Planned Development Permit
PROJ-2023-00012
The Oasis at Glen Helen Parkway
County of San Bernardino, California

Prepared by:

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1.0 INTRODUCTION

1.1 Project Background

The Oasis at Glen Helen Parkway Project (Project) encompasses 33-acres consisting of Applicant owned land (21.22 acres), land owned by Department of Transportation (6.6 acres), and land owned by San Bernardino County (4.21 acres) and is currently being processed for a Planned Development Permit (PDP) approval for a commercial/retail Project located within the 3,460-acre Glen Helen Specific Plan (GHSP). The GHSP was adopted in November 2005 and amended in May 2017 and December 2020 by the Board of Supervisors. The Specific Plan covers approximately 3,400 acres in the Glen Helen area and contains 14 land use designations. The approved GHSP notes that the Specific Plan's original purpose was to create a comprehensive guide for quality land development with a viable program for building and financing the infrastructure necessary to support it. Additionally, the GHSP assumed land use designations to be tailored to the physical and environmental conditions, existing activities and uses that will remain onsite, and future market potentials identified for the area. The Project consists of a Specific Plan Amendment (SPA) to expand on the allowed uses under the GHSP for the Destination Recreation (DR) designation on the Project site, as well as a PDP and a Tentative Parcel Map (TPM 20748). Under the San Bernardino County Development Code (County Code Section 85.10), PDPs are appropriate on sites with unique site characteristics, such as difficult topography (i.e., varied terrain, steep slopes, etc.), to establish enhanced development standards that provide a more efficient use of the land. The County has determined that a PDP is appropriate for the Project site.

1.2 Project Setting

The Project site is in an unincorporated area of southwestern San Bernardino County and is within the City of Rialto sphere of influence (SOI); refer to **Figure 1: Regional Location Map**. The Project site consists of Assessor Parcel Numbers (APNs) 0239-031-04, 0239-031-32, 0239-031-37, and 0239-031-50, as well as 6.6 acres adjacent to I-15 that is currently owned by the California Department of Transportation (Caltrans). Assessor Parcel Nos. 0239-031-32 and 0239-031-04 are currently owned by San Bernardino County. The proponent of the Project would acquire both the 6.6 acres of land owned by Caltrans and 4.21 acres owned by the County. The Project site is approximately 33 acres of vacant land bounded by Interstate 15 (I-15) to the west and Glen Helen Parkway to the south and east; refer to **Figure 2: Local Vicinity Map**. As depicted by **Figure 2**, the Project site and its surrounding land uses are contained within an area confined by the San Gabriel Mountains to the northwest, Cajon Wash to the north, and Lytle Creek Wash to the south. Development in this area is limited due to these physical confines and the mountainous terrain.

The area that surrounds the Project encompasses private and public lands, including approximately 1,900 acres occupied by Glen Helen Regional Park and the San Bernardino County Sheriff Training Facility and Rehabilitation Center. The Project site is also adjacent to single-family residences north of the site, vacant undeveloped open space to the south, east, and west, and the Glen Helen Regional Park to the east. Further south, a residential community (Rosena Ranch) is along Clearwater Parkway, about one-half mile south of the Project site. Paakuma' K-8 School is located within this community and lies approximately 0.9-mile south of the Project site. Paakuma' K-8 School is part of the San Bernardino City Unified School District (SBCUSD) and is the closest school to the Project site. The Glen Helen Regional Park lies between the Project site and the Cajon Wash. The Glen Helen Regional Park, located east of the Project site across the Glen Helen Parkway right-of-way, contains the Glen Helen Regional Park Swim Complex, the Glen Helen Regional Park Large Fishing Lake, and the Glen Helen Amphitheater.

The Cajon Wash lies approximately 0.5 mile north/northeast of the Project site. The Cajon Wash is a tributary of Lytle Creek in the County of San Bernardino and flows out of the San Gabriel Mountains into the San Bernardino Valley. Lytle Creek lies approximately 1.35 miles southwest of the Project site. These portions of Lytle Creek and the Cajon Wash are characterized by broad floodplains. Further downstream, the Cajon Wash joins with Lytle Creek. This junction called the Lytle Creek Floodway, lies about 2.4 miles southeast of the Project site and is a broad floodplain of about 2 miles at its widest point. Despite its proximity to these floodplains, the Project site lies in an area of relatively higher relief and lies in an area designated by the Federal Emergency Management Agency (FEMA) as Flood Zone D, denoting areas in which flood hazards are undetermined due to the relative elevation of the Project site to other areas that are included within the determined FEMA flood zones; discussed further in **Section 6.0: Conservation, Preservation, and Open Space**.

1.3 Topography

On-site topographic features include two prominent hills, as depicted by **Figure 3: Topographic Map**. Approximately 21.5 acres of the southern portion of the Project site consists of two hills. The larger hill has a surface elevation ranging from a low point of approximately 2,010 feet above mean sea level (amsl) at the southwest corner of the Project site to a maximum of approximately 2,255 feet amsl. The smaller hill at the northern portion of the Project site ranges from a low point of approximately 2,080 feet amsl to a maximum elevation of 2,137 feet amsl. In addition, there is an existing concrete swale along the western boundary of the Project site (adjacent to the I-15 freeway) that captures all tributary runoff from the Project's hillside and conveys runoff southward to an intake storm drain inlet abutting Glen Helen Parkway.

1.4 Legal Description

A legal description of the site for the Oasis at Glen Helen Parkway Project is provided as **Appendix A: Legal Description** to this report.

1.5 Project Objectives

The purpose of the Project is to implement the vision laid out in the Project objectives by providing additional flexibility to the existing GHSP. The Project would further the goals of the County's Countywide Plan (CWP) on a currently underutilized and undeveloped site by enhancing San Bernardino County's emerging entertainment/hospitality economy and increasing local employment opportunities. The PDP proposes an economical and efficient use of the land and will ensure compatibility between existing and proposed land uses.

The objectives of the Oasis at Glen Helen Parkway Project are as follows:

- Reinforce Glen Helen as a prominent gateway and as a regional entertainment/recreation destination.
- Provide new retail and commercial development that would serve currently underserved residents of the area as well as the region in general by providing goods and services to traffic passing by on the I-15 freeway.
- Create new employment opportunities.
- Provide quality public facilities to serve new development.

- Respect the historic roots of the Glen Helen area, include old Route 66, the Pioneer Women monument and historic Devore community, through design themes and cultural activities.
- Establish Glen Helen as an economically sound enclave of specialized businesses and commercial recreation/entertainment venues.
- Landscaping appropriate to the level of development and sensitive to surrounding areas.

1.5.1 Purpose of the Planned Development Permit

The Oasis at Glen Helen Parkway would be developed according to the PDP represented by **Figure 4: Planned Development Permit**. The Development Code provisions allows for the development of the PDP to provide greater regulatory and design flexibility to achieve a more economical and efficient use of land and ensure compatible design verses conventional zoning and development standards. The PDP proposes a comprehensive land use plan, internal circulation, infrastructure service plan, grading plan, maintenance plan, design guidelines, development regulations, and implementation measures to guide the development of the approximately 33-acre Project site into a master-planned commercial/retail center that would serve adjacent neighborhoods, communities, and freeway commuters. Approval of the PDP by the County is required for development to occur on the Project site.

1.5.2 Relationship to the Existing Glen Helen Specific Plan

The GHSP area is located near the junction of I-15 and I-215, bounded by the Cajon and Lytle Creek Washes and the San Bernardino National Forest. The City of San Bernardino is located to the north and east of the GHSP area, and the City of Rialto lies to the south. The approved GHSP encompasses a 1,900-acre area that is currently occupied by Glen Helen Regional Park, the San Bernardino County Sheriff Training Facility and Rehabilitation Center, and portions of Sycamore Canyon. Within the GHSP area, the Project site is located to the east of I-15 and is surrounded by various open space designations and the Glen Helen Regional Park. Additionally, the GHSP area is composed of six planning sub-areas. Of these, the Project site is located within the North Glen Helen sub-area. As stated in the approved GHSP, this planning sub-area is the center of regional recreation activities within and adjacent to the Glen Helen Regional Park.

The Project proposes a PDP to allow for the development of a Shopping Center consisting of a hotel, retail stores, a gym, a joint police/fire station, two gasoline service stations with car washes, and multiple drive-through restaurants on approximately 33 acres of undeveloped land. The PDP will be facilitated by a proposed SPA to expand on the allowed uses under the GHSP for the Recreation Destination designation on the Project site, and a Tentative Parcel Map to consolidate four (4) parcels and subdivide into 14 newly created parcels. This amendment to the GHSP would allow for a broader range of uses, similar to what is allowed in the approved GHSP, to provide flexibility in providing services to an area that is currently underserved and to provide transit related service to regional travelers and visitors to the area. Specifically, the proposed SPA would amend the Destination Recreation land use to allow for professional services (such as financial services, medical/dental offices, and mail centers), government/civic uses, coffee shops or quick-serve restaurants with a drive-thru, small, and large format grocery stores and specialty food stores, and pharmacy/drug stores with or without a drive-thru. Further, the proposed SPA does not propose amendments to the established development standards including building site requirements, height, and area limitations, building and landscape setbacks, off-street parking, and design guidelines.

1.6 Projected Construction Schedule and Phasing

Project construction would take place in one phase. Construction would begin in 2024, with an anticipated opening year of 2028. Project grading requires approximately 2.6 million cubic yards of soil export, which is anticipated to require approximately three years to complete, starting January 2024 and ending January 2027. Site development, utility construction, and other required infrastructure improvements would begin in 2027 and continue through the opening year of 2028. This would constitute approximately four years of active grading and construction.

1.7 Related Legal Requirements, Regional Plans, and Implementing Agreements

1.7.1 California Environmental Quality Act

The proposed SPA and PDP are considered a "Project" under the California Environmental Quality Act (CEQA). CEQA is a statute that requires state and local agencies to identify the significant environmental impacts of their proposed discretionary actions and to avoid or mitigate those impacts, if feasible to a less than significant impact. To document the potential significant impacts of the Project, a Subsequent Environmental Impact Report (SEIR) will be prepared for the Project and must be certified by the San Bernardino County Board of Supervisors (Board) prior to adoption of the Project or any other discretionary Project entitlements. Subsequent development within the Project boundaries deemed consistent with Specific Plan and PDP standards and within the scope of the SEIR's analysis will not require further environmental review. San Bernardino County is the lead agency responsible for certification of the Project's SEIR and approval of the Project.

1.7.2 County of San Bernardino Countywide Plan

The County adopted the CWP in October 2020. The CWP serves as the County of San Bernardino's General Plan which provides the countywide goals and policies relative to the distribution of future land uses (California Government Code Section 65300). The CWP includes the Policy Plan, Business Plan, Community Action Guides, and Environmental Documents. The Policy Plan component considers all services—not just land-use planning—provided by the County Government, while the Community Action Guides communicate the unique values and priorities of each unincorporated community. The Business Plan component serves as a guide for County decision-making, financial planning, and communications.

California Government Code (Title 7, Division 1, Chapter 3, Article 8, Sections 65450-65457) permits adoption and administration of specific plans as an implementation tool for the local general plan. Specific plans must demonstrate consistency in regulations, guidelines, and programs with the goals and policies set forth in the general plan.

The Project has been prepared in conformance with the goals and policies of the CWP, in providing a broader range of allowable uses that are generally similar to those that are currently allowed, providing further clarity and more flexibility in developing a successful commercial/retail Project on an underutilized property, creating new employment opportunities, and providing regulations through the PDP as an implementation tool that would support the success of a developing area of the County.

1.7.3 Specific Plan Amendment

The Project site is presently zoned as GHSP-DR. The GHSP is a regulatory document that establishes the development standards and design guidelines for the entire Specific Plan area in a manner that is consistent with the CWP and Development Code. The SPA proposes relatively minor changes in allowable uses within the existing GHSP-DR zone. The minor changes include clarifying the types of commercial retail

uses and clarifying which uses are permitted outright or allowable subject to a Conditional Use Permit. The proposed changes would also add multi-family residential (with a PDP) as an allowable use, to provide flexibility to adapt to changing market conditions and to provide the County with additional residential zoning to meet Regional Housing Needs Assessment requirements. At present there are no residential uses proposed on the Project site. Any future residential uses within the DR zone would be subject to separate County discretionary review and approval.

1.7.4 Planned Development Permit

The Project would be developed in accordance with the PDP as represented by **Figure 4**. The PDP proposes a comprehensive land use plan, internal circulation plan, streetscape plan, infrastructure service plan, grading plan, maintenance plan, phasing plan, design guidelines, development regulations, and implementation measures to guide development of the approximately 33-acre Project site into a master-planned commercial/retail center that would serve adjacent neighborhoods, communities, and freeway commuters. Approval of the PDP by the County is required for development to occur on the Project site.

1.7.5 Tentative Parcel Map

Approval of the Tentative Parcel Map that outlines the proposed subdivision of the Project site into 14 parcels to allow for additional and more refined land uses within the Project area; refer to **Figure 5: Tentative Parcel Map**. The Tentative Parcel Map proposes consolidating the existing parcel of the Project site and creating 14 parcels for the Project with land uses consisting of a variety of commercial and retail uses.

FIGURE 1: Regional Location Map
The Oasis at Glen Helen Parkway

Not to scale

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Legend

Project Site

Source: Nearmap, 2023.

FIGURE 2: Local Vicinity Map
The Oasis at Glen Helen Parkway

Not to scale

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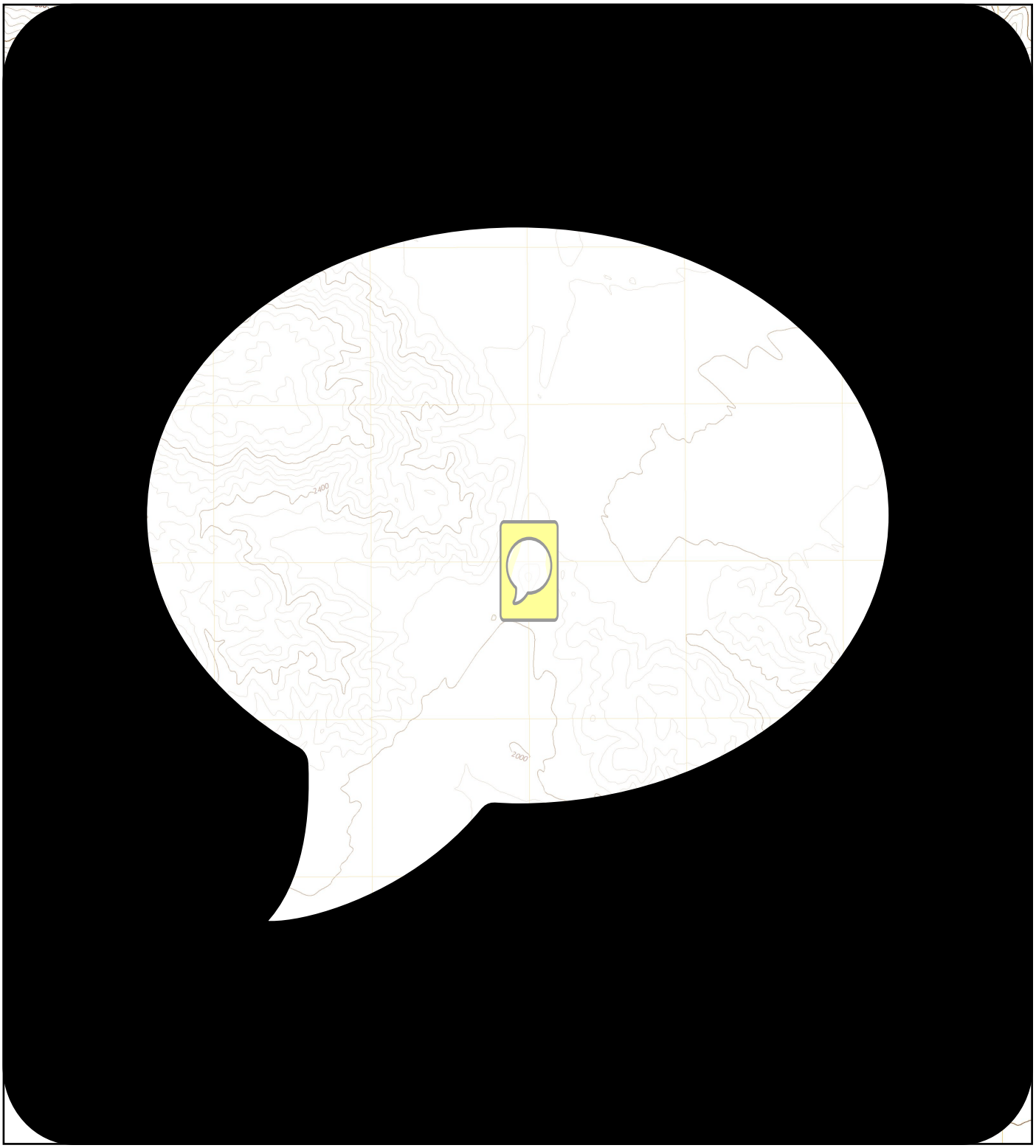

Legend

Project Site

Source: USGS Devore 7.5' quadrangle, San Bernardino County, California.

FIGURE 3: Topographic Map
The Oasis at Glen Helen Parkway

Not to scale

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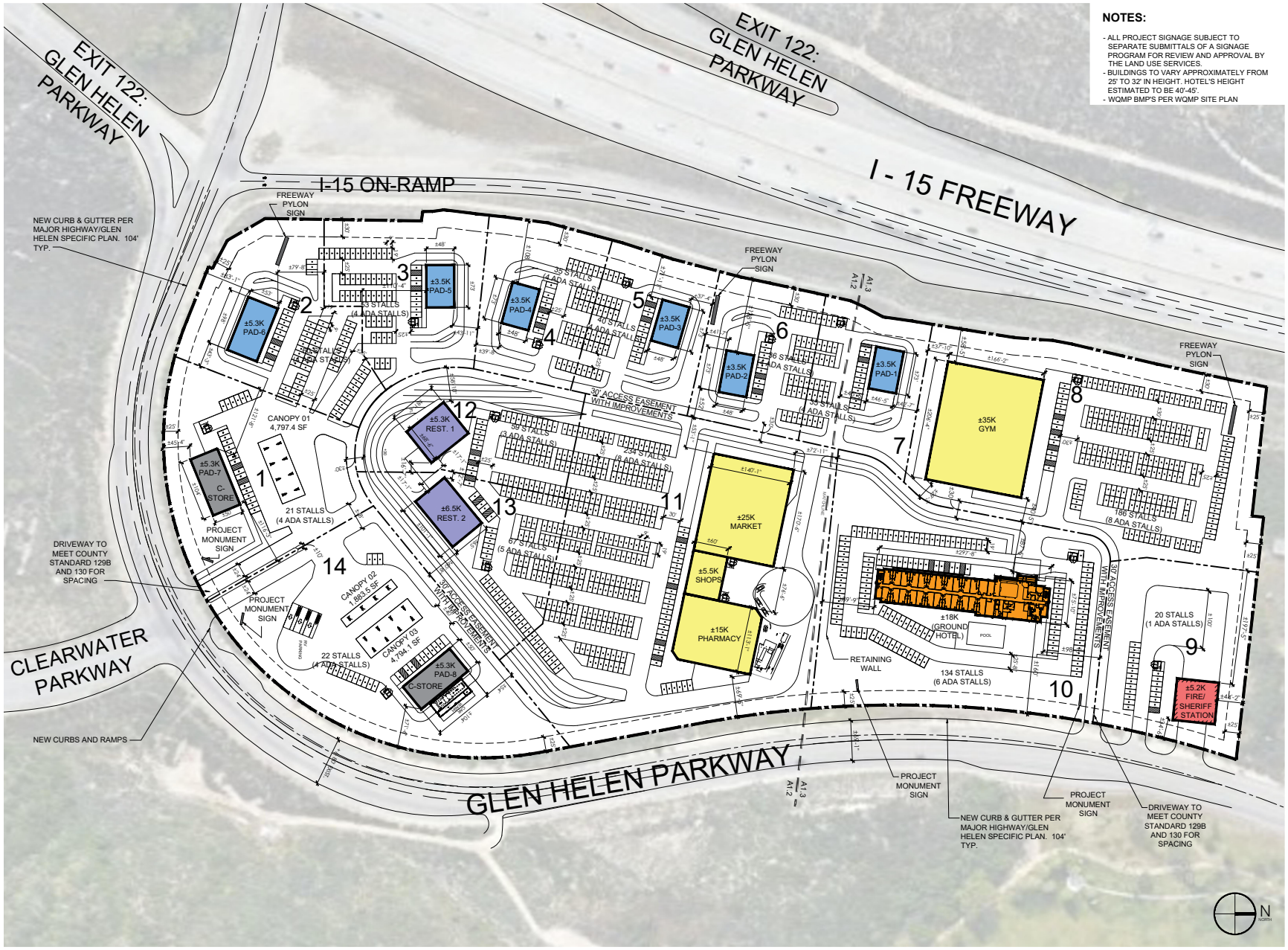

NOTES:

- ALL PROJECT SIGNAGE SUBJECT TO SEPARATE SUBMITTALS OF A SIGNAGE PROGRAM FOR REVIEW AND APPROVAL BY THE LAND USE SERVICES.
- BUILDINGS TO VARY APPROXIMATELY FROM 25' TO 32' IN HEIGHT. HOTEL'S HEIGHT ESTIMATED TO BE 40'-45'.
- WQMP BMP'S PER WQMP SITE PLAN

SUMMARY

SITE AREA: **1,411,779 SF (32.41 AC)**

GROSS AREA (W/ FIRE STATION): **+/- 202,900 SF**

NET AREA (W/O FIRE STATION): **+/- 197,700 SF**

BUILDING F.A.R.: **14%**

PARCEL 1
AREA: +/- 95,328 SF OR +/- 2.2 AC
BLDG AREA: +/- 5,300 SF
PARKING PROVIDED: 21 STALLS
PARKING RATIO: 3.9/1000

PARCEL 2
AREA: +/- 76,421 SF OR +/- 1.8 AC
BLDG AREA: +/- 5,300 SF
PARKING PROVIDED: 60 STALLS
PARKING RATIO: 11.3/1000

PARCEL 3
AREA: +/- 65,125 SF OR +/- 1.5 AC
BLDG AREA: +/- 3,500 SF
PARKING PROVIDED: 53 STALLS
PARKING RATIO: 15.1/1000

PARCEL 4
AREA: +/- 52,211 SF OR +/- 1.2 AC
BLDG AREA: +/- 3,500 SF
PARKING PROVIDED: 35 STALLS
PARKING RATIO: 10/1000

PARCEL 5
AREA: +/- 51,857 SF OR +/- 1.2 AC
BLDG AREA: +/- 3,500 SF
PARKING PROVIDED: 40 STALLS
PARKING RATIO: 11.4/1000

PARCEL 6
AREA: +/- 48,800 SF OR +/- 1.1 AC
BLDG AREA: +/- 3,500 SF
PARKING PROVIDED: 36 STALLS
PARKING RATIO: 10.3/1000

PARCEL 7
AREA: +/- 47,838 SF OR +/- 1.1 AC
BLDG AREA: +/- 3,500 SF
PARKING PROVIDED: 35 STALLS
PARKING RATIO: 10/1000

PARCEL 8
AREA: +/- 190,151 SF OR +/- 4.4 AC
BLDG AREA: +/- 35,000 SF
PARKING PROVIDED: 186 STALLS
PARKING RATIO: 5.31/1000

PARCEL 9
AREA: +/- 69,353 SF OR +/- 1.6 AC
BLDG AREA: +/- 5,200 SF
PARKING PROVIDED: 20 STALLS
PARKING RATIO: 3.86/1000

PARCEL 10
AREA: +/- 168,134 SF OR +/- 3.9 AC
BLDG AREA: +/- 72,000 SF
PARKING PROVIDED: 134 STALLS
PARKING RATIO: 1.86/1000

PARCEL 11
AREA: +/- 261,482 SF OR +/- 6.0 AC
BLDG AREA: +/- 45,500 SF
PARKING PROVIDED: 234 STALLS
PARKING RATIO: 5.14/1000

PARCEL 12
AREA: +/- 64,135 SF OR +/- 1.5 AC
BLDG AREA: +/- 5,300 SF
PARKING PROVIDED: 59 STALLS
PARKING RATIO: 11.13/1000

PARCEL 13
AREA: +/- 66,352 SF OR +/- 1.5 AC
BLDG AREA: +/- 6,500 SF
PARKING PROVIDED: 67 STALLS
PARKING RATIO: 10.3/1000

PARCEL 14
AREA: +/- 138,704 SF OR +/- 3.2 AC
BLDG AREA: +/- 5,300 SF
PARKING PROVIDED: 22 STALLS
PARKING RATIO: 4.15/1000

TOTAL PARKING: 1,002 SPACES
(63 ADA)
40 EV SPACES
02 LOADING SPACES

TOTAL PARKING RATIO: 4.93 SPACES PER 1,000 SF

Source: UCR Group, March 11, 2024

FIGURE 4: Preliminary Development Plan
The Oasis at Glen Helen Parkway

Not to scale

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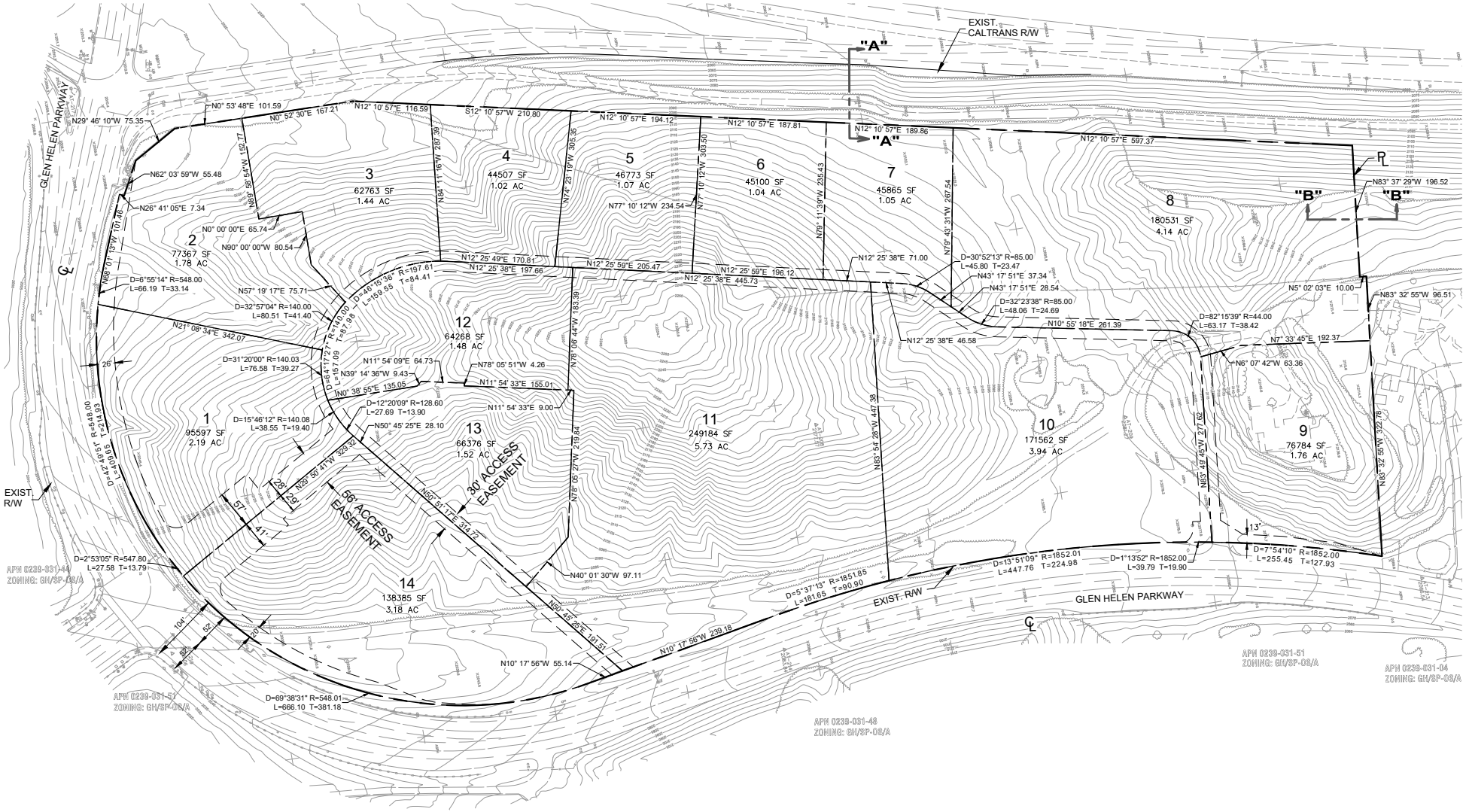

Source: Christiansen and Company, May 24, 2023.

FIGURE 5: Tentative Parcel Map
The Oasis at Glen Helen Parkway

Not to scale

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2.0 LAND USE

The 33-acre Project site is within the GHSP DR District. The DR zoning provides standard to allow for the development of a Planned Development application and specifies certain uses. However, the uses determined to occupy each tenant space within the Project site will be based on market demand and provide opportunity to optimize economic and environmental benefits to the County. The current DR uses allow for a freeway mixed-use development, but the SPA would provide clarification, and increase the types and number of permitted uses. Refer to **Table 1: Existing Land Use Designation and Zoning District**.

2.1 Existing General Plan Land Use and Zoning Designations

According to San Bernardino County's CWP, Land Use Policy Map (last updated in October 2020), the Project site and its adjoining land uses are in the Special Development (SD) land use category and are zoned Specific Plan (SP). According to the GHSP (last amended in December 2020), the Project site has a zoning of DR (Destination Recreation). Adjacent land use designations consist of Commercial/Destination Entertainment (C/DE) and Destination Recreation (DR) to the north, Open Space Passive Recreation (OS/P) to the south, Open Space/Active Recreation (OS/A) to the east, and Existing Road/Railroad (E-RR) to the west. The Project would be consistent with the existing CWP land use designation and Zoning District. Refer to **Figure 6: Existing General Plan Land Use Designation** and **Figure 7: Existing Zoning**.

The GHSP designates safety and resource overlay zones including the Fire Safety (FS) overlay, Geologic Hazard overlay, Scenic Resources overlay, Biotic Resources overlay, and Floodplain Safety overlay. The entirety of the GHSP area is included in the Fire Safety overlay that designates areas prone to wildland brush fires. Consistent with the CWP and County Development Code, these areas are subject to additional development standards to provide greater public safety in fire-prone areas. The Project site is designated as Fire Safety Area 1 (FS-1), which includes areas designated as extremely high fire hazard severity zones by the California Department of Forestry and Fire Protection. All proposed projects or subdivision applications must be submitted to the responsible fire authority, in accordance with the provisions of the County Development Code. Additionally, the Project site is subject to the Scenic Resources overlay which requires a 200-foot buffer along the I-15 Scenic Corridor as well as areas that are within the long-range southbound views of the Glen Helen area from I-15 in the Cajon Pass. The Project would be subject to the GHSP development requirements specific to the Scenic Resources Overlay.

Table 1: Existing Land Use Designation and Zoning District

Location	Existing Use	General Plan Land Use Designation	Zoning District	Overlays
Project Site	Vacant	Special Development (SD)	Destination Recreation (DR)	Fire Safety (FS-1), Scenic Resources
North	Single Family	Special Development (SD)	Commercial/Destination Entertainment (C/DE) Destination Recreation (DR)	Fire Safety
South	Glen Helen Parkway, Vacant	Special Development (SD)	Open Space Passive Recreation (OS/P)	Fire Safety, Scenic Resources
East	Glen Helen Parkway, Vacant, Glen Helen Park	Special Development (SD)	Open Space/Active Recreation (OS/A)	Fire Safety
West	15 Freeway	Special Development (SD)	Existing Road/Railroad (E-RR)	Fire Safety
Source: Glen Helen Specific Plan, 2020; Countywide Plan, 2020.				

2.2 Existing Land Use

The Project site is generally undeveloped and surrounded by vacant land and roadway infrastructure to the west, south, and east with an existing vacant structure with accessory structures located in the northern portion of the of Project site that have historically been used as an adjunct accessory uses to the Glen Helen Amphitheater operation. There are three single family homes to the far north, and the Glen Helen Regional Park to the east. Open spaces areas are located across I-15 to the west, and across Glen Helen Parkway to the south and east. Further south, a residential community is located along Clearwater Parkway. The Glen Helen Regional Park lies to the north and east of the Project site with the Glen Helen Amphitheater to the east. There are associated accessory structures located at the Glen Helen Park and Amphitheater to the north and east of the Project site. There is minimal infrastructure that serves the site. There is an existing overhead electric power distribution line and series of wood poles that run along the eastern portion of the Project site along Clearwater Parkway and Glen Helen Parkway. The existing services that ran to the vacant structure have been abandoned.

2.3 Proposed Specific Plan Amendment

The SPA component of the Project proposes an amendment to the current Destination Recreation (DR) land use designation. The proposed SPA allows for a broader range of uses than what is currently allowed under the GHSP to provide flexibility in meeting the needs of current and future visitors to this commercial/retail center. As mentioned above, the proposed SPA does not propose amendments to the established development standards contained within the approved GHSP including building site requirements, height, and area limitations, building and landscape setbacks, off-street parking, and design guidelines. Specific Project design standards are included in the PDP guidelines per the GHSP Section 2.0440 Destination Recreation (DR) (g). The Project site is depicted in **Figure 7**.

2.4 Proposed Project Land Use Plan

The Project proposes the development of the uses identified in **Table 2: Maximum Project Build-Out Summary** but generally would include a hotel use; fitness facility; in line shopping center with a 25,000-square foot market, a pharmacy, and commercial shops; a 5,300 square foot convenience store and a gas station with 12 fueling islands and associated drive-thru carwash; six (6) drive-thru restaurants; two sit down restaurants; and a 5,200 square foot Fire/Sheriff Station; refer to **Figure 4**.

Table 2: Maximum Project Build-Out Summary

Parcel	Proposed Land Use	Parcel Acreage	Maximum Building Square Footage
1	Convenience Store; Gas Station	2.2 Acres	5,300 SF
2	Drive-Thru Restaurant	1.8 Acres	5,300 SF
3	Drive-Thru Restaurant	1.5 Acres	3,500 SF
4	Drive-Thru Restaurant	1.2 Acres	3,500 SF
5	Drive-Thru Restaurant	1.2 Acres	3,500 SF
6	Drive-Thru Restaurant	1.1 Acres	3,500 SF
7	Drive-Thru Restaurant	1.1 Acres	3,500 SF
Total Drive-Thru Restaurant		*7.9 Acres*	*17,500*
8	Gym	4.4 Acres	35,000 SF
9	Fire/Police Station	1.6 Acres	5,200 SF
10	Hotel	3.9 Acres	18,000 SF (ground) 72,000 SF (total)
11	Market; Retail Shops; Pharmacy	6.0 Acres	45,500 SF
12	Restaurant; Parking	1.5 Acres	5,300 SF
13	Restaurant; Parking	1.5 Acres	6,500 SF
Total Restaurant; Parking		*3 Acres*	*11,800*

Parcel	Proposed Land Use	Parcel Acreage	Maximum Building Square Footage
14	Convenience Store; Gas Station	3.2 Acres	5,300 SF
Total		**32.2 Acres**	**202,900 SF**

Notes:
1. The numbers were rounded to present a conservative estimate. Acreages may be adjusted as part of final engineering and surveying.
2. The Subsequent EIR will evaluate the total maximum allowable development in the Specific Plan Amendment, which falls below the GHSP maximum allowable development.
3. Development standards, such as setback requirements, parking, open space, minimum landscaping, infrastructure, and site design, may reduce the maximum gross square footage or density.

2.5 Development Standards

This section controls all the development and design of the Oasis at Glen Helen Planned Development Permit ("Plan") to ensure that development and design align with the Project's vision. The Project is intended to encourage a mixture of commercial and freeway mixed-use development uses. Service commercial activities, such as restaurants, gas stations, hotels, gyms, and retail stores, will be allowed at the Project site. Specifically, the standards herein are developed to enable and encourage the following outcomes:

- Appropriately scaled development.
- Mixture of community serving retail including food use, grocery, entertainment, and local serving retail (hair and nail salons, professional and dental offices, etc.)
- Transit related retail and service uses including gas stations, convenience stores and quick service restaurants.
- Regional visitor and transit activity through hotel, restaurant, and convenience retail uses.

General development and design features of the Oasis at Glen Helen include:

- Landscape/streetscape enhancement and edge treatment to create an appealing project site.
- Establishment of uses that capitalize on regional market potential as well as local demand, to capitalize on the various freeway access points and truck routes in the area.
- Service commercial uses that are auto-oriented and pedestrian-sensitive.

2.5.1 Applicability

This section contains the Development and Design Standards that govern all future private development actions in the Oasis at Glen Helen, including new construction, additions, or renovations to existing structures, and/or new land uses proposed for existing facilities.

2.5.2 Overview of Development and Design Standards

A. Relationship of Land Use. The Development Regulations in this Section apply to those properties that are within the Oasis at Glen Helen PDP. **Figure 4: Planned Development Permit** indicates the location of the Oasis at Glen Helen and its relationship to the other land uses in the area.

B. Standards, Guidelines, and Procedures. The Development Regulations are divided into the following Sections: 2.5.4 Allowed Use, 2.5.5 Uses not Listed, 2.5.6 Other Applicable Regulations, 2.5.7 Design Standards, 2.5.8 Development Guidelines, 2.5.9 Commercial Uses, 2.5.10 Specific Use Design Guidelines, 2.5.11 Residential Uses, and 2.5.12 Entitlement. Projects must meet all development standards to achieve approval in the development review process. Projects are encouraged to adhere to the guidelines contained in these Design Standards.

2.5.3 Other Requirements

This Section does not eliminate the need for obtaining any other permits required by the County, or any permit, approval or entitlement required by any other applicable special district or agency, and/or the regulations of any State or Federal agency.

2.5.4 Allowed Use

The GHSP Section GH2.0440 Destination Recreation (DR) identifies the proposed land uses allowed in the Oasis at Glen Helen, permitted with a Minor Use Permit (MUP), and conditionally permitted with a Conditional Use Permit (CUP). Section 2.5: Land Use and Development Standards further clarifies and sets development and design standards for any use that is subject to the PDP.

Professional Services:

Banks, Financial Services, Real Estate Offices - The primary use is providing financial services to consumers, including financial institutions such as banks and trust companies, credit agencies, etc. May include providing services relating to escrow (e.g., process of completing a transaction), real estate, and other financial institutions.

Medical and Dental Offices - Medical offices are defined as buildings used by physicians to examine and consult with patients. Facility would be primarily engaged in providing outpatient medical, mental health, surgical, and other personal health services, but which is separate from hospitals, including medical and dental laboratories, medical, dental, and psychiatric offices, outpatient care facilities, and other allied health services. Counseling services by other than medical doctors or psychiatrists may be included in this service.

Copy and Mail Centers - This is defined as facilities that print, copy, and provide other services in the printing trade. May include postal center, mailboxes, and Postal services. Also included is newspaper, book, periodical publishers.

Retail Trade/Personal Service:

Appliance and Hardware stores - A store that primarily sells product and related services, including incidental repair services: window coverings, floor coverings, furniture, glass and chinaware, home appliances, home furnishings, home sound systems, interior decorating materials and services, large musical instruments, lawn furniture, movable spas and hot tubs, office furniture, other household electrical and gas appliances, refrigerators, stoves, and electronics.

Beauty salons (nails, barber, dry cleaner, florist, etc.) - An establishment that provides nonmedical services for personal care. This includes but is not limited to barber, beauty, nail shops, day spas, hair salons, shoe repair, weight loss clinics, tailors, florist, etc.

Convenience stores w/alcoholic beverage sales - This use is defined as an easy access retail store with a variety of merchandise for traveler's needs. Sales of alcoholic beverages would be permitted through review and approval of an ABC Liquor license and subject to approval of a Conditional Use Permit.

Mini Storage, Car Condos, and indoor/outdoor RV storage - A facility for the storage of household goods or other commercial goods generally containing small, individual compartmentalized stalls or lockers rented or leased as individual storage spaces with no parking demand. Individual car condos, RV storage and other parking facilities may be considered within this land use. These uses may not be located within

300 feet of Glen Helen Parkway or adjacent to residentially zone property. **Offsite signs** - Signs associated with an individual tenant, multi-tenant monument sign or direction/wayfinding sign that is located with an easement, master development area or within the PDP development area which identifies or directs attention to a business or other activity not being conducted or offered on that parcel or within specified tenant space.

Freeway signs/Digital Billboards - Pylon or billboard signs that are directly adjacent to or specifically oriented to the traffic on the interstate rather than the local road network.

Outdoor Commercial uses (including vehicle sales and rentals) - The retail sales of various products including new or used cars, rentals, boats, and supplies. Does not include tire repair shops or businesses dealing exclusively in used parts, which exclude recycling businesses. Sales and service of part and service of autos, vans, and trucks. Services are not limited to the repair, alteration, restoration, towing, painting, or finishing of automobiles, trucks, recreational vehicles, boats, and other vehicles.

Service/gas stations w/ convenience - A place where the sale of fuels, EV charging, lubricants or petrol is used for automobile vehicles. See Convenience stores above for definition.

Warehouse retail - A large format warehouse retailer that includes both storage and sales onsite with the primary use for retail of various products and services in a building, space, or other clearly defined/dedicated area that is located within the building occupied by a primary tenant.

2.5.5 Uses Not Listed

Section 2: Land Use of the PDP and the GHSP identifies the proposed land uses allowed in the Oasis at Glen Helen and the prohibited land uses, until and unless the Director of Land Use Services makes a similar use determination in compliance with the County General Plan and Development Code.

2.5.6 Other Applicable Regulations

The provisions contained in this PDP constitute the primary land use and development standards for the Oasis at Glen Helen. These regulations are in addition to the provisions in the County General Plan and Development Code.

This PDP provides all development standards and guidelines necessary to approve subsequent project applications, unless otherwise noted. Permit processing procedures (e.g., noticing, hearing, appeals, and expiration procedures) and enforcement procedures are provided in the County Development Code shall apply, unless otherwise noted. Where there is a conflict between the provisions in this PDP and those in the County Development Code, the PDP provisions shall prevail to the extent allowable under Federal or State law.

2.5.7 Development Guidelines

The following development guidelines and provisions apply to structures in the PDP and shall be designed, constructed, and established in compliance with the requirements in this Section.

The Development Guidelines will promote and reinforce the County's commitment to high quality development. In general, the guidelines are intended to ensure that development preserves or improves the positive characteristics of the County. The objectives of these guidelines are to:

- Promote orderly development by implementing the Glen Helen PDP objectives, policies, and principles.

- Protect and enhance property values by ensuring that development is compatible within the adjacent community architectural style, land topography, scale, and context.
- Ensure adequate circulation to and from and through the development and enhance pedestrian linkages from adjacent uses to reduce traffic demands.

2.5.8 Commercial Uses

Site Layout

- The Project site, including circulation, parking, plazas, and land uses, shall be developed to provide efficient movement between the commercial/retail uses, reduce stacking from drive-thru, and provide attractive plazas adjacent to restaurants and quick serve restaurants to enhance publicly accessible spaces.
- Loading areas, access and circulation driveways, trash enclosures, storage areas, and rooftop equipment shall be as far as possible from adjacent residentially zoned properties and acoustically screened where necessary for containment of noise.
- Site design shall consider the public street and relationship to freeway access and adjacent uses.
- Buildings may be adjacent to the street with a fully landscaped setback or buildings set back with limited parking in front with landscape screening.

Courtyards and Plazas

- The organization and design of buildings shall encourage and facilitate pedestrian activity.
- Buildings should be organized to create usable open space, courtyards, plazas, employee break areas, and dining areas that are designed to provide resting locations and recreation areas to be used.
- Landscape shall be placed to provide adequate shade and buffering from adjacent drive aisles with natural clustering of trees to be encouraged.
- Shrubs used for landscaping shall be designed to form natural groupings with varying heights to create a multi-faceted effect.
- Hardscaping shall reflect the architectural design styles of the adjacent buildings and the use of pervious ground plane hardscape is encouraged to contribute to water conservation efforts.
- Site furnishings shall be specified for durability and flexibility within the space and have a consistent design style within the spaces.
- Different ground plane hardscape styles within the spaces should be limited to provide a consistent ground plane with up to two styles may be specified to provide a visual separation of space as needed. However, one style shall be the primary ground plane hardscape, with the second style as a complimentary hardscape.

Screening

- Service and delivery areas shall be screened by building placement, decorative sound attenuation walls, or landscaping to the fullest extent feasible so that views of loading areas are acoustically screened and minimized from adjacent public streets.
- Outdoor mechanical equipment shall be screened from public view.
- Roof-mounted equipment shall be screened from public view. Special consideration shall be given to the screening of roof-mounted equipment on building rooftops visible from Glen Helen Parkway and the I-15 freeway.

Table 3: Development Guidelines: Commercial

Item	Standard
Minimum Lot Area	0.5 acres
Minimum Lot Width at the Front Property Line	150 feet
Minimum Lot Depth	100 feet
Maximum Lot Coverage	25%
Floor Area Ratio (max)	0.20
Building Setback	
Building Setback (internal property line)	10 feet
Building Setback (perimeter boundary)	25 feet
Setback, Building Entry to Parking	10 feet
Building Separation	Per fire code
Site Landscaping	15% (15% in GHSP)
Building Height (maximum)	60 feet
Uninhabited Architectural Projections Height Exception	10 feet
Landscape Setback from Major Highways and Secondary Highways	15 feet from Ultimate Right-of-Way
Landscape Setback from Collector and Local Roads	10 feet from Ultimate Right-of-Way
Landscape Setback from Freeways	30 feet from Ultimate Right-of-Way

1. Minimum lot size shall be permitted as noted in this table and defined by the PDP to facilitate the pad development of commercial development, inline retail, and muti-tenant buildings and therefore will not meet the minimum requirements of the GHSP.
2. Minimum setbacks are permitted at 10 feet within the PDP as part of a Master Planned Commercial or Mixed Use Development and therefore are not required to meet the minimum 15 foot setback of the GHSP.
3. Building separations shall meet the minimum building separations as required by the Fire Code and as determined appropriate by the Fire District.

- Projections are permitted for architectural projections such as columns, cornices, door or window frames or other decorative features and eaves, so long as emergency access is not compromised.
- Height of uninhabited architectural projections such as roof peaks, parapets, and towers may extend up to ten feet above the maximum building height limit.
- Two-way drive aisles for automobiles shall have a minimum width of 24 to 26 feet, depending upon their location relative to buildings, subject to approval of a fire access plan by the Fire Department as part of plot plan review. Access aisles for multiple axle trucks shall be a minimum of 40 feet in width (Development Code Section 83.11.070 (h)(4)).
- Outdoor uses (outdoor seating, entertainment, and storage) shall be screened from internal circulation routes and from the I-15 freeway and Glen Helen Parkway through the use of

landscaping (trees, hedges), low walls, or berms. Outdoor seating for food consumption is strongly encouraged. Outdoor seating shall be enclosed by a low fence, wall, or planters.

- Drive through uses must provide queuing for a minimum of 5 vehicles. Certain high-volume fast-food uses shall require a queuing study prepared by a traffic/transportation consultant, subject to the discretion of the Land Use Services Director.
- All uses shall be conducted within a building.

Lighting

- Lighting fixtures shall be designed with shielding to contain light from spilling over onto adjacent properties and shall be reviewed and approved by the County as part of Development Review. Lighting shall conform to the provisions of the GHSP and the Development Code.
- Dependent on development in proximity to adjacent off-site sensitive land uses, the Planning Director may require a photometric study to be submitted.
- Lighting should be strategically placed to illuminate parking areas, docks/loading areas, and building entries.
- Lighting along entrance paths (i.e., bollards). to buildings should be provided at the same level as street lighting.

Walls and Fences

- All service and delivery areas, such as those associated with commercial uses, shall be screened by walls and fences, where feasible, in combination with landscaping.
- The height of walls and fences that surround public facilities such as fire stations or police stations shall be permitted to not exceed six feet in height and will provide a barrier between the public buildings and the Project.
- All wall standards as identified in the GHSP Chapter 3 Section GH3.0345 Exterior Walls and Fences shall apply to the Project as identified per the Commercial wall and fence standards within Table 3, with the exception of the following:
  - Maximum wall height in the front and side yards shall be permitted to not exceed 6’0” in height.
  - Dock doors shall be screened by a solid screen wall which may be up to 10’-0” in height in order to appropriately screen the area of the dock door(s) and loading and unloading area(s) of each use subject to the Planning Directors approval.

Landscaping and Irrigation

- Landscaping should help complete the design of the site and enhance the quality of commercial developments by framing and softening the appearance of buildings, screening undesirable views, and buffering incompatible uses.
- Landscape and walls and fence requirements shall comply with the design standards as outlined in the GHSP Chapter 3, Section GH3.0305: On-site Landscape Requirements and Section GH3.0345: Exterior Walls and Fences.

Signage

All signage within the boundaries of this PDP shall conform with the provisions of the GHSP or Development Code unless otherwise stated in the PDP and/or governed by a comprehensive sign program approved by the County. A master comprehensive sign program may be submitted and approved for all signage in the development area.

Billboards, freeway-oriented signs, offsite and directional/wayfinding signs may be permitted with a comprehensive sign program and may be located within the boundaries of the PDP area or located within private drive isles, within the setbacks, and on private property. Signs shall not include flashing, flickering, or rotating moving lights (does not apply to a digital screen billboard).

Freeway Oriented/Pylon Sign

The following standards and guidelines apply to pylon signs oriented towards the I-15 Freeway. Pylon signs shall only be allowed for commercial properties.

a) One Freeway Adjacent Sign is allowed for the Project site and may include a single tenant, or multi-tenant list, and located along the I-15 freeway within the Project site or right-of-way.

b) Freeway Identification Signs shall not exceed 200 square feet in area and a maximum height of 40 feet. If additional sign height and/or area is requested, the Planning Commission, at the Planning Commission's discretion, may approve additional sign height and/or area (up to a maximum height of 50 feet and maximum sign area of 250 square feet) after either or both of the following visual modeling simulations is conducted by the applicant:

    i. A "flag test" to simulate the visual impact of the proposed sign structure.

    ii. A line-of-sight study to determine what size of sign could be seen from any given distance, and whether the additional height and/or area are warranted.

Parking

Unless otherwise provided herein, parking shall be provided in accordance with Chapter 83.11 of the Development Code. Parking within the PDP area shall be provided in accordance with **Table 4: Parking Standards**.

- Minimum parking stall dimensions shall be in accordance with Section 83.11.070 of the Development Code, summarized as follows:
- Standard automobile stalls: 9-foot x 19-foot

Parking will be provided on-site to accommodate Project visitors and employees. **Table 4: Parking Standards** shows the number of parking spaces required and the number provided by the Project.

