or unfaulted materials. In the Southern California Coastal areas, marine terraces typically present a stable surface which soils have formed. One of the most prominent terrace deposits is associated with the high sea level that occurred approximately 120, 000 years ago, during Stage 5e (Quaternary chronology based on oxigene isotopes). The Old Paralic Deposits Unit 6 corresponds with this unit. Subsequent to formation, the exposed surface becomes subject to weathering and soil formation. The soil profile encountered in our fault trenches is relatively well developed and preserved. Three primary subunits have been logged overlaying the sandy clay bed of the Old Paralic Deposits. The upper unit (2A) represents A horizon that consists of dark brown, silty sand with abundant pores and trace of organic matter. The E horizon (2E) which is essentially lighter color and less porosity overlays the moderately developed argillic B horizon (2B). This unit consists of dark brown, sandy clay and clayey sand with thin to moderately thick clay films. Except in Fault Trench FT-5, located within the southern portion of the site where the 2B soil profile was entirely removed by erosion, this soil profile is present, continuous and undisrupted.

6.4 On-Site Faulting Evaluation

We performed seven fault trenches on the site to provide confirmation that the buried fault, as shown on the Kennedy and Tan 2008 geologic map, is not located within the upper portion of the Old Paralic Deposits. Two fault trenches were excavated in previous phases of study and five are the result of our recent explorations. The fault trench logs are provided in Appendix A, Figures A-5 and A-6 and Appendix C (Figure C-1).

Fault Trench 1 (FT-1) was excavated in 2004. The trench was approximately 42 feet long and 10 to 12 feet deep. The trench log shows undocumented fill as part of an old trench backfill associated with a 36 to 48 inch diameter VCP pipe in the area. The geologic unit encountered was logged as two

distinct and continuous layers of the Bay Point Formation (former name of the Old Paralic Deposits). No sign of disruption was evident.

Fault Trench 2 (FT-2) was excavated in 2014. The trench was approximately 100 feet long with a maximum depth of approximately 9 ½ feet. It was placed directly over the mapped location of the buried fault on the northeast portion of the site. The trench was excavated into the upper portion of the Old Paralic Deposits. The Old Paralic Deposits were continuous and unbroken with no faulting features observed.

Fault Trench 3 (FT-3) was located within the northern portion of the site with an approximate length of 170 feet and depth ranging from 8 to 10 feet. Below a thin layer of undocumented fill, we encountered a relatively well developed soil horizon, consisting of A and E horizons (2A and 2E) with argillic (secondary clay formation) of the B horizon (2B). The A and H horizons were cut and removed during the grading of the site. The very stiff, moist to wet sandy clay layer of the Very Old Paralic Deposits (3A) was encountered at the depth of approximately 2 feet at the eastern portion of the trench to 5 feet in the western section was continuous, uniform and undisrupted. Vertical cracks with sand infill and no vertical displacement were observed on top of this bed. These cracks can be attributed to lateral extension. The underlying clayey sandstone layers are also undisrupted and continuous.

Fault Trench 4 (FT-4) was excavated in the central portion of the site. The trench was approximately 100 feet long with the depth ranging from 7 to 10 feet. Up to 3 feet of fill was encountered in the western part of the trench. The fill becomes thinner east ward. In this trench the A horizon is mostly removed during grading, except the middle portion of the trench. The B horizon found to be continues and uniform. The sandy clay bed of the Old Paralic Deposits was encountered at a depth of 5 feet in the western end of the trench to approximately 2 feet at the east side. This bed is continues, uniform and undisrupted. In the middle section of the trench, we encountered a large body of compacted base material that was associated with an underground tank removal in 1993.

Fault Trench 5 (FT-5) is located within the southeastern portion of the site. The trench was approximately 48 feet long and 10 to 12 feet deep. Soil profile was missing in this trench. Deposition of a relatively thick alluvium is the evidence of an ancient creek in this area. Two distinct layers of Holocene age alluvium, approximately 8 feet thick overlay the sandy clay layer of the Old Paralic Deposits. (3A). This layer is continues, uniform and undisrupted. We encountered a large body of undocumented fill within the eastern end of the trench. It appears this fill is associated with the old VCP pipe backfill. We did not detect any pipe in the trench.

Fault Trench 6 (FT-6) was excavated within the east central portion of the site, with an approximate length of 86 feet and a maximum depth of 14 feet. Although the area is covered by 2 to

6 feet of alluvium, the soil profile is relatively well developed with distinct A, E and B horizons (2A, 2E and 2B). The sandy clay bed of the Old Paralic Deposits (3A) was relatively thick, nearly horizontal, and undisrupted.

Fault Trench (FT-7) is located in the southwestern portion of the site. The trench was approximately 68 feet long with the average depth of 14 feet. Below approximately 2 feet of feel, we encountered 4 to 6 feet of alluvium, which is associated with the old drainage that existed in this area prior to development. The soil profile is partially preserved, however, undisrupted and continues. The sandy clay layer of the Old Paralic Deposits is approximately 3 to 5 feet thick, continuous, and uniform.

The recent fault trench excavations were also observed by Dr. Thomas Rockwell of San Diego State University, an expert in local geology and faulting to provide a second opinion for logging our fault trenches and perform report review. Three of the trenches were also observed by Mr. James Quinn, the senior engineering geologist with the City of San Diego.

With the excavation of seven trenches throughout the site, we have covered not only the potential of encountering any north-south trending faults, but also from the northeast and northwest directions. To correlate the information obtained from the fault trenches, we have used the top of the sandy clay layer of the Old Paralic Deposits that was common in all trenches. This layer is near horizontal and not disrupted by faults.

As previously stated, the Old Paralic Deposits is at least 36 feet thick and is likely as much as 75 to 100 feet thick based on reported thicknesses north of the downtown area. Based on our review of the Kennedy and Tan 2008 geologic map, presuming this buried fault segment exists, it does not offset the Old Paralic Deposits and would not be observed until encountering the San Diego Formation at least 75 feet below existing ground surface. Therefore it is our opinion, based on the review of the geologic data and our fault trenching, that building setbacks will not be required from this potentially active buried fault trace located on the site.

6.5 Seismicity

According to the computer program *EZ-FRISK* (Version 7.62), 6 known active faults are located within a search radius of 50 miles from the midpoint of the project alignment. We used the 2008 USGS fault database to evaluate the fault parameters. The nearest known active fault is the Newport-Inglewood – Rose Canyon fault system, located approximately 0.2 miles from the site, and is the dominant source of potential ground motion. Earthquakes that might occur on the Newport Inglewood – Rose Canyon Fault or other faults within the southern California and northern Baja California area are potential generators of significant ground motion at the site. The estimated

deterministic maximum earthquake magnitude and peak ground acceleration for the Newport Inglewood – Rose Canyon Fault are 7.5 and 0.53g, respectively. Table 6.5.1 lists the estimated maximum earthquake magnitude and peak ground acceleration for the most dominant faults in relationship to the site location. We calculated peak ground acceleration (PGA) using Boore-Atkinson (2008) NGA USGS2008, Campbell-Bozorgnia (2008) NGA USGS 2008, and Chiou-Youngs (2007) NGA USGS 2008 acceleration-attenuation relationships.

TABLE 6.5.1
DETERMINISTIC SPECTRA SITE PARAMETERS

Fault Name	Distance from Site (miles)	Maximum Earthquake Magnitude (Mw)	Peak Ground Acceleration		
			Boore-Atkinson 2008 (g)	Campbell-Bozorgnia 2008 (g)	Chiou-Youngs 2007 (g)
Newport-Inglewood	0.2	7.5	0.53	0.42	0.60
Rose Canyon	0.2	6.9	0.52	0.42	0.58
Coronado Bank	14	7.4	0.23	0.17	0.21
Palos Verdes Connected	14	7.7	0.25	0.18	0.24
Elsinore	39	7.9	0.15	0.09	0.12

We used the computer program *EZ-FRISK* to perform a probabilistic seismic hazard analysis. The computer program *EZ-FRISK* operates under the assumption that the occurrence rate of earthquakes on each mappable Quaternary fault is proportional to the faults slip rate. The program accounts for fault rupture length as a function of earthquake magnitude, and site acceleration estimates are made using the earthquake magnitude and distance from the site to the rupture zone. The program also accounts for uncertainty in each of following: (1) earthquake magnitude, (2) rupture length for a given magnitude, (3) location of the rupture zone, (4) maximum possible magnitude of a given earthquake, and (5) acceleration at the site from a given earthquake along each fault. By calculating the expected accelerations from considered earthquake sources, the program calculates the total average annual expected number of occurrences of site acceleration greater than a specified value. We utilized acceleration-attenuation relationships suggested by Boore-Atkinson (2008) NGA USGS 2008, Campbell-Bozorgnia (2008) NGA USGS 2008, and Chiou-Youngs (2007) NGA USGS 2008 in the analysis. Table 6.5.2 presents the site-specific probabilistic seismic hazard parameters including acceleration-attenuation relationships and the probability of exceedence.

TABLE 6.5.2
PROBABILISTIC SEISMIC HAZARD PARAMETERS

Probability of Exceedence	Peak Ground Acceleration		
	Boore-Atkinson, 2007 (g)	**Campbell-Bozorgnia, 2008 (g)**	**Chiou-Youngs, 2007 (g)**
2% in a 50 Year Period	0.66	0.52	0.71
5% in a 50 Year Period	0.42	0.35	0.44
10% in a 50 Year Period	0.28	0.24	0.27

The California Geologic Survey (CGS) has a program that calculates the ground motion for a 10 percent of probability of exceedence in 50 years based on an average of several attenuation relationships. Table 6.5.3 presents the calculated results from the Probabilistic Seismic Hazards Mapping Ground Motion Page from the CGS website.

TABLE 6.5.3
PROBABILISTIC SITE PARAMETERS FOR SELECTED FAULTS
CALIFORNIA GEOLOGIC SURVEY

Calculated Acceleration (g) Firm Rock	Calculated Acceleration (g) Soft Rock	Calculated Acceleration (g) Alluvium
0.28	0.30	0.34

While listing peak accelerations is useful for comparison of potential effects of fault activity in a region, other considerations are important in seismic design, including the frequency and duration of motion and the soil conditions underlying the site. Seismic design of the structure should be evaluated in accordance with the California Building Code (CBC) or other applicable guidelines.

6.6 Liquefaction

The City of San Diego Seismic Safety Study, Geologic Hazards and Faults, Grid Tile 25 defines the site with a Hazard Category 31*: Liquefaction – High Potential – Shallow Groundwater, major drainages, hydraulic fills.* Liquefaction typically occurs when a site is located in a zone with seismic activity, onsite soils are cohesionless or silt/clay with low plasticity, groundwater is encountered within 50 feet of the surface, and soil densities are less than about 70 percent of the maximum dry densities. If the four previous criteria are met, a seismic event could result in a rapid pore water pressure increase from the earthquake-generated ground accelerations. Due to the age and the dense nature of the underlying Old Paralic Deposits, liquefaction potential for the site is considered very low.

6.7 Landslides

We did not observe evidence of ancient landslide deposits at the site during the geotechnical investigation or during our review of aerial photographs. In addition, there are no known landslides near the site, nor is the site in the path of any known or potential landslides.

6.8 Seiches and Tsunamis

Seiches are caused by the movement of an inland body of water due to the movement from seismic forces. The potential of seiches to occur is considered to be very low due to the absence of a nearby inland body of water.

A tsunami is a series of long-period waves generated in the ocean by a sudden displacement of large volumes of water. Causes of tsunamis include underwater earthquakes, volcanic eruptions, or offshore slope failures. The first order driving force for locally generated tsunamis offshore southern California is expected to be tectonic deformation from large earthquakes (Legg, *et al.*, 2002). The largest tsunami effect recorded in San Diego since 1950 was May 22, 1960 which had a maximum run-up amplitude of 2.1 feet (0.7 meters) [URS, 2004]. Wave heights and run-up elevations from tsunamis along the San Diego Coast have historically fallen within the normal range of the tides. The State of California Tsunami Inundation Map for Emergency Planning (CGS, 2009) does not show the property within a tsunami inundation zone. The site is located approximately 1,000 feet from the northern tip of De Anza Cove of Fiesta Bay at an elevation of approximately 16 to 30 feet above Mean Sea Level. Therefore, the risk of tsunamis affecting the site is negligible.

7. CONCLUSIONS AND RECOMMENDATIONS

7.1 General

7.1.1 It is our opinion that neither soil nor geologic conditions were encountered during the investigation that would preclude the construction of the proposed development provided the recommendations presented herein are followed and implemented during design and construction.

7.1.2 We expect approximately 2 to 5 feet of undocumented fill is present on a majority of the site and locally to depths of 12 feet. Deeper fills exist within the existing abandoned sewer line trench zone and may exist within other utility easements and other portions of the site not directly explored. Alluvial soils present in the southern portion of the site may extend to depths of 7 feet. Future demolitions of the existing structures and below ground improvements which occupy the site will likely disturb the upper 2 to 3 feet of site soil. In addition, removal of the abandoned sewer line will extend up to about 15 feet below grade.

7.1.3 Relatively soft saturated soil may be encountered within the garage level excavation bottoms due to the existing groundwater. Operation of rubber tire equipment on the exposed subgrade soil may cause excessive disturbance of the soil, and equipment may sink and become stuck in the soft soil. Excavation activities to establish the finished subgrade elevation must be conducted carefully and methodically to avoid excessive disturbance to the subgrade. Stabilization of the bottom of the excavation may be required in order to provide a firm working surface upon which heavy equipment can operate. Dewatering and temporary lowering of the groundwater table can improve the stability of the bottom of the excavation if properly maintained throughout the construction operations. Recommendations for bottom stabilization and earthwork are provided herein.

7.1.4 The soil near and below the groundwater table is currently very moist to saturated. The grading contractor should be aware that the existing soil will likely require some spreading and drying activities in order to achieve proper compaction.

7.1.5 Based on the results of our exploratory borings, we expect groundwater will be encountered during the excavation of the subterranean levels. Due to the depth of the proposed subterranean parking level and the potential for seasonal fluctuation in the groundwater levels, temporary dewatering measures will be required to mitigate groundwater seepage during excavation and construction. We understand that the portion of the proposed structure that extends below the depth of groundwater will be designed for hydrostatic pressure.

7.1.6 The utilization of a hydrostatic design (fully waterproofed bathtub) may generate uplift forces as a result of the water table which could actually lift or float the structure unless the building is sufficiently heavy to resist buoyancy forces. Temporary dewatering must be maintained during construction until the building loads are heavy enough to resist the buoyant forces. If the buoyant forces are greater than the weight of the structure, permanent anchoring of the mat will be required to prevent the building from lifting. The project structural engineer should determine if the proposed structure is sufficiently heavy to resist buoyant forces after constructed using a design groundwater elevation of 8 feet above MSL.

7.1.7 Due to the nature of the proposed design and intent for a subterranean level, permanent waterproofing of subterranean walls and slabs should be installed. Particular care should be taken in the design and installation of waterproofing to avoid moisture problems, or actual water seepage into the structure through any normal shrinkage cracks which may develop in the concrete walls, floor slab, foundations and/or construction joints. The design and inspection of the waterproofing is not the responsibility of the geotechnical engineer. A waterproofing consultant should be retained in order to recommend a product or method, which would provide protection to subterranean walls, floor slabs and foundations. In addition, an experienced waterproofing inspector should be retained to check proper installation of the system during construction.

7.1.8 We expect shoring will be required where excavations for the subterranean garage are up against or in close proximity to the property line or existing improvements. We expect a temporary soldier pile shoring and tie-back system will be utilized during the grading operations.

7.1.9 Based on the presence of shallow groundwater at the site, infiltration of storm water into the ground is not consider feasible and should not be incorporated into the design for this development.

7.1.10 Once the structural plans are completed, Geocon should review for conformance with the recommendations of this report.

7.1.11 Once the shoring plans are completed, Geocon should review for conformance with the recommendations of this report. It is our opinion that if the shoring plans are prepared in conformance with the recommendations of this report, adjacent properties will not be impacted by the proposed development and settlement will not impact adjacent improvements.

7.2 Soil and Excavation Characteristics

7.2.1 The existing soil can be excavated with light to moderate effort using conventional heavy-duty grading equipment. Moderate slumping and caving should be anticipated in unshored excavations, especially where saturated or granular soils are encountered.

7.2.2 The soil encountered in the field investigation is considered to be "expansive" (expansion index [EI] of greater than 20) as defined by 2013 California Building Code (CBC) Section 1803.5.3. Table 7.2 presents soil classifications based on the expansion index. We expect a majority of the soil encountered possess a "very low" to "medium" expansion potential (expansion index of 90 or less).

TABLE 7.2
EXPANSION CLASSIFICATION BASED ON EXPANSION INDEX

Expansion Index (EI)	Expansion Classification	2013 CBC Expansion Classification
0 – 20	Very Low	Non-Expansive
21 – 50	Low	Expansive
51 – 90	Medium	
91 – 130	High	
Greater Than 130	Very High	

7.2.3 We performed laboratory tests on samples of the site materials to evaluate the percentage of water-soluble sulfate content. Results from the laboratory water-soluble sulfate content tests are presented in Appendix B and indicate that the on-site materials at the locations tested possess "Not Applicable" and "S0" sulfate exposure to concrete structures as defined by 2013 CBC Section 1904 and ACI 318-11 Sections 4.2 and 4.3. The presence of water-soluble sulfates is not a visually discernible characteristic; therefore, other soil samples from the site could yield different concentrations. Additionally, over time landscaping activities (i.e., addition of fertilizers and other soil nutrients) may affect the concentration.

7.2.4 We tested samples for water-soluble chloride, potential of hydrogen (pH) and resistivity laboratory tests to aid in evaluating the corrosion potential to subsurface structures. Appendix B presents the laboratory test results

7.2.5 Geocon Incorporated does not practice in the field of corrosion engineering. Therefore, further evaluation by a corrosion engineer may be performed if improvements susceptible to corrosion are planned.

7.3 Seismic Design Criteria

7.3.1 We used the computer program *U.S. Seismic Design Maps*, provided by the USGS. Table 7.3.1 summarizes site-specific design criteria obtained from the 2013 California Building Code (CBC; Based on the 2012 International Building Code [IBC] and ASCE 7-10), Chapter 16 Structural Design Section 1613 Earthquake Loads. The short spectral response uses a period of 0.2 second. The proposed structures should be designed using Site Class D. We evaluated the Site Class based on the discussion in Section 1613.3.2 of the 2013 CBC and Table 20.3-1 of ASCE 7-10. The values presented in Table 7.3.1 are for the risk-targeted maximum considered earthquake (MCE_R).

TABLE 7.3.1
2013 CBC SEISMIC DESIGN PARAMETERS

Parameter	Value	2013 CBC Reference
Site Class	D	Section 1613.3.2
MCE_R Ground Motion Spectral Response Acceleration – Class B (short), S_S	1.261g	Figure 1613.3.1(1)
MCE_R Ground Motion Spectral Response Acceleration – Class B (1 sec), S_1	0.487g	Figure 1613.3.1(2)
Site Coefficient, F_A	1.000	Table 1613.3.3(1)
Site Coefficient, F_V	1.513	Table 1613.3.3(2)
Site Class Modified MCE_R Spectral Response Acceleration (short), S_{MS}	1.261g	Section 1613.3.3 (Eqn 16-37)
Site Class Modified MCE_R Spectral Response Acceleration (1 sec), S_{M1}	0.737g	Section 1613.3.3 (Eqn 16-38)
5% Damped Design Spectral Response Acceleration (short), S_{DS}	0.841g	Section 1613.3.4 (Eqn 16-39)
5% Damped Design Spectral Response Acceleration (1 sec), S_{D1}	0.492g	Section 1613.3.4 (Eqn 16-40)

7.3.2 Table 7.3.2 presents additional seismic design parameters for projects located in Seismic Design Categories of D through F in accordance with ASCE 7-10 for the mapped maximum considered geometric mean (MCE_G).

TABLE 7.3.2
2013 CBC SITE ACCELERATION DESIGN PARAMETERS

Parameter	Value	ASCE 7-10 Reference
Site Class	D	Section 1613.3.2 (2013 CBC)
Mapped MCE_G Peak Ground Acceleration, PGA	0.572	Figure 22-7
Site Coefficient, F_{PGA}	1.000	Table 11.8-1
Site Class Modified MCE_G Peak Ground Acceleration, PGA_M	0.572	Section 11.8.3 (Eqn 11.8-1)

7.3.3 Conformance to the criteria in Tables 7.3.1 and 7.3.2 for seismic design does not constitute any kind of guarantee or assurance that significant structural damage or ground failure will not occur if a large earthquake occurs. The primary goal of seismic design is to protect life, not to avoid all damage, since such design may be economically prohibitive.

7.4 Temporary Dewatering

7.4.1 Temporary dewatering will be necessary for this project to maintain a safe working environment during excavation and construction activities associated with the proposed subterranean levels. Based on the groundwater elevations encountered during our site investigation and the groundwater encountered in nearby monitoring wells, we recommend a temporary dewatering system be designed for a groundwater elevation of 8 feet MSL. We expect groundwater seepage will emanate from the sandy layers within the Old Paralic Deposits.

7.4.2 A qualified dewatering consultant should be retained to assess flow rates during the design phase of the project. Temporary dewatering consisting of perimeter wells with interior well points may not be completely effective due to the presence of fine grained soil and inability of a well to produce groundwater draw-down in its vicinity. If wells are ineffective, the water may be collected and controlled within the excavation through the use of gravel filled trenches (French drains). The number and locations of the French drains can be adjusted during excavation activities as necessary to collect and control encountered seepage. The French drains will then direct the collected seepage to a sump where it will be pumped out of the excavation. If soft soil is encountered that could not support the planned construction equipment, a gravel blanket will be required for stabilization. This gravel blanket may also be utilized for dewatering purposes as necessary.

7.4.3 We performed hydraulic conductivity laboratory testing on two undisturbed in-situ soil samples collected below the groundwater table at the site. The hydraulic conductivity test

results can be used by a qualified dewatering consultant for the design of dewatering at the site. Table 7.4 presents the hydraulic conductivity laboratory results.

TABLE 7.4
SUMMARY OF LABORATORY HYDRAULIC CONDUCTIVITY RESULTS
ASTM D 5084

Sample No.	Depth (feet)	Geologic Unit (Soil Type)	Dry Density (pcf)	Moisture Content (%)		Average Permeability at 20º C (in/hr)	Average Permeability at 20º C (cm/sec)
				Initial	Final		
B1-8	21-22	Qop	114.3	17.3	17.9	3.64E-03	2.57E-06
B2-5	14-18	Qop	119.4	14.9	16.4	3.22E-05	2.27E-08

7.5 Grading

7.5.1 Earthwork grading should be observed, and compacted fill tested by representatives of Geocon. The existing fill, alluvium, and Old Paralic Deposits encountered during exploration are suitable for re-use as an engineered fill, provided any encountered oversize material (greater than 6 inches) and any encountered deleterious debris is removed.

7.5.2 A preconstruction conference should be held at the site prior to the beginning of grading operations with the city inspector, owner, contractor, civil engineer and geotechnical engineer in attendance. Special soil handling requirements can be discussed at that time.

7.5.3 Grading should commence with the removal of existing vegetation and existing improvements from the area to be graded. We should observe the base of the excavation once a clean excavation bottom has been established. Deleterious debris such as wood and root structures should be exported from the site and should not be mixed with the fill soil. Asphalt grindings and concrete should not be mixed with the fill soils unless approved by the Geotechnical Engineer. Existing underground improvements planned for removal should be excavated and the resulting depressions properly backfilled in accordance with the procedures described herein.

7.5.4 In the areas outside of the subterranean garage, the undocumented fill and alluvium within the planned improvement areas should be removed and replaced with properly compacted fill. We expect the foundations for the structures outside of the parking garage limits will be embedded into the Old Paralic Deposits. The limits of removal of existing fill should be checked by the Geocon representative during site grading activities.

7.5.5 The existing soil can be removed to finish grade within the area of the planned subterranean garage. Excavation and processing of Old Paralic Deposit soils is not required within the proposed subterranean parking levels unless unsuitable soil is encountered or if excessively disturbed by the grading contractor. Depending on the depth to groundwater at the time of construction, periodic watering of the exposed soil may be required to maintain the moisture content of the soil and prevent drying back and/or desiccation.

7.5.6 We should observe the grading operations during the excavation for the planned subterranean garage. Specifically, we will observe the sidewall excavations across the project to confirm the absence of faulting during the grading operations. Therefore, we should be onsite prior to the placement of wood lagging for the temporary shoring.

7.5.7 Since a temporary long term dewatering system will likely be required for excavation of the proposed subterranean parking garage, subgrade stabilization may be necessary and can be accomplished by placing a one-foot thick layer of washed, angular ¾-inch gravel atop a stabilization fabric (Mirafi 600X or equivalent), subsequent to subgrade approval. This procedure should be conducted in sections until the entire excavation bottom has been blanketed by fabric and gravel. In order to prevent excessive disturbance to a soft subgrade, track mounted equipment should be used to perform the gravel spreading operations. Heavy equipment may operate upon the gravel once it has been placed. The gravel should be compacted to a dense state utilizing track equipment or a drum roller. The placement of gravel at the subgrade level should be coordinated with the temporary dewatering of the site. The gravel and fabric system will function as both a permeable material for any necessary dewatering procedures, as well as a stable material upon which heavy equipment may operate. It is recommended that the grading contractor meet with the Geotechnical Engineer to discuss this procedure in more detail.

7.5.8 Where temporary dewatering is not required, subgrade stabilization may be achieved by placing three- to six-inch diameter crushed angular rock into the soft excavation bottom. The use of crushed concrete will also be acceptable. Rock generated from crushing operations of on-site concrete can be used. The crushed rock should be spread thinly across the excavation bottom and pressed into the soils by track rolling or wheel rolling with heavy equipment

7.5.9 Fill and backfill soil should be placed in horizontal loose layers with a maximum thickness of approximately 6 to 8 inches thick, moisture conditioned to a moisture content near to slightly above optimum moisture content, and properly compacted to a dry density of at least 90 percent of the laboratory maximum dry density in accordance with ASTM D 1557. The upper 12 inches of subgrade soil underlying pavement should compacted to a dry density of

at least 95 percent of the laboratory maximum dry density near to slightly above optimum moisture content shortly before paving operations.

7.5.10 Utility trenches should be properly backfilled in accordance with the requirements of the Green Book (latest edition) and the City of San Diego requirements. The use of gravel within utility trenches below the groundwater table and below an elevation of 8 feet above MSL is not acceptable unless used in conjunction with filter fabric. The trench backfill may be derived from onsite soil or approved import soil, compacted as necessary, until the required compaction is obtained. The use of minimum 2-sack slurry is also acceptable. Prior to placing any bedding materials or pipes, the excavation bottom must be observed and approved by a representative of Geocon.

7.6 Temporary Excavation Slopes, Shoring, and Tiebacks

7.6.1 The recommendations included herein are provided for stable excavations. It is the responsibility of the contractor to provide a safe excavation during the construction of the proposed project.

7.6.2 Temporary excavations should be made in conformance with OSHA requirements. The undocumented fill should be considered a type C soil and the Old Paralic Deposits can be considered a Type B soil (Type C soil if seepage or groundwater is encountered) in accordance with OSHA requirements. In general, special shoring requirements will not be necessary if temporary excavations will be less than 4 feet in height and do not have seepage. Temporary excavations greater than 4 feet in height, however, should be sloped back at an appropriate inclination. These excavations should not be allowed to become saturated or to dry out. Surcharge loads should not be permitted to a distance equal to the height of the excavation from the top of the excavation. The top of the excavation should be a minimum of 15 feet from the edge of existing improvements. Excavations steeper than those recommended or closer than 15 feet from an existing surface improvement should be shored in accordance with applicable OSHA codes and regulations.

7.6.3 The design of temporary shoring is governed by soil and groundwater conditions, and by the depth and width of the excavated area. Continuous support of the excavation face can be provided by a system of soldier piles and wood lagging. Excavations exceeding 15 feet may require soil nails, tieback anchors, or internal bracing to provide additional wall restraint. A qualified shoring contractor should be contacted to provide a design for temporary shoring.

7.6.4 We expect groundwater will be encountered during construction. The shoring contractor should be prepared to encounter groundwater during the drilling operations for the soldier pile installation. Soldier piles placed below the water level may require the use of a tremie to place the concrete into the bottom of the hole as instructed by the project shoring engineer. A tremie should consist of a rigid, water-tight tube having a diameter of not less than 6 inches with a hopper at the top. The tube should be equipped with a device that will close the discharge end and prevent water from entering the tube while it is being charged with concrete. The tremie should be supported so as to permit free movement of the discharge end over the entire top surface of the work and to permit rapid lowering when necessary to retard or stop the flow of concrete. The discharge end should be closed at the start of the work to prevent water entering the tube and should be entirely sealed at all times, except when the concrete is being placed. The tremie tube should be kept full of concrete. The flow should be continuous until the work is completed and the resulting concrete seal should be monolithic and homogeneous. The tip of the tremie tube should always be kept about 5 feet below the surface of the concrete and definite steps and safeguards should be taken to insure that the tip of the tremie tube is never raised above the surface of the concrete.

7.6.5 Casing or drilling mud may be required since caving may occur in the saturated soils. If casing is used, extreme care should be employed so that the pile is not pulled apart as the casing is withdrawn. At no time should the distance between the surface of the concrete and the bottom of the casing be less than five feet. Continuous observation of the drilling and pouring of the piles by the Geotechnical Engineer (a representative of Geocon), is required.

7.6.6 In general, ground conditions are moderately suited for soldier pile and tieback anchor wall construction techniques. If cohesionless sands or groundwater is encountered, some raveling/caving may result along the unsupported portions of excavations. The excavations may require the use of drilling mud or steel casing to properly install the temporary shoring components. The recommendations presented herein assume that groundwater will not be loading the active portion of the temporary shoring but will be affect the passive portion of the shoring. We should be contacted if different conditions exist.

7.6.7 Temporary shoring with a level backfill should be designed using a lateral pressure envelope acting on the back of the shoring and applying pressures for a triangular, rectangular, or trapezoidal distribution as presented on Figure 8. The pressures are a function of H_D and H_W, where H_D is the height of the wall above groundwater, and H_W is the height of the wall below groundwater. Triangular distribution should be used for cantilevered shoring and, the trapezoidal and rectangular distribution should be used for multi-braced systems such as tieback anchors and rakers. The project shoring engineer

should determine the applicable soil distribution for the design of the temporary shoring system. Additional lateral earth pressure due to the surcharging effects of adjacent structures or traffic loads should be considered, where appropriate, during design of the shoring system.

7.6.8 Passive soil pressure resistance for embedded portions of soldier piles can be based upon an equivalent passive soil fluid weight of 150D + 500 where D is the depth of embedment, in feet (resulting in pounds per square foot), as shown on Figure 9. The passive resistance can be assumed to act over a width of three pile diameters. Typically, soldier piles are embedded a minimum of 0.5 times the maximum height of the excavation (this depth is to include footing excavations) if tieback anchors are not employed. The project structural engineer should determine the actual embedment depth.

7.6.9 Drilled shafts for the soldier piles should be observed by Geocon Incorporated prior to the placement of steel reinforcement to check that the exposed soil conditions are similar to those expected and that footing excavations have been extended to the appropriate bearing strata, and design depths. If unexpected soil conditions are encountered, foundation modifications may be required

7.6.10 Lateral movement of shoring is associated with vertical ground settlement outside of the excavation. Therefore, it is essential that the soldier pile and tieback system allow very limited amounts of lateral displacement. Earth pressures acting on a lagging wall can cause movement of the shoring toward the excavation and result in ground subsidence outside of the excavation. Consequently, horizontal movements of the shoring wall should be accurately monitored and recorded during excavation and anchor construction.

7.6.11 Survey points should be established at the top of the pile on at least 20 percent of the soldier piles. An additional point located at an intermediate point between the top of the pile and the base of the excavation should be monitored on at least 20 percent of the piles if tieback anchors will be used. These points should be monitored on a weekly basis during excavation work and on a monthly basis thereafter until the permanent support system is constructed.

7.6.12 The shoring system should be designed to limit horizontal soldier pile movement to a maximum of 1 inch. The amount of horizontal deflection can be assumed to be essentially zero along the Active Zone and Effective Zone boundary. The magnitude of movement for intermediate depths and distances from the shoring wall can be linearly interpolated. The project civil and/or shoring engineer should determine the allowable amount of horizontal movement associated with the shoring system that could affect existing utilities and

structures, if present. In addition, the project civil and/or shoring engineer should evaluate the existing utilities and improvements and provide a conclusion regarding the ability of the utilities and improvements to withstand the expected lateral and vertical movement associated with the planned excavation.

7.6.13 If a raker system is employed, the rakers should not be inclined steeper than 1:1 (horizontal to vertical) to provide an excavation to the raker foundation system with an inclination less than 1:1. A shallow or deep foundation system can be used for the raker system. We should be contacted if a raker system is planned.

7.6.14 Tieback anchors employed in shoring should be designed such that anchors fully penetrate the Active Zone behind the shoring. The Active Zone can be considered the wedge of soil from the face of the shoring to a plane extending upward from the base of the excavation at a 32-degree angle from vertical, as shown on Figure 10. Normally, tieback anchors are contractor-designed and installed, and there are numerous anchor construction methods available. Non-shrinkage grout should be used for the construction of the tieback anchors.

7.6.15 Experience has shown that the use of pressure grouting during formation of the bonded portion of the anchor will increase the soil-grout bond stress. A pressure grouting tube should be installed during the construction of the tieback. Post grouting should be performed if adequate capacity cannot be obtained by other construction methods.

7.6.16 Anchor capacity is a function of construction method, depth of anchor, batter, diameter of the bonded section, and the length of the bonded section. Anchor capacity should be evaluated using a cohesion value of 500 psf and a friction angle of 27 degrees.

7.6.17 Grout should only be placed in the tieback anchor's bonded section prior to testing. Tieback anchors should be proof-tested to at least 130 percent of the anchor's design working load. Following a successful proof test, the tieback anchors should be locked off at 80 percent of the allowable working load or in accordance with the project shoring engineer. Tieback anchor test failure criteria should be established in project plans and specifications. The tieback anchor test failure criteria should be based upon a maximum allowable displacement at 130 percent of the anchor's working load (anchor creep) and a maximum residual displacement within the anchor following stressing. Tieback anchor stressing should only be conducted after sufficient hydration has occurred within the grout. Tieback anchors that fail to meet project specified test criteria should be replaced or additional anchors should be constructed.