Table 4: Parking Standards

Parcel	Proposed Land Use	Area	Building Area	Required Parking per County Code of Ordinances	Proposed Parking
1	Convenience Store; Gas Station	95,328 SF or 2.2 AC	5,300 SF	1 for each 250 square feet of GLA	21 stalls (4 ADA Stalls)
2	Drive-Thru Restaurant	76,421 SF or 1.8 AC	5,300 SF	1 per 100 square feet of GLA	60 stalls (4 ADA stalls)
3	Drive-Thru Restaurant	65,152 SF or 1.5 AC	3,500 SF	1 per 100 square feet of GLA	53 stalls (4 ADA stalls)
4	Drive-Thru Restaurant	52,211 SF or 1.2 AC	3,500 SF	1 per 100 square feet of GLA	35 stalls (4 ADA Stalls)
5	Drive-Thru Restaurant	51,857 SF or 1.2 AC	3,500 SF	1 per 100 square feet of GLA	40 stalls (4 ADA Stalls)
6	Drive-Thru Restaurant	48,800 SF or 1.1 AC	3,500 SF	1 per 100 square feet of GLA	36 stalls (4 ADA Stalls)
7	Drive-Thru Restaurant	47,838 SF or 1.1 AC	3,500 SF	1 per 100 square feet of GLA	35 stalls (4 ADA stalls)
8	Gym	190,151 SF or 4.4 AC	35,000 SF	1 for each 4 persons of the facility's allowed maximum attendance	186 (8 ADA stalls)
9	Fire/Police Station	69,353 SF or 1.6 AC	5,200 SF	1 for each 250 square feet of GLA	20 stalls (1 ADA stall)
10	Hotel	168,877 SF or 3.9 AC	18,000 SF (ground)	1 for each room/unit	134 stalls (6 ADA stalls)
11	Market; Retail Shops; Pharmacy	261,792 SF or 6.0 AC	45,500 SF	1 for each 250 square feet of GLA	234 stalls (8 ADA Stalls)
12	Restaurant; Parking	64,135 SF or 1.5 AC	5,300 SF	1 per 100 square feet of GLA	59 stalls (3 ADA Stalls)
13	Restaurant; Parking	66,352 SF or 1.5 AC	6,500 SF	1 per 100 square feet of GLA	67 stalls (5 ADA Stalls)
14	Convenience Store; Gas Station	138, 704 SF or 3.2 AV	5,300 SF	1 for each 250 square feet of GLA	10 stalls (2 ADA Stalls)
Total			**Gross with Fire Station: 202,900 SF Net without Fire Station: 197,700 SF**		**990 Spaces (61 ADA) 40 EV Spaces 4 RV Spaces**

Notes:
1. SF stands for Square feet.
2. AC stands for Acres.
3. GLA stands for Gross Leasable Area.

Source: San Bernardino County, CA Code of Ordinances Chapter 83.11: Parking and Loading Standards, 2023; The Oasis of Glen Helen Site Plan, 2023

- Parking shall include parking designated exclusively for 'clean air' vehicles (electric vehicle or vanpool parking).
- Entries, exits, parking lots, and pedestrian pathways shall allow customers, employees, emergency vehicles, and delivery vehicles to navigate through the site easily and safely and without obstruction hazards that would otherwise hinder vehicular and pedestrian movement.
- Parking for EV spaces shall adhere to the requirements of the GHSP and the CALGreen Building Code, which requires that 10% of parking spaces to be EV capable.[1]

[1] CALGreen, CA Green Building Standards Code, Chapter 5: Nonresidential Mandatory Measures, 2022

- Parking for ADA spaces shall adhere to the requirements of the GHSP and the County Development Code. **Table 5: ADA Parking Standards** shows the number of parking spaces required for Disabled parking.

Table 5: ADA Parking Standards

Required Number of Parking Spaces for Disabled	
Total Number of Parking Spaces	Number of Parking Spaces for the Disabled
1-25	1
26-50	2
51-75	3
76-100	4
101-150	5
151-200	6
201-300	7
301-400	8
401-500	9
501-1,000	2 percent of total
1,001 and over	20 plus 1 for each 100 or fraction, over 1,001
Source: San Bernardino County, CA Code of Ordinances Chapter 83.11: Parking and Loading Standards, 2023	

2.5.9 Specific Use Design Guidelines

Drive-Through Uses

Site Design

- The predominant features along the street frontage should be the building, not parking lots or the drive-through aisle.
- The building shall maximize the distance for vehicle queuing while screening the drive-through operations.
- When adjacent to residential zones, outdoor order kiosks, loading/unloading areas, and storage areas shall be as far as possible from residential properties.
- Drive-through aisles shall be in the rear of the building away from the street frontage whenever possible. If the drive-through aisle is between the building and the street, dense landscaping and landscaped berms shall be provided to screen the drive-through aisle from street view or provide screen wall (42” or less in height).

Building Design

- All building elevations shall receive the same level of architectural detailing.
- Buildings shall incorporate roof designs with built-in equipment wells or other built-in screening methods, so that screening devices do not appear added-on (i.e., parapets).
- If the drive-through facility is a pad building within a shopping center, the architecture shall relate to and be compatible with the design of the center. The only feature that identifies the franchise shall be the company's logo and signs.

Mini-Storage Facilities

Site Design

- Offices and customer service areas shall be located adjacent to the street frontage to provide convenient access and help visually break up the front façade.
- Consolidate site access and entrances to avoid potential conflicts with other uses and pedestrians where possible. Entrance to the main building/office should be located where visible, identifiable and distinctive.
- Covered parking and/or loading areas shall be located internal to the site and not visible to the public right of way.
- Open space/landscaping shall be provided at the entrances and along all edge conditions to buffer any nearby sensitive uses.
- Locate all utility equipment, refuse buildings, service areas, etc. internal to the site and not visible to the public right of way.

Building Design

- Long, flat, unarticulated walls shall be avoided along street frontages.
- Building walls and screen walls shall incorporate substantial articulation, and changes in plane and height to add visual interest.
- At least two building materials shall be used on building walls and screen walls adjacent to street frontages (e.g., stucco, brick, stone).
- Building materials, textures and landscaping shall be chosen to deter graffiti.

Service Stations

Site Design

- The site shall be designed to accommodate anticipated circulation patterns. Patterns should be defined by paving and by well-placed landscaped areas.
- In areas developed with buildings adjacent to the sidewalk, service stations shall also be oriented to the sidewalk, placing any service bay door and car wash openings on the rear of the structure.
- Where commercial development abuts the service station, two-way vehicular access integrated with the adjacent commercial development shall be provided where feasible.
- The site design for projects located at street corners shall provide a strong design or prominent theme feature element at the corner to help frame the public right-of-way and anchor the corner.
- No overnight parking shall be permitted unless vehicles are parked within an enclosed building that are left for repair.
- Service or car wash bays shall not face toward a public street or toward residential zone.
- Work bays shall be oriented so that their interior is not visible or audible from a public street, adjacent residential zones, or designated open space.

- Each pump island shall include a vehicle stacking area for at least two vehicles (38-feet), on at least one end of the pump island and shall not restrict vehicle circulation and parking areas.
- A designated gasoline tanker truck unloading zone shall be provided and shall not obstruct vehicle circulation and parking areas.

Building Design

- Service station buildings shall be designed to complement and be compatible with the area's main architectural theme and scale. If located within a multi-use center, the architectural design shall be compatible with the center's design.
- The design of the building should be clean and simple and shall relate to surrounding buildings through use of similar scale, materials, colors, and/or detailing.
- Building elevations facing public streets and residential zones shall be architecturally detailed to provide interest and the appearance of quality development.
- The roof design of service stations, including pump island canopies, shall incorporate full, pitched roof treatments with a low to moderate slope.
- Building materials shall have the appearance of substance and permanency (e.g., masonry).

Hotel

Site Design

- The site shall be designed to accommodate anticipated circulation patterns and those patterns should be defined by paving and by well-placed landscaped areas.
- In areas developed with buildings adjacent to the sidewalk, hotels shall also be oriented to the sidewalk, placing any Work Bay door on the rear of the structure.
- Where commercial development abuts the hotel, two-way vehicular access integrated with the adjacent commercial development shall be provided where feasible.
- The site design for projects located at street corners shall provide a strong design element at the corner to help frame the public right-of-way and anchor the corner.
- Parking spaces for vehicles associated with the hotel shall be well lit with outdoor lighting and situated in the least visible areas of the site and screened from public view.
- A loading and unloading zone shall be provided and shall not obstruct vehicle circulation and parking areas.

Building Design

- Hotels shall be designed to complement and be compatible with the area's main architectural theme and scale. If located within a multi-use center, the architectural design shall be compatible with the center's design.
- The design of the building should be clean and simple and shall relate to surrounding buildings through use of similar scale, materials, colors, and/or detailing.
- Building elevations facing public streets and residential zones shall be architecturally detailed to provide interest and the appearance of quality development.

- Building materials shall have the appearance of substance and permanency (e.g., masonry).

Civic and Public Facilities

Site Design

- The site shall be designed to accommodate anticipated circulation patterns and those patterns should be defined by paving and by well-placed landscaped areas.
- In areas developed with buildings adjacent to the sidewalk, public facilities shall also be oriented to the sidewalk, placing fire services work bay doors on the structure's facing the street for accessibility and other work bay doors on the structure's rear if appropriate.
- With the exception of Fire Stations, work bays shall be oriented so that their interior is not visible or audible from a public street, adjacent residential zones, or designated open space.

Building Design

- Public Facilities shall be designed to complement and be compatible with the area's main architectural theme and scale. If located within a multi-use center, the architectural design shall be compatible with the center's design.
- Building elevations facing public streets and residential zones shall be architecturally detailed to provide interest and the appearance of quality development.
- Special attention shall be provided to the location of access doors, equipment doors, speakers, and other operations equipment specific to the facility to ensure that noise, light and glare (engine lights) and other impacts related to the use are anticipated in site and building design as not to impact the adjacent residential land use.

2.5.10 Residential Uses

General Architecture and Site Design

- Residential uses shall comply with the GHSP Chapter 4 Architectural Guidelines.
- Residential Uses shall reflect the mass and scale of the surrounding neighborhood.
- Residential architecture shall be consistent with the existing residential architecture in the area.

2.5.11 Entitlement

The entitlement process allows for the review of design, location, and manner of development prior to application for building permits. The review authority of the entitlement process would be the Director of Development Services. Due to the PDP being within the scope of the approved Glen Helen Specific Plan and certified EIR, the approval process is administrative and limited to determining whether implementing the Project substantially conforms with the GHSP.

Submittal Requirements

The submittal for the Entitlement processes shall include the following:

- Submittal of the appropriate entitlement application using the checklist and submittal materials list as outlined on the County's Development Code and based on the permit necessary for the project submitted.

- A completed application containing the name, address, and phone number of the applicant, the owner, the person(s) preparing the plan, and the authorized agent (if any), the address and legal description of the property (or planning area as defined by an adopted Specific Plan/PDP).
- A summary of demonstrating substantial conformance with the Specific Plan, PDP, and consistency with the EIR. This may be accompanied by supplemental technical studies or reports to the extent required by the Project's MMRP.
- Planned Development Permit Amendments shall be submitted to the review authority that originally approved the permit for review and approval per the Development Code.

2.6 Relationship of the Proposed Project to the Countywide Plan and Glen Helen Specific Plan

2.6.1 Countywide Plan

The CWP designates specific land uses assigned to all land within its jurisdiction. As mentioned, the Project site is designated as Specific Plan and subject to the Glen Helen Specific Plan, Destination Recreation District. The applicant proposes a SPA to the approved GHSP to amend the current Destination Recreation land use designation and incorporate the associated PDP to facilitate the proposed Project.

The Project would comply with CWP **Goal LU-1: Fiscally Sustainable Growth**, **Goal LU-2: Land Use Mix and Compatibility**, **Goal LU-3: Annexations and Sphere Development**, and **Goal LU-4: Community Design**. The Project complies with these different goals in different ways to help conform to the Land Use Element of the CWP. The proposed SPA and PDP would support the original intent of the GHSP DR District to provide low-intensity retail and commercial uses sensitive to the area's physical and environmental constraints.

Additionally, the proposed SPA and PDP would support CWP **Goal LU-1: Fiscally Sustainable Growth** in facilitating economically viable development that contributes to a thriving community. **Goal LU-1** also encourages the growth and development of fiscally sustainable development, and the Project helps to comply with this goal by providing development that will provide sustainable fiscal growth to the community. The SPA would offer additional opportunities for commercial and traveler services along the I-15 corridor and to an area currently underserved for commercial services. The Project would provide a variety of commercial, restaurant, grocery, and traveler accommodations such as a hotel and fuel stations creating economic activity in an area of the County that is currently lacking in all neighborhood's commercial and regional services. The PDP and SPA expand the existing allowable retail, residential and professional service uses and increase the variety of viable commercial opportunities that would contribute to the GHSP's vision of fostering future economic development.

The Project would also be compatible with CWP **Goal LU-2: Land Use Mix and Compatibility** and associated policies (**Policies LU-2.1**, **2.2**, and **2.3**), which calls for compatibility with existing uses, planned uses, and the natural environment as the new development relates to location, scaling, and buffer zones designed to minimize adverse impacts to adjacent areas and the surrounding natural environment. The PDP would support low-intensity development due to the location being zoned for Destination Recreation, which allows for low-intensity development to be built in the Project, which will help to reduce adverse effects and increasing cohesion with the surrounding low-intensity, Open Space Passive Recreation (OS/P) and Open Space/Active Recreation (OS/A) land uses.

CWP **Goal LU-3: Annexations and Sphere Development** guides the County by encouraging the development in spheres of influence that improve the community, and the Project helps to achieve this goal by adding commercial uses that will help the growth of the GHSP, the Rialto SOI, and the overall community. CWP **Goal LU-4: Community Design** helps to encourage the enhancement of the unique community identity and encourages community design; the Project helps to comply with this goal by providing design and development standards that help to promote the unique design of the Project site.

The Project has been prepared in conformance with the goals and policies of the CWP. It proposes to provide a broader range of allowable uses that are generally similar to those that are currently allowed, providing further clarity and more flexibility in developing a successful commercial/retail Project on an underutilized property, creating new employment opportunities, and providing regulations through the SPA and PDP as an implementation tool that would support the success of a developing area of the County.

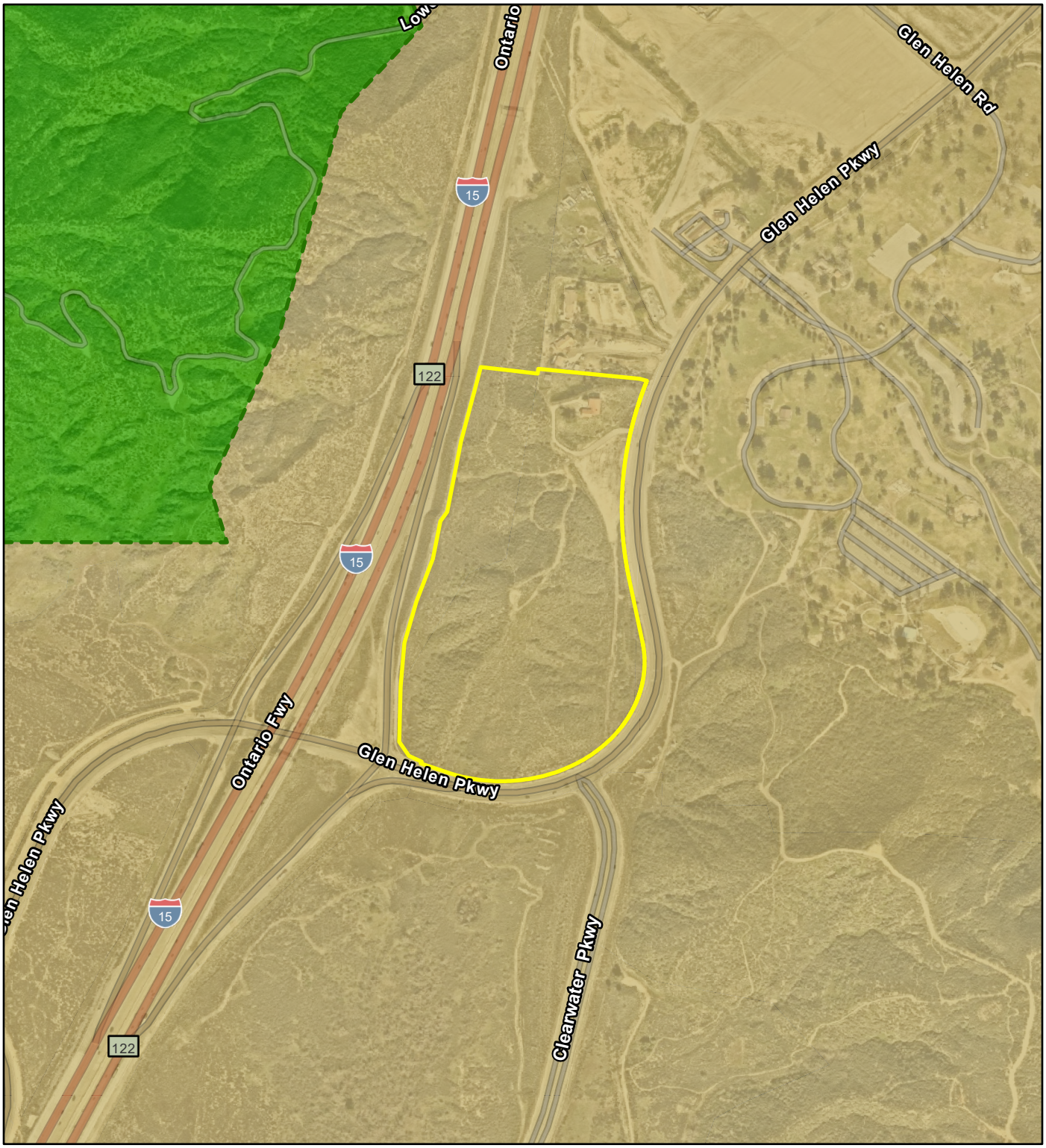
The CWP Land Use Element guides how the County should accommodate for development and arrange land uses to achieve the countywide vision. The Land Use Element provides goals and policies for land uses and development that add value to the community and the County in function, design, and fiscal value. The Land Use Element encourages access to infrastructure and services while preserving the open spaces that define San Bernardino County.

2.6.2 Glen Helen Specific Plan Amendment

The GHSP is a regulatory document that establishes the development standards and design guidelines for the entire Specific Plan area in a manner that is consistent with the CWP and Development Code. The Project site is presently zoned as GHSP-DR. The proposed SPA proposes minor changes in allowable uses within the existing GHSP-DR zone. The minor changes include clarifying the types of commercial retail uses and clarifying which uses are permitted outright or allowable subject to a Conditional Use Permit. The proposed changes would also add multi-family residential (with facilitation of a PDP) as an allowable use to provide flexibility to adapt to changing market conditions and to provide the County with additional residential zoning to meet Regional Housing Needs Assessment (RHNA) requirements. No residential uses are currently proposed by the Project, as represented by the Planned Development Permit; refer to **Figure 4**. Any future residential uses within the DR zone would be subject to separate County discretionary review and approval.

With an approved PDP within the GHSP, the Project would not be subject to the provisions within Chapter 1: Landscape Architectural Guidelines, Chapter 2: Site Planning Guidelines, Chapter 3: On-site Landscape Requirements, Chapter 4: Architectural Guidelines, Chapter 5: Signage Guidelines, Chapter 5L Lighting Guidelines, and Chapter 6: Hillside Development requirements, as Section 2.5: Development Standards will serve as the PDP's established guidelines for the Project.

The Project is consistent with the general provisions of the GHSP. The SPA and PDP are intended to guide development within the Project site that is in tune with the policies and guidelines of the GHSP, enabling an economically viable project that would help meet market demand and provide optimal economic and environmental benefits. The proposed SPA and PDP would result in a more efficient land use pattern and a broad range of land uses that enhance and provide needed services to the existing community and capture transit and tourist business along the I-15 corridor in Fontana, Rialto and Glen Helen. The Project represents a logical implementation of the DR District.



Legend

Project Site

Glen Helen Specific Plan

Land Use Categories

OS: Open Space

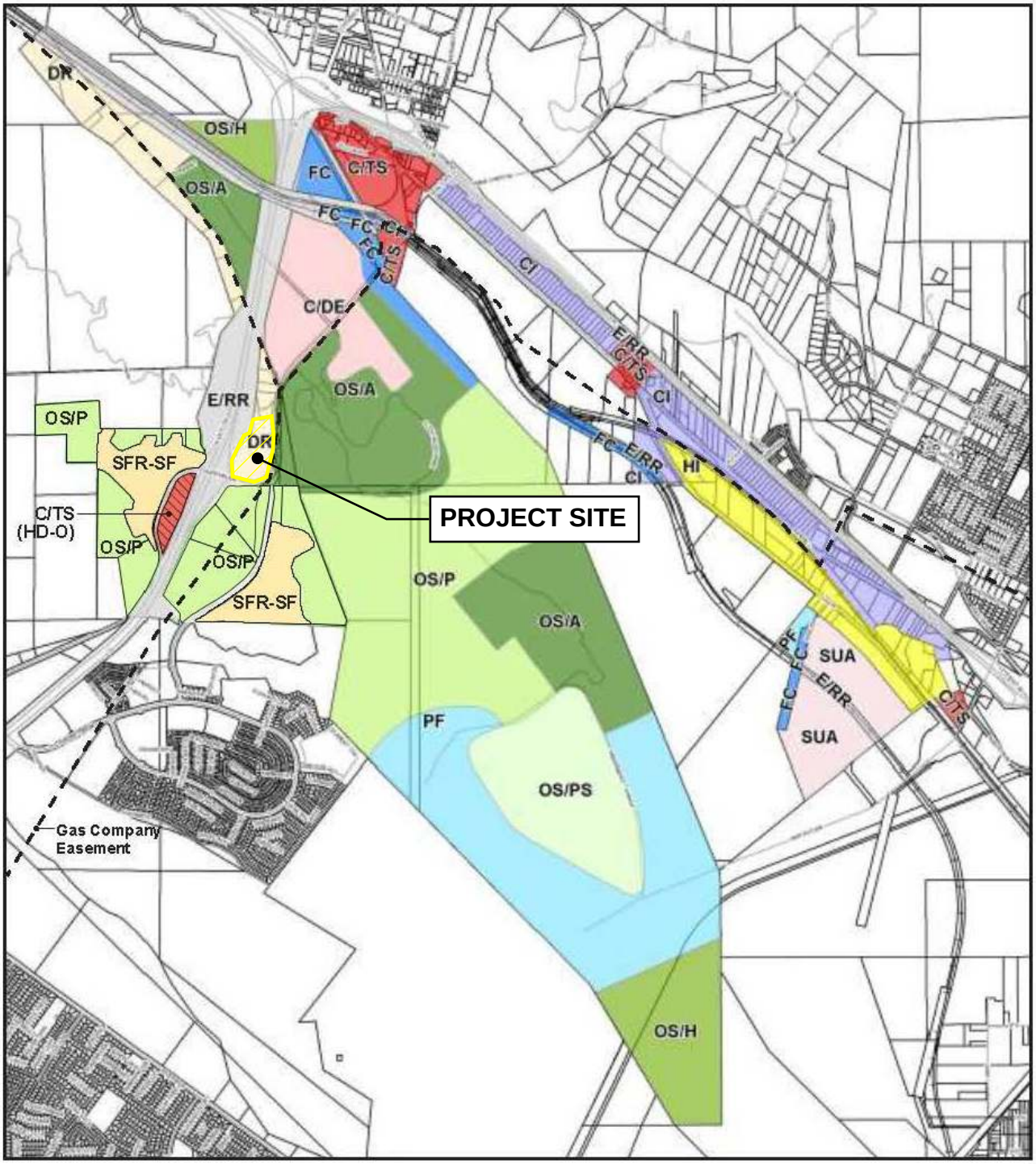
SD: Special Development

Source: County of San Bernardino, 2020; Nearmap, 2023.

FIGURE 6: Existing General Pan Land Use Designations
The Oasis at Glen Helen Parkway

Not to scale

Kimley»Horn



Land Uses

- Commercial/Destination Entertainment (C/DE)
- Commercial/Traveler Services (C/TS)
- Corridor Industrial (CI)
- Destination Recreation (DR)
- Existing Road/Railroad (E/RR)
- Flood Control (FC)
- Heavy Industrial (HI)
- Open Space/Active Recreation (OS/A)
- Open Space Passive Recreation (OS/P)
- Open Space Habitat Preserve (OS/H)
- Open Space/Public Safety (OS/PS)
- Public Facility (PF)
- Single Family Residential-Sycamore Flats (SFR-SF)
- High Density Overlay (HD-O)
- Special Use Area
- PDP/Site Plan Boundary

Note: the proposed Specific Plan Amendment would make minor changes to allowable uses for the entire area zoned DR within the Glen Helen Specific Plan (shaded in yellow color and marked "DR" per the zoning map legend).

Source: County of San Bernardino, December 2020.

FIGURE 7: Existing Zoning
The Oasis at Glen Helen Parkway

Not to scale

Kimley»Horn

3.0 HOUSING

3.1 Relationship of the Proposed Project to the Countywide Plan Housing Element

The CWP 2013-2021 Housing Element (last updated on September 9, 2022) contains goals, policies, and programs to address the state law requirements and the needs of our unincorporated communities. The County of San Bernardino also provides housing services to the County through the Housing Authority and Community Development & Housing Agency. The Proposed GH SPA allows residential as a permitted use and would allow multiple family dwelling units through the PDP process, to provide flexibility to adapt to changing market conditions and to provide the County with additional residential zoning to meet Regional Housing Needs Assessment requirements. At present, there are no residential uses proposed within the Project site, as represented by **Figure 4**.

Currently, the Project site is generally undeveloped surrounded by vacant land and roadway infrastructure to the west, south, and east with an existing vacant single-family residence as well as accessory structures located in the northern portion of the of Project site that have historically been used as an adjunct accessory uses to the Glen Helen Amphitheater operation. This structure, although constructed as a residence, has not been occupied consistently as a residence and has been vacant for a number of years as the structure was occupied as needed as a support structure to the Amphitheater operation. The structure would be demolished in connection with the development of the Project, compared to the existing larger housing availability in the region, the Project would not displace a substantial number of people or houses and would not necessitate the construction of replacement housing elsewhere due to the low to no displacement of residents, the existing structure being vacant, and the absence of other structures proposed for demolition. Any future residential uses within the DR zone would be subject to separate County discretionary review and approval.

4.0 PUBLIC SERVICES AND FACILITIES

The Project site is currently unoccupied. The only structures that exist on the Project site are a vacant single-family residence as well as other vacant structures that have historically been used as an adjunct to the Glen Helen Amphitheater operation. The Project would require new utility connections including water, wastewater, stormwater, electricity, natural gas, and telecommunications. The utility and public service providers that would serve the Project are detailed in **Table 6: Service Providers**.

Table 6: Service Providers

Service	Provider
Water	West Valley Water District
Wastewater	San Bernardino County Special Districts
Stormwater Drainage	San Bernardino County Flood Control District
Electric Service	Southern California Edison (SCE)
Gas Service	Southern California Gas Company (SoCal Gas)
Solid Waste Disposal	Burrtec
Telecommunications	Charter Communications and Frontier Communications
Fire Protection	San Bernardino County Fire Protection District (SBC Fire)
Police Protection	San Bernardino County Sheriff's Department
Schools	San Bernardino City Unified School District

4.1 Project Utilities and Infrastructure

4.1.1 Water Supply

The Project site is within West Valley Water District's (WVWD) sphere of influence and once the Project site is annexed to the district, would be served by WVWD. Currently, domestic water services are provided to the single-family residential properties to the north of the Project site. WVWD services would be extended and upsized as necessary to service the Project site.

4.1.2 Wastewater/Sewage Disposal

Sewer service is provided by San Bernardino County Special Districts. The Project site is in County Service Area 70 GH Glen Helen.

4.1.3 Stormwater Drainage

The existing drainage pattern for the Project site is characterized by sheet flow. Under existing conditions, the Project site naturally drains from the peaks of the hills towards the Project boundaries. Stormwater infrastructure within Glen Helen Parkway consists of curb and gutter providing shallow concentrated flows to the southwest toward existing discharge points. There is an existing V-shaped concrete ditch on the western portion of the Project site within the Caltrans right-of-way of I-15. Flows are directed southerly to an inlet structure at the northeast corner of the intersection of Glen Helen Parkway and the northbound I-15 on-ramp. These flows are directed further south via underground stormwater conveyance infrastructure and daylighted approximately 400 feet south. Flows intercepted by Glen Helen Parkway on the northern and northeastern portion of the Project site are conveyed via curb and gutter where it is channelized into existing underground infrastructure.

4.1.4 Electric Service

There is an existing aboveground/overhead 12-kilovolt (kV) distribution power line and wood poles that run along the eastern portion of the Project site owned and operated by Southern California Edison (SCE).

As part of Project implementation, these power lines would be relocated and undergrounded within and along the public right of way of Glen Helen Parkway. Additional electrical infrastructure would be installed to provide electricity to the Project site and individual developments within the Project site. Southern California Edison has provided the Project Applicant with will serve letters notifying that electrical services would be provided to the Project site.

4.1.5 Gas Service

The Project site is served gas by the Southern California Gas Company (SoCal Gas) through existing transmission lines that run east of the site, connecting to a high-pressure distribution line to the north.

4.1.6 Solid Waste Disposal

The Project is expected to generate solid waste during the temporary, short-term construction and during the operational phase of the Project. The site would be provided solid waste disposal services by Burrtec, which currently serves the developed areas within the GHSP area. The solid waste generated on-site would be brought to Mid-Valley Sanitary Landfill in Rialto, about 3.5 miles south of the Project site. The Mid-Valley Sanitary Landfill has a daily, maximum permitted throughput of 7,500 tons. Additionally, the Mid-Valley Sanitary Landfill has 61,219,377 cubic yards of remaining capacity, as of 2019 – the date of latest available data, out of a maximum permitted capacity of 101,300,000.[2] The GHSP EIR and 2020 GHSP EIR Addendum analyzes solid waste generation impacts of the approved GHSP. Utilizing the disposal rates database produced by the California Integrated Waste-Management Board, the GHSP site at buildout would generate a total of 6,342 tons of solid waste per year. As identified by the County, the Mid-Valley Landfill will have sufficient capacity for another thirty years or more.

4.2 Cost and Financing for Utility Services and Infrastructure

The Master Developer is responsible for grading and design features related to infrastructure serving more than one parcel. Examples may include Project-wide grading, perimeter walls, fencing and gates, streets, and backbone utility facilities such as electric, stormwater, water, and sewer serving more than one parcel. The fourteen (14) parcels will be delivered for development with utility connections installed onsite for all 14 parcels. Each site developer will be responsible for all design features related to improvements (including utility connection and infrastructure improvements, such as water connections, sewer connections, electric connections, perimeter walls, fencing and gates, streets, and landscaping) located on each parcel being developed by the site developer.

Development of the PDP Project site would require new utility connections including water, wastewater, stormwater, electricity, natural gas, and telecommunications to serve the Project. All utilities shall be undergrounded where feasible or to the extent possible.

[2] CalRecycle. 2019. *SWIS Facility/Site Activity Details: Mid-Valley Sanitary Landfill (36-AA-0055).* https://www2.calrecycle.ca.gov/SolidWaste/SiteActivity/Details/1880?siteID=2662 (accessed October 2023).

Undergrounding of Utilities

The following standards apply to the undergrounding of utilities:

1. Utility service laterals to new development shall be installed underground.
2. Temporary overhead power and telephone facilities to only be permitted only during construction.
3. Placement, location, and screening of utilities of any kind, which cannot be installed underground and must be placed above ground for function and safety reasons, shall require written approval by the Director of Land Uses Services or the Planning Commission prior to any administrative or discretionary approval.
4. Transformer enclosures shall be designed of durable materials with finishes and colors used that are compatible and harmonious with the overall architectural theme.
5. All utilities including drainage systems, sewers, gas lines, water lines, and electrical, telephone, and communications wires and equipment shall be installed and maintained underground. Placement, location, and screening of utilities of any kind, which cannot be installed underground and must be placed above ground for function and safety reasons, require written approval by the Director of Land Uses Services or the Planning Commission before any administrative or discretionary approval.

The Developer shall pay all Development Impact Fees (DIF) as required to offset any impacts to public facilities including repayment of infrastructure bonds, public improvements, and public facilities (County drainage Improvements, Street improvements, etc.).

The construction of dry utilities infrastructure to serve the Project is anticipated to be funded through private financing. Although, currently anticipated to be private financing, infrastructure improvements may be funded through both private and public financing as appropriate. The current estimated cost for utility improvements is $477 per lineal foot over the 3,135 feet of frontage based on preliminary costs estimates (2023). This cost is subject to change based on when the infrastructure is installed and the cost of materials, labor, and rates at the time of construction.

Table 6 identifies the local utilities that will be required to serve the Project. It is anticipated that construction of the local utility facilities will be financed by a combination of private equity, development loan proceeds, and community facilities district/assessment district financing. It is anticipated that the utility facilities will be maintained through the use of one or more public maintenance districts.

Pursuant to CWP **Policy IU-3.5**, the Project applicant would be required to pay its fair share of capital costs to maintain an adequate capacity of the County's regional flood control systems.

4.3 Relationship of the Proposed Project to the Countywide Plan Infrastructure and Utilities Element

The Project site is predominately vacant and there is limited utility infrastructure to the site. The Project site is minimally served by water, power, and natural gas, as described above. A domestic water service connection is provided to the vacant structure located in the northern portion of the Project site, although the connection is not currently in service. The Project site would tie into existing utility lines within the

existing roadways and rights-of-way adjacent to the site. The Project would be required to connect to the following utilities:

- Domestic water supply and distribution (West Valley Water District)
- Wastewater facilities (San Bernardino County Special Districts)
- Electricity (SCE)
- Natural gas (Southern California Gas Company [SoCal Gas])
- Communication systems (Frontier Communications)
- Solid waste (Burrtec)

The CWP Infrastructure and Utilities Element sets goals and policies to ensure the adequate supply of potable water, the safe disposal, treatment, and recycling of wastewater, and the recycling and safe disposal of solid waste. The Project is subject to CWP **Goal IU-1: Water Supply**, which requires that all new developments have sufficient water supply and infrastructure to meet the needs of potential future residents and businesses that are resilient to drought. Upon Project development, water infrastructure and services would be extended and upsized as necessary to service the Project site. Additionally, **Policy IU-1.6: User Fees** requires that water systems that are operated by County Special Districts establish user fees that cover operation and maintenance costs and set aside adequate reserves for capital upgrades and improvements. Similarly, **Policy IU-3.5: Fair Share Requirements** requires that new development pay its fair share of capital costs to maintain adequate capacity of the County's regional flood control systems.

The Project would also comply with CWP **Policy IU-4.3: Waste Diversion**, which requires that the Project shall meet or exceed state waste diversion requirements, augment future landfill capacity, and reduce greenhouse gas emissions and use of natural resources through the reduction, reuse, or recycling of solid waste.

CWP **Policy IU-4.3** requires the County and its subsequent projects to meet or exceed the state waste diversion requirements such as those outlined in California Assembly Bill (AB) 341. AB 341 would require that at least 75 percent of waste generated from construction activities be diverted to recycling centers. The Project would comply with local measures such as County Code Section 46.0602, which requires the diversion of commercial solid waste to adequate facilities in accordance with state laws.

4.4 Public Services

4.4.1 Fire and Police Protection

Police protection services are provided by the County of San Bernardino Sheriff's Department out of the Central Station located at 655 East Third Street, San Bernardino, CA 92415, approximately 10.5 miles southeast of the PDP area. Sheriff's Department Deputies at the Central Station work closely with the surrounding agencies of Fontana Police, Rialto Police, Rancho Cucamonga Police, and Riverside Sheriff to service the area.

Fire Protection services are provided by the San Bernardino County Fire Protection District or responsible agency as conditioned by the County through mutual agreement. The PDP area is located within Division 2 (East Valley), with two stations in close proximity. Those stations are Station 2 located at 1511 Devore

Road in San Bernardino (approximately 1.5 mile north from the PDP area) and Station 232 located at 6065 N. Palm Avenue in San Bernardino (approximately 3.1 miles east from the PDP area).

The Project would provide a parcel for the future construction of a new Fire and Sheriff Station on the northeast corner of the Project site. This station would be designed to provide access, operations, and personnel to support the community including sizing the facility to adequately respond to emergency calls within the Project area.

4.4.2 Schools

The Project site is located within the San Bernardino City Unified School District. While residential uses are allowable within the Project site, no residential or growth-inducing uses are proposed under the PDP nor would any of the proposed uses result in an increased demand for schools.

4.4.3 Other Public Facilities

Other public facilities refer to libraries and government buildings that serve the population within the jurisdiction. The Project construction and operation would not require the physical modification of any of the County's public facilities or the construction of new public facilities, nor does the PDP include the development of other public facilities. However, public government or civic uses would be permitted within the DRD (Destination Recreation District) zoning within the GHSP.

4.16 Cost and Financing for Public Services

Any new development or improvement of real property within the limits of the County shall be subject to the imposition of fees for capital improvements necessary to provide public services. The County may allow partial or complete satisfaction of the fee required through execution of an agreement requiring construction of public improvements and/or dedication of property.

Pursuant to CWP **Policy LU-1.5: Development Impact Fees**, the Project applicant would be required to pay its fair share of DIFs to help offset incremental impacts to public services and infrastructure, including fire protection, police protection, schools, parks, and other public facilities, by helping fund capital improvements and expenditures. Through the payment of development impact fees by the Project, public services would receive increased capital and, funding that would be available to expand services as needed to meet rising demand.

The Project is required to comply with the provisions of the County of San Bernardino Fire Protection District Ordinance (Ordinance No. FPD 20-01), which requires a fee payment for any developments requiring permitting that the County applies to the funding of fire protection facilities. Fees are exacted on new development to pay for new police facilities. DIFs would also be required to help offset incremental impacts to libraries by helping fund capital improvements and expenditures.

Based on San Bernardino City Unified School District fees, effective April 10th, 2023, the Project would incur $0.78 per square foot for new covered and enclosed commercial and industrial spaces. Based on the proposed PDP, which proposes approximately 207,900 square feet of maximum building area, the Project could potentially incur about $160,000[3] in school impact fees to the San Bernardino City Unified School District. Upon payment of fees, or determination that none are due, a Certificate of Compliance will be

[3] 202,700 maximum building square footage (excluding public facility uses, i.e., the fire/police station) x $0.78 = $158,106.

issued by the San Bernardino City Unified School District Facilities Planning and Development Department to be presented to County officials when obtaining building permits.

It is anticipated that construction of public facilities will be financed by a combination of private equity, development loan proceeds, and community facilities district/assessment district financing. It is anticipated that the public facilities will be maintained through the use of one or more public maintenance districts.

Furthermore, the Project would provide a parcel for the future construction of a Fire/Police station to provide service to the region of the County.

4.17 Relationship of the Proposed Project to the Countywide Personal and Property Protection Element

The CWP Personal and Property Protection Element sets goals and policies for the continuous improvement of public safety including County-provided Sheriff/law enforcement and fire protection. As mentioned above, the Project Applicant would coordinate with the County Fire Protection District and Sheriff's Department to provide an on-site Fire/Sheriff's station.

The Project would facilitate the Sheriff's Department's fulfillment of CWP **Policy PP-1.7: Community partnerships**, which supports community partnerships with the Sheriff's Department to help identify and improve public safety services to unincorporated communities. Furthermore, the Project would be designed to comply with CWP **Policy PP-3.7: Fire safe design** which requires new development within the Fire Safety overlay, to include additional site design, building, and access standards to provide enhanced resistance to fire hazards.

As mentioned above, the Project would comply with CWP **Policy LU-1.5** which requires that new development pay its fair share of DIFs to help offset incremental impacts to public services and infrastructure, including fire protection, police protection, schools, and other public facilities, by helping fund capital improvements and expenditures.

5.0 CIRCULATION

5.1 Existing Setting

Southern California has a recognized problem with mobility, traffic, and congestion. The problem, both at a regional and local level, has been intensely studied in the context of direct mobility-related actions and other regulatory programs.

5.1.1 Regional Circulation

The Project site has regional access via I-215, located approximately two miles north of the Project site, and I-15, located adjacent to the Project site's western border. I-215 is a commuter freeway that joins several of the Inland Empire communities. I-215 is a north-south connector that runs from the I-15 connector in the City of Temecula to the south and runs to the north, where it shifts westerly to Devore and connects back with I-15 to the south of Cajon Pass. I-215 runs northwest from the City of San Bernardino and is currently a four-lane facility.

I-15 is a primary eight-lane facility that provides a north-south link between the Inland Empire to San Diego to the south and connects to Las Vegas and beyond to the northeast. State Route (SR) 210 is located six miles southwest of the Project site, a major transportation route between Los Angeles to the west and connects to the eastern parts of the Inland Empire.

The Ontario International Airport is approximately 15 miles southwest of the Project site on the south side of I-10 at Archibald Avenue. The San Bernardino International Airport is 12 miles southeast of the Project site located at the southeast corner of Del Rosa Drive and 3rd Street.

5.1.2 Local Circulation

At the local circulation level, all personal trips in and through the County of San Bernardino are by automobile or through public transit such as Metrolink and Omitrans, and most industrial traffic is made by truck, with some goods being transported by rail. The County of San Bernardino has a well-developed system of highways and streets, which serves the existing traffic volumes with the exception except for rush hour traffic. Problematic areas are expected to increase as more development increases roadway traffic.

Major north-south arterials in the region include Sierra Avenue, Citrus Avenue, and Beech Avenue (from east to west). Sierra Avenue is a two-lane facility that connects with I-15 at the north and runs to the south, and interchanges with SR-210. Citrus Avenue is a four-lane facility that runs from I-15 from the north to SR 210 to the south. Beech Avenue is a four-lane facility that connects I-15 from the north to SR-210 to the south.

Major east-west arterials in the Project area include Sierra Lakes Parkway, Summit Avenue, and Riverside Avenue (from south to north). Sierra Lakes Parkway is a four-lane facility that runs parallel to SR 210, connecting Beech Avenue from the west to Riverside Avenue on the east. Summit Avenue is a four-lane facility that runs from I-15 from the west to Sierra Avenue to the east. Riverside Avenue is a four-lane facility that runs from the northwest of I-15 to the southeast, where it interchanges with SR 210.

Glen Helen Parkway borders the Project site on the east and south. The Glen Helen Parkway is a four-lane parkway that runs the border to the south and east of the Project site with an interchange to the southwest at I-15 and connects with I-215 to the north near the I-15 and I-215 interchange. The Clearwater

Parkway is a four-lane parkway that intersects with the Glen Helen Parkway from the north and connects Sycamore Creek Drive to the south.

A well-developed network of local commercial and residential streets is to the south and east of the Project site plan that utilizes a general grid pattern.

5.1.3 Railroads

Metrolink is a commuter rail system serving the southern California region, including Los Angeles, Orange, Riverside, San Bernardino, and Ventura counties, as well as the City of Oceanside in northern San Diego County. There is no existing Metrolink stations that would serve the Project within the general vicinity of the Project site. An existing privately owned main rail line traverses the Cajon Pass to the north of the Project site and is owned and operated by Burlington Northern Santa Fe (BNSF) railroad and Union Pacific. Currently, no transit services are provided at the Project site.

5.2 Circulation Plan

A traffic study for the Oasis at Glen Helen Parkway Project was prepared by David Evans and Associates Inc. and is included as **Appendix B: General Plan Level of Service Conformance Analysis and Vehicle Miles Traveled (VMT) Screening Assessment**.

5.2.1 Trip Characteristics

The Project would have two distinct trip characteristics due to the Project being a local serving retail and freeway-oriented commercial retail center, which would affect the area roadway network daily. The local-serving retail and freeway-oriented commercial retail center would have typical commuter traffic patterns, occurring year-round, Monday through Friday.

The Project would primarily have trips generated by local serving retail and freeway-oriented commercial retail center development, which need access to the site as a convenient interim stop while traveling between an origin and destination and thus defined as a primary trip. Since the Project is in a rural undeveloped area with few nearby residents and businesses, most of the traffic on I-15 is generally considered as long-distance automobile and truck trips for various purposes such as commuting, freight hauling, regional travel, and tourism. These trips are consistent with primary, passer-by, and diverted trips for convenience and highway-oriented land uses. Since the trips are primarily for interim stops while traveling, the Project is estimated to generate roughly 32,000 daily trips to the area, with 2,300 AM and 2,300 PM trips during peak hours of 7:00 am to 9:00 am and 4:00 pm to 6:00 pm.

5.2.2 Vehicles Miles Traveled (VMT) Screening Assessment

David Evans and Associates, Inc. conducted a Vehicles Miles Traveled (VMT) Screening Assessment for the site to determine if a detailed VMT analysis will be required to identify transportation impacts under CEQA using San Bernardino County's VMT screening criteria; provided as **Appendix B**. The Project would primarily attract trips from existing users of the services offered by the Project who are currently traveling farther to obtain the same services, especially on I-15 but also in the surrounding communities. The Project land uses are defined as local serving retail but also align with the subcategory of a freeway-oriented commercial. The Project site can be regarded and defined as a combination of local serving neighborhood/community retail and freeway-oriented commercial.

As shown in **Figure 4**, the Project site is anchored by a supermarket, drugstore, and health club/gym, which all have floor areas of less than 50,000 square feet and are land uses classified as

neighborhood/community retail or personal services. The hotel on site is not a destination but a local serving hotel serving visitors to the Glen Helen recreational and entertainment venues or to serve travelers on I-15. The remaining uses on the Project site are drive-through restaurants, casual sit-down restaurants, or convenience markets with gas stations, all local serving and for travelers on I-15.

Table 7: Summary of Rates for Pass-By and Diverted Link Trips for Freeway-Oriented Uses in the Project summarizes the Institute of Transportation Engineers (ITE) data for freeway-oriented retail as the average percentage of total trips that are pass-by, diverted link, or primary from the 11th edition of Trip Generation and presents the proportion of the Project's estimated PM peak hour trips into the three trip types. This assessment presents evidence that the Project meets the criteria of a local-serving retail center and a freeway-oriented commercial center that further reduces the VMT produced by the Project compared to an alternative Project without freeway-oriented land uses.

Table 7: Summary of Rates for Pass-by and Diverted Link Trips for Freeway-Oriented Uses in the Project

Land Use	ITE Land Use Code	Percent of Total Traffic by Trip Type		
		Pass-By	Non-Pass-By Trips	
			Primary	Diverted Link
Pass-by, Diverted Link, and Primary Trip Data from ITE Trip Generation				
Supermarket (Grocery Store)	821	24%	48%	28%
Pharmacy/Drugstore with Drive-Through	881	51%	40%	14%
High-Turnover Sit-Down Restaurant	932	43%	37%	20%
Fast Food Restaurant with Drive-Through (AM Peak)	934	50%	27%	28%
Fast Food Restaurant with Drive-Through (PM Peak)		55%	30%	19%
Convenience Store/Gas Station (AM Peak)	945	70%	18%	22%
Convenience Store/Gas Station (PM Peak)		70%	16%	28%
Total PM Peak Hour Pass-By, Diverted Link, and Primary Trips Estimated for the Proposed Project				
Estimated Proportion of Trips by Type for Project Land Uses: Supermarket, pharmacy/drugstore with drive-through, high turnover sit-down restaurant, fast food restaurant with drive-through, and convenience market with gas station.	821, 881 (Pass-by)	45%	32%	23%
	932, 934 (Diverted link)			
	945 (Primary trips)			
Source: *General Plan Level of Service Conformance Analysis and Vehicle Miles Traveled (VMT) Screening Assessment* by David Evans and Associates				

Based on the information from the VMT Screening Assessment from David Evans and Associates, Inc., the Project is comprised of local serving retail with buildings under 50,000 square feet, which satisfies the County's criterion that local serving retail under 50,000 square feet (per building) is presumed to have a less-than-significant impact and does not require a detailed VMT analysis under CEQA. The Project's proposed commercial uses (restaurants, gas stations, convenience stores, etc.) in serving the I-15 would primarily generate traffic from commuters, thus creating minimal new Project trips. Due to the absence of nearby commercial retail in the area, the Project would create more local serving trips from nearby

residential communities, such as Rosena Ranch, thereby reducing the VMT. The Project would not create a cumulative impact in generating more VMT than initially analyzed under the previous EIR.[4]

5.2.3 Trip Generation

David Evans and Associates, Inc. developed a projection of trip generation for the Project based on anticipated trip characteristics using the 11th Edition of the ITE Trip Generation with trip rates for the AM and PM Peak Hours of the Adjacent Street Traffic (AST). The Project impact would primarily be from trips that access the site as a convenient interim stop while traveling between an origin and destination that is their primary trip. These trips are considered "diverted link trips" or "pass-by trips." The ITE Trip Generation Handbook describes a diverted-link trip as, "*adding traffic to streets adjacent to a site and could remove traffic on streets from which it diverted*." The ITE Trip Generation Handbook defines a pass-by trip as being attracted by traffic passing the site on an adjacent street or roadway that offers direct access to the generator. Diverted-link trips for the Project are diverted from I-15 and then returned to their original route using the same reverse path of travel. Pass-by trips would come from Glen Helen Parkway, which fronts the Project site and would have direct access to the Project site via two driveways.

Due to the Project being in a rural undeveloped area with few nearby residents or businesses, most of the traffic on I-15 is considered as long-distance trips for various purposes, including commuting, freight hauling, regional travel, and tourism. All the diverted-link and pass-by trips are assigned to the Project's primary driveway (52 foot wide in total with a 4-foot-wide center divider) to maximize the traffic entering and exiting and to help accommodate high traffic volumes.

Table 8: Estimated Project Trip Generation provides the Project's estimated trip generation based on trip generation rates representing the Peak Hour of the AST for the morning and afternoon periods. Based on **Table 8,** the proposed Project is estimated to generate 32,327 daily trips, 2,366 AM and 2,336 PM trips during the peak hours, and a 10 percent trip reduction is applied to the Project trip generation due to internalizations of trips between the site's land uses. Primary trips are the smallest component of the Project's total trip generation based on ITEs (Institute of Transportation Engineers) surveys of hundreds of similar commercial land uses and centers, which the Project is estimated to generate 29,094 daily primary trips, 716 primary AM peak hour trips, and 674 primary PM peak hour trips.

Table 8: Estimated Project Trip Generation

Use		Size/Quantity	Daily	AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
1	**Hotel-Land Use Category (ITE 310)**								
	Per 1,000 Sq. Ft. GLA	130	7.99	0.26	0.2	0.46	0.3	0.29	0.59
	Trips		1,039	33	27	60	40	38	78
	International Trip Capture (10%)		104	4	3	7	4	4	8
	Adjusted Sub-Total Trips		935	29	24	53	36	34	70
2	**Fitness Center - Land Use Category (ITE 492)**								
	Per 1,000 Sq. Ft. GLA	40,000	34.5	0.67	0.64	1.31	1.97	1.48	3.45
	Trips		1,380	27	26	53	79	60	139
	International Trip Capture (10%)		138	3	3	6	8	6	14
	Adjusted Sub-Total Trips		1,242	24	23	47	71	54	125
3	**Shopping Plaza (40-150k) - Supermarket - Yes - Land Use Category (ITE 821) - 2 Buildings**								

[4] *General Plan Level of Service Conformance Analysis and Vehicle Miles Traveled (VMT) Screening Assessment* by David Evans and Associates, Pg. 6 – 7.

	Use	Size/Quantity	Daily	AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
	Per 1,000 Sq. Ft. GLA	30,500	94.49	2.19	1.34	3.53	4.33	4.7	9.03
	Trips		2,882	67	41	108	132	144	276
	International Trip Capture (10%)		288	7	4	11	13	14	28
	Adjusted Sub-Total Trips		2,594	61	37	98	119	129	248
	Diverted Link Trips (0%/0%/29%)		0	0	0	0	35	38	73
	Pass-by Trips (0%/0%/29%)		0	0	0	0	35	38	73
	Primary Trips (100%/100%/38%)		2,594	61	37	98	49	53	102
4	**Pharmacy/Drugstore with Drive-Through Window - Land Use Category (ITE 881)**								
	Per 1,000 Sq. Ft. GLA	15,000	108.4	1.94	1.8	3.74	5.13	5.13	10.25
	Trips		1,626	29	27	56	77	77	154
	International Trip Capture (10%)		163	3	3	6	8	8	15
	Adjusted Sub-Total Trips		1,463	27	25	52	70	70	140
	Diverted Link Trips (0%/0%/13%)		0	0	0	0	9	9	18
	Pass-by Trips (0%/0%/49%)		0	0	0	0	34	34	68
	Primary Trips (100%/100%/38%)		1,463	27	25	52	27	27	54
5	**Convenience Store/Gas Station (VFP 16-24) - Land Use Category (ITE 945) - PAD 7 and PAD 8**								
	Per 1,000 Sq. Ft. GLA	10,600	1283.38	45.68	45.68	91.35	39.48	39.48	78.95
	Trips		13,604	485	485	970	419	419	838
	International Trip Capture (10%)		1,360	49	49	97	42	42	84
	Adjusted Sub-Total Trips		12,244	436	436	872	377	377	754
	Diverted Link Trips (0%/21%/31%)		0	92	92	184	117	117	234
	Pass-by Trips (0%/63%/57%)		0	275	275	550	215	215	430
	Primary Trips (100%/16%/12%)		12,244	69	69	138	45	45	90
6	**Fast-Food Restaurant with Drive-Through Window - Land Use Category (ITE 934) - Pads 1-6**								
	Per 1,000 Sq. Ft. GLA	22,800	467	22.75	21.86	44.61	17.18	15.85	33.03
	Trips		10,659	519	498	1,017	392	362	754
	International Trip Capture (10%)		1,066	52	50	102	39	36	75
	Adjusted Sub-Total Trips		9,593	467	449	916	353	326	679
	Diverted Link Trips (0%/21%/31%)		0	131	126	257	67	62	129
	Pass-by Trips (0%/63%/57%)		0	215	207	422	180	166	346
	Primary Trips (100%/16%/12%)		9,593	121	116	237	106	98	204
7	**High-Turnover (Sit-Down) Restaurant - Land Use Category (ITE 932) - 2 Buildings**								
	Per 1,000 Sq. Ft. GLA	10,600	107	5.26	4.31	9.57	5.52	3.53	9.05
	Trips		1,137	56	46	102	59	38	97
	International Trip Capture (10%)		114	6	5	10	6	4	10
	Adjusted Sub-Total Trips		1,023	51	42	93	53	34	87
	Diverted Link Trips (0%/0%/26%)		0	0	0	0	14	9	23
	Pass-by Trips (0%/0%/38%)		0	0	0	0	21	13	34
	Primary Trips (100%/100%/36%)		1,023	51	42	93	18	12	30
	Sub-Total Trips (Unadjusted Trips at Driveways)		**32,327**	**1,216**	**1,150**	**2,366**	**1,198**	**1,138**	**2,336**
	Internal Trip Capture (10%)		3,233	122	115	237	120	114	234
	Trips Adjusted for Internal Capture		29,094	1,094	1,034	2,129	1,076	1,021	2,102
	Diverted Link Trips		0	223	218	441	242	235	477
	Pass-by Trips		0	490	482	972	485	466	951

Use	Size/Quantity	Daily	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Primary Trips		**29,094**	381	334	716	349	320	**674**
Source: *General Plan Level of Service Conformance Analysis and Vehicle Miles Traveled (VMT) Screening Assessment* by David Evans and Associates								

Project traffic distribution for peak traffic times was developed based on research of potential origins, availability of accommodations for visitors, and available transportation modes. Project traffic was then assigned manually to study roadways based on the logical access routes and the proposed traffic management plan. **Appendix B: General Plan Level of Service Conformance Analysis and Vehicle Miles Traveled (VMT) Screening Assessment** discussed the Project traffic volume assignment on the study roadway network during peak hours to determine if projected traffic volumes would have substantial impacts on the region. The VMT Screening Assessment concluded that the Project is estimated to generate 29,094 daily primary trips, 716 AM primary AM peak hour trips, and 674 primary PM peak hour trips. The projected traffic volume level was found not to have a minor impact on the regional traffic volumes.

5.2.4 Site Access

Figure 4: Planned Development Permit illustrates that primary access to the Project will be from the Glen Helen Parkway (two access points)**.** Several freeway interchanges will be utilized to provide regional access to the site, including:

- Primary access from Interstate 15 (I-15) will be at the Glen Helen Parkway interchange.
- Primary access from Clearwater Parkway will connect the Rosena Ranch residential community to the south at the Glen Helen Parkway interchange.
- Secondary access from Interstate 215 (I-215) will be at the I-215/Devore Road interchange.

Surface street access to the Project will occur primarily from Glen Helen Parkway with two Project driveways.

5.2.5 Approximate Cost

The construction of onsite and offsite road improvements to serve the Project is anticipated to be $477 per linear foot based on preliminary costs estimates (2023). The costs for construction of the roads are subject to change due to changing construction material costs, labor costs, maintenance costs, etc. Additionally, the Project is required to adhere to the requirements of the Regional Transportation Development Mitigation Plan Area and Fee Schedule (Plan Fee), which requires any new development to pay for impacts to transportation that might occur from the new development. The Plan Fee shall be paid to the Land Use Services Department. The Plan Fee shall be computed in accordance with the Plan Fee Schedule in effect as of the date that the building plans are submitted, and the building permit is applied for. The Plan Fee is subject to change periodically. Transportation DIFs include $3,537 per room for hotel/motel uses within the Project site, $13 per square foot of commercial retail development, and $8 per square foot for commercial office development (based on the date of the PDP and subject to change with County fee increases).[5]

[5] County of San Bernardino. 2023. Interactive Fee Schedule. https://wp.sbcounty.gov/ezop/feesearch/ (accessed August 2023).

5.2.6 Financing

Financing of all Project-related improvements may be considered through construction and maintenance bonds or other forms of financing including formation of a maintenance district(s). Financing districts may be considered as part of the PDP approval and subject the County's Land Development and Special Districts Department approval. Formation of a maintenance district(s) is required prior to installation of improvements for the future management and to fund the maintenance and operations of the proposed improvements that will be funded and developed by the Project/Developer. Regional Transportation Development Mitigation Fee Plan Area for the Fontana Subarea. Any Regional Transportation Development Mitigation Plan Fee (Plan Fee) shall be required to be paid in accordance with the Plan Fee Schedule in effect as of the date that the building plans are submitted and the building permit is applied for.

The construction of onsite and offsite road improvements to serve the Project is anticipated to be $477 per linear foot based on preliminary costs estimates (2023). However, due to increases in material and labor costs related to construction or maintenance further funding might be necessary to fund the improvements. The Project anticipates funding the improvement through private financing but may choose to fund both construction and maintenance with both private and public funding options, such as construction and maintenance bonds, or other forms of financing including formation of a maintenance district(s). Financing districts may be considered as part of the PDP approval and subject the County's Land Development and Special Districts Department approval.

It is anticipated that construction of circulation facilities will be financed by a combination of private equity, development loan proceeds and community facilities district/assessment district financing. It is anticipated that the circulation facilities will be maintained through the use of one or more public maintenance districts.

5.2.7 Relationship of the Proposed Project to the Countywide Plan Transportation & Mobility Element

The CWP Transportation & Mobility Element sets goals and policies to help manage and provide guidance for San Bernardino County's transportation and mobility system. Given the Project's settings, the CWP Transportation & Mobility Goals that would relate to the Project are CWP **Goal TM-1: Roadway Capacity**, **Goal TM-2: Road Design Standards**, **Goal TM-3: Vehicle Miles Traveled**, **Goal TM-4: Complete Streets, Transit, and Active Transportation**, and **Goal TM-5: Goods Movement**. The goals and policies of the CWP Transportation & Mobility Element are multi-faceted but highlight the need for a balance between the several types of land uses in the area and multiple modes of transportation that help to serve these land uses effectively.

According to **Appendix B: General Plan Level of Service Conformance Analysis and Vehicle Miles Traveled (VMT) Screening Assessment**, the Project would exacerbate the traffic to the mid-week, peak hour congestion currently in San Bernardino County, mainly because the most significant operations will occur from vehicle trips that access the site as a convenient interim stop while traveling between an origin and destination of which is the motorist's primary trip. However, the Project comprises local serving retail with buildings under 50,000 square feet, which satisfies the county's criterion that local serving retail under 50,000 square feet (per building) is presumed to have a less-than-significant impact and does not require a detailed VMT analysis under CEQA. The Project's proposed commercial uses (restaurants, gas stations, convenience stores, etc.) in serving the I-15 would primarily generate diverted link and pass-by traffic, thus creating minimal new Project trips. The number of trips generated by a community and highway-oriented commercial retail center operating off a highway daily and year-round compared to the

proposed Project would be more significant due to no nearby availability of commercial retail in the area and the proposed commercial uses. The Project would create more local serving trips from nearby residential communities, such as Rosena Ranch, thereby having a less-than-significant impact and reducing the VMT. The Project's total of all commercial retail spaces combined would not create a cumulative impact in generating more VMT than initially analyzed under the previous EIR.

The Project would be subject to CWP **Goal TM-1** through **Goal TM-5,** as those goals relate to the road capacity, road design, vehicle miles traveled, different modes of transportation, and goods movement, which the Project will impact during construction, maintenance, and the ongoing usage of the Project. The Project would provide interior roads, drives and connections that would be designed appropriately to mitigate any impacts to the roadway capacity that would be affected by the Project. CWP **Goal TM-3: Vehicle Miles Traveled** establishes policies that promote VMT reduction throughout the region. The VMT analysis utilized the San Bernardino County Transportation Authority VMT Screening Tool and found that the Project does not require a detailed VMT analysis under CEQA. The Project would provide nearby residential communities with commercial retail opportunities that would create more local serving trips, thereby would reducing the VMT that is increased from the number of trips generated by diverted or pass-by traffic that visit the Project. The Project proposes using bike facilities to help promote multi-modal usage, incorporates publicly accessible parking areas that ensure the safety of pedestrians and bicyclists, and provides opportunities for the future expansion of public transit uses for regional connections. CWP **Goal TM-5: Goods Movement** promotes the efficient and sustainable movement of goods throughout the road, rail, and air transportation network that supports the logistics industry while minimizing congestion in unincorporated areas. The Project encourages the efficient and sustainable movement of goods through the Project area and helps to provide a regional connection for truck movement in the delivery of retail and service supplies (i.e., gasoline, diesel, perishables, groceries, office supplies, etc.).

5.2.8 San Bernardino County Congestion Management Program

San Bernardino Associated Governments (SANBAG) adopted its Congestion Management Program (CMP) in 1992 to improve regional air quality. The program was initiated after Proposition 11, which allocates a portion of State gasoline tax revenues to agencies meeting CMP criteria outlined in Government Code sections 65088 and 65089. In summary, the San Bernardino County CMP provides a mechanism to define the existing and future transportation network at a regional level. This will allow the County and other jurisdictions to systematically evaluate roadway service levels and analyze the impacts of new development more easily on the regional transportation system.

The CMP charges SANBAG with monitoring local agencies' implementation of the CMP, including adopting trip reduction and travel demand management ordinances and implementing the land use/transportation analysis program. The CMP implements the Land Use/Transportation Analysis analyze the impacts of land use decisions made by a local jurisdiction on regional transportation systems. As part of the Land/Transportation Analysis program if an area is outside the San Bernardino Valley and Victor Valley spheres of influence, which the Project site is, a local jurisdiction must prepare a Traffic Impact Analysis (TIA) for a proposed development project that exceed specified thresholds of trip generation. The TIA report includes a review of the proposed Project relative to its impact on the existing roadway network. For the proposed Project, the local agency is the County of San Bernardino.

The traffic analysis prepared for the Project is consistent with the CMP methodology. Because the CMP is based on managing ongoing weekday peak-hour traffic, the Project is therefore subject to CMP requirements.

6.0 CONSERVATION, PRESERVATION, AND OPEN SPACE

6.1 Existing Setting

A Habitat Assessment was conducted by ELMT Consulting (**Appendix C**: **Habitat Assessment**), which evaluated the Project site to establish baseline conditions of the environment and to assess the site for the potential for special-status plants and wildlife species to occur within the Project site that could pose an environmental constraint to implementation of the Project. The following existing settings were established and derived from **Appendix C**.

6.1.1 Existing Landform

The vacant site consists of undeveloped land except for dirt access roads and a single structure, associated with the Glen Helen Regional Park, with two hills. The Project site is bordered by existing roads that lie to the west, south, and east separating the Project site from open areas to the west, south, and east. Residential developments and disturbed areas to the north border the Project site. The southern portion of the Project site consists of a larger hill structure, and the smaller hill is in the site's northern part.

6.1.2 Biological Resources

Vegetation

The Project site is an undisturbed area that supports natural plant communities. The Project site has two natural plant communities: the Riversidean sage scrub (RSS) and the mulefat scrub. The Project site also has two land cover types: disturbed and developed.

Most of the Project site supports a Riversidean sage scrub plant community that is dense and mature throughout the site on the steep hillsides. The mulefat scrub plant community is located on the Project site's southeast corner in a topographic low spot between the hillside to the west and Glen Helen Parkway to the east.

Disturbed areas refer to unpaved or dirt areas routinely exposed to anthropogenic disturbances and typically do not comprise a plant community. Surface soils within these areas lack vegetation or support non-native and weedy plants. Disturbed areas encompass an unimproved dirt access road and the land immediately adjacent to the rural structure on the northern boundary of the Project site. Developed areas within the Project site consist of paved or impervious surfaces, which include a paved road and an existing structure, associated with the Glen Helen Regional Park, on the northern border of the Project site.

Wildlife

The Project site provides limited habitats for wildlife species except those adapted to a high degree of anthropogenic disturbances and development. No fish, amphibians, or hydrogeomorphic features (e.g., perennial creeks, ponds, lakes, reservoirs) that would provide suitable habitats for fish or amphibians are on or near the Project site. The Project site is suitable for some common reptilian species. However, no reptiles were observed at the Project site. Common mammalians can occur within the Project site, but no bat species are expected to occur due to a lack of suitable roosting habitat. The Project site and surrounding area provide suitable foraging and nesting habitat for year-round and seasonal bird species that allows for the potential of migratory birds even though the San Bernardino County General Plan Open Space Element considers the Project site as not being identified as within any major open space areas.

Due to the Project and existing site conditions, some special-status plants or wildlife species are known to occur in the general vicinity. However, the special-status plant or wildlife species are expected not to be directly or indirectly impacted by the implementation of the Project, and there will be no affected critical habitats or wildlife movement corridors.

6.1.3 Climate

The western San Bernardino Valley is characterized by warm summers, moderate winters, light yearly rainfall from late November to early April, light to moderate winds, and comfortable humidity. Daily temperatures may vary by up to 50°F, with daytime highs of 105°F and nighttime lows of 55°F. Annual temperatures range from lows in the mid-30°Fs in winter to highs over 100°F in the summer. Precipitation occurs due to Pacific storms that pass through the area between November and April. Annual rainfall varies from 7-30 inches, averaging about 15 inches annually.

Area wind patterns play a significant role in the West San Bernardino Valley's climate and air quality conditions. Daytime winds are primarily onshore northwesterly breezes with an average velocity of five to seven miles per hour, and nighttime winds travel reversely, from the mountains toward the ocean, averaging one to two miles per hour. A seasonal wind pattern, known as the "Santa Ana" winds, significantly affects these wind and climate conditions that, during the fall and winter, can be expected at more than 50 miles per hour (mph) and in extreme conditions above 80 mph. These warm and dry winds temporarily relieve the West San Bernardino Valley. However, the winds also create unpredictable dust storms in the region.

6.1.4 Outdoor Recreation

The Project site is currently an undeveloped vacant site with no outdoor recreation. However, the Project is less than half a mile south of the Glen Helen Regional Park. The Glen Helen Regional Park provides a swimming complex, a fishing lake, an outdoor entertainment amphitheater, campgrounds, and an outdoor recreational area for residents and visitors. The Rosena Ranch Recreation Center is approximately a mile south of the Project site and provides residents and visitors with outdoor recreational areas and pools. The surrounding area to the southeast of the Oasis at Glen Helen Parkway Project site has a substantial trail system in the surrounding area, and to the west of the Project site, on the other side of I-15, there is open space with trails for public use throughout the Sycamore Canyon.

6.2 Proposed Project

6.2.1 Natural Resource Quality

The operation of the Project would produce significant short- and long-term natural resource quality impacts from the construction and occupancy of the Project due to the size and uses of the Project. The natural resource quality would be permanently degraded during the construction activities and have long-term impacts from the Project uses. The Project would primarily be used for community and highway-oriented retail centers anchored by a grocery store, drug store, fitness center, and hotel, which would have a cumulative effect on the natural resources at the Project site due to the incremental addition of erosion and pollutants, from increased traffic to the site.

The construction of the Project will have the most significant impact on the natural resource quality of the Project site, from the leveling of the hills and paving, landscaping, and construction of the site.

6.2.2 Air Quality

Operation of the Project would produce significant short-term air quality impacts from construction and significant long-term air quality impacts from Project occupancy due to the size and uses of the Project. The air quality would be temporarily degraded during construction activities that occur separately or simultaneously. The Project would be used primarily for community and highway-oriented retail centers anchored by a grocery store, drug store, fitness center, and hotel, which would have the most significant cumulative impact on air quality due to the incremental addition of pollutants from increased traffic to the site.

It should be noted that the impact on air quality related to the operation of the Project would be primarily from traffic to and from the site location, considering that the overall operations of the Project are for the community and highway-oriented retail centers anchored by a grocery store, drug store, fitness center, and hotel. In addition, the traffic generated by the Project would add significant traffic to the current peak hour, weekday traffic in the region, since most of the traffic would occur during peak AM and PM hours when people would be visiting the site.

Measures have been incorporated into the Project design to reduce the Project's potential negative impacts on air quality to the highest degree possible. The Project contains measures designed to help with air quality from traffic moving into and out of the site, such as including dedicated turn lanes, synchronized traffic signals, employer-based mitigation plans for employees (i.e., ride-share programs), encouraging the use of alternative fuel or low emissions vehicles, providing bike lanes, install energy sufficient street lighting, and provide adequate ingress and egress at entrances to minimize vehicle idling.

An Air Quality Assessment was completed by Kimley-Horn and Associates, Inc. for the Project in July 2023; provided as **Appendix D**: **Air Quality Assessment**. The Air Quality Assessment aims to evaluate the potential construction and operational emissions associated with the Project and determine the impact the Project would have on the environment. Additionally, the Air Quality Assessment assesses potential impacts from the Project relating to any applicable air quality plans, any criteria pollutants, exposed sensitive receptors, and any other emissions that could adversely affect a substantial number of people while providing mitigation measures to help reduce any potential impacts. Furthermore, the analysis provides an understanding of whether the proposed Project would result in any new or substantially more severe significant environmental impacts as compared to the certified Final Program Environmental Impact Report (FEIR) for the GHSP (Previously Approved Project), approved July 25, 2005 (State Clearinghouse # 2000011093). The 2020 GHSP EIR Addendum identified significant unavoidable impacts relating to the following significance criteria derived from State CEQA Guidelines Appendix G:

- Conflict with or obstruct the implementation of an applicable air quality plan.
- Result in a cumulatively considerable net increase of any criteria pollutant.

The Project is subject to applicable mitigation measures from the GHSP FEIR and the 2020 GHSP EIR Addendum. Based on the Air Quality Assessment, Project construction emissions would not exceed South Coast Air Quality Management District (SCAQMD) operational standards by implementing **Mitigation Measure (MM) AQ-1**. However, operation emissions exceeded SCAQMD operation standards for ROG, NO_x, and CO despite implementing all feasible mitigation. Mitigation measures from the GHSP FEIR, specifically **MM 4.6-1** through **4.6-11**, would assist in reducing operation emissions by the most feasible amount. The Project would not require any changes to zoning and would be consistent with the land uses

planned for the site and permitted within the PDP. Additionally, the Project would not result in a direct increase in population as the Project would not accommodate new dwelling units/new residents. As such, the Project would not result in unplanned growth and would be consistent with the AQMP. These mitigation measures are provided in **Appendix D**.

The Project would result in air pollutant emissions that exceed SCAQMD's operational emission thresholds and, despite the implementation of **MM 4.6-1** through **4.6-11** from the GHSP FEIR and **MM AQ-1** through **MM AQ-6** as recommended from the Air Quality Assessment, Project emissions levels would remain significant and would contribute to the nonattainment designations in the South Coast Air Basin (SCAB). Therefore, the Project would be inconsistent with the AQMP, resulting in a significant and unavoidable impact despite implementing mitigation. No additional feasible mitigation measures can reduce this impact to less than significant. Although the FEIR for the Previously Approved Project concluded that the Previously Approved Project would not result in significant impacts, the proposed Project would exceed SCAQMD operational thresholds for ROG, NO_X, and CO. As a result, impacts from the proposed Project would be more significant than those of the Previously Approved Project. These mitigation measures are provided in **Appendix D**.

The unmitigated maximum daily emissions associated with the Project would only exceed the nitrogen oxides (NO_x) construction emissions standards. With the implementation of **MM AQ-1**, which requires all off-road equipment to be 50 horsepower or greater to meet CARB Tier 4 Final standards, NO_x emissions would be reduced below the SCAQMD construction standards. Construction emissions have been reduced to less than significant with the incorporation of 2020 GHSP Addendum EIR **MM 7-1** through **7-10** and **MM AQ-1**. However, operational impacts from mobile sources remain significant even after incorporation of **MM 4.6-1** through **4.6-11** from the FEIR, as well as **MM 7-12** from the 2020 GHSP Addendum EIR. The FEIR for the Previously Approved Project also determined that impacts from operations would be significant and unavoidable. No additional feasible mitigation measures are available to reduce mobile emission impacts to less than significant. Therefore, the Project would not result in new or more severe impacts than previously analyzed in the FEIR. These mitigation measures are provided in **Appendix A: Air Quality Assessment**.

The Project was found to have a less than significant impact with mitigation incorporated into Air Quality, specifically concerning exposure of sensitive receptors to substantial pollutant concentrations. Although modeling shows that localized impacts will be less than significant, **MM AQ-2** has been added to ensure that sensitive receptors near to the site will not be affected by construction-related particulate matter displaced by the wind. **MM AQ-2** requires the Project Applicant to have a Dust Control Management Plan approved before the approval of the grading plan. Implementing the **MM 4.6-1** through **4.6-11** from the FEIR and **MM AQ-1** through **MM AQ-6** would reduce risks from Project construction and operations for all sensitive receptors. These mitigation measures are provided in **Appendix D**: **Air Quality Assessment** and specifically factored in for this PDP.

Construction equipment emissions, such as diesel exhaust and volatile organic compounds from architectural coatings and paving activities, may generate odors. However, these odors would be temporary, are not expected to affect a substantial number of people and would disperse rapidly. Therefore, Project construction activities would not result in objectionable odors that would adversely affect many people, and impacts would be less than significant. The Project would not include any land uses identified by the SCAQMD as odor sources. Therefore, Project operations would not produce odors that would adversely affect people.

6.2.3 Water Quality

Methods for water quality protection have been established as part of the Project's Water Quality Management Plan; provided as **Appendix E: Water Quality Management Plan**.

Flood Control

The operation of the Project would produce significant short-and long-term impacts from construction and occupancy of the site that could cause issues with stormwater and flooding. The Project would require the leveling of a natural resource (hills) for the site's development and would add impervious surfaces that will affect the stormwater drainage on site and can lead to flooding issues.

The Project would utilize best management practices (BMPs) for flood control to help mitigate any flooding or stormwater issues that might occur from the construction or operation of the Project site. These flood control BMPs would include minimizing impervious area coverage at the site; providing approximately 15% of pervious landscaping area to help maximize natural infiltration; developing an infiltration basin to help with natural infiltration; disconnecting of impervious areas; re-vegetating disturbed areas; and the minimization of unnecessary compaction in stormwater retention. These recommended BMPs for flood control are provided in **Appendix E**.

Water Pollution

The Project would contribute to the prevention of water pollution through the use of non-structural and structural source control BMPs. BMPs must be incorporated into all new developments per state requirements for pollution prevention. The Project has incorporated different pollution prevention BMPs to help mitigate any effects the Project would have on water quality in the region and help prevent water pollution.

The Project would utilize different non-structural source control BMPs to help prevent water pollution with mitigation practices that use non-physical or structural ways to prevent water pollution at the Project site. The Project would use different non-structural source control BMP methods such as education of property owners, tenants, and occupants on stormwater BMPs, restrictions on harmful activities, appropriate landscaping maintained by property owners that helps with pollution mitigation, BMP maintenance by property owners, local water quality ordinance compliance, underground storage tank compliance, uniform fire code implementation/compliance, implementation of a trash management program, BMP employee training, periodic on-site catch basins inspections, vacuum sweeping of private streets and parking lots, and compliance with all applicable National Pollutant Discharge Elimination System (NPDES) permits.

The Project would utilize different structural source control BMPs to help prevent water pollution with solutions that use physical or structural means to prevent water pollution at the Project site. The Project would use different structural source control BMP methods such as providing storm drain stenciling at all catch basins, the design and construction of trash/waste storage to reduce pollution introduction, design of landscaping and irrigation to incorporate all state and local requirements, finishing the grade of landscaped areas at a minimum of 1-2 inches below the top of curb, sidewalks or pavement, the use of open channels and outlets for minimal flow velocities and energy dissipation and scour protection, and the washing of tenant vehicles, which would be restricted to specific areas.

6.3 Grading and Landform Modification

Before Project construction, the Project Proponent would complete ongoing demolition and reclamation of the site, and clearing the site of all aboveground structures, except for water facilities, which would be incorporated into the Project site's new water system. All underground structures would be demolished three feet below grade, as directed by a licensed soil engineer. As part of the demolition, the Project site would be reclaimed by providing a continuously sloping graded pad, ranging from one to two percent. All areas within the site do not contain hazardous materials resulting from any previous operations, and if any are found, then the hazardous material will be remediated under the supervision of the California Department of Toxic Substances Control.

6.3.1 Excavation and Slope Stability

The Project site is an approximate 33-acre vacant lot that ranges from an elevation of 2,010 feet to 2,255 feet above sea level and is planned to be graded down to a range of approximate elevation of 2,050 feet to 2,070 feet above sea level. The Project site is currently an undeveloped, hilly area typical of the foothills of the San Gabriel Mountains and has dense, low-lying vegetation. The proposed grading would impact the area by converting the natural hilly terrain to a cut graded lot with amenities ideal for travelers along the I-15 freeway. Additional improvements would include asphalt and Portland cement concrete pavements, curbs, sidewalks, landscaped areas, and gravel/dust-proofed parking lots. The CWP Policy Map HZ-2 Liquefaction and Landslides has designated most of the site as having moderate to high generalized landslide susceptibility. Liquefaction and landslide susceptibility is discussed further in **Section 7.0: Seismic and Public Safety** of this report.

The proposed Project includes extensive grading. The planned grading would result in large quantities of rocks, aggregates, and soils from cutting and removal processes. This presents a unique opportunity to the region as the Project site can serve as a local borrow source for other local projects. Rocks, gravels, and non-expansive soils can be used for several purposes in construction including, but not limited to use as railroad ballast, roadway aggregate base, a porous medium for drainage, riprap, structural (select) engineered fill and erosion control.

During construction activities, the placement and/or movement of soils can create potential for erosion. Prior to grading, the Project would obtain required permits such as the NPDES and the Stormwater Pollution Prevention Plan (SWPPP), to address erosion and discharge impacts associated with grading. With BMPs during construction as specified in these permits, the potential hazard for erosion of soils would be less than significant.

The western portion of the Project site – at grade with Glen Helen Parkway – may consist of fills or alluvial deposits that require additional evaluations prior to development. The Project site is planned to be graded to remove the majority of the mantle soils that could be prone to collapse or expansion. Following grading and prior to final development of the site, collapse and expansion potential need to be evaluated and possible impacts can be mitigated through proper design and earthwork. Permissible total and differential settlements need to be evaluated during the design level investigation and possible impacts can be mitigated through proper design and earthwork to be less than significant. Generally, the Project site would be graded down into less compressible granitic bedrock. Potentially compressible soils (i.e., undocumented fill, alluvium and/or colluvium), expansive soils, and transitions between cut and fill beneath the new building slabs should be investigated during final design and mitigated as needed.

The final grading of the Project site would consist of creating level building pads for building structures, grading improved parking lots and vehicular access roads, and the hardscaped and landscaped areas. Due to the site having a hill at the location, there will be extensive grading to create level building pads for the Project. The fill would be exported by the geotechnical engineer's recommendations and established by an approved Project soil report. The planned grading will result in large quantities of rocks, aggregates, and soils from cutting and removals, which will present a unique opportunity to the region as the Project site can serve as a local borrow source for other local projects or during construction. The rock, gravel, and non-expansive soils can be used for several purposes in construction, which can help meet several constructions needs and gradation specifications. Fill slopes would have a maximum slope ratio of 2 to 1 (horizontal to vertical) and a maximum vertical height of 30 feet. The fill export is expected to be required for grading the building pads, and preliminary quantity estimates place the export required at approximately 2.6 million cubic yards. Materials and grading are anticipated to be exported over three years using 50-ton trucks. All final grading of subgrade and final grade areas would comply with requirements for control of fugitive dust and a SWPPP, as required by the State of California.

6.3.2 Soil Erosion Control

Due to the short-and long-term effects of the construction and occupancy of the Project, ensuring that soil erosion is being controlled is essential to the operation of the Project and the overall region. The Project would result in soil erosion from the construction due to the leveling of the hills on the site that would affect the soil and landform of the site, making the location more susceptible to soil erosion.

The Project would utilize different methods to help mitigate the soil erosion that might occur from the construction and operation of the Project site. The Project would use different methods of soil erosion BMPs such as: the use of catch basins to serve as inline treatment devices; storm inlets covered with filter fabrics, filter socks, or etc. to trap sediments and allow water to flow; storm inlets removed to help with soil erosion control; ensuring that the storm line is connected to the sanitary sewer; and maintaining good housekeeping policies during the construction and ongoing maintenance of the site. These BMPs for soil erosion control are provided in **Appendix E**.

6.4 Relationship of the Proposed Project to the Countywide Plan Natural Resources Element

The Project site is currently vacant and possesses open space value in its current condition. Upon its development, the Project would provide for a local-serving retail and freeway-oriented commercial retail center rather than an open space or recreation use that would provide substantial commercial benefits to the area. The Project would help to maintain the County's goals and policies regarding natural resources included in the CWP Natural Resources Element.

The CWP Natural Resources Element sets goals and policies for managing and preserving the County's natural resources, including agricultural/grazing lands, open spaces, watersheds, minerals, native plants and wildfire, and plant and wildfire habitat areas. Given the Project's setting, the Project is subject to CWP **Goals NR-1: Air Quality**, **NR-2: Water Quality**, **NR-3: Open Space**, **Parks, and Recreation**, and **NR-5: Biological Resources**, which provide guidance and establish policies that help to preserve and enhance the beauty and resilience of the County's natural resources.

CWP **Goal NR-1: Air Quality** promotes the health and wellness of residents in San Bernardino County through policies that target improvements in locally generated emissions. The Project's construction,

maintenance, and operation would have short- and long-term impacts on the air quality. Therefore, the mitigation of these impacts is important for the Project to comply with **Goal NR-1**. The Project would incorporate mitigation measures to minimize air quality effects caused by the Project, such as the provision of dedicated turn lanes, synchronized traffic signals, employer-based mitigation plans for employees, alternative fuel or low emissions vehicles, bike lanes, ride share programs for Project employees, energy sufficient street lighting, and adequate ingress and egress at entrances to minimize vehicle idling.

The Air Quality Assessment evaluates the potential construction and operational emissions associated with the Project and determines the impact the Project would have on the environment based on CEQA significance criteria. As concluded in the Air Quality Assessment, Project construction emissions would not exceed SCAQMD operational standards with the implementation of **MM AQ-1**. However, operation emissions exceeded SCAQMD operation standards for ROG, NO_x, and CO despite implementing all feasible mitigation available. Mitigation measures **MM 4.6-1** through **4.6-11** from the GHSP FEIR, would help reduce operation emissions to the most feasible amount and are required to reduce operational emissions to the maximum extent feasible. Motor vehicle emissions are regulated by State and Federal standards and the proposed Project has no control over these standards. Therefore, even with mitigation, operational emissions from the proposed Project would exceed the SCAQMD thresholds for ROG, NO_X, and CO. However, with mitigation the proposed Project would generate less construction impacts than the Previously Approved Project.

The Project would not require any zoning or land use changes, which would be consistent with the land uses planned for the site and the Project would not result in unplanned growth in making the Project otherwise inconsistent with the AQMP. The Project would result in air pollutant emissions that exceed SCAQMD's operational emission thresholds and, despite the implementation of **MM 4.6-1** through **4.6-11** from the FEIR and **MM AQ-1** through **MM AQ-6**, Project emissions levels would remain significant and would contribute to the nonattainment designations in the SCAB. Therefore, the Project would be inconsistent with the AQMP, resulting in a significant and unavoidable impact despite implementing mitigation. No additional feasible mitigation measures can reduce this impact to less than significant. As a result, impacts from the proposed Project would be more significant than those of the Previously Approved Project.

The unmitigated maximum daily emissions associated with the Project would only exceed the NO_x construction emissions standards. With the implementation of **MM AQ-1**, NO_x emissions would be reduced below the SCAQMD construction standards. Construction emissions have been reduced to less than significant with the incorporation of 2020 GHSP EIR Addendum **MM 7-1** through **7-10** and **MM AQ-1**. However, operational impacts from mobile sources remain significant even after incorporating mitigation measures. The FEIR for the Previously Approved SPA also determined that impacts from operations would be significant and unavoidable. No additional feasible mitigation measures are available to reduce mobile emission impacts to less than significant. Therefore, the Project would not result in new or more severe air quality impacts than previously analyzed in the FEIR. Project construction-related emissions with the incorporation of construction **MM 7-1** through **7-10** from the 2020 Addendum EIR and **MM AQ-1** would not exceed the SCAQMD significance thresholds for criteria pollutants. Therefore, the proposed Project would not generate a cumulatively considerable contribution to air pollutant emissions during construction.

The Project operational emissions (primarily mobile source emissions) would exceed the SCAQMD threshold for ROG, NO_X, and CO despite the implementation of mitigation. As a result, operational emissions associated with the Project would result in a cumulatively considerable contribution to significant cumulative air quality impacts. Emissions of motor vehicles are controlled by State and Federal standards and the Project has no control over these standards. The application of mandatory plans, programs, and policies along with the implementation of operational mitigation measures from the FEIR, **4.6-1** through **4.6-11** would reduce some emissions, but the majority of the mobile source emissions are beyond the Project's control. Therefore, the Project would contribute to a significant cumulative operational impact, consistent with the Previously Approved Project.

The Project was found to have a less than significant impact with mitigation incorporated into Air Quality, specifically concerning exposure of sensitive receptors to substantial pollutant concentrations. Implementing **MM 4.6-1** through **4.6-11** from the FEIR and **MM AQ-1** through **MM AQ-6** would reduce risks from Project construction and operations for all sensitive receptors. Construction equipment and operational emissions may generate odors. However, these odors would be temporary, are not expected to affect a substantial number of people and would disperse rapidly, and the Project would not include any land uses identified by the SCAQMD as odor sources. Therefore, Project construction and operational activities would not result in objectionable odors that would adversely affect many people, and impacts would be less than significant. These mitigation measures are provided in **Appendix D: Air Quality Assessment** and would help the Project meet CWP Natural Resources Element **Goal NR-1: Air Quality**.

CWP **Goal NR-2: Water Quality** sets a goal that promotes clean and safe water for human consumption and the natural environment. The construction, maintenance, and operation of the Project would have short- and long-term impacts on the area's water quality that the Project will mitigate through different techniques to help with the effects of the Project on water quality. The Project would use structural and non-structural techniques to help mitigate water quality issues proposed as part of **Appendix E.** The Project will comply with **CWP Policy NR-2.1, 2.2, 2.4, and 2.5** by complying with local, federal, and state water quality standards relating to coordination on water quality, providing a WQMP for the Project, ensure wastewater and stormwater discharge is appropriately handled, as discussed in Section 6.2.3 of this report.

CWP **Goal NR-3: Open Space, Parks, and Recreation** aims to establish a system of well-planned and maintained parks, trails, and open space that provides recreation opportunities for residents, attracts visitors, and preserves the natural environment. The Project will help provide open spaces on the Project site between buildings and parking lots to provide opportunities for employees and visitors to utilize these spots for break room locations, walkable sidewalks with benches, rest stops, or to help preserve the environment in locations of opportunity. The Project would not provide any specifically designated open spaces or natural areas as part of the PDP.

CWP **Goal NR-5: Biological Resources** sets a goal that protects the interconnected landscape of open spaces and habitat areas that promotes biodiversity and healthy ecosystems, both for their intrinsic value and the value placed on them by the County and the residents of the area. The Project will do the most it can to help promote biodiversity and the healthy ecosystems in the area throughout the Project's construction, maintenance, and operation through different mitigation processes, such as ensuring that landscaping meets County code and that all special habitats at the site are protected. The Project would provide open space between buildings and parking lots in the Project site. However, the Project will not have any designated open space or natural areas at the Project site. The Project will comply with **CWP**

Policy NR-5.1, 5.5, and **5.7** by complying with local, federal, and state conservation regulations relating to the development by providing a Habitat Assessment to mitigate any biological resources that might be affected by the Project, ensuring that habitat conservation responsibilities are being satisfied for the Project, and coordinating with the habitat planning by providing habitat conservation and natural resource management during the Project construction and operation, as discussed in this Section and within **Appendix C**.

Compliance with the CWP Natural Resources Element is essential to protect the necessary natural resources of the County, as they are integral to the County's quality of life, community identities, and economic success. The Project would comply with the goals and policies of the CWP Natural Resources Element when constructing and maintaining the Project to ensure that the County's natural resources are preserved and protected.

7.0 SEISMIC AND PUBLIC SAFETY

7.1 Geologic Hazards

7.1.1 Seismicity

The Project site is in an area subject to ground motions due to earthquakes, as is all southern California. Many active or potentially active faults cross through the GHSP area and surrounding area. These faults have been designated in Alquist-Priolo Earthquake Fault Zones, which cover nearly half of the GHSP Area. Alquist-Priolo Earthquake Fault Zones are regulatory zones that surround active faults that have potential for surface rupture. As such, structure for human occupancy cannot be placed over the fault or within a minimum distance 50 feet from an identified active fault. In the GHSP area, these zones are associated with the San Andreas and San Jacinto systems that extend through the general Cajon Pass area. Development within these zones is subject to detailed fault investigations, which define the hazards and affect the locations of structures.

The Project site is located between two laterals of the San Jacinto Fault, both of which are approximately 2,000 feet to the northeast and southwest of the center of the Project site. The Project site is outside of an Alquist-Priolo Earthquake fault zone; refer to **Figure 8: Seismic Hazards**.

7.1.2 Landslides and Liquefaction

Although the proposed Project is not within an Alquist-Priolo Earthquake fault zone, the Project site is located close to several active faults where historic seismic activities have been observed in the past. The Project site's proximity to faults would increase risks attributed to ground surface rupture. Additionally, the Project site is in an area designated by the County as having a moderate to high landslide susceptibility; refer to **Figure 9: Landslide and Liquefaction Hazards**. The existing slopes are generally sloped at 1.4H:1V (horizontal to vertical) to 2H:1V site and heavily vegetated. The hilly terrain is planned to be graded down to a relatively flat pad for the future development. This removal of slopes within the Project site would mitigate the potential for landslides.

The Project site is not in an area designated by the County as susceptible to liquefaction. Owing to the absence of shallow groundwater and the presence of dense soils at the Project site, the potential for liquefaction is low.

7.2 Wildfire

As mentioned above, the Project is subject to the County Fire Safety (FS) overlay that includes areas designated as extremely high fire hazard severity zones by the California Department of Forestry and Fire Protection. Due to this, the Project would be subject to additional development standards (such as setback requirements, fuel modification zones, vehicular access, building separation, erosion and sediment control, and other design requirements) to provide greater public safety in these fire-prone areas. Each project located in the FS Overlay that goes through the entitlement process must submit a fuel modification plan that addresses fuel loading, ungraded slopes, maintenance, on-site water availability, and landscaping. In addition, each proposed development must comply with FS Overlay general development standards (82.13.050), including but not limited to:[6]

[6] Office of Planning and Research. 2022. *Fire Safety Overlay Zone: San Bernardino County.* https://opr.ca.gov/docs/20220817-San_Bernadino_County_Case_Study.pdf.

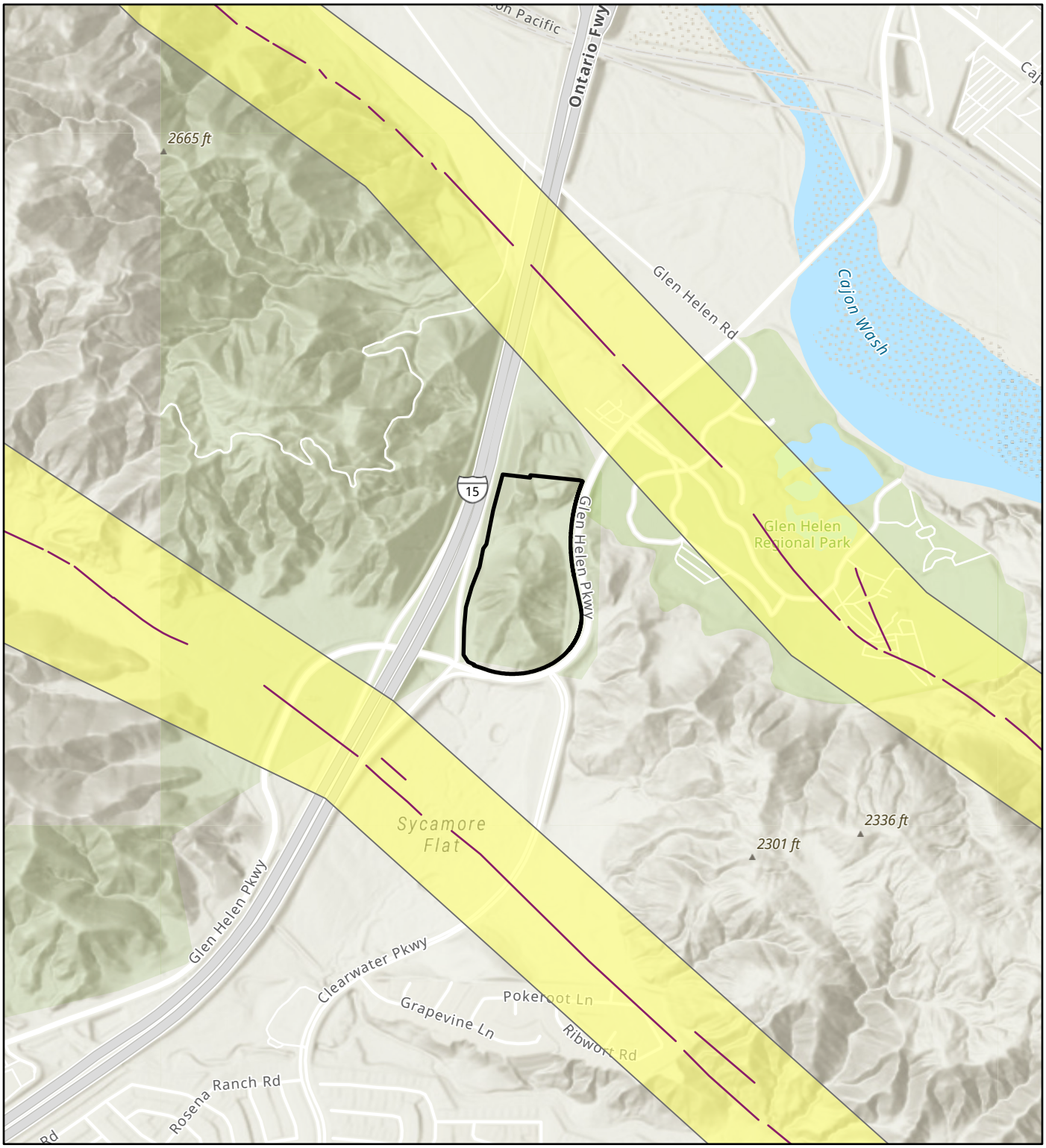
- Residential density criteria that limit the number of dwelling units per gross acre based on slope percentage;
- Site and emergency access that requires a minimum of two points of ingress and egress, and minimum width of 26 feet of all-weather surface for roads;
- Private driveways or access roadways for residential units that have a 150-foot maximum length;
- Fencing requirements, including a minimum five-foot separation for wood or vinyl fencing and the wall of the nearest structure;
- Cul-de-sac length limits of 350 feet in length;
- Vehicular access to water sources, including ponds, lakes, swimming pools, reservoirs, and water storage tanks; and
- Permanent fuel modification areas around a development projects or portions adjacent or exposed to hazardous fire areas.

All applications must also comply with fire authority standards, including California Building Code Chapter 7A and California Residential Code Chapter 327. After a project is approved, the code enforcement division is responsible for ensuring compliance with the conditions agreed upon in the approved permit, as well as annually inspecting fuel modification and defensible space.

Additionally, the open spaces that surround the Project site pose a risk of wildfire to new development within the Project site. Within this wildfire hazard context, it is worth noting that the Project site is bounded by I-15 to the west and Glen Helen Parkway to the south and east, which would serve as an effective fire break to protect the Project site from wildfires on surrounding open space.

7.3 Evacuation Routes and Emergency Preparedness

Emergency access to the Project site would be provided at the existing signalized intersection of Glen Helen Parkway and Clearwater Parkway at the southern portion of the Project site. With implementation of the PDP, there would be an unsignalized 30-foot-wide driveway on the northeastern portion of the Project site. Additionally, the proposed Fire/Sheriff Station would have driveway access directly to Glen Helen Parkway to provide emergency vehicle access from the station to public roadways. The Project would construct 30-foot-wide driveways throughout the Project site to provide circulation to the individual developments. While the Project would increase traffic to and from the site, its proximity to the I-15, as well as the presence of a Fire/Sheriff facility on-site would not diminish the efficacy of established evacuation routes and would improve emergency preparedness.



Legend

Project Site

Quaternary Faults

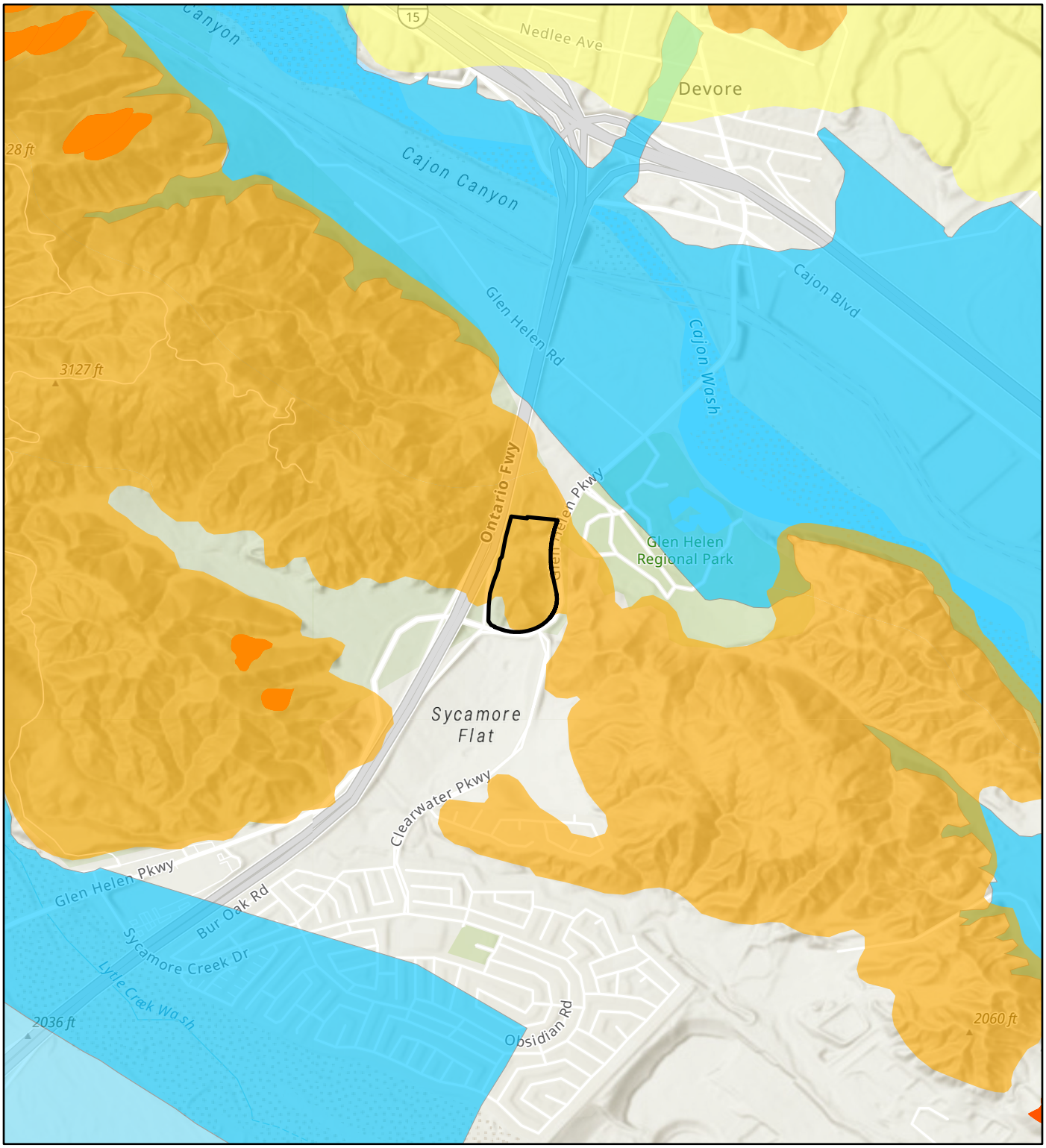
Alquist Priolo Fault Zones

Source: USGS, December 2020; California Department of Conservation, 2017; ESRI, 2023.