7.6.18 Lagging should keep pace with excavation and tieback anchor construction. The excavation should not be advanced deeper than three feet below the bottom of lagging at any time. These unlagged gaps of up to three feet should only be allowed to stand for short periods of time in order to decrease the probability of soil instability and should never be unsupported overnight. Backfilling should be conducted when necessary between the back of lagging and excavation sidewalls to reduce sloughing in this zone and all voids should be filled by the end of each day. Further, the excavation should not be advanced further than four feet below a row of tiebacks prior to those tiebacks being proof tested and locked off.

7.6.19 If tieback anchors are employed, an accurate survey of existing utilities and other underground structures adjacent to the shoring wall should be conducted. The survey should include both locations and depths of existing utilities. Locations of anchors should be adjusted as necessary during the design and construction process to accommodate the existing and proposed utilities.

7.6.20 The condition of existing buildings, streets, sidewalks, and other structures/improvements around the perimeter of the planned excavation should be documented prior to the start of shoring and excavation work. Special attention should be given to documenting existing cracks or other indications of differential settlement within these adjacent structures, pavements and other improvements. Underground utilities sensitive to settlement should be videotaped prior to construction to check the integrity of pipes. In addition, monitoring points should be established indicating location and elevation around the excavation and upon existing buildings. These points should be monitored on a weekly basis during excavation work and on a monthly basis thereafter. Inclinometers should be installed and monitored behind any shoring sections that will be advanced deeper than 30 feet below the existing ground surface.

7.7 Shallow Foundation and Concrete Slab-On-Grade Recommendations

7.7.1 The proposed structures outside the planned subterranean garage area can be supported on a shallow foundation system founded in the Old Paralic Deposits. We expect the proposed structures include portions of the commercial tech/hub, gym/retail structures, leasing building and the townhomes at-grade Foundations for the structures should consist of continuous strip footings and/or isolated spread footings. Continuous footings should be at least 12 inches wide and extend at least 24 inches below lowest adjacent pad grade or 6 inches into the Old Paralic Deposits, whichever results in a deeper foundation. Isolated spread footings should have a minimum width of 2 feet and should also extend at least 24 inches below lowest adjacent pad grade or 6 inches into the Old Paralic Deposits, whichever results in a deeper foundation. Steel reinforcement for continuous footings

should consist of at least four No. 5 steel reinforcing bars placed horizontally in the footings, two near the top and two near the bottom. Steel reinforcement for the spread footings should be designed by the project structural engineer. A wall/column footing dimension detail is presented in Figure 11. In addition, footings should be deepened such that the bottom outside edge of the footing is at least 7 feet horizontally from the face of the slope.

7.7.2 The recommendations herein are based on soil characteristics only (EI of 90 or less) and are not intended to replace reinforcement required for structural considerations.

7.7.3 The recommended allowable bearing capacity for foundations with minimum dimensions described herein is 4,000 pounds per square foot (psf) for footings bearing in compacted fill. The allowable soil bearing pressure may be increased by an additional 500 psf for each additional foot of depth and 300 psf for each additional foot of width, to a maximum allowable bearing capacity of 8,000 psf for compacted fill. The values presented herein are for dead plus live loads and may be increased by one-third when considering transient loads due to wind or seismic forces.

7.7.4 We estimate the total and differential settlements under the imposed allowable loads to be about ½ inch based on a 5-foot square footing.

7.7.5 Concrete floor slabs should possess a thickness of at least 5 inches and reinforced with a minimum of No. 4 steel reinforcing bars at 18 inches on center in both horizontal directions. The structural engineer should design the steel required for the planned loading conditions.

7.7.6 Slabs that may receive moisture-sensitive floor coverings or may be used to store moisture-sensitive materials should be underlain by a vapor retarder. The vapor retarder design should be consistent with the guidelines presented in the American Concrete Institute's (ACI) *Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials* (ACI 302.2R-06). In addition, the membrane should be installed in accordance with manufacturer's recommendations and ASTM requirements and installed in a manner that prevents puncture. The vapor retarder used should be specified by the project architect or developer based on the type of floor covering that will be installed and if the structure will possess a humidity controlled environment. It is common in the southern California area to use a Stego 10-mil product as the vapor retarder.

7.7.7 The bedding sand thickness should be determined by the project foundation engineer, architect, and/or developer. It is common to have 3 to 4 inches of sand for 5-inch thick

slabs in the southern California region. However, we should be contacted to provide recommendations if the bedding sand is thicker than 6 inches. The foundation design engineer should provide appropriate concrete mix design criteria and curing measures to assure proper curing of the slab by reducing the potential for rapid moisture loss and subsequent cracking and/or slab curl. We suggest that the foundation design engineer present the concrete mix design and proper curing methods on the foundation plans. It is critical that the foundation contractor understands and follows the recommendations presented on the foundation plans.

7.7.8 Foundation excavations should be observed by the geotechnical engineer (a representative of Geocon Incorporated) prior to the placement of reinforcing steel to check that the exposed soil conditions are similar to those expected and that they have been extended to the appropriate bearing strata. If unexpected soil conditions are encountered, foundation modifications may be required.

7.7.9 Special subgrade presaturation is not deemed necessary prior to placing concrete; however, the exposed foundation and slab subgrade soil should be moisturized to maintain a moist condition as would be expected in any such concrete placement.

7.7.10 Where buildings or other improvements are planned near the top of a slope steeper than 3:1 (horizontal to vertical), special foundations and/or design considerations are recommended due to the tendency for lateral soil movement to occur.

- Building footings should be deepened such that the bottom outside edge of the footing is at least 7 feet horizontally from the face of the slope.
- If swimming pools are planned, Geocon Incorporated should be contacted for a review of specific site conditions.
- Although other improvements, which are relatively rigid or brittle, such as concrete flatwork or masonry walls, may experience some distress if located near the top of a slope, it is generally not economical to mitigate this potential. It may be possible, however, to incorporate design measures that would permit some lateral soil movement without causing extensive distress. Geocon Incorporated should be consulted for specific recommendations.

7.7.11 The foundation and concrete slab-on-grade recommendations are based on soil support characteristics only. The project structural engineer should evaluate the structural requirements of the concrete slabs for supporting expected loads.

7.7.12 Concrete slabs should be provided with adequate construction joints and/or expansion joints to control unsightly shrinkage cracking. The design of joints should consider criteria of the American Concrete Institute when establishing crack-control spacing.

7.7.13 The recommendations of this report are intended to reduce the potential for cracking of slabs due to expansive soil (if present), differential settlement of existing soil or soil with varying thicknesses. However, even with the incorporation of the recommendations presented herein, foundations, stucco walls, and slabs-on-grade placed on such conditions may still exhibit some cracking due to soil movement and/or shrinkage. The occurrence of concrete shrinkage cracks is independent of the supporting soil characteristics. Their occurrence may be reduced and/or controlled by limiting the slump of the concrete, proper concrete placement and curing, and by the placement of crack control joints at periodic intervals, in particular, where re-entrant slab corners occur.

7.7.14 Where exterior flatwork abuts the structure at entrant or exit areas, the exterior slab should be dowelled into the structure's foundation stemwall. This recommendation is intended to reduce the potential for differential elevations that could result from differential settlement or minor heave of the flatwork. Dowelling details should be designed by the project structural engineer.

7.7.15 Geocon Incorporated should be consulted to provide additional design parameters as required by the structural engineer.

7.8 Mat Foundation Recommendations

7.8.1 We understand the proposed subterranean garage structure may be supported on a mat foundation due to the presence of the existing groundwater. A mat foundation consists of a thick, rigid concrete mat that allows the entire footprint of the structure to carry building loads and helps prevent water infiltration due to the existing groundwater. In addition, the mat can tolerate significantly greater differential movements such as those associated with expansive soils or differential settlement. We expect the mat foundation would be supported in the Old Paralic Deposits.

7.8.2 The allowable bearing capacity can be taken as 1,000 pounds per square foot (psf) in Old Paralic Deposits. The modulus of subgrade reaction for design of the mat can range from 200 to 300 pounds per cubic inch (pci) for the Old Paralic Deposits. These values should be modified as necessary using standard equations for mat size. We expect total and differential settlements to be ½ inch, respectively, under static loads.

7.8.3 The foundation and retaining walls should be designed for hydrostatic pressure using a groundwater elevation of about 8 feet above MSL.

7.8.4 A mat foundation system will allow the structure to settle with the ground and should have sufficient rigidity to allow the structure to move as a single unit.

7.8.5 Foundation and bottom excavations should be observed by the Geotechnical Engineer (a representative of Geocon Incorporated) prior to the placement of reinforcing steel and concrete to observe that the exposed soil conditions are consistent with those expected and have been extended to appropriate bearing strata. If expected soil conditions are encountered, foundation modifications may be required.

7.9 Concrete Flatwork

7.9.1 Exterior concrete flatwork not subject to vehicular traffic should be constructed in accordance with the recommendations herein. Slab panels should be a minimum of 4 inches thick and, when in excess of 8 feet square, should be reinforced with 6 x 6 - W2.9/W2.9 (6 x 6 - 6/6) welded wire mesh or No. 3 reinforcing bars spaced at least 18 inches center-to-center in both directions to reduce the potential for cracking. In addition, concrete flatwork should be provided with crack control joints to reduce and/or control shrinkage cracking. Crack control spacing should be determined by the project structural engineer based upon the slab thickness and intended usage. Criteria of the American Concrete Institute (ACI) should be taken into consideration when establishing crack control spacing. Subgrade soil for exterior slabs not subjected to vehicle loads should be compacted in accordance with criteria presented in the grading section prior to concrete placement. Subgrade soil should be properly compacted and the moisture content of subgrade soil should be checked prior to placing concrete.

7.9.2 Even with the incorporation of the recommendations within this report, the exterior concrete flatwork has a likelihood of experiencing some uplift due to expansive soil beneath grade; therefore, the steel reinforcement should overlap continuously in flatwork to reduce the potential for vertical offsets within flatwork. Additionally, flatwork should be structurally connected to the curbs, where possible, to reduce the potential for offsets between the curbs and the flatwork.

7.9.3 Where exterior flatwork abuts the structure at entrant or exit points, the exterior slab should be dowelled into the structure's foundation stemwall. This recommendation is intended to reduce the potential for differential elevations that could result from differential settlement

or minor heave of the flatwork. Dowelling details should be designed by the project structural engineer.

7.9.4 The recommendations presented herein are intended to reduce the potential for cracking of slabs and foundations as a result of differential movement. However, even with the incorporation of the recommendations presented herein, foundations and slabs-on-grade will still crack. The occurrence of concrete shrinkage cracks is independent of the soil supporting characteristics. Their occurrence may be reduced and/or controlled by limiting the slump of the concrete, the use of crack control joints and proper concrete placement and curing. Literature provided by the Portland Concrete Association (PCA) and American Concrete Institute (ACI) present recommendations for proper concrete mix, construction, and curing practices, and should be incorporated into project construction.

7.10 Preliminary Pavement Recommendations

7.10.1 We calculated the preliminary flexible pavement sections in general conformance with the *Caltrans Method of Flexible Pavement Design* (Highway Design Manual, Section 608.4) using an estimated Traffic Index (TI) of 5.5 and 7.0 for parking areas and driveways, respectively. The project civil engineer and owner should review the pavement designations to determine appropriate locations for pavement thickness. The final pavement sections for the proposed driveway should be based on the R-Value of the subgrade soils encountered at final subgrade elevation. Based on our experience with similar soil, we used R-Values of 10 and 78 for the subgrade soil and base materials, respectively, for the purposes of this preliminary analysis. Preliminary flexible pavement sections are presented in Table 7.10.1.

TABLE 7.10.1
PRELIMINARY FLEXIBLE PAVEMENT SECTION

Location	Assumed Traffic Index	Assumed Subgrade R-Value	Asphalt Concrete (inches)	Class 2 Aggregate Base (inches)
Parking Areas	5.5	10	4	8
Driveways	7.0	10	4	15

7.10.2 The upper 12 inches of the subgrade soil should be compacted to a dry density of at least 95 percent of the laboratory maximum dry density near to slightly above optimum moisture content beneath pavement sections shortly before paving.

7.10.3 Base materials should conform to Section 26-1.028 of the *Standard Specifications for The State of California Department of Transportation (Caltrans)* with a ¾-inch maximum size aggregate. Base materials should be compacted to a dry density of at least 95 percent of the laboratory maximum dry density near to slightly above optimum moisture content. The asphalt concrete should conform to Section 203-6 of the *Standard Specifications for Public Works Construction (Greenbook)*. Asphalt concrete should be compacted to a density of at least 95 percent of the laboratory Hveem density in accordance with ASTM D 2726.

7.10.4 A rigid Portland cement concrete (PCC) pavement section can be placed within driveway apron entrances, trash truck areas, fire lanes, and cross-gutters. The concrete pad for the trash truck should be large enough to accommodate all the wheels during loading. We calculated the rigid pavement section in general conformance with the procedure recommended by the American Concrete Institute report ACI 330R-08 *Guide for Design and Construction of Concrete Parking Lots* using the parameters presented in Table 7.10.2.

TABLE 7.10.2
RIGID PAVEMENT DESIGN PARAMETERS

Design Parameter	Design Value
Modulus of subgrade reaction, k	50 pci
Modulus of rupture for concrete, M_R	500 psi
Traffic Category, TC	A and C
Average daily truck traffic, ADTT	10 and 100

7.10.5 Based on the criteria presented herein, the PCC pavement sections should have a minimum thickness as presented in Table 7.10.3.

TABLE 7.10.3
RIGID PAVEMENT RECOMMENDATIONS

Location	Portland Cement Concrete (inches)
Automobile Parking Areas (TC=A)	6.5
Driveways, Aprons, Trash Truck Loading Areas, Fire Lanes, and Cross-Gutters (TC=C)	7.5

7.10.6 The PCC pavement should be placed over subgrade soil that is compacted to a dry density of at least 95 percent of the laboratory maximum dry density near to slightly above optimum moisture content. This pavement section is based on a minimum concrete compressive strength of approximately 3,000 psi (pounds per square inch). Base materials

will not be required beneath concrete improvements including cross-gutters, driveway aprons, curb and gutters, and sidewalks.

7.10.7 A thickened edge or integral curb should be constructed on the outside of concrete slabs subjected to wheel loads. The thickened edge should be 1.2 times the slab thickness or a minimum thickness of 2 inches, whichever results in a thicker edge, and taper back to the recommended slab thickness 4 feet behind the face of the slab (e.g., a 7.5-inch-thick slab would have a 9.5-inch-thick edge). Reinforcing steel will not be necessary within the concrete for geotechnical purposes with the possible exception of dowels at construction joints as discussed herein.

7.10.8 To control the location and spread of concrete shrinkage cracks, crack-control joints (weakened plane joints) should be included in the design of the concrete pavement slab. Crack-control joints should not exceed 30 times the slab thickness with a maximum spacing of 15 feet for the 6.5 - and 7.5-inch-thick slabs (e.g., a 7.5-inch-thick slab would have a 15-foot spacing pattern), and should be sealed with an appropriate sealant to prevent the migration of water through the control joint to the subgrade materials. The depth of the crack-control joints should be determined by the referenced ACI report.

7.10.9 To provide load transfer between adjacent pavement slab sections, a butt-type construction joint should be constructed. The butt-type joint should be thickened by at least 20 percent at the edge and taper back at least 4 feet from the face of the slab. As an alternative to the butt-type construction joint, dowelling can be used between construction joints for pavements of 7 inches or thicker. As discussed in the referenced ACI guide, dowels should consist of smooth, 1-inch-diameter reinforcing steel 14 inches long embedded a minimum of 6 inches into the slab on either side of the construction joint. Dowels should be located at the midpoint of the slab, spaced at 12 inches on center and lubricated to allow joint movement while still transferring loads. In addition, tie bars should be installed at the as recommended in Section 3.8.3 of the referenced ACI guide. The structural engineer should provide other alternative recommendations for load transfer.

7.10.10 The performance of pavement is highly dependent on providing positive surface drainage away from the edge of the pavement. Ponding of water on or adjacent to the pavement will likely result in pavement distress and subgrade failure to proposed improvements. Drainage from landscaped areas should be directed to controlled drainage structures. Landscape areas adjacent to the edge of asphalt pavements are not recommended due to the potential for surface or irrigation water to infiltrate the underlying permeable aggregate base and cause distress. Where such a condition cannot be avoided, consideration should be given to incorporating measures that will significantly reduce the potential for subsurface water

migration into the aggregate base. If planter islands are planned, the perimeter curb should extend at least 6 inches below the level of the base materials.

7.11 Retaining Walls

7.11.1 Non-building retaining and site walls should be founded on properly compacted fill or Old Paralic Deposits. The foundations should have a minimum depth and width of 12 inches below finish pad subgrade and may be designed for an allowable soil bearing pressure of 2,000 psf.

7.11.2 Retaining walls not restrained at the top and having a level backfill surface should be designed for an active soil pressure equivalent to the pressure exerted by a fluid density of 40 pounds per cubic foot (pcf). Where the backfill will be inclined at 2:1 (horizontal to vertical), an active soil pressure of 55 pcf is recommended. Soil with an expansion index (EI) of greater than 90 should not be used as backfill material behind retaining walls.

7.11.3 Unrestrained walls are those that are allowed to rotate more than 0.001H (where H equals the height of the retaining portion of the wall) at the top of the wall. Where walls are restrained from movement at the top, an additional uniform (rectangular) pressure of 7H psf and 13H psf should be added to the active soil pressure where the planned walls are 8 feet or less and the portion of walls over 8 feet, respectively. The recommendations presented herein are for walls with a height of 15 feet or less. For retaining walls subject to vehicular loads within a horizontal distance equal to two-thirds the wall height, a surcharge equivalent to 2 feet of fill soil should be added.

7.11.4 The use of drainage openings through the base of the wall (weep holes) is not recommended where the seepage could be a nuisance or otherwise adversely affect the property adjacent to the base of the wall. The recommendations herein assume a properly compacted granular (EI of 90 or less) free-draining backfill material with no hydrostatic forces or imposed surcharge load. Figure 12 presents a typical soldier pile wall drainage detail. Figure 13 presents a typical retaining wall drain detail. If conditions different than those described are expected, or if specific drainage details are desired, Geocon Incorporated should be contacted for additional recommendations.

7.11.5 The structural engineer should determine the seismic design category for the project in accordance with Section 1613 of the CBC. If the project possesses a seismic design category of D, E, or F, retaining walls that support more than 6 feet of backfill should be designed with seismic lateral pressure in accordance with Section 18.3.5.12 of the 2013 CBC. The seismic load is dependent on the retained height where H is the height of the

wall, in feet, and the calculated loads result in pounds per square foot (psf) exerted at the base of the wall and zero at the top of the wall. A seismic load of 16H should be used for design. We used the peak ground acceleration adjusted for Site Class effects, PGA_M, of 0.572g calculated from ASCE 7-10 Section 11.8.3 and applied a pseudo-static coefficient of 0.33.

7.11.6 Unrestrained walls will move laterally when backfilled and loading is applied. The amount of lateral deflection is dependent on the wall height, the type of soil used for backfill, and loads acting on the wall. The retaining walls and improvements above the retaining walls should be designed to incorporate an appropriate amount of lateral deflection as determined by the structural engineer.

7.12 Lateral Loading

7.12.1 To resist lateral loads, a passive pressure exerted by an equivalent fluid weight of 350 pounds per cubic foot (pcf) should be used for the design of footings or shear keys poured neat in compacted fill. The passive pressure assumes a horizontal surface extending at least 5 feet, or three times the surface generating the passive pressure, whichever is greater. The upper 12 inches of material in areas not protected by floor slabs or pavement should not be included in design for passive resistance.

7.12.2 If friction is to be used to resist lateral loads, an allowable coefficient of friction between soil and concrete of 0.4 should be used for design.

7.13 Elevator Pit Design

7.13.1 The elevator pit slab and retaining wall should be designed by the project structural engineer. As a minimum the slab-on-grade should be at least 5 inches thick and reinforced with No. 4 steel reinforcing bars placed 18 inches on center in both horizontal directions, positioned near the slab midpoint. Elevator pit walls may be designed in accordance with the recommendations in the *Retaining Wall Design* section of this report as well as account for potentially being below the groundwater table. The elevator pit should be structurally supported either indirectly or directly by the mat and pile foundation system.

7.13.2 Additional active pressure should be added for a surcharge condition due to sloping ground, vehicular traffic or adjacent foundations and should be designed for each condition as the project progresses. Once the design becomes more finalized, an addendum letter can be prepared addressing specific surcharge conditions throughout the project, if necessary.

7.13.3 If retaining wall drainage is to be provided, the drainage system should be designed in accordance with the *Retaining Wall Drainage* section of this report.

7.13.4 The elevator pit walls and slab should be properly waterproofed to prevent excessive moisture inside of the elevator pit.

7.14 Elevator Piston

7.14.1 If a plunger-type elevator piston is installed for this project, a deep drilled excavation will be required. The drilled excavation should not situated immediately adjacent to a foundation or shoring pile, or the drilled excavation could compromise the existing foundation or pile support, especially if the drilling is performed subsequent to the foundation or pile construction.

7.14.2 Casing may be required if caving is experienced in the drilled excavation, especially if the excavation is conducted below the groundwater level. The contractor should be prepared to use casing and should have it readily available at the commencement of drilling activities. The contractor should also be prepared to mitigate buoyant forces since the casing will be below the groundwater level. Continuous observation of the drilling and installation of the elevator piston by the Geotechnical Engineer (a representative of Geocon, Inc.) is required.

7.14.3 The annular space between the piston casing and drilled excavation wall should be filled with a minimum of 1½-sack slurry pumped from the bottom up. As an alternative, pea gravel may be utilized. The use of soil to backfill the annular space is not acceptable.

7.15 Surface Drainage

7.15.1 Proper surface drainage is critical to the future performance of the project. Uncontrolled infiltration of irrigation excess and storm runoff into the soils can adversely affect the performance of the planned improvements. Saturation of a soil can cause it to lose internal shear strength and increase its compressibility, resulting in a change in the original designed engineering properties. Proper drainage should be maintained at all times.

7.15.2 Site drainage should be collected and controlled in non-erosive drainage devices. Drainage should not be allowed to pond anywhere on the site, and especially not against any foundation or retaining wall. The site should be graded and maintained such that surface drainage is directed away from structures in accordance with 2013 CBC 1804.3 or other applicable standards. In addition, drainage should not be allowed to flow uncontrolled over any descending slope. Discharge from downspouts, roof drains and scuppers are not recommended onto unprotected soils within five feet of the building perimeter. Planters

which are located adjacent to foundations should be sealed to prevent moisture intrusion into the soils providing foundation support. Landscape irrigation is not recommended within five feet of the building perimeter footings except when enclosed in protected planters.

7.15.3 Positive site drainage should be provided away from structures, pavement, and the tops of slopes to swales or other controlled drainage structures. The building pad and pavement areas should be fine graded such that water is not allowed to pond.

7.15.4 Landscaping planters immediately adjacent to paved areas are not recommended due to the potential for surface or irrigation water to infiltrate the pavement's subgrade and base course. Either a subdrain, which collects excess irrigation water and transmits it to drainage structures, or an impervious above-grade planter boxes should be used. In addition, where landscaping is planned adjacent to the pavement, it is recommended that consideration be given to providing a cutoff wall along the edge of the pavement that extends at least 12 inches below the base material.

7.15.5 We understand the property may incorporate storm water management devices that promote water storage but not water infiltration. The existing and planned soil conditions are not conducive to water infiltration and infiltration should not be allowed due to the shallow groundwater elevation. Water storage devices can be installed to reduce the velocity and amount of water entering the storm drain system but liners will be required if water in contact with soil. Distress may be caused to planned improvements and properties located hydrologically downstream if water infiltrates the soil. The distress depends on the amount of water to be detained, its residence time, soil permeability, and other factors. We have not performed a hydrogeology study at the site. If infiltration of storm water runoff was incorporated into the project design, downstream properties may be subjected to seeps, springs, slope instability, raised groundwater, movement of foundations and slabs, or other undesirable impacts as a result of this water infiltration.

7.16 Grading and Foundation Plan Review

7.16.1 Grading, foundation, and shoring plans should be reviewed by the Geocon to verify that the plans have been prepared in substantial conformance with the recommendations of this report and to provide additional analyses or recommendations, if necessary.

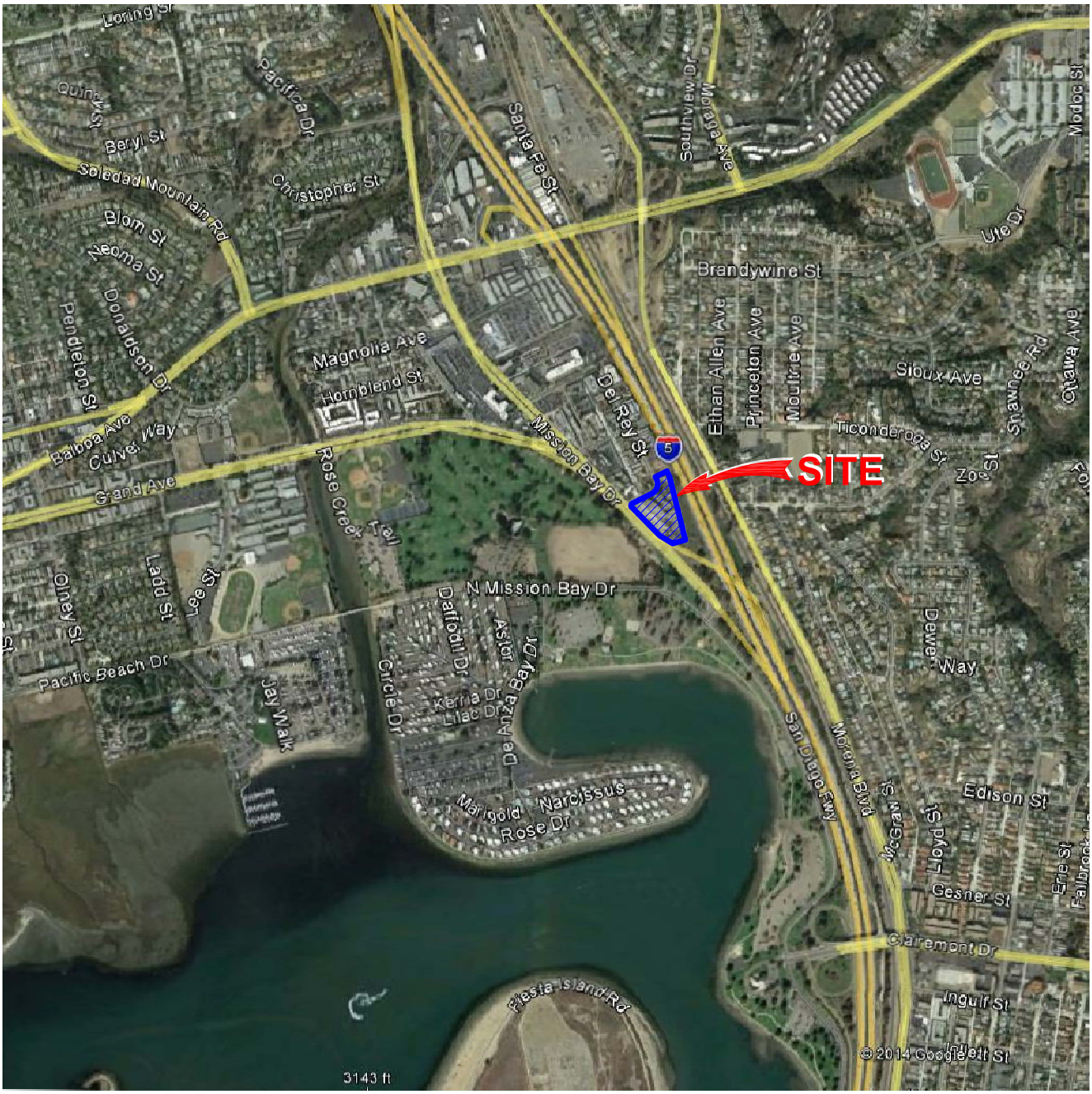
LIMITATIONS AND UNIFORMITY OF CONDITIONS

1. The firm that performed the geotechnical investigation for the project should be retained to provide testing and observation services during construction to provide continuity of geotechnical interpretation and to check that the recommendations presented for geotechnical aspects of site development are incorporated during site grading, construction of improvements, and excavation of foundations. If another geotechnical firm is selected to perform the testing and observation services during construction operations, that firm should prepare a letter indicating their intent to assume the responsibilities of project geotechnical engineer of record. A copy of the letter should be provided to the regulatory agency for their records. In addition, that firm should provide revised recommendations concerning the geotechnical aspects of the proposed development, or a written acknowledgement of their concurrence with the recommendations presented in our report. They should also perform additional analyses deemed necessary to assume the role of Geotechnical Engineer of Record.

2. The recommendations of this report pertain only to the site investigated and are based upon the assumption that the soil conditions do not deviate from those disclosed in the investigation. If any variations or undesirable conditions are encountered during construction, or if the proposed construction will differ from that anticipated herein, Geocon Incorporated should be notified so that supplemental recommendations can be given. The evaluation or identification of the potential presence of hazardous or corrosive materials was not part of the scope of services provided by Geocon Incorporated.

3. This report is issued with the understanding that it is the responsibility of the owner or his representative to ensure that the information and recommendations contained herein are brought to the attention of the architect and engineer for the project and incorporated into the plans, and the necessary steps are taken to see that the contractor and subcontractors carry out such recommendations in the field.

4. The findings of this report are valid as of the date of this report. However, changes in the conditions of a property can occur with the passage of time, whether they be due to natural processes or the works of man on this or adjacent properties. In 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. Therefore, this report is subject to review and should not be relied upon after a period of three years.



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VICINITY MAP

GUY HILL PROPERTY
SAN DIEGO, CALIFORNIA

RM / AML		DSK/GTYPD

DATE 09 - 11 - 2015	PROJECT NO. G1592 - 11 - 03	FIG. 1

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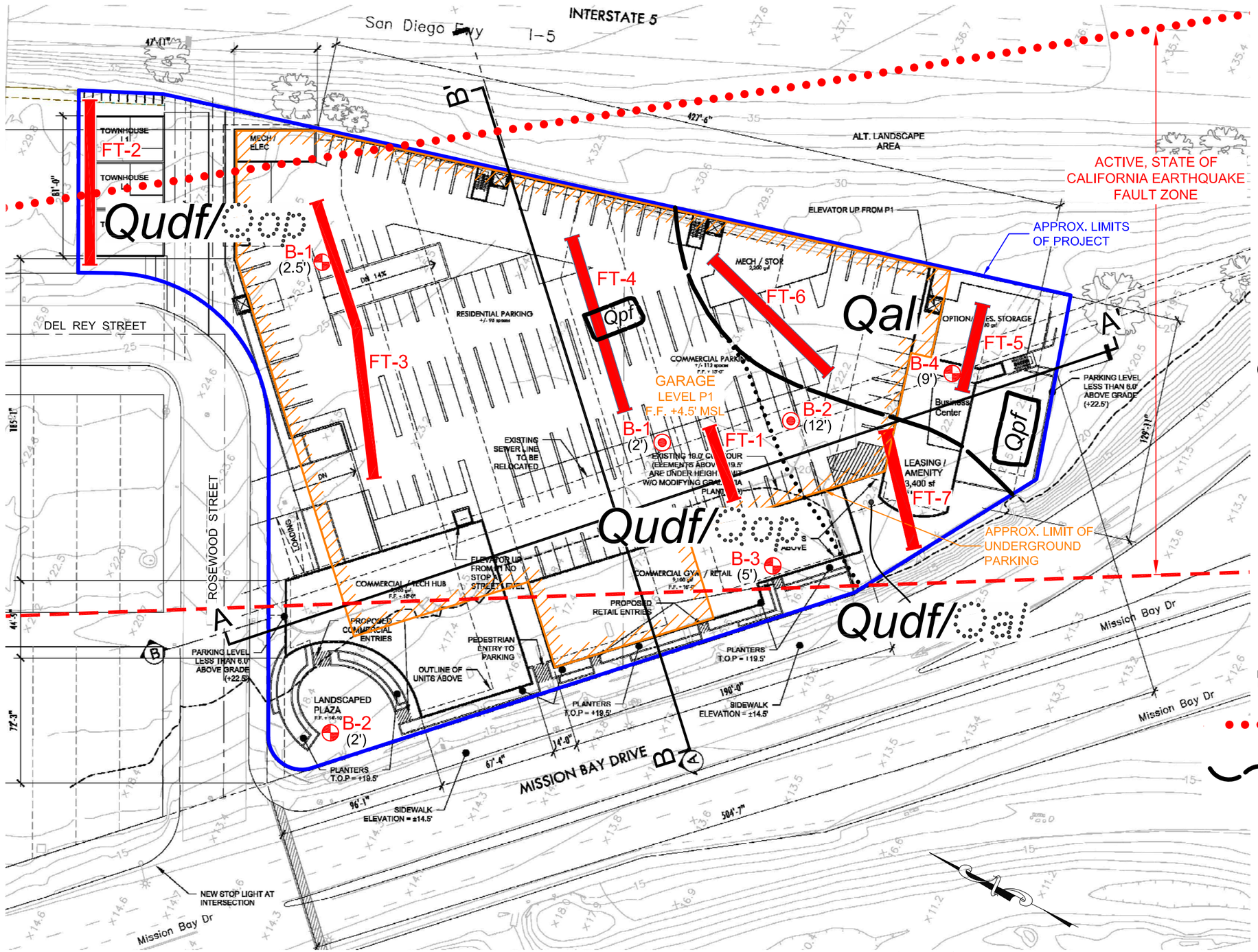
Y:\PROJECTS\G1592-11-03 Guy Hill Property\DETAILS\G1592-11-03 Vic Map.dwg

GUY HILL PROPERTY
SAN DIEGO, CALIFORNIA



GEOCON LEGEND

- **Qpf** .....PREVIOUSLY PLACED FILL
- **Qudf** .....UNDOCUMENTED FILL
- **Qal** .....ALLUVIUM
- **Qop** .....OLD PARALIC DEPOSITS (Dotted Where Buried)
- B-4 .....APPROX. LOCATION OF EXPLORATORY BORING (Geocon, 2014)
- B-2 .....APPROX. LOCATION OF PREVIOUS BORING (Geocon, 2004)
- FT-7 .....APPROX. LOCATION OF FAULT TRENCH
- FT-1 .....APPROX. LOCATION OF PREVIOUS FAULT TRENCH (Geocon, 2004)
- (9') .....APPROX. DEPTH OF FILL (In Feet)
- B B' .....APPROX. LOCATION OF GEOLOGIC CROSS SECTION
- .....APPROX. LOCATION OF MAPPED BURIED POTENTIALLY ACTIVE FAULT (Kennedy & Tan, 2008)
- .....APPROX. LOCATION OF GEOLOGIC CONTACT (Dotted Where Buried)

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PROJECT NO. G1592 - 11 - 03
FIGURE 2
DATE 09 - 11 - 2015

GEOLOGIC MAP

Ladrillono

Plotted:09/11/2015 11:17AM | By:RUBEN AGUILAR | File Location:Y:\PROJECTS\G1592-11-03 Guy Hill Property\SHEETS\G1592-11-03 GeoMap (UPD-082715).dwg

GUY HILL PROPERTY
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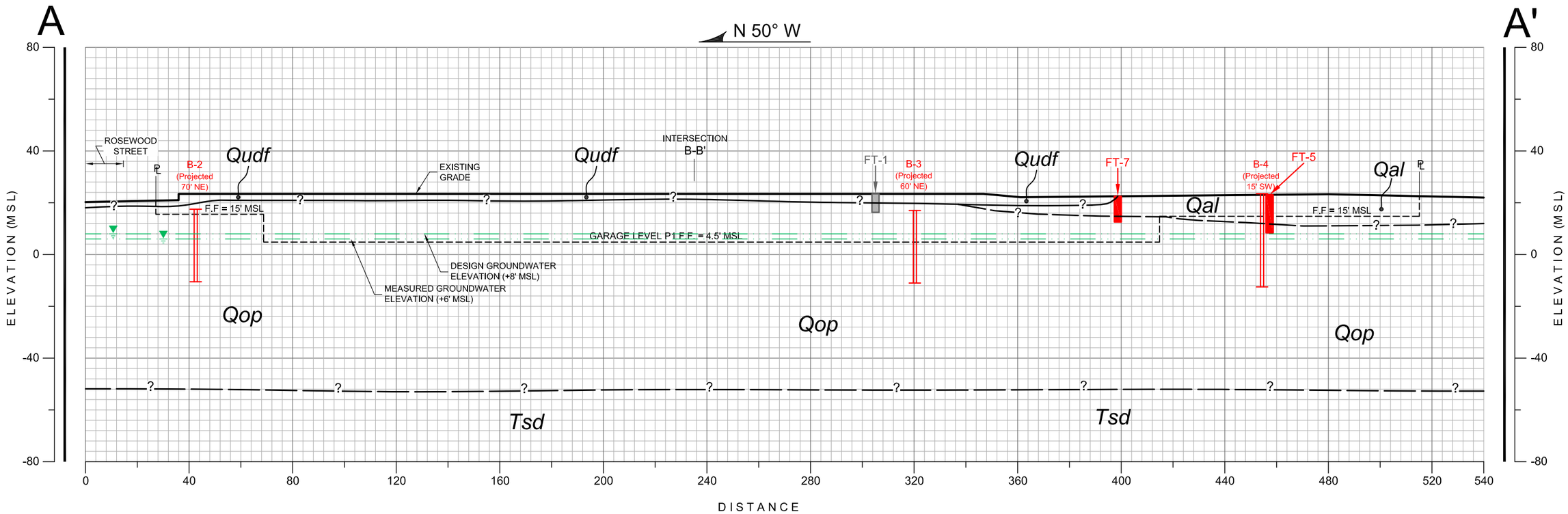

GEOLOGIC CROSS-SECTION A-A'

SCALE: 1" = 40' (Vert. = Horiz.)