FIGURE 8: Seismic Hazards
The Oasis at Glen Helen Parkway

Not to scale

Kimley»Horn



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- Project Site
- High Liquefaction Susceptibility
- Medium Liquefaction Susceptibility
- Low to Moderate Landslide Susceptibility
- Moderate to High Landslide Susceptibility
- Mapped, Existing Landslide

Source: County of San Bernardino, 2020.

FIGURE 9: Landslide and Liquefaction Hazards
The Oasis at Glen Helen Parkway

Not to scale

Kimley»Horn

8.0 NOISE

8.1 Existing Noise Generators

The Project site is currently undeveloped and does not contain uses that generate noise on the site. The most common source of noise in the Project site vicinity is vehicular traffic from Glen Helen Parkway and I-15. According to the CWP Hazard Element, the Project site lies within the existing 70 Community Noise Equivalent Level (CNEL) noise contour due to traffic noise generated on I-15; see **Figure 10: Existing Noise Contours**. Additionally, Glen Helen Parkway has an existing noise level of 70 CNEL.

8.2 Project Noise Generators

The Project would generate both temporary construction-related noise and long-term noise associated with the operation of the Project. A technical noise study has been prepared for the Project and is provided as **Appendix F: Noise and Vibration Study**. The proposed fire/sheriff's station, the drive-thru restaurants, parking, the hotel uses, and retail and gas stations are noise generators that would affect noise-sensitive land uses within the PDP Area, and on adjacent properties. Sensitive land uses include residential structures to the north of the Project site. Additionally, Project-related noise both on-site and off-site could affect the Glen Helen Regional Park to the east. Mitigation of noise impacts or modifications to the Project may need to occur as part of any residential development in the area. However, as noted above, no residential uses are proposed within the PDP Project site at this time.

The CWP Hazard Element future noise contours are based on projected future traffic data. These future noise contours are depicted in **Figure 11: Future Noise Contours** and show that the 70 CNEL noise contour, related to I-15, extends approximately 250-feet further under CWP buildout compared to existing conditions. Additionally, the portion of Glen Helen Parkway that borders the Project site is within this 70 CNEL future noise contour.

8.2.1 Operational Noise

The Project would introduce new sources of operational noise to the site, including from stationary sources such as mechanical equipment (i.e., HVAC [Heating, Ventilation, and Air Conditioning] units and drive-thru speaker boxes), and off-site noise on nearby roadways from new vehicle trips, such as on Glen Helen Parkway between Glen Helen Road and Cajon Boulevard. The Project would include a Fire Station, and, at times, emergency sirens would be audible at nearby sensitive receptors.

The County Noise Ordinance states that noise from a stationary source must not exceed 55 dBA Leq (average noise level over a set period) around residential or other noise sensitive receptors. The Noise and Vibration Study analyzed non-exempt operational noise (i.e., noise from mechanical equipment such as HVAC units and drive-thru speaker boxes) and found that the combined noise levels from the combination of on-site Project sources at the nearest residential use to the north would be up to 39.4 dBA Leq at the nearest sensitive receptor. These levels do not exceed the County's performance standards for noise related to residential uses, including the residential nighttime threshold of 45 dBA Leq. Noise from the Fire/Sheriff's Station, such as noise from emergency equipment, vehicles, and devices, is exempt from the County's noise standards.

8.2.2 Construction Noise

Off-site construction noise would be generated by mechanized grading equipment, jackhammering, trenching, and hauling trucks transporting dirt and rock debris from the Project site to a receiving end. Construction of the Project would generate about 136 outbound haul trips per day over three years. Outbound haul trucks would travel on designated haul routes via I-15 and I-215, and would be conditioned not to travel next to sensitive receptors, and would occur only during daytime hours.

8.2.3 Off-site Traffic Noise

As mentioned above, the Project would incur off-site noise on nearby roadways from new vehicle trips, such as on Glen Helen Parkway between Glen Helen Road and Cajon Boulevard. An increase in traffic noise along this segment of the road would affect the Glen Helen Regional Park. While certain segments along Glen Helen Parkway would have a cumulative increase of more than 5 dBA CNEL, the Project's contribution to the cumulative increase would be less than 1.0 dBA CNEL along these roadway segments. Due to distance, other private properties in the GHSP area, including the nearby railroad operations, the Glen Helen Raceway, the driver-training course and firing range operated by the Sheriff's Department, would not be affected.

8.3 Noise Reduction Standards

The Project would be subject to the County's Noise Ordinance (County Code 83.10.080, Noise). The Noise Ordinance establishes noise standards for stationary and adjacent stationary mobile noise sources. Also, the County Noise Ordinance identifies noise sources exempt from these standards, including construction activities. Per County Noise Ordinance, Project-related construction activities would occur between 7:00 a.m. and 7:00 p.m. The County Noise Ordinance also sets standards for ground-borne vibration Construction activities that may generate ground-borne vibration more than County noise thresholds. According to the Noise and Vibration Study, ground-borne vibrations generated during Project construction would not exceed County noise thresholds at 125 feet, or the distance to the closest sensitive receptor. Additionally, noise from emergency equipment, vehicles, and devices is exempt from the noise standards of the County's Noise Ordinance (County Code Section 83.01.080(G), Exempt Noise) and during emergency dispatch operations, tends to be for very brief periods of time. Therefore, in these cases, the Project would not exceed the County's noise reduction standards and would not necessitate further noise reduction strategies.

As mentioned above, Project-related traffic would increase off-site noise levels on Glen Helen Parkway between Glen Helen Road and Cajon Boulevard. Noise reduction standards along this road segment are feasible, as a modification to Glen Helen Parkway would be installed by the County through the Project's payment of DIFs, and the creation of a Lighting, Landscaping and Maintenance District (LLMD) or other maintenance district to maintain the street improvements. Additional irrigated planted landscaping along both sides of the Glen Helen Parkway would provide additional sound attenuation to reduce vehicular noise.

A Noise and Vibration Study was completed for the Project by Rincon Consultants, Inc. in June 2023; provided as **Appendix F: Noise and Vibration Study**. The Noise and Vibration Study found that the Project would generate both temporary construction-related noise and long-term noise associated with the operation of the Project. The Project's noise exposure from construction would not exceed the Federal Transit Administration's (FTA's) noise threshold of 80 dBA. Project construction would occur between

7:00 a.m. and 7:00 p.m. under the County's Municipal Code. Implementing **MM NOI-1** would reduce construction noise to the degree feasible, and impacts would be less than significant. Project construction noise would not be substantially more severe than addressed in the GHSP FEIR.

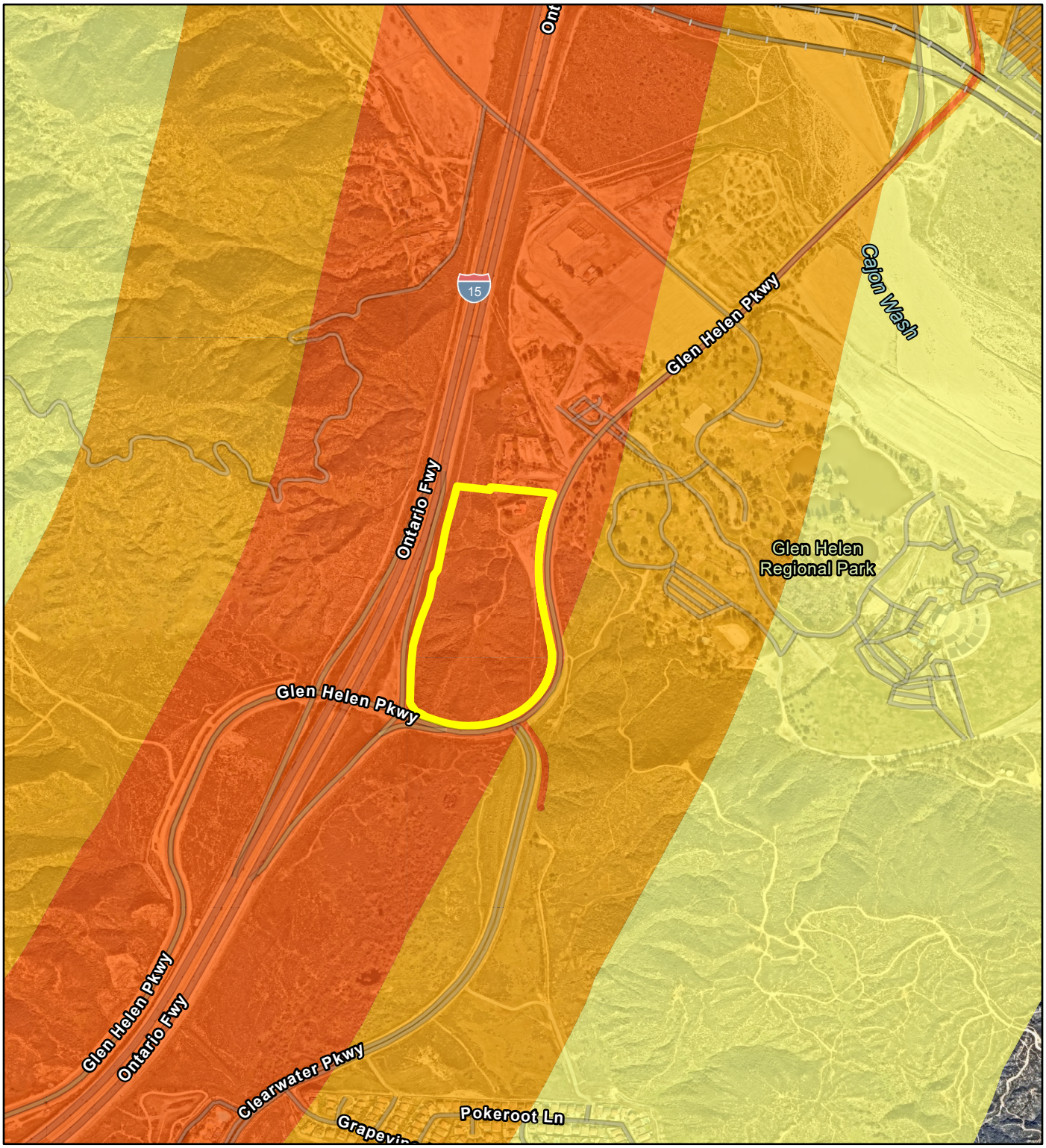
The Project's stationary noise sources (i.e., HVAC units and drive-thru speakers) would not exceed County noise standards at the nearest sensitive receiver. Therefore, stationary noise impacts would be less than significant. Operational stationary source noise impacts would not be more severe than those addressed in the GHSP EIR. Project traffic noise increases would be below the significance threshold of 5 dBA CNEL. While specific segments along Glen Helen Parkway would have a cumulative increase of more than five dBA CNEL, the Project's contribution to the cumulative increase would be less than 1.0 dBA CNEL along these roadway segments and, therefore, would be less than significant. Operational traffic noise impacts would not be more severe than those addressed in the GHSP EIR.

The Project would generate ground-borne vibration during construction, but vibration would not exceed the applicable thresholds at the closest residential structures to the north. Therefore, construction-related vibration impacts would be less than significant. The Project site is outside an airport land use plan or two miles from a public or private airport. Therefore, the Project would not result in impacts from airport noise. Noise reduction recommendations are provided in **Appendix F**.

The Project applicant shall implement the following construction noise reduction measures:

- At least 10 days prior to the start of construction activities, a sign shall be posted at each construction site entrance, or other conspicuous location, which includes a 24-hour telephone number for project information, and a procedure where a construction manager will respond to, investigate noise complaints, and take corrective action, if necessary, in a timely manner. The sign shall have a minimum dimension of 48 inches wide by 24 inches high with a one-inch minimum font height and shall also include contact information for Department of Land Use Services staff. The sign shall be placed five feet above ground level.
- At least 21 days prior to the start of construction activities, all off-site businesses, and residents within 300 feet of the project site shall be notified of the planned construction activities. The notification shall include a brief description of the project, the activities that would occur, the hours when construction would occur, and the construction period's overall duration. The notification shall include the telephone numbers of the County's and contractor's authorized representatives that are assigned to respond in the event of a noise or vibration complaint.
- If a construction noise complaint(s) is registered, and if County code enforcement is not available to make noise measurements, the contractor shall retain a County-approved noise consultant to conduct noise measurements at the properties that registered the complaint. The noise measurements shall be conducted for a minimum of one hour. The consultant shall prepare a letter report for code enforcement summarizing the measurements, calculation data used in determining impacts, and potential measures to reduce noise levels to the maximum extent feasible.
- Staging and delivery areas shall be located as far as feasible from existing residences.
- Material hauling and deliveries shall be coordinated by the construction contractor to reduce the potential of trucks waiting to unload for protracted periods of time.

- To the extent feasible, hydraulic equipment shall be used instead of pneumatic impact tools, and electric powered equipment shall be used instead of diesel-powered equipment.
- For smaller equipment (such as air compressors and small pumps), line powered (electric) equipment shall be used to the extent feasible.
- Stationary noise sources (e.g., generators and air compressors) shall be located as far from sensitive receptors as possible, and shall be muffled and enclosed within temporary sheds, or insulation barriers, as necessary.
- Signs shall be posted at the job site entrance(s), within the on-site construction zones, and along queueing lanes (if any) to reinforce the prohibition of unnecessary engine idling. All other equipment shall be turned off if not in use for more than 5 minutes. The construction manager shall be responsible for enforcing this and to be monitored by the County.



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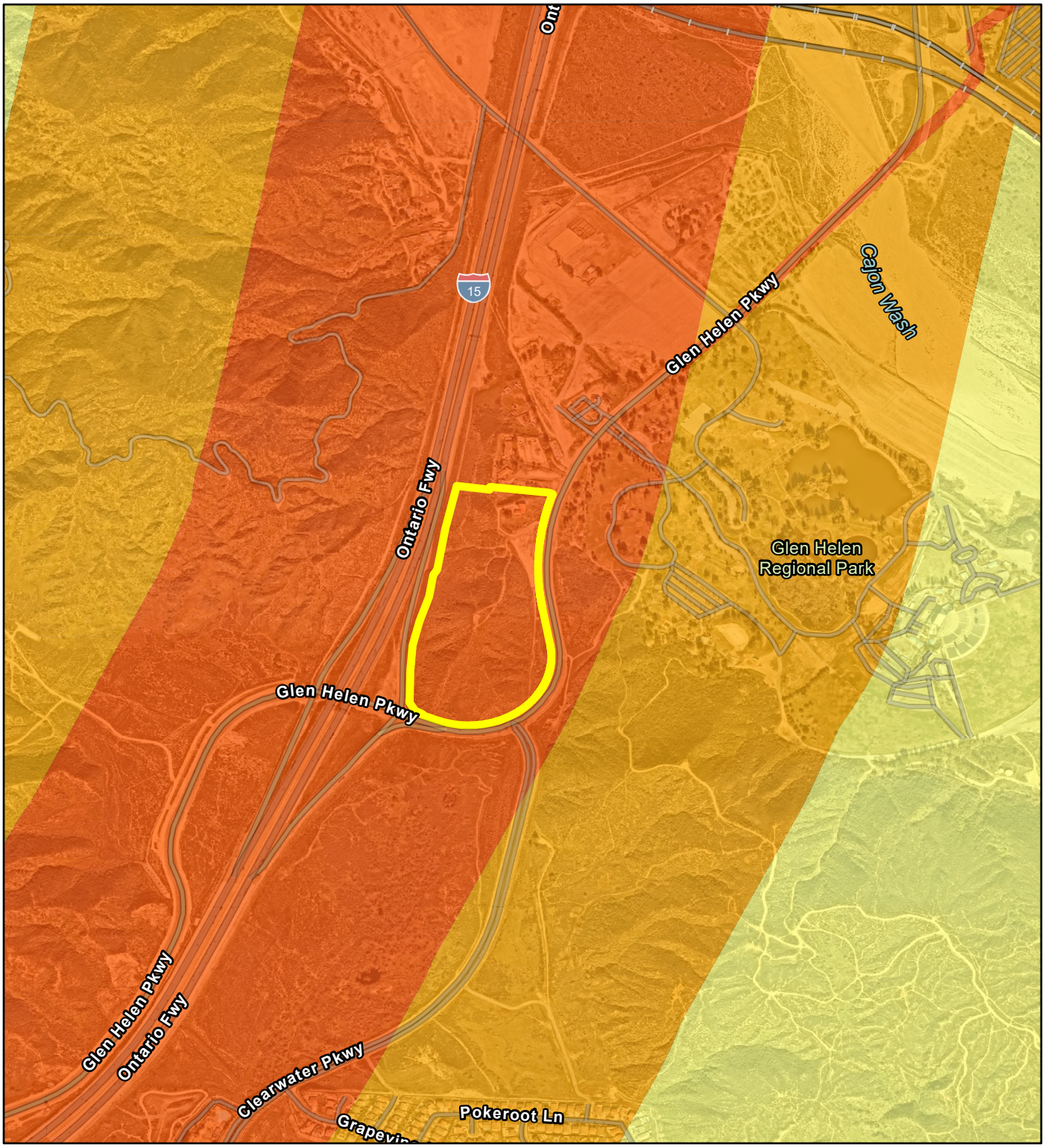
Project Site	70 CNEL
	65 CNEL
	60 CNEL

Source: County of San Bernardino, 2021; Nearmap, 2023.

FIGURE 10: Existing Noise Contours
The Oasis at Glen Helen Parkway

Not to scale

Kimley»Horn



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Project Site	70 CNEL
	65 CNEL
	60 CNEL

Source: County of San Bernardino, 2021; Nearmap, 2023.

FIGURE 11: Future Noise Contours
The Oasis at Glen Helen Parkway

Not to scale

Kimley»Horn

9.0 SCENIC HIGHWAYS AND CORRIDORS

Scenic vistas viewable from this point of the County include distant views of the San Gabriel Mountains located to the northwest, San Bernardino Mountains located to the northeast, and the Jurupa Hills located to the south. These vistas provide an aesthetically pleasing natural backdrop for the County's residents. While the CWP does not officially designate any scenic vistas near the GHSP, the San Gabriel and San Bernardino Mountains, along with the Jurupa Hills are still considered a valuable visual resource for the County, adjacent cities, and region.

The Project site and many surrounding areas are subject to the Scenic Resources Overlay, as described in **Section 2.0: Land Use**. The natural topographic features in the north GHSP area create a strong visual statement when entering the PDP Area. While the Project Site offers considerable view opportunities from I-15, there are no officially designated or eligible state scenic highways within the area. The nearest state scenic highway is State Route 138, approximately seven miles north and northeast of the Project site. In addition, the CWP designates County scenic routes, depicted in **Figure 12: County Scenic Highways and Corridors**. The nearest County scenic highway is Lytle Creek Canyon Drive, which extends from I-15 northwest into Sycamore Canyon and is about 1.8 miles southwest of the Project site. Lytle Creek Canyon Drive has quality scenic views of the surrounding mountains and Lytle Creek, which runs alongside the entire stretch of the Lytle Creek Canyon Drive scenic corridor. The Project site would not be visible from Lytle Creek Canyon Drive and is obstructed by the steep terrain of the Sycamore Canyon area. Therefore, the Project is not visible from state or County-designated scenic highways or corridors.

The County has established an Open Space Overlay that seeks to preserve scenic resources (County Code Section 82.19). To this end, the County Code provides specific development criteria for development within this zone. The Project site is not within the County's Open Space Overlay and would not be subject to the development criteria specified by County Code Section 82.19.040. However, the Project would be subject to the development standards set forth by the approved GHSP, as discussed below.

9.1 Relationship of the Proposed Project to the Countywide Plan Natural Resources Element

The CWP Natural Resources Element sets goals and policies to ensure the preservation of scenic resources, coordination with federal, state, local, and tribal agencies to protect scenic resources, and to discourage off-site signage along scenic roadways. The Project is subject to CWP **Goal NR-1: Scenic Resources**, which ensures that the County consider the location and scale of development to preserve regionally significant scenic vistas and natural features, including prominent hillsides, ridgelines, dominant landforms, and reservoirs. Given their scale, the topographic features currently existing on the Project site are considered as prominent hillsides. However, under the approved GHSP, development could proceed on-site including the grading for potential development of the existing hillsides. Upon Project development, the existing hillsides would similarly be removed, and graded over a period of approximately three years. During grading and construction, the Project would be subject to any established conditions and mitigation measures set forth by the approved GHSP, the GHSP EIR, the 2020 GHSP EIR Addendum and measures set forth by the SEIR prepared for the Project, as described below.

9.2 Methods for Preservation of Significant Natural Features and Scenic Highways

While implementation of the proposed PDP is not likely to affect views from nearby scenic routes or highways, the current condition of the Project site provides some visual quality from viewsheds from I-15 to the west of the Project site and from open space and the Glen Helen Regional Park to the east of the Project site. Due to the grading that is required, the existing hillsides will be removed, and the scenic quality of the current Project site will be degraded.

The Project is within a Scenic Resources overlay, pursuant to the approved GHSP. The GHSP has established conditions relating to projects within the Scenic Resources overlay. According to the approved GHSP, when a land use is proposed within the Scenic Resources overlay, the following criteria shall be used to evaluate the Project compliance with the intent of the overlay:

- **Building and Structure Placement**: The building and structure placement should be compatible with and should not detract from the visual setting or obstruct significant views.
- **Grading:** The alteration of the site's natural topography shall be minimized and avoid detrimental effects on the visual setting of the designated area and the existing natural drainage system. Alterations of the natural topography should be screened from view from either the scenic highway or the adjacent scenic and recreational resource by landscaping and plantings which harmonize with the natural landscape of the designated area and can survive with a minimum of maintenance and supplemental water.
- **Outside Storage Areas**: Outside storage areas allowed shall be completely screened from view of the right-of-way with walls, landscaping, and plantings which are compatible with the local environment and can survive with a minimum of maintenance and supplemental water.
- **Utilities**: All utilities shall be placed underground.

Additionally, mitigation measures in the 2020 GHSP EIR Addendum are applicable to the Project. Relevant mitigation measures of the GHSP FEIR were superseded by those of the 2020 GHSP EIR Addendum. The following apply to the proposed Project:

MM 4.10-2 All development improvements shall comply with the design standards contained in the County of San Bernardino Development Code.

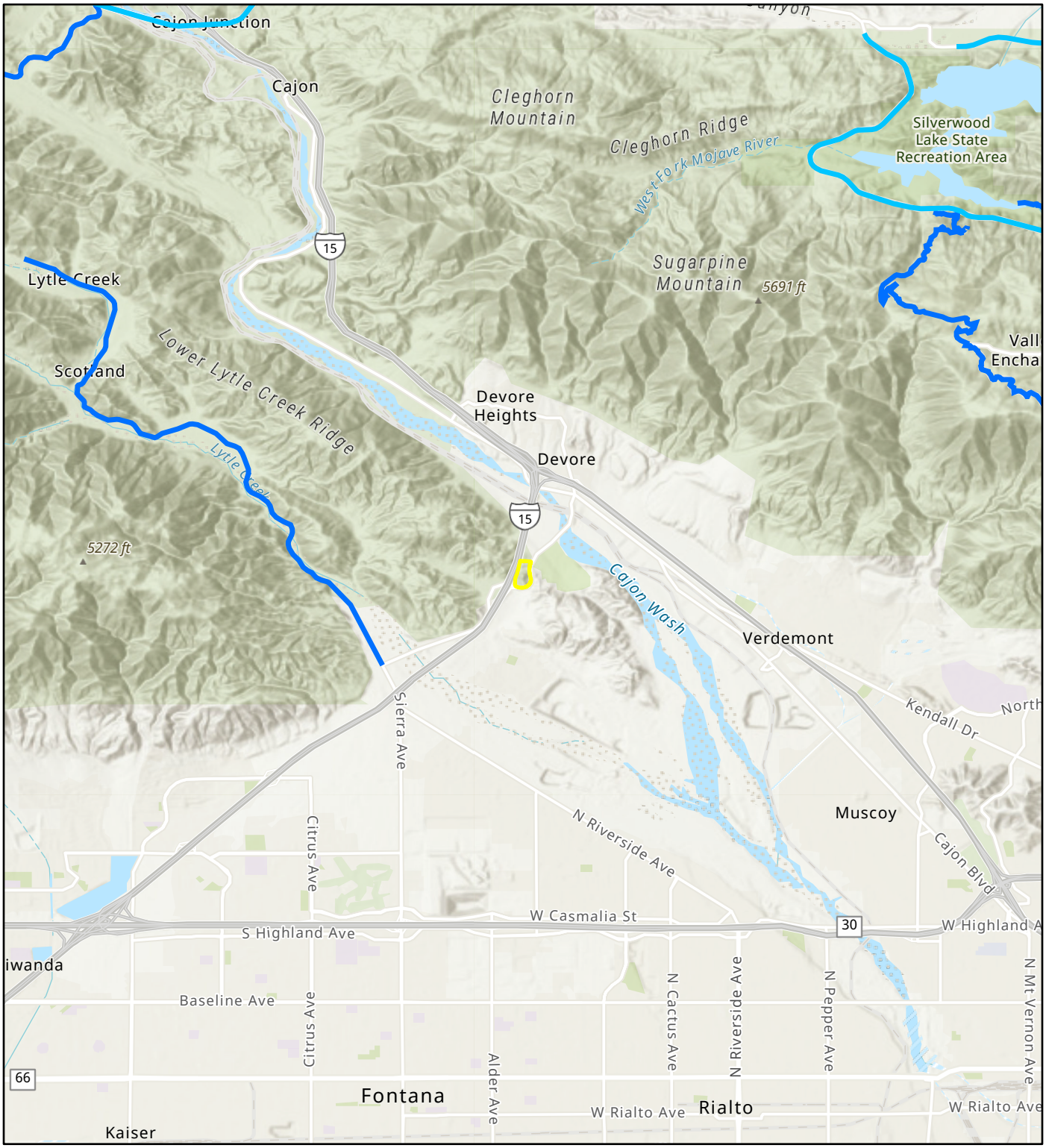
MM 4.10-3 All development improvements shall comply with Section 162 of the National Scenic Byways program and Section 260-283 of the California Streets and Highways Code as required by the County of San Bernardino General Plan.

MM 13-4 Areas that have been mass graded to accommodate later development upon which no project is immediately imminent shall be hydroseeded or otherwise landscaped with a plant palette incorporating native vegetation and shall be routinely watered to retain a landscape cover thereupon pending the area's subsequent development. The landscape plan shall include a mix of such species appropriate for hydro-seeding and shall be approved by the County of San Bernardino Land Use Services and Fire Departments prior to the issuance of grading permits.

MM 13-5 Grading within retained open space areas shall be minimized to the extent feasible. Graded open space areas within and adjacent to retained open space areas shall be

revegetated with plants selected from a landscape palette emphasizing the use of native plant species.

MM 13-6 Prior to the installation of any high-intensity, outdoor sports lighting within a park site and/or school facility, a detailed lighting plan shall be prepared for the illumination of active recreational areas, including a photometric analysis indicating horizontal illuminance, and submitted to and, when deemed acceptable, approved by the Development Services Director. Plans shall indicate that high-intensity, pole-mounted luminaries installed for the purpose of illuminating field and hardcourt areas include shielding louvers or baffles or contain other design features or specification, such as selecting luminaire with cut-off features, to minimize light intrusion to not more than 0.5 horizontal foot candle, as measured at the property boundary. Compliance with these standards shall not be required for adjoining public streets, school or recreational facilities, and other non-light-sensitive land uses.



Legend

- Project Site
- County Scenic Route
- County Scenic Route & Eligible State Scenic Highway

Source: County of San Bernardino, 2021.

FIGURE 12: County Scenic Routes and Highways
The Oasis at Glen Helen Parkway

Not to scale

Kimley»Horn

Appendix A:
Legal Description of Property

Appendix A:
Legal Description of Property

NOTICE

PLEASE BE ADVISED THAT THE DATA AND INFORMATION FROM THE PUBLIC RECORDS CONTAINED HEREIN WILL NEED TO BE UPDATED PRIOR TO CLOSING AS MANY COUNTY FACILITIES ARE CLOSED OR HAVE LIMITED STAFFING AS A RESULT OF THE CORONAVIRUS PANDEMIC. IF THE INFORMATION FROM THE COUNTY IS NOT AVAILABLE THERE WILL BE ADDITIONAL REQUIREMENTS IN ORDER TO CLOSE AND INSURE THIS TRANSACTION. PLEASE CONTACT YOUR LOCAL TITLE OFFICER FOR DETAILS.

Orange Coast Title Company

2151 E. Convention Center Way, Suite 102
Ontario, CA 91764
909-987-5433

UPDATED PRELIMINARY REPORT

UCR Group
1980 Park Ave
Redlands, CA 92373

Attention:	Kelli Corcoran	**Your no.:**	Glen Helen
Property address:	vacant land, in an unincorporated area known as San Bernardino, County of San Bernardino, State of CA 92404.	**Order no.:**	140-1637389-20

Dated: January 20, 2023

In response to the above referenced application for a policy of title insurance, **Orange Coast Title Company** hereby reports that it is prepared to issue, or cause to be issued, as of the date hereof, a Policy or Policies of Title Insurance describing the land and the estate or interest therein hereinafter set forth, insuring against loss which may be sustained by reason of any defect, lien or encumbrance not shown or referred to as an Exception below or not excluded from coverage pursuant to the printed Schedules, Conditions and Stipulations of said Policy forms.

The printed Exceptions and Exclusions from the coverage and Limitations on Covered Risks of said policy or policies are set forth in Exhibit B attached. The policy to be issued may contain an arbitration clause. When the Amount of Insurance is less than that set forth in the arbitration clause, all arbitrable matters shall be arbitrated at the option of either the Company or the Insured as the exclusive remedy of the parties. Limitations on Covered Risks applicable to the CLTA and ALTA Homeowner's Policies of Title Insurance which establish a Deductible Amount and a Maximum Dollar Limit of Liability for certain coverages are also set forth in Exhibit B. Copies of the policy forms should be read. They are available from the office which issued this report.

Please read the exceptions shown or referred to below and the exceptions and exclusions set forth in Exhibit B of this report carefully. The exceptions and exclusions are meant to provide you with notice of matters, which are not covered under the terms of the title insurance policy and should be carefully considered.

It is important to note that this preliminary report is not a written representation as the condition of title and may not list all liens, defects, and encumbrances affecting title to the land.

This report (and any supplements or amendments hereto) is issued solely for the purpose of facilitating the issuance of a policy of title insurance and no liability is assumed hereby. If it is desired that liability be assumed prior to the issuance of a policy of title insurance, a Binder or Commitment should be requested.

Dated as of January 11, 2023 at 7:30 AM

Ranny Harper, Title Officer
Email: rannyh@octitle.com
Ph: 909-987-5433
Fax: 714-415-7961

The form of policy of title insurance contemplated by this report is:

A.L.T.A. Loan Policy (06-17-06)

The Policy of Title Insurance, if issued, will be underwritten by: First American Title Insurance Company. See attached disclosure.

NOTE: The premium for a policy of Title Insurance, if issued, will be based on:

A liability of $1,000,000.00 Subject to any filed rate increases and/or changes in the liability.

Schedule "A"

The estate or interest in the land hereinafter described or referred to covered by this report is:

A Fee.

Title to said estate or interest at the date hereof is vested in:

215 Table Top LLC, a California Limited Liability Company

The land referred to in this report is situated in an unincorporated area known as San Bernardino, the County of San Bernardino, State of California, and is described as follows:

Government Lot 6 (formerly Lot 1) and Government Lot 4, in Section 4, Township 1 North, Range 5 West, San Bernardino Base and Meridian, in the County of San Bernardino, State of California, per supplemental plat of amended lottings on file and accepted by the U.S. Bureau of Land Management January 18, 1980, shown on survey as C.S. 1729 in the office of the County Surveyor of said County

Except therefrom that portion of land conveyed to the State of California by deed recorded July 14, 1981 as Instrument No. 1981-154338, Official Records

Also except therefrom that portion of land conveyed to the County of San Bernardino, body corporate by deed recorded July 14, 1981, Instrument No. 1981-154339, Official Records

Also excepting therefrom that portion of land lying with the Homestead Entry Survey No. 164 situated in Government Lot 1 of Fraction Section 4, Township 1 North, Range 5 West, San Bernardino Base and Meridian

Also excepting therefrom that portion lying Easterly of the Westerly line of that portion conveyed to the County of San Bernardino for highway and road purposes, recorded July 14, 1981 as Instrument No. 1981-154342, Official Records

Also except any portion lying within Parcel Map No. 415, as per plat recorded in Book 4 Page 46 of Parcel Maps, records of said County and also excepting therefrom that portion thereof conveyed to the County of San Bernardino, body corporate by deed recorded November 2, 1994 as Instrument No. 1994-445921, Official Records and also excepting therefrom that portion thereof conveyed to the County of San Bernardino, body corporate by deed recorded November 2, 1994 as Instrument No. 1994-445922, Official Records

Together with all that portion of Government Lot 4 in Section 4, Township 1 North, Range 5 West, San Bernardino Base and Meridian, per supplemental plat of amended lottings on file and accepted by the U.S. Bureau of Land Management January 18, 1980, shown on survey filed as C.S. 1729 in the office of the County Surveyor of said County of San Bernardino recorded July 14, 1981 as Instrument No. 1981-154342, Official Records of said County and lying Northwesterly and Westerly of the Westerly line of a strip of land 104.00 feet wide, 52.00 feet on each side of the following described centerline;

Commencing at the centerline intersections of Devore Road relocated and Stage Highway 15 as shown per state highway right-of-

way Map No. 404571, Sheet 1 of 5;

Thence along said center line of Devore Road relocated South 74º 50' 27" East 138.00 59 feet to the true point of beginning;

Thence continuing along said centerline South 74º 50' 27" East, 50.84 feet to the beginning of a tangent curve concave Southerly and having a radius of 1800.00 feet;

Thence Easterly along said curve, 217.11 feet through a central angle of 6º 54' 38" to a point of tangency with a having a bearing of South 67º 45' 49" East

Thence along said tangent line 67º 45' 49" East, 245.33 feet to the beginning of a tangent curve to the North, Northwest and West and having a radius of 600.00 feet

Thence Easterly, Northeasterly and Northerly along said curve 1280.50 feet through a central angle of 122º 16' 43" to a point of tangency with a line having a bearing of North 10º 02' 32" West;

Thence along said tangent line North 10º 02' 32" West 294.32 feet to the beginning of a tangent curve concave Easterly and Southeasterly and having a radius of 1800.00 feet; thence Northerly and Northeasterly along said curve 1734.83 feet through a central angle of 55º 13' 17" to a point of tangency with a line having a bearing of North 45º 10' 45" East; thence along said tangent line North 45º 10' 45" East, 177.09 feet to a point is such 45º 10' 45" West, 810.09 feet from Point "A" as described in that certain Declaration of road right-of-way (Devore Road and Glen Helen Road, Devore Area - Second District, Resolution No. 93-18) recorded as Instrument No. 1993-067483 of Official Records of said County, said point being the point of terminus and all that portion of Government Lots 4 and 6 (formerly Government Lot 1) in Section 4, Township 1 North, Range 5 West, San Bernardino Base and Meridian, per supplemental plat of amended lottings on file and accepted by the U.S. Bureau of and Management January 18, 1980, shown on survey filed C.S. 1729 in the office of the County Surveyor of said County, lying within the described boundaries of that certain grant of easement to the County of San Bernardino recorded July 14, 1981, as Instrument No. 1981-154342, Official Records of said County and lying Northwesterly and Westerly of the Westerly line of a strip of land 104.00 feet wide, 52.00 feet on each side of the following described centerline:

Commencing at the centerline intersections of Devore Road relocated and State Highway 15 as shown per State Highway 15 as shown per state highway right-of-way Map No. 404571, Sheet 1 of 5;

Thence along said centerline of Devore Road relocated South 74º 40' 27" East, 138.59 feet to the true point of beginning;

Thence continuing along said centerline 74º 40' 27" East, 50.84 feet to the beginning of a tangent curve concave Southerly and having a radius of 1800.00 feet

Thence Easterly along said curve 217.11 feet through a central angle of 6º 54' 38" to a point of tangency with a line having a bearing of South 67º 45' 40" East;

Thence along said tangent line South 67º 45' 40" East, 245.33 feet to the beginning of a tangent curve concave to the North, Northwest and West and having a radius of 600.00 feet; thence Easterly, Northeasterly and Northerly along said curve 1280.50 feet through a central angle of 122º 16' 43" to a point of tangency with a line having a bearing of North 10º 02' 32" West;

Thence along said tangent line North 10º 02' 32" West, 294.32 feet to the beginning of a tangent curve concave Easterly and Southeasterly and having a radius of 1800.00 feet; thence Northerly and Northeasterly along said curve 1734.83 feet through a central angle of 55º 13' 17" to a point of tangency with a line having a bearing of North 45º 10' 45" East;

Thence along said tangent line North 45º 10' 45" East, 177.09 feet to a point that is South 45º 10' 45" West, 810.09 feet from Point "A" as described in that certain declaration of road right-of-way (Devore Road and Glen Helen Road, Devore Area - Second District Resolution No. 93-18) recorded as Instrument No. 1993-067483 of Official Records of said County, said point being the point of terminus.

Assessor's Parcel Numbers(s):
: 0239-031-37-0-000
: 0239-031-50-0-000

Schedule "B"

At the date hereof exceptions to coverage in addition to the printed exceptions and exclusions contained in said policy form would be as follows:

1 General and Special taxes for the fiscal year 2023-2024, including any assessments collected with taxes. A lien not yet payable.

First installment due and payable 11/01/2023, delinquent if not paid by 12/10/2023
Second installment due and payable 02/01/2024, delinquent if not paid by 04/10/2024

2 General and Special taxes for the fiscal year 2022-2023, including any assessments collected with current taxes.

Total amount	$**8,599.32**
1st installment	$**4,299.67**, paid
Penalty	$**429.97** (after 12-12)
2nd installment	$**4,299.65**, open
Penalty	$**439.97** (after 4-10)
Code area	107153
Parcel No.	**0239-031-37-0-000**
Exemption	$0.00

3 General and Special taxes for the fiscal year 2022-2023, including any assessments collected with current taxes.

Total amount	$**2,318.24**
1st installment	$**1,159.14**, paid
Penalty	$**115.91** (after 12-12)
2nd installment	$**1,159.10**, open
Penalty	$**125.91** (after 4-10)
Code area	107153
Parcel No.	**0239-031-50-0-000**
Exemption	$0.00

4 The Lien of future supplemental taxes, if any, assessed pursuant to the provisions of section 75, et seq of the revenue and taxation code of the state of California

5 Rights of the public in and to any portion of said land lying within any lawfully established streets, roads or highways.

6 Reservations recited in the patent from the United States, as follows:"Subject to any vested and accrued water rights for mining, agricultural, manufacturing or other purposes, and rights to ditches and reservoirs used in connection with such water rights as may be recognized and acknowledged by the local customs, laws and decisions of courts, and a right of way for ditches or canals constructed by authority of the United States" recorded 7/14/1981 as Instrument No. 81-154337, Official Records.

An easement as set forth in the above document

For :	transmission line right of way, pipe lines, canal and incidental purposes
Affects :	The location of said easement cannot be determined from the public records.

7 The fact that the ownership of said land does not include any rights of ingress or egress to or from the freeway adjacent to said land. Said rights have been relinquished in the deed to the State of California recorded 7/14/1981, as Instrument No. 81-154338, of Official Records.

8 An easement for purposes herein stated, and rights incidental thereto as provided in an instrument

Recorded:	7/14/1981, as Instrument No. 81-154340, of Official Records.
For :	construct, maintain, operate, repair, renew, change the size of and remove one or more pipe lines, with metering measuring, regulating and other equipment, for the transportation of gas, petroleum products and other substances, with the right of ingress and egress and incidental purposes
In favor of :	Southern California Gas Company
Affects :	Those portions of Section 4, in Township 1 North and, Range 5, West being a strip of land 52.5 feet in width, lying 7.5 feet generally Southerly and Southeasterly and 45 feet generally Northerly and Northwesterly of the following described line: Beginning at a point in the Easterly line of Government Lot 4 in Section 4, Township 1 North, Range 5 West, which bears North 1º 43' 00" East, 252.40 feet from a Southeasterly corner of Government Lot marked 'Stone M-8' on Map filed with the U.S. Surveyor Generals Office, San Francisco, California, June 24, 1898; said point being the true point of beginning of this description; thence South 39º 59' 38" West 71.16 feet; thence South 25º 43' 47" West 451.39 feet to a point in the Southerly line of said Government Lot 4 which bears North 78º 30' 00" West along said Southerly line, 108.38 feet from a Southeasterly corner of said Government Lot 4 marked 'Stone M-7' as shown on said above mentioned Map, said point being the terminus of this description.

9 An easement for purposes herein stated, and rights incidental thereto as provided in an instrument

Recorded:	7/14/1981, as Instrument No. 81-154341, of Official Records.
For :	construct, use, maintain, operate, alter, add to, repair, replace, reconstruct, inspect and remove at any time and from time to time overhead and underground electrical supply systems and communication systems (hereinafter referred to as "systems"), consisting of poles, guys and anchors, crossarms, wires, underground conduits, cables, vaults, manholes, handholes, and including above-ground enclosures, markers and concrete pads and other appurtenant fixtures and equipment necessary or useful for distributing electrical energy and for transmitting intelligence by electrical means and incidental purposes
In favor of :	Southern California Edison Company, a Corporation, its successors and assigns
Affects :	Various strips of land, 10 feet in width, being 5 feet on either side of the centerline of an existing Southern California Edison Company electric line within that certain real property as described in that certain patent recorded on the 14 day of July 1981, as Instrument No. 81-154337 of Official Records of San Bernardino County.

Said instrument provides that no building, planter boxes, earth fill or other structure except walls and fences shall be erected on said easement.

10 An easement for purposes herein stated, and rights incidental thereto as provided in an instrument

Recorded:	7/14/1981, as Instrument No. 81-154342, of Official Records.
For :	highway and road purposes and incidental purposes
In favor of :	County of San Bernardino
Affects :	Those portions of Government of Lot 6 (formerly Government Lot 1) and 4 in Section 4, Township 1 North, Range 5 West, San Bernardino Meridian, per supplemental plat of amended lottings on file and accepted by the U.S. Bureau of Land Management January 18, 1980, shown on survey filed as C.S. 1729 in the Office of the County Surveyors of said County, said portions described as follows:

Commencing at the Southwesterly corner of Parcel No. 4 of Parcel Map No. 415, as per plat recorded in Book 4 of Parcel Maps, Page 46, records of said County; thence South 7º 55' 04" East (record South 7º 36' East per said C.S. 1729), a distance of 212.08 feet to Corner No. 4 of the Homestead Entry Survey No. 164, as said corner is shown on said C.S. Map No. 1729; thence North 76º 11' 54" East (record North 76º 31' East per said C.S. 1729) along the Southerly line of said H.E.S. No. 164, a distance of 124.07 feet to the true point of beginning; thence leaving said South line, South 23º 49' 33" East, a distance of 73.74 feet to the beginning of a tangent curve concave to the Southwest, having a radius of 600.00 feet; thence Southerly along said tangent curve, through an angle of 26º 57' 18" an arc distance of 282.27 feet; thence tangent to said curve South 03º 07' 45" West, a distance of 815.29 feet to the beginning of a tangent curve concave to the Northwest, having a radius of 206.00 feet; thence Southwesterly along said curve, through an angle of 28º 14' 09" an arc distance of 101.52 feet; thence tangent to said curve South 31º 21' 54" West 157.05 feet to a point in the Southerly line of said Government Lot 4, said point being situate thereon North 78º 52' 08" West (record North 78º 30' West per said C.S. 1729), a distance of 252.37 feet from Corner M-7 of the Muscupiable Rancho as per plat recorded in Book 1 of Maps, Page 24 and Book 7 of Maps, Page 23, records of said County; thence South 78º 52' 08" East along said Southerly line, a distance of 93.79 feet; thence leaving said Southerly line North 31º 21' 54" East, a distance of 124.61 feet to the beginning of a tangent curve concave to the Northwest, having a radius of 294.00 feet; thence Northeasterly along said curve, through an angle of 28º 14' 09" an arc distance of 144.89 feet; thence tangent to said curve North 03º 07' 45" East, a distance of 1209.80 feet more or less to a point in the said Southerly line of said H.E.S. No. 164, also being the Southerly line of that certain deed to the County of San Bernardino, recorded April 4, 1955 in Book 3611, Pages 479 and 480, records of said County; thence South 76º 11' 54" West (record of South 76º 31' West per said C.S. 1729) along said Southerly line a distance of 195.06 feet more or less to the true point of beginning.

11 An easement for purposes herein stated, and rights incidental thereto as provided in an instrument

Recorded:	7/14/1981, as Instrument No. 81-154343, of Official Records.
For :	as specified therein and incidental purposes
In favor of :	General Telephone Company of California, a Corporation
Affects :	The location of said easement cannot be determined from the public records.

12 Any boundary discrepancies or rights which may exist or arise by reason of a Record of Survey, which was recorded in Book 25 page 17 of Record of Survey.

13 The fact that the ownership of said land does not include any rights of ingress or egress to or from the freeway adjacent to said land. Said rights have been relinquished in the deed to the State of California recorded 11/2/1994, as Instrument No. 94445922, of Official Records.

14 An easement for purposes herein stated, and rights incidental thereto as provided in an instrument

Recorded: 11/2/1994, as Instrument No. 94445923, of Official Records.

For : The undersigned also grants to said County, the privilege and right to extend and maintain drainage structures 1 1/2:1 excavation slopes and 2:1 embankment slopes: also the privilege and right to plant and maintain grass, plants and trees on said slopes for the protection and beautification of the same on said parcel of land described as Parcels SE-1a, b, c.

Reserving unto grantors, their successors or assigns, the right at any time to remove such slopes or portions thereof upon removing the necessity for maintaining such slopes or portions thereof or upon providing in place thereof other adequate support, the design and construction of which shall be first approved by said County, for the protection and support of said highway and incidental purposes

In favor of : County of San Bernardino

Affects : All those portions of Government Lot 4 in Section 4, Township 1 North, Range 5 West, San Bernardino Meridian, per supplemental plat of amended lottings on file and accepted by the U.S. Bureau of Land Management January 18, 1980, shown on survey filed as C.S. 1729 in the Office of the County Surveyor of said County, as described in those certain deeds to Richard Allen Dumouchelle and Janis Kay Dumouchelle, husband and wife, and recorded by Instrument Nos. 81-154337 and 83-031620, Official Records of said County, being more particularly described as follows:

SE-1a

Commencing at the beginning of “Course (1)” of Parcel 1A (Amended) as described in that certain Final Order of Condemnation recorded December 26, 1967, in Book 6947, Page 231, Official Records of said County; thence along that course described as “South 27º 55' 31" West 97.38 feet in said “Course (1)” South 28º 10' 38" West 7.42 feet to a point that is North 28º 10' 38" East 89.96 feet from the Southwesterly terminus of said course “South 27º 55' 31" West 97.38 feet”; thence South 67º 45' 49" East 12.34 feet to Point “A”, said point being the point of beginning; thence continuing South 67º 45' 49" East 89.39 feet to the beginning of a tangent curve concave Northerly and having a radius of 548.00 feet; thence Easterly along said curve 4.22 feet through a central angle of 0º 26' 29" to a point of non-tangency with a line having a bearing of North 53º 00' 33" West, a radial line through said point of non-tangency bears South 21º 47' 42" West; thence along said non-tangent line North 53º 00' 33" West 17.08 feet; thence North 59º 56' 02" West 52.21 feet; thence South 87º 53' 47" West 27.85 feet to Point “A”, said point being the true point of beginning.

SE-1b

Commencing at the beginning of “Course (1)” of Parcel 1A (Amended) as described in that certain Final Order of Condemnation recorded December 26, 1967, in Book 6947, Page 231, Official Records of said County; thence along that course described as “South 27º 55' 31" West 97.38 feet in said “Course (1)” South 28º 10' 38" West 7.42 feet to a point that is North 28º 10' 38" East 89.96 feet from the Southwesterly terminus of said course “South 27º 55' 31" West 97.38 feet”; thence South 67º 45' 49" East 101.74 feet to the beginning of a tangent curve concave Northerly and Northwesterly and having a radius of 548.00 feet; thence Easterly along said curve 124.22 feet through a central angle of 12º 59' 17" to Point "B", a radial line through said point bears South 09º 14' 54" West, said point being the point of beginning; thence continuing along said curve Easterly and Northeasterly 366.35 feet through a central angle of 38º 18' 11" to a point of non-tangency with a line having a bearing of North 42º 11' 14" West, a radial line through said point of non-tangency bears South 29º 03' 18" East; thence along said non-tangent line North 42º 11' 14" West 138.79 feet; thence South 47º 36' 55" West 42.78 feet; thence South 52º 39' 47" West 39.68 feet; thence South 34º 43' 14" West 54.00 feet; thence South 29º 32' 24" West 67.16 feet; thence North 76º 24' 13" West 43.53 feet; thence South 80º 59' 56" West 46.32 feet; thence South 75º 25' 02" West 47.45 feet to Point “B”, said point being the true point of beginning.

SE-1c

Commencing at the beginning of “Course (1)” of Parcel 1A (Amended) as described in that

15 An easement for slope easements with the privilege and right to extend and maintain drainage structures, 1-1/2:1 excavation slopes and 2:1 embankment slopes: also the privilege and right to plant and maintain grass, plants and trees on said slopes for the protection and beautification and incidental purposes as reserved by The County of San Bernardino in the deed recorded 11/2/1994, as Instrument No. 94445927, Official Records, along the location of said easements set forth therein. .

16 An easement for slope easements with the privilege and right to extend and maintain drainage structures, 1-1/2:1 excavation slopes and 2:1 embankment slopes: also the privilege and right to plant and maintain grass, plants and trees on said slopes for the protection and beautification and incidental purposes as reserved by The County of San Bernardino in the deed recorded 11/2/1994, as Instrument No. 94445928, Official Records, along the location of said easements set forth therein .