GEOCON LEGEND

Qudf .....UNDOCUMENTED FILL

Qal .....ALLUVIUM

Qop .....OLD PARALIC DEPOSITS

Tsd .....SAN DIEGO FORMATION

.....APPROX. LOCATION OF GEOLOGIC CONTACT (Queried Where Uncertain)

B-3 .....APPROX. LOCATION OF EXPLORATORY BORING

FT-7 .....APPROX. LOCATION OF FAULT TRENCH

FT-1 .....APPROX. LOCATION OF PREVIOUS FAULT TRENCH (Geocon, 2004)

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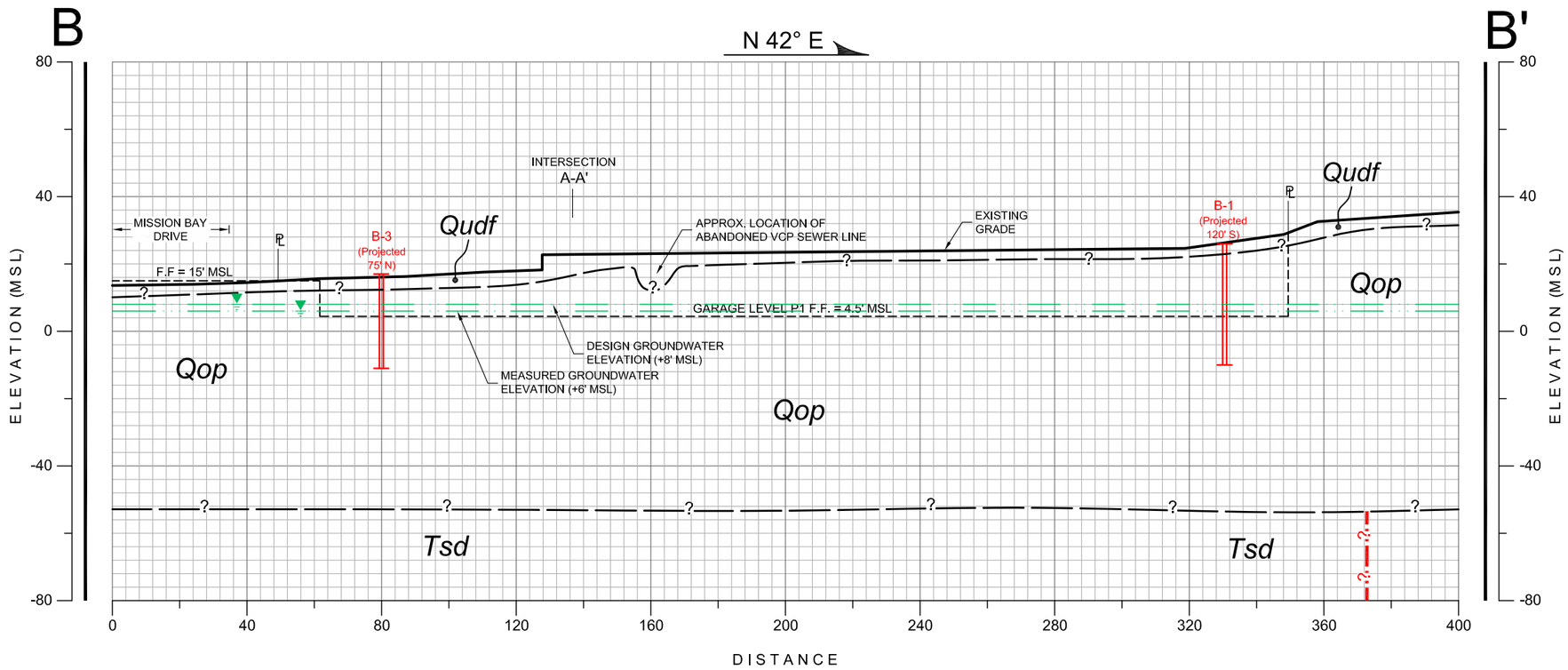
FIGURE 3
DATE 09 - 11 - 2015

GUY HILL PROPERTY
SAN DIEGO, CALIFORNIA



GEOLOGIC CROSS-SECTION B-B'

SCALE: 1" = 40' (Vert. = Horiz.)

GEOCON LEGEND

Qudf .....UNDOCUMENTED FILL

Qop .....OLD PARALIC DEPOSITS

Tsd .....SAN DIEGO FORMATION

.....APPROX. LOCATION OF GEOLOGIC CONTACT (Queried Where Uncertain)

B-3 .....APPROX. LOCATION OF EXPLORATORY BORING

.....APPROX. LOCATION OF BURIED POTENTIALLY ACTIVE FAULT

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PROJECT NO. G1592 - 11 - 03
FIGURE 4
DATE 09 - 11 - 2015

GUY HILL PROPERTY
SAN DIEGO, CALIFORNIA

Geologic Hazard Categories

FAULT ZONES

- 11 Active, Alquist-Priolo Earthquake Fault Zone
- 12 Potentially Active, Inactive, Presumed Inactive, or Activity Unknown

SLIDE-PRONE FORMATIONS

- 25 Ardath: neutral or favorable geologic structure

LIQUEFACTION

- 31 High Potential -- shallow groundwater major drainages, hydraulic fills
- 32 Low Potential -- fluctuating groundwater minor drainages

OTHER TERRAIN

- 51 Level mesas -- underlain by terrace deposits and bedrock nominal risk
- 52 Other level areas, gently sloping to steep terrain, favorable geologic structure, Low risk
- 53 Level or sloping terrain, unfavorable geologic structure, Low to moderate risk
- 54 Steeply sloping terrain, unfavorable or fault controlled geologic structure, Moderate risk

FAULTS

- Fault
- Inferred Fault
- Concealed Fault
- Shear Zone

N

NOT TO SCALE

SOURCE : CITY OF SAN DIEGO (2008)

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PROJECT NO. G1592 - 11 - 03
FIGURE 5
DATE 09 - 11 - 2015

GEOLOGIC HAZARD MAP

Ladrillono

Plotted:09/11/2015 11:27AM | By:RUBEN AGUILAR | File Location:Y:\PROJECTS\G1592-11-03 Guy Hill Property\DETAILS\G1592-11-03 Geo Hazard Map.dwg

GUY HILL PROPERTY
SAN DIEGO, CALIFORNIA

MAP EXPLANATION

Active Faults

1906 C

Faults considered to have been active during Holocene time and to have a relatively high potential for surface rupture; solid line where accurately located, long dash where approximately located, short dash where inferred, dotted where concealed; query (?) indicates additional uncertainty. Evidence of historic offset indicated by year of earthquake-associated event or C for displacement caused by creep or possible creep.

Special Studies Zone Boundaries

These are delineated as straight-line segments that connect encircled turning points so as to define special studies zone segments.

Seaward projection of zone boundary.

SOURCE : STATE OF CALIFORNIA, SPECIAL STUDIES ZONE, LA JOLLA QUADRANGLE (1991)

N

NOT TO SCALE

SPECIAL STUDIES ZONE MAP

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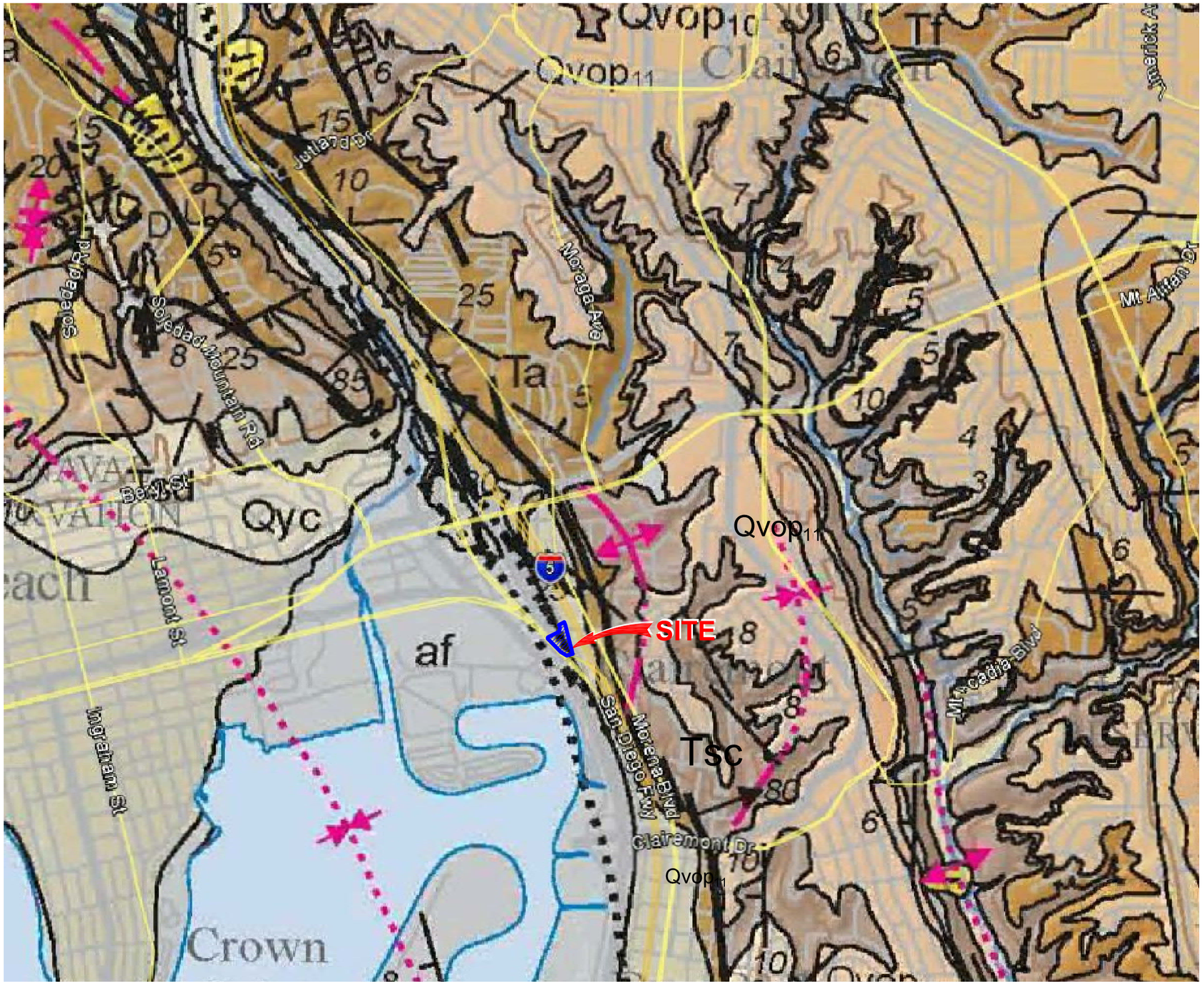
PROJECT NO. G1592 - 11 - 03
FIGURE 6
DATE 09 - 11 - 2015

GUY HILL PROPERTY
SAN DIEGO, CALIFORNIA



MAP UNITS

- af — Artificial fill (late Holocene)
- Qyc — Young colluvial deposits (Holocene and late Pleistocene)
- Qop — Old paralic deposits, undivided (late to middle Pleistocene)
- Qvop — Very old paralic deposits, undivided (middle to early Pleistocene)
- San Diego Formation (early Pleistocene and late Pliocene)
  - Tsd - undivided
  - Tsdcg - transitional marine and nonmarine pebble and cobble conglomerate
  - Tsdss - marine sandstone
- Scripps Formation (middle Eocene)
  - Tscu - upper unit
- Ta — Ardath Shale (middle Eocene)

Fault - Solid where accurately located; dashed where approximately located; dotted where concealed. U = upthrown block, D = downthrown block. Arrow and number indicate direction and angle of dip of fault plane.

Anticline - Solid where accurately located; dashed where approximately located; dotted where concealed. Arrow indicates direction of axial plunge.

Syncline - Solid where accurately located; dotted where concealed. Arrow indicates direction of axial plunge.

Landslide - Arrows indicate principal direction of movement. Queried where existence is questionable.

Strike and dip of beds

Inclined

Faults

Fault - Solid where well defined; dashed where approximately located; short dash where inferred; dotted where concealed; queried where uncertain. Where fault offsets sea floor, age symbol is shown on bar on downthrown side. Where age was determined, age symbol is shown astride fault and relative offset, if known, is shown by "D" and "U" on downthrown and upthrown sides. Ages of faults are indicated as follows:

- cuts strata of Holocene age
- cuts strata of late Quaternary age
- cuts strata of Quaternary age
- cuts Miocene or older strata

Fault zone - Area of extensively sheared rock within a zone defined by multiple faults.

Folds

Anticline - Solid where well defined; short dash where inferred.

Syncline - Solid where well defined; short dash where inferred.

N

NOT TO SCALE

SOURCE : USGS, KENNEDY & TAN, SAN DIEGO QUADRANGLE (2008)

REGIONAL GEOLOGIC MAP

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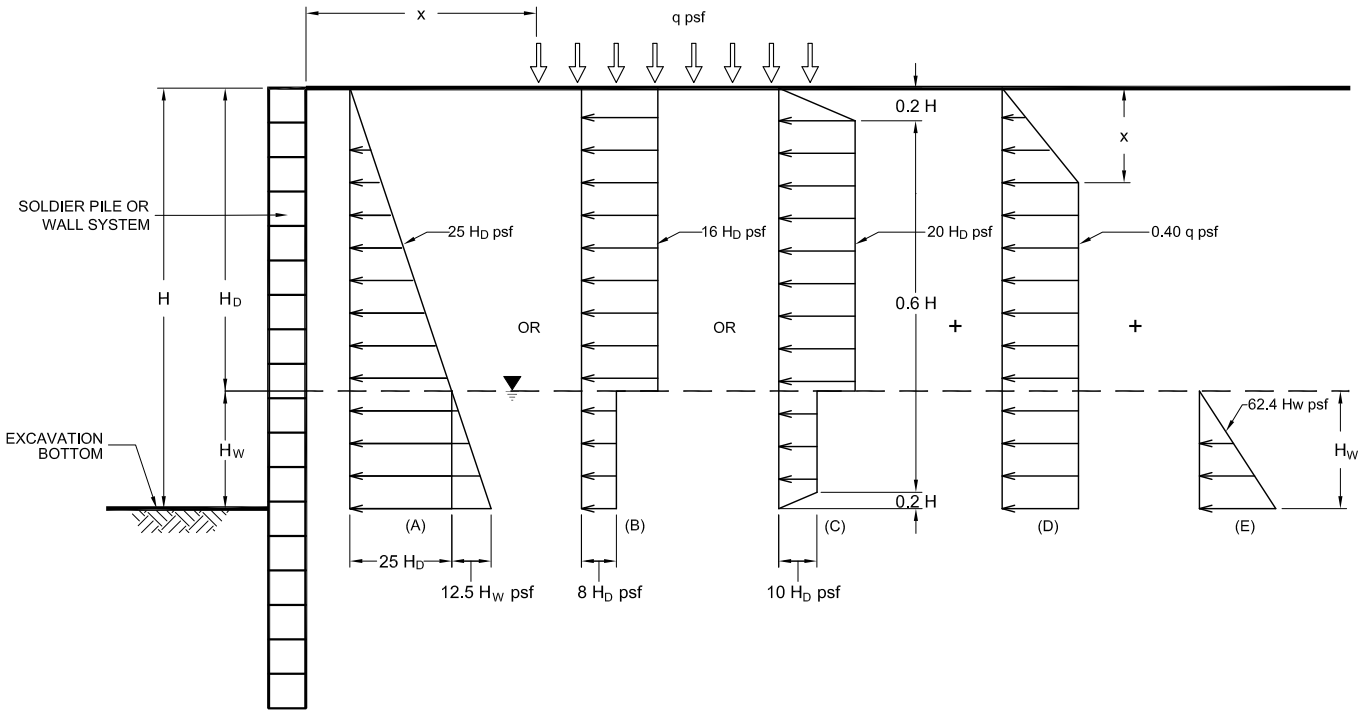
PROJECT NO. G1592 - 11 - 03
FIGURE 7
DATE 09 - 11 - 2015

Ladrillono

Plotted:09/11/2015 11:28AM | By:RUBEN AGUILAR | File Location:Y:\PROJECTS\G1592-11-03 Guy Hill Property\DETAILS\G1592-11-03 Regional Geo Map.dwg



NOTE: DIMENSIONS H, H_D, AND H_W
ARE MEASURED IN FEET

(A).....TRIANGULAR DISTRIBUTION

(B).....RECTANGULAR DISTRIBUTION

(C).....TRAPIZOIDAL DISTRIBUTION

(D).....SURCHARGE DISTRIBUTION

(E).....WATER PRESSURE

▼ .....APPROX. GROUNDWATER TABLE

NO SCALE

LATERAL ACTIVE PRESSURES FOR VERTICAL EXCAVATIONS

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GUY HILL PROPERTY
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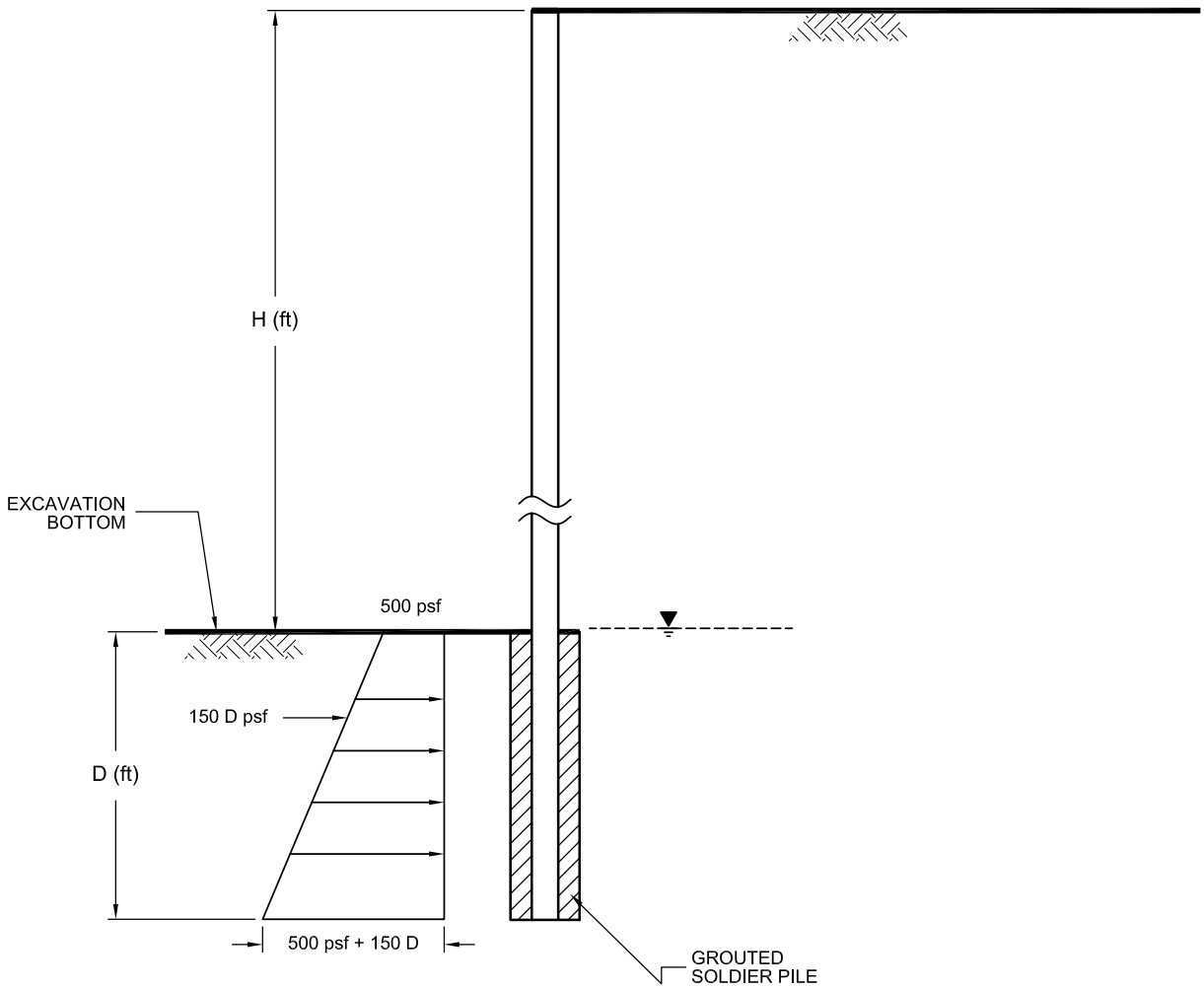
LR / AML		DSK/GTYPD	DATE 09 - 11 - 2015	PROJECT NO. G1592 - 11 - 03	FIG. 8

Y:/PROJECTS/G1592-11-03 Guy Hill Property/DETAILS/LAPFVE1.dwg



NO SCALE

RECOMMENDED GROUTED SOLDIER PILE PRESSURE DISTRIBUTION

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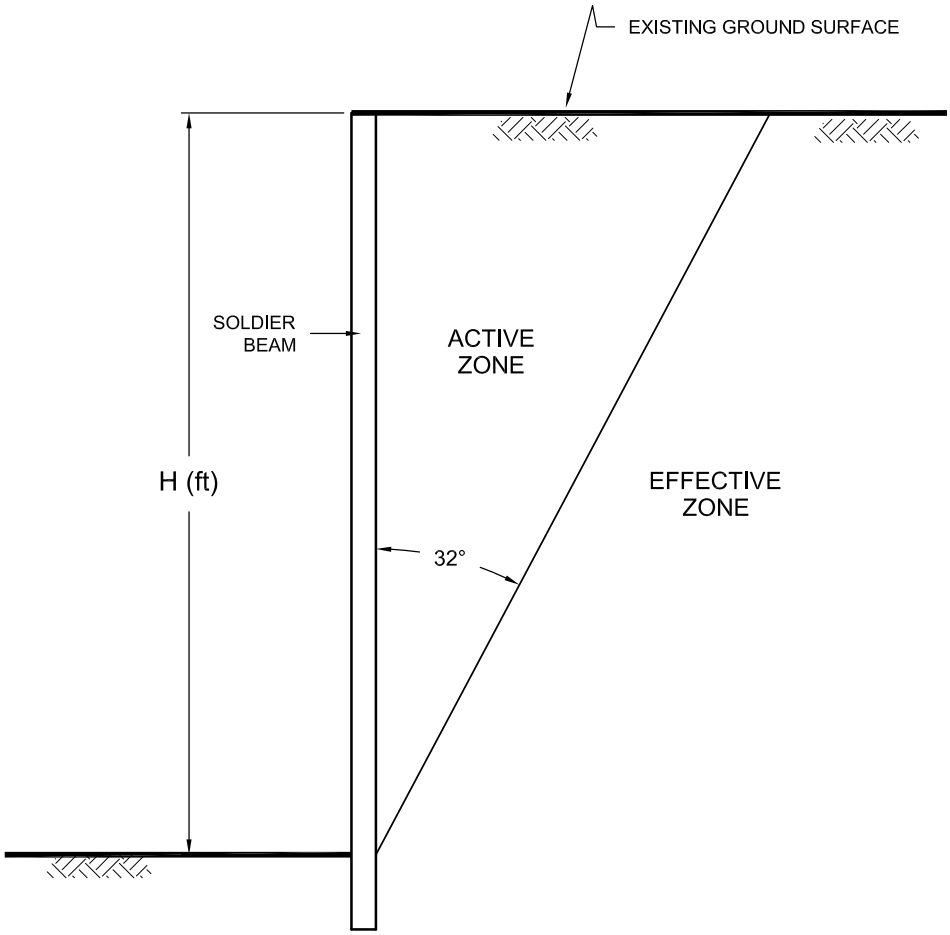
LR / AML		DSK/GTYPD	DATE 09 - 11 - 2015	PROJECT NO. G1592 - 11 - 03	FIG. 9

RGSPPD



NO SCALE

RECOMMENDED EFFECTIVE ZONE FOR TIEBACK ANCHORS

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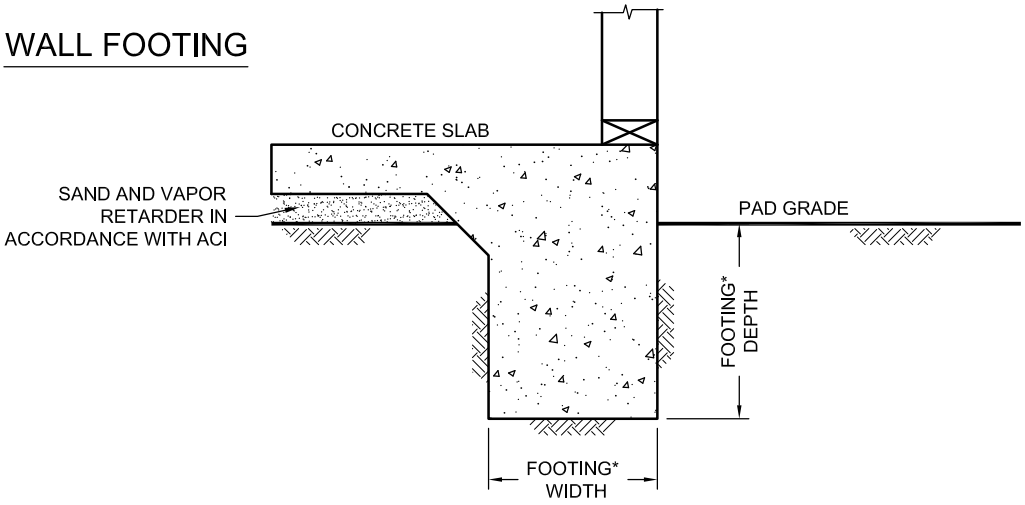
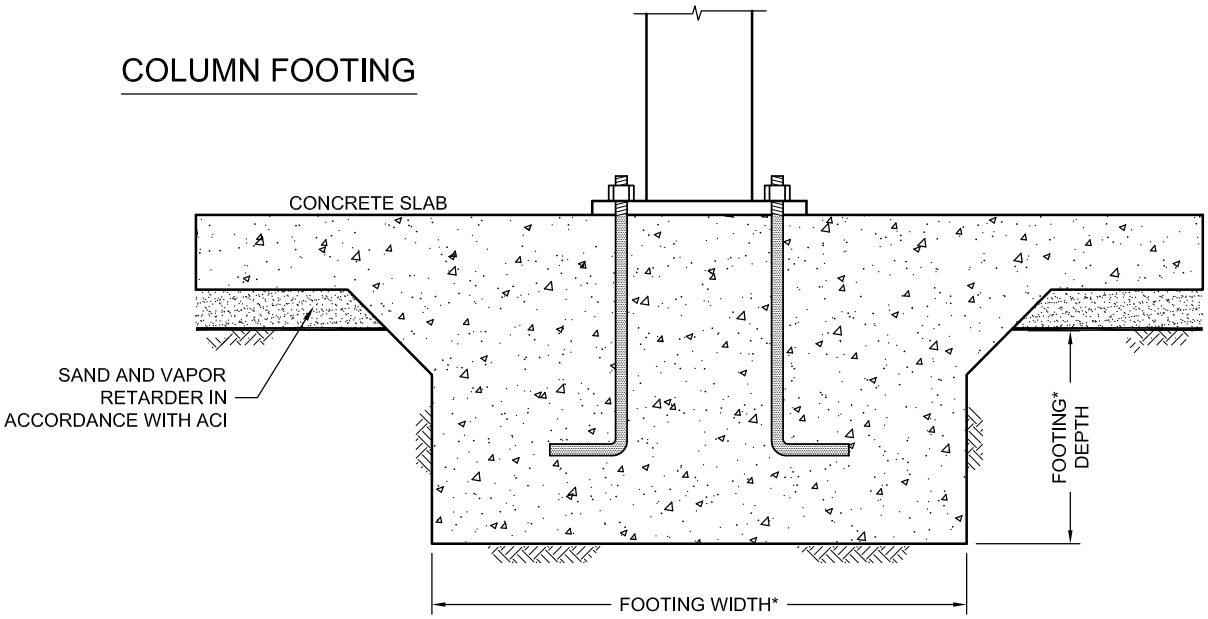
LR / AML		DSK/E0000	DATE 09 - 11 - 2015	PROJECT NO. G1592 - 11 - 03	FIG. 10

E:/TYP/REZTA.DWG/aml

WALL FOOTING



COLUMN FOOTING



NO SCALE

*....SEE REPORT FOR FOUNDATION WIDTH AND DEPTH RECOMMENDATION

WALL / COLUMN FOOTING DIMENSION DETAIL

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RM / AML		DSK/GTYPD	DATE 09 - 11 - 2015	PROJECT NO. G1592 - 11 - 03	FIG. 11

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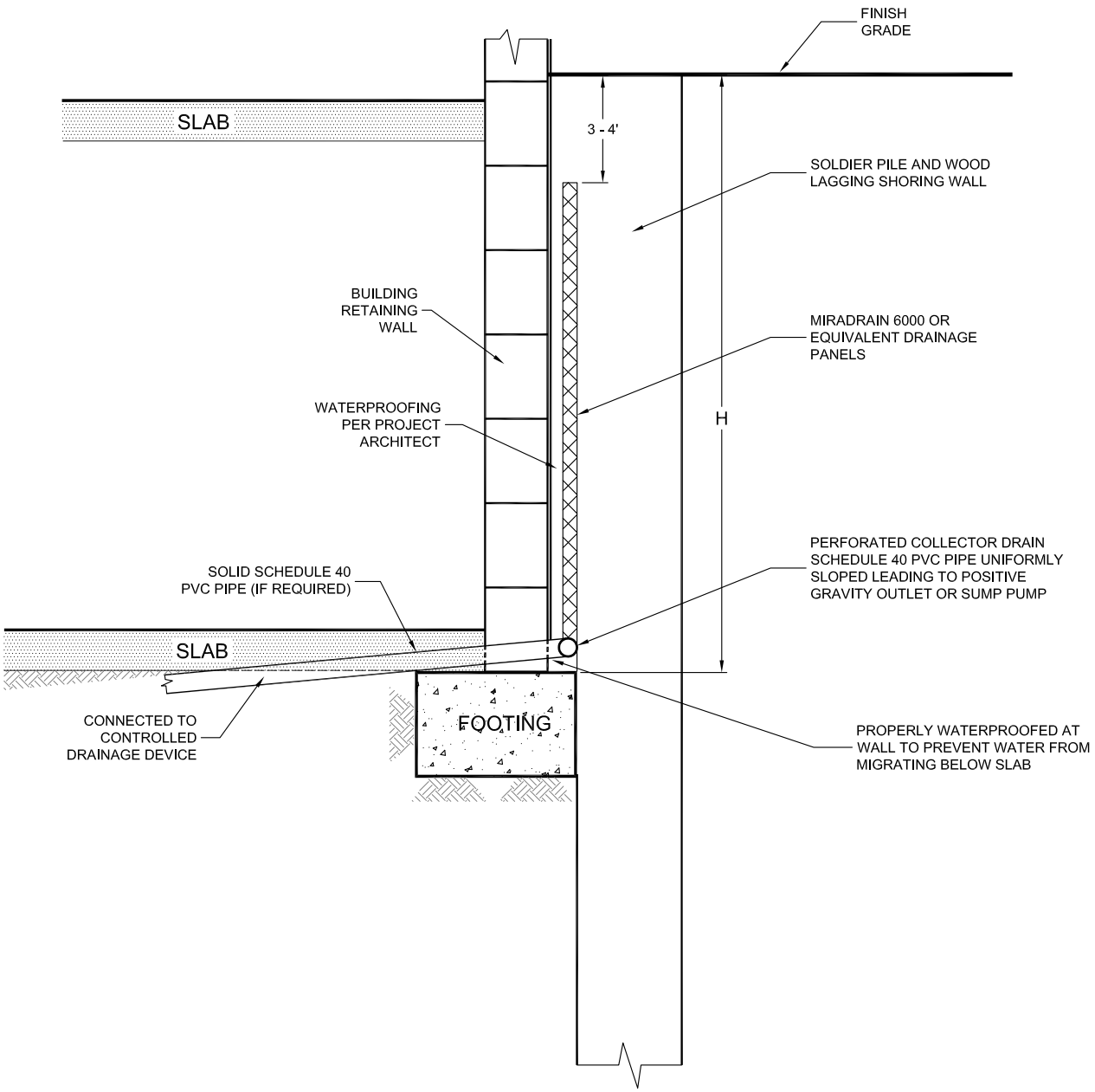

NO SCALE

SOLDIER PILE WALL DRAINAGE DETAIL

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GUY HILL PROPERTY
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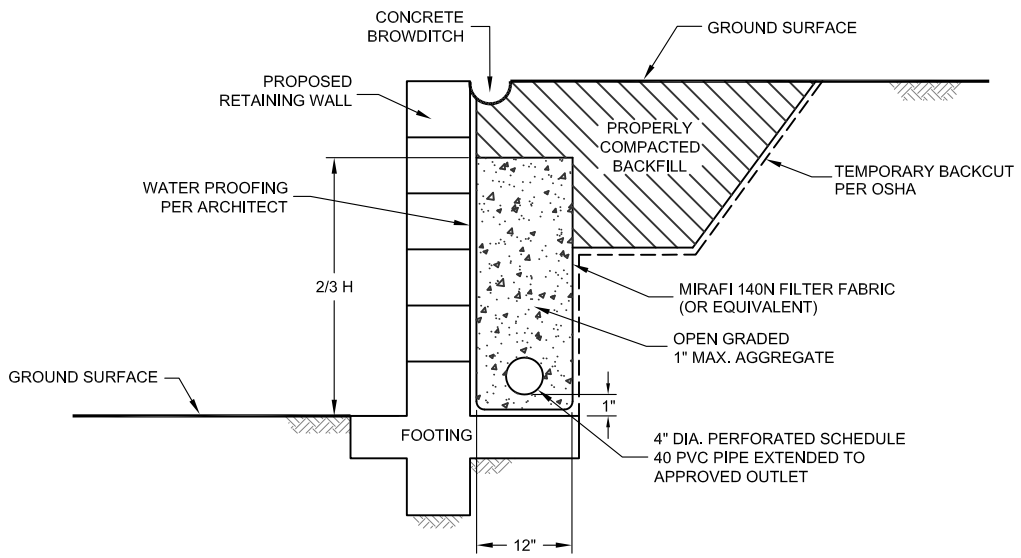
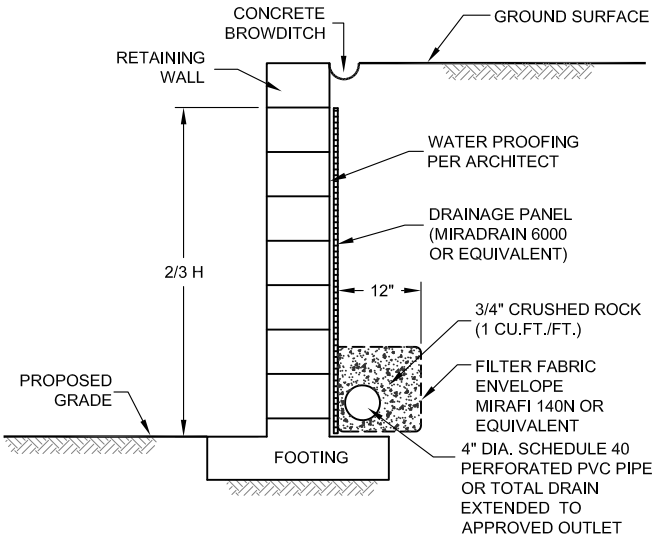
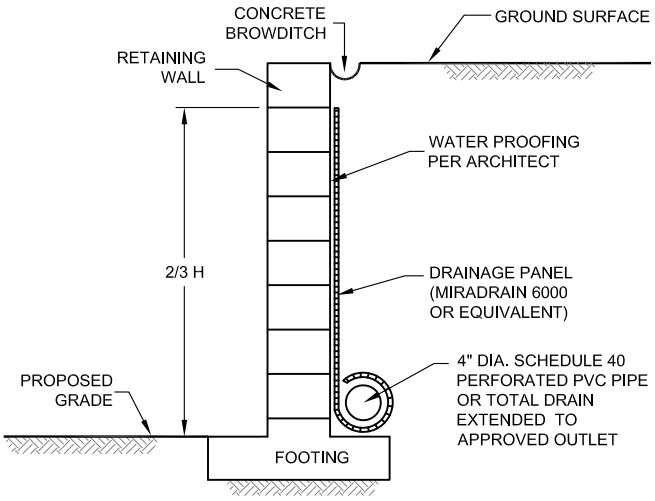
LR / AML		DSK/GTYPD	DATE 09 - 11 - 2015	PROJECT NO. G1592 - 11 - 03	FIG. 12

COLFOOT2.DWG/aml







NOTE :

DRAIN SHOULD BE UNIFORMLY SLOPED TO GRAVITY OUTLET OR TO A SUMP WHERE WATER CAN BE REMOVED BY PUMPING

NO SCALE

TYPICAL RETAINING WALL DRAIN DETAIL

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GUY HILL PROPERTY
SAN DIEGO, CALIFORNIA

RM / AML		DSK/GTYPD	DATE 09 - 11 - 2015	PROJECT NO. G1592 - 11 - 03	FIG. 13

RWDD7A

Y:\PROJECTS\G1592-11-03 Guy Hill Property\DETAILS\RWDD7A.dwg

APPENDIX A

APPENDIX A

FIELD INVESTIGATION

We performed the field investigation on October 16 and 17, 2014, and August 17 through 24, 2015 consisting of the excavation of four small-diameter borings and six exploratory fault trenches. The approximate locations of the excavations are shown on the Geologic Map, Figure 2. We located the exploratory borings and trenches in the field using a measuring tape and/or existing landmarks; therefore, actual boring and trench locations may vary slightly. We drilled the small diameter borings to a maximum depth of 36 feet using a CME 55 truck-mounted drill rig equipped with 8-inch diameter hollow stem augers. The trenches were excavated with a John Deere 410G backhoe. As drilling and excavation of the trenches proceeded, we logged and sampled the soil and geologic conditions encountered.

We obtained soil samples during our boring excavations using a California split-spoon sampler and a Standard Penetration Test (SPT) sampler. Both samplers are driven to obtain soil samples. The California sampler has an inside diameter of 2.5 inches and an outside diameter of 2.875 inches. Up to 18 rings, 2.4 inches in diameter and 1 inch in height are placed inside the sampler. The SPT sampler has an inside diameter of 1.5 inches and an outside diameter of 2 inches. We retained ring samples at appropriate intervals in moisture-tight containers and transported them to the laboratory for testing. We also collected bulk samples from the borings for laboratory testing. The type of sample is noted on the exploratory boring logs.

For the standard penetration test (SPT), the sampler was driven 18 inches into the bottom of the excavations with the use of an automatic hammer and the use of A-rods. The California sampler was driven 12 inches into the bottom of the excavation. The sampler is connected to the A rods and driven into the bottom of the excavation using a 140-pound hammer with a 30-inch drop. Blow counts are recorded for every 6 inches the sampler is driven. The penetration resistances shown on the boring logs are shown in terms of blows per foot. The values indicated on the boring logs are the sum of the last 12 inches of the sampler if driven 18 inches. If the sampler was not driven for 18 inches, an approximate value is calculated in term of blows per foot or the final 6-inch interval is reported. These values are not to be taken as SPT N-values, adjustments have not been applied.

We visually examined, classified and logged the soil conditions encountered in the excavations in general accordance with the Unified Soil Classification System (USCS). Logs of the exploratory borings and fault trench are presented on Figures A-1 through A-6. The logs depict the general soil and geologic conditions encountered and the depth at which samples were obtained

The County of San Diego Department of Environmental Health issued a permit for geotechnical borings and is shown after the boring logs in this appendix.

PROJECT NO. G1592-11-03

BORING B 1

ELEV. (MSL.) **26'** DATE COMPLETED **10-16-2014**

EQUIPMENT **IR A-300** BY: **L. RODRIGUEZ**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B1-1			SC	4" **ASPHALT CONCRETE**			
					UNDOCUMENTED FILL (Qudf) Medium dense, damp to moist, reddish brown, Clayey, fine SAND			
2	B1-2			CL	**OLD PARALIC DEPOSITS (Qop)** Hard, moist, dark brown, Sandy CLAY; micaceous	64	118.3	13.5
4	B1-3				-Becomes olive brown to dark brown	81	120.5	13.6
6								
8								
10	B1-4			SC	Dense, damp, olive to yellowish brown, Clayey, fine to medium SAND; micaceous	74	121.0	10.4
12								
14	B1-5				-Becomes very dense; thin layers of fine to coarse sand	80/11"	119.3	9.0
16								
18	B1-6							
	B1-7			SM/ML	Dense, moist, olive to yellowish brown, Silty, fine SAND to Sandy SILT	50	109.8	18.6
20			▼		-Groundwater at +5.6' MSL at 10:00 am			
	B1-8			SM	Very dense, very moist, olive to yellowish brown, Silty, fine to medium SAND; trace angular gravel up to 1" diameter; micaceous	75/10"	114.3	17.3
22								
24	B1-9			SC/CL	Dense to hard, very moist, olive to yellowish brown, Clayey, fine SAND to Sandy CLAY	70	117.5	16.6
26	B1-10			CL	Stiff, very moist, olive to yellowish brown, Sandy CLAY	25	110.4	19.1
28								

Figure A-1,
Log of Boring B 1, Page 1 of 2

G1592-11-03.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1592-11-03

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING B 1** ELEV. (MSL.) **26'** DATE COMPLETED **10-16-2014** EQUIPMENT **IR A-300** BY: **L. RODRIGUEZ**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
30								
	B1-11					32	108.4	21.7
32								
34								
	B1-12				-Becomes wet	40	110.9	19.2
36					BORING TERMINATED AT 36 FEET Groundwater encountered at 20.5 feet Backfilled with 12.6 ft³ bentonite grout slurry			

Figure A-1,
Log of Boring B 1, Page 2 of 2

G1592-11-03.GPJ

SAMPLE SYMBOLS			
	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1592-11-03

BORING B 2

ELEV. (MSL.) **17.5'** DATE COMPLETED **10-16-2014**

EQUIPMENT **IR A-300** BY: **L. RODRIGUEZ**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					5" **CONCRETE**			
				SC	**UNDOCUMENTED FILL (Qudf)** Medium dense, moist, dark brown, Clayey, fine to medium SAND; trace gravel			
2				SC/CL	**OLD PARALIC DEPOSITS (Qop)** Dense, damp to moist, olive to yellowish brown, Clayey, fine to medium SAND to Sandy CLAY; micaceous			
4								
6	B2-1					50	118.6	13.4
8	B2-2				-Becomes very dense	89/11"	120.9	12.3
10	B2-3				-Becomes dense	66	119.4	14.9
12								
14	B2-4		▼	CL	Very stiff, moist to wet, dark olive brown, Sandy CLAY; micaceous -Groundwater at +4.0' MSL at 2:55 pm	58	114.6	16.6
16								
18	B2-5			ML	Very stiff, moist to wet, dark olive brown, Sandy SILT; micaceous	52	115.9	16.5
20								
22	B2-6				-Becomes stiff, olive to yellowish brown	33	102.4	22.5
24								
26								
28					-No recovery	28		
					BORING TERMINATED AT 28 FEET Groundwater encountered at 13.5 feet Backfilled with 9.8 ft³ bentonite grout slurry			

Figure A-2,
Log of Boring B 2, Page 1 of 1

G1592-11-03.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1592-11-03

BORING B 3

ELEV. (MSL.) **17.0'** DATE COMPLETED **10-17-2014**

EQUIPMENT **IR A-300** BY: **L. RODRIGUEZ**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B3-1			SM	**7" CONCRETE**			
					UNDOCUMENTED FILL (Qudf) Medium dense, moist, olive brown, Silty, fine to medium SAND			
2	B3-2			CL	Very stiff, moist, dark brown, Sandy CLAY	49	119.3	14.2
4								
6	B3-3			SC/CL	**OLD PARALIC DEPOSITS (Qop)** Dense to very stiff, moist, dark olive to yellowish brown, Clayey, fine to medium SAND to Sandy CLAY; micaceous	52	118.4	15.1
8	B3-4					42	119.6	14.5
10	B3-5			CL	Very stiff, moist to wet, dark olive to yellowish brown, Sandy CLAY; micaceous	42	116.5	15.5
	B3-6							
12			▼		-Groundwater at +5.0' MSL at 10:00 am			
14	B3-7					46	108.8	19.4
16	B3-8			SM	Medium dense, wet, dark olive to yellowish brown, Silty, fine SAND; micaceous	33	111.1	20.1
18					-No recovery	37		
20								
22					-No recovery	37		
24								
26								
28	B3-9			CL	Very stiff, wet, olive to yellowish brown, Sandy CLAY	28		
					BORING TERMINATED AT 28 FEET Groundwater encountered at 12 feet Backfilled with 9.8 ft³ bentonite grout slurry			

Figure A-3,
Log of Boring B 3, Page 1 of 1

G1592-11-03.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1592-11-03

BORING B 4

ELEV. (MSL.) **23.5'** DATE COMPLETED **10-16-2014**

EQUIPMENT **IR A-300** BY: **L. RODRIGUEZ**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B4-1				6" **ASPHALT CONCRETE**			
				CL	**UNDOCUMENTED FILL (Qudf)** Firm, damp to moist, dark olive to reddish brown, Sandy CLAY; trace gravel			
2								
4								
6	B4-2			SC/CL	Medium dense, moist, olive to yellowish brown, Clayey, fine SAND to Sandy CLAY	19	111.5	15.9
8								
				CL	**OLD PARALIC DEPOSITS (Qop)** Very stiff, moist, dark olive brown, Sandy CLAY; micaceous			
10	B4-3					53	115.7	15.5
12								
14								
16	B4-4 B4-5				-Becomes olive to yellowish brown; sand content increases	40	110.9	18.4
18	B4-6		▼		-Groundwater at +5.8' MSL at 12:50 pm	62	111.3	19.0
20								
	B4-7			CL/SC	Stiff, wet, dark olive to yellowish brown, Sandy CLAY to Clayey fine SAND	27	106.7	20.3
22								
24								
26	B4-8				-Becomes very stiff	41	113.8	17.4
28								

Figure A-4,
Log of Boring B 4, Page 1 of 2

G1592-11-03.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G1592-11-03

BORING B 4

ELEV. (MSL.) **23.5'** DATE COMPLETED **10-16-2014**

EQUIPMENT **IR A-300** BY: **L. RODRIGUEZ**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
30	B4-9			SC	Dense, moist to wet, olive to yellowish brown, Clayey, fine SAND; micaceous	56	109.3	19.2
32								
34								
36	B4-10			CL	Very stiff, very moist to wet, olive to yellowish brown, Sandy CLAY; micaceous	41	111.8	18.9

BORING TERMINATED AT 36 FEET
Groundwater encountered at 17.75 feet
Backfilled with 12.6 ft³ bentonite grout slurry

Figure A-4,
Log of Boring B 4, Page 2 of 2

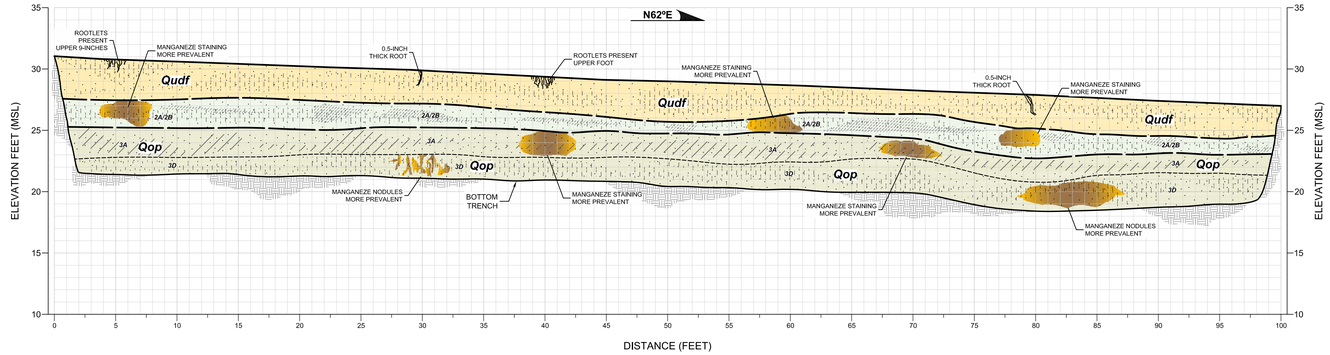
G1592-11-03.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

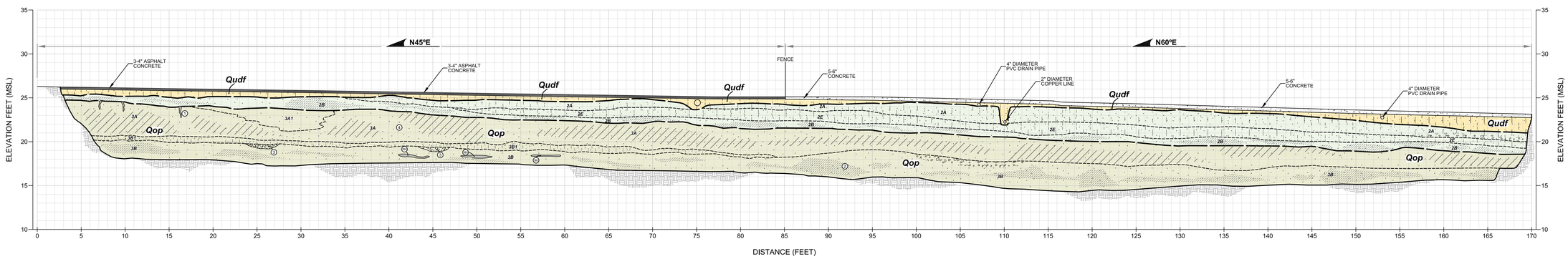
NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON



FAULT TRENCH FT-2

SCALE: 1" = 5' (Vert. = Horiz.)



FAULT TRENCH FT-3

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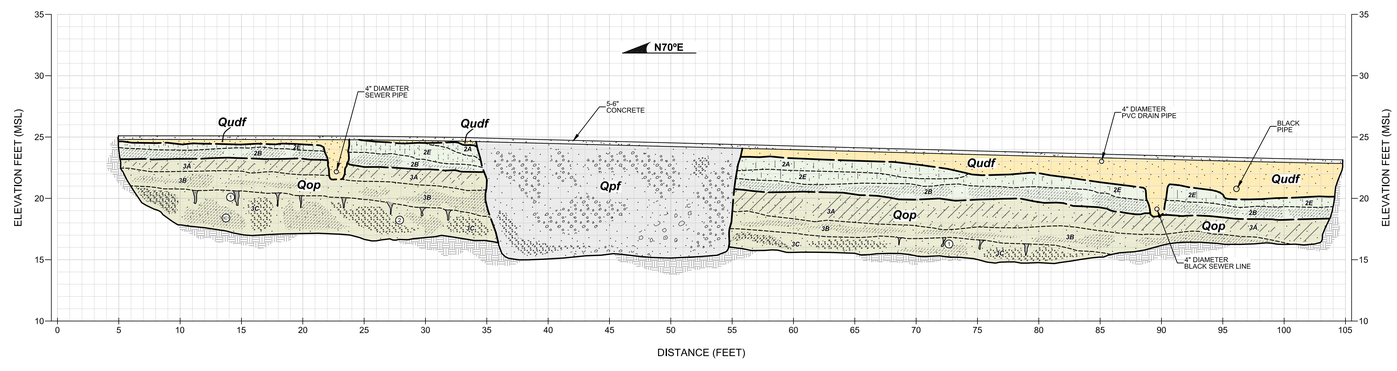


FAULT TRENCH FT-4

SCALE: 1" = 5' (Vert. = Horiz.)

GEOCON LEGEND

Qpf .....**PREVIOUSLY PLACED FILL**
Dense, wet, very dark gray, SAND and GRAVEL (backfill of the underground tanks, extracted in 1993)

Qudf .....**UNDOCUMENTED FILL**
Medium dense, damp to moist, dark gray, Silty, fine to medium SAND; trace gravel (SM)

Qal .....**ALLUVIUM**
Qal1...Medium dense, moist, light brown, Silty, fine SAND, few carbon flakes; a layer of gravel; abundant pinholes
Qal2...Medium dense, moist to wet, brown, Silty, fine to medium SAND with little clay, less pinholes, some calcium carbonate veinlets

SOIL PROFILE
2A.....Loose to medium dense, moist, dark brown, Silty, fine SAND; abundant pinholes, fine manganese nodules, bioturbation (SM)
2B.....Medium dense, dark brown, Clayey, fine to medium SAND; moderately developed argillic horizon (SC)
2E.....Medium dense, moist, light brown, Silty, fine SAND; less pinholes (SM)

Qop .....**OLD PARALIC DEPOSITS**
3A.....Very stiff, moist, dark grayish brown, Sandy CLAY; mottled orange and dark gray (CL)
3B.....Very dense, moist, dark grayish brown to greenish brown, Clayey, fine SAND; iron staining (SC)
3C.....Very dense, moist, dark grayish brown, mottled orange and green, Clayey SAND; trace fine gravel (SC)
3A1.....Dense, very moist, dark brown, Clayey SAND; interfingering with 3 feet
3B1.....Light greenish brown, Silty SAND 4 to 6" thick
3B2.....Clay rich lenses
3C1.....Olive brown, Silty SAND layer
3D.....Dense, moist, mottled reddish brown to light brown, Silty, fine SAND; some manganese nodules present, massive with no cementation (SM)

1 .....VERTICAL FRACTURES-No vertical displacement; brown sand infill
2 .....FAINT BEDDING
3 .....Small channel, light brown, coarse SAND
4 .....Calcium carbonate nodules
5 .....Calcium carbonate; pebble size nodules and veinlets

.....APPROX. LOCATION OF GEOLOGIC CONTACT
.....APPROX. LOCATION OF INTERFORMATIONAL CONTACT

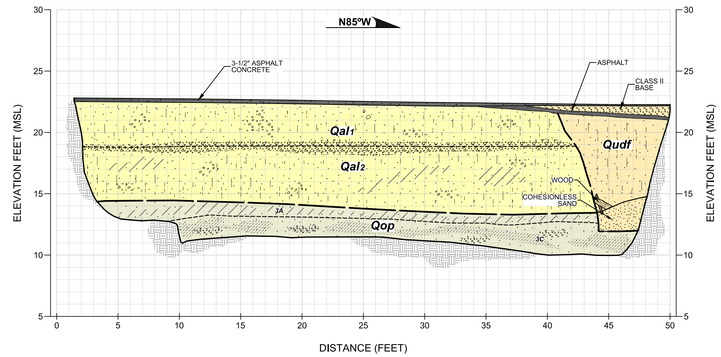
FAULT TRENCHES

GUY HILL PROPERTY
SAN DIEGO, CALIFORNIA

GEOCON INCORPORATED
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121 - 2974
PHONE 858 558-6900 - FAX 858 558-6159

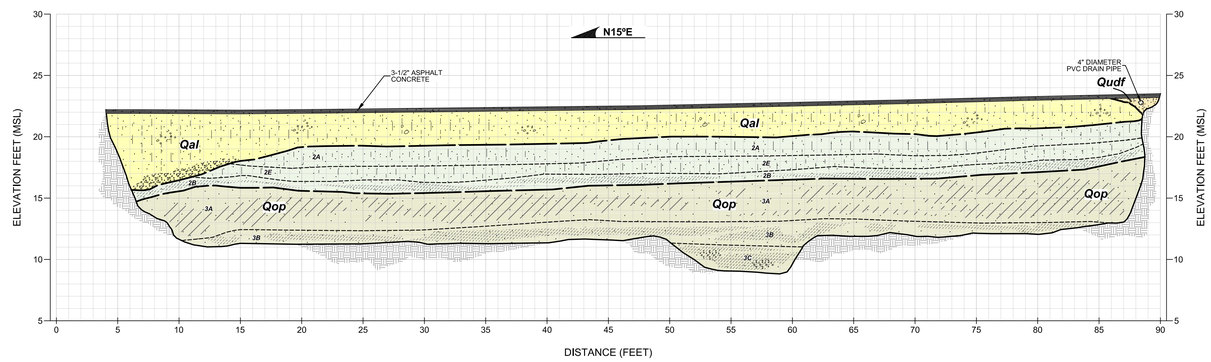
SCALE	1" = 5'	DATE	09 - 11 - 2015
PROJECT NO.	G1592 - 11 - 03	FIGURE	A-5
SHEET	1 OF 1		

Plotted:09/11/2015 11:21AM | By:RUBEN AGUILAR | File Location:Y:\PROJECTS\G1592-11-03 Guy Hill Property\SHEETS\G1592-11-03 FaultTrenches.dwg



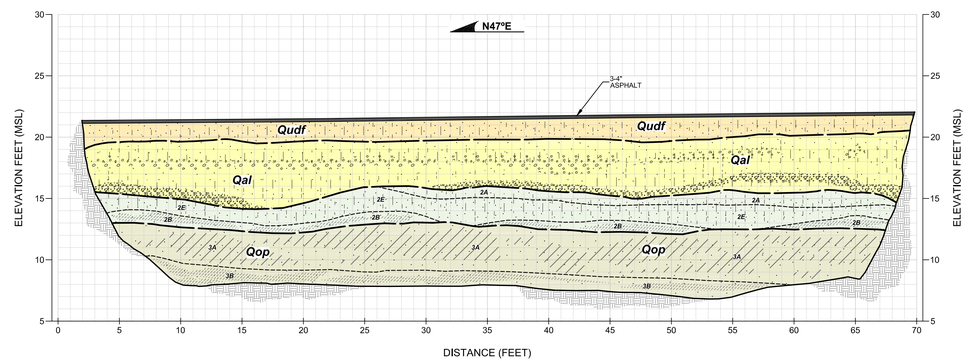
FAULT TRENCH FT-5

SCALE: 1" = 5' (Vert. = Horiz.)



FAULT TRENCH FT-6

SCALE: 1" = 5' (Vert. = Horiz.)



FAULT TRENCH FT-7

SCALE: 1" = 5' (Vert. = Horiz.)

GEOCON LEGEND

Qpf.....**PREVIOUSLY PLACED FILL**
Dense, wet, very dark gray, SAND and GRAVEL (backfill of the underground tanks, extracted in 1993)

Qudf.....**UNDOCUMENTED FILL**
Medium dense, damp to moist, dark gray, Silty, fine to medium SAND; trace gravel (SM)

Qal.....**ALLUVIUM**
Qal1...Medium dense, moist, light brown, Silty, fine SAND, few carbon flakes; a layer of gravel; abundant pinholes
Qal2...Medium dense, moist to wet, brown, Silty, fine to medium SAND with little clay, less pinholes, some calcium carbonate veinlets

SOIL PROFILE
2A.....Loose to medium dense, moist, dark brown, Silty, fine SAND; abundant pinholes, fine manganese nodules, bioturbation (SM)
2B.....Medium dense, dark brown, Clayey, fine to medium SAND; moderately developed argillic horizon (SC)
2E.....Medium dense, moist, light brown, Silty, fine SAND; less pinholes (SM)

Qop.....**OLD PARALIC DEPOSITS**
3A.....Very stiff, moist, dark grayish brown, Sandy CLAY; mottled orange and dark gray (CL)
3B.....Very dense, moist, dark grayish brown to greenish brown, Clayey, fine SAND; iron staining (SC)
3C.....Very dense, moist, dark grayish brown, mottled orange and green, Clayey SAND; trace fine gravel (SC)
3A1.....Dense, very moist, dark brown, Clayey SAND; Interfingering with 3 feet
3B1.....Light greenish brown, Silty SAND 4 to 6" thick
3B2.....Clay rich lenses
3C1.....Olive brown, Silty SAND layer
3D.....Dense, moist, mottled reddish brown to light brown, Silty, fine SAND; some manganese nodules present, massive with no cementation (SM)

1 .....VERTICAL FRACTURES-No vertical displacement: brown sand infill
2 .....FAINT BEDDING
3 .....Small channel, light brown, coarse SAND
4 .....Calcium carbonate nodules
5 .....Calcium carbonate; pebble size nodules and veinlets
.....APPROX. LOCATION OF GEOLOGIC CONTACT
.....APPROX. LOCATION OF INTERFORMATIONAL CONTACT

FAULT TRENCHES

GUY HILL PROPERTY
SAN DIEGO, CALIFORNIA

GEOCON INCORPORATED
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121 - 2974
PHONE 858 558-6900 - FAX 858 558-6159

SCALE	1" = 5'	DATE	09 - 11 - 2015
PROJECT NO.	G1592 - 11 - 03		
SHEET	1 OF 1	FIGURE	A-6

Plotted:09/11/2015 11:22AM | By:RUBEN AGUILAR | File Location:Y:\PROJECTS\G1592\11-03 Guy Hill Property\SHEETS\G1592-11-03 FaultTrenches.dwg

PERMIT #LMWP-001324
A.P.N. #424-380-06
EST #H103045 HMD

COUNTY OF SAN DIEGO
DEPARTMENT OF ENVIRONMENTAL HEALTH
LAND AND WATER QUALITY DIVISION
MONITORING WELL PROGRAM

SOIL BORING CONSTRUCTION PERMIT

SITE NAME: GUY HILL CADILLAC INC.

SITE ADDRESS: 4275 MISSION BAY DR., SAN DIEGO CA 92109

PERMIT FOR: **FOUR BORINGS**

PERMIT APPROVAL DATE: OCTOBER 13, 2014

PERMIT EXPIRES ON: FEBRUARY 9, 2015

RESPONSIBLE PARTY: CAMDEN

PERMIT CONDITIONS:

1. All borings must be sealed from the bottom of the boring to the ground surface with an approved sealing material as specified in California Well Standards Bulletin 74-90, Part III, Section 19.D. **Drill cuttings are not an acceptable fill material.**

2. All borings must be properly destroyed within 24 hours of drilling.

3. Placement of any sealing material at a depth greater than 30 feet must be done using the tremie method.

4. All water and soil resulting from the activities covered by this permit must be managed, stored and disposed of as specified in the SAM Manual in Section 5, E- 4. (**http://www.sdcounty.ca.gov/deh/water/sam_manual.html** In addition, drill cuttings must be properly handled and disposed in compliance with the Stormwater Best Management Practices of the local jurisdiction.

5. Within 60 days of completing work, submit a well construction report, including all well and/or boring logs and laboratory data to the Well Permit Desk. This report must include all items required by the SAM Manual, Section 5, Pages 6 & 7.

6. This office must be given 48-hour notice of any drilling activity on this site and advanced notification of drilling cancellation. Please contact the Well Permit Desk at (858) 505-6688.

NOTE: **This permit does not constitute approval of a work plan as defined in Section 2722 of Article 11 of C.C.R., Title 23. Work plans are required for all unauthorized release investigations in San Diego County.**

APPROVED BY: _____ DATE: 10.13.2014
AMELIA CESEÑA

APPENDIX B

APPENDIX B

LABORATORY TESTING

We performed laboratory tests in accordance with the current, generally accepted test methods of the American Society for Testing and Materials (ASTM) or other suggested procedures. We tested selected samples for their in-place dry density and moisture content, maximum dry density and optimum moisture content, direct shear strength, expansion index, water-soluble sulfate content, water-soluble chloride ion content, potential of hydrogen (pH) and resistivity, hydraulic conductivity, and gradation characteristics. The results of our laboratory tests are presented in Tables B-I through B-VII and Figures B-1 through B-5.