17 An easement for purposes herein stated, and rights incidental thereto as provided in an instrument

Recorded:	6/22/2005, as Instrument No. 2005-0445898, of Official Records.
For :	privilege and right to extend and maintain drainage structures, 1 1/2:1 excavation slopes and 1 1/2:1 embankment slopes: also the privilege and right to plant and maintain grass, plants and trees on said slopes for the protection and beautification and incidental purposes
In favor of :	County of San Bernardino
Affects :	That portion of the land described in Grant Deed from Richard G. Wahler to Pavillion Properties, LLC, per Document No. 2003-0694877 of Official Records of said County, lying within a strip of land 240.00 feet wide 120.00 feet each side of the following described centerline:

Commencing at Station 4 in the Westerly boundary line of Rancho Muscupiabe per Map recorded in Book 7 of Maps, at Page 23, records of said County, said point being marked with a 2" brass disk stamped "California Division of Highways M 4" as shown on Record of Survey No. 04-015, filed in Book 120 at Pages 90 through 99, inclusive, Records of Survey of said County; thence South 87º 07' 17" East 1311.31 feet along the Northerly line of said Record of Survey, said line also being the Southerly line of Parcel 4 as described in Grant Deed recorded December 30, 1998 as Instrument No. 19980557386, Official Records, to the beginning point of a non-tangent curve concave Southeasterly having a radius of 1000.00 feet, a radial line to said point bears North 36º 42' 23" West, said point also being the point of beginning; thence Northeasterly along said curve through a central angle of 08º 35' 35" an arc length of 149.98 feet; thence North 61º 53' 12" East, 582.56 feet to the beginning of a curve concave Northwesterly having a radius of 1600.00 feet; thence Northeasterly along said curve through a central angle of 50º 14' 50" an arc length of 1403.16 feet; thence North 11º 38' 22" East, 1053.18 feet to the beginning of a curve concave Westerly having a radius of 550.00 feet; thence Northerly along said curve through a central angle of 41º 17' 20" an arc length of 396.34 feet; thence North 29º 38' 58" West, 83.57 feet to a point on the proposed centerline of improvement Devore Road as shown on State of California Right of Way Map No. 422601-3 approved 9/28/93, said point being the point of terminus.

The sidelines of said strip shall be shortened or extended as necessary to terminate in the boundary lines of said Grant Deed.

Excepting therefrom that portion lying Southwesterly of the Northeasterly line of a strip of land 104.00 feet wide 52.00 feet each side of said above described centerline.

The bearing South 87º 07' 17" East along the Northerly line of Record of Survey No. 04-015, filed in Book 120, at Pages 90 through 99, records of San Bernardino County was used as the basis of bearings for this description.

18 An easement for purposes herein stated, and rights incidental thereto as provided in an instrument

Recorded:	6/22/2005, as Instrument No. 2005-0445899, of Official Records.
For :	highway and roadway purposes and incidental purposes
In favor of :	County of San Bernardino
Affects :	That portion of the land described in grant deed from Richard G. Wahler to Pavillion Properties, LLC, per Document No. 2003-0694877 of Official Records of said County, lying within a strip of land 104.00 feet wide 52.00 feet each side of the following described centerline:

Commencing at Station 4 in the Westerly boundary line of Rancho Muscupiabe per Map recorded in Book 7 of Maps, at Pages 23, records of said County, said point being marked with a 2" brass disk stamped "California Division of Highways M 4" as shown on Record of Survey No. 04-015, filed in Book 120 at Pages 90 through 99, inclusive, records of survey of said County; thence South 87º 07' 17" East, 1311.31 feet along the Northerly line of said record of survey said line also being the Southerly line of Parcel 4 as described in grant deed recorded December 30, 1998 as Instrument No. 19980557386, Official Records, to the beginning point of a non-tangent curve concave Southeasterly having a radius of 1000.00 feet, a radial line to said point bears North 36º 42' 23" West, said point also being the point of beginning; thence Northeasterly along said curve through a central angle of 08º 35' 35" an arc length of 149.98 feet; thence North 61º 53' 12" East, 582.56 feet to the beginning of a curve concave Northwesterly having a radius of 1600.00 feet; thence Northeasterly along said curve through a central angle of 50º 14' 50" an arc length of 1403.16 feet; thence North 11º 38' 22" East, 1053.18 feet to the beginning of a curve concave Westerly having a radius of 550.00 feet; thence Northerly along said curve through a central angle of 41º 17' 20" an arc length of 396.34 feet; thence North 29º 38' 58" West, 83.57 feet to a point on the proposed centerline of improvement Devore Road as shown on State of California right of way Map No. 422601-3 approved 9/28/93, said point being the point of terminus.

The sidelines of said strip shall be shortened or extended as necessary to terminate in the boundary lines of said grant deed.

The bearing South 87º 07' 17" East along the Northerly line of Record of Survey No. 04-015, filed in Book 120, at Pages 90 through 99, records of San Bernardino County was used as the basis of bearings for this description.

19 A Deed of Trust to secure the indebtedness of

Amount:	**$700,000.00**
Trustor:	**215 Table Top, LLC, a California Limited Liability Company**
Trustee:	Orange Coast Title Company
Beneficiary:	Transcoast Financial, Inc., a California Corporation
Dated:	10/17/2013
Recorded:	**12/30/2013** as **Instrument No. 2013-0555832**, Official Records.

20 The requirement that we be provided:

(1) A copy of the filed articles of organization of 215 Table Top LLC, a limited liability company.

(2) A current list of the names of said limited liability company members.

(3) A copy of said limited liability company's operating agreement, with a verified certificate that the operating agreement is a true and correct copy of the agreement now in effect.

21 Any facts, rights, interest or claims which may be shown by an inspection of the land or which may be disclosed by inquiry of persons in possession of said land.

22 The effect of documents, proceedings, liens, decrees or other matters which do not specifically describe said land, but which, if any do exist, may affect the title or impose liens or encumbrances thereon. The name search necessary to ascertain the existence of such matters has not been completed and will require a statement of information from all parties involved in this transaction.

23 (A) Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the public records;

Proceedings by a public agency which may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the Public Records.

(B) Any facts, rights, interests, or claims which are not shown by the public records but which could be ascertained by an inspection of the land or which may be asserted by persons in possession thereof.

(C) Easements, liens or encumbrances, or claims thereof, which are not shown by the public records.

(D) Discrepancies, conflicts in boundary lines, shortage in area, encroachments, or any other facts which a correct survey would disclose, and which are not shown by the public records

(E) (a) Unpatented mining claims; (b) reservations or exceptions in patents or in Acts authorizing the issuance thereof; (c) water rights, claims or title to water, whether or not the matters excepted under (a), (b), or (c) are shown by the public records

(F) Any lien or right to a lien for services, labor or material theretofore or hereafter not shown by the public records.

Exceptions A-F will be omitted on extended coverage policies.

End of Schedule B

"NOTES AND REQUIREMENTS SECTION"

BUILDER SERVICES

NOTE NO. 1

AFFILIATED BUSINESS ARRANGEMENT DISCLOSURE STATEMENT NOTICE

This is to give you notice that Orange Coast Title Company owns an interest in Real Advantage Title Insurance Company. This underwriter may be chosen by Orange Coast Title Company and this referral may provide Orange Coast Title Company a financial or other benefit.

You are NOT required to use the listed provider as a condition for settlement of your loan or purchase, sale or refinance of the subject property and you have the opportunity to select any of the Orange Coast Title Company title insurance underwriters for your transaction. THERE ARE FREQUENTLY OTHER SETTLEMENT SERVICE PROVIDERS AVAILABLE WITH SIMILAR SERVICES. YOU ARE FREE TO SHOP AROUND TO DETERMINE THAT YOU ARE RECEIVING THE BEST SERVICES AND THE BEST RATE FOR THESE SERVICES

Notes section continued on next page…

NOTE NO. 2

California Revenue and Taxation Code Section 18662, effective January 1, 1994 and by amendment effective January 1, 2003, provides that the buyer in all sales of California Real Estate may be required to withhold 3 and 1/3% of the total sales price as California State Income Tax, subject to the various provisions of the law as therein contained.

NOTE NO. 3 PAYOFF INFORMATION:

Note: this company does require current beneficiary demands prior to closing.
If the demand is expired and a correct demand cannot be obtained, our requirements will be as follows:

A. If this company accepts a verbal update on the demand, we may hold an amount equal to one monthly mortgage payment. The amount of this hold will be over and above the verbal hold the lender may have stipulated.

B. If this company cannot obtain a verbal update on the demand, will either pay off the expired demand or wait for the amended demand, at the discretion of the escrow.

C. In the event that a payoff is being made to a servicing agent for the beneficiary, this company will require a complete copy of the servicing agreement prior to close.

NOTE NO. 4

If this company is requested to disburse funds in connection with this transaction, chapter 598, statutes of 1989 mandates hold periods for checks deposited to escrow or sub-escrow accounts. The mandatory hold is one business day after the day deposited. Other checks require a hold period from three to seven business days after the day deposited.

Notice Regarding Your Deposit of Funds

California Insurance Code Sections 12413 *et. Seq.* Regulates the disbursement of escrow and sub-escrow funds by title companies. The law requires that funds be deposited in the title company escrow and sub-escrow accounts and be available for withdrawal prior to disbursement. Funds deposited with the Company by wire transfer may be disbursed upon receipt. Funds deposited with the Company via cashier's checks drawn on a California based bank may be disbursed the next business day after the day of deposit. If funds are deposited with by other methods, recording or disbursement may be delayed. All escrow and sub-escrow funds received by the Company will be deposited with other funds in one or more non-interest bearing escrow accounts of the Company in a financial institution selected by the Company. The Company and/or its parent company may receive certain direct or indirect benefits from the financial institution by reason of the deposit of such funds or the maintenance of such accounts with the financial institution, and the Company shall have no obligation to account to the depositing party in any manner for the value of, or to pay such party, any benefit received by the Company and/or its parent Company. Those benefits may include, without limitation, credits allowed by such financial institution on loans to the Company and/or its parent company and earnings on investments made on the proceeds of such loans, accounting, reporting and other services and products of such financial institution. Such benefits shall be deemed additional compensation of the Company for its services in connection with the escrow or sub-escrow.

Orange Coast Title Company
2151 E. Convention Center Way, Suite 102
Ontario, CA 91764
909-987-5433

Attention:
Borrower: **215 Top LLC**

Lenders supplemental report

The above numbered report (including any supplements or amendments thereto) is hereby modified and/or supplemented in order to reflect the following additional items relating to the issuance of an A.L.T.A. Loan Policy (06-17-06) form as follows:

A. The land referred to in Schedule A is vacant land.

The only conveyance(s) affecting said land recorded within 24 months of the date of this report are as follows:

Grantor:	Transcoast Financial, Inc., a California Corporation
Grantee:	215 Table Top, LLC, a California Limited Liability Company
Recorded:	12/30/2013 as Instrument No. 2013-0555831, Official Records.

Attention

Please note that this preliminary report now has an extra copy of the legal description on a separate sheet of paper. There are no markings on the page. The idea is to provide you with a legal description that can be attached to other documents as needed. That legal description page immediately follows this page.

Thank you for your support of **Orange Coast Title Company**. We hope that this makes your job a little easier.

Exhibit "A"

Government Lot 6 (formerly Lot 1) and Government Lot 4, in Section 4, Township 1 North, Range 5 West, San Bernardino Base and Meridian, in the County of San Bernardino, State of California, per supplemental plat of amended lottings on file and accepted by the U.S. Bureau of Land Management January 18, 1980, shown on survey as C.S. 1729 in the office of the County Surveyor of said County

Except therefrom that portion of land conveyed to the State of California by deed recorded July 14, 1981 as Instrument No. 1981-154338, Official Records

Also except therefrom that portion of land conveyed to the County of San Bernardino, body corporate by deed recorded July 14, 1981, Instrument No. 1981-154339, Official Records

Also excepting therefrom that portion of land lying with the Homestead Entry Survey No. 164 situated in Government Lot 1 of Fraction Section 4, Township 1 North, Range 5 West, San Bernardino Base and Meridian

Also excepting therefrom that portion lying Easterly of the Westerly line of that portion conveyed to the County of San Bernardino for highway and road purposes, recorded July 14, 1981 as Instrument No. 1981-154342, Official Records

Also except any portion lying within Parcel Map No. 415, as per plat recorded in Book 4 Page 46 of Parcel Maps, records of said County and also excepting therefrom that portion thereof conveyed to the County of San Bernardino, body corporate by deed recorded November 2, 1994 as Instrument No. 1994-445921, Official Records and also excepting therefrom that portion thereof conveyed to the County of San Bernardino, body corporate by deed recorded November 2, 1994 as Instrument No. 1994-445922, Official Records

Together with all that portion of Government Lot 4 in Section 4, Township 1 North, Range 5 West, San Bernardino Base and Meridian, per supplemental plat of amended lottings on file and accepted by the U.S. Bureau of Land Management January 18, 1980, shown on survey filed as C.S. 1729 in the office of the County Surveyor of said County of San Bernardino recorded July 14, 1981 as Instrument No. 1981-154342, Official Records of said County and lying Northwesterly and Westerly of the Westerly line of a strip of land 104.00 feet wide, 52.00 feet on each side of the following described centerline;

Commencing at the centerline intersections of Devore Road relocated and Stage Highway 15 as shown per state highway right-of-way Map No. 404571, Sheet 1 of 5;

Thence along said center line of Devore Road relocated South 74º 50' 27" East 138.00 59 feet to the true point of beginning;

Thence continuing along said centerline South 74º 50' 27" East, 50.84 feet to the beginning of a tangent curve concave Southerly and having a radius of 1800.00 feet;

Thence Easterly along said curve, 217.11 feet through a central angle of 6º 54' 38" to a point of tangency with a having a bearing of South 67º 45' 49" East

Thence along said tangent line 67º 45' 49" East, 245.33 feet to the beginning of a tangent curve to the North, Northwest and West and having a radius of 600.00 feet

Thence Easterly, Northeasterly and Northerly along said curve 1280.50 feet through a central angle of 122º 16' 43" to a point of tangency with a line having a bearing of North 10º 02' 32" West;

Thence along said tangent line North 10º 02' 32" West 294.32 feet to the beginning of a tangent curve concave Easterly and Southeasterly and having a radius of 1800.00 feet; thence Northerly and Northeasterly along said curve 1734.83 feet through a central angle of 55º 13' 17" to a point of tangency with a line having a bearing of North 45º 10' 45" East; thence along said tangent line North 45º 10' 45" East, 177.09 feet to a point is such 45º 10' 45" West, 810.09 feet from Point "A" as described in that certain Declaration of road right-of-way (Devore Road and Glen Helen Road, Devore Area - Second District, Resolution No. 93-18) recorded as Instrument No. 1993-067483 of Official Records of said County, said point being the point of terminus and all that portion of Government Lots 4 and 6 (formerly Government Lot 1) in Section 4, Township 1 North, Range 5 West, San Bernardino Base and Meridian, per supplemental plat of amended lottings on file and accepted by the U.S. Bureau of and Management January 18, 1980, shown on survey filed C.S. 1729 in the office of the County Surveyor of said County, lying within the described boundaries of that certain grant of easement to the County of San Bernardino recorded July 14, 1981, as Instrument No. 1981-154342, Official Records

of said County and lying Northwesterly and Westerly of the Westerly line of a strip of land 104.00 feet wide, 52.00 feet on each side of the following described centerline:

Commencing at the centerline intersections of Devore Road relocated and State Highway 15 as shown per State Highway 15 as shown per state highway right-of-way Map No. 404571, Sheet 1 of 5;

Thence along said centerline of Devore Road relocated South 74º 40' 27" East, 138.59 feet to the true point of beginning;

Thence continuing along said centerline 74º 40' 27" East, 50.84 feet to the beginning of a tangent curve concave Southerly and having a radius of 1800.00 feet

Thence Easterly along said curve 217.11 feet through a central angle of 6º 54' 38" to a point of tangency with a line having a bearing of South 67º 45' 40" East;

Thence along said tangent line South 67º 45' 40" East, 245.33 feet to the beginning of a tangent curve concave to the North, Northwest and West and having a radius of 600.00 feet; thence Easterly, Northeasterly and Northerly along said curve 1280.50 feet through a central angle of 122º 16' 43" to a point of tangency with a line having a bearing of North 10º 02' 32" West;

Thence along said tangent line North 10º 02' 32" West, 294.32 feet to the beginning of a tangent curve concave Easterly and Southeasterly and having a radius of 1800.00 feet; thence Northerly and Northeasterly along said curve 1734.83 feet through a central angle of 55º 13' 17" to a point of tangency with a line having a bearing of North 45º 10' 45" East;

Thence along said tangent line North 45º 10' 45" East, 177.09 feet to a point that is South 45º 10' 45" West, 810.09 feet from Point “A” as described in that certain declaration of road right-of-way (Devore Road and Glen Helen Road, Devore Area - Second District Resolution No. 93-18) recorded as Instrument No. 1993-067483 of Official Records of said County, said point being the point of terminus.

CLTA Preliminary Report Form – Exhibit B (06-03-11)

CLTA STANDARD COVERAGE POLICY – 1990
EXCLUSIONS FROM COVERAGE

The following matters are expressly excluded from the coverage of this policy and the Company will not pay loss or damage, costs, attorneys' fees or expenses which arise by reason of:
1. (a) Any law, ordinance or governmental regulation (including but not limited to building or zoning laws, ordinances, or regulations) restricting, regulating, prohibiting or relating (i) the occupancy, use, or enjoyment of the land; (ii) the character, dimensions or location of any improvement now or hereafter erected on the land; (iii) a separation in ownership or a change in the dimensions or area of the land or any parcel of which the land is or was a part; or (iv) environmental protection, or the effect of any violation of these laws, ordinances or governmental regulations, except to the extent that a notice of the enforcement thereof or a notice of a defect, lien, or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the public records at Date of Policy. (b) Any governmental police power not excluded by (a) above, except to the extent that a notice of the exercise thereof or notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the public records at Date of Policy.
2. Rights of eminent domain unless notice of the exercise thereof has been recorded in the public records at Date of Policy, but not excluding from coverage any taking which has occurred prior to Date of Policy which would be binding on the rights of a purchaser for value without knowledge.
3. Defects, liens, encumbrances, adverse claims or other matters: (a) whether or not recorded in the public records at Date of Policy, but created, suffered, assumed or agreed to by the insured claimant; (b) not known to the Company, not recorded in the public records at Date of Policy, but known to the insured claimant and not disclosed in writing to the Company by the insured claimant prior to the date the insured claimant became an insured under this policy; (c) resulting in no loss or damage to the insured claimant; (d) attaching or created subsequent to Date of Policy; or (e) resulting in loss or damage which would not have been sustained if the insured claimant had paid value for the insured mortgage or for the estate or interest insured by this policy.
4. Unenforceability of the lien of the insured mortgage because of the inability or failure of the insured at Date of Policy, or the inability or failure of any subsequent owner of the indebtedness, to comply with the applicable doing business laws of the state in which the land is situated.
5. Invalidity or unenforceability of the lien of the insured mortgage, or claim thereof, which arises out of the transaction evidenced by the insured mortgage and is based upon usury or any consumer credit protection or truth in lending law.
6. Any claim, which arises out of the transaction vesting in the insured the estate of interest insured by this policy or the transaction creating the interest of the insured lender, by reason of the operation of federal bankruptcy, state insolvency or similar creditors' rights laws.

EXCEPTIONS FROM COVERAGE - SCHEDULE B, PART I

This policy does not insure against loss or damage (and the Company will not pay costs, attorneys' fees or expenses) which arise by reason of:
1. Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the public records. Proceedings by a public agency which may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the public records.
2. Any facts, rights, interests, or claims which are not shown by the public records but which could be ascertained by an inspection of the land or which may be asserted by persons in possession thereof.
3. Easements, liens or encumbrances, or claims thereof, which are not shown by the public records.
4. Discrepancies, conflicts in boundary lines, shortage in area, encroachments, or any other facts which a correct survey would disclose, and which are not shown by the public records.
5. (a) Unpatented mining claims; (b) reservations or exceptions in patents or in Acts authorizing the issuance thereof; (c) water rights, claims or title to water, whether or not the matters excepted under (a), (b) or (c) are shown by the public records.
6. Any lien or right to a lien for services, labor or material not shown by the public records.

CLTA/ALTA HOMEOWNER'S POLICY OF TITLE INSURANCE (02/03/10)
EXCLUSIONS

In addition to the Exceptions in Schedule B, You are not insured against loss, costs, attorneys' fees, and expenses resulting from:
1. Governmental police power, and the existence or violation of those portions of any law or government regulation concerning: a.building, b. zoning, c.land use d. improvements on the Land, e.land division; and ,f. environmental protection. This Exclusion does not limit the coverage described in Covered Risk 8.a., 14, 15, 16, 18, 19, 20, 23 or 27.
2. The failure of Your existing structures, or any part of them, to be constructed in accordance with applicable building codes. This Exclusion does not limit the coverage described in Covered Risk 14 or 15.
3. The right to take the Land by condemning it. This Exclusion does not limit the coverage described in Covered Risk 17.
4. Risks: a. that are created, allowed, or agreed to by You, whether or not they recorded in the Public Records; b. that are Known to You at the Policy Date, but not to Us, unless they are recorded in the Public Records at the Policy Date; c. that result in no loss to You; or d. that first occur after the Policy Date - this does not limit the coverage described in Covered Risk 7, 8.e, 25, 26, 27, or 28.
5. Failure to pay value for Your Title.
6. Lack of a right: a. to any land outside the area specifically described and referred to in paragraph 3 of Schedule A; and b. in streets, alleys, or waterways that touch the Land. This Exclusion does not limit the coverage described in Covered Risk 11 or 21.
7. The transfer of the Title to You is invalid as a preferential transfer or as a fraudulent transfer or conveyance under federal bankruptcy, state insolvency, or similar creditors' rights laws.

LIMITATIONS ON COVERED RISKS

Your insurance for the following Covered Risks is limited on the Owner's Coverage Statement as follows:
• For Covered Risk 16, 18, 19, and 21 Your Deductible Amount and Our Maximum Dollar Limit of Liability shown in Schedule A.
The deductible amounts and maximum dollar limits shown on Schedule A are as follows:

	Your Deductible Amount	Our Maximum Dollar Limit of Liability
Covered Risk 16:	**1 % of Policy Amount shown in Schedule A or $ 2,500 (whichever is less)**	**$ 10,000**
Covered Risk 18:	**1 % of Policy Amount shown in Schedule A or $ 5,000 (whichever is less)**	**$ 25,000**
Covered Risk 19:	**1 % of Policy Amount shown in Schedule A or $ 5,000 (whichever is less)**	**$ 25,000**
Covered Risk 21:	**1 % of Policy Amount shown in Schedule A or $ 2,500 (whichever is less)**	**$ 5,000**

ALTA RESIDENTIAL TITLE INSURANCE POLICY (6-1-87)
EXCLUSIONS

In addition to the Exceptions in Schedule B, you are not insured against loss, costs, attorneys' fees, and expenses resulting from:
1. Governmental police power, and the existence or violation of any law or government regulation. This includes building and zoning ordinances and also laws and regulations concerning: * land use * improvements on the land * land division * environmental protection. This exclusion does not apply to violations or the enforcement of these matters which appear in the public records at Policy Date. This exclusion does not limit the zoning coverage described in Items 12 and 13 of Covered Title Risks.
2. The right to take the land by condemning it, unless: *a notice of exercising the right appears in the public records *on the Policy Date *the taking happened prior to the Policy Date and is binding on you if you bought the land without knowing of the taking
3. Title Risks: *that are created, allowed, or agreed to by you *that are known to you, but not to us, on the Policy Date -- unless they appeared in the public records *that result in no loss to you *that first affect your title after the Policy Date -- this does not limit the labor and material lien coverage in Item 8 of Covered Title Risks
4. Failure to pay value for your title.
5. Lack of a right: *to any land outside the area specifically described and referred to in Item 3 of Schedule A OR *in streets, alleys, or waterways that touch your land. This exclusion does not limit the access coverage in Item 5 of Covered Title Risks.

2006 ALTA LOAN POLICY (06-17-06)
EXCLUSIONS FROM COVERAGE

The following matters are expressly excluded from the coverage of this policy, and the Company will not pay loss or damage, costs, attorneys' fees or expenses which arise by reason of:
1. (a) Any law, ordinance or governmental regulation (including those relating to building and zoning) restricting, regulating, prohibiting or relating to (i) the occupancy, use, or enjoyment of the land; (ii) the character, dimensions or location of any improvement erected on the Land; (iii) the subdivision of land; or (iv) environmental protection; or the effect of any violation of these laws, ordinances or governmental regulations. This Exclusion 1(a) does not modify or limit the coverage provided under Covered Risk 5.
2. Rights of eminent domain. This Exclusion does not modify or limit the coverage provided under Covered Risk 7 or 8.
3. Defects, liens, encumbrances, adverse claims or other matters:(a)created, suffered, assumed or agreed to by the Insured Claimant; (b)not known to the Company, not recorded in the public records at Date of Policy, but known to the Insured Claimant and not disclosed in writing to the Company by the Insured Claimant prior to the date the Insured Claimant became an Insured under this policy; (c) resulting in no loss or damage to the Insured Claimant; (d) attaching or created subsequent to Date of Policy (however, this does not modify or limit the coverage provided under Covered Risk 11, 13 or 14);or(e) resulting in loss or damage that would not have been sustained if the Insured Claimant had paid value for the Insured Mortgage.
4. Unenforceability of the lien of the Insured Mortgage because of the inability or failure of an Insured to comply with applicable doing-business laws of the state in which the Land is situated.
5. Invalidity or unenforceability in whole or in part of the lien of the Insured Mortgage that arises out of the transaction evidenced by the Insured Mortgage and is based upon usury or any consumer credit protection or truth in lending law.
6. Any claim, by reason of the operation of federal bankruptcy, state insolvency, or similar creditors' rights laws, that the transaction creating the lien of the Insured Mortgage, is (a) a fraudulent conveyance or fraudulent transfer, or (b) a preferential transfer for any reason not stated in Covered Risk 13(b) of this policy.
7. Any lien on the Title for real estate taxes or assessments imposed by governmental authority and created or attaching between Date of Policy and the date of recording of the Insured Mortgage in the Public Records. This Exclusion does not modify or limit the coverage provided under Covered Risk 11(b):

EXCEPTIONS FROM COVERAGE

This policy does not insure against loss or damage (and the Company will not pay costs, attorneys' fees or expenses) that arise by reason of:
1.(a) Taxes or assessments that are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the Public Records; (b) proceedings by a public agency that may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the Public Records.
2.Any facts, rights, interests or claims which are not shown by the Public Records but that could be ascertained by an inspection of the Land or that may be asserted by persons in possession of the Land.
3.Easements, liens or encumbrances, or claims thereof, not shown by the Public Records.
4.Any encroachment, encumbrance, violation, variation, or adverse circumstance affecting the Title that would be disclosed by an accurate and complete land survey of the Land and not shown by the Public Records.
5.(a) Unpatented mining claims; (b) reservations or exceptions in patents or in Acts authorizing the issuance thereof; (c) water rights, claims or title to water, whether or not the matters excepted under (a), (b) or (c) are shown by the Public Records.
6. Any lien or right to a lien for services, labor or material not shown by the public records.

2006 ALTA OWNER'S POLICY (06-17-06)
EXCLUSIONS FROM COVERAGE

The following matters are expressly excluded from the coverage of this policy, and the Company will not pay loss or damage, costs, attorneys' fees, or expenses that arise by reason of:

1. (a) Any law, ordinance, permit, or governmental regulation (including those relating to building and zoning) restricting, regulating, prohibiting, or relating to: (i) the occupancy, use, or enjoyment of the Land; (ii) the character, dimensions, or location of any improvement erected on the Land; (iii) the subdivision of land; or (IV) environmental protection; or the effect of any violation of these laws, ordinances, or governmental regulations. This Exclusion 1(a) does not modify or limit the coverage provided under Covered Risk 5. (b) Any governmental police power. This Exclusion 1(b) does not modify or limit the coverage provided under Covered Risk 6.
2. Rights of eminent domain. This Exclusion does not modify or limit the coverage provided under Covered Risk 7 or 8.
3. Defects, liens, encumbrances, adverse claims, or other matters: (a) created, suffered, assumed, or agreed to by the Insured Claimant; (b) not Known to the Company, not recorded in the Public Records at Date of Policy, but Known to the Insured Claimant and not disclosed in writing to the Company by the Insured Claimant prior to the date the Insured Claimant became an Insured under this policy;(c) resulting in no loss or damage to the Insured Claimant; (d) attaching or created subsequent to Date of Policy (however, this does not modify or limit the coverage provided under Covered Risk 9 and 10); or (e) resulting in loss or damage that would not have been sustained if the Insured Claimant had paid value for the Title.
4. Any claim, by reason of the operation of federal bankruptcy, state insolvency, or similar creditors' rights laws, that the transaction vesting the Title as shown in Schedule A, is (a) a fraudulent conveyance or fraudulent transfer; or (b) a preferential transfer for any reason not stated in Covered Risk 9 of this policy.
5. Any lien on the Title for real estate taxes or assessments imposed by governmental authority and created or attaching between Date of Policy and the date of recording of the deed or other instrument of transfer in the Public Records that vests Title as shown in Schedule A.
The above policy form may be issued to afford either Standard Coverage or Extended Coverage. In addition to the above Exclusions from Coverage, the Exceptions from Coverage in a Standard Coverage policy will also include the following Exceptions from Coverage:

EXCEPTIONS FROM COVERAGE

This policy does not insure against loss or damage (and the Company will not pay costs, attorneys' fees or expenses) that arise by reason of:
1. (a) Taxes or assessments that are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the Public Records; (b) proceedings by a public agency that may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the Public Records.
2. Any facts, rights, interests, or claims that are not shown by the Public Records but that could be ascertained by an inspection of the Land or that may be asserted by persons in possession of the Land.
3. Easements, liens or encumbrances, or claims thereof, not shown by the Public Records.
4. Any encroachment, encumbrance, violation, variation, or adverse circumstance affecting the Title that would be disclosed by an accurate and complete land survey of the Land and that are not shown by the Public Records.
5. (a) Unpatented mining claims; (b) reservations or exceptions in patents or in Acts authorizing the issuance thereof; (c) water rights, claims or title to water, whether or not the matters excepted under (a), (b), or (c) are shown by the Public Records.
6. Any lien or right to a lien for services, labor or material not shown by the public records.

ALTA EXPANDED COVERAGE RESIDENTIAL LOAN POLICY (07-26-10)

EXCLUSIONS FROM COVERAGE

The following matters are expressly excluded from the coverage of this policy and the Company will not pay loss or damage, costs, attorneys fees or expenses which arise by reason of:
1. (a) Any law, ordinance, permit, or governmental regulation (including but not limited to building and zoning) restricting, regulating, prohibiting or relating to (i) the occupancy, use, or enjoyment of the Land; (ii) the character, dimensions or location of any improvement erected on the Land; (iii) the subdivision of the land; or (iv) environmental protection, or the effect of any violation of these laws, ordinances or governmental regulations This Exclusion 1(a) does not modify or limit the coverage provided under Covered Risks 5, 6, 13(c), 13(d), 14, and 16.(b) Any governmental police power. This Exclusion 1(b)does not modify or limit the coverage provided under Covered Risks 5, 6, 13(c), 13(b), 14, and 16.
2. Rights of eminent domain. This Exclusion does not modify or limit the coverage provided under Covered Risk 7 or 8.
3. Defects, liens, encumbrances, adverse claims or other matters (a) created, suffered, assumed or agreed to by the Insured Claimant; (b) not Known to the Company, not recorded in the Public Records at Date of Policy, but Known to the Insured Claimant and not disclosed in writing to the Company by the Insured Claimant prior to the date the Insured Claimant became an Insured under this policy;(c) resulting in no loss or damage to the Insured Claimant;(d) attaching or created subsequent to Date of Policy (however, this does not modify or limit the coverage provided under Covered Risks 11, 16, 17, 18, 19, 20, 21, 22, 23, 24, 27 or 26); or (e)resulting in loss or damage which would not have been sustained if the Insured Claimant had paid value for the Insured Mortgage.
4. Unenforceability of the lien of the Insured Mortgage because of the inability or failure of the Insured to comply with applicable doing-business laws of the state in which the Land is situated.
5. Invalidity or unenforceability in whole or in part of the lien of the Insured Mortgage that arises out of the transaction evidenced by the Insured Mortgage and is based upon usury, or any consumer credit protection or truth in lending law. This Exclusion does not modify or limit the coverage provided in Covered Risk 26.

6. Any claim of invalidity, unenforceability or lack of priority of the lien of the Insured Mortgage as to Advances or modifications made after the Insured has Knowledge that the vestee shown in Schedule A is no longer the owner of the estate or interest covered by this policy. This Exclusion does not modify or limit the coverage provided in Covered Risk 11.
7. Any lien on the Title for real estate taxes or assessments imposed by governmental authority and created or attaching subsequent to Date of Policy in accordance with applicable building codes. This Exclusion does not modify or limit the coverage provided in Covered Risk 5 or 6..
8. The failure of the residential structure, or any portion of it, to have been constructed before, on or after Date of Policy in accordance with applicable building codes. This Exclusion does not modify or limit the coverage provided in Covered Risk 5 or 6.
9. Any claim, by reason of the operation of federal bankruptcy, state insolvency, or similar creditors' rights laws, that the transaction creating the lien of the Insured Mortgage, is (a) a fraudulent conveyance or fraudulent transfer, or (b) a preferential transfer for any reason not stated in Covered Risk 27(b) of this policy.

Orange Coast Title Company
PRIVACY POLICY

We Are Committed to Safeguarding Customer Information
In order to better serve your needs now and in the future, we may ask you to provide us with certain information. We understand that you may be concerned about what we will do with such information – particularly any personal or financial information. We agree that you have a right to know how we will utilize the personal information that you provide to us. Therefore, we have adopted this Privacy Policy to govern the use and handling of your personal information.

Applicability
This Privacy Policy governs our use of the information which you provide to us. It does not govern the manner in which we may use information we have obtained from any other source, such as information obtained from a public record or from another person or entity.

Types of Information
Depending upon which of our services you are utilizing, the types of nonpublic personal information that we may collect include:

- Information we receive from you on applications, forms and in other communications to us, whether in writing, in person, by telephone or any other means.
- Information we receive from providers of services to us, such as appraisers, appraisal management companies, real estate agents and brokers and insurance agencies (this may include the appraised value, purchase price and other details about the property that is the subject of your transaction with us).
- Information about your transactions with us, our Affiliated Companies, or others; and
- Information we receive from a consumer reporting agency.

Your California Rights (immediately following this Privacy Policy) or you may visit our website at https://www.titleadvantage.com/privacypolicy.htm or call toll-free at (866) 241-7373. Only applies to CA residents

Use of Information
We request information from you for our own legitimate business purposes and not for benefit of any nonaffiliated party. Therefore, we will not release your information to nonaffiliated parties except: (1) as necessary for us to provide the product or service you have requested of us; or (2) as permitted by law. We may, however, store such information indefinitely, including the period after which any customer relationship has ceased. Such information may be used for any internal purpose, such as quality control efforts or customer analysis.

Former Customers

Even if you are no longer our customer, our Privacy Policy will continue to apply to you.

Confidentiality and Security
We will use our best efforts to ensure that no unauthorized parties have access to any of your information. We restrict access to nonpublic personal information about you to those individuals and entities who need to know that information to provide products or services to you. We will use our best efforts to train and oversee our employees and agents to ensure that your information will be handled responsibly and in accordance with this Privacy Policy. We currently maintain physical, electronic, and procedural safeguards that comply with federal regulations to guard your nonpublic personal information.

Other Important Information
We reserve the right to modify or supplement this Privacy Policy at any time. If our Privacy Policy changes, we will provide the new Privacy Policy before the new policy becomes effective.

Last Revision 12/26/2019
Effective on 1/01/2020

Your California Rights

If you are a California resident, you may have certain rights under California law, including but not limited to the California Consumer Privacy Act ("CCPA"). All phrases used herein shall have the same meaning as those phrases used under relevant California law, including but not limited to the CCPA.

Right to Know
You have the right to know:

- The categories of personal information we have collected about or from you;
- The categories of sources from which we collected your personal information;
- The business or commercial purpose for collecting or sharing your personal information;
- The categories of third parties with whom we have shared your personal information; and
- The specific pieces of your personal information we have collected.

Process to Submit a Request. To submit a verified request for this information you may visit our website at https://www.titleadvantage.com/privacypolicy.htm or call toll-free at (866) 241-7373. You may also designate an authorized agent to submit a request on your behalf by visiting our website https://www.titleadvantage.com/privacypolicy.htm or calling toll-free at (866) 241-7373 and then also submitting written proof of such authorization via e-mail to dataprivacy@octitle.com.

Verification Method. In order to ensure your personal information is not disclosed to unauthorized parties, and to protect against fraud, we will verify your identity before responding to your request. To verify your identity, we will generally match the identifying information provided in your request with the information we have on file about you. Depending on the sensitivity of the personal information requested, we may also utilize more stringent verification methods to verify your identity, including but not limited to requesting additional information from you and/or requiring you to sign a declaration under penalty of perjury.

Right of Deletion
You have a right to request that we delete the **personal information** we have collected from or about you.

Process to Submit a Request. To submit a verified request to delete you information you may visit our website at https://www.titleadvantage.com/privacypolicy.htm or call toll-free at (866) 241-7373. You may also designate an authorized agent to submit a request on your behalf by clicking here or calling toll-free at (866) 241-7373 and then also submitting written proof of such authorization via e-mail to dataprivacy@octitle.com.

Verification Method. In order to ensure we do not inadvertently delete your **personal information** based on a fraudulent request, we will verify your identity before we respond to your request. To verify your identity, we will generally match the identifying information provided in your request with the information we have on file about you. Depending on the sensitivity of the **personal information** requested to be deleted, we may also utilize more stringent verification methods to verify your identity, including but not limited to requesting additional information from you and/or requiring you to sign a declaration under penalty of perjury.

Right to Opt-Out
We do not sell your **personal information** to third parties, and do not plan to do so in the future.

Right of Non-Discrimination
You have a right to exercise your rights under the CCPA without suffering discrimination. Accordingly, OC Title & family of Companies will not discriminate against you in any way if you choose to exercise your rights under the CCPA.

California Minors
If you are a California resident under the age of 18, California Business and Professions Code § 22581 permits you to request and obtain removal of content or information you have publicly posted on any of our Applications or Websites. To make such a request, please send an email with a detailed description of the specific content or information to dataprivacy@octitle.com. Please be aware that such a request does not ensure complete or comprehensive removal of the content or information you have posted and there may be circumstances in which the law does not require or allow removal even if requested.

Collection Notice
The following is a list of the categories of **personal information** we may have collected about California residents in the twelve months preceding the date this Privacy Notice was last updated, including the business or commercial purpose for said collection, the

categories of sources from which we may have collected the **personal information**, and the categories of third parties with whom we may have shared the **personal information**:

Categories of Personal Information Collected

The categories of **personal information** we have collected include, but may not be limited to:

- real name
- Signature
- Alias
- SSN
- physical characteristics or description, including protected characteristics under federal or state law
- address
- telephone number
- passport number
- driver's license number
- state identification card number
- IP address
- policy number
- file number
- employment history
- bank account number
- credit card number
- debit card number
- financial account numbers
- commercial information
- professional or employment information

Categories of Sources

Categories of sources from which we've collected **personal information** include, but may not be limited to:

- the consumer directly
- public records
- governmental entities
- non-affiliated third parties
- affiliated third parties

Business Purpose for Collection

The business purposes for which we've collected **personal information** include, but may not be limited to:

- completing a transaction for our Products
- verifying eligibility for employment
- facilitating employment
- performing services on behalf of affiliated and non-affiliated third parties
- protecting against malicious, deceptive, fraudulent, or illegal activity

Categories of Third Parties Shared

The categories of third parties with whom we've shared **personal information** include, but may not be limited to:

- service providers
- government entities
- operating systems and platforms
- non-affiliated third parties
- affiliated third parties

Sale Notice

We have not sold the **personal information** of California residents to any third party in the twelve months preceding the date this Privacy Notice was last updated, and we have no plans to sell such information in the future. We also do not, and will not sell the **personal information** of minors under sixteen years of age without affirmative authorization.

Disclosure Notice

The following is a list of the categories of **personal information** of California residents we may have disclosed for a business purpose in the twelve months preceding the date this Privacy Notice was last updated.

- real name
- Signature
- Alias
- SSN
- physical characteristics or description, including protected characteristics under federal or state law
- telephone number
- passport number
- driver's license number
- state identification card number
- IP address
- policy number
- file number
- bank account number
- credit card number
- debit card number
- financial account numbers
- commercial information
- professional or employment information

- address
- employment history

If you have any questions and/or comments you may contact us:

Call Us at our toll free number (866) 241-7373
Email Us at dataprivacy@octitle.com
Mail:
Orange Coast Title
Attn: Privacy Officer
1551 N. Tustin Ave., Ste. 300
Santa Ana, CA 92705

Effective on 1/1/2019
Revised on 12/23/2019

STATEMENT OF FACTS

CONFIDENTIAL INFORMATION FOR YOUR PROTECTION

This statement is to be signed personally by each party to the transaction and by both husband and wife, or domestic partner before title insurance can be written. When filled in completely it will serve to establish identity, eliminate matters affecting persons of similar name, protect you against forgeries, and speed the completion of your transaction.

MY FULL NAME (First, Middle, Last)_____Date of Birth :_____

Business Ph: _____ Home Ph: _____ Birthplace: _____

SS# _____Driver's License No._____ Expiration Date _____ State Issued_____

I have lived continuously in the USA since: _____

Full name of spouse/domestic partner: (First, Middle, Last)_____-_____

Spouse/domestic partner's Birthplace: _____ Date of Birth: _____

Spouse/domestic partner's SS# _____ I have lived continuously in the USA since: _____

We were married/legally joined on : _____ at _____

Spouse/domestic partner's maiden name: _____

RESIDENCES & OCCUPATIONS DURING PAST 10 YEARS

Street_____City_____From_____to_____

Street_____City_____From_____to_____

Street_____City_____From_____to_____

OCCUPATIONS

(Husband/Domestic partner) Firm Name: _____ Location: _____

Firm Name: _____ Location: _____

Firm Name: _____ Location: _____

(Wife/Domestic partner) Firm Name: _____ Location: _____

Firm Name: _____ Location: _____

(If no former marriage/union, write "none" Otherwise complete the following)

Any Former Marriages (check one item - fill in date & place)

Name of former wife/domestic partner: _____

Deceased: ____ Divorced: ____ Interlocutory: ____ Final: _____ When: _____ Where: _____

Name of former husband/domestic partner: _____

Deceased: ____ Divorced: ____ Interlocutory: ____ Final: _____ When: _____ Where: _____

There are no leases, defects, encumbrances, adverse claims, or other matters affecting said property other than as

Shown on the Preliminary Report prepared by: _____

Bearing the above referenced order number dated: _____

There is no-one in possession or entitled to possession of said property other than the Vestee shown in said Preliminary Report except: _____

There is no work of improvement in progress and no such work has been completed within one year of this date:

(Circle One) YES NO

The Street address of the property in this transaction is:_____

Single Family Residence: _____ Multiple Residence: _____ Commercial: _____ Vacant Land: _____

Occupied By: Owner: _____ Lessee: _____ Tenants: _____

Is any portion of new loan funds to be used for construction? (circle one) YES NO

The subject of this Statement of Identity, assumes full responsibility for any and all discrepancies, and agrees to hold harmless the recipient herein from any losses sustained by relying on such information.

Date: _____ _____

(Signature)

Order No: _____140-1637389-20 _____

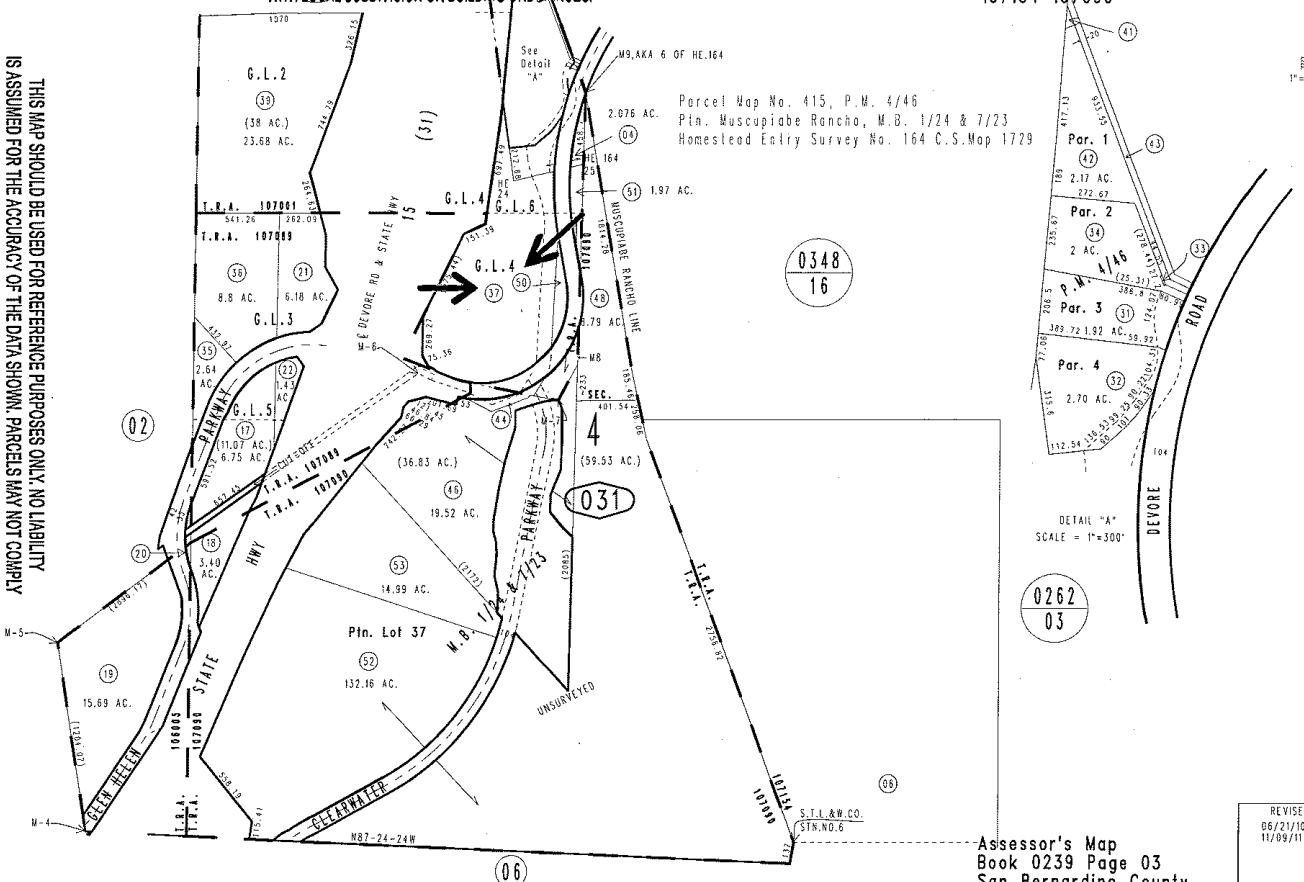
(Signature)

THIS MAP IS FOR THE PURPOSE OF AD VALOREM TAXATION ONLY.

Ptn. Sec.4, T.1N.,R.5W., S.B.B.&M.

THIS MAP SHOULD BE USED FOR REFERENCE PURPOSES ONLY. NO LIABILITY IS ASSUMED FOR THE ACCURACY OF THE DATA SHOWN. PARCELS MAY NOT COMPLY WITH LOCAL SUBDIVISION OR BUILDING ORDINANCES.

San Bernardino Unified 0239 - 03
Rialto Unified
Tax Rate Area
106005 107001 107153
107154 107090



THIS MAP SHOULD BE USED FOR REFERENCE PURPOSES ONLY. NO LIABILITY IS ASSUMED FOR THE ACCURACY OF THE DATA SHOWN. PARCELS MAY NOT COMPLY WITH LOCAL SUBDIVISION OR BUILDING ORDINANCES.

December 2003

Assessor's Map
Book 0239 Page 03
San Bernardino County

REVISED
06/21/10 RU
11/09/11 XC

NOTICE

PLEASE BE ADVISED THAT THE DATA AND INFORMATION FROM THE PUBLIC RECORDS CONTAINED HEREIN WILL NEED TO BE UPDATED PRIOR TO CLOSING AS MANY COUNTY FACILITIES ARE CLOSED OR HAVE LIMITED STAFFING AS A RESULT OF THE CORONAVIRUS PANDEMIC. IF THE INFORMATION FROM THE COUNTY IS NOT AVAILABLE THERE WILL BE ADDITIONAL REQUIREMENTS IN ORDER TO CLOSE AND INSURE THIS TRANSACTION. PLEASE CONTACT YOUR LOCAL TITLE OFFICER FOR DETAILS.

Orange Coast Title Company

2151 E. Convention Center Way, Suite 102
Ontario, CA 91764
909-987-5433

UPDATED PRELIMINARY REPORT

Orange Coast Title Company of Southern California
1845 Business Center Drive, Suite 218
San Bernardino, CA 92408

Attention:	Catherine Von Moos	**Your no.:**	1761131-CVM
Property address:	1: Vacant Land , San Bernardino, CA 92404 2: Vacant Land known as 2534 Devore Road, San Bernardino, CA 92404	**Order no.:**	140-1761131-20

Dated: January 26, 2023

In response to the above referenced application for a policy of title insurance, **Orange Coast Title Company** hereby reports that it is prepared to issue, or cause to be issued, as of the date hereof, a Policy or Policies of Title Insurance describing the land and the estate or interest therein hereinafter set forth, insuring against loss which may be sustained by reason of any defect, lien or encumbrance not shown or referred to as an Exception below or not excluded from coverage pursuant to the printed Schedules, Conditions and Stipulations of said Policy forms.

The printed Exceptions and Exclusions from the coverage and Limitations on Covered Risks of said policy or policies are set forth in Exhibit B attached. The policy to be issued may contain an arbitration clause. When the Amount of Insurance is less than that set forth in the arbitration clause, all arbitrable matters shall be arbitrated at the option of either the Company or the Insured as the exclusive remedy of the parties. Limitations on Covered Risks applicable to the CLTA and ALTA Homeowner's Policies of Title Insurance which establish a Deductible Amount and a Maximum Dollar Limit of Liability for certain coverages are also set forth in Exhibit B. Copies of the policy forms should be read. They are available from the office which issued this report.

Please read the exceptions shown or referred to below and the exceptions and exclusions set forth in Exhibit B of this report carefully. The exceptions and exclusions are meant to provide you with notice of matters, which are not covered under the terms of the title insurance policy and should be carefully considered.

It is important to note that this preliminary report is not a written representation as the condition of title and may not list all liens, defects, and encumbrances affecting title to the land.

This report (and any supplements or amendments hereto) is issued solely for the purpose of facilitating the issuance of a policy of title insurance and no liability is assumed hereby. If it is desired that liability be assumed prior to the issuance of a policy of title insurance, a Binder or Commitment should be requested.

Dated as of January 18, 2023 at 7:30 AM

Ranny Harper, Title Officer
Email: rannyh@octitle.com
Ph: 909-987-5433
Fax: 714-415-7961

The form of policy of title insurance contemplated by this report is:

C.L.T.A. Standard Coverage Policy - 1990 (Owner's Policy or Joint Protection) and A.L.T.A. Loan Policy (06-17-06)

See attached disclosure.

Schedule "A"

The estate or interest in the land hereinafter described or referred to covered by this report is:

A Fee

Title to said estate or interest at the date hereof is vested in:

County of San Bernardino, a Body Corporate and Politic of the State of California

The land referred to in this report is situated in the City of San Bernardino, the County of San Bernardino, State of California, and is described as follows:

Parcel A:

That portion of Section 4, Township 1 North, Range 5 West, San Bernardino Base and Meridian, in the County of San Bernardino, State of California, being a portion of Homestead Entry Survey No. 164, according to government plat approved February 11, 1916, in the County of San Bernardino, State of California, described as beginning at Corner No. 4 of said survey; thence North 7 Deg. 36' West, 212.88 feet; thence North 82 Deg. 24' East, 170.70 feet to a point in the center line of County Road; thence North 48 Deg. 42' North, 90 feet; thence along a curve to the left with a radius of 430 feet, a distance of 101 feet; thence North 36 Deg. 14-1/2 East, 90.23 feet; thence along a curve to the left with a radius of 170 feet, a distance of 129.44 feet; thence North 8 Deg. 23' West, 59.92 feet; thence along a curve to the right with a radius of 160 feet, a distance of 148.93 feet to a point on the East line of said Homestead Survey; thence South 20 Deg. 59' East, 204.10 feet; thence South 1 Deg. 31' West, 458.70 feet; thence South 76 Deg. 31' West, 467.26 feet to the point of beginning.

Parcel B:

Parcel 4 of Parcel Map No. 415, in the County of San Bernardino, State of California, as per plat recorded in Book 4 of Parcel Maps Page 46, records of said County.

Together with that portion of that vacated street that would attach by operation of law, as disclosed by that Resolution No. 95-255, recorded December 07, 1995 as Instrument No. 19950420668, Official Records.

Assessor's Parcel Numbers(s):
1: 0239-031-04-0-000
2: 0239-031-32-0-000

Schedule "B"

At the date hereof exceptions to coverage in addition to the printed exceptions and exclusions contained in said policy form would be as follows:

1 General and Special taxes for the fiscal year 2023-2024, including any assessments collected with taxes. A lien not yet payable.

First installment due and payable 11/01/2023, delinquent if not paid by 12/10/2023
Second installment due and payable 02/01/2024, delinquent if not paid by 04/10/2024

2 General and Special taxes for the fiscal year 2022-2023, including any assessments collected with taxes.

Total amount	0.00
1st installment	$0.00 no tax due
Penalty	$0.00 (after 12-10)
2nd installment	$0.00 no tax due
Penalty	$0.00 (after 4/10)
Code area	not set out
Parcel No.	0239-031-04-0-000
Exemption	$0.00

The above taxes cover Parcel A.

3 General and Special taxes for the fiscal year 2022-2023, including any assessments collected with taxes.

Total amount	0.00
1st installment	$0.00 no tax due
Penalty	$0.00 (after 12-10)
2nd installment	$0.00 no tax due
Penalty	$0.00 (after 4/10)
Code area	not set out
Parcel No.	0239-031-32-0-000
Exemption	$0.00

The above taxes cover Parcel B.

4 General and special city and/or county taxes, bonds or assessments which may become due on said land, if and when title to said land is no longer vested in a governmental or quasi-governmental agency

5 The Lien of future supplemental taxes, if any, assessed pursuant to the provisions of section 75, et seq of the revenue and taxation code of the state of California

6 Minerals of whatsoever kind, subsurface and surface substances, including but not limited to coal, lignite, oil, gas, geothermal resources, brine, uranium, clay, rock, sand and gravel in, on, under and that may be produced from the Land, together with all rights, privileges, and immunities relating thereto, whether or not appearing in the Public Records or listed in Schedule B. The Company makes no representation as to the present ownership of any such interests. There may be leases, grants, exceptions or reservations of interests that are not listed.

7 Rights of the public in and to any portion of said land lying within any lawfully established streets, roads or highways.

8 Reservations recited in the patent from the United States, as follows:"Subject to any vested and accrued water rights for mining, agricultural, manufacturing or other purposes, and rights to ditches and reservoirs used in connection with such water rights as may be recognized and acknowledged by the local customs, laws and decisions of courts, and a right of way for ditches or canals constructed by authority of the United States" recorded in Book L, Page 119 of Patents.

Said matter affects Parcel A.

9 An easement for purposes herein stated, and rights incidental thereto as provided in an instrument

Recorded:	2/21/1939, in Book 1325, Page 456, of Official Records.
For :	road and incidental purposes
In favor of :	The United States of America
Affects :	The location of said easement cannot be determined from the public records.

Said matter affects Parcel A.

10 The fact that the ownership of said land does not include any rights of ingress or egress to or from the freeway adjacent to said land. Said rights have been relinquished in the deed to the State of California recorded 4/3/1967, in Book 6797, Page 311, of Official Records.

A waiver in favor of the State of California of any claim for damages to said land by reason of the location, construction, landscaping or maintenance of a highway contiguous thereto, as contained in the instrument recorded 4/3/1967 , in Book 6797, Page 311, of Official Records.

Said matter affects Parcel B.

11 Covenants, conditions and restrictions in an instrument recorded 08/26/1970 in Book 7505, Page 891, Official Records, which provide that a violation thereof shall not defeat or render invalid the lien of any mortgage or Deed of Trust made in good faith and for value, but omitting any covenants or restrictions, if any, based upon race, color, religion, sex, handicap, familial status, or national origin unless and only to the extent that said covenant (a) is exempt under chapter 42, section 3604 of the United States code or (b) relates to handicap but does not discriminate against handicapped persons.

"NOTE: section 12955 of the government code provide the following: if this document contains any restriction based on race, color, religion, sex, familial status, marital status, disability, national origin, or ancestry, that restriction violates state and federal fair housing laws and is void, and may be removed pursuant to Section 12955 of the government code. Lawful restriction under state and federal law on the age of occupants in senior housing for older persons shall not be construed as restriction based on familial status."

Said matter affects Parcel B.

12 A declaration of right-of way executed by the Board of Supervisors of the County of San Bernardino, Resolution No. 81-101, recorded April 10, 1981 as Instrument No. 81-78448, Official Records.

Reference is hereby made to the above document for full particulars.

Said matter affects Parcel A.

13 Resolution No. 82-334 of the Board of Supervisors of the County of San Bernardino, State of California, approving the reorganization to include the annexation to and detachments from the West San Bernardino County Water District LAFC No. 2164, recorded March 15, 1983 as Instrument No. 83-54393, Official Records.

Reference is hereby made to the above document for full particulars.

Said matter affects Parcel A.

14 A Lease of said land upon the terms, covenants and provisions therein provided

Recorded:	3/29/1994, as Instrument No. 94-147929 , Official Records.
Dated:	3/1/1994
Term:	Said years from March 1, 1994
Lessor:	San Bernardino County California, a public body
Lessee:	Inland Empire Public Facilities Corporation, a nonprofit, public benefit corporation

A Sub Lease upon the terms, covenants and provisions therein provided recorded:3/29/1994 as Instrument No. 94-147930, Official Records.

Dated:	3/1/1994
Term:	As provided therein years from March 1, 1994 (or Saidyears ending as provided therein) .
Lessor:	Inland Empire Public Facilities Corporation
Lessee:	San Bernardino County, California

An instrument, upon the terms and conditions contained therein

Entitled:	Assignment Agreement
Dated:	3/1/1994
Executed by and between:	Inland Empire Public Facilities Corporation and Texas Commerce Bank National Association
Recorded:	3/29/1994 as Instrument No 94-147931, Official Records.

Reference is hereby made to the above document for full particulars.

15 A declaration of road right-of way executed by the Board of Supervisors of the County of San Bernardino, Resolution No. 94-100, recorded June 1, 1994 as Instrument No. 94-247897, Official Records.

Reference is hereby made to the above document for full particulars.

Said matter affects Parcel A.

16 The effect of the following:

An instrument, upon the terms and conditions contained therein

Entitled:	Assignment Agreement
Dated:	12/1/1995
Executed by and between:	Inland Empire Public Facilities Corporation, and Texas Commerce Bank National Association
Recorded:	12/12/1995 as Instrument No 95-424298, Official Records.

Reference is hereby made to the above document for full particulars.

17 The effect of the following:

An instrument, upon the terms and conditions contained therein

Entitled:	Assignment Agreement
Dated:	12/1/1995
Executed by and between:	Inland Empire Public Facilities Corporation and Texas Commerce Bank National Association
Recorded:	12/12/1995 as Instrument No 95-424302, Official Records.

Reference is hereby made to the above document for full particulars.

18 An instrument, upon the terms and conditions contained therein

Entitled:	Certificate of Street Name Change
Recorded:	8/5/1996, as Instrument No. 96-283850, Official Records

19 Rights of parties in possession of said land by reason of unrecorded leases, if any. Please forward said leases for our examination.

20 "NOTE: Please be advised that our search did not disclose any open Deeds of Trust of record. If you should have knowledge of any outstanding obligation, please contact your title officer immediately for further review".

21 (A) Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the public records;

Proceedings by a public agency which may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the Public Records.

(B) Any facts, rights, interests, or claims which are not shown by the public records but which could be ascertained by an inspection of the land or which may be asserted by persons in possession thereof.

(C) Easements, liens or encumbrances, or claims thereof, which are not shown by the public records.

(D) Discrepancies, conflicts in boundary lines, shortage in area, encroachments, or any other facts which a correct survey would disclose, and which are not shown by the public records

(E) (a) Unpatented mining claims; (b) reservations or exceptions in patents or in Acts authorizing the issuance thereof; (c) water rights, claims or title to water, whether or not the matters excepted under (a), (b), or (c) are shown by the public records

(F) Any lien or right to a lien for services, labor or material theretofore or hereafter not shown by the public records.

Exceptions A-F will be omitted on extended coverage policies.

End of Schedule B

"NOTES AND REQUIREMENTS SECTION"

BUILDER SERVICES

NOTE NO. 1

AFFILIATED BUSINESS ARRANGEMENT DISCLOSURE STATEMENT NOTICE

This is to give you notice that Orange Coast Title Company owns an interest in Real Advantage Title Insurance Company. This underwriter may be chosen by Orange Coast Title Company and this referral may provide Orange Coast Title Company a financial or other benefit.

You are NOT required to use the listed provider as a condition for settlement of your loan or purchase, sale or refinance of the subject property and you have the opportunity to select any of the Orange Coast Title Company title insurance underwriters for your transaction. THERE ARE FREQUENTLY OTHER SETTLEMENT SERVICE PROVIDERS AVAILABLE WITH SIMILAR SERVICES. YOU ARE FREE TO SHOP AROUND TO DETERMINE THAT YOU ARE RECEIVING THE BEST SERVICES AND THE BEST RATE FOR THESE SERVICES

Notes section continued on next page…

NOTE NO. 2

California Revenue and Taxation Code Section 18662, effective January 1, 1994 and by amendment effective January 1, 2003, provides that the buyer in all sales of California Real Estate may be required to withhold 3 and 1/3% of the total sales price as California State Income Tax, subject to the various provisions of the law as therein contained.

NOTE NO. 3 PAYOFF INFORMATION:

Note: this company does require current beneficiary demands prior to closing.
If the demand is expired and a correct demand cannot be obtained, our requirements will be as follows:

A. If this company accepts a verbal update on the demand, we may hold an amount equal to one monthly mortgage payment. The amount of this hold will be over and above the verbal hold the lender may have stipulated.

B. If this company cannot obtain a verbal update on the demand, will either pay off the expired demand or wait for the amended demand, at the discretion of the escrow.

C. In the event that a payoff is being made to a servicing agent for the beneficiary, this company will require a complete copy of the servicing agreement prior to close.

NOTE NO. 4

If this company is requested to disburse funds in connection with this transaction, chapter 598, statutes of 1989 mandates hold periods for checks deposited to escrow or sub-escrow accounts. The mandatory hold is one business day after the day deposited. Other checks require a hold period from three to seven business days after the day deposited.

Notice Regarding Your Deposit of Funds

California Insurance Code Sections 12413 *et. Seq.* Regulates the disbursement of escrow and sub-escrow funds by title companies. The law requires that funds be deposited in the title company escrow and sub-escrow accounts and be available for withdrawal prior to disbursement. Funds deposited with the Company by wire transfer may be disbursed upon receipt. Funds deposited with the Company via cashier's checks drawn on a California based bank may be disbursed the next business day after the day of deposit. If funds are deposited with by other methods, recording or disbursement may be delayed. All escrow and sub-escrow funds received by the Company will be deposited with other funds in one or more non-interest bearing escrow accounts of the Company in a financial institution selected by the Company. The Company and/or its parent company may receive certain direct or indirect benefits from the financial institution by reason of the deposit of such funds or the maintenance of such accounts with the financial institution, and the Company shall have no obligation to account to the depositing party in any manner for the value of, or to pay such party, any benefit received by the Company and/or its parent Company. Those benefits may include, without limitation, credits allowed by such financial institution on loans to the Company and/or its parent company and earnings on investments made on the proceeds of such loans, accounting, reporting and other services and products of such financial institution. Such benefits shall be deemed additional compensation of the Company for its services in connection with the escrow or sub-escrow.

Orange Coast Title Company
2151 E. Convention Center Way, Suite 102
Ontario, CA 91764
909-987-5433

Attention:
Borrower: **215 TOP LLC**

Lenders supplemental report

The above numbered report (including any supplements or amendments thereto) is hereby modified and/or supplemented in order to reflect the following additional items relating to the issuance of an C.L.T.A. Standard Coverage Policy - 1990 (Owner's Policy or Joint Protection) and A.L.T.A. Loan Policy (06-17-06) form as follows:

A. This report is preparatory to this issuance of an American Land Title Association loan policy of title insurance. This report discloses nothing, which would preclude the issuance of said American land title association loan policy of title insurance with endorsement no. 100 attached thereto.

B. The improvements on said land are designated as:

Vacant Land
1: Vacant Land , in the City of San Bernardino, County of San Bernardino, State of California.

Vacant Land
2: Vacant Land known as 2534 Devore Road, in the City of San Bernardino, County of San Bernardino, State of California.

C. Our search of the public records revealed conveyance(s) affecting said land recorded within 24 months of the date of this report are as follows:

None.

Attention

Please note that this preliminary report now has an extra copy of the legal description on a separate sheet of paper. There are no markings on the page. The idea is to provide you with a legal description that can be attached to other documents as needed. That legal description page immediately follows this page.

Thank you for your support of **Orange Coast Title Company**. We hope that this makes your job a little easier.

Exhibit "A"

Parcel A:

That portion of Section 4, Township 1 North, Range 5 West, San Bernardino Base and Meridian, in the County of San Bernardino, State of California, being a portion of Homestead Entry Survey No. 164, according to government plat approved February 11, 1916, in the County of San Bernardino, State of California, described as beginning at Corner No. 4 of said survey; thence North 7 Deg. 36' West, 212.88 feet; thence North 82 Deg. 24' East, 170.70 feet to a point in the center line of County Road; thence North 48 Deg. 42' North, 90 feet; thence along a curve to the left with a radius of 430 feet, a distance of 101 feet; thence North 36 Deg. 14-1/2 East, 90.23 feet; thence along a curve to the left with a radius of 170 feet, a distance of 129.44 feet; thence North 8 Deg. 23' West, 59.92 feet; thence along a curve to the right with a radius of 160 feet, a distance of 148.93 feet to a point on the East line of said Homestead Survey; thence South 20 Deg. 59' East, 204.10 feet; thence South 1 Deg. 31' West, 458.70 feet; thence South 76 Deg. 31' West, 467.26 feet to the point of beginning.

Parcel B:

Parcel 4 of Parcel Map No. 415, in the County of San Bernardino, State of California, as per plat recorded in Book 4 of Parcel Maps Page 46, records of said County.

Together with that portion of that vacated street that would attach by operation of law, as disclosed by that Resolution No. 95-255, recorded December 07, 1995 as Instrument No. 19950420668, Official Records.

CLTA Preliminary Report Form – Exhibit B (06-03-11)

CLTA STANDARD COVERAGE POLICY – 1990
EXCLUSIONS FROM COVERAGE

The following matters are expressly excluded from the coverage of this policy and the Company will not pay loss or damage, costs, attorneys' fees or expenses which arise by reason of:
1. (a) Any law, ordinance or governmental regulation (including but not limited to building or zoning laws, ordinances, or regulations) restricting, regulating, prohibiting or relating (i) the occupancy, use, or enjoyment of the land; (ii) the character, dimensions or location of any improvement now or hereafter erected on the land; (iii) a separation in ownership or a change in the dimensions or area of the land or any parcel of which the land is or was a part; or (iv) environmental protection, or the effect of any violation of these laws, ordinances or governmental regulations, except to the extent that a notice of the enforcement thereof or a notice of a defect, lien, or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the public records at Date of Policy. (b) Any governmental police power not excluded by (a) above, except to the extent that a notice of the exercise thereof or notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the public records at Date of Policy.
2. Rights of eminent domain unless notice of the exercise thereof has been recorded in the public records at Date of Policy, but not excluding from coverage any taking which has occurred prior to Date of Policy which would be binding on the rights of a purchaser for value without knowledge.
3. Defects, liens, encumbrances, adverse claims or other matters: (a) whether or not recorded in the public records at Date of Policy, but created, suffered, assumed or agreed to by the insured claimant; (b) not known to the Company, not recorded in the public records at Date of Policy, but known to the insured claimant and not disclosed in writing to the Company by the insured claimant prior to the date the insured claimant became an insured under this policy; (c) resulting in no loss or damage to the insured claimant; (d) attaching or created subsequent to Date of Policy; or (e) resulting in loss or damage which would not have been sustained if the insured claimant had paid value for the insured mortgage or for the estate or interest insured by this policy.
4. Unenforceability of the lien of the insured mortgage because of the inability or failure of the insured at Date of Policy, or the inability or failure of any subsequent owner of the indebtedness, to comply with the applicable doing business laws of the state in which the land is situated.
5. Invalidity or unenforceability of the lien of the insured mortgage, or claim thereof, which arises out of the transaction evidenced by the insured mortgage and is based upon usury or any consumer credit protection or truth in lending law.
6. Any claim, which arises out of the transaction vesting in the insured the estate of interest insured by this policy or the transaction creating the interest of the insured lender, by reason of the operation of federal bankruptcy, state insolvency or similar creditors' rights laws.

EXCEPTIONS FROM COVERAGE - SCHEDULE B, PART I

This policy does not insure against loss or damage (and the Company will not pay costs, attorneys' fees or expenses) which arise by reason of:
1. Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the public records. Proceedings by a public agency which may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the public records.
2. Any facts, rights, interests, or claims which are not shown by the public records but which could be ascertained by an inspection of the land or which may be asserted by persons in possession thereof.
3. Easements, liens or encumbrances, or claims thereof, which are not shown by the public records.
4. Discrepancies, conflicts in boundary lines, shortage in area, encroachments, or any other facts which a correct survey would disclose, and which are not shown by the public records.
5. (a) Unpatented mining claims; (b) reservations or exceptions in patents or in Acts authorizing the issuance thereof; (c) water rights, claims or title to water, whether or not the matters excepted under (a), (b) or (c) are shown by the public records.
6. Any lien or right to a lien for services, labor or material not shown by the public records.

CLTA/ALTA HOMEOWNER'S POLICY OF TITLE INSURANCE (02/03/10)
EXCLUSIONS

In addition to the Exceptions in Schedule B, You are not insured against loss, costs, attorneys' fees, and expenses resulting from:
1. Governmental police power, and the existence or violation of those portions of any law or government regulation concerning: a.building, b. zoning, c.land use d. improvements on the Land, e.land division; and ,f. environmental protection. This Exclusion does not limit the coverage described in Covered Risk 8.a., 14, 15, 16, 18, 19, 20, 23 or 27.
2. The failure of Your existing structures, or any part of them, to be constructed in accordance with applicable building codes. This Exclusion does not limit the coverage described in Covered Risk 14 or 15.
3. The right to take the Land by condemning it. This Exclusion does not limit the coverage described in Covered Risk 17.
4. Risks: a. that are created, allowed, or agreed to by You, whether or not they recorded in the Public Records; b. that are Known to You at the Policy Date, but not to Us, unless they are recorded in the Public Records at the Policy Date; c. that result in no loss to You; or d. that first occur after the Policy Date - this does not limit the coverage described in Covered Risk 7, 8.e, 25, 26, 27, or 28.
5. Failure to pay value for Your Title.
6. Lack of a right: a. to any land outside the area specifically described and referred to in paragraph 3 of Schedule A; and b. in streets, alleys, or waterways that touch the Land. This Exclusion does not limit the coverage described in Covered Risk 11 or 21.
7. The transfer of the Title to You is invalid as a preferential transfer or as a fraudulent transfer or conveyance under federal bankruptcy, state insolvency, or similar creditors' rights laws.

LIMITATIONS ON COVERED RISKS

Your insurance for the following Covered Risks is limited on the Owner's Coverage Statement as follows:
• For Covered Risk 16, 18, 19, and 21 Your Deductible Amount and Our Maximum Dollar Limit of Liability shown in Schedule A.
The deductible amounts and maximum dollar limits shown on Schedule A are as follows:

	Your Deductible Amount	Our Maximum Dollar Limit of Liability
Covered Risk 16:	**1 % of Policy Amount shown in Schedule A or $ 2,500 (whichever is less)**	**$ 10,000**
Covered Risk 18:	**1 % of Policy Amount shown in Schedule A or $ 5,000 (whichever is less)**	**$ 25,000**
Covered Risk 19:	**1 % of Policy Amount shown in Schedule A or $ 5,000 (whichever is less)**	**$ 25,000**
Covered Risk 21:	**1 % of Policy Amount shown in Schedule A or $ 2,500 (whichever is less)**	**$ 5,000**

ALTA RESIDENTIAL TITLE INSURANCE POLICY (6-1-87)
EXCLUSIONS

In addition to the Exceptions in Schedule B, you are not insured against loss, costs, attorneys' fees, and expenses resulting from:
1. Governmental police power, and the existence or violation of any law or government regulation. This includes building and zoning ordinances and also laws and regulations concerning: * land use * improvements on the land * land division * environmental protection. This exclusion does not apply to violations or the enforcement of these matters which appear in the public records at Policy Date. This exclusion does not limit the zoning coverage described in Items 12 and 13 of Covered Title Risks.
2. The right to take the land by condemning it, unless: *a notice of exercising the right appears in the public records *on the Policy Date *the taking happened prior to the Policy Date and is binding on you if you bought the land without knowing of the taking
3. Title Risks: *that are created, allowed, or agreed to by you *that are known to you, but not to us, on the Policy Date -- unless they appeared in the public records *that result in no loss to you *that first affect your title after the Policy Date -- this does not limit the labor and material lien coverage in Item 8 of Covered Title Risks
4. Failure to pay value for your title.
5. Lack of a right: *to any land outside the area specifically described and referred to in Item 3 of Schedule A OR *in streets, alleys, or waterways that touch your land. This exclusion does not limit the access coverage in Item 5 of Covered Title Risks.

2006 ALTA LOAN POLICY (06-17-06)
EXCLUSIONS FROM COVERAGE

The following matters are expressly excluded from the coverage of this policy, and the Company will not pay loss or damage, costs, attorneys' fees or expenses which arise by reason of:
1. (a) Any law, ordinance or governmental regulation (including those relating to building and zoning) restricting, regulating, prohibiting or relating to (i) the occupancy, use, or enjoyment of the land; (ii) the character, dimensions or location of any improvement erected on the Land; (iii) the subdivision of land; or (iv) environmental protection; or the effect of any violation of these laws, ordinances or governmental regulations. This Exclusion 1(a) does not modify or limit the coverage provided under Covered Risk 5.
2. Rights of eminent domain. This Exclusion does not modify or limit the coverage provided under Covered Risk 7 or 8.
3. Defects, liens, encumbrances, adverse claims or other matters:(a)created, suffered, assumed or agreed to by the Insured Claimant; (b)not known to the Company, not recorded in the public records at Date of Policy, but known to the Insured Claimant and not disclosed in writing to the Company by the Insured Claimant prior to the date the Insured Claimant became an Insured under this policy; (c) resulting in no loss or damage to the Insured Claimant; (d) attaching or created subsequent to Date of Policy (however, this does not modify or limit the coverage provided under Covered Risk 11, 13 or 14);or(e) resulting in loss or damage that would not have been sustained if the Insured Claimant had paid value for the Insured Mortgage.
4. Unenforceability of the lien of the Insured Mortgage because of the inability or failure of an Insured to comply with applicable doing-business laws of the state in which the Land is situated.
5. Invalidity or unenforceability in whole or in part of the lien of the Insured Mortgage that arises out of the transaction evidenced by the Insured Mortgage and is based upon usury or any consumer credit protection or truth in lending law.
6. Any claim, by reason of the operation of federal bankruptcy, state insolvency, or similar creditors' rights laws, that the transaction creating the lien of the Insured Mortgage, is (a) a fraudulent conveyance or fraudulent transfer, or (b) a preferential transfer for any reason not stated in Covered Risk 13(b) of this policy.
7. Any lien on the Title for real estate taxes or assessments imposed by governmental authority and created or attaching between Date of Policy and the date of recording of the Insured Mortgage in the Public Records. This Exclusion does not modify or limit the coverage provided under Covered Risk 11(b):

EXCEPTIONS FROM COVERAGE

This policy does not insure against loss or damage (and the Company will not pay costs, attorneys' fees or expenses) that arise by reason of:
1.(a) Taxes or assessments that are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the Public Records; (b) proceedings by a public agency that may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the Public Records.
2.Any facts, rights, interests or claims which are not shown by the Public Records but that could be ascertained by an inspection of the Land or that may be asserted by persons in possession of the Land.
3.Easements, liens or encumbrances, or claims thereof, not shown by the Public Records.
4.Any encroachment, encumbrance, violation, variation, or adverse circumstance affecting the Title that would be disclosed by an accurate and complete land survey of the Land and not shown by the Public Records.
5.(a) Unpatented mining claims; (b) reservations or exceptions in patents or in Acts authorizing the issuance thereof; (c) water rights, claims or title to water, whether or not the matters excepted under (a), (b) or (c) are shown by the Public Records.
6. Any lien or right to a lien for services, labor or material not shown by the public records.

2006 ALTA OWNER'S POLICY (06-17-06)
EXCLUSIONS FROM COVERAGE

The following matters are expressly excluded from the coverage of this policy, and the Company will not pay loss or damage, costs, attorneys' fees, or expenses that arise by reason of:

1. (a) Any law, ordinance, permit, or governmental regulation (including those relating to building and zoning) restricting, regulating, prohibiting, or relating to: (i) the occupancy, use, or enjoyment of the Land; (ii) the character, dimensions, or location of any improvement erected on the Land; (iii) the subdivision of land; or (IV) environmental protection; or the effect of any violation of these laws, ordinances, or governmental regulations. This Exclusion 1(a) does not modify or limit the coverage provided under Covered Risk 5. (b) Any governmental police power. This Exclusion 1(b) does not modify or limit the coverage provided under Covered Risk 6.
2. Rights of eminent domain. This Exclusion does not modify or limit the coverage provided under Covered Risk 7 or 8.
3. Defects, liens, encumbrances, adverse claims, or other matters: (a) created, suffered, assumed, or agreed to by the Insured Claimant; (b) not Known to the Company, not recorded in the Public Records at Date of Policy, but Known to the Insured Claimant and not disclosed in writing to the Company by the Insured Claimant prior to the date the Insured Claimant became an Insured under this policy;(c) resulting in no loss or damage to the Insured Claimant; (d) attaching or created subsequent to Date of Policy (however, this does not modify or limit the coverage provided under Covered Risk 9 and 10); or (e) resulting in loss or damage that would not have been sustained if the Insured Claimant had paid value for the Title.
4. Any claim, by reason of the operation of federal bankruptcy, state insolvency, or similar creditors' rights laws, that the transaction vesting the Title as shown in Schedule A, is (a) a fraudulent conveyance or fraudulent transfer; or (b) a preferential transfer for any reason not stated in Covered Risk 9 of this policy.
5. Any lien on the Title for real estate taxes or assessments imposed by governmental authority and created or attaching between Date of Policy and the date of recording of the deed or other instrument of transfer in the Public Records that vests Title as shown in Schedule A.
The above policy form may be issued to afford either Standard Coverage or Extended Coverage. In addition to the above Exclusions from Coverage, the Exceptions from Coverage in a Standard Coverage policy will also include the following Exceptions from Coverage:

EXCEPTIONS FROM COVERAGE

This policy does not insure against loss or damage (and the Company will not pay costs, attorneys' fees or expenses) that arise by reason of:
1. (a) Taxes or assessments that are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the Public Records; (b) proceedings by a public agency that may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the Public Records.
2. Any facts, rights, interests, or claims that are not shown by the Public Records but that could be ascertained by an inspection of the Land or that may be asserted by persons in possession of the Land.
3. Easements, liens or encumbrances, or claims thereof, not shown by the Public Records.
4. Any encroachment, encumbrance, violation, variation, or adverse circumstance affecting the Title that would be disclosed by an accurate and complete land survey of the Land and that are not shown by the Public Records.
5. (a) Unpatented mining claims; (b) reservations or exceptions in patents or in Acts authorizing the issuance thereof; (c) water rights, claims or title to water, whether or not the matters excepted under (a), (b), or (c) are shown by the Public Records.
6. Any lien or right to a lien for services, labor or material not shown by the public records.

ALTA EXPANDED COVERAGE RESIDENTIAL LOAN POLICY (07-26-10)

EXCLUSIONS FROM COVERAGE

The following matters are expressly excluded from the coverage of this policy and the Company will not pay loss or damage, costs, attorneys fees or expenses which arise by reason of:
1. (a) Any law, ordinance, permit, or governmental regulation (including but not limited to building and zoning) restricting, regulating, prohibiting or relating to (i) the occupancy, use, or enjoyment of the Land; (ii) the character, dimensions or location of any improvement erected on the Land; (iii) the subdivision of the land; or (iv) environmental protection, or the effect of any violation of these laws, ordinances or governmental regulations This Exclusion 1(a) does not modify or limit the coverage provided under Covered Risks 5, 6, 13(c), 13(d), 14, and 16.(b) Any governmental police power. This Exclusion 1(b)does not modify or limit the coverage provided under Covered Risks 5, 6, 13(c), 13(b), 14, and 16.
2. Rights of eminent domain. This Exclusion does not modify or limit the coverage provided under Covered Risk 7 or 8.
3. Defects, liens, encumbrances, adverse claims or other matters (a) created, suffered, assumed or agreed to by the Insured Claimant; (b) not Known to the Company, not recorded in the Public Records at Date of Policy, but Known to the Insured Claimant and not disclosed in writing to the Company by the Insured Claimant prior to the date the Insured Claimant became an Insured under this policy;(c) resulting in no loss or damage to the Insured Claimant;(d) attaching or created subsequent to Date of Policy (however, this does not modify or limit the coverage provided under Covered Risks 11, 16, 17, 18, 19, 20, 21, 22, 23, 24, 27 or 26); or (e)resulting in loss or damage which would not have been sustained if the Insured Claimant had paid value for the Insured Mortgage.
4. Unenforceability of the lien of the Insured Mortgage because of the inability or failure of the Insured to comply with applicable doing-business laws of the state in which the Land is situated.
5. Invalidity or unenforceability in whole or in part of the lien of the Insured Mortgage that arises out of the transaction evidenced by the Insured Mortgage and is based upon usury, or any consumer credit protection or truth in lending law. This Exclusion does not modify or limit the coverage provided in Covered Risk 26.

6. Any claim of invalidity, unenforceability or lack of priority of the lien of the Insured Mortgage as to Advances or modifications made after the Insured has Knowledge that the vestee shown in Schedule A is no longer the owner of the estate or interest covered by this policy. This Exclusion does not modify or limit the coverage provided in Covered Risk 11.
7. Any lien on the Title for real estate taxes or assessments imposed by governmental authority and created or attaching subsequent to Date of Policy in accordance with applicable building codes. This Exclusion does not modify or limit the coverage provided in Covered Risk 5 or 6..
8. The failure of the residential structure, or any portion of it, to have been constructed before, on or after Date of Policy in accordance with applicable building codes. This Exclusion does not modify or limit the coverage provided in Covered Risk 5 or 6.
9. Any claim, by reason of the operation of federal bankruptcy, state insolvency, or similar creditors' rights laws, that the transaction creating the lien of the Insured Mortgage, is (a) a fraudulent conveyance or fraudulent transfer, or (b) a preferential transfer for any reason not stated in Covered Risk 27(b) of this policy.

Orange Coast Title Company
PRIVACY POLICY

We Are Committed to Safeguarding Customer Information
In order to better serve your needs now and in the future, we may ask you to provide us with certain information. We understand that you may be concerned about what we will do with such information – particularly any personal or financial information. We agree that you have a right to know how we will utilize the personal information that you provide to us. Therefore, we have adopted this Privacy Policy to govern the use and handling of your personal information.

Applicability
This Privacy Policy governs our use of the information which you provide to us. It does not govern the manner in which we may use information we have obtained from any other source, such as information obtained from a public record or from another person or entity.

Types of Information
Depending upon which of our services you are utilizing, the types of nonpublic personal information that we may collect include:

- Information we receive from you on applications, forms and in other communications to us, whether in writing, in person, by telephone or any other means.
- Information we receive from providers of services to us, such as appraisers, appraisal management companies, real estate agents and brokers and insurance agencies (this may include the appraised value, purchase price and other details about the property that is the subject of your transaction with us).
- Information about your transactions with us, our Affiliated Companies, or others; and
- Information we receive from a consumer reporting agency.

Your California Rights (immediately following this Privacy Policy) or you may visit our website at https://www.titleadvantage.com/privacypolicy.htm or call toll-free at (866) 241-7373. Only applies to CA residents

Use of Information
We request information from you for our own legitimate business purposes and not for benefit of any nonaffiliated party. Therefore, we will not release your information to nonaffiliated parties except: (1) as necessary for us to provide the product or service you have requested of us; or (2) as permitted by law. We may, however, store such information indefinitely, including the period after which any customer relationship has ceased. Such information may be used for any internal purpose, such as quality control efforts or customer analysis.

Former Customers

Even if you are no longer our customer, our Privacy Policy will continue to apply to you.

Confidentiality and Security
We will use our best efforts to ensure that no unauthorized parties have access to any of your information. We restrict access to nonpublic personal information about you to those individuals and entities who need to know that information to provide products or services to you. We will use our best efforts to train and oversee our employees and agents to ensure that your information will be handled responsibly and in accordance with this Privacy Policy. We currently maintain physical, electronic, and procedural safeguards that comply with federal regulations to guard your nonpublic personal information.

Other Important Information
We reserve the right to modify or supplement this Privacy Policy at any time. If our Privacy Policy changes, we will provide the new Privacy Policy before the new policy becomes effective.

Last Revision 12/26/2019
Effective on 1/01/2020

Your California Rights

If you are a California resident, you may have certain rights under California law, including but not limited to the California Consumer Privacy Act ("CCPA"). All phrases used herein shall have the same meaning as those phrases used under relevant California law, including but not limited to the CCPA.

Right to Know
You have the right to know:

- The categories of personal information we have collected about or from you;
- The categories of sources from which we collected your personal information;
- The business or commercial purpose for collecting or sharing your personal information;
- The categories of third parties with whom we have shared your personal information; and
- The specific pieces of your personal information we have collected.

Process to Submit a Request. To submit a verified request for this information you may visit our website at https://www.titleadvantage.com/privacypolicy.htm or call toll-free at (866) 241-7373. You may also designate an authorized agent to submit a request on your behalf by visiting our website https://www.titleadvantage.com/privacypolicy.htm or calling toll-free at (866) 241-7373 and then also submitting written proof of such authorization via e-mail to dataprivacy@octitle.com.

Verification Method. In order to ensure your personal information is not disclosed to unauthorized parties, and to protect against fraud, we will verify your identity before responding to your request. To verify your identity, we will generally match the identifying information provided in your request with the information we have on file about you. Depending on the sensitivity of the personal information requested, we may also utilize more stringent verification methods to verify your identity, including but not limited to requesting additional information from you and/or requiring you to sign a declaration under penalty of perjury.

Right of Deletion
You have a right to request that we delete the **personal information** we have collected from or about you.

Process to Submit a Request. To submit a verified request to delete you information you may visit our website at https://www.titleadvantage.com/privacypolicy.htm or call toll-free at (866) 241-7373. You may also designate an authorized agent to submit a request on your behalf by clicking here or calling toll-free at (866) 241-7373 and then also submitting written proof of such authorization via e-mail to dataprivacy@octitle.com.

Verification Method. In order to ensure we do not inadvertently delete your **personal information** based on a fraudulent request, we will verify your identity before we respond to your request. To verify your identity, we will generally match the identifying information provided in your request with the information we have on file about you. Depending on the sensitivity of the **personal information** requested to be deleted, we may also utilize more stringent verification methods to verify your identity, including but not limited to requesting additional information from you and/or requiring you to sign a declaration under penalty of perjury.

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Right of Non-Discrimination
You have a right to exercise your rights under the CCPA without suffering discrimination. Accordingly, OC Title & family of Companies will not discriminate against you in any way if you choose to exercise your rights under the CCPA.

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If you are a California resident under the age of 18, California Business and Professions Code § 22581 permits you to request and obtain removal of content or information you have publicly posted on any of our Applications or Websites. To make such a request, please send an email with a detailed description of the specific content or information to dataprivacy@octitle.com. Please be aware that such a request does not ensure complete or comprehensive removal of the content or information you have posted and there may be circumstances in which the law does not require or allow removal even if requested.

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The following is a list of the categories of **personal information** we may have collected about California residents in the twelve months preceding the date this Privacy Notice was last updated, including the business or commercial purpose for said collection, the

categories of sources from which we may have collected the **personal information**, and the categories of third parties with whom we may have shared the **personal information**:

Categories of Personal Information Collected

The categories of **personal information** we have collected include, but may not be limited to:

- real name
- Signature
- Alias
- SSN
- physical characteristics or description, including protected characteristics under federal or state law
- address
- telephone number
- passport number
- driver's license number
- state identification card number
- IP address
- policy number
- file number
- employment history
- bank account number
- credit card number
- debit card number
- financial account numbers
- commercial information
- professional or employment information

Categories of Sources

Categories of sources from which we've collected **personal information** include, but may not be limited to:

- the consumer directly
- public records
- governmental entities
- non-affiliated third parties
- affiliated third parties

Business Purpose for Collection

The business purposes for which we've collected **personal information** include, but may not be limited to:

- completing a transaction for our Products
- verifying eligibility for employment
- facilitating employment
- performing services on behalf of affiliated and non-affiliated third parties
- protecting against malicious, deceptive, fraudulent, or illegal activity

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The categories of third parties with whom we've shared **personal information** include, but may not be limited to:

- service providers
- government entities
- operating systems and platforms
- non-affiliated third parties
- affiliated third parties

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We have not sold the **personal information** of California residents to any third party in the twelve months preceding the date this Privacy Notice was last updated, and we have no plans to sell such information in the future. We also do not, and will not sell the **personal information** of minors under sixteen years of age without affirmative authorization.

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- Signature
- Alias
- SSN
- physical characteristics or description, including protected characteristics under federal or state law
- telephone number
- passport number
- driver's license number
- state identification card number
- IP address
- policy number
- file number
- bank account number
- credit card number
- debit card number
- financial account numbers
- commercial information
- professional or employment information

- address
- employment history

If you have any questions and/or comments you may contact us:

Call Us at our toll free number (866) 241-7373
Email Us at dataprivacy@octitle.com
Mail:
Orange Coast Title
Attn: Privacy Officer
1551 N. Tustin Ave., Ste. 300
Santa Ana, CA 92705

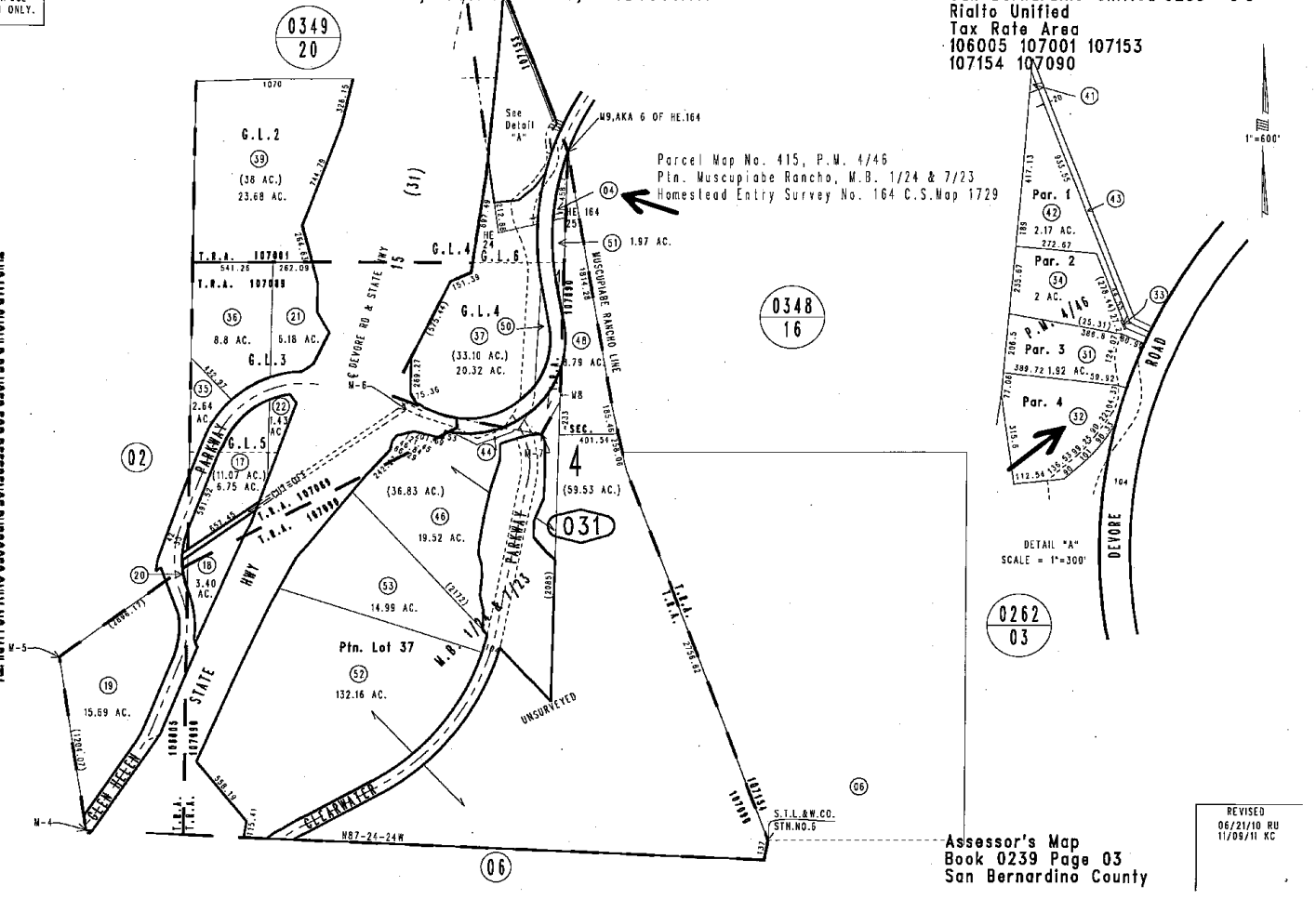
Effective on 1/1/2019
Revised on 12/23/2019

Description: San Bernardino,CA Assessor Map - Book.Page 239.3 Page: 1 of 1
Order: 210-1761131-02 Comment:

THIS MAP IS FOR THE PURPOSE OF AD VALOREM TAXATION ONLY.

Ptn. Sec.4, T.1N.,R.5W., S.B.B.&M.

San Bernardino Unified 0239 - 03
Rialto Unified
Tax Rate Area
106005 107001 107153
107154 107090



THIS MAP SHOULD BE USED FOR REFERENCE PURPOSES ONLY. NO LIABILITY IS ASSUMED FOR THE ACCURACY OF THE DATA SHOWN. PARCELS MAY NOT COMPLY WITH LOCAL SUBDIVISION OR BUILDING ORDINANCES.

December 2003

Assessor's Map
Book 0239 Page 03
San Bernardino County

REVISED
06/21/10 RU
11/09/11 KC

Appendix B:
Traffic Impact Study

GENERAL PLAN LEVEL OF SERVICE CONFORMANCE ANALYSIS AND VEHICLE MILES TRAVELED (VMT) SCREENING ASSESSMENT

LOS ANGELES
201 S. Figueroa St,
Suite 240
Los Angeles, CA 90012
213.337.3680
Fax :213.337.3679

ONTARIO
4141 E. Inland Empire Blvd,
Suite 250
Ontario, CA 91764
909.481.5750
Fax:909.481.5757

SAN DIEGO
3530 Camino Del Rio North,
Suite 105
San Diego, CA 92108
619.400.0600
Fax: 619.400.0599

SANTA CLARITA
25152 Springfield Ct,
Suite 350
Santa Clarita, CA 91355
661.284.7400
Fax 661.284.7401

TEMECULA
41951 Remington Ave,
Suite 220
Temecula, CA 92590
951.294.9300
Fax: 951.294-9301

TUSTIN
17782 17th St,
Suite 200
Tustin, CA 92780
714.665.4500
Fax: 714.665.4501

VICTORVILLE
18484 Outer Highway 18 North,
Suite 225
Apple Valley, CA 92307
760.524.9100
Fax 760.524.9101

www.deainc

THE OASIS AT GLEN HELEN PARKWAY

SAN BERNARDINO COUNTY CALIFORNIA

Prepared by:

DAVID EVANS AND ASSOCIATES INC.

REVISED FINAL REPORT
APRIL 27, 2023

APPROVED: AUGUST 31, 2023
MINOR CORRECTIONS: NOVEMBER 2, 2023

DAVID EVANS
AND ASSOCIATES INC.

Job No. UCRG215T-0003

April 27, 2023

Mr. Jim Mauge
215TableTop, LLC
PO Box 9716
Redlands, CA 92375

RE: REVISED GENERAL PLAN LEVEL OF SERVICE CONFORMANCE ANALYSIS AND VEHICLE MILES TRAVELED (VMT) ASSESSMENT FOR THE OASIS AT GLEN HELEN PARKWAY COMMERCIAL CENTER, SAN BERNARDINO COUNTY, CALIFORNIA – APN 0239-03-137, 150, 104

Dear Mr. Mauge,

David Evans and Associates, Inc. is pleased to submit this revised General Plan Level of Service Conformance Analysis and Vehicle Miles Traveled (VMT) Screening Assessment for your proposed commercial development in unincorporated San Bernadino County, California. The proposed project, the Oasis at Glen Helen Parkway, consists of community and highway-oriented retail center anchored by a grocery store, drug store, fitness center, and a hotel. The project is in the northeast quadrant of the I-15 / Glen Helen Parkway interchange.

This revised final report incorporates responses to comments on the February 20, 2023, and the April 11, 2023, draft report and draft final report received from the San Bernardino County Traffic Engineering and Caltrans District 8 Land Development Review (LDR). Further, this revised final report incorporates responses to comments from the third-party peer review the county requested from Harris and Associates. Enclosed with this report is a comment and response matrix that documents our responses to each comment received from the county, Caltrans, and peer reviewer.

We are pleased to have been of assistance to you in processing and obtaining approval for your project. If you have any questions or comments, please feel free to contact me at 909-912-7304.

Respectfully submitted,

DAVID EVANS AND ASSOCIATES, INC.

James M. Daisa, P.E.
Senior Project Manager

REGISTERED PROFESSIONAL ENGINEER
JAMES M. DAISA
No. TR 1624
TRAFFIC
STATE OF CALIFORNIA

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1 EXECUTIVE SUMMARY

This executive summary presents the findings and recommendations of this study.

1.1 Project Description

The project site is in the northeast quadrant of the I-15 / Glen Helen Parkway interchange on a parcel of land between the I-15 northbound on ramp and the curvature of Glen Helen Parkway as it passes under the I-15 overcrossing. The approximately 33-acre site is proposed as a community and highway-oriented retail center consisting of uses serving residents of the area including a grocery store, a drug store, and a fitness center and uses that would attract customers passing by on I-15 including a hotel, gas stations, a carwash, sit-down restaurants, and fast-food restaurants with drive-through windows. At the far northern end of the site is proposed a fire station and /or sheriff's substation. See **Figure ES-1.**

The project site is currently vacant and undeveloped property. It is bounded to the north by rural residential properties, to the south by Glen Helen Parkway and vacant/undeveloped properties, to the west by Interstate 15 and the northbound on-ramp from Glen Helen Parkway to I-15, and to the east by vacant/undeveloped properties.

Access to the site is proposed from two driveways on Glen Helen Parkway; the primary driveway is proposed at the intersection of Glen Helen Parkway with Clearwater Parkway creating a four-leg intersection. A secondary is proposed as a full-access side street stop-controlled intersection.

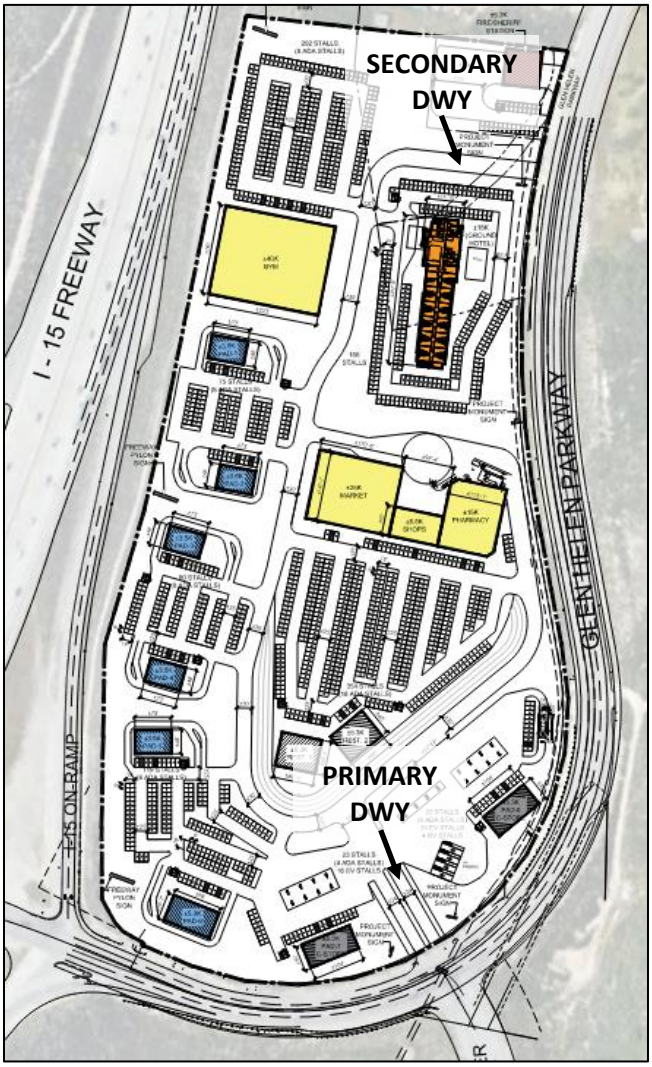

Figure ES-1: The project site is east of the I-15 freeway and north and west of Glen Helen Parkway.