TABLE B-I
SUMMARY OF LABORATORY MAXIMUM DRY DENSITY AND OPTIMUM MOISTURE CONTENT TEST RESULTS
ASTM D 1557

Sample No.	Description	Maximum Dry Density (pcf)	Optimum Moisture Content (% dry wt.)
B4-1	Dark olive brown, Sandy CLAY (Qudf)	127.4	9.8

TABLE B-II
SUMMARY OF LABORATORY DIRECT SHEAR TEST RESULTS
ASTM D 3080

Sample No.	Depth (feet)	Geologic Unit (Soil Type)	Dry Density (pcf)	Moisture Content (%)		Unit Peak [Ultimate[1]] Cohesion (psf)	Angle of Peak [Ultimate[1]] Shear Resistance (degrees)
				Initial	Final		
B1-9	23.5–24.5	Qop (SC/CL)	117.5	16.6	16.8	920 [675]	29 [28]
B2-3	10-11	Qop (SC/CL)	119.4	14.9	16.4	1520 [1170]	26 [26]
B3-8	15-16	Qop (SM)	111.1	20.1	19.3	620 [515]	30 [27]
B4-3	10-11	Qop (CL)	115.7	15.5	17.4	650 [650]	26 [26]

[1] Ultimate at end of test at 0.2 inch deflection

TABLE B-III
SUMMARY OF LABORATORY EXPANSION INDEX TEST RESULTS
ASTM D 4829

Sample No.	Moisture Content (%)		Dry Density (pcf)	Expansion Index	CBC Expansion Classification	Soil Expansion Classification
	Before Test	After Test				
B3-6 (Qop–CL)	10.4	20.0	110.2	50	Expansive	Low
B4-1 (Qudf-CL)	9.1	16.8	114.4	28	Expansive	Low

TABLE B-IV
SUMMARY OF LABORATORY WATER-SOLUBLE SULFATE TEST RESULTS
CALIFORNIA TEST NO. 417

Sample No.	Water-Soluble Sulfate (%)	Sulfate Severity	Sulfate Class
B3-6	0.048	Not Applicable	S0
B4-1	0.006	Not Applicable	S0

TABLE B-V
SUMMARY OF LABORATORY CHLORIDE ION CONTENT TEST RESULTS
AASHTO TEST NO. T 291

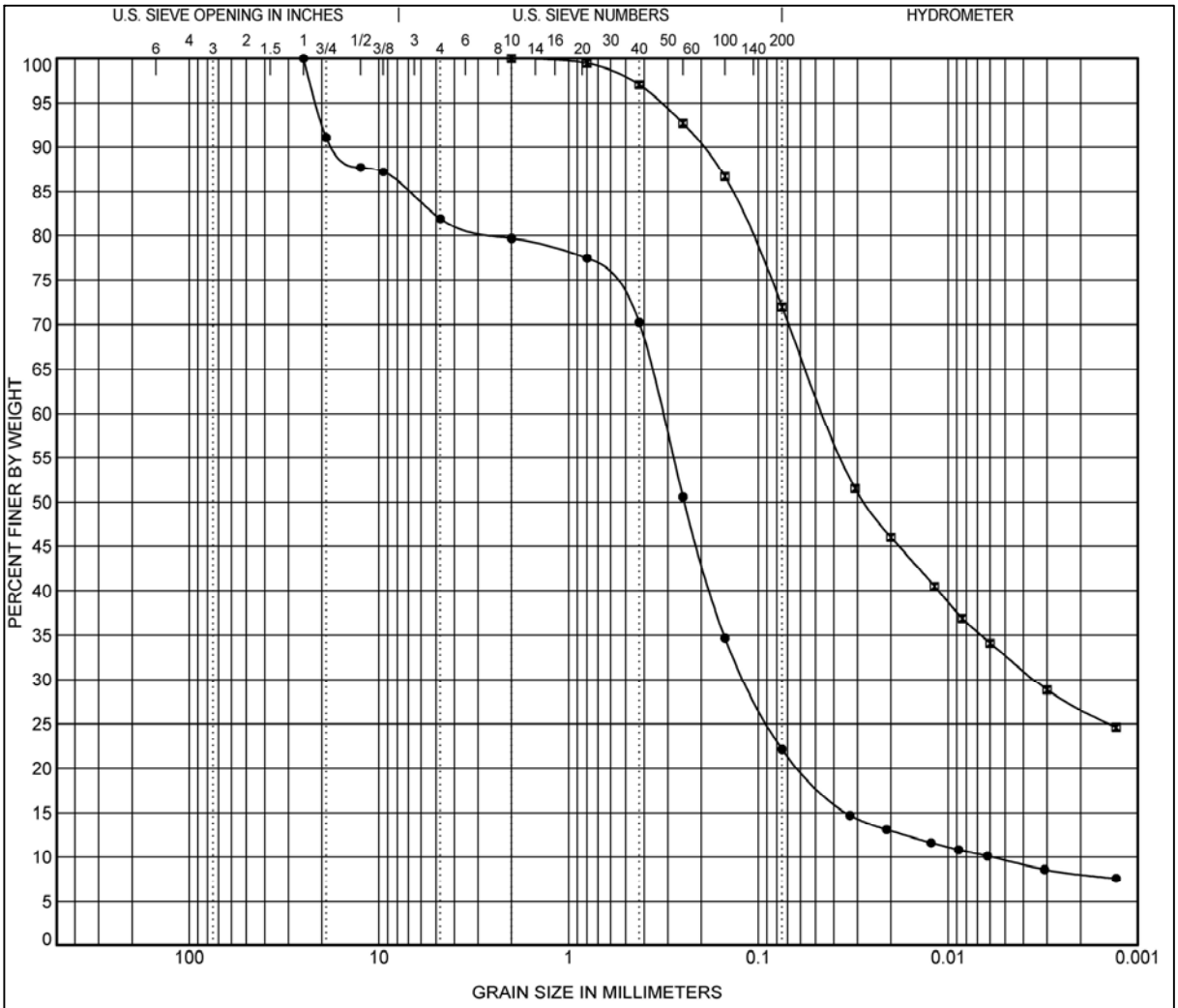
Sample No.	Chloride Ion Content, PPM (%)
B3-6	795 (0.080)
B4-1	426 (0.043)

TABLE B-VI
SUMMARY OF LABORATORY POTENTIAL OF HYDROGEN (PH) AND RESISTIVITY TEST RESULTS
CALIFORNIA TEST METHOD 643

Sample No.	pH	Minimum Resistivity (ohm-centimeters)
B3-6	7.5	450
B4-1	7.8	1,500

TABLE B-VII
SUMMARY OF LABORATORY HYDRAULIC CONDUCTIVITY RESULTS
ASTM D 5084

Sample No.	Depth (feet)	Geologic Unit	Dry Density (pcf)	Moisture Content (%)		Average Permeability at 20º C (in/hr)	Average Permeability at 20º C (cm/sec)
				Initial	Final		
B1-8	21-22	Qop	114.3	17.3	17.9	3.64E-03	2.57E-06
B2-5	14-18	Qop	119.4	14.9	16.4	3.22E-05	2.27E-08



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Sample No.	Classification	LL	PL	PI	Cc	Cu
●	B1-8 (21')	(SM) Silty SAND[illegible]l and trace clay				7.04	54.5
⧓	B2-5 (17')	(ML) Sandy SILT CLAY					

	Sample No.	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B1-8 (21')	25	0.322	0.116	0.006	18.1	59.8	12.5	9.6
⧓	B2-5 (17')	2	0.045	0.004		0.0	28.0	39.3	32.7

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GRADATION CURVE

GUY HILL PROPERTY
SAN DIEGO, CALIFORNIA

LR / AML		DSK/GTYPD	DATE 09 - 11 - 2015	PROJECT NO. G1592 - 11 - 03	FIG. B1

Ladrillono

Y:\PROJECTS\G1592-11-03 Guy Hill Property\DETAILS\Gradation Curve.dwg

SAMPLE NO.: B1-9
DEPTH OF SAMPLE 23.5'

Test Data			
Load	1 K	3 K	5 K
INITIAL			
Water Content	16.3%	17.5%	15.9%
Dry Density (pcf)	118.7	115.1	118.8
Saturation*	109.6%	105.9%	107.4%
Height (inches)	1	1	1
AFTER TEST			
Water Content	16.7%	18.2%	15.4%
Dry Density (pcf)	116.5	114.5	121.0
FAILURE			
Normal Stress (psf)	952	2084	4346
Ultimate Stress (psf)	1386	1456	3071
Peak Stress (psf)	1625	1805	3410
Rate (in/min)	0.010	0.010	0.010

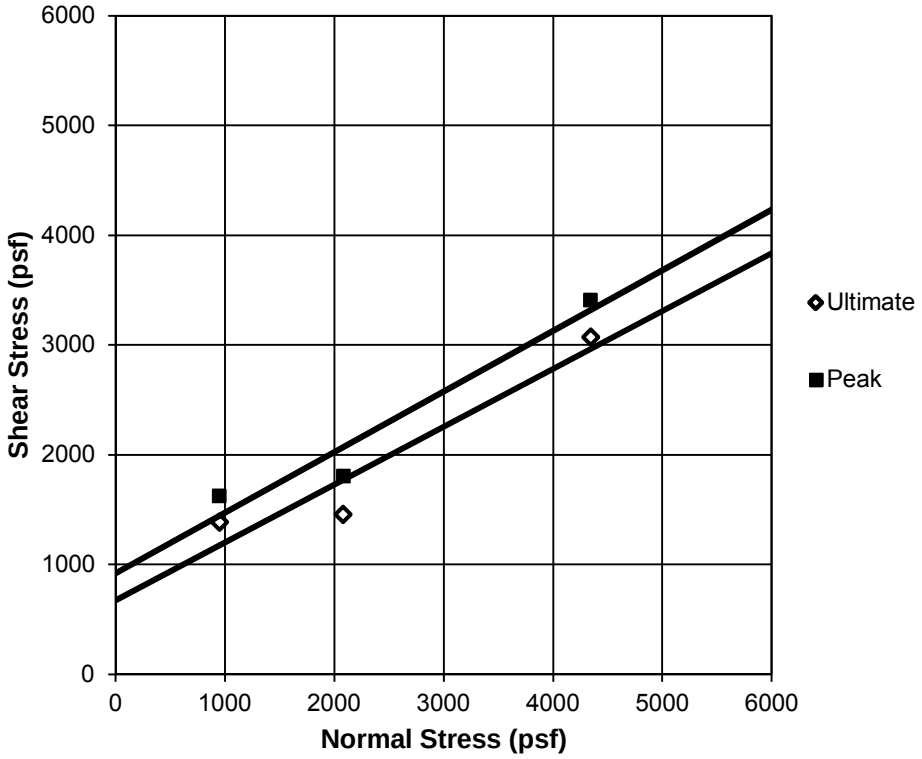
*Degree of saturation calculated with a specific gravity of 2.65

Results	
ϕ (Ultimate)	28 degrees
ϕ (Peak)	29 degrees
c (Ultimate)	675 psf
c (Peak)	920 psf

DATE: 10/21/2014
DESCRIPTION: Qop (SC/CL)

☑ Natural

☐ Remold



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SW/LR

DIRECT SHEAR TEST DATA

GUY HILL PROPERTY
4275 EAST MISSION BAY DRIVE
SAN DIEGO, CALIFORNIA

PROJECT NO. G1592-11-02 | FIG. B-2

SAMPLE NO.: B2-3
DEPTH OF SAMPLE 10'

Test Data			
Load	1 K	3 K	5 K
INITIAL			
Water Content	15.1%	15.1%	14.4%
Dry Density (pcf)	119.7	119.2	119.4
Saturation*	104.6%	103.0%	98.9%
Height (inches)	1	1	1
AFTER TEST			
Water Content	17.0%	16.4%	15.9%
Dry Density (pcf)	113.8	115.7	120.6
FAILURE			
Normal Stress (psf)	952	2084	4346
Ultimate Stress (psf)	1436	2533	3240
Peak Stress (psf)	1645	2852	3250
Rate (in/min)	0.010	0.010	0.010

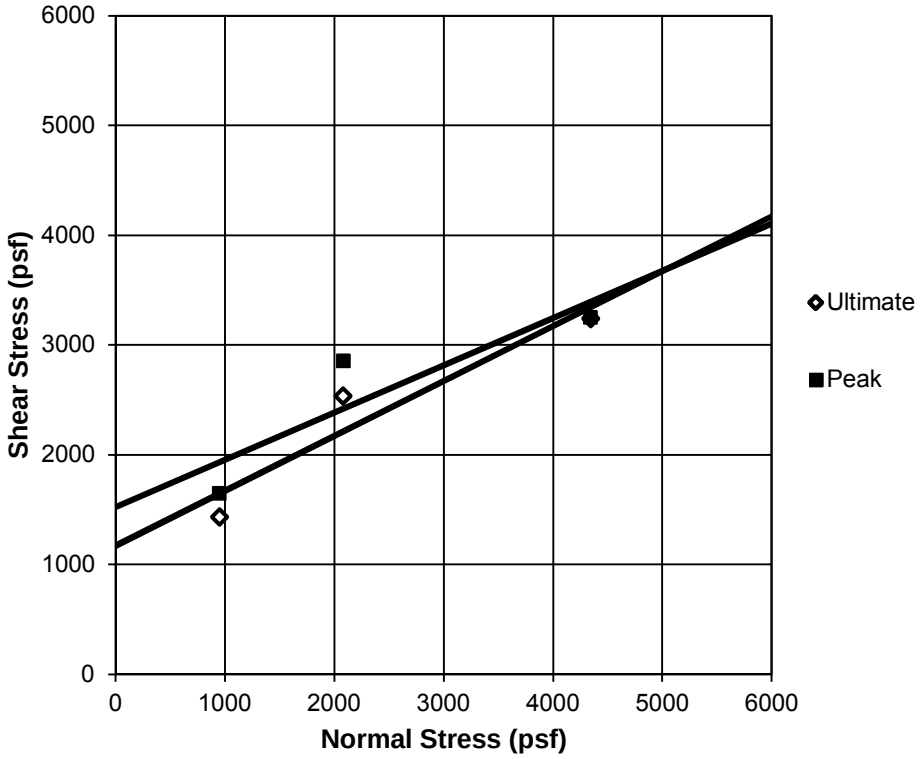
*Degree of saturation calculated with a specific gravity of 2.65

Results	
ϕ (Ultimate)	26 degrees
ϕ (Peak)	26 degrees
c (Ultimate)	1170 psf
c (Peak)	1520 psf

DATE: 10/21/2014
DESCRIPTION: Qop (SC/CL)

☑ Natural

☐ Remold



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SW/LR

DIRECT SHEAR TEST DATA

GUY HILL PROPERTY
4275 EAST MISSION BAY DRIVE
SAN DIEGO, CALIFORNIA

PROJECT NO. G1592-11-02 | FIG. B-3

SAMPLE NO.: B3-8
DEPTH OF SAMPLE 15'

Test Data			
Load	1 K	3 K	5 K
INITIAL			
Water Content	20.0%	19.8%	20.4%
Dry Density (pcf)	111.6	112.5	109.2
Saturation*	109.7%	111.5%	105.0%
Height (inches)	1	1	1
AFTER TEST			
Water Content	19.7%	18.7%	19.5%
Dry Density (pcf)	111.3	112.4	111.5
FAILURE			
Normal Stress (psf)	952	2084	4346
Ultimate Stress (psf)	917	1705	2692
Peak Stress (psf)	1037	2024	3071
Rate (in/min)	0.010	0.010	0.010

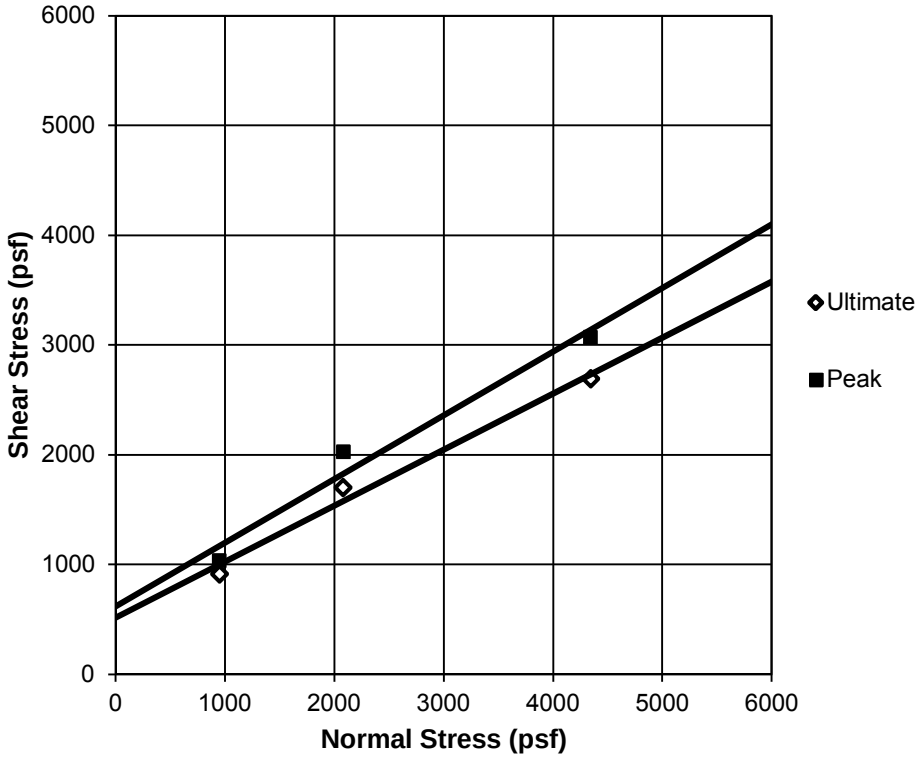
*Degree of saturation calculated with a specific gravity of 2.65

Results	
ϕ (Ultimate)	27 degrees
ϕ (Peak)	30 degrees
c (Ultimate)	515 psf
c (Peak)	620 psf

DATE: 10/21/2014
DESCRIPTION: Qop (SM)

☑ Natural

☐ Remold



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SW/LR

DIRECT SHEAR TEST DATA

GUY HILL PROPERTY
4275 EAST MISSION BAY DRIVE
SAN DIEGO, CALIFORNIA

PROJECT NO. G1592-11-02 | FIG. B-4

SAMPLE NO.: B4-3
DEPTH OF SAMPLE 10'

Test Data			
Load	1 K	3 K	5 K
INITIAL			
Water Content	15.6%	15.4%	15.5%
Dry Density (pcf)	115.0	117.6	114.4
Saturation*	94.4%	99.9%	91.9%
Height (inches)	1	1	1
AFTER TEST			
Water Content	17.5%	17.2%	17.4%
Dry Density (pcf)	113.2	117.5	115.9
FAILURE			
Normal Stress (psf)	952	2084	4346
Ultimate Stress (psf)	1147	1615	2772
Peak Stress (psf)	1147	1615	2772
Rate (in/min)	0.010	0.010	0.010

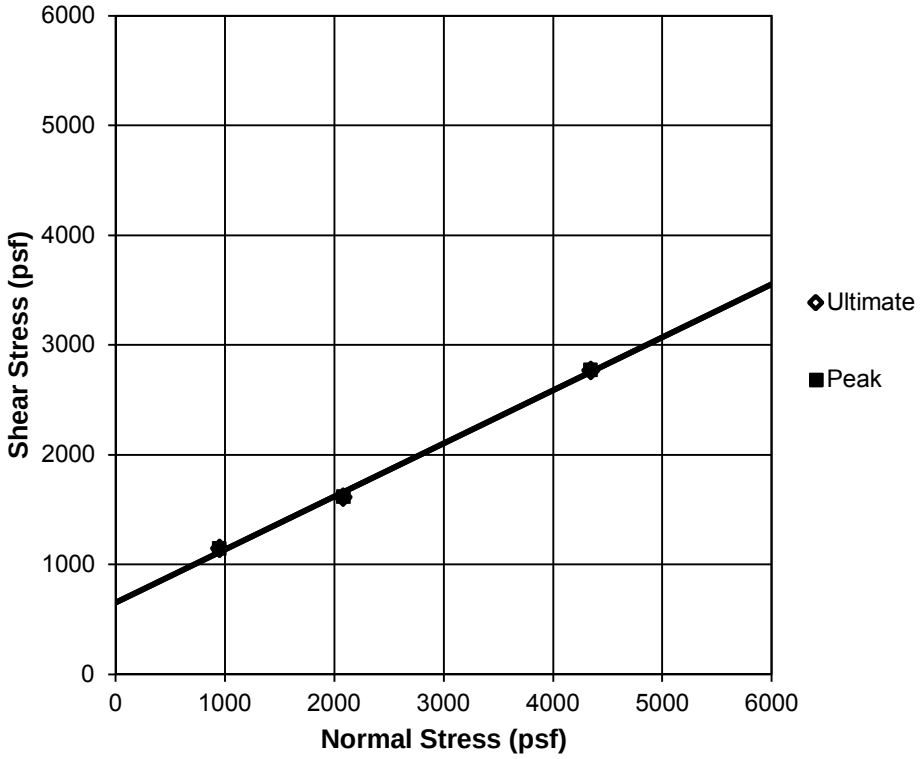
*Degree of saturation calculated with a specific gravity of 2.65

Results	
ϕ (Ultimate)	26 degrees
ϕ (Peak)	26 degrees
c (Ultimate)	650 psf
c (Peak)	650 psf

DATE: 10/21/2014
DESCRIPTION: Qop (CL)

☑ Natural

☐ Remold



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SW/LR

DIRECT SHEAR TEST DATA

GUY HILL PROPERTY
4275 EAST MISSION BAY DRIVE
SAN DIEGO, CALIFORNIA

PROJECT NO. G1592-11-02 | FIG. B-5

APPENDIX C

APPENDIX C

LOGS OF EXPLORATORY EXCAVATIONS AND LABORATORY DATA

FROM PREVIOUS GEOTECHNICAL INVESTIGATION:

***GEOTECHNICAL INVESTIGATION, GUY HILL AUTOMOBILE DEALERSHIP, 4275 EAST MISSION BAY DRIVE, SAN DIEGO, CALIFORNIA,* PREPARED BY GEOCON INC.**
DATED JANUARY 7, 2004

FOR

GUY HILL PROPERTY
4275 MISSION BAY DRIVE
SAN DIEGO, CALIFORNIA

PROJECT NO. G1592-11-03

PROJECT NO. 07210-22-01

BORING B 1

ELEV. (MSL.) 23' MSL DATE COMPLETED 12-06-2003

EQUIPMENT 8 INCH HOLLOW STEM AUGER

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B1-3			SM-ML	**UNDOCUMENTED FILL** Loose to medium dense, olive brown SILT, to fine to medium SAND, with some GRAVEL			
2	B1-1			SM-ML	**BAY POINT FORMATION** Medium dense, moist, olive brown, Sandy SILT to very fine SAND; pinhole porosity	49	117.0	15.2
4								
6	B1-2					52	116.5	14.8
8				CL-ML	Very stiff to hard, moist, dark brown to dark olive brown, fine Sandy CLAY to Clayey SILT; some medium to coarse sand			
10	B1-4					46	112.4	15.4
12				ML	Medium dense, moist, olive to grayish brown, fine Sandy SILT; mottled coloration, some iron and manganese oxide staining			
14								
16	B1-5				- Thin layer of very moist, Silty SAND	33	111.5	17.2
18				CL	Very stiff, moist, dark grayish to olive brown, Silty CLAY, with fine SAND			

BORING TERMINATED AT 19.9 FEET
No groundwater encountered
Backfilled on 12-06-2003

Figure A-1,
Log of Boring B 1, Page 1 of 1

07210-22-01.GPJ

SAMPLE SYMBOLS

- SAMPLING UNSUCCESSFUL
- STANDARD PENETRATION TEST
- DRIVE SAMPLE (UNDISTURBED)
- DISTURBED OR BAG SAMPLE
- CHUNK SAMPLE
- WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. 07210-22-01

BORING B 2

ELEV. (MSL.) 23' MSL DATE COMPLETED 12-06-2003

EQUIPMENT 8 INCH HOLLOW STEM AUGER

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0								
2	B2-1			SM-ML	**UNDOCUMENTED FILL** Loose, moist, olive brown, SILT to fine to medium SAND; some scattered gravel	18	111.7	14.4
4								
6	B2-2			ML	**BAY POINT FORMATION** Medium dense, damp, brown to olive gray, fine to medium Sandy SILT	19		
8				CL-ML	Stiff to hard, moist, dark brown to mottled dark olive brown, fine, Sandy, Silty CLAY to Clayey SILT; trace gravel, some manganese oxide and carbonate mineralization			
10	B2-3			ML	Medium dense, moist, olive to reddish brown, fine Sandy SILT, with CLAY	17		
12								
14				CL	Very stiff to hard, moist, dark grayish brown to dark olive gray, Silty CLAY; thinly laminated, iron oxide staining			
16	B2-4			SM-ML	Dense, moist, olive to slightly reddish brown, fine, Silty SAND to Sandy SILT; iron and manganese oxide staining	56	118.0	14.8
18				CL	Very stiff, moist, dark brown, Silty CLAY; fine laminations - Increasingly moist; locally soft - Minor seepage			
					BORING TERMINATED AT 19.9 FEET Minor seepage at 19 feet Backfilled on 12-06-2003			

Figure A-2,
Log of Boring B 2, Page 1 of 1

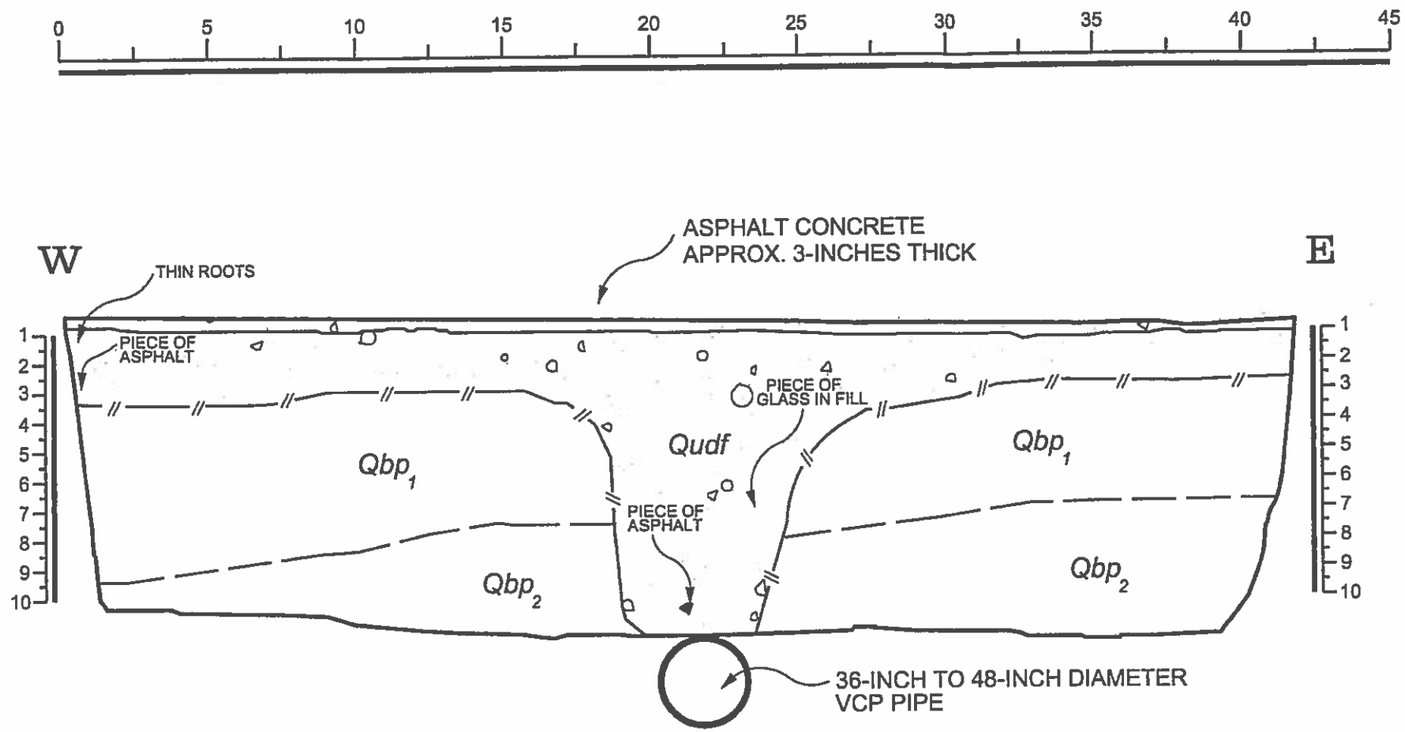
07210-22-01.GPJ

SAMPLE SYMBOLS

- SAMPLING UNSUCCESSFUL
- STANDARD PENETRATION TEST
- DRIVE SAMPLE (UNDISTURBED)
- DISTURBED OR BAG SAMPLE
- CHUNK SAMPLE
- WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GUY HILL AUTOMOBILE DEALERSHIP
4275 EAST MISSION BAY DRIVE
SAN DIEGO, CALIFORNIA



GEOCON LEGEND

UNDOCUMENTED FILL *Qudf*

Loose to medium dense, moist, dark grayish to dark olive and reddish brown, Silty and Clayey, fine to medium SAND and Sandy to Clayey SILT; scattered pieces of glass and asphalt, appears moderately well compacted, occurs as thin, relatively uniform layer 2 - 3 feet thick; between approx. 18 to 26 feet occurs as trench backfill to full depth of trench, thin roots in upper foot at west end of trench, gravel to small cobbles scattered throughout

BAY POINT FORMATION *Qbp*

Qbp_1 Medium dense to dense, damp to moist, brown to light olive and reddish brown, Silty fine SAND to Sandy SILT; pinhole porosity throughout, some medium to coarse sand grains, massive and relatively uniform, very weakly cemented, locally contains somewhat blocky texture

Qbp_2 Dense to hard, moist, dark grayish brown, very fine, Sandy SILT to Silty CLAY; weakly laminated, locally mottled with olive to reddish brown, some pinhole porosity; unit occurs as continuous layer with gradational upper contact, thickens towards the east

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PROJECT NO. 07210 - 22 - 01
FIGURE A-3
DATE 01-07-2004

FAULT TRENCH T - 1

APPENDIX B

LABORATORY TESTING

Laboratory tests were performed in accordance with generally accepted test methods of the American Society for Testing and Materials (ASTM) or other suggested procedures. Selected soil samples were tested for their in-place dry density and moisture content, maximum dry density and optimum moisture content, shear strength, expansion, pH and resistivity, and water-soluble sulfate characteristics.

The results of our laboratory tests are presented on Tables B-I through B-V. The in-place dry density and moisture content results are indicated on the exploratory boring logs.

TABLE B-I
SUMMARY OF LABORATORY MAXIMUM DRY DENSITY AND OPTIMUM MOISTURE CONTENT TEST RESULTS ASTM D 1557-00

Sample No.	Description	Maximum Dry Density (pcf)	Optimum Moisture Content (% dry wt.)
B1-3	Dark brown, Clayey, SAND with trace gravel	128.4	9.5

TABLE B-II
SUMMARY OF LABORATORY DIRECT SHEAR TEST RESULTS ASTM D 3080-98

Sample No.	Dry Density (pcf)	Moisture Content (%)	Unit Cohesion (psf)	Angle of Shear Resistance (degrees)
B1-1	117.0	15.2	693	40
B2-1	111.7	14.4	619	32

TABLE B-III
SUMMARY OF LABORATORY EXPANSION INDEX TEST RESULTS
ASTM D 4829-95

Sample No.	Moisture Content		Dry Density (pcf)	Expansion Index
	Before Test (%)	After Test (%)		
B1-4	10.4	16.9	110.4	16

TABLE B-IV
SUMMARY OF LABORATORY WATER-SOLUBLE SULFATE TEST RESULTS
CALIFORNIA TEST NO. 417

Sample No.	Water-Soluble Sulfate (%)	Classification
B1-3	0.038	Negligible

TABLE B-V
SUMMARY OF LABORATORY POTENTIAL OF HYDROGEN (pH) AND RESISTIVITY TEST RESULTS
CALIFORNIA TEST NO. 643

Sample No.	pH	Resistivity (ohm-centimeters)	Corrosive Rating
B1-3	7.8	1690	Severely Corrosive

LIST OF REFERENCES

1. *2013 California Building Code, California Code of Regulations, Title 24, Part 2, based on the 2012 International Building Code*, prepared by California Building Standards Commission, dated July, 2013.

2. *1999 Abbott, P.L., The Rise and Fall of San Diego,* Sunbelt Publications,. 231 p.

3. *ACI 318-11, Building Code Requirements for Structural Concrete and Commentary*, prepared by the American Concrete Institute, dated August, 2011.

4. *ACI 330-08, Guide for the Design and Construction of Concrete Parking Lots*, prepared by the American Concrete Institute, dated June, 2008.

5. Anderson, J. G., T. K. Rockwell, and D. C. Agnew, *Past and Possible Future Earthquakes of Significance to the San Diego Region*: Earthquake Spectra, 1989, v.5, no. 2, p.299-333.

6. *ASCE 7-10, Minimum Design Loads for Buildings and Other Structures, Second Printing*, April 6, 2011.

7. Boore, D. M., and G. M Atkinson, *Ground-Motion Prediction for the Average Horizontal Component of PGA, PGV, and 5%-Damped PSA at Spectral Periods Between 0.01 and 10.0 S*, Earthquake Spectra, Volume 24, Issue 1, pages 99-138, February 2008.

8. Burkett & Wong Engineers, *Map Waiver No. 406450/Grading & Drainage Plan, Park Equity, 2820 6th Avenue, San Diego, California*, dated November 28, 2006.

9. California Geologic Survey, *Seismic Shaking Hazards in California, Based on the USGS/CGS Probabilistic Seismic Hazards Assessment (PSHA) Model*, 2002 (revised April 2003). 10% probability of being exceeded in 50 years. http://redirect.conservation.ca.gov/cgs/rghm/pshamap/pshamain.html

10. California Geologic Survey, *Tsunami Inundation Map For Emergency Planning, State of California- County of San Diego, La Jolla Quadrangle,* dated June 1, 2009.

11. California Geologic Survey, (CGS), Earthquake Fault Zone Map, La Jolla Quadrangle, dated November 1, 1991.

12. Campbell, K. W., and Y. Bozorgnia, *NGA Ground Motion Model for the Geometric Mean Horizontal Component of PGA, PGV, PGD and 5% Damped Linear Elastic Response Spectra for Periods Ranging from 0.01 to 10 s*, Preprint of version submitted for publication in the NGA Special Volume of Earthquake Spectra, Volume 24, Issue 1, pages 139-171, February 2008.

13. Chiou, Brian S. J., and Robert R. Youngs, *A NGA Model for the Average Horizontal Component of Peak Ground Motion and Response Spectra*, preprint for article to be published in NGA Special Edition for Earthquake Spectra, Spring 2008.

14. *City of San Diego Seismic Safety Study, Geologic Hazards and Faults*, 2008 edition, Grid Tile 25.

LIST OF REFERENCES (Concluded)

15. *1953 Department of Agriculture, Aerial Stereo Photographs, AXN-4M-90 and 91*.

16. *Jennings, C.W., 1994, Fault Activity Map of California.* California Geological Survey, Scale 1:750,000.