1.2 San Bernardino County Level of Service Standards

According to San Bernardino County's Transportation Impact Study Guidelines (July 2019), the minimum acceptable intersection level of service for the County's Valley region (the region where the project is located) as described in the current San Bernardino County General Plan, is LOS D. This standard applies to both signalized and unsignalized intersections. Section 3.2 describes the criteria in greater detail.

1.3 Level of Service Comparison With and Without the Proposed Project

The following compares levels of service with and without the project in the near-term scenario (background conditions in the year 2028) and long-term scenario (future conditions in the year 2040) and identifies deficient intersections.

Background conditions represents the project's opening year of 2028 and includes growth in ambient traffic from regional development equaling 2.0 percent annually. In addition, the 2028 scenario includes traffic from planned and approved development in unincorporated county within a 2-mile radius of the project. A description and estimated traffic generation of these cumulative projects is discussed in Section 4.

Traffic forecasts for future (year 2040) conditions use the San Bernardino Transportation Analysis Model (SBTAM) to estimate the ambient growth in traffic from regional development over the 12-year period

between 2028 and 2040. In addition, traffic from the local cumulative development is also included in the 2040 scenario.

Table 1-1 compares intersection levels of service between background and background + project conditions for the typical weekday AM and PM peak hours assuming existing lane geometries and traffic control at all the intersections. In background conditions without the project, the magnitude of the traffic generated by the cumulative developments causes severe level of service deficiencies at five of the eight study intersections with significant delays and LOS F conditions.

Table 1-1: Comparison of Background (Year 2028) and Background + Project Intersection Levels of Service

Intersection	Control Type	Background Condition				Background + Project Condition			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		Delay†	LOS	Delay†	LOS	Delay†	LOS	Delay†	LOS
1. Glen Helen Pkwy at I-15 SB Ramps	TWSC	108.8	F	124.3	F	3141.8	F	1071.5	F
2. Glen Helen Pkwy at I-15 NB Ramps	TS	24.2	C	23.3	C	45.2	D	20.8	C
3. Glen Helen Pkwy / Clearwater Pkwy / Dwy "A"	TS	30.5	C	18.4	B	357.0	F	292.9	F
4. Glen Helen Pkwy at Devore Rd/Cajon Blvd	AWSC	234.2	F	251.2	F	321.7	F	333.1	F
5. Devore Rd at I-215 SB Ramps	AWSC	443.8	F	256.7	F	499.3	F	298.0	F
6. Devore Rd at I-215 NB Ramps	AWSC	188.9	F	63.7	F	191.2	F	69.8	F
7. Glen Helen Pkwy at Project Dwy "B"	TWSC	Not Applicable (Future Intersection)				14.8	B	17.0	C
8. Glen Helen Pkwy at Glen Helen Rd	TWSC	175.4	F	50.4	F	389.7	F	129.5	F

Notes:
† Exponentially high delays, although unrealistic, represent over-saturated conditions on the minor street at side-street stop-controlled intersections and at all approaches of all-way stop-controlled intersections. The Highway Capacity Manual 6th Ed. designates this magnitude of delay as >300 seconds per vehicle.
Shaded cells in the table represent intersection peak hours with LOS deficiencies (LOS E or F).
Abbreviations:
TS – Traffic signal-controlled intersection, AWSC – All-way stop-controlled intersection, TWSC (SSSC) – Two-way or Side-street stop-controlled intersection

The addition of the project's traffic exacerbates the delay at deficient intersections and in some cases the delay increases exponentially. Although these very high delays are theoretical and unrealistic, they indicate that the stop-controlled intersections have reached a level of saturation that necessitates a change in the type of traffic control and/or additional lane capacity. As shown in **Table 1-1**, one intersection (Glen Helen Parkway / Clearwater Parkway / Project Driveway A) experiences a change in level of service from an acceptable LOS D or better to a deficient LOS E or LOS F with the addition of project traffic:

Table 1-2, on the following page, compares the future (year 2040) and future plus project weekday peak hour levels of service at the study intersections, still assuming existing lane geometries and traffic control. Under future conditions without the project, the deficient intersections under background 2028 conditions worsen, but the number of impacted intersections remains the same.

With the addition of project traffic, two intersections experience a change in level of service from an acceptable LOS D or better to a deficient LOS E or LOS F:

- Glen Helen Parkway / I-15 Northbound Ramps
- Glen Helen Parkway / Clearwater Parkway / Project Driveway A

1.4 County Criteria for Determining General Plan Level of Service Policy Conformance Impacts

The county's level of service standard for the Valley Region is LOS D for both signal controlled and stop sign-controlled intersections. The criteria for identifying a project's responsibility for level of service deficiencies varies by the type of traffic control. Chapter 3 summarizes the county's criteria for identifying level of service deficiencies and the level of mitigation required depending on whether the project "causes" or "contributes" to the deficiency. Application of the county's criteria to the study intersections in this report, identification of the project's impacts, and measures that mitigate level of service deficiencies are presented in Chapter 8 of this report.

Table 1-2: Comparison of Future (Year 2040) and Future + Project Intersection Levels of Service

Intersection	Control Type	Future 2040 Condition				Future 2040 + Project Condition			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		Delay†	LOS	Delay†	LOS	Delay†	LOS	Delay†	LOS
1. Glen Helen Pkwy at I-15 SB Ramps	TWSC	727.7	F	529.1	F	8522.1	F	2586.3	F
2. Glen Helen Pkwy at I-15 NB Ramps	TS	26.7	C	23.6	C	59.3	E	24.2	C
3. Glen Helen Pkwy / Clearwater Pkwy / Dwy A	TS	19.5	B	17.4	B	276.9	F	271.5	F
4. Glen Helen Pkwy at Devore Rd / Cajon Blvd	AWSC	363.3	F	389.6	F	467.1	F	477.0	F
5. Devore Rd at I-215 SB Ramps	AWSC	406.7	F	347.8	F	457.6	F	403.7	F
6. Devore Rd at I-215 NB Ramps	AWSC	230.1	F	95.7	F	235.1	F	102.8	F
7. Glen Helen Pkwy at Project Dwy B	TWSC	Not Applicable (Future Intersection)				26.3	D	27.6	D
8. Glen Helen Pkwy at Glen Helen Rd	TWSC	491.2	F	235.7	F	844.6	F	448.8	F

Notes:
† Exponentially high delays, although unrealistic, represent over-saturated conditions on the minor street at side-street stop-controlled intersections. The Highway Capacity Manual 6th Ed. designates this magnitude of delay as >300 seconds per vehicle.
Shaded cells in the table represent intersection peak hours with LOS deficiencies (LOS E or F).
Abbreviations:
TS – Traffic signal-controlled intersection, AWSC – All-way stop-controlled intersection, TWSC – Two-way or Side-street stop-controlled intersection

1.5 Measures to Improve Level of Service Deficiencies

This section presents the measures that improve the level of service deficiencies identified in the previous sections and presents the resulting levels of service with implementation of the measures. This section identifies measures to improve deficient levels of service to LOS D or better.

According to county policy, the project's fair-share contribution to the cost of mitigating deficient intersections is not applicable to opening day (2028) or near-term conditions where new development is required to implement identified mitigation measures upon application for a building permit regardless of whether the development causes or contributes to the deficiency. Fair-share calculations for mitigation of impacts under future cumulative conditions (2040) are presented in a subsequent section.

Table 1-3 presents the recommended mitigation measures and resulting intersection level of service for the deficient intersections in the opening year (2028) plus project scenario. **Table 1-3** demonstrates that the recommended measures for each of the deficient intersections effectively mitigate the deficiencies resulting in LOS D or better operations.

Consistent with the county's policy described above, the project responsibility column in the table identifies the mitigation measures as "project-specific", but if a development project identified as causing, or contributing, to the deficiency of the intersections shown in **Table 1-3** applies for a building permit before the proposed project, that development is responsible for implementing the mitigation measures.

Table 1-4 presents the recommended mitigation measures and resulting intersection level of service for the deficient intersections in the future year (2040) plus project scenario. The table also demonstrates that the recommended measures for each of the deficient intersections effectively mitigates the deficiencies resulting in LOS D or better operations.

The 2040 mitigation measures build upon the year 2028 mitigation measures. The table only presents measures if required in addition to the opening day (2028) mitigation measures. If the 2040 deficiency at a study intersection is improved to a LOS D or better with the 2028 mitigation measure, then the intersection is not included in **Table 1-4**.

Table 1-3: Recommended Measures to Improve Background (2028) + Project Deficient Levels of Service

Intersection	Control Type	Background (2028) + Project Mitigated Level of Service				Project Responsibility [a]
		AM Peak Hour		PM Peak Hour		
		Delay	LOS	Delay	LOS	
1. Glen Helen Pkwy / I-15 SB Ramps (TWSC)	TWSC	3141.8	F	1071.5	F	PS
Mitigation Measure: Install traffic signal	TS	44.5	D	45.8	D	
3. Glen Helen Pkwy / Clearwater Pkwy / Project Driveway "A"	TS	357.0	F	292.9	F	PS
Mitigation: See Figure 9 and Conceptual Geometric Plan in Appendix E plus the following: Southbound approach: add second LT lane Westbound approach: add RT overlap phase Eastbound approach: add RT overlap phase	TS	49.2	D	48.8	D	
4. Glen Helen Pkwy / Devore Rd / Cajon Blvd	AWSC	321.7	F	333.1	F	PS
Mitigation: Install traffic signal Northbound approach (Glen Helen Pkwy): stripe LT, TH, and THR on existing approach with 2TH lanes on SB departure Southbound approach (Devore Rd): LT, TH, THR with 2TH lanes on NB departure Westbound approach (Cajon Blvd): convert existing THR to a RT lane plus add RT overlap phase	TS	29.3	C	35.0	C	
5. Devore Rd / I-215 SB Ramps	AWSC	499.3	F	298.0	F	PS
Mitigation: Install traffic signal Northbound approach (Devore Rd): 2TH, RT with 2TH lanes on SB departure Southbound approach (Devore Rd): LT, and 2TH with 2TH lanes on NB departure (Requires widening I-215 overcrossing to five lanes)	TS	48.4	D	39.9	D	
6. Devore Rd / I-215 NB Ramps	AWSC	191.2	F	69.8	F	PS
Mitigation: Install traffic signal Northbound approach (Devore Rd): 2LT, and one TH with 2TH lanes on SB departure Southbound approach (Devore Rd): 2TH, one RT lane with 2TH lanes on NB departure (Requires widening I-215 overcrossing to five lanes)	TS	49.3	D	21.6	C	
8. Glen Helen Pkwy at Glen Helen Rd	TWSC	389.7	F	129.5	F	PS
Mitigation Measure: Install traffic signal	TS	25.2	C	13.6	B	

Notes:
[a] It is the county's policy that opening day (or near-term) impacts be mitigated without deferment of project responsibility to a future date. This means that the county does not accept a fair-share contribution to the cost of mitigation of near-term impacts regardless of whether a development causes or contributes to the impact. Based on the county's policy, the first development to apply for a building permit is responsible for implementing the mitigation for any impacts identified in the development's traffic impact study whether the development causes the level of service deficiency or contributes to a deficiency projected to occur even without the project. There is no mechanism for reimbursement from future development. Source: County of San Bernardino – Department of Public Works, Traffic Engineering Division.

Abbreviations:
Project responsibility: PS – Project Specific, FS – Fair-Share Contribution
Intersection control types: TS – Traffic signal-controlled intersection, AWSC – All-way stop-controlled intersection, TWSC (SSSC) – Two-way or Side-street stop-controlled intersection
Lane configurations: LT- Left turn lane, TH – Through lane, THR – Shared through-right turn lane, RT – Right turn lane, 2LT – Two left turn lanes, 2TH – Two through lanes

Table 1-4: Recommended Measures to Improve Future (2040) Deficient Intersection Levels of Service

Intersection	Control Type	Future (2040) + Project Mitigated Level of Service				
		AM Peak Hour		PM Peak Hour		Project Responsibility
		Delay	LOS	Delay	LOS	
4. Glen Helen Pkwy / Devore Rd / Cajon Blvd	AWSC	467.1	F	477.0	F	FS
Mitigation: In addition to 2028 mitigations implement the following: Northbound approach (Glen Helen Pkwy): RT lane	TS	44.9	D	47.0	D	
5. Devore Rd / I-215 SB Ramps	AWSC	457.6	F	403.7	F	FS
Mitigation: In addition to 2028 mitigations implement the following: Eastbound approach (SB I-215 Off-ramp): Add 2nd RT lane	TS	42.2	D	27.4	C	
6. Devore Rd / I-215 NB Ramps	AWSC	235.1	F	102.8	F	FS
Mitigation: In addition to 2028 mitigation implement the following: Westbound approach (NB I-215 Off-ramp): Add 2nd WB LT Lane	TS	38.4	D	21.8	C	

Abbreviations:
Project responsibility: PS – Project Specific, FS – Fair-Share Contribution
Intersection control types: TS – Traffic signal-controlled intersection, AWSC – All-way stop-controlled intersection, TWSC (SSSC) – Two-way or Side-street stop-controlled intersection
Lane configurations: LT- Left turn lane, TH – Through lane, THR – Shared through-right turn lane, RT – Right turn lane, 2LT – Two left turn lanes, 2TH – Two through lanes

1.6 Fair-Share Calculations for Intersections with Deficiencies to Which Project Contributes

Although **Table 1-5** is not applicable to opening year (or near-term) conditions, it presents the proportion of the project's traffic with respect to the total projected growth in traffic at each study intersection in the background (2028) plus project scenario based on the formula in the county's guidelines. **Table 1-5** is presented for informational and comparative purposes only.

Table 1-5: Project Proportion of Total Projected Traffic Growth Under Near-Term (2028) Conditions

Intersection	Project Trips		Growth in Traffic (Background 2028 + Project Conditions)		Fair-Share Percentage	
	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
1. Glen Helen Pkwy / I-15 SB Ramps	513	330	654	481	78.44%	68.61%
2. Glen Helen Pkwy / I-15 NB Ramps	739	755	957	1004	77.22%	75.20%
3. Glen Helen Pkwy / Clearwater Pkwy / Project Driveway "A"	1445	1443	1863	1749	77.56%	82.50%
4. Glen Helen Pkwy / Devore Rd / Cajon Blvd	219	201	1532	1274	14.30%	15.78%
5. Devore Rd / I-215 SB Ramps	146	134	1445	1180	10.10%	11.36%
6. Devore Rd / I-215 NB Ramps	112	102	829	651	13.51%	15.67%
8. Glen Helen Pkwy / Glen Helen Rd	219	201	1014	824	21.60%	24.39%

Notes:
Source of formula [% Proportion = (Project Trips) / (Project Trips + Growth (Ambient + Cumulative Development) - Existing Vols) X 100]: San Bernardino County Transportation Impact Guidelines (July 2019), Page 17.

Table 1-6 presents the calculation of the project's fair share contribution to each study intersection in the future year (2040) scenario. The project share of traffic using each intersection in 2040 is less than the share in 2028 because the increase in future background traffic dilutes the project's contribution of traffic. The fair

share calculations shown in **Table 1-6** are intended to be applied to any additional measures needed in 2040. The highlighted rows identify intersections that have mitigation measures in 2040 over and above the measures identified for opening year (2028) conditions.

Table 1-6: Project Fair Share Contribution to Study Intersections Under Future 2040 Conditions

Intersection	Project Trips		Growth in Traffic (Future 2040 + Project Conditions)		Fair-Share Percentage	
	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
1. Glen Helen Pkwy at I-15 SB Ramps	513	330	876	623	**58.56%**	52.97%
2. Glen Helen Pkwy at I-15 NB Ramps	739	755	1177	1323	**62.79%**	57.07%
3. Glen Helen Pkwy at Clearwater Pkwy / Project Dwy "A"	1445	1443	1763	2015	**81.96%**	71.61%
4. Glen Helen Pkwy at Devore Rd/Cajon Blvd	219	201	1998	1664	10.96%	**12.08%**
5. Devore Rd at I-215 SB Ramps	146	134	1747	1377	8.36%	**9.73%**
6. Devore Rd at I-215 NB Ramps	112	102	960	832	11.67%	**12.26%**
8. Glen Helen Pkwy at Glen Helen Rd	219	201	1370	1177	15.99%	**17.08%**

Notes:
Source of fair-share formula [FS = (Project Trips) / (Project Trips + Future 2040 Projections - Existing Vols) X 100]: San Bernardino County Transportation Impact Guidelines (July 2019), Page 17.
Typically, the highest percentage of the AM and PM peak hours (**shown in bold**) is selected as the fair-share percentage for the intersection.

1.7 Queuing Analysis

Chapter 5 (background 2028 plus project conditions) and Chapter 7 (future year 2040 plus project conditions) include queuing analyses of the most critical movements at the study intersections. Critical movements are those with a relatively short length for storage of vehicles, turn bays in which the entry becomes blocked by relatively short queues in the adjacent through lane, through / turning lanes between closely spaced intersections such as freeway ramps where queues can potentially spill over into an upstream intersection and obstruct traffic flows, and queues at off-ramps with the potential to back up onto the mainline creating a potentially dangerous condition.

Tables in Chapters 5 and 7 present the average and 95th percentile queue length (in feet), turning lane storage bay length (in feet), and the distance of through lanes between junctures. Also presented is the percent of time a storage lane is blocked by queues, and the time upstream traffic flows are blocked by queues exceeding available storage. The findings of the queuing analysis are discussed in their respective chapters.

1.8 Conclusions of the Vehicle Miles Traveled (VMT) Screening Assessment

The project is screened from a detailed VMT analysis under CEQA because the project is a local serving retail use that would capture pass-by trips on I-15 and in the surrounding community. The project would attract most of its trips from existing users of the services that are already occurring and traveling farther to receive services and redistribute, rather than create new trips, thereby result in reduction in VMT because of shorter trips lengths.

The project is consistent with the defining characteristics of local serving retail centers as defined by the Urban Land Institute and local serving hotel as defined by the Hotel Tech Report. The project is also in align with freeway-oriented commercial, which is also considered locally serving retail. Most of the traffic generated for freeway-oriented land uses located at an interchange are "diverted" customer trips from the freeway for services important to freeway travelers (diverted link trips) or are travelers passing-by the site on an adjacent street (Glen Helen Parkway, Clearwater Parkway) who stop as an interim stop between their primary origin and destination (pass-by trips). Although the project would generate primary trips mostly from employees

and staff for the retail/commercial, hotel, and civic uses, these would be the smallest component of total project generated trips, therefore, the project would still meet California's Office of Planning and Research (OPR's) intent for screening VMT for local serving retail and would reduce overall VMT.

The project would not change the existing density and intensity of development under the existing DR zoning and would not result in substantial adverse changes to the land use assumptions evaluated by the GHSP EIR. At the time of the GHSP EIR certification in 2005, transportation impacts were evaluated based on LOS.

While it is acknowledged that as of July 1, 2020, LOS can no longer be the basis for determining an environmental effect under CEQA, CEQA Guidelines § 15064.3(c) states"[t]he provisions of [§ 15064.3] shall apply prospectively as described in [CEQA Guidelines] section 15007, " and CEQA Guidelines § 15007(c) specifically states: "[i]f a document meets the content requirements in effect when the document is sent out for public review, the document shall not need to be revised to conform to any new content requirements in Guideline amendments taking effect before the document is finally approved."

Therefore, in accordance with CEQA Guidelines §§ 15064.3(c) and 15007(c), revisions to the previously certified EIR are not required under CEQA to conform to the new requirements established by CEQA Guidelines § 15064.3. See *A Local & Regional Monitor v. City of Los Angeles* (1993) 12 Cal.App.4th 1773, 1801. Furthermore, the adoption of VMT guidelines for analyzing and evaluating the significance of data does not constitute new information that require preparation of a subsequent EIR if the underlying information was otherwise known or should have been known at the time the EIR was certified. See *Concerned Dublin Citizens v. City of Dublin* (2013) 214 Cal.App.4th 1301, 1320. Therefore, the project would not require detailed VMT analysis.

Chapter 9 presents the VMT screening assessment and discusses the guidance prepared by the OPR and adopted by the county and incorporated (slightly modified) into their current VMT screening criteria. The discussion in this section focuses on the criterion demonstrating that local serving retail under 50,000 square feet (per building) can be presumed to have a less-than-significant VMT impact.

In conclusion, based on the information provided in Chapter 9 of this study, the proposed project is comprised of local serving retail with buildings under 50,000 square feet which satisfy the county's criterion that local serving retail under 50,000 square feet (per building) is presumed to have a less-than-significant impact and does not require a detailed VMT analysis under CEQA.

2 INTRODUCTION

This report assesses the proposed project's conformance with San Bernardino's General Plan level of service policies and standards and recommends traffic mitigation for any level of service deficiencies caused by, or contributed to, the proposed development project located at the northeast quadrant of the I-15 / Glen Helen Parkway interchange in unincorporated San Bernardino County. The proposed project is a community and highway-oriented commercial retail center. **Figure 1** illustrates the vicinity map, and **Figure 2** illustrates the proposed project site plan.

The intent of this report is to evaluate potentially significant traffic impacts caused by the proposed development in accordance with the county's traffic impact study requirements and under the following scenarios as outlined in the traffic scope approved by the county's Department of Public Works Traffic Division:

- Existing Conditions - Chapter 3
- Background Conditions (Year 2028) - Chapter 4
- Background Plus Project Conditions- Chapter 5
- Future Year 2040 Conditions – Chapter 6
- Future Year 2040 Plus Project Conditions - Chapter 7
- Summary of Impacts and Recommended Mitigation Measures – Chapter 8
- Summary of Vehicle Miles Traveled (VMT Screening Assessment – Chapter 9

2.1 Scenario Definitions

Existing Conditions. This scenario represents existing transportation conditions at the time this report was prepared. Data includes traffic counts collected in November 2022. This scenario is used as the baseline condition to establish context and serves as the foundation for the future traffic forecasts.

Background Conditions (Year 2028). This scenario represents conditions at the time the project is anticipated to be fully constructed and occupied (known as the opening year) but without traffic generated by the project. This scenario is comprised of ambient growth, a general rate of growth in traffic from overall regional growth (assumed to be 2.0% annually for this study) and includes planned and approved cumulative development within a two-mile radius of the project.

Background Plus Project Conditions (Year 2028). This scenario adds the project's estimated traffic generation at buildout (2025) to the background conditions scenario described above. Impacts identified in this near-term scenario may be considered either "project-specific"—impacts the project causes and is fully responsible for mitigating, or "cumulative"—impacts that the project contributes to, but does not solely cause, and may be responsible for a fair-share of the cost to implement any mitigation measures.

Future Background (Year 2040) Conditions. This scenario represents conditions at the approximate 20-year planning horizon without traffic generated by the project. The forecasts in this scenario representing ambient growth from regional growth are derived from the San Bernardino Transportation Analysis Model (SBTAM). A 20-year planning horizon is usually requested by Caltrans to monitor the typical 20-year lifespan of state highway facilities. In addition to the ambient growth projections from the SBTAM model, the planned and approved cumulative development projects included in the 2028 analysis are also included in the 2040 analysis.

Future Background (Year 2040) Plus Project Conditions. This scenario adds the project's estimated traffic generation at buildout to the future (year 2040) conditions scenario described above. Impacts identified in this long-term scenario may be considered either "project-specific"—impacts the project causes and is fully responsible for mitigating, or "cumulative"—impacts that the project contributes to, but does not solely cause, and may be responsible for a fair-share of the cost to implement any mitigation measures.

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FIGURE 1: VICINITY MAP
OASIS AT GLEN HELEN PARKWAY
SAN BERNARDINO COUNTY, CALIFORNIA

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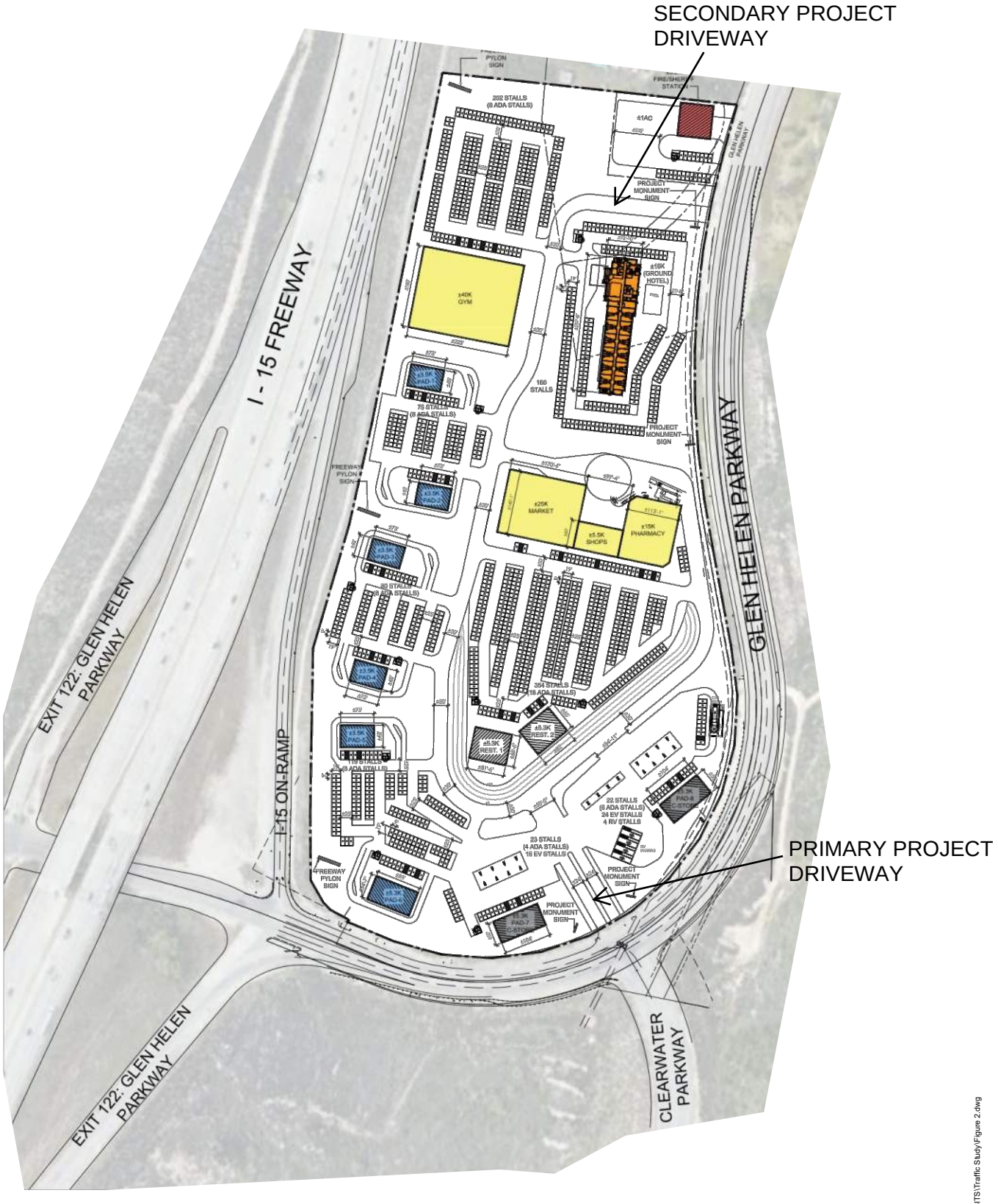

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FIGURE 2: SITE PLAN
OASIS AT GLEN HELEN PARKWAY
SAN BERNARDINO COUNTY, CALIFORNIA

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3 EXISTING CONDITIONS

This section describes and analyzes the existing transportation system that serve as regional and local access to the project site.

3.1 Existing Street System

The following roadways provide regional and local access to the project within the study area:

Interstate 15 (I-15) is a major Interstate Highway in the western United States, running through Southern California and the Intermountain West. I-15 begins near the Mexican border in San Diego County and stretches north to Canada, passing through many western U.S. states. I-15 is a significant trucking corridor and served as a key long-haul route for North American commerce. Near the project, I-15 is eight lanes wide (four in each direction) and its nearest interchange to the project site is the I-15 / Glen Helen Parkway interchange. It is expected that the project will attract many "diverted-link" trips from I-15 to use the project's highway-oriented services.

Interstate 215 (I-215) is a north–south auxiliary Interstate Highway in the San Bernardino–Riverside urban area. I-215 also serves as a bypass auxiliary route of I-15, running from Murrieta to northern San Bernardino. I-215 junctions with I-15 about 1.5 miles from the project site. This freeway provides regional access to the project site via the I-215 / Devore Road interchange.

Glen Helen Parkway is a county road classified as a major highway on the San Bernardino County General Plan Circulation map. Glen Helen Parkway begins at Lytle Creek Road south of the project site and meanders through the foothills forming the base of the adjacent mountain range and ends at its intersection with Cajon Boulevard. From there it continues as Devore Road. Glen Helen Parkway is a four-lane divided roadway (with a center lane for turning at intersections) and has a posted speed limit of 45 mph. This road provides direct access to the project site via two driveways.

Clearwater Parkway is a county road classified as a major highway in the county's general plan. It connects the Rosena Ranch residential community to Glen Helen Parkway at an intersection that the project proposes to use as its primary access driveway. Clearwater Parkway is a four-lane divided roadway with a raised landscaped median with breaks for striped left turn lanes at intersections and a posted speed limit of 35 mph.

Devore Road is a county road classified as a secondary highway. It extends from the Glen Helen Parkway / Cajon Boulevard intersection crossing I-215 (with interchange ramps north and south) northward into the hillside residential community of Devore. Devore Road is a two-lane divided roadway with a center turn lane. This width is restricted by the three-lane cross section of the Devore Road overcrossing of I-215. However, the west side of the overcrossing has been widened enough for an additional southbound lane, but the widened portion is incomplete, and a barrier has been installed about 14-feet from the bridge's west parapet.

3.2 Study Intersections

Study intersections for this traffic study include six existing intersections and two proposed future driveway intersections for level of service analysis. Proposed study intersections include:

1. Glen Helen Pkwy / I-15 SB Ramps
2. Glen Helen Pkwy / I-15 NB Ramps
3. Glen Helen Pkwy / Clearwater Pkwy / Project Dwy "A"
4. Glen Helen Pkwy / Devore Rd/Cajon Blvd
5. Devore Rd / I-215 SB Ramps
6. Devore Rd / I-215 NB Ramps
7. Glen Helen Pkwy / Project Dwy "B" (future driveway)
8. Glen Helen Parkway / Glen Helen Road

The intersection of Glen Helen Parkway at the I-15 Southbound Ramps is side-street stop-controlled with stop signs controlling the southbound off-ramp. The intersections of Glen Helen Parkway at I-15 Northbound Ramps, and Glen Helen Parkway at Clearwater Parkway are controlled with traffic signals. The intersections of Glen Helen Parkway at Devore Road / Cajon Boulevard, Devore Road at the I-215 Southbound Ramps, and Devore Road at the I-215 Northbound Ramps are controlled with all-way stops. The Glen Helen Parkway at Project Driveway is a proposed future side-street stop-controlled driveway provided along the east side of the project site. Finally, the intersection of Glen Helen Parkway / Glen Helen Road is side-street stopped controlled.

3.3 Existing Traffic Volumes

Turn movement counts were conducted in November 2022 by Newport Traffic Studies (NTS), an independent traffic data collection company. The counts were collected during the AM (7:00-9:00 AM) and PM (4:00-6:00 PM) peak periods. The raw turning movement counts are included in **Appendix B** of this study. The truck percentages utilized in the capacity analysis were developed from the turn movement counts by movement. **Figure 3** shows existing peak hour traffic volumes in the study area, while **Figure 4** illustrates the existing lane geometrics.

3.4 Capacity Analysis Methodology

Intersection capacity analysis is conducted using Synchro software[1], which implements the methods of the Highway Capacity Manual, 6th Edition (HCM 6)[2] used in this report. The intersection capacity analyses utilize existing intersection geometrics and existing and forecasted traffic volumes in analyzing AM and PM peak hour intersection operations. The traffic analysis methodology concepts presented in Chapters 19 and 20 of the Highway Capacity Manual (HCM 6) are utilized to calculate intersection level of service (LOS) based on the average control delay (in seconds per vehicle) of vehicles utilizing the intersections.

The analysis assigns a letter grade of LOS (A through F) that quantitatively describes the operating characteristics of signalized and unsignalized intersections based on a range of control delay. **Table 3-1** provides the LOS thresholds for signalized intersections as provided in the HCM 6 Chapter 19.

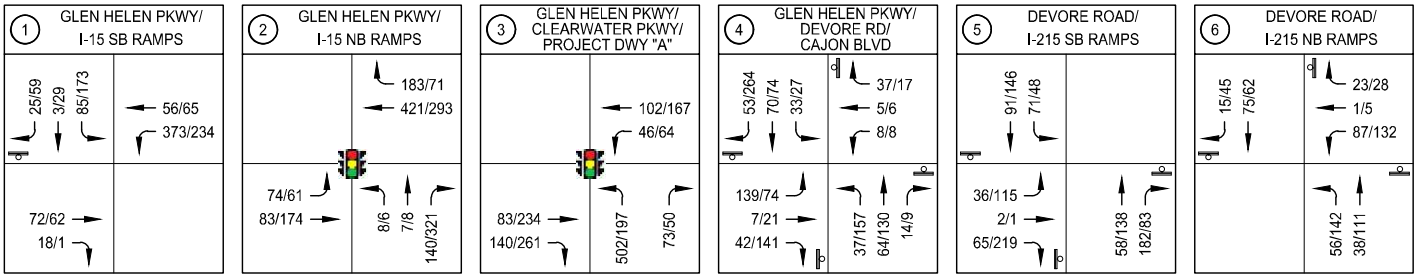
Table 3-1: Level of Service Criteria for Signalized Intersections

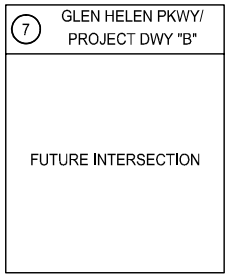
Control Delay (seconds /vehicle)	LOS by Volume-to-Capacity Ratio (V/C) †	
	Volume / Capacity Ratio ≤ 0.99	Volume / Capacity Ratio < 1.0
≤ 10	A	F
> 10 - 20	B	F
> 20 - 35	C	F
> 35 - 55	D	F
> 55 - 80	E	F
> 80	F	F

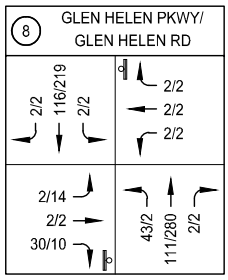
Notes:
† For approach-based and intersection-wide assessments, level of service is defined solely by control delay.
Source: Highway Capacity Manual 6th Edition, Exhibit 19-8.

[1] Trafficware Ltd, Version 10.

[2] Transportation Research Board, Washington D.C., 2010.







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LEGEND

XX/XX - AM/PM TRAFFIC VOLUMES

(#) - STUDY INTERSECTIONS

- SIGNALIZED INTERSECTION

- STOP CONTROLLED APPROACH

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FIGURE 3: EXISTING TRAFFIC VOLUMES
OASIS AT GLEN HELEN PARKWAY
SAN BERNARDINO COUNTY, CALIFORNIA

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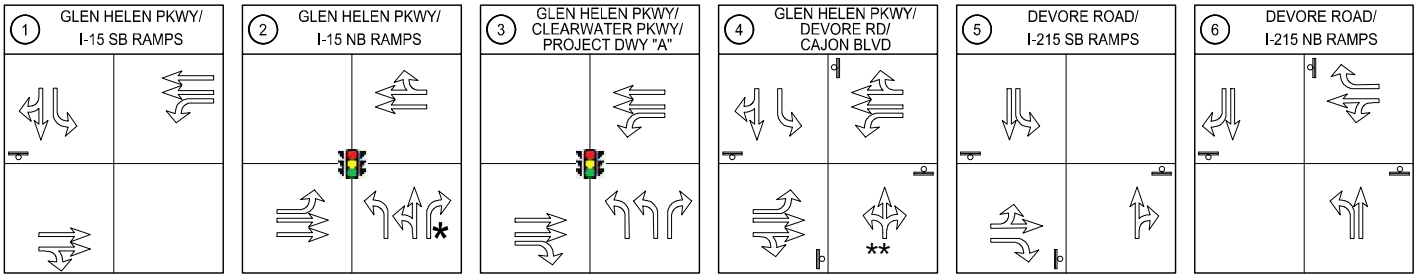
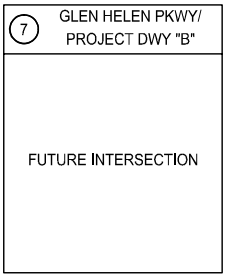
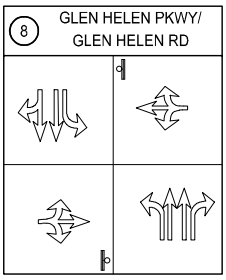


** TEMPORARY NB APPROACH WILL BE FOUR-LANE DIVIDED STREET WHEN FULL WIDTH OF BRIDGE OVER THE RAILROAD IS OPENED TO TRAFFIC.





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LEGEND

- EXISTING GEOMETRICS
- (#) - STUDY INTERSECTIONS
- SIGNALIZED INTERSECTION
- STOP CONTROLLED APPROACH
- * - FREE RIGHT TURN

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FIGURE 4: EXISTING INTERSECTION GEOMETRICS
OASIS AT GLEN HELEN PARKWAY
SAN BERNARDINO COUNTY, CALIFORNIA

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The level of service for a two-way or side-street stop-controlled (TWSC) or all-way stop-controlled intersection is determined by the computed or measured control delay. For TWSC the level of service is calculated for each minor street movement (or shared movement) by using the criteria provided in **Table 3-2**, referenced from HCM 6 Chapter 20 but the level of service is reported for the approach or movement with the high delay and thus the worst level of service. For AWSC the level of service is averaged for each approach using the criteria provided in **Table 3-2** and the level of service is presented at an average for the entire intersection.

Table 3-2: Level of Service Criteria for Unsignalized TWSC and AWSC Intersections

Control Delay (seconds/vehicle)	LOS by Volume-to-Capacity Ratio (V/C)	
	Volume / Capacity Ratio ≤ 0.99	Volume / Capacity Ratio < 1.0
0 - 10	A	F
> 10 -15	B	F
> 15 - 25	C	F
> 25 - 35	D	F
> 35 - 50	E	F
> 50	F	F

Notes:
The criteria apply to each lane on each approach of the stop-controlled minor street. LOS is not calculated for uncontrolled major-street approaches or for the entire intersection.
Source: Highway Capacity Manual 6th Edition, Exhibit 20-2.

3.5 San Bernardino County General Plan Conformance Requirements

San Bernardino County's General Plan includes policies that address level of service (LOS) and identifies transportation facility LOS standards for which the county strives to maintain. In addition to analysis of Vehicle Miles Traveled (VMT) required under the California Environmental Quality Act (CEQA), the County also requires transportation impact studies for new development projects to demonstrate conformance with General Plan level of service policies and standards.

According to San Bernardino County's Transportation Impact Study Guidelines (July 2019), the minimum acceptable intersection level of service for the County's **Valley region** (the region where the project is located) as described in the current San Bernardino County General Plan, is LOS D. This standard applies to both signalized and unsignalized intersections as described in the following sections.

3.5.1 Signalized Intersection Criteria for Conformance with County LOS Polices

The county's guidelines specify the following criteria for identifying whether a development project has caused or contributed to deficiencies in the level of service at signalized intersections in the Valley region.

a) Any signalized intersection in the Valley region that is operating at an acceptable LOS D or better without project traffic in which the addition of project traffic causes the intersection to degrade to a LOS E or LOS F shall identify improvements to improve operations to a LOS D or better.

b) Any signalized intersection in the Valley region that is operating at LOS E or F without project traffic where the project increases delay by 5.0 or more seconds shall identify improvements to offset the increase in delay.

3.5.2 Unsignalized Intersection Criteria for Conformance with County LOS Polices

The criteria for identifying whether a development project has caused or contributed to deficiencies at an unsignalized intersection are shown in **Table 3-3** on the following page.

Table 3-3: Criteria for Determining General Plan Level of Service Conformity at Unsignalized Intersections

At an unsignalized intersection, an operational improvement would be required if the analysis determines that the proposed project causes or contributes to conditions described in criterion (A) or criterion (B) and (C).	
(A) The addition of project traffic causes an intersection to degrade from a LOS D to LOS E or F. OR	(B) The project adds 5.0 seconds or more of delay to an intersection that is already projected to operate without project traffic at a LOS E or F. AND
(C) One or both of the following conditions are met:	
(C1) The project adds ten (10) or more peak hour trips to any minor street approach of the unsignalized intersection being analyzed.	(C2) The intersection, with the addition of project traffic, meets the peak hour traffic signal warrant as defined in the California Manual on Uniform Traffic Control Devices.
Mitigation requirements: • Measures applied to unsignalized intersections impacted under Criteria A should improve peak hour level of service to a LOS D or better or, • Measures applied to unsignalized intersections impacted under Criteria B and C should reduce delay (and associated LOS) to at least pre-project levels.	

3.6 Caltrans Policy on Intersection Level of Service on State Highways

The Caltrans' Guide for the Preparation of Traffic Impact Studies (December 2002) states "Caltrans endeavors to maintain a target LOS at the transition between LOS "C" and LOS "D" (see Appendix "C-3") on State highway facilities, however, Caltrans acknowledges that this may not always be feasible and recommends that the lead agency (San Bernardino County) consult with Caltrans to determine the appropriate target LOS".

For this study, the County's LOS D standard is assumed to be the minimum level of service criteria for the study intersections including the interstate ramp intersections controlled by Caltrans.

3.7 Existing Conditions Traffic Analysis

Existing intersection capacity and LOS analyses use the existing intersection geometrics and the AM and PM peak hour traffic counts discussed earlier. The results of the analysis are shown in **Table 3-4** and provided in **Appendix C**.

Table 3-4: Existing Conditions Intersection Levels of Service

Intersection	Control Type	AM Peak Hour		PM Peak Hour	
		Delay	LOS	Delay	LOS
1. Glen Helen Pkwy at I-15 SB Ramps	TWSC	39.1	E	32.9	D
2. Glen Helen Pkwy at I-15 NB Ramps	TS	24.0	C	25.3	C
3. Glen Helen Pkwy at Clearwater Pkwy / Project Dwy "A"	TS	28.7	C	17.2	B
4. Glen Helen Pkwy at Devore Rd/Cajon Blvd	AWSC	9.8	A	15.5	B
5. Devore Rd at I-215 SB Ramps	AWSC	11.1	B	13.4	B
6. Devore Rd at I-215 NB Ramps	AWSC	9.0	A	9.9	A
7. Glen Helen Pkwy at Project Dwy "B"	TWSC	Not Applicable (Future Intersection)			
8. Glen Helen Pkwy at Glen Helen Rd	TWSC	10.5	B	11.5	B
Abbreviations: TS – Traffic signal-controlled intersection, AWSC – All-way stop-controlled intersection, TWSC – Two-way or Side-street stop-controlled intersection					

As shown in the table under existing conditions, all except one study intersections operates at LOS D or better during the AM and PM peak hours. The exception is the two-way stop-controlled Glen Helen Parkway / I-15 Southbound Ramp intersection which operates at a LOS E in the AM peak hour.

4 BACKGROUND CONDITIONS (YEAR 2028)

4.1 Ambient Growth Projections

This scenario represents conditions at the time the proposed project is anticipated to be fully constructed and occupied (known as buildout which is the year 2028 for this project) but without traffic generated by the project. Forecasts for this scenario are based on ambient growth, a general rate of growth in traffic from overall regional growth (assumed to be 2.0% annually for this study).

4.2 Cumulative Development Projects

The San Bernardino County's Land Use Services provided an initial list of planned and approved developments located within a two-mile radius of the proposed project consistent with the county's transportation impact study guidelines. Staff from the county's traffic division reviewed and finalized the development projects to include in the 2028 (and 2040) background traffic forecasts resulting in fourteen individual developments.

Descriptions of the cumulative projects and the estimated trip generation for each cumulative development project is in **Appendix F**. The estimated trips were distributed and assigned to the street and highway network within the study area.

4.3 Background Conditions (Year 2028) Traffic Analysis

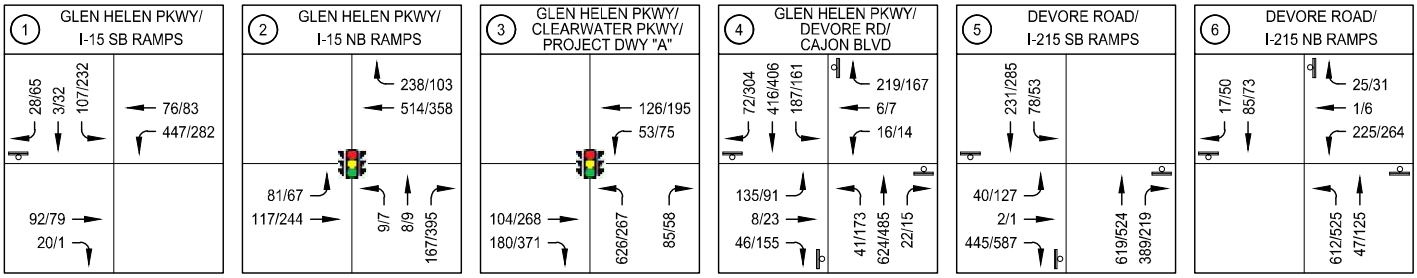
The background conditions analysis uses the traffic forecasts illustrated in **Figure 5** and existing lane geometries. The results of the analysis are shown in **Table 4-1** and provided in **Appendix C.**

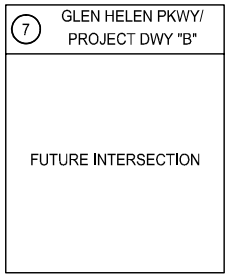
Table 4-1: Background Conditions Intersection Levels of Service

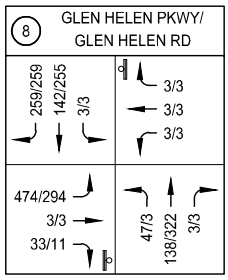
Intersection	Control Type	Background (2028) Conditions			
		AM Peak Hour		PM Peak Hour	
		Delay†	LOS	Delay†	LOS
1. Glen Helen Pkwy at I-15 SB Ramps	TWSC	108.8	F	124.3	F
2. Glen Helen Pkwy at I-15 NB Ramps	TS	24.2	C	23.3	C
3. Glen Helen Pkwy / Clearwater Pkwy / Driveway A	TS	30.5	C	18.4	B
4. Glen Helen Pkwy at Devore Rd/Cajon Blvd	AWSC	234.2	F	251.2	F
5. Devore Rd at I-215 SB Ramps	AWSC	443.8	F	256.7	F
6. Devore Rd at I-215 NB Ramps	AWSC	188.9	F	63.7	F
7. Glen Helen Pkwy at Project Driveway B	TWSC	Not Applicable (Future Intersection)			
8. Glen Helen Pkwy at Glen Helen Rd	SSSC	175.4	F	50.4	F

Notes:
† Exponentially high delays, although unrealistic, represent over-saturated conditions on the minor street at side-street stop-controlled intersections and at all approaches of all-way stop-controlled intersections. The Highway Capacity Manual 6th Ed. designates this magnitude of delay as >300 seconds per vehicle.
Shaded cells in the table represent intersection peak hours with LOS deficiencies (LOS E or F).
Abbreviations:
TS – Traffic signal-controlled intersection, AWSC – All-way stop-controlled intersection, TWSC (SSSC) – Two-way or Side-street stop-controlled intersection

As presented in the table above, under the background conditions, more than half of the study intersections operate with a deficient LOS F in both peak hours. The two remaining study intersections operate at a LOS C or better.







N

NOT TO SCALE

LEGEND

XX/XX - AM/PM TRAFFIC VOLUMES

(#) - STUDY INTERSECTIONS

- SIGNALIZED INTERSECTION

- STOP CONTROLLED APPROACH

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FIGURE 5: BACKGROUND TRAFFIC VOLUMES
OASIS AT GLEN HELEN PARKWAY
SAN BERNARDINO COUNTY, CALIFORNIA

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5 BACKGROUND PLUS PROJECT CONDITIONS

Background plus project conditions adds the project's estimated trip generation in the opening year (2028) to the background conditions scenario described in Chapter 4. Level of service impacts identified in this opening year scenario may be considered either "project-specific"—impacts the project causes and is fully responsible for mitigating, or "cumulative"—impacts that the project contributes to, but does not solely cause, and may be responsible for a fair-share of the cost to implement any mitigation measures. The type of impact depends on the criteria satisfied in the scenario.

5.1 Project Description

The project site is in the northeast quadrant of the I-15 / Glen Helen Parkway interchange on a parcel of land between the I-15 northbound on ramp and the curvature of Glen Helen Parkway as it passes under the I-15 overcrossing. The approximately 33-acre site is proposed as a community and highway-oriented retail center consisting of uses serving residents of the area including a shopping plaza with a grocery store, a drug store, and a fitness center and uses that would attract customers passing by on I-15 including a hotel, gas stations, a carwash, sit-down restaurants, and fast-food restaurants with drive-through windows. At the far northern end of the site is proposed a fire station and /or sheriff's substation.

Commercial Retail / Services / Hospitality

- 130-room hotel (ITE Category 310)
- 40,000 square foot fitness facility / gym (ITE Category 492)
- 30,500 square foot shopping plaza with a supermarket and retail shops (ITE Category 821)
- 15,000 square foot pharmacy/drugstore with drive-through window (ITE Category 881)
- 22,800 square feet of fast-food restaurants with drive through windows (ITE Category 934)
- 10,600 square feet of sit-down restaurants (ITE Category 932)

Convenience Store/Gas Station/ Carwash (ITE Category 945)

- 5,300 square foot convenience store with gas station (12 fueling stations) and drive-through carwash
- 5,300 square foot convenience store with gas station (8 fueling stations)

Public Safety

- 5,200 square foot county fire/sheriff station

The project site is currently vacant and undeveloped property. It is bounded to the north by rural residential properties, to the south by Glen Helen Parkway and vacant/undeveloped properties, to the west by Interstate 15 and the northbound on-ramp from Glen Helen Parkway to I-15, and to the east by vacant/undeveloped properties.