17. Kennedy, M. P., and S. S. Tan, *Geologic Map of the San Diego 30'x60' Quadrangle, California,* USGS Regional Map Series Map No. 3, Scale 1:100,000, 2008.

18. *Lindvall, S. C., and Rockwell, T. K., 1999, Holocene Activity of the Rose Canyon Fault Zone,* Southern California Earthquake Center Quarterly Newsletter, Vol. 5, No. 1, pp. 10-15.

19. Risk Engineering, *EZ-FRISK*, 2015.

20. United States Geological Survey computer program, *Seismic Hazard Curves and Uniform Hazard Response Spectra*. http://geohazards.usgs.gov/designmaps/us/application.php

21. Unpublished Geotechnical Reports and Information, Geocon Incorporated.

22. USGS computer program, *Seismic Hazard Curves and Uniform Hazard Response Spectra.* http://earthquake.usgs.gov/research/hazmaps/design/

Project No. G1592-11-03
July 5, 2016

JPI Real Estate Acquisition, LLC
12250 El Camino Real, Suite 380
San Diego, California 92130

Attention: Mr. Justin Craig

Subject: RESPONSE TO CITY COMMENTS
JEFFERSON PB
4275 EAST MISSION BAY DRIVE
SAN DIEGO, CALIFORNIA

References:

1. *Infiltration Investigation, Jefferson PB, 4275 Mission Bay Drive, San Diego, California*, prepared by Geocon Incorporated, dated June 3, 2016 (Project No. G1592-11-03).

2. *Geotechnical Investigation, Guy Hill Property, 4275 East Mission Bay Drive, San Diego, California, prepared by Geocon Incorporated, dated September 11, 2015 (Project No. G1592-52-03)*.

3. *Cycle Issues, Guy Hill Cadillac, San Diego, California*, prepared by the City of San Diego, dated June 27, 2016 (Project No. 327976).

Dear Mr. Craig:

We prepared this letter to address review comments provided by the City of San Diego LDR-Geology dated June 10, 2016 regarding the storm water management investigation for the subject site. The city's comments are listed herein with the Geocon response immediately following.

Comment 22: *The following comments pertain to the revised Worksheet C.4-1: Criteria 1: An infiltration rate of greater than 0.5 inches per hour was determined for one test location on site. The box should be marked yes.*

Response: We performed additional infiltration tests within the northeastern area of the property (at locations P-8 and P-9 shown on Figure 2). The updated Geologic Map presents the locations of the additional tests. Table 1 presents the updated results of the infiltration tests. The updated field test data are also included herein. We adjusted the infiltration rates to be equal to the saturated hydraulic conductivity test results based on the discussion in the County of Riverside *Design Handbook for Low Impact Development Best Management Practices.*

TABLE 1
FIELD PERMEAMETER INFILTRATION TEST RESULTS

Test No.	Geologic Unit	Test Depth (Feet, Below Grade)	Fines-Content[1] [Clay Content[2]] (%)	Field-Saturated Hydraulic Conductivity, k_{sat} (Inch/Hour)	Worksheet[3] Saturated Hydraulic Conductivity, k_{sat} (Inch/Hour)
P-1	Qop	3.8	65 [16]	0.47	0.24
P-2	Qudf	3.9	76 [23]	0.01	>0.01
P-4	Qop	3.2	71 [25]	0.01	>0.01
P-5	Qop	2.7	66 [26]	0.36	0.18
P-6	Qop	8.0	82 [27]	0.03	0.02
P-7	Qop	7.4	70 [17]	1.10	0.55
P-8	Qop	5.5	--	0.58	0.29
P-9	Qop	5.5	--	0.29	0.15

[1] Percent finer than the #200 Sieve.
[2] Percent finer than the 0.002 mm.
[3] Using a factor of safety of 2 for Worksheet C.4-1.

Based on the additional infiltration testing in the northeast area, the existing soil should be considered to possess an infiltration rate of less than 0.5 inches per hour after applying the allowed factor of safety of 2. Therefore, Criteria 1 on Worksheet C.4-1 should remain a "No". The updated worksheet also presents the additional infiltration test results.

Comment 23: *Criteria 3: Clarify if infiltration greater than 0.5 inches per hour in the area of P-7 can be allowed without increasing the risk of groundwater contamination that cannot be mitigated to an acceptable level.*

Response: See revised worksheet.

Comment 24: *Criteria 4: Address if infiltration greater than 0.5 inches per hour can be allowed without affecting seasonality of ephemeral streams. Address if infiltration greater than 0.5 inches per hour can be allowed without increasing discharge of contaminated groundwater to surface water.*

Response: See revised worksheet.

Comment 25: *Criteria 5: Consider listing/summarizing the infiltration test rates.*

Response: See revised worksheet.

If you have any questions regarding this response, or if we may be of further service, please contact the undersigned at your convenience.

Very truly yours,

GEOCON INCORPORATED

John Hoobs
CEG 1524

Shawn Foy Weedon
GE 2714

JH:SFW:dmc

Attachments: Geologic Map, Figure 2
Worksheet C.4-1
Aardvark Permeameter Data Analysis

(e-mail) Addressee
(e-mail) Leppert Engineering
Attention: Mr. Norm Kasubuchi

JEFFERSON PB
SAN DIEGO, CALIFORNIA

0' 30' 60' 90' 120'

SCALE 1"=60' (on 11x17)

GEOCON LEGEND

- Qpf .....PREVIOUSLY PLACED FILL
- Qudf .....UNDOCUMENTED FILL
- Qal .....ALLUVIUM
- Qop .....OLD PARALIC DEPOSITS (Dotted Where Buried)
- B-4 .....APPROX. LOCATION OF EXPLORATORY BORING (Geocon, 2014)
- B-2 .....APPROX. LOCATION OF PREVIOUS BORING (Geocon, 2004)
- P-9 .....APPROX. LOCATION OF INFILTRATION TEST
- FT-7 .....APPROX. LOCATION OF FAULT TRENCH
- FT-1 .....APPROX. LOCATION OF PREVIOUS FAULT TRENCH (Geocon, 2004)
- (9') .....APPROX. DEPTH OF FILL (In Feet)
- B B' .....APPROX. LOCATION OF GEOLOGIC CROSS SECTION
- .....APPROX. LOCATION OF MAPPED BURIED POTENTIALLY ACTIVE FAULT (Kennedy & Tan, 2008)
- .....APPROX. LOCATION OF GEOLOGIC CONTACT (Dotted Where Buried)
- .....APPROX. AREAS WHERE TPH IMPACTED SOIL MAY BE ENCOUNTERED

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PHONE 858 558-6900 - FAX 858 558-6159

PROJECT NO. G1592 - 11 - 03
FIGURE 2
DATE 07 - 05 - 2016

GEOLOGIC MAP

Ladrillono

Plotted:07/05/2016 9:10AM | By:ALVIN LADRILLONO | File Location:Y:\PROJECTS\G1592-11-03 (Guy Hill Property - Update)\SHEETS\G1592-11-03 Geo Map (Upd 07-05-2016).dwg

GEOCON

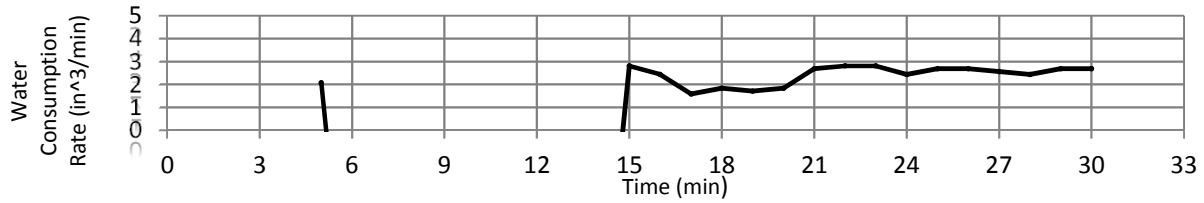
Aardvark Permeameter Data Analysis

Project Name:	PB Jefferson	Date:	5/13/2016
Project Number:	G1592-11-03	By:	LR
Borehole Location:	P1	Ref. EL:	20.00
		Bottom EL:	16.17

Borehole Diameter (2r):	8.00	in			
Borehole Depth (H):	3.83	ft	Wetted Area:	199.84	in^2
Distance Between Reservoir & Top of Borehole:	2.00	ft			
Depth to Water Table (s):	13.00	ft			
Height APM Raised from Bottom:	2.25	in			

Distance Between Resevoir and APM (D):	5.04	ft
Head Height (h):	5.95	in
Distance Between Constant Head and Water Table (L):	115.99	in

Reading	Time (min)	Time Elapsed (min)	Reservoir Water Weight (g)	Resevoir Water Weight (lbs)	Interval Water Consumption (lbs)	Total Water Consumption (lbs)	*Water Consumption Rate (in^3/min)
1	0.00		2944	6.49			
2	5.00	5.00	2774	6.12	0.37	0.37	2.08
3	10.00	5.00	8004	17.65	-11.53	-11.16	-63.92
4	15.00	5.00	7774	17.14	0.51	-10.65	2.81
5	16.00	1.00	7734	17.05	0.09	-10.56	2.44
6	17.00	1.00	7708	16.99	0.06	-10.50	1.59
7	18.00	1.00	7678	16.93	0.07	-10.44	1.83
8	19.00	1.00	7650	16.87	0.06	-10.37	1.71
9	20.00	1.00	7620	16.80	0.07	-10.31	1.83
10	21.00	1.00	7576	16.70	0.10	-10.21	2.69
11	22.00	1.00	7530	16.60	0.10	-10.11	2.81
12	23.00	1.00	7484	16.50	0.10	-10.01	2.81
13	24.00	1.00	7444	16.41	0.09	-9.92	2.44
14	25.00	1.00	7400	16.31	0.10	-9.82	2.69
15	26.00	1.00	7356	16.22	0.10	-9.73	2.69
16	27.00	1.00	7314	16.12	0.09	-9.63	2.57
17	28.00	1.00	7274	16.04	0.09	-9.55	2.44
18	29.00	1.00	7230	15.94	0.10	-9.45	2.69
19	30.00	1.00	7186	15.84	0.10	-9.35	2.69
				Steady Flow Rate, Q (in^3/min):			2.69
				Steady Flow Rate, Q (in^3/hr):			161.33



Field-Saturated Hydraulic Conductivity:

Case 1: L/h > 3 K_{sat} = 0.008 in/min 0.48 in/hr

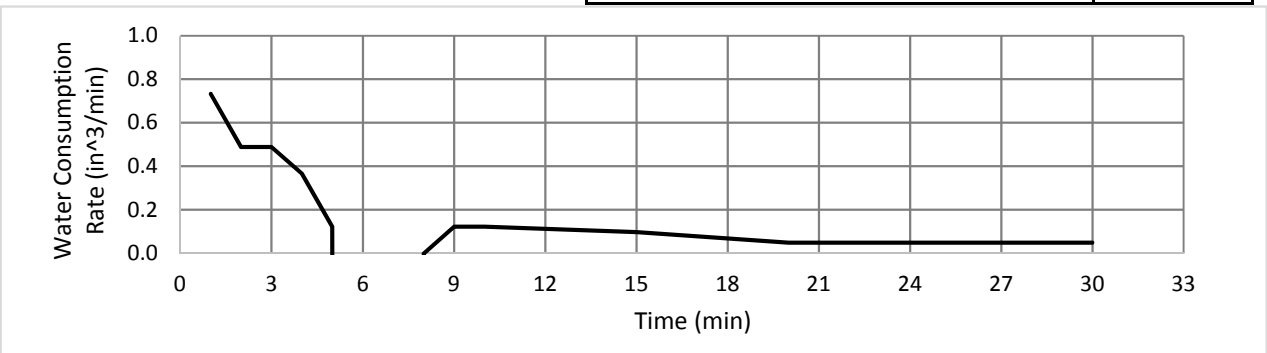
GEOCON

Aardvark Permeameter Data Analysis

Project Name:	PB Jefferson	Date:	5/13/2016
Project Number:	G1592-11-03	By:	LR
Borehole Location:	P2	Ref. EL:	21.00
		Bottom EL:	17.08

Borehole Diameter (2r):	8.00	in			
Borehole Depth (H):	3.92	ft	Wetted Area:	193.67	in^2
Distance Between Reservoir & Top of Borehole:	2.00	ft			
Depth to Water Table (s):	14.00	ft			
Height APM Raised from Bottom:	2.00	in			
Distance Between Resevoir and APM (D):	5.15	ft			
Head Height (h):	5.71	in			
Distance Between Constant Head and Water Table (L):	126.67	in			

Reading	Time (min)	Time Elapsed (min)	Reservoir Water Weight (g)	Resevoir Water Weight (lbs)	Interval Water Consumption (lbs)	Total Water Consumption (lbs)	*Water Consumption Rate (in^3/min)
1	0.00		3692	8.14			
2	1.00	1.00	3680	8.11	0.03	0.03	0.73
3	2.00	1.00	3672	8.10	0.02	0.04	0.49
4	3.00	1.00	3664	8.08	0.02	0.06	0.49
5	4.00	1.00	3658	8.06	0.01	0.07	0.37
6	5.00	1.00	3656	8.06	0.00	0.08	0.12
7	7.00	2.00	7870	17.35	-9.29	-9.21	-128.76
8	8.00	1.00	7870	17.35	0.00	-9.21	0.00
9	9.00	1.00	7868	17.35	0.00	-9.21	0.12
10	10.00	1.00	7866	17.34	0.00	-9.20	0.12
11	15.00	5.00	7858	17.32	0.02	-9.18	0.10
12	20.00	5.00	7854	17.32	0.01	-9.18	0.05
13	25.00	5.00	7850	17.31	0.01	-9.17	0.05
14	30.00	5.00	7846	17.30	0.01	-9.16	0.05
						Steady Flow Rate, Q (in^3/min):	0.05
						Steady Flow Rate, Q (in^3/hr):	2.93



Field-Saturated Hydraulic Conductivity:

Case 1: L/h > 3 K_{sat} = 0.0002 in/min 0.01 in/hr

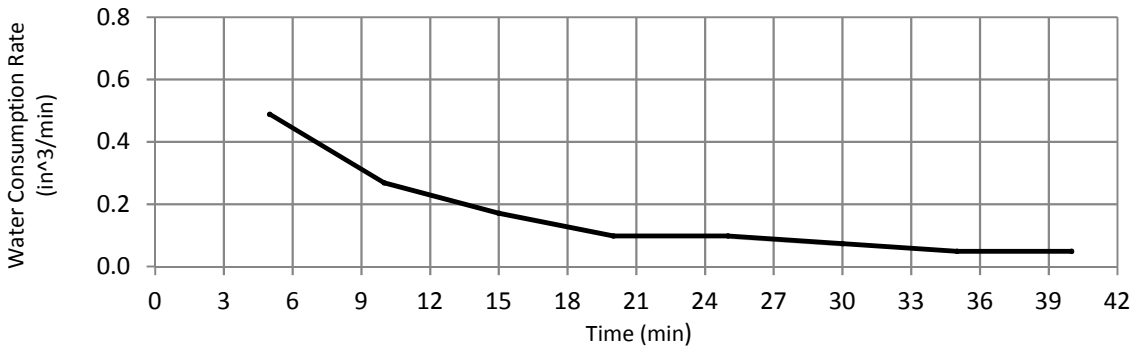
GEOCON

Aardvark Permeameter Data Analysis

Project Name:	PB Jefferson	Date:	5/13/2016
Project Number:	G1592-11-03	By:	LR
Borehole Location:	P4	Ref. EL:	18.50
		Bottom EL:	15.33

Borehole Diameter (2r):	8.00	in			
Borehole Depth (H):	3.17	ft	Wetted Area:	192.92	in^2
Distance Between Reservoir & Top of Borehole:	2.00	ft			
Depth to Water Table (s):	11.50	ft			
Height APM Raised from Bottom:	2.00	in			
Distance Between Resevoir and APM (D):	4.40	ft			
Head Height (h):	5.68	in			
Distance Between Constant Head and Water Table (L):	105.64	in			

Reading	Time (min)	Time Elapsed (min)	Reservoir Water Weight (g)	Resevoir Water Weight (lbs)	Interval Water Consumption (lbs)	Total Water Consumption (lbs)	*Water Consumption Rate (in^3/min)
1	0.00		3808	8.40			
2	5.00	5.00	3768	8.31	0.09	0.09	0.49
3	10.00	5.00	3746	8.26	0.05	0.14	0.27
4	15.00	5.00	3732	8.23	0.03	0.17	0.17
5	20.00	5.00	3724	8.21	0.02	0.19	0.10
6	25.00	5.00	3716	8.19	0.02	0.20	0.10
7	30.00	5.00	3710	8.18	0.01	0.22	0.07
8	35.00	5.00	3706	8.17	0.01	0.22	0.05
9	40.00	5.00	3702	8.16	0.01	0.23	0.05
						Steady Flow Rate, Q (in^3/min):	0.05
						Steady Flow Rate, Q (in^3/hr):	2.93



Field-Saturated Hydraulic Conductivity:

Case 1: L/h > 3 K_{sat} = 0.0002 in/min 0.01 in/hr

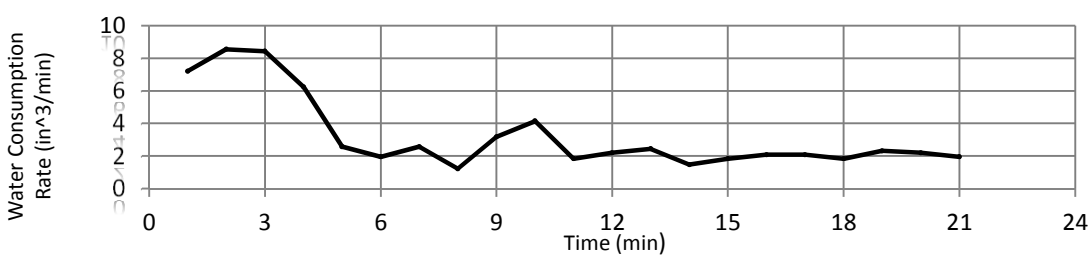
GEOCON

Aardvark Permeameter Data Analysis

Project Name:	PB Jefferson	Date:	5/13/2016
Project Number:	G1592-11-03	By:	LR
Borehole Location:	P5	Ref. EL:	19.00
		Bottom EL:	16.33

Borehole Diameter (2r):	8.00	in			
Borehole Depth (H):	2.67	ft	Wetted Area:	192.42	in^2
Distance Between Reservoir & Top of Borehole:	2.00	ft			
Depth to Water Table (s):	12.00	ft			
Height APM Raised from Bottom:	2.00	in			
Distance Between Resevoir and APM (D):	3.90	ft			
Head Height (h):	5.66	in			
Distance Between Constant Head and Water Table (L):	117.62	in			

Reading	Time (min)	Time Elapsed (min)	Reservoir Water Weight (g)	Resevoir Water Weight (lbs)	Interval Water Consumption (lbs)	Total Water Consumption (lbs)	*Water Consumption Rate (in^3/min)
1	0.00		5336	11.76			
2	1.00	1.00	5218	11.50	0.26	0.26	7.21
3	2.00	1.00	5078	11.20	0.31	0.57	8.56
4	3.00	1.00	4940	10.89	0.30	0.87	8.43
5	4.00	1.00	4838	10.67	0.22	1.10	6.23
6	5.00	1.00	4796	10.57	0.09	1.19	2.57
7	6.00	1.00	4764	10.50	0.07	1.26	1.96
8	7.00	1.00	4722	10.41	0.09	1.35	2.57
9	8.00	1.00	4702	10.37	0.04	1.40	1.22
10	9.00	1.00	4650	10.25	0.11	1.51	3.18
11	10.00	1.00	4582	10.10	0.15	1.66	4.16
12	11.00	1.00	4552	10.04	0.07	1.73	1.83
13	12.00	1.00	4516	9.96	0.08	1.81	2.20
14	13.00	1.00	4476	9.87	0.09	1.90	2.44
15	14.00	1.00	4452	9.81	0.05	1.95	1.47
16	15.00	1.00	4422	9.75	0.07	2.02	1.83
17	16.00	1.00	4388	9.67	0.07	2.09	2.08
18	17.00	1.00	4354	9.60	0.07	2.16	2.08
19	18.00	1.00	4324	9.53	0.07	2.23	1.83
20	19.00	1.00	4286	9.45	0.08	2.31	2.32
21	20.00	1.00	4250	9.37	0.08	2.39	2.20
22	21.00	1.00	4218	9.30	0.07	2.46	1.96
					Steady Flow Rate, Q (in^3/min):		1.96
					Steady Flow Rate, Q (in^3/hr):		117.33



Field-Saturated Hydraulic Conductivity:

Case 1: L/h > 3 K_{sat} = 0.006 in/min 0.37 in/hr

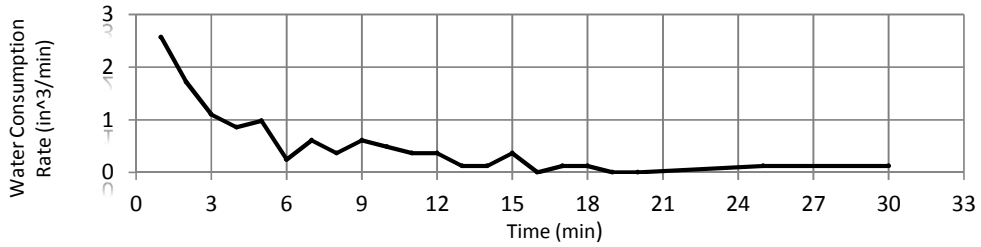
GEOCON

Aardvark Permeameter Data Analysis

Project Name:	PB Jefferson	Date:	5/13/2016
Project Number:	G1592-11-03	By:	LR
Borehole Location:	P6	Ref. EL:	19.00
		Bottom EL:	11.00

Borehole Diameter (2r):	8.00	in			
Borehole Depth (H):	8.00	ft	Wetted Area:	198.28	in^2
Distance Between Reservoir & Top of Borehole:	2.50	ft			
Depth to Water Table (s):	17.00	ft			
Height APM Raised from Bottom:	2.00	in			
Distance Between Resevoir and APM (D):	9.73	ft			
Head Height (h):	5.89	in			
Distance Between Constant Head and Water Table (L):	113.89	in			

Reading	Time (min)	Time Elapsed (min)	Reservoir Water Weight (g)	Resevoir Water Weight (lbs)	Interval Water Consumption (lbs)	Total Water Consumption (lbs)	*Water Consumption Rate (in^3/min)
1	0.00		4016	8.85			
2	1.00	1.00	3974	8.76	0.09	0.09	2.57
3	2.00	1.00	3946	8.70	0.06	0.15	1.71
4	3.00	1.00	3928	8.66	0.04	0.19	1.10
5	4.00	1.00	3914	8.63	0.03	0.22	0.86
6	5.00	1.00	3898	8.59	0.04	0.26	0.98
7	6.00	1.00	3894	8.58	0.01	0.27	0.24
8	7.00	1.00	3884	8.56	0.02	0.29	0.61
9	8.00	1.00	3878	8.55	0.01	0.30	0.37
10	9.00	1.00	3868	8.53	0.02	0.33	0.61
11	10.00	1.00	3860	8.51	0.02	0.34	0.49
12	11.00	1.00	3854	8.50	0.01	0.36	0.37
13	12.00	1.00	3848	8.48	0.01	0.37	0.37
14	13.00	1.00	3846	8.48	0.00	0.37	0.12
15	14.00	1.00	3844	8.47	0.00	0.38	0.12
16	15.00	1.00	3838	8.46	0.01	0.39	0.37
17	16.00	1.00	3838	8.46	0.00	0.39	0.00
18	17.00	1.00	3836	8.46	0.00	0.40	0.12
19	18.00	1.00	3834	8.45	0.00	0.40	0.12
20	19.00	1.00	3834	8.45	0.00	0.40	0.00
21	20.00	1.00	3834	8.45	0.00	0.40	0.00
22	25.00	5.00	3824	8.43	0.02	0.42	0.12
23	30.00	5.00	3814	8.41	0.02	0.45	0.12
				Steady Flow Rate, Q (in^3/min):			0.12
				Steady Flow Rate, Q (in^3/hr):			7.33



Field-Saturated Hydraulic Conductivity:

Case 1: L/h > 3 K_{sat} = 0.0004 in/min 0.02 in/hr

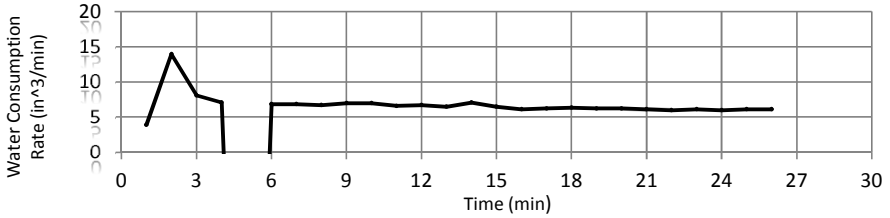
GEOCON

Aardvark Permeameter Data Analysis

Project Name:	PB Jefferson	Date:	5/13/2016
Project Number:	G1592-11-03	By:	LR
Borehole Location:	P7	Ref. EL:	28.00
		Bottom EL:	20.58

Borehole Diameter (2r):	8.00	in			
Borehole Depth (H):	7.42	ft	Wetted Area:	197.19	in^2
Distance Between Reservoir & Top of Borehole:	2.00	ft			
Depth to Water Table (s):	21.00	ft			
Height APM Raised from Bottom:	2.00	in			
Distance Between Resevoir and APM (D):	8.65	ft			
Head Height (h):	5.85	in			
Distance Between Constant Head and Water Table (L):	168.81	in			

Reading	Time (min)	Time Elapsed (min)	Reservoir Water Weight (g)	Resevoir Water Weight (lbs)	Interval Water Consumption (lbs)	Total Water Consumption (lbs)	*Water Consumption Rate (in^3/min)
1	0.00		4854	10.70			
2	1.00	1.00	4790	10.56	0.14	0.14	3.91
3	2.00	1.00	4562	10.06	0.50	0.64	13.93
4	3.00	1.00	4430	9.77	0.29	0.93	8.07
5	4.00	1.00	4314	9.51	0.26	1.19	7.09
6	5.00	1.00	5664	12.49	-2.98	-1.79	-82.50
7	6.00	1.00	5552	12.24	0.25	-1.54	6.84
8	7.00	1.00	5440	11.99	0.25	-1.29	6.84
9	8.00	1.00	5330	11.75	0.24	-1.05	6.72
10	9.00	1.00	5216	11.50	0.25	-0.80	6.97
11	10.00	1.00	5102	11.25	0.25	-0.55	6.97
12	11.00	1.00	4994	11.01	0.24	-0.31	6.60
13	12.00	1.00	4884	10.77	0.24	-0.07	6.72
14	13.00	1.00	4778	10.53	0.23	0.17	6.48
15	14.00	1.00	4662	10.28	0.26	0.42	7.09
16	15.00	1.00	4556	10.04	0.23	0.66	6.48
17	16.00	1.00	4456	9.82	0.22	0.88	6.11
18	17.00	1.00	4354	9.60	0.22	1.10	6.23
19	18.00	1.00	4250	9.37	0.23	1.33	6.36
20	19.00	1.00	4148	9.14	0.22	1.56	6.23
21	20.00	1.00	4046	8.92	0.22	1.78	6.23
22	21.00	1.00	3946	8.70	0.22	2.00	6.11
23	22.00	1.00	3848	8.48	0.22	2.22	5.99
24	23.00	1.00	3748	8.26	0.22	2.44	6.11
25	24.00	1.00	3650	8.05	0.22	2.65	5.99
26	25.00	1.00	3550	7.83	0.22	2.87	6.11
27	26.00	1.00	3450	7.61	0.22	3.10	6.11
						Steady Flow Rate, Q (in^3/min):	6.11
						Steady Flow Rate, Q (in^3/hr):	366.66



Field-Saturated Hydraulic Conductivity:

Case 1: L/h > 3 K_{sat} = 0.02 in/min 1.10 in/hr

GEOCON

Aardvark Permeameter Data Analysis

Project Name:	Guy Hill	Date:	7/1/2016
Project Number:	G1592-11-03	By:	JML
Borehole Location:	P-8	Ref. EL (feet, MSL):	25.0
		Bottom EL (feet, MSL):	19.5

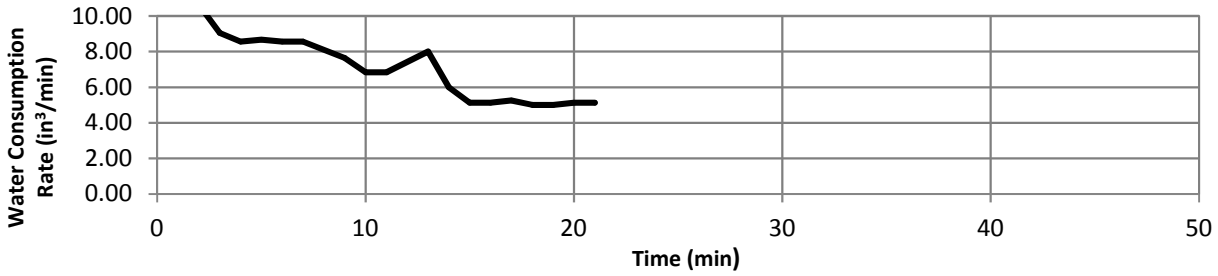
Borehole Diameter (inches):	4.00
Borehole Depth, **H** (feet):	5.50
Distance Between Reservoir & Top of Borehole (feet):	2.50
Depth to Water Table, **s** (feet):	10
Height APM Raised from Bottom (inches):	8.00

Wetted Area, **A** (in^2): 160.46

Distance Between Resevoir and APM, **D** (feet):	6.73
Head Height, **h** (inches):	11.77
Distance Between Constant Head and Water Table, **L** (inches):	66

Reading	Time (min)	Time Elapsed (min)	Reservoir Water Weight (g)	Resevoir Water Weight (lb)	Interval Water Consumption (lb)	Total Water Consumption (lb)	Water Consumption Rate (in^3/min)
1	0.00		9000	19.84			
2	1.00	1.00	8362	18.44	1.41	1.41	38.99
3	2.00	1.00	8188	18.05	0.38	1.79	10.63
4	3.00	1.00	8040	17.73	0.33	2.12	9.04
5	4.00	1.00	7900	17.42	0.31	2.43	8.56
6	5.00	1.00	7758	17.10	0.31	2.74	8.68
7	6.00	1.00	7618	16.79	0.31	3.05	8.56
8	7.00	1.00	7478	16.49	0.31	3.36	8.56
9	9.00	2.00	7228	15.94	0.55	3.91	7.64
10	10.00	1.00	7116	15.69	0.25	4.15	6.84
11	11.00	1.00	7004	15.44	0.25	4.40	6.84
12	13.00	2.00	6742	14.86	0.58	4.98	8.01
13	14.00	1.00	6644	14.65	0.22	5.19	5.99
14	15.00	1.00	6560	14.46	0.19	5.38	5.13
15	16.00	1.00	6476	14.28	0.19	5.56	5.13
16	17.00	1.00	6390	14.09	0.19	5.75	5.26
17	18.00	1.00	6308	13.91	0.18	5.93	5.01
18	19.00	1.00	6226	13.73	0.18	6.12	5.01
19	20.00	1.00	6142	13.54	0.19	6.30	5.13
20	21.00	1.00	6058	13.36	0.19	6.49	5.13
21							
22							
23							
24							
25							
26							
27							
28							

Steady Flow Rate, Q (in^3/min):	5.13
Steady Flow Rate, Q (in^3/hr):	307.99



Field-Saturated Hydraulic Conductivity

Case 1: L/h > 3 K_{sat} = 9.61E-03 in/min 0.58 in/hr

GEOCON

Aardvark Permeameter Data Analysis

Project Name:	Guy Hill	Date:	7/1/2016
Project Number:	G1592-11-03	By:	JML
Borehole Location:	P-9	Ref. EL (feet, MSL):	26.0
		Bottom EL (feet, MSL):	20.5

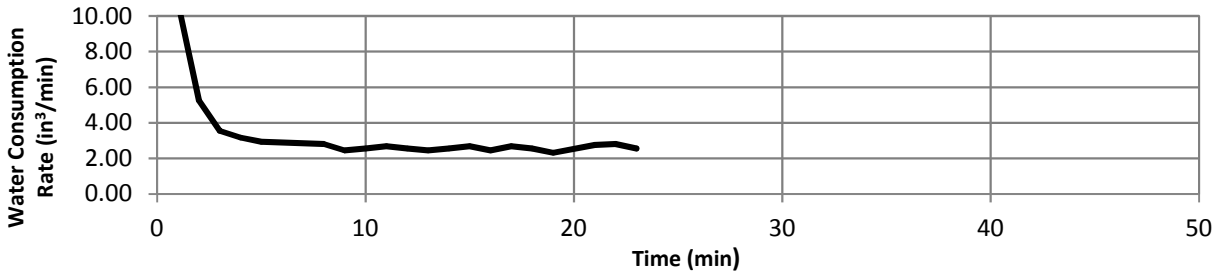
Borehole Diameter (inches):	4.00
Borehole Depth, **H** (feet):	5.50
Distance Between Reservoir & Top of Borehole (feet):	2.50
Depth to Water Table, **s** (feet):	10
Height APM Raised from Bottom (inches):	8.00

Wetted Area, **A** (in^2): 160.46

Distance Between Resevoir and APM, **D** (feet):	6.73
Head Height, **h** (inches):	11.77
Distance Between Constant Head and Water Table, **L** (inches):	66

Reading	Time (min)	Time Elapsed (min)	Reservoir Water Weight (g)	Resevoir Water Weight (lb)	Interval Water Consumption (lb)	Total Water Consumption (lb)	Water Consumption Rate (in^3/min)
1	0.00		9000	19.84			
2	1.00	1.00	8824	19.45	0.39	0.39	10.76
3	2.00	1.00	8738	19.26	0.19	0.58	5.26
4	3.00	1.00	8680	19.14	0.13	0.71	3.54
5	4.00	1.00	8628	19.02	0.11	0.82	3.18
6	5.00	1.00	8580	18.92	0.11	0.93	2.93
7	8.00	3.00	8442	18.61	0.30	1.23	2.81
8	9.00	1.00	8402	18.52	0.09	1.32	2.44
9	10.00	1.00	8360	18.43	0.09	1.41	2.57
10	11.00	1.00	8316	18.33	0.10	1.51	2.69
11	12.00	1.00	8274	18.24	0.09	1.60	2.57
12	13.00	1.00	8234	18.15	0.09	1.69	2.44
13	14.00	1.00	8192	18.06	0.09	1.78	2.57
14	15.00	1.00	8148	17.96	0.10	1.88	2.69
15	16.00	1.00	8108	17.88	0.09	1.97	2.44
16	17.00	1.00	8064	17.78	0.10	2.06	2.69
17	18.00	1.00	8022	17.69	0.09	2.16	2.57
18	19.00	1.00	7984	17.60	0.08	2.24	2.32
19	21.00	2.00	7894	17.40	0.20	2.44	2.75
20	22.00	1.00	7848	17.30	0.10	2.54	2.81
21	23.00	1.00	7806	17.21	0.09	2.63	2.57
22							
23							
24							
25							
26							
27							
28							

Steady Flow Rate, Q (in^3/min):	2.57
Steady Flow Rate, Q (in^3/hr):	154.0



Field-Saturated Hydraulic Conductivity

Case 1: L/h > 3 K_{sat} = 4.80E-03 in/min 0.29 in/hr

Categorization of Infiltration Feasibility Condition			Worksheet C.4-1
Part 1 - Full Infiltration Feasibility Screening Criteria **Would infiltration of the full design volume be feasible from a physical perspective without any undesirable consequences that cannot be reasonably mitigated?**			
Criteria	Screening Question	Yes	No
1	**Is the estimated reliable infiltration rate below proposed facility locations greater than 0.5 inches per hour?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.		X
Provide basis: The results of the infiltration tests (inches per hour after a factor of safety of 2 is applied) are as follows: P-1 – 0.24; P-2 – >0.01; P-4 – >0.01; P-5 – 0.18; P-6 – 0.02; P-7 – 0.55; P-8 – 0.29; P-9 – 0.15. P-7 through P-9 are in the same general vicinity of each other and possess an average of about 0.33 inches per hour (after applying the factor of safety of 2). Therefore, the property does not possess an area with an infiltration rate of 0.5 or greater (after applying the factor of safety of 2). Full infiltration should not be performed on the property but partial infiltration can be incorporated into the design and construction of the property. The infiltration rate is equal to the saturated hydraulic conductivity based on the discussion in the County of Riverside manual.			
2	**Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.		X
Provide basis: Based on the results of the infiltration testing, infiltration rates greater than 0.5 inches per hour should not be allowed on the property. The rates are highly variable and the existing materials are fine-grained that limit the infiltration rate. The site in underlain by previously placed fill, undocumented fill, alluvium and Old Paralic Deposits. Partial infiltration should be considered on the property and liners will be required on the sidewalls of the storm water devices. Setbacks within a minimum distance of 50 feet will be required adjacent to slopes. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			

Worksheet C.4-1 Page 2 of 4			
Criteria	Screening Question	**Yes**	**No**
3	**Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of groundwater contamination (shallow water table, storm water pollutants or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.		X
Provide basis: Based on the results of the infiltration testing, infiltration rates greater than 0.5 inches per hour should not be allowed on the property. The rates are highly variable and the existing materials are fine-grained that limit the infiltration rate. Infiltration should be limited to an elevation of 18 feet above MSL and within the Old Paralic Deposits. This elevation is 10 feet above the historic high groundwater elevation. The historic high groundwater elevation of 8 feet MSL should be used in our analyses based on the discussion in Section C.4.1. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
4	**Can infiltration greater than 0.5 inches per hour be allowed without causing potential water balance issues such as change of seasonality of ephemeral streams or increased discharge of contaminated groundwater to surface waters?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.		X
Provide basis: Based on the results of the infiltration testing, infiltration rates greater than 0.5 inches per hour should not be allowed on the property. The rates are highly variable and the existing materials are fine-grained that limit the infiltration rate. We do not expect infiltration will cause water balance issues such as seasonality of ephemeral streams or increased discharge of contaminated groundwater to surface waters. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
Part 1 Result*	If all answers to rows 1 - 4 are "**Yes**" a full infiltration design is potentially feasible. The feasibility screening category is **Full Infiltration** If any answer from row 1-4 is "**No**", infiltration may be possible to some extent but would not generally be feasible or desirable to achieve a "full infiltration" design. Proceed to Part 2		No

*To be completed using gathered site information and best professional judgment considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by the City to substantiate findings.

Worksheet C.4-1 Page 3 of 4

Part 2 – Partial Infiltration vs. No Infiltration Feasibility Screening Criteria

Would infiltration of water in any appreciable amount be physically feasible without any negative consequences that cannot be reasonably mitigated?

Criteria	Screening Question	Yes	No
5	**Do soil and geologic conditions allow for infiltration in any appreciable rate or volume?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.	X	

Provide basis:

The results of the infiltration tests (inches per hour after a factor of safety of 2 is applied) are as follows: P-1 – 0.24; P-2 – >0.01; P-4 – >0.01; P-5 – 0.18; P-6 – 0.02; P-7 – 0.55; P-8 – 0.29; P-9 – 0.15.

P-7 through P-9 are in the same general vicinity of each other and possess an average of about 0.67 inches per hour or 0.33 inches per hour after applying the factor of safety of 2. Partial infiltration can be incorporated into the design and construction of the property.

The infiltration rate is equal to the saturated hydraulic conductivity based on the discussion in the County of Riverside manual.

6	**Can Infiltration in any appreciable quantity be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level**? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.	X	

Provide basis:

Based on the comprehensive evaluation presented in the geotechnical documents dated September 11, 2015 and June 3, 2016, partial infiltration can be incorporated in to the design of the property. As discussed in the geotechnical documents, liners on the sidewalls and setback due to existing slopes and utilities will be required. Setbacks within a minimum distance of 50 feet will be required adjacent to slopes.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.

Worksheet C.4-1 Page 4 of 4			
Criteria	Screening Question	**Yes**	**No**
7	**Can Infiltration in any appreciable quantity be allowed without posing significant risk for groundwater related concerns (shallow water table, storm water pollutants or other factors)?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
Provide basis: Based on the comprehensive evaluation presented in the geotechnical documents dated September 11, 2015 and June 3, 2016, partial infiltration can be incorporated in to the design of the property. However, the bottom of the infiltration devices in some areas will be within a distance of 10 feet of the groundwater elevation. We understand storm water devices are typically designed at a depth of at least 10 feet above the groundwater table to prevent contamination migration. However, the groundwater in this area is likely considered non-beneficial use due to the proximity of the site to the San Diego Bay. Storm water infiltration should not occur within areas of known contamination as evaluated by SCS Engineers. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			
8	**Can infiltration be allowed without violating downstream water rights**? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
Provide basis: We did not provide a study regarding water rights due to the project elevation, proximity to Mission Bay, and lack of on-site streams (ephemeral or otherwise). However, these rights are not typical in the San Diego area. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			
Part 2 Result*	If all answers from row 1-4 are yes then partial infiltration design is potentially feasible. The feasibility screening category is **Partial Infiltration.** If any answer from row 5-8 is no, then infiltration of any volume is considered to be **infeasible** within the drainage area. The feasibility screening category is **No Infiltration.**		Partial Infiltration

*To be completed using gathered site information and best professional judgment considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by the City to substantiate findings.

ROCKWELL CONSULTING
4560 PANORAMA DRIVE
LA MESA, CA 91941
TROCKWELL@MAIL.SDSU.EDU

11 September, 2015

JPI Real Estate Acquisition, LLC.
San Diego, CA

Subject: Fault Investigation at the Guy Hill Property, San Diego

Dear Sirs:

This letter report summarizes my opinion on the assessment of possible faulting at the Guy Hill Property (4275 East Mission Bay Drive in San Diego) conducted by Geocon, Inc. I reviewed each of the trenches for the presence or absence of faulting during the current phase of study, assisted Geocon personnel with the identification of critical soil units that could be traced the length of the trenches, and reviewed Geocon's technical report dated September 9, 2015 as it relates to faulting issues. I did not critically review other aspects of Geocon's geotechnical report, nor do I express an opinion on those aspects of their report.

Fault Trenching

Geocon, Inc. excavated a total of seven trenches during three phases of geotechnical work at the project site (2004, 2014, 2015). I have reviewed only the five trenches excavated during the current phase of work (2015). The trenches are well-placed and sufficiently deep to expose any faults associated with the Rose Canyon fault zone that may project into or across the project site. The previously excavated trenches were of similar depth and are presumed to have been sufficient to expose any faults, if present.

All five of the 2015 trenches exposed essentially the same Pleistocene stratigraphic units across the project site, with a younger, presumably Holocene, unit in the southwestern portion of the site capping the Pleistocene alluvial sequence. A Pleistocene age is indicated by the strength and character of soil development; the soil profile contains a topsoil (A) horizon, albic (E) horizon, and moderately well-developed argillic (Bt) horizon. The depth and strength of soil development is consistent with formation under a wetter Pleistocene climate, as is the presence of the albic horizon, which typically forms under forest vegetation. The argillic horizon exhibited well-developed soil structure with moderately thick, and locally thick, clay films coating ped faces and pores. The thickness of the Bt horizon is greater than the modern (Holocene) depth of wetting, which also supports a Pleistocene age interpretation for this alluvial unit.

The soil and all underlying strata were found to be continuous and unbroken, indicating the absence of faulting since deposition of these strata. I agree with Geocon's conclusion that there are no active faults that cross the site or potentially impact site development.

Aerial Photograph Review

I reviewed aerial photography flown in 1928 and 1953 to assess the presence of active faulting near the project site that may have been evident prior to development of the area. By 1953, considerable development had already occurred, but the site and vicinity are relatively pristine in 1928 with the exception that the railroad and some roads were already established.

The main trace of the Rose Canyon fault is interpreted to lie about 300 feet northeast of the northeastern corner of the site beneath Morena Boulevard. This distance is closer than indicated in the Geocon report and is based on new data developed for the MidCoast Trolley Extension to La Jolla. Another strand of the fault may be present beneath the I-5 corridor, but is greater than 50 feet from the closest approach to the project site.

The site sits on an alluvial fan that crosses the Rose Canyon fault northeast of the site. Stream channels incised into the fan deposits are deflected by the fault by as much as 150 feet, which at the current slip rate assigned to the fault, suggests that the alluvial deposits are on the order of 30,000 to 50,000 years, consistent with the degree of soil development capping the alluvial fan, as exposed in Geocon's trenches. There are no lineaments that may be fault-related that cross the project site, or lie within 50 feet of the site, supporting the absence of active faulting through or immediately adjacent to the project site. This observation is consistent with the absence of faulting, as exposed in Geocon's trenches.

Summary of Observations

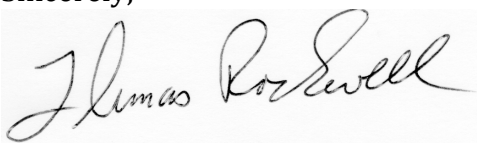
The Geocon trenches were well-located and sufficiently deep to expose any evidence of young faulting, had the alluvial deposits been displaced by a strand(s) of the Rose Canyon fault. The trenches were excavated into late Pleistocene alluvial deposits that are likely on the order of 30,000 to 50,000 years in age based on the degree of soil development and the amount of offset of the fan deposits by the main trace of the Rose Canyon fault. Together, these observations argue that no active or potentially active (late Pleistocene) faults cross the project site, in concurrence with the conclusions stated in Geocon's geotechnical report.

Analysis of early aerial photography indicates that the closest possible fault that was expressed in the landscape prior to local development is located more than 50 feet from the northeastern project site boundary. I concur with Geocon that a setback is not warranted. This is particularly important considering that the site abuts Caltrans property to the northeast (I-5 corridor) and fault studies within the corridor will be extremely difficult or impossible. Based on the analysis of the early aerial photography, it is highly unlikely that any active faults lie within 50 feet of the project site boundary.

In summary, Geocon's fault assessment of the Guy Hill Property was well-planned and well-executed, and I concur with Geocon's conclusions that no active faults impact potential development of the project site and that a setback is not warranted as no potentially active faults are identified with 50 feet of the project site.

If I can be of further service, please do not hesitate to call.

Sincerely,



Dr. Thomas Rockwell, PhD, PG

APPENDIX A

Air Quality – CalEEMod Output Files

Mission Bay Drive Mixed-Use Project

San Diego County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	8.00	1000sqft	0.18	8,000.00	0
Enclosed Parking with Elevator	144.05	1000sqft	3.31	144,049.00	0
Apartments Mid Rise	172.00	Dwelling Unit	4.53	200,000.00	492
Strip Mall	7.50	1000sqft	0.17	7,500.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	40
Climate Zone	13			**Operational Year**	2019
Utility Company	San Diego Gas & Electric				
CO2 Intensity (lb/MWhr)	509	**CH4 Intensity (lb/MWhr)**	0.02	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics - CO2 intensity factor per 36.4% RPS

Land Use - Land uses provided by applicant

Construction phases per applicant

Architectural Coating - per SDAPCD Rule 67.0.1

Vehicle Trips - Based on trip rates provided in the Urban Systems Associates, Inc. traffic study for the proposed project (2016).

Vechicle Emission Factors - CO2 factors per ACC program

Woodstoves - No wood stoves or fireplaces

Area Coating - per SDAPCD Rule 67.0.1

Energy Use - Default values

Water And Wastewater - 100 percent aerobic, standard plumbing

Mobile Land Use Mitigation - CAPCOA inputs per project design

Area Mitigation - No hearth

Energy Mitigation - Project will meet at least Title 24 2013 standards

Water Mitigation - 25% reduction in overall water use per B-29-15

Waste Mitigation - 75% diversion rate per AB 939

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	ConstArea_Nonresidential_Exterior	79,775.00	16,157.00
tblArchitecturalCoating	ConstArea_Nonresidential_Interior	239,324.00	23,250.00
tblArchitecturalCoating	EF_Nonresidential_Exterior	250.00	100.00
tblArchitecturalCoating	EF_Nonresidential_Interior	250.00	50.00
tblArchitecturalCoating	EF_Residential_Exterior	250.00	100.00
tblArchitecturalCoating	EF_Residential_Interior	250.00	50.00
tblAreaCoating	Area_EF_Nonresidential_Exterior	250	100
tblAreaCoating	Area_Nonresidential_Interior	239324	23250
tblAreaMitigation	UseLowVOCPaintNonresidentialInteriorValue	250	50
tblAreaMitigation	UseLowVOCPaintResidentialExteriorValue	250	100
tblAreaMitigation	UseLowVOCPaintResidentialInteriorValue	250	50
tblConstructionPhase	NumDays	20.00	43.00
tblConstructionPhase	NumDays	230.00	413.00
tblConstructionPhase	NumDays	20.00	23.00
tblConstructionPhase	NumDays	20.00	43.00
tblConstructionPhase	NumDays	20.00	21.00
tblConstructionPhase	PhaseEndDate	1/29/2019	12/31/2018
tblConstructionPhase	PhaseStartDate	1/1/2019	12/1/2018
tblFireplaces	FireplaceDayYear	82.00	0.00
tblFireplaces	FireplaceHourDay	3.00	0.00
tblFireplaces	FireplaceWoodMass	3,078.40	0.00
tblFireplaces	NumberGas	94.60	0.00

tblFireplaces	NumberNoFireplace	17.20	0.00
tblFireplaces	NumberWood	60.20	0.00
tblGrading	AcresOfGrading	21.50	2.94
tblGrading	MaterialExported	0.00	50,100.00
tblLandUse	LandUseSquareFeet	144,050.00	144,049.00
tblLandUse	LandUseSquareFeet	172,000.00	200,000.00
tblProjectCharacteristics	CH4IntensityFactor	0.029	0.02
tblProjectCharacteristics	CO2IntensityFactor	720.49	509
tblProjectCharacteristics	N2OIntensityFactor	0.006	0.004
tblProjectCharacteristics	OperationalYear	2014	2019
tblVehicleEF	LDA	255.43	236.93
tblVehicleEF	LDA	54.71	50.72
tblVehicleEF	LDT1	309.85	288.86
tblVehicleEF	LDT1	66.03	61.63
tblVehicleEF	LDT2	378.64	353.78
tblVehicleEF	LDT2	80.44	75.17
tblVehicleEF	MDV	507.05	474.87
tblVehicleEF	MDV	106.82	100.21
tblVehicleTrips	ST_TR	7.16	6.00
tblVehicleTrips	ST_TR	2.37	31.25
tblVehicleTrips	ST_TR	42.04	72.00
tblVehicleTrips	SU_TR	6.07	6.00
tblVehicleTrips	SU_TR	0.98	31.25
tblVehicleTrips	SU_TR	20.43	72.00
tblVehicleTrips	WD_TR	6.59	6.00
tblVehicleTrips	WD_TR	11.01	31.25
tblVehicleTrips	WD_TR	44.32	72.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AerobicPercent	87.46	100.00

tblWater	AerobicPercent	87.46	100.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWoodstoves	NumberCatalytic	8.60	0.00
tblWoodstoves	NumberNoncatalytic	8.60	0.00
tblWoodstoves	WoodstoveDayYear	82.00	0.00
tblWoodstoves	WoodstoveWoodMass	3,019.20	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2017	6.1772	72.4345	53.7751	0.1400	8.9196	2.5298	11.4494	4.0705	2.3274	6.3979	0.0000	13,959.3656	13,959.3656	1.1171	0.0000	13,982.8239
2018	5.2760	44.5625	43.9974	0.0810	1.9745	2.4969	4.4713	0.5297	2.3272	2.8569	0.0000	7,532.1344	7,532.1344	1.4218	0.0000	7,561.9916
2019	39.7427	1.9549	3.1286	6.9300e-003	0.3122	0.1310	0.4431	0.0828	0.1308	0.2136	0.0000	575.8160	575.8160	0.0372	0.0000	576.5963
Total	**51.1959**	**118.9518**	**100.9010**	**0.2280**	**11.2062**	**5.1576**	**16.3638**	**4.6830**	**4.7854**	**9.4684**	**0.0000**	**22,067.3160**	**22,067.3160**	**2.5760**	**0.0000**	**22,121.4117**

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					
2017	6.1772	72.4345	53.7751	0.1400	5.1020	2.5298	7.6318	2.0314	2.3274	4.3587	0.0000	13,959.3656	13,959.3656	1.1171	0.0000	13,982.8239
2018	5.2760	44.5625	43.9974	0.0810	1.9745	2.4969	4.4713	0.5297	2.3272	2.8569	0.0000	7,532.1344	7,532.1344	1.4218	0.0000	7,561.9916
2019	39.7427	1.9549	3.1286	6.9300e-003	0.3122	0.1310	0.4431	0.0828	0.1308	0.2136	0.0000	575.8160	575.8160	0.0372	0.0000	576.5963
Total	**51.1959**	**118.9518**	**100.9010**	**0.2280**	**7.3886**	**5.1576**	**12.5463**	**2.6439**	**4.7854**	**7.4292**	**0.0000**	**22,067.3160**	**22,067.3160**	**2.5760**	**0.0000**	**22,121.4117**

	ROG	**NOx**	**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**	**34.07**	**0.00**	**23.33**	**43.54**	**0.00**	**21.54**	**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	10.0219	0.1653	14.2770	7.5000e-004		0.0782	0.0782		0.0782	0.0782	0.0000	25.5859	25.5859	0.0252	0.0000	26.1146
Energy	0.0333	0.2879	0.1432	1.8200e-003		0.0230	0.0230		0.0230	0.0230		363.7066	363.7066	6.9700e-003	6.6700e-003	365.9201
Mobile	5.4157	10.9018	51.5022	0.1379	9.2584	0.1580	9.4164	2.4714	0.1457	2.6172		10,919.5000	10,919.5000	0.4155		10,928.2261
Total	**15.4709**	**11.3551**	**65.9223**	**0.1405**	**9.2584**	**0.2592**	**9.5177**	**2.4714**	**0.2470**	**2.7184**	**0.0000**	**11,308.7926**	**11,308.7926**	**0.4477**	**6.6700e-003**	**11,320.2608**

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	8.6771	0.1653	14.2770	7.5000e-004		0.0782	0.0782		0.0782	0.0782	0.0000	25.5859	25.5859	0.0252	0.0000	26.1146
Energy	0.0262	0.2265	0.1123	1.4300e-003		0.0181	0.0181		0.0181	0.0181		286.2761	286.2761	5.4900e-003	5.2500e-003	288.0183
Mobile	4.9608	8.4998	41.3039	0.1017	6.7429	0.1190	6.8619	1.7999	0.1098	1.9097		8,049.4792	8,049.4792	0.3156		8,056.1068
Total	**13.6641**	**8.8916**	**55.6931**	**0.1039**	**6.7429**	**0.2153**	**6.9582**	**1.7999**	**0.2061**	**2.0060**	**0.0000**	**8,361.3412**	**8,361.3412**	**0.3463**	**5.2500e-003**	**8,370.2397**

	ROG	**NOx**	**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	**11.68**	**21.69**	**15.52**	**26.07**	**27.17**	**16.94**	**26.89**	**27.17**	**16.55**	**26.21**	**0.00**	**26.06**	**26.06**	**22.65**	**21.29**	**26.06**

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	3/1/2017	3/31/2017	5	23	
2	Grading	Grading	4/1/2017	5/31/2017	5	43	
3	Building Construction	Building Construction	6/1/2017	12/31/2018	5	413	
4	Paving	Paving	12/1/2018	12/31/2018	5	21	
5	Architectural Coating	Architectural Coating	1/1/2019	2/28/2019	5	43	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 2.94

Acres of Paving: 0

Residential Indoor: 405,000; Residential Outdoor: 135,000; Non-Residential Indoor: 23,250; Non-Residential Outdoor: 16,157

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	162	0.38
Demolition	Rubber Tired Dozers	2	8.00	255	0.40
Grading	Excavators	1	8.00	162	0.38
Grading	Graders	1	8.00	174	0.41
Grading	Rubber Tired Dozers	1	8.00	255	0.40
Grading	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Building Construction	Cranes	1	7.00	226	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	125	0.42
Paving	Paving Equipment	2	8.00	130	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	166.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	6	15.00	0.00	6,263.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	189.00	45.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	38.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Demolition - 2017

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					1.5805	0.0000	1.5805	0.2394	0.0000	0.2394			0.0000			0.0000
Off-Road	4.0482	42.6971	33.8934	0.0399		2.1252	2.1252		1.9797	1.9797		4,036.4674	4,036.4674	1.1073		4,059.7211
Total	**4.0482**	**42.6971**	**33.8934**	**0.0399**	**1.5805**	**2.1252**	**3.7057**	**0.2394**	**1.9797**	**2.2191**		**4,036.4674**	**4,036.4674**	**1.1073**		**4,059.7211**

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	0.1325	1.8035	1.3769	5.3900e-003	0.1258	0.0243	0.1501	0.0344	0.0223	0.0568		534.6945	534.6945	3.7000e-003		534.7722
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	0.0477	0.0559	0.6070	1.5600e-003	0.1232	9.0000e-004	0.1241	0.0327	8.3000e-004	0.0335		125.2526	125.2526	6.0400e-003		125.3794
Total	**0.1802**	**1.8594**	**1.9839**	**6.9500e-003**	**0.2490**	**0.0252**	**0.2742**	**0.0671**	**0.0232**	**0.0903**		**659.9471**	**659.9471**	**9.7400e-003**		**660.1517**

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					0.6164	0.0000	0.6164	0.0934	0.0000	0.0934			0.0000			0.0000
Off-Road	4.0482	42.6971	33.8934	0.0399		2.1252	2.1252		1.9797	1.9797	0.0000	4,036.4674	4,036.4674	1.1073		4,059.7211
Total	**4.0482**	**42.6971**	**33.8934**	**0.0399**	**0.6164**	**2.1252**	**2.7416**	**0.0934**	**1.9797**	**2.0731**	**0.0000**	**4,036.4674**	**4,036.4674**	**1.1073**		**4,059.7211**

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	0.1325	1.8035	1.3769	5.3900e-003	0.1258	0.0243	0.1501	0.0344	0.0223	0.0568		534.6945	534.6945	3.7000e-003		534.7722
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	0.0477	0.0559	0.6070	1.5600e-003	0.1232	9.0000e-004	0.1241	0.0327	8.3000e-004	0.0335		125.2526	125.2526	6.0400e-003		125.3794
Total	**0.1802**	**1.8594**	**1.9839**	**6.9500e-003**	**0.2490**	**0.0252**	**0.2742**	**0.0671**	**0.0232**	**0.0903**		**659.9471**	**659.9471**	**9.7400e-003**		**660.1517**

3.3 Grading - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Fugitive Dust					6.2583	0.0000	6.2583	3.3429	0.0000	3.3429			0.0000			0.0000
Off-Road	3.4555	35.9825	25.3812	0.0297		2.0388	2.0388		1.8757	1.8757		3,043.6667	3,043.6667	0.9326		3,063.2507
Total	**3.4555**	**35.9825**	**25.3812**	**0.0297**	**6.2583**	**2.0388**	**8.2971**	**3.3429**	**1.8757**	**5.2186**		**3,043.6667**	**3,043.6667**	**0.9326**		**3,063.2507**

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	2.6740	36.3961	27.7869	0.1087	2.5380	0.4901	3.0281	0.6950	0.4508	1.1458		10,790.4464	10,790.4464	0.0747		10,792.0148
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	0.0477	0.0559	0.6070	1.5600e-003	0.1232	9.0000e-004	0.1241	0.0327	8.3000e-004	0.0335		125.2526	125.2526	6.0400e-003		125.3794
Total	**2.7216**	**36.4520**	**28.3939**	**0.1103**	**2.6613**	**0.4910**	**3.1523**	**0.7276**	**0.4517**	**1.1793**		**10,915.6990**	**10,915.6990**	**0.0807**		**10,917.3943**

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					2.4407	0.0000	2.4407	1.3037	0.0000	1.3037			0.0000			0.0000
Off-Road	3.4555	35.9825	25.3812	0.0297		2.0388	2.0388		1.8757	1.8757	0.0000	3,043.6667	3,043.6667	0.9326		3,063.2507
Total	**3.4555**	**35.9825**	**25.3812**	**0.0297**	**2.4407**	**2.0388**	**4.4796**	**1.3037**	**1.8757**	**3.1794**	**0.0000**	**3,043.6667**	**3,043.6667**	**0.9326**		**3,063.2507**

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	2.6740	36.3961	27.7869	0.1087	2.5380	0.4901	3.0281	0.6950	0.4508	1.1458		10,790.4464	10,790.4464	0.0747		10,792.0148
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	0.0477	0.0559	0.6070	1.5600e-003	0.1232	9.0000e-004	0.1241	0.0327	8.3000e-004	0.0335		125.2526	125.2526	6.0400e-003		125.3794
Total	**2.7216**	**36.4520**	**28.3939**	**0.1103**	**2.6613**	**0.4910**	**3.1523**	**0.7276**	**0.4517**	**1.1793**		**10,915.6990**	**10,915.6990**	**0.0807**		**10,917.3943**

3.4 Building Construction - 2017

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	3.1024	26.4057	18.1291	0.0268		1.7812	1.7812		1.6730	1.6730		2,639.8053	2,639.8053	0.6497		2,653.4490
Total	**3.1024**	**26.4057**	**18.1291**	**0.0268**		**1.7812**	**1.7812**		**1.6730**	**1.6730**		**2,639.8053**	**2,639.8053**	**0.6497**		**2,653.4490**

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	0.4303	3.8138	4.6986	0.0107	0.2987	0.0560	0.3547	0.0852	0.0515	0.1367		1,055.5105	1,055.5105	7.8400e-003		1,055.6752
Worker	0.6005	0.7046	7.6477	0.0197	1.5526	0.0113	1.5639	0.4118	0.0104	0.4222		1,578.1830	1,578.1830	0.0761		1,579.7810
Total	**1.0308**	**4.5184**	**12.3463**	**0.0304**	**1.8513**	**0.0673**	**1.9186**	**0.4970**	**0.0619**	**0.5589**		**2,633.6935**	**2,633.6935**	**0.0839**		**2,635.4561**

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	3.1024	26.4057	18.1291	0.0268		1.7812	1.7812		1.6730	1.6730	0.0000	2,639.8053	2,639.8053	0.6497		2,653.4490
Total	**3.1024**	**26.4057**	**18.1291**	**0.0268**		**1.7812**	**1.7812**		**1.6730**	**1.6730**	**0.0000**	**2,639.8053**	**2,639.8053**	**0.6497**		**2,653.4490**

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	0.4303	3.8138	4.6986	0.0107	0.2987	0.0560	0.3547	0.0852	0.0515	0.1367		1,055.5105	1,055.5105	7.8400e-003		1,055.6752
Worker	0.6005	0.7046	7.6477	0.0197	1.5526	0.0113	1.5639	0.4118	0.0104	0.4222		1,578.1830	1,578.1830	0.0761		1,579.7810

Total	**1.0308**	**4.5184**	**12.3463**	**0.0304**	**1.8513**	**0.0673**	**1.9186**	**0.4970**	**0.0619**	**0.5589**		**2,633.6935**	**2,633.6935**	**0.0839**		**2,635.4561**

3.4 Building Construction - 2018

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	2.6687	23.2608	17.5327	0.0268		1.4943	1.4943		1.4048	1.4048		2,609.9390	2,609.9390	0.6387		2,623.3517
Total	**2.6687**	**23.2608**	**17.5327**	**0.0268**		**1.4943**	**1.4943**		**1.4048**	**1.4048**		**2,609.9390**	**2,609.9390**	**0.6387**		**2,623.3517**

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	0.4050	3.4449	4.4773	0.0107	0.2987	0.0520	0.3507	0.0852	0.0478	0.1330		1,037.3856	1,037.3856	7.6900e-003		1,037.5470
Worker	0.5474	0.6430	6.9420	0.0197	1.5526	0.0111	1.5637	0.4118	0.0103	0.4221		1,518.9860	1,518.9860	0.0708		1,520.4724
Total	**0.9524**	**4.0879**	**11.4193**	**0.0303**	**1.8513**	**0.0631**	**1.9143**	**0.4970**	**0.0581**	**0.5551**		**2,556.3715**	**2,556.3715**	**0.0785**		**2,558.0194**

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	2.6687	23.2608	17.5327	0.0268		1.4943	1.4943		1.4048	1.4048	0.0000	2,609.9389	2,609.9389	0.6387		2,623.3517
Total	**2.6687**	**23.2608**	**17.5327**	**0.0268**		**1.4943**	**1.4943**		**1.4048**	**1.4048**	**0.0000**	**2,609.9389**	**2,609.9389**	**0.6387**		**2,623.3517**

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	0.4050	3.4449	4.4773	0.0107	0.2987	0.0520	0.3507	0.0852	0.0478	0.1330		1,037.3856	1,037.3856	7.6900e-003		1,037.5470
Worker	0.5474	0.6430	6.9420	0.0197	1.5526	0.0111	1.5637	0.4118	0.0103	0.4221		1,518.9860	1,518.9860	0.0708		1,520.4724
Total	**0.9524**	**4.0879**	**11.4193**	**0.0303**	**1.8513**	**0.0631**	**1.9143**	**0.4970**	**0.0581**	**0.5551**		**2,556.3715**	**2,556.3715**	**0.0785**		**2,558.0194**

3.5 Paving - 2018

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	1.6114	17.1628	14.4944	0.0223		0.9386	0.9386		0.8635	0.8635		2,245.2695	2,245.2695	0.6990		2,259.9481
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.6114**	**17.1628**	**14.4944**	**0.0223**		**0.9386**	**0.9386**		**0.8635**	**0.8635**		**2,245.2695**	**2,245.2695**	**0.6990**		**2,259.9481**

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	0.0435	0.0510	0.5510	1.5600e-003	0.1232	8.8000e-004	0.1241	0.0327	8.1000e-004	0.0335		120.5544	120.5544	5.6200e-003		120.6724
Total	**0.0435**	**0.0510**	**0.5510**	**1.5600e-003**	**0.1232**	**8.8000e-004**	**0.1241**	**0.0327**	**8.1000e-004**	**0.0335**		**120.5544**	**120.5544**	**5.6200e-003**		**120.6724**

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	1.6114	17.1628	14.4944	0.0223		0.9386	0.9386		0.8635	0.8635	0.0000	2,245.2695	2,245.2695	0.6990		2,259.9481
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.6114**	**17.1628**	**14.4944**	**0.0223**		**0.9386**	**0.9386**		**0.8635**	**0.8635**	**0.0000**	**2,245.2695**	**2,245.2695**	**0.6990**		**2,259.9481**

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	0.0435	0.0510	0.5510	1.5600e-003	0.1232	8.8000e-004	0.1241	0.0327	8.1000e-004	0.0335		120.5544	120.5544	5.6200e-003		120.6724
Total	**0.0435**	**0.0510**	**0.5510**	**1.5600e-003**	**0.1232**	**8.8000e-004**	**0.1241**	**0.0327**	**8.1000e-004**	**0.0335**		**120.5544**	**120.5544**	**5.6200e-003**		**120.6724**

3.6 Architectural Coating - 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					
Archit. Coating	39.3740					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2664	1.8354	1.8413	2.9700e-003		0.1288	0.1288		0.1288	0.1288		281.4481	281.4481	0.0238		281.9473
Total	**39.6404**	**1.8354**	**1.8413**	**2.9700e-003**		**0.1288**	**0.1288**		**0.1288**	**0.1288**		**281.4481**	**281.4481**	**0.0238**		**281.9473**

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	0.1023	0.1195	1.2872	3.9500e-003	0.3122	2.2100e-003	0.3144	0.0828	2.0500e-003	0.0849		294.3679	294.3679	0.0134		294.6490
Total	**0.1023**	**0.1195**	**1.2872**	**3.9500e-003**	**0.3122**	**2.2100e-003**	**0.3144**	**0.0828**	**2.0500e-003**	**0.0849**		**294.3679**	**294.3679**	**0.0134**		**294.6490**

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	39.3740					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2664	1.8354	1.8413	2.9700e-003		0.1288	0.1288		0.1288	0.1288	0.0000	281.4481	281.4481	0.0238		281.9473
Total	**39.6404**	**1.8354**	**1.8413**	**2.9700e-003**		**0.1288**	**0.1288**		**0.1288**	**0.1288**	**0.0000**	**281.4481**	**281.4481**	**0.0238**		**281.9473**

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	0.1023	0.1195	1.2872	3.9500e-003	0.3122	2.2100e-003	0.3144	0.0828	2.0500e-003	0.0849		294.3679	294.3679	0.0134		294.6490

Total	**0.1023**	**0.1195**	**1.2872**	**3.9500e-003**	**0.3122**	**2.2100e-003**	**0.3144**	**0.0828**	**2.0500e-003**	**0.0849**		**294.3679**	**294.3679**	**0.0134**		**294.6490**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Increase Density

Increase Diversity

Improve Destination Accessibility

Increase Transit Accessibility

Integrate Below Market Rate Housing

Improve Pedestrian Network

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	4.9608	8.4998	41.3039	0.1017	6.7429	0.1190	6.8619	1.7999	0.1098	1.9097		8,049.4792	8,049.4792	0.3156		8,056.1068
Unmitigated	5.4157	10.9018	51.5022	0.1379	9.2584	0.1580	9.4164	2.4714	0.1457	2.6172		10,919.5000	10,919.5000	0.4155		10,928.2261

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Mid Rise	1,032.00	1,032.00	1032.00	2,946,673	2,146,057
Enclosed Parking with Elevator	0.00	0.00	0.00		
General Office Building	250.00	250.00	250.00	597,438	435,113
Strip Mall	540.00	540.00	540.00	831,618	605,666
Total	1,822.00	1,822.00	1,822.00	4,375,729	3,186,836

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
Apartments Mid Rise	10.80	7.30	7.50	41.60	18.80	39.60	86	11	3
Enclosed Parking with Elevator	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
General Office Building	9.50	7.30	7.30	33.00	48.00	19.00	77	19	4
Strip Mall	9.50	7.30	7.30	16.60	64.40	19.00	45	40	15

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.512639	0.073513	0.191470	0.131122	0.036200	0.005158	0.012615	0.022741	0.001866	0.002067	0.006563	0.000594	0.003452

5.0 Energy Detail

4.4 Fleet Mix

Historical Energy Use: N

5.1 Mitigation Measures Energy

Exceed Title 24

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0262	0.2265	0.1123	1.4300e-003		0.0181	0.0181		0.0181	0.0181		286.2761	286.2761	5.4900e-003	5.2500e-003	288.0183
NaturalGas Unmitigated	0.0333	0.2879	0.1432	1.8200e-003		0.0230	0.0230		0.0230	0.0230		363.7066	363.7066	6.9700e-003	6.6700e-003	365.9201

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
General Office Building	460.932	4.9700e-003	0.0452	0.0380	2.7000e-004		3.4300e-003	3.4300e-003		3.4300e-003	3.4300e-003		54.2272	54.2272	1.0400e-003	9.9000e-004	54.5573
Strip Mall	47.0548	5.1000e-004	4.6100e-003	3.8800e-003	3.0000e-005		3.5000e-004	3.5000e-004		3.5000e-004	3.5000e-004		5.5359	5.5359	1.1000e-004	1.0000e-004	5.5696
Apartments Mid Rise	2583.52	0.0279	0.2381	0.1013	1.5200e-003		0.0193	0.0193		0.0193	0.0193		303.9435	303.9435	5.8300e-003	5.5700e-003	305.7933
Total		**0.0333**	**0.2879**	**0.1432**	**1.8200e-003**		**0.0230**	**0.0230**		**0.0230**	**0.0230**		**363.7066**	**363.7066**	**6.9800e-003**	**6.6600e-003**	**365.9201**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
General Office Building	0.350268	3.7800e-003	0.0343	0.0289	2.1000e-004		2.6100e-003	2.6100e-003		2.6100e-003	2.6100e-003		41.2081	41.2081	7.9000e-004	7.6000e-004	41.4588
Strip Mall	0.0396575	4.3000e-004	3.8900e-003	3.2700e-003	2.0000e-005		3.0000e-004	3.0000e-004		3.0000e-004	3.0000e-004		4.6656	4.6656	9.0000e-005	9.0000e-005	4.6940
Apartments Mid Rise	2.04342	0.0220	0.1883	0.0801	1.2000e-003		0.0152	0.0152		0.0152	0.0152		240.4025	240.4025	4.6100e-003	4.4100e-003	241.8655
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0263**	**0.2266**	**0.1123**	**1.4300e-003**		**0.0181**	**0.0181**		**0.0181**	**0.0181**		**286.2761**	**286.2761**	**5.4900e-003**	**5.2600e-003**	**288.0183**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Low VOC Paint - Residential Interior

Use Low VOC Paint - Residential Exterior

Use Low VOC Paint - Non-Residential Interior

Use Low VOC Paint - Non-Residential Exterior

No Hearths Installed

	ROG	NOx	CO	SO2	Fugitive 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	8.6771	0.1653	14.2770	7.5000e-004		0.0782	0.0782		0.0782	0.0782	0.0000	25.5859	25.5859	0.0252	0.0000	26.1146
Unmitigated	10.0219	0.1653	14.2770	7.5000e-004		0.0782	0.0782		0.0782	0.0782	0.0000	25.5859	25.5859	0.0252	0.0000	26.1146

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	1.8894					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	7.6944					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.4381	0.1653	14.2770	7.5000e-004		0.0782	0.0782		0.0782	0.0782		25.5859	25.5859	0.0252		26.1146
Total	**10.0219**	**0.1653**	**14.2770**	**7.5000e-004**		**0.0782**	**0.0782**		**0.0782**	**0.0782**	**0.0000**	**25.5859**	**25.5859**	**0.0252**	**0.0000**	**26.1146**

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	0.5446					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	7.6944					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.4381	0.1653	14.2770	7.5000e-004		0.0782	0.0782		0.0782	0.0782		25.5859	25.5859	0.0252		26.1146
Total	**8.6771**	**0.1653**	**14.2770**	**7.5000e-004**		**0.0782**	**0.0782**		**0.0782**	**0.0782**	**0.0000**	**25.5859**	**25.5859**	**0.0252**	**0.0000**	**26.1146**

7.0 Water Detail

7.1 Mitigation Measures Water

Apply Water Conservation Strategy

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

9.0 Operational Offroad

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

10.0 Vegetation

Mission Bay Drive Mixed-Use Project

San Diego County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	8.00	1000sqft	0.18	8,000.00	0
Enclosed Parking with Elevator	144.05	1000sqft	3.31	144,049.00	0
Apartments Mid Rise	172.00	Dwelling Unit	4.53	200,000.00	492
Strip Mall	7.50	1000sqft	0.17	7,500.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	40
Climate Zone	13			**Operational Year**	2019
Utility Company	San Diego Gas & Electric				
CO2 Intensity (lb/MWhr)	509	**CH4 Intensity (lb/MWhr)**	0.02	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics - CO2 intensity factor per 36.4% RPS

Land Use - Land uses provided by applicant

Construction phases per applicant

Architectural Coating - per SDAPCD Rule 67.0.1

Vehicle Trips - Based on trip rates provided in the Urban Systems Associates, Inc. traffic study for the proposed project (2016).

Vechicle Emission Factors - CO2 factors per ACC program

Woodstoves - No wood stoves or fireplaces

Area Coating - per SDAPCD Rule 67.0.1

Energy Use - Default values

Water And Wastewater - 100 percent aerobic, standard plumbing

Mobile Land Use Mitigation - CAPCOA inputs per project design

Area Mitigation - No hearth

Energy Mitigation - Project will meet at least Title 24 2013 standards

Water Mitigation - 25% reduction in overall water use per B-29-15

Waste Mitigation - 75% diversion rate per AB 939

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	ConstArea_Nonresidential_Exterior	79,775.00	16,157.00
tblArchitecturalCoating	ConstArea_Nonresidential_Interior	239,324.00	23,250.00
tblArchitecturalCoating	EF_Nonresidential_Exterior	250.00	100.00
tblArchitecturalCoating	EF_Nonresidential_Interior	250.00	50.00
tblArchitecturalCoating	EF_Residential_Exterior	250.00	100.00
tblArchitecturalCoating	EF_Residential_Interior	250.00	50.00
tblAreaCoating	Area_EF_Nonresidential_Exterior	250	100
tblAreaCoating	Area_Nonresidential_Interior	239324	23250
tblAreaMitigation	UseLowVOCPaintNonresidentialInteriorValue	250	50
tblAreaMitigation	UseLowVOCPaintResidentialExteriorValue	250	100
tblAreaMitigation	UseLowVOCPaintResidentialInteriorValue	250	50
tblConstructionPhase	NumDays	20.00	43.00
tblConstructionPhase	NumDays	230.00	413.00
tblConstructionPhase	NumDays	20.00	23.00
tblConstructionPhase	NumDays	20.00	43.00
tblConstructionPhase	NumDays	20.00	21.00
tblConstructionPhase	PhaseEndDate	1/29/2019	12/31/2018
tblConstructionPhase	PhaseStartDate	1/1/2019	12/1/2018
tblFireplaces	FireplaceDayYear	82.00	0.00
tblFireplaces	FireplaceHourDay	3.00	0.00
tblFireplaces	FireplaceWoodMass	3,078.40	0.00

tblFireplaces	NumberGas	94.60	0.00
tblFireplaces	NumberNoFireplace	17.20	0.00
tblFireplaces	NumberWood	60.20	0.00
tblGrading	AcresOfGrading	21.50	2.94
tblGrading	MaterialExported	0.00	50,100.00
tblLandUse	LandUseSquareFeet	144,050.00	144,049.00
tblLandUse	LandUseSquareFeet	172,000.00	200,000.00
tblProjectCharacteristics	CH4IntensityFactor	0.029	0.02
tblProjectCharacteristics	CO2IntensityFactor	720.49	509
tblProjectCharacteristics	N2OIntensityFactor	0.006	0.004
tblProjectCharacteristics	OperationalYear	2014	2019
tblVehicleEF	LDA	255.43	236.93
tblVehicleEF	LDA	54.71	50.72
tblVehicleEF	LDT1	309.85	288.86
tblVehicleEF	LDT1	66.03	61.63
tblVehicleEF	LDT2	378.64	353.78
tblVehicleEF	LDT2	80.44	75.17
tblVehicleEF	MDV	507.05	474.87
tblVehicleEF	MDV	106.82	100.21
tblVehicleTrips	ST_TR	7.16	6.00
tblVehicleTrips	ST_TR	2.37	31.25
tblVehicleTrips	ST_TR	42.04	72.00
tblVehicleTrips	SU_TR	6.07	6.00
tblVehicleTrips	SU_TR	0.98	31.25
tblVehicleTrips	SU_TR	20.43	72.00
tblVehicleTrips	WD_TR	6.59	6.00
tblVehicleTrips	WD_TR	11.01	31.25
tblVehicleTrips	WD_TR	44.32	72.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AerobicPercent	87.46	100.00

tblWater	AerobicPercent	87.46	100.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWoodstoves	NumberCatalytic	8.60	0.00
tblWoodstoves	NumberNoncatalytic	8.60	0.00
tblWoodstoves	WoodstoveDayYear	82.00	0.00
tblWoodstoves	WoodstoveWoodMass	3,019.20	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2017	6.4724	73.6134	62.0840	0.1398	8.9196	2.5311	11.4507	4.0705	2.3286	6.3991	0.0000	13,926.3912	13,926.3912	1.1171	0.0000	13,949.8505
2018	5.3677	44.7271	45.3431	0.0797	1.9745	2.4974	4.4718	0.5297	2.3277	2.8574	0.0000	7,424.1757	7,424.1757	1.4220	0.0000	7,454.0375
2019	39.7480	1.9694	3.0747	6.6800e-003	0.3122	0.1310	0.4431	0.0828	0.1308	0.2136	0.0000	557.8555	557.8555	0.0372	0.0000	558.6358
Total	**51.5882**	**120.3100**	**110.5019**	**0.2262**	**11.2062**	**5.1595**	**16.3657**	**4.6830**	**4.7871**	**9.4701**	**0.0000**	**21,908.4224**	**21,908.4224**	**2.5763**	**0.0000**	**21,962.5238**

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					
2017	6.4724	73.6134	62.0840	0.1398	5.1020	2.5311	7.6331	2.0314	2.3286	4.3599	0.0000	13,926.3912	13,926.3912	1.1171	0.0000	13,949.8505
2018	5.3677	44.7271	45.3431	0.0797	1.9745	2.4974	4.4718	0.5297	2.3277	2.8574	0.0000	7,424.1757	7,424.1757	1.4220	0.0000	7,454.0374
2019	39.7480	1.9694	3.0747	6.6800e-003	0.3122	0.1310	0.4431	0.0828	0.1308	0.2136	0.0000	557.8555	557.8555	0.0372	0.0000	558.6358
Total	**51.5882**	**120.3100**	**110.5019**	**0.2262**	**7.3886**	**5.1595**	**12.5481**	**2.6439**	**4.7871**	**7.4309**	**0.0000**	**21,908.4224**	**21,908.4224**	**2.5763**	**0.0000**	**21,962.5238**

	ROG	**NOx**	**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**	**34.07**	**0.00**	**23.33**	**43.54**	**0.00**	**21.53**	**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	10.0219	0.1653	14.2770	7.5000e-004		0.0782	0.0782		0.0782	0.0782	0.0000	25.5859	25.5859	0.0252	0.0000	26.1146
Energy	0.0333	0.2879	0.1432	1.8200e-003		0.0230	0.0230		0.0230	0.0230		363.7066	363.7066	6.9700e-003	6.6700e-003	365.9201
Mobile	5.7666	11.5722	54.8452	0.1311	9.2584	0.1587	9.4171	2.4714	0.1464	2.6178		10,397.3872	10,397.3872	0.4159		10,406.1215
Total	**15.8218**	**12.0254**	**69.2653**	**0.1337**	**9.2584**	**0.2599**	**9.5183**	**2.4714**	**0.2476**	**2.7190**	**0.0000**	**10,786.6797**	**10,786.6797**	**0.4481**	**6.6700e-003**	**10,798.1561**

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	8.6771	0.1653	14.2770	7.5000e-004		0.0782	0.0782		0.0782	0.0782	0.0000	25.5859	25.5859	0.0252	0.0000	26.1146
Energy	0.0262	0.2265	0.1123	1.4300e-003		0.0181	0.0181		0.0181	0.0181		286.2761	286.2761	5.4900e-003	5.2500e-003	288.0183
Mobile	5.3225	9.0090	45.4720	0.0967	6.7429	0.1197	6.8626	1.7999	0.1104	1.9103		7,665.9864	7,665.9864	0.3160		7,672.6222
Total	**14.0258**	**9.4009**	**59.8612**	**0.0989**	**6.7429**	**0.2160**	**6.9589**	**1.7999**	**0.2067**	**2.0067**	**0.0000**	**7,977.8484**	**7,977.8484**	**0.3467**	**5.2500e-003**	**7,986.7551**

	ROG	**NOx**	**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	**11.35**	**21.82**	**13.58**	**26.02**	**27.17**	**16.90**	**26.89**	**27.17**	**16.51**	**26.20**	**0.00**	**26.04**	**26.04**	**22.63**	**21.29**	**26.04**

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	3/1/2017	3/31/2017	5	23	
2	Grading	Grading	4/1/2017	5/31/2017	5	43	
3	Building Construction	Building Construction	6/1/2017	12/31/2018	5	413	
4	Paving	Paving	12/1/2018	12/31/2018	5	21	
5	Architectural Coating	Architectural Coating	1/1/2019	2/28/2019	5	43	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 2.94

Acres of Paving: 0

Residential Indoor: 405,000; Residential Outdoor: 135,000; Non-Residential Indoor: 23,250; Non-Residential Outdoor: 16,157

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	162	0.38
Demolition	Rubber Tired Dozers	2	8.00	255	0.40
Grading	Excavators	1	8.00	162	0.38
Grading	Graders	1	8.00	174	0.41
Grading	Rubber Tired Dozers	1	8.00	255	0.40
Grading	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Building Construction	Cranes	1	7.00	226	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	125	0.42
Paving	Paving Equipment	2	8.00	130	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	166.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	6	15.00	0.00	6,263.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	189.00	45.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	38.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Demolition - 2017

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					1.5805	0.0000	1.5805	0.2394	0.0000	0.2394			0.0000			0.0000
Off-Road	4.0482	42.6971	33.8934	0.0399		2.1252	2.1252		1.9797	1.9797		4,036.4674	4,036.4674	1.1073		4,059.7211
Total	**4.0482**	**42.6971**	**33.8934**	**0.0399**	**1.5805**	**2.1252**	**3.7057**	**0.2394**	**1.9797**	**2.2191**		**4,036.4674**	**4,036.4674**	**1.1073**		**4,059.7211**

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	0.1470	1.8616	1.7896	5.3800e-003	0.1258	0.0244	0.1501	0.0344	0.0224	0.0568		533.4386	533.4386	3.7500e-003		533.5174
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	0.0504	0.0628	0.5868	1.4700e-003	0.1232	9.0000e-004	0.1241	0.0327	8.3000e-004	0.0335		117.6222	117.6222	6.0400e-003		117.7491
Total	**0.1974**	**1.9244**	**2.3764**	**6.8500e-003**	**0.2490**	**0.0253**	**0.2742**	**0.0671**	**0.0232**	**0.0904**		**651.0608**	**651.0608**	**9.7900e-003**		**651.2665**

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					0.6164	0.0000	0.6164	0.0934	0.0000	0.0934			0.0000			0.0000
Off-Road	4.0482	42.6971	33.8934	0.0399		2.1252	2.1252		1.9797	1.9797	0.0000	4,036.4674	4,036.4674	1.1073		4,059.7211
Total	**4.0482**	**42.6971**	**33.8934**	**0.0399**	**0.6164**	**2.1252**	**2.7416**	**0.0934**	**1.9797**	**2.0731**	**0.0000**	**4,036.4674**	**4,036.4674**	**1.1073**		**4,059.7211**

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	0.1470	1.8616	1.7896	5.3800e-003	0.1258	0.0244	0.1501	0.0344	0.0224	0.0568		533.4386	533.4386	3.7500e-003		533.5174
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	0.0504	0.0628	0.5868	1.4700e-003	0.1232	9.0000e-004	0.1241	0.0327	8.3000e-004	0.0335		117.6222	117.6222	6.0400e-003		117.7491
Total	**0.1974**	**1.9244**	**2.3764**	**6.8500e-003**	**0.2490**	**0.0253**	**0.2742**	**0.0671**	**0.0232**	**0.0904**		**651.0608**	**651.0608**	**9.7900e-003**		**651.2665**

3.3 Grading - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Fugitive Dust					6.2583	0.0000	6.2583	3.3429	0.0000	3.3429			0.0000			0.0000
Off-Road	3.4555	35.9825	25.3812	0.0297		2.0388	2.0388		1.8757	1.8757		3,043.6667	3,043.6667	0.9326		3,063.2507
Total	**3.4555**	**35.9825**	**25.3812**	**0.0297**	**6.2583**	**2.0388**	**8.2971**	**3.3429**	**1.8757**	**5.2186**		**3,043.6667**	**3,043.6667**	**0.9326**		**3,063.2507**

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	2.9666	37.5683	36.1160	0.1086	2.5380	0.4914	3.0294	0.6950	0.4520	1.1470		10,765.1023	10,765.1023	0.0757		10,766.6927
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	0.0504	0.0628	0.5868	1.4700e-003	0.1232	9.0000e-004	0.1241	0.0327	8.3000e-004	0.0335		117.6222	117.6222	6.0400e-003		117.7491
Total	**3.0169**	**37.6310**	**36.7028**	**0.1101**	**2.6613**	**0.4923**	**3.1536**	**0.7276**	**0.4529**	**1.1805**		**10,882.7245**	**10,882.7245**	**0.0818**		**10,884.4418**

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					2.4407	0.0000	2.4407	1.3037	0.0000	1.3037			0.0000			0.0000
Off-Road	3.4555	35.9825	25.3812	0.0297		2.0388	2.0388		1.8757	1.8757	0.0000	3,043.6667	3,043.6667	0.9326		3,063.2507
Total	**3.4555**	**35.9825**	**25.3812**	**0.0297**	**2.4407**	**2.0388**	**4.4796**	**1.3037**	**1.8757**	**3.1794**	**0.0000**	**3,043.6667**	**3,043.6667**	**0.9326**		**3,063.2507**

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	2.9666	37.5683	36.1160	0.1086	2.5380	0.4914	3.0294	0.6950	0.4520	1.1470		10,765.1023	10,765.1023	0.0757		10,766.6927
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	0.0504	0.0628	0.5868	1.4700e-003	0.1232	9.0000e-004	0.1241	0.0327	8.3000e-004	0.0335		117.6222	117.6222	6.0400e-003		117.7491
Total	**3.0169**	**37.6310**	**36.7028**	**0.1101**	**2.6613**	**0.4923**	**3.1536**	**0.7276**	**0.4529**	**1.1805**		**10,882.7245**	**10,882.7245**	**0.0818**		**10,884.4418**

3.4 Building Construction - 2017

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	3.1024	26.4057	18.1291	0.0268		1.7812	1.7812		1.6730	1.6730		2,639.8053	2,639.8053	0.6497		2,653.4490
Total	**3.1024**	**26.4057**	**18.1291**	**0.0268**		**1.7812**	**1.7812**		**1.6730**	**1.6730**		**2,639.8053**	**2,639.8053**	**0.6497**		**2,653.4490**

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	0.4962	3.9041	6.3810	0.0106	0.2987	0.0566	0.3553	0.0852	0.0520	0.1372		1,047.3924	1,047.3924	8.0500e-003		1,047.5615
Worker	0.6345	0.7906	7.3931	0.0185	1.5526	0.0113	1.5639	0.4118	0.0104	0.4222		1,482.0400	1,482.0400	0.0761		1,483.6380
Total	**1.1307**	**4.6947**	**13.7742**	**0.0291**	**1.8513**	**0.0678**	**1.9191**	**0.4970**	**0.0624**	**0.5595**		**2,529.4324**	**2,529.4324**	**0.0842**		**2,531.1995**

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	3.1024	26.4057	18.1291	0.0268		1.7812	1.7812		1.6730	1.6730	0.0000	2,639.8053	2,639.8053	0.6497		2,653.4490
Total	**3.1024**	**26.4057**	**18.1291**	**0.0268**		**1.7812**	**1.7812**		**1.6730**	**1.6730**	**0.0000**	**2,639.8053**	**2,639.8053**	**0.6497**		**2,653.4490**

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	0.4962	3.9041	6.3810	0.0106	0.2987	0.0566	0.3553	0.0852	0.0520	0.1372		1,047.3924	1,047.3924	8.0500e-003		1,047.5615
Worker	0.6345	0.7906	7.3931	0.0185	1.5526	0.0113	1.5639	0.4118	0.0104	0.4222		1,482.0400	1,482.0400	0.0761		1,483.6380

Total	**1.1307**	**4.6947**	**13.7742**	**0.0291**	**1.8513**	**0.0678**	**1.9191**	**0.4970**	**0.0624**	**0.5595**		**2,529.4324**	**2,529.4324**	**0.0842**		**2,531.1995**

3.4 Building Construction - 2018

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	2.6687	23.2608	17.5327	0.0268		1.4943	1.4943		1.4048	1.4048		2,609.9390	2,609.9390	0.6387		2,623.3517
Total	**2.6687**	**23.2608**	**17.5327**	**0.0268**		**1.4943**	**1.4943**		**1.4048**	**1.4048**		**2,609.9390**	**2,609.9390**	**0.6387**		**2,623.3517**

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	0.4652	3.5248	6.1093	0.0106	0.2987	0.0525	0.3512	0.0852	0.0483	0.1335		1,029.3877	1,029.3877	7.9000e-003		1,029.5537
Worker	0.5766	0.7215	6.6768	0.0185	1.5526	0.0111	1.5637	0.4118	0.0103	0.4221		1,426.3752	1,426.3752	0.0708		1,427.8616
Total	**1.0418**	**4.2462**	**12.7861**	**0.0291**	**1.8513**	**0.0636**	**1.9148**	**0.4970**	**0.0585**	**0.5556**		**2,455.7629**	**2,455.7629**	**0.0787**		**2,457.4153**

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	2.6687	23.2608	17.5327	0.0268		1.4943	1.4943		1.4048	1.4048	0.0000	2,609.9389	2,609.9389	0.6387		2,623.3517
Total	**2.6687**	**23.2608**	**17.5327**	**0.0268**		**1.4943**	**1.4943**		**1.4048**	**1.4048**	**0.0000**	**2,609.9389**	**2,609.9389**	**0.6387**		**2,623.3517**

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	0.4652	3.5248	6.1093	0.0106	0.2987	0.0525	0.3512	0.0852	0.0483	0.1335		1,029.3877	1,029.3877	7.9000e-003		1,029.5537
Worker	0.5766	0.7215	6.6768	0.0185	1.5526	0.0111	1.5637	0.4118	0.0103	0.4221		1,426.3752	1,426.3752	0.0708		1,427.8616
Total	**1.0418**	**4.2462**	**12.7861**	**0.0291**	**1.8513**	**0.0636**	**1.9148**	**0.4970**	**0.0585**	**0.5556**		**2,455.7629**	**2,455.7629**	**0.0787**		**2,457.4153**

3.5 Paving - 2018

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	1.6114	17.1628	14.4944	0.0223		0.9386	0.9386		0.8635	0.8635		2,245.2695	2,245.2695	0.6990		2,259.9481
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.6114**	**17.1628**	**14.4944**	**0.0223**		**0.9386**	**0.9386**		**0.8635**	**0.8635**		**2,245.2695**	**2,245.2695**	**0.6990**		**2,259.9481**

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	0.0458	0.0573	0.5299	1.4600e-003	0.1232	8.8000e-004	0.1241	0.0327	8.1000e-004	0.0335		113.2044	113.2044	5.6200e-003		113.3224
Total	**0.0458**	**0.0573**	**0.5299**	**1.4600e-003**	**0.1232**	**8.8000e-004**	**0.1241**	**0.0327**	**8.1000e-004**	**0.0335**		**113.2044**	**113.2044**	**5.6200e-003**		**113.3224**

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	1.6114	17.1628	14.4944	0.0223		0.9386	0.9386		0.8635	0.8635	0.0000	2,245.2695	2,245.2695	0.6990		2,259.9481
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.6114**	**17.1628**	**14.4944**	**0.0223**		**0.9386**	**0.9386**		**0.8635**	**0.8635**	**0.0000**	**2,245.2695**	**2,245.2695**	**0.6990**		**2,259.9481**

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	0.0458	0.0573	0.5299	1.4600e-003	0.1232	8.8000e-004	0.1241	0.0327	8.1000e-004	0.0335		113.2044	113.2044	5.6200e-003		113.3224
Total	**0.0458**	**0.0573**	**0.5299**	**1.4600e-003**	**0.1232**	**8.8000e-004**	**0.1241**	**0.0327**	**8.1000e-004**	**0.0335**		**113.2044**	**113.2044**	**5.6200e-003**		**113.3224**

3.6 Architectural Coating - 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					
Archit. Coating	39.3740					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2664	1.8354	1.8413	2.9700e-003		0.1288	0.1288		0.1288	0.1288		281.4481	281.4481	0.0238		281.9473
Total	**39.6404**	**1.8354**	**1.8413**	**2.9700e-003**		**0.1288**	**0.1288**		**0.1288**	**0.1288**		**281.4481**	**281.4481**	**0.0238**		**281.9473**

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	0.1076	0.1340	1.2334	3.7100e-003	0.3122	2.2100e-003	0.3144	0.0828	2.0500e-003	0.0849		276.4075	276.4075	0.0134		276.6886
Total	**0.1076**	**0.1340**	**1.2334**	**3.7100e-003**	**0.3122**	**2.2100e-003**	**0.3144**	**0.0828**	**2.0500e-003**	**0.0849**		**276.4075**	**276.4075**	**0.0134**		**276.6886**

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	39.3740					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2664	1.8354	1.8413	2.9700e-003		0.1288	0.1288		0.1288	0.1288	0.0000	281.4481	281.4481	0.0238		281.9473
Total	**39.6404**	**1.8354**	**1.8413**	**2.9700e-003**		**0.1288**	**0.1288**		**0.1288**	**0.1288**	**0.0000**	**281.4481**	**281.4481**	**0.0238**		**281.9473**

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	0.1076	0.1340	1.2334	3.7100e-003	0.3122	2.2100e-003	0.3144	0.0828	2.0500e-003	0.0849		276.4075	276.4075	0.0134		276.6886

Total	**0.1076**	**0.1340**	**1.2334**	**3.7100e-003**	**0.3122**	**2.2100e-003**	**0.3144**	**0.0828**	**2.0500e-003**	**0.0849**		**276.4075**	**276.4075**	**0.0134**		**276.6886**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Increase Density

Increase Diversity

Improve Destination Accessibility

Increase Transit Accessibility

Integrate Below Market Rate Housing

Improve Pedestrian Network

	ROG	NOx	CO	SO2	Fugitive 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	5.3225	9.0090	45.4720	0.0967	6.7429	0.1197	6.8626	1.7999	0.1104	1.9103		7,665.9864	7,665.9864	0.3160		7,672.6222
Unmitigated	5.7666	11.5722	54.8452	0.1311	9.2584	0.1587	9.4171	2.4714	0.1464	2.6178		10,397.3872	10,397.3872	0.4159		10,406.1215

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Mid Rise	1,032.00	1,032.00	1032.00	2,946,673	2,146,057
Enclosed Parking with Elevator	0.00	0.00	0.00		
General Office Building	250.00	250.00	250.00	597,438	435,113
Strip Mall	540.00	540.00	540.00	831,618	605,666
Total	1,822.00	1,822.00	1,822.00	4,375,729	3,186,836

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
Apartments Mid Rise	10.80	7.30	7.50	41.60	18.80	39.60	86	11	3
Enclosed Parking with Elevator	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
General Office Building	9.50	7.30	7.30	33.00	48.00	19.00	77	19	4
Strip Mall	9.50	7.30	7.30	16.60	64.40	19.00	45	40	15

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.512639	0.073513	0.191470	0.131122	0.036200	0.005158	0.012615	0.022741	0.001866	0.002067	0.006563	0.000594	0.003452

5.0 Energy Detail

4.4 Fleet Mix

Historical Energy Use: N

5.1 Mitigation Measures Energy

Exceed Title 24

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0262	0.2265	0.1123	1.4300e-003		0.0181	0.0181		0.0181	0.0181		286.2761	286.2761	5.4900e-003	5.2500e-003	288.0183
NaturalGas Unmitigated	0.0333	0.2879	0.1432	1.8200e-003		0.0230	0.0230		0.0230	0.0230		363.7066	363.7066	6.9700e-003	6.6700e-003	365.9201

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
General Office Building	460.932	4.9700e-003	0.0452	0.0380	2.7000e-004		3.4300e-003	3.4300e-003		3.4300e-003	3.4300e-003		54.2272	54.2272	1.0400e-003	9.9000e-004	54.5573
Strip Mall	47.0548	5.1000e-004	4.6100e-003	3.8800e-003	3.0000e-005		3.5000e-004	3.5000e-004		3.5000e-004	3.5000e-004		5.5359	5.5359	1.1000e-004	1.0000e-004	5.5696
Apartments Mid Rise	2583.52	0.0279	0.2381	0.1013	1.5200e-003		0.0193	0.0193		0.0193	0.0193		303.9435	303.9435	5.8300e-003	5.5700e-003	305.7933
Total		**0.0333**	**0.2879**	**0.1432**	**1.8200e-003**		**0.0230**	**0.0230**		**0.0230**	**0.0230**		**363.7066**	**363.7066**	**6.9800e-003**	**6.6600e-003**	**365.9201**

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					
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
General Office Building	0.350268	3.7800e-003	0.0343	0.0289	2.1000e-004		2.6100e-003	2.6100e-003		2.6100e-003	2.6100e-003		41.2081	41.2081	7.9000e-004	7.6000e-004	41.4588
Strip Mall	0.0396575	4.3000e-004	3.8900e-003	3.2700e-003	2.0000e-005		3.0000e-004	3.0000e-004		3.0000e-004	3.0000e-004		4.6656	4.6656	9.0000e-005	9.0000e-005	4.6940
Apartments Mid Rise	2.04342	0.0220	0.1883	0.0801	1.2000e-003		0.0152	0.0152		0.0152	0.0152		240.4025	240.4025	4.6100e-003	4.4100e-003	241.8655
Total		**0.0263**	**0.2266**	**0.1123**	**1.4300e-003**		**0.0181**	**0.0181**		**0.0181**	**0.0181**		**286.2761**	**286.2761**	**5.4900e-003**	**5.2600e-003**	**288.0183**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Low VOC Paint - Residential Interior

Use Low VOC Paint - Residential Exterior

Use Low VOC Paint - Non-Residential Interior

Use Low VOC Paint - Non-Residential Exterior

No Hearths Installed

	ROG	NOx	CO	SO2	Fugitive 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	8.6771	0.1653	14.2770	7.5000e-004		0.0782	0.0782		0.0782	0.0782	0.0000	25.5859	25.5859	0.0252	0.0000	26.1146
Unmitigated	10.0219	0.1653	14.2770	7.5000e-004		0.0782	0.0782		0.0782	0.0782	0.0000	25.5859	25.5859	0.0252	0.0000	26.1146

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	1.8894					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	7.6944					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.4381	0.1653	14.2770	7.5000e-004		0.0782	0.0782		0.0782	0.0782		25.5859	25.5859	0.0252		26.1146
Total	**10.0219**	**0.1653**	**14.2770**	**7.5000e-004**		**0.0782**	**0.0782**		**0.0782**	**0.0782**	**0.0000**	**25.5859**	**25.5859**	**0.0252**	**0.0000**	**26.1146**

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	0.5446					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	7.6944					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.4381	0.1653	14.2770	7.5000e-004		0.0782	0.0782		0.0782	0.0782		25.5859	25.5859	0.0252		26.1146
Total	**8.6771**	**0.1653**	**14.2770**	**7.5000e-004**		**0.0782**	**0.0782**		**0.0782**	**0.0782**	**0.0000**	**25.5859**	**25.5859**	**0.0252**	**0.0000**	**26.1146**

7.0 Water Detail

7.1 Mitigation Measures Water

Apply Water Conservation Strategy

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

9.0 Operational Offroad

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

10.0 Vegetation