Access to the site is proposed from two driveways on Glen Helen Parkway; the primary driveway (Driveway A) is proposed at the intersection of Glen Helen Parkway with Clearwater Parkway creating a four-leg intersection. This driveway is about 805-feet east of the I-15 northbound on and off-ramp intersection. The project proposes to modify the existing traffic signal at the primary driveway creating a fourth leg and adding lanes to Glen Helen Parkway. A secondary driveway (Driveway B) on Glen Helen Parkway is proposed near the northern property line of the project about 1,760-feet north of the primary driveway. The secondary driveway is proposed as a full-access side street stop-controlled intersection.

The project site is within the boundary of the Glen Helen Specific Plan adopted by the county on November 15, 2005, and last amended in December 2020. The parcels comprising the project's site is designated as "Destination Recreation" in the Specific Plan's land use plan. According to the land use plan, this designation is intended to accommodate residential land uses, low-intensity service commercial, and recreation entertainment uses.

5.2 Project Trip Generation

The project's trip generation was estimated using the 11th Edition of the Institute of Transportation Engineers (ITE) Trip Generation with trip rates for the AM and PM Peak Hours of the Adjacent Street Traffic. Most of the vehicle trips generated by highway-oriented development are trips that access the site as a convenient interim stop while traveling between an origin and destination that is their primary trip. These types of trips are either "diverted link trips" or "pass-by trips". The Institute of Transportation Engineers (ITE) Trip Generation Handbook defines a diverted-link trip as:

> *"A diverted trip is attracted from the traffic volume on roadways within the vicinity of the project but without direct access to the site. A diverted trip requires a diversion from a roadway not adjacent to the site to another roadway to gain direct access to the site.* ***A diverted trip adds traffic to streets adjacent to a site and could remove traffic on streets from which it diverted.*** *A diverted trip may be part of multiple-stop chain of trips."*

Diverted link trips for the proposed project are diverted from the I-15 freeway and then return to their original route using the reverse of the same path of travel used to access the site.

ITE defines a pass-by trip as:

> *"A pass-by trip is made as an intermediate stop on the way from an origin to a primary trip destination without a route diversion.* ***Pass-by trips are attracted from traffic passing the site on an adjacent street or roadway that offers direct access to the generator.*** *Pass-by trips are not diverted from another roadway not adjacent to the site."*

Pass-by trips will come from Glen Helen Pkwy which fronts the project site and has direct access via two driveways.

Since the project is in a relatively remote area with few nearby residents and businesses, most of the traffic traveling on I-15 freeway are long-distance automobile and truck trips for various purposes including commuting, freight hauling, intra and inter-regional travel, and tourism. These trip types are consistent with ITE data on the split between primary, pass-by, and diverted trips for convenience and highway-oriented land uses[3].

The percentage split between primary, pass-by, and diverted trips is from the database of surveys found in the appendices of the 11th Edition of the Institute of Transportation Engineers (ITE) Trip Generation and provided by land use and peak period. Percentage splits are provided for the shopping plaza, pharmacy/drugstore with drive-through window, convenience store and gas station, and fast-food restaurant with drive-through window land uses. Further, the source of the of the various trip types is assumed as:

- Pass-by trips are from Glen Helen Parkway.
- Diverted-link trips are from the I-15 freeway. The route the diverted-link trips use includes the I-15 ramps at Glen Helen Parkway to the main driveway at the intersection of Glen Helen Parkway and Clearwater Parkway.

For conservative reasons, all the diverted-link and pass-by trips are assigned to the project's primary driveway (Driveway A). This was done to maximize the traffic entering and exiting the primary driveway to help design the driveway to accommodate high traffic volumes.

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[3] Trip Generation Handbook (3rd Edition). Appendix E. Database on Pass-By, Diverted, and Primary Trips. Institute of Transportation Engineers. Washington DC. 2017.

Table 5-1 provides the project's estimated trip generation is based on trip generation rates representing the Peak Hour of the Adjacent Street Traffic for the morning and afternoon periods.

As shown in **Table 5-1** in the row titled "Subtotal Trips (Unadjusted Trips at Driveways), at the project's two driveways (without considering diverted link trips, pass-by trips, or internal capture) the proposed project is estimated to generate 32,327 daily trips, 2,366 AM and 2,336 PM trips during the peak hours of the adjacent streets. A 10% trip reduction representing internalization of trips between the site's land uses is applied to the project trip generation.

Table 5-1: Estimated Project Trip Generation

	Use	Size/ Quantity	Daily	AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
1	**Hotel - Land Use Category (ITE 310)**								
	Per 1,000 Sq. Ft. GLA	130	7.99	0.26	0.20	0.46	0.30	0.29	0.59
	Trips		1,039	33	27	60	40	38	78
	Internal Trip Capture (10%)		104	4	3	7	4	4	8
	Adjusted Sub-Total Trips		935	29	24	53	36	34	70
2	**Fitness Center - Land Use Category (ITE 492)[1]**								
	Per 1,000 Sq. Ft. GLA	40,000	34.5	0.67	0.64	1.31	1.97	1.48	3.45
	Trips		1,380	27	26	53	79	60	139
	Internal Trip Capture (10%)		138	3	3	6	8	6	14
	Adjusted Sub-Total Trips		1,242	24	23	47	71	54	125
3	**Shopping Plaza (40-150k) - Supermarket - Yes - Land Use Category (ITE 821)- 2 Buildings**								
	Per 1,000 Sq. Ft. GLA	30,500	94.49	2.19	1.34	3.53	4.33	4.70	9.03
	Trips		2,882	67	41	108	132	144	276
	Internal Trip Capture (10%)		288	7	4	11	13	14	28
	Adjusted Sub-Total Trips		2,594	61	37	98	119	129	248
	Diverted Link Trips (0%/0%/29%)		0	0	0	0	35	38	73
	Pass-by Trips (0%/0%/29%)		0	0	0	0	35	38	73
	Primary Trips (100%/100%/42%)		2,594	61	37	98	49	53	102
4	**Pharmacy/Drugstore with Drive-Through Window - Land Use Category (ITE 881)**								
	Per 1,000 Sq. Ft. GLA	15,000	108.4	1.94	1.80	3.74	5.13	5.13	10.25
	Trips		1,626	29	27	56	77	77	154
	Internal Trip Capture (10%)		163	3	3	6	8	8	15
	Adjusted Sub-Total Trips		1,463	27	25	52	70	70	140
	Diverted Link Trips (0%/0%/13%)		0	0	0	0	9	9	18
	Pass-by Trips (0%/0%/49%)		0	0	0	0	34	34	68
	Primary Trips (100%/100%/38%)		1,463	27	25	52	27	27	54
5	**Convenience Store/Gas Station (VFP 16-24) - Land Use Category (ITE 945) - PAD 7 and PAD 8**								
	Per 1,000 Sq. Ft. GLA	10,600	1283.38	45.68	45.68	91.35	39.48	39.48	78.95
	Trips		13,604	485	485	970	419	419	838
	Internal Trip Capture (10%)		1,360	49	49	97	42	42	84
	Adjusted Sub-Total Trips		12,244	436	436	872	377	377	754
	Diverted Link Trips (0%/21%/31%)		0	92	92	184	117	117	234
	Pass-by Trips (0%/63%/57%)		0	275	275	550	215	215	430
	Primary Trips (100%/16%/12%)		12,244	69	69	138	45	45	90

	Use	Size/ Quantity	Daily	AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
6	**Fast-Food Restaurant with Drive-Through Window - Land Use Category (ITE 934) - Pads 1-6**								
	Per 1,000 Sq. Ft. GLA	22,800	467.48	22.75	21.86	44.61	17.18	15.85	33.03
	Trips		10,659	519	498	1,017	392	362	754
	Internal Trip Capture		1,066	52	50	102	39	36	75
	Adjusted Sub-Total Trips		9,593	467	449	916	353	326	679
	Diverted Link Trips (0%/21%/31%)		0	131	126	257	67	62	129
	Pass-by Trips (0%/63%/57%)		0	215	207	422	180	166	346
	Primary Trips (100%/16%/12%)		9,593	121	116	237	106	98	204
7	**High-Turnover (Sit-Down) Restaurant - Land Use Category (ITE 932) - 2 Buildings**								
	Per 1,000 Sq. Ft. GLA	10,600	107.2	5.26	4.31	9.57	5.52	3.53	9.05
	Trips		1,137	56	46	102	59	38	97
	Internal Trip Capture		114	6	5	10	6	4	10
	Adjusted Sub-Total Trips		1,023	51	42	93	53	34	87
	Diverted Link Trips (0%/0%/26%)		0	0	0	0	14	9	23
	Pass-by Trips (0%/0%/38%)		0	0	0	0	21	13	34
	Primary Trips (100%/100%/36%)		1,023	51	42	93	18	12	30
	Sub-Total Trips (Unadjusted Trips at Driveways)		32,327	1,216	1,150	2,366	1,198	1,138	2,336
	Internal Trip Capture (10%)		3,233	122	115	237	120	114	234
	Trips Adjusted for Internal Capture		29,094	1,094	1,034	2,129	1,076	1,021	2,102
	Diverted Link Trips		0	223	218	441	242	235	477
	Pass-by Trips		0	490	482	972	485	466	951
	Primary Trips		**29,094**	381	334	**716**	349	320	**674**

Source: "Trip Generation, Institute of Transportation Engineers", 11th Edition
In addition to the above uses, the project proposes a Fire/Sheriff Station. ITE does not have land use categories for these uses or lacks sufficient data for accurate estimates. Fire/Sheriff Station's, particularly subsidiary locations with a focused public safety service area, generate negligible traffic during the peak hours and, therefore, were not included in the estimates.
[1] ITE does not provide daily trip generation rates for the Fitness Center – Land Use Category (ITE 492). The rate is calculated as 10 times that of the PM peak period.

The table also breaks out diverted link trips and pass-by trips because these are trips that would already be traveling on I-15 and Glen Helen Parkway even without the project but are attracted to the project as interim stops between their origins and destinations.

The final row in **Table 5-1** are the project's primary or "new" trips added to the surrounding streets. The project is the destination of these primary trips. Examples include a nearby resident leaving their home to drive to the project to shop for groceries and then returning directly to home afterward, or a resident who works at one of the retail shops in the project.

Primary trips are the smallest component of the project's total trip generation based on ITE's surveys of hundreds of similar commercial land uses and centers. The proposed project is estimated to generate 29,094 daily primary trips, 716 primary AM peak hour trips, and 674 primary PM peak hour trips.

5.3 Project Trip Distribution and Assignment

The distribution of project trips to the surrounding street network is based on assumed origins of the project's employees and customers. The macro-directional distribution patterns (east, west, north, and south) are consistent with area traffic patterns, and the type of the trip (i.e., primary, diverted link or pass-by) is then assigned to the street system on the most direct route on major streets (micro-distribution).

The following list of figures located in **Appendix D** illustrate both the directional distribution (percent direction) and the assignment of project traffic (peak hour trips) to the street system.

Figure D1 presents the primary project trips distribution percentages at each study intersection. **Figure D2** presents the distribution of diverted-link trips at each study intersection. **Figure D3** presents the primary project trips assigned to each study intersection, and **Figure D4** presents the diverted-link project trips assigned to each study intersection. **Figure D5** shows the pass-by trips as assigned to each project driveway and study intersection. Finally, **Figure D6** presents the total project trips assigned to each study intersection. These figures supersede the project distribution and assignment exhibits in the scope agreement for this study found in **Appendix A**.

5.4 Background Plus Project Traffic Analysis

The project trip generation, traffic distribution and assignment patterns were used in the intersection capacity analyses to assess potential project impacts on level of service. The project trips were added to background traffic volumes to derive background plus project conditions. This scenario's traffic volumes are illustrated in **Figure 6**. Intersection capacity analysis for the study intersections uses existing lane geometries and the project's proposed driveways to access the site.

Table 5-2 compares the levels of service between background (without project) conditions and background plus project conditions to illustrate the changes that occur with the project. The intersection level of service worksheets are in **Appendix C**.

Table 5-2: Comparison of Background and Background + Project Intersection Levels of Service

Intersection	Control Type	Background Condition				Background + Project Condition			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		Delay†	LOS	Delay†	LOS	Delay†	LOS	Delay†	LOS
1. Glen Helen Pkwy at I-15 SB Ramps	TWSC	108.8	F	124.3	F	3141.8	F	1071.5	F
2. Glen Helen Pkwy at I-15 NB Ramps	TS	24.2	C	23.3	C	45.2	D	20.8	C
3. Glen Helen Pkwy / Clearwater Pkwy / Dwy "A"	TS	30.5	C	18.4	B	357.0	F	292.9	F
4. Glen Helen Pkwy at Devore Rd/Cajon Blvd	AWSC	234.2	F	251.2	F	321.7	F	333.1	F
5. Devore Rd at I-215 SB Ramps	AWSC	443.8	F	256.7	F	499.3	F	298.0	F
6. Devore Rd at I-215 NB Ramps	AWSC	188.9	F	63.7	F	191.2	F	69.8	F
7. Glen Helen Pkwy at Project Dwy "B"	TWSC	Not Applicable (Future Intersection)				14.8	B	17.0	C
8. Glen Helen Pkwy at Glen Helen Rd	TWSC	175.4	F	50.4	F	389.7	F	129.5	F

Notes:
† Exponentially high delays, although unrealistic, represent over-saturated conditions on the minor street at side-street stop-controlled intersections and at all approaches of all-way stop-controlled intersections. The Highway Capacity Manual 6th Ed. designates this magnitude of delay as >300 seconds per vehicle.
Shaded cells in the table represent intersection peak hours with LOS deficiencies (LOS E or F).
Abbreviations:
TS – Traffic signal-controlled intersection, AWSC – All-way stop-controlled intersection, TWSC (SSSC) – Two-way or Side-street stop-controlled intersection

As presented in **Table 5-2**, under background plus project conditions, only two study intersections operate at LOS D or better in both peak hours (Glen Helen Parkway / I-15 Northbound Ramps, and Glen Helen Parkway / Project Driveway B) while the remaining intersections operate with LOS F deficiencies in either one or both peak hours.

5.5 Year 2028 Queuing Analysis

Table 5-3 presents the year 2028 average and 95th percentile queue lengths (in feet), turning lane storage bay length (in feet), and the length of through lanes between junctures, as determined by SimTraffic. The vehicle queue lengths can be compared to the available storage lengths and where vehicle queues exceed available storage the table includes the metric of "time storage blocked" as a percentage of time that the lane is queued at the top of the storage length (the percent of time can be a cycle length or a peak hour).

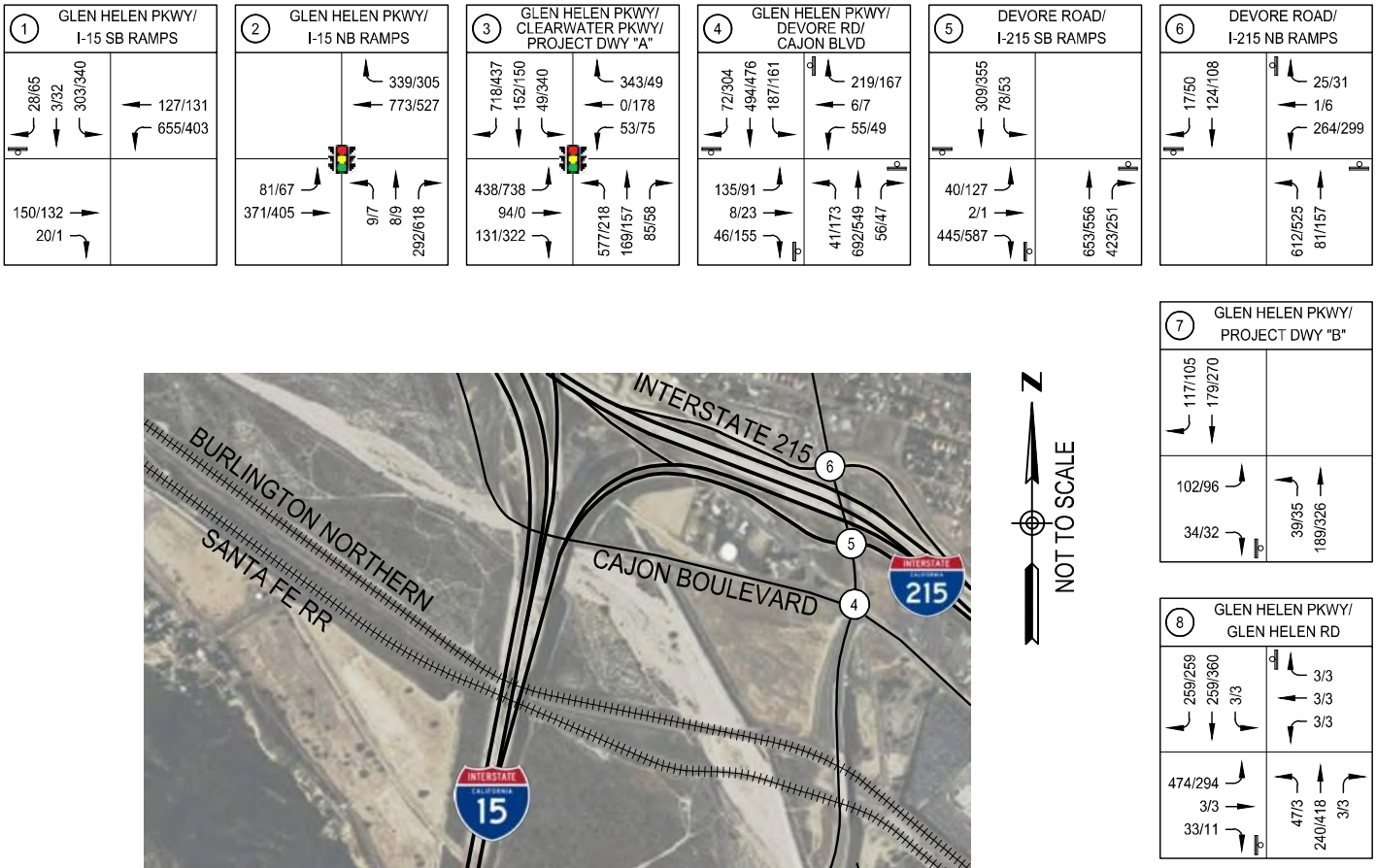

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FIGURE 6: BACKGROUND PLUS PROJECT TRAFFIC VOLUMES
OASIS AT GLEN HELEN PARKWAY
SAN BERNARDINO COUNTY, CALIFORNIA

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Table 5-3: Estimated Queuing by Movement for Background (Year 2028) + Project Conditions (Mitigated)

Intersection	Controlled Movement [a]	AM Peak Hour - Background (2028) + Project (With Mitigation)				PM Peak Hour - Background (2028) + Project (With Mitigation)			
		Avg. Queue (ft)	95th Perc. Queue (ft)	Storage (ft)	Time Storage Blocked (%)	Avg. Queue (ft)	95th Perc. Queue (ft)	Storage (ft)	Time Storage Blocked (%)
1. Glen Helen Pkwy / I-15 SB Ramps	WB Left	230	391	235	19%	204	311	235	20%
	SB Left (off-ramp)	163	262	840	0%	115	135	840	0%
	SB Right (off-ramp)	15	49	840	0%	33	66	840	0%
2. Glen Helen Pkwy / I-15 NB Ramps	EB Left	71	133	200	0%	58	119	200	0%
	EB Through	33	112	550	0%	57	101	550	0%
	WB Through	331	616	750	0%	155	256	750	0%
	NB Left (off-ramp)	7	33	1470	0%	36	131	1470	0%
	NB Right (off-ramp)	62	120	1738	0%	95	172	1738	0%
3. Glen Helen Pkwy / Clearwater Pkwy / Driveway A	EB Left	150	215	200	2%	226	315	200	16%
	EB Through	29	84	680	1%	80	370	680	0%
	WB Left	31	68	300	0%	34	65	300	0%
	WB Right	80	135	300	0%	19	48	300	0%
	NB Left	252	482	125	35% [b]	86	149	125	3%
	NB Through	88	160	1000	0%	115	200	1000	0%
4. Glen Helen Pkwy / Devore Rd / Cajon Blvd	EB Left	156	289	175	26%	48	83	175	0%
	WB Left	45	93	275	0%	39	74	275	0%
	WB Right	136	265	925	0%	54	98	925	0%
	NB Left	39	89	460	0%	105	194	460	0%
	NB Through	184	338	460	0%	89	152	460	0%
	SB Left	124	222	200	3%	92	148	200	0%
	SB Through	153	325	350	0%	103	183	350	0%
5. Devore Rd / I-215 SB Ramps	EB Left (off-ramp)	35	84	760	0%	61	221	760	0%
	EB Right (off-ramp)	150	342	760	0%	190	398	760	0%
	NB Through	348	400	360	0%	101	164	360	0%
	NB Right	101	203	360	0%	55	91	360	0%
	SB Left	70	161	200	1%	35	71	200	0%
	SB Through	82	150	490	0%	39	82	490	0%
6. Devore Rd / I-215 NB Ramps	WB Left (off-ramp)	154	310	535	0%	109	185	535	0%
	WB Right (off-ramp)	17	53	535	0%	14	45	535	0%
	NB Left1	247	416	200	12%	109	189	200	0%
	NB Left2	373	610	490	23%	109	175	490	0%
	NB Through	42	102	490	0%	45	99	490	0%
	SB Through	24	93	235	0%	15	43	235	0%
	SB Right	9	31	200	0%	21	48	200	0%

Notes:
[a] Where a movement has multiple lanes (i.e., dual left turn lanes, through lanes, etc.) the lane with the longest queue is reported in the table. Where the storage length varies between multiple lanes for the same movement, queuing for both lanes is reported.
[b] The northbound left turn bays extend into the inside northbound through lane which is greater than 3,500 feet to the next intersection.

Most of the movements in **Table 5-3** have average and 95th percentile queues well within the provided storage for the movement resulting in a time storage blocked percentage of 15% or less. Several movements experience queues that exceed available storage with time storage blocked upwards of 30%. These queuing impacts are footnoted which describes the situation, and indicating whether it is a real problem or a limitation of the network extent, etc.

6 FUTURE YEAR 2040 CONDITIONS

6.1 Ambient Growth Projections

The future year 2040 conditions scenario represents long-term conditions with a nearly 20-year planning horizon without traffic generated by the project. The 2040 forecasts are derived from the San Bernardino County Transportation Authority's (SBCTA) regional transportation analysis model (SBTAM). The 2040 forecasts are used to develop annual growth rates which are applied to the 2022 traffic counts and compounded annually for an 18-year period between 2022 and 2040. The future year 2040 conditions forecasted traffic volumes are shown in **Figure 7**.

6.2 Cumulative Development Projects

In addition to the forecast of regional ambient growth, the future year 2040 scenario includes traffic from the cumulative development projects used in the background 2028 scenario. Descriptions of the cumulative projects and the estimated trip generation used in this study are in **Appendix F**.

6.3 Future Year 2040 Traffic Analysis

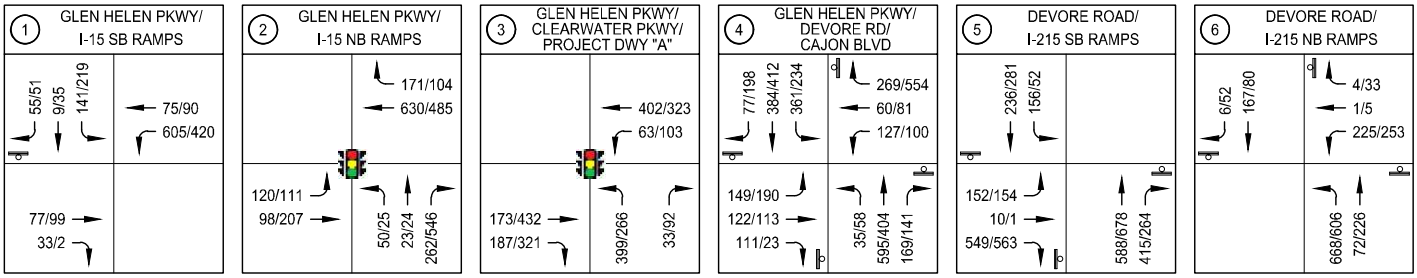
Intersection capacity analysis for this scenario uses the forecast traffic volumes described above and existing lanes geometries. The results of the analysis are shown in **Table 6-1** and provided in **Appendix C**.

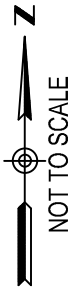
Table 6-1: Future Year 2040 Intersection Levels of Service

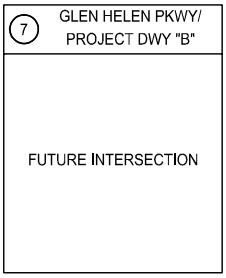
Intersection	Control Type	Future 2040 Conditions			
		AM Peak Hour		PM Peak Hour	
		Delay†	LOS	Delay†	LOS
1. Glen Helen Pkwy at I-15 SB Ramps	TWSC	727.7	F	529.1	F
2. Glen Helen Pkwy at I-15 NB Ramps	TS	26.7	C	23.6	C
3. Glen Helen Pkwy / Clearwater Pkwy / Driveway A	TS	19.5	B	17.4	B
4. Glen Helen Pkwy at Devore Rd/Cajon Blvd	AWSC	363.3	F	389.6	F
5. Devore Rd at I-215 SB Ramps	AWSC	406.7	F	347.8	F
6. Devore Rd at I-215 NB Ramps	AWSC	230.1	F	95.7	F
7. Glen Helen Pkwy at Project Driveway B	TWSC	Not Applicable (Future Intersection)			
8. Glen Helen Pkwy at Glen Helen Rd	TWSC	491.2	F	235.7	F

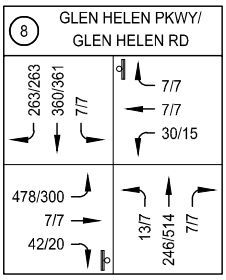
Notes:
† Exponentially high delays, although unrealistic, represent over-saturated conditions on the minor street at side-street stop-controlled intersections. The Highway Capacity Manual 6th Ed. designates this magnitude of delay as >300 seconds per vehicle.
Shaded cells in the table represent intersection peak hours with LOS deficiencies (LOS E or F).
Abbreviations:
TS – Traffic signal-controlled intersection, AWSC – All-way stop-controlled intersection, TWSC – Two-way or Side-street stop-controlled intersection

As presented in **Table 6-1**, under future year 2040 conditions, two study intersections operate at LOS C or better while the remaining intersections operate with LOS F deficiencies in both peak hours.









LEGEND

XX/XX - AM/PM TRAFFIC VOLUMES

(#) - STUDY INTERSECTIONS

- SIGNALIZED INTERSECTION

- STOP CONTROLLED APPROACH

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FIGURE 7: FUTURE YEAR 2040 TRAFFIC VOLUMES
OASIS AT GLEN HELEN PARKWAY
SAN BERNARDINO COUNTY, CALIFORNIA

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7 FUTURE YEAR 2040 PLUS PROJECT CONDITIONS

The future year 2040 plus project conditions scenario adds the project's estimated traffic generation to the future year 2040 conditions scenario described in Chapter 6. Level of service impacts identified in this scenario are considered "cumulative" impacts—impacts that the project contributes to, but does not solely cause, and may be responsible for a fair-share of the cost to implement any mitigation measures.

Level of service impacts identified in this long-term scenario may be considered either "project-specific"—impacts the project causes and is fully responsible for mitigating, or "cumulative"—impacts that the project contributes to, but does not solely cause, and may be responsible for a fair-share of the cost to implement any mitigation measures. The type of impact depends on the criteria satisfied in the scenario.

7.1 Future Year 2040 Plus Project Traffic Analysis

The intersection capacity analysis for this scenario uses the forecast traffic volumes shown in **Figure 8** and existing lane geometries. **Table 7-1** compares the levels of service between future year 2040 conditions and future year 2040 plus project conditions. The level of service worksheets are provided in **Appendix C.**

Table 7-1: Comparison of Future (Year 2040) and Future + Project Intersection Levels of Service

Intersection	Control Type	Future 2040 Condition				Future 2040 + Project Condition			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		Delay†	LOS	Delay†	LOS	Delay†	LOS	Delay†	LOS
1. Glen Helen Pkwy at I-15 SB Ramps	TWSC	727.7	F	529.1	F	8522.1	F	2586.3	F
2. Glen Helen Pkwy at I-15 NB Ramps	TS	26.7	C	23.6	C	59.3	E	24.2	C
3. Glen Helen Pkwy / Clearwater Pkwy / Dwy A	TS	19.5	B	17.4	B	276.9	F	271.5	F
4. Glen Helen Pkwy at Devore Rd / Cajon Blvd	AWSC	363.3	F	389.6	F	467.1	F	477.0	F
5. Devore Rd at I-215 SB Ramps	AWSC	406.7	F	347.8	F	457.6	F	403.7	F
6. Devore Rd at I-215 NB Ramps	AWSC	230.1	F	95.7	F	235.1	F	102.8	F
7. Glen Helen Pkwy at Project Dwy B	TWSC	Not Applicable (Future Intersection)				26.3	D	27.6	D
8. Glen Helen Pkwy at Glen Helen Rd	TWSC	491.2	F	235.7	F	844.6	F	448.8	F

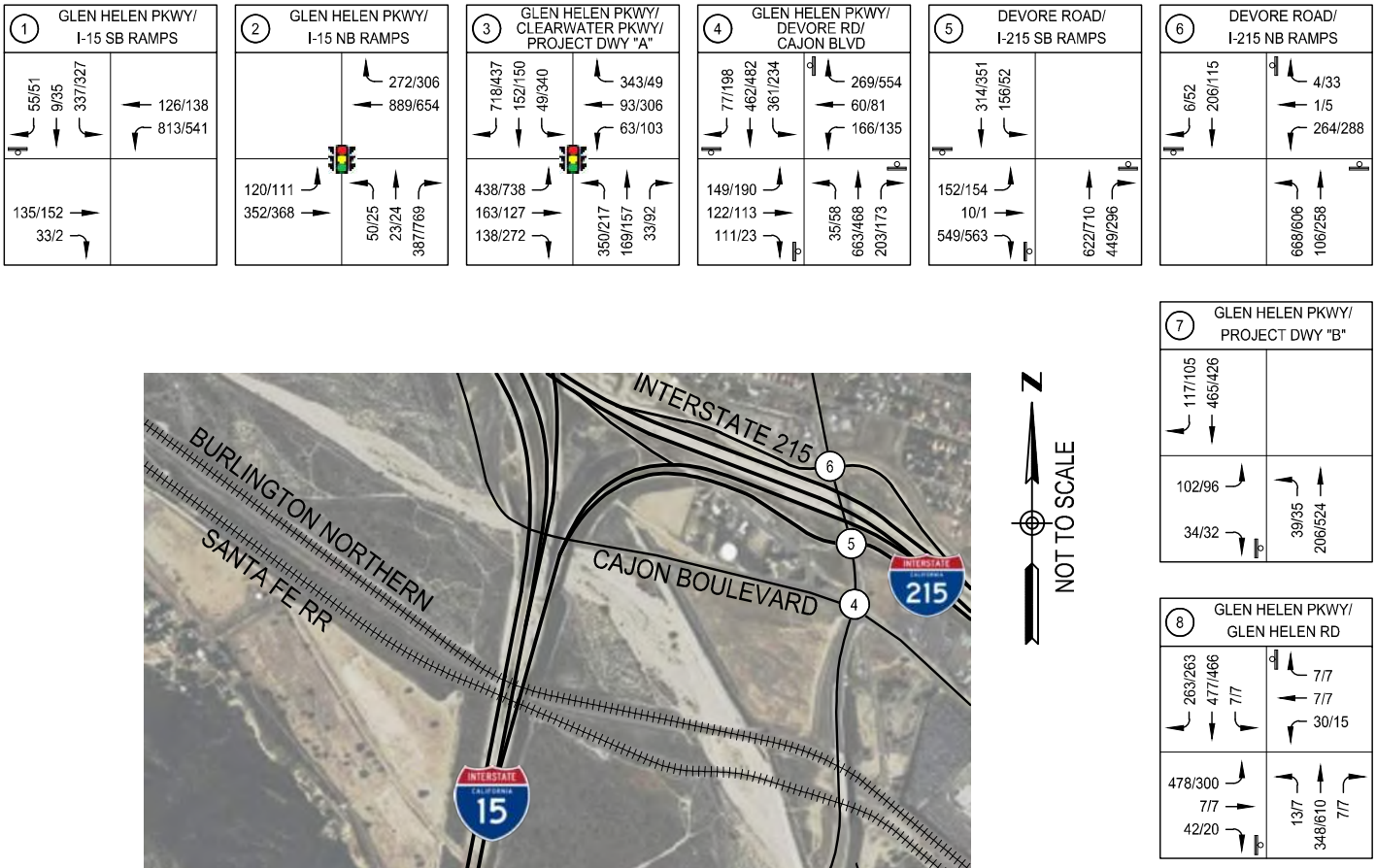
Notes:
† Exponentially high delays, although unrealistic, represent over-saturated conditions on the minor street at side-street stop-controlled intersections. The Highway Capacity Manual 6th Ed. designates this magnitude of delay as >300 seconds per vehicle.
Shaded cells in the table represent intersection peak hours with LOS deficiencies (LOS E or F).
Abbreviations:
TS – Traffic signal-controlled intersection, AWSC – All-way stop-controlled intersection, TWSC – Two-way or Side-street stop-controlled intersection

As presented in **Table 7-1,** the addition of project traffic intensifies the deficiencies at the intersections impacted in future year 2040 conditions without the project, and causes two intersections, Glen Helen Parkway / I-15 NB Ramps, and Glen Helen Parkway / Clearwater Parkway / Project's Primary Driveway A, to change from operating at a LOS C or better to operating at LOS F in one or both peak hours.

7.2 Year 2040 Queuing Analysis

Table 7-2 presents the average and 95th percentile queue length (in feet), turning lane storage bay length (in feet), and the length of through lanes between junctures, as determined by SimTraffic. The vehicle queue lengths can be compared to the available storage lengths and where vehicle queues exceed available storage the table includes the metric of "time storage blocked" as a percentage of time that the lane is queued at the top of the storage length (the percent of time can be a cycle length or a peak hour.

Most of the movements in **Table 7-2** have average and 95th percentile queues well within the provided storage for the movement resulting in a time storage blocked percentage of 15% or less. Several movements experience queues that exceed available storage with time storage blocked upwards of 38%. These queuing



LEGEND

XX/XX - AM/PM TRAFFIC VOLUMES

(#) - STUDY INTERSECTIONS

- SIGNALIZED INTERSECTION

- STOP CONTROLLED APPROACH

DAVID EVANS AND ASSOCIATES INC.

FIGURE 8: FUTURE YEAR 2040 PLUS PROJECT TRAFFIC VOLUMES
OASIS AT GLEN HELEN PARKWAY
SAN BERNARDINO COUNTY, CALIFORNIA

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Table 7-2: Estimated Queuing by Movement for Future (Year 2040) + Project Conditions

Intersection	Controlled Movement [a]	AM Peak Hour - Future (2040) + Project (With Mitigation)				PM Peak Hour - Future (2040) + Project (With Mitigation)			
		Avg. Queue (ft)	95th Perc. Queue (ft)	Storage (ft)	Time Storage Blocked (%)	Avg. Queue (ft)	95th Perc. Queue (ft)	Storage (ft)	Time Storage Blocked (%)
1. Glen Helen Pkwy / I-15 SB Ramps	WB Left	319	319	235	43%	222	362	235	22%
	SB Left (off-ramp)	213	355	840	0%	156	281	840	0%
	SB Right (off-ramp)	36	89	840	0%	28	58	840	20%
2. Glen Helen Pkwy / I-15 NB Ramps	EB Left	104	181	200	1%	103	184	200	0%
	EB Through	53	120	550	0%	62	148	550	0%
	WB Through	486	762	750	0%	261	439	750	0%
	NB Left (off-ramp)	47	100	1470	0%	205	370	1470	0%
	NB Right (off-ramp)	73	128	1738	0%	50	117	1738	0%
3. Glen Helen Pkwy / Clearwater Pkwy / Dwy A	EB Left	134	196	200	1%	247	342	200	22%
	EB Through	26	62	680	0%	122	440	680	0%
	WB Left	29	54	300	0%	43	77	300	0%
	WB Right	86	149	300	0%	24	50	300	0%
	NB Left	156	241	125	38% [b]	71	126	125	1%
	NB Through	80	145	1000	0%	155	247	1000	0%
4. Glen Helen Pkwy / Devore Rd / Cajon Blvd	EB Left	104	185	175	1%	40	75	175	0%
	WB Left	75	135	275	0%	61	113	275	0%
	WB Right	82	149	275	0%	68	121	275	0%
	NB Left	37	80	460	0%	156	302	460	0%
	NB Through	155	253	460	0%	135	209	460	0%
	SB Left	141	239	200	3%	112	193	200	3%
	SB Through	82	206	350	0%	119	192	350	0%
5. Devore Rd / I-215 SB Ramps	EB Left (off-ramp)	615	929	760	0% [c]	48	90	760	0%
	EB Right (off-ramp)	339	826	760	0% [c]	100	172	760	0%
	NB Through	302	404	360	0%	142	247	360	0%
	NB Right	79	186	360	0%	69	167	360	0%
	SB Left	102	187	200	1%	29	61	200	0%
	SB Through	28	101	490	0%	39	89	490	0%
6. Devore Rd / I-215 NB Ramps	WB Left (off-ramp)	139	249	535	0%	87	150	535	0%
	WB Right (off-ramp)	3	17	535	0%	13	36	535	0%
	NB Left1	238	390	200	11%	130	251	200	0%
	NB Left2	355	554	490	30%	134	255	490	0%
	NB Through	41	102	490	0%	73	150	490	0%
	SB Through	117	195	235	0%	37	75	235	0%
	SB Right	5	23	200	0%	26	46	200	0%

Notes:
[a] Where a movement has multiple lanes (i.e., dual left turn lanes, through lanes, etc.) the lane with the longest queue is reported in the table. Where the storage length varies between multiple lanes for the same movement, queuing for both lanes is reported.
[b] The northbound left turn bays extend into the inside northbound through lane which is greater than 3,500 feet to the next intersection.
[c] The percent reported for the off-ramp is upstream block time. The southbound off-ramp is longer than what is reported in the table from SYNCHRO. Two ramps merge into the Devore Road off-ramp (from northbound I-15 and southbound I-215 approximately 1,200 feet from the ramp terminus at Devore Road, and these ramps extend even further upstream. Therefore, the 760-foot right turn queue and the 880-foot left turn queue would not extend into the mainline lanes on I-15 or I-215.

8 SUMMARY OF IMPACTS AND RECOMMENDED MITIGATION MEASURES

8.1 Summary of General Plan Conformance Impacts in Near-Term (2028) and Long-Term (2040) Conditions

This section applies the county's criteria for determining if a level of service deficiency is caused by the proposed project and the level of mitigation required (i.e., improve intersection to a LOS D or offset increase in delay). The county's criteria are described in detail in Chapter 3.

Table 8-1 presents the conformance assessment for the near-term background (year 2028) plus project condition at the study intersections. The project is found to cause the deficiency at one intersection (Glen Helen Parkway / Clearwater Parkway / Driveway A) and contribute to the deficiency at five intersections (Glen Helen Parkway / I-15 Southbound Ramps, Glen Helen Pkwy / Devore Rd / Cajon Blvd, Devore Rd / I-215 Southbound Ramps, Devore Rd / I-215 Northbound Ramps, and Glen Helen Parkway / Glen Helen Road).

Table 8-1: Application of County Impact Criteria to Background (2028) Plus Project Conditions

Intersection	Background (Year 2028) Plus Project Conditions		
	Signalized Intersections		
	Project Causes Change from LOS D to LOS E/F	Project Increases Delay by 5.0+ Seconds at Intersection at LOS E/F Without Project	Mitigation Required
2. Glen Helen Pkwy / I-15 NB Ramps (TS)	NO	NO	NO
3. Glen Helen Pkwy / Clearwater Pkwy / Driveway A (TS)	YES	YES	Improve to LOS D
	Unsignalized Intersections		
	Project Causes Change from LOS D to LOS E/F	Project Increases Delay by 5.0+ Seconds at Intersection at LOS E/F Without Project	Project Adds 10+ Trips to Stop-Controlled Street and/or Satisfies Peak Hour Signal Warrant
1. Glen Helen Pkwy / I-15 SB Ramps (TWSC)	NO	YES	YES
4. Glen Helen Pkwy / Devore Rd / Cajon Blvd (AWSC)	NO	YES	YES
5. Devore Rd / I-215 SB Ramps (AWSC)	NO	YES	YES
6. Devore Rd / I-215 NB Ramps	NO	YES	YES
7. Glen Helen Pkwy / Project Driveway B	Not Applicable		
8. Glen Helen Pkwy / Glen Helen Rd	NO	YES	YES
Notes: Refer to Section 3.5 for detailed description of the county's criteria for determining level of service deficiencies and project responsibility.			

8.2 Recommended Measures to Improve Near-Term Level of Service Deficiencies

This section presents the recommended measures to improve the background (2028) plus project conditions level of service deficiencies described above to the required level and presents the resulting levels of service with implementation of the recommended measures.

Table 8-2 on the following page, presents the recommended mitigation measures and resulting intersection level of service for the deficient intersections in the near-term scenario. In addition, **Table 8-2** identifies the project's responsibility for mitigating impacts based on the county's policy—a project applying for a building permit is responsible for implementing mitigation measure identified in the project's traffic study in near-term conditions regardless of causation or contribution to the deficiency. The mitigation measures are described in detail below. **Table 8-2** demonstrates that the recommended measures for each of the three deficient intersections effectively mitigates the deficiencies resulting in LOS D or better operations.

Figure 9 illustrates the recommended traffic control and lane geometries required to improve the level of service to a LOS D or better.

Table 8-2: Recommended Measures to Improve Background (2028) + Project Deficient Intersection LOS

Intersection	Control Type	Background (2028) + Project Mitigated Level of Service				
		AM Peak Hour		PM Peak Hour		Project Responsibility [a]
		Delay	LOS	Delay	LOS	
1. Glen Helen Pkwy / I-15 SB Ramps (TWSC)	TWSC	3141.8	F	1071.5	F	PS
Mitigation Measure: Install traffic signal	TS	44.5	D	45.8	D	
3. Glen Helen Pkwy / Clearwater Pkwy / Project Driveway "A"	TS	357.0	F	292.9	F	PS
Mitigation: See Figure 9 and Conceptual Geometric Plan in Appendix E plus the following: Southbound approach: add second LT lane Westbound approach: add RT overlap phase Eastbound approach: add RT overlap phase	TS	49.2	D	48.8	D	
4. Glen Helen Pkwy / Devore Rd / Cajon Blvd	AWSC	321.7	F	333.1	F	PS
Mitigation: Install traffic signal Northbound approach (Glen Helen Pkwy): stripe LT, TH, and THR on existing approach with 2TH lanes on SB departure Southbound approach (Devore Rd): LT, TH, THR with 2TH lanes on NB departure Westbound approach (Cajon Blvd): convert existing THR to a RT lane plus add RT overlap phase	TS	29.3	C	35.0	C	
5. Devore Rd / I-215 SB Ramps	AWSC	499.3	F	298.0	F	PS
Mitigation: Install traffic signal Northbound approach (Devore Rd): 2TH, RT with 2TH lanes on SB departure Southbound approach (Devore Rd): LT, and 2TH with 2TH lanes on NB departure (Requires widening I-215 overcrossing to five lanes)	TS	48.4	D	39.9	D	
6. Devore Rd / I-215 NB Ramps	AWSC	191.2	F	69.8	F	PS
Mitigation: Install traffic signal Northbound approach (Devore Rd): 2LT, and one TH with 2TH lanes on SB departure Southbound approach (Devore Rd): 2TH, one RT lane with 2TH lanes on NB departure (Requires widening I-215 overcrossing to five lanes)	TS	49.3	D	21.6	C	
8. Glen Helen Pkwy at Glen Helen Rd	TWSC	389.7	F	129.5	F	PS
Mitigation Measure: Install traffic signal	TS	25.2	C	13.6	B	

Notes:
[a] It is the county's policy that opening day (or near-term) impacts be mitigated without deferment of project responsibility to a future date. This means that the county does not accept a fair-share contribution to the cost of mitigation of near-term impacts regardless of whether a development causes or contributes to the impact. Based on the county's policy, the first development to apply for a building permit is responsible for implementing the mitigation for any impacts identified in the development's traffic impact study whether the development causes the level of service deficiency or contributes to a deficiency projected to occur even without the project. There is no mechanism for reimbursement from future development. Source: County of San Bernardino – Department of Public Works, Traffic Engineering Division.
Abbreviations:
Project responsibility: PS – Project Specific, FS – Fair-Share Contribution
Intersection control types: TS – Traffic signal-controlled intersection, AWSC – All-way stop-controlled intersection, TWSC (SSSC) – Two-way or Side-street stop-controlled intersection
Lane configurations: LT- Left turn lane, TH – Through lane, THR – Shared through-right turn lane, RT – Right turn lane, 2LT – Two left turn lanes, 2TH – Two through lanes

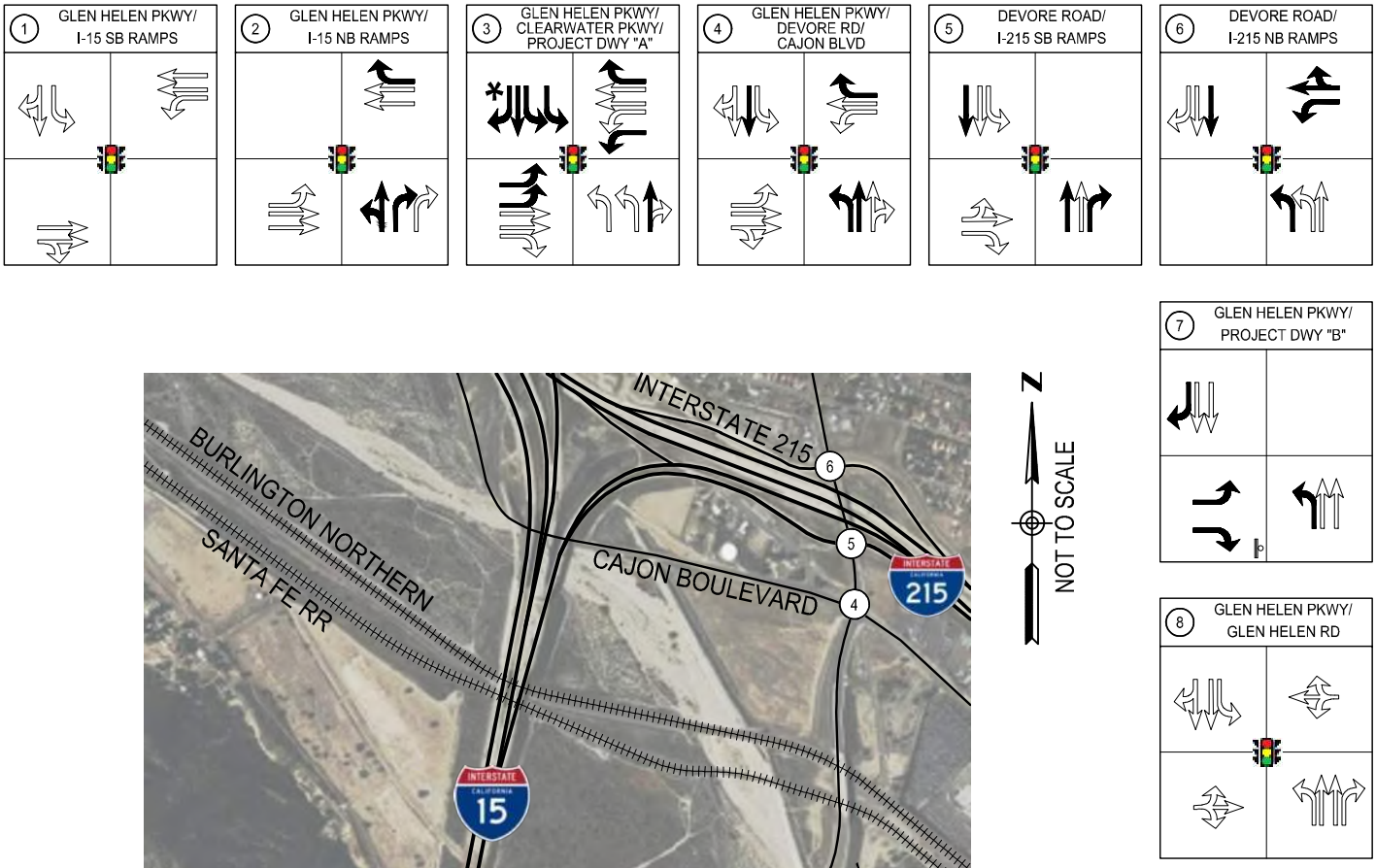

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FIGURE 9: BACKGROUND PLUS PROJECT (2028) MITIGATED INTERSECTION GEOMETRICS
OASIS AT GLEN HELEN PARKWAY
SAN BERNARDINO COUNTY, CALIFORNIA

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According to county policy, the project's fair-share contribution to the cost of mitigating deficient intersections is not applicable to opening day (2028) or near-term conditions where new development is required to implement identified mitigation measures upon application for a building permit regardless of whether the development causes or contributes to the deficiency. Fair-share calculations for mitigation of impacts under future cumulative conditions (2040) are presented in a subsequent section.

The mitigation measures are described below for each deficient intersection:

1. Glen Helen Parkway at I-15 SB Ramps (TWSC) – Mitigation to improve the level of service at this saturated stop controlled southbound off-ramp is to install a traffic signal. The distance between the southbound and northbound ramp intersections is about 600 feet so the two traffic signals will need to be coordinated to keep the segment of Glen Helen Parkway under I-15 clear of vehicles.

2. Glen Helen Parkway / Clearwater Parkway / Project Driveway A (TS) – Mitigation to improve the level of service at this signalized intersection which will serve as the project's primary driveway includes expanding the intersection as part of a series of improvements to Glen Helen Parkway spanning from the I-15 southbound ramps to the secondary driveway at the eastern end of the project's property including a westbound bike lane along the project's frontage. A schematic of the proposed lane geometries is illustrated in **Figure 9** and described below. **Appendix E** contains a detailed conceptual geometric plan of the Glen Helen Parkway improvements:

    - North leg (project driveway): The new north leg of the intersection would be configured as a multi-lane divided entry road with two inbound lanes and three outbound lanes including a free right turn lane turning onto westbound Glen Helen Parkway, a through and a left turn lane. the southbound approach to include a left turn lane, a through lane, and a free right turn lane which continues directly onto the I-15 northbound on-ramp.
    - West leg (Glen Helen Parkway): The eastbound approach will convey most of the project's traffic into the site via dual left turn lanes, two through lanes, and an exclusive right turn lane onto southbound Clearwater Parkway.
    - East leg (Glen Helen Parkway): The westbound approach mirrors the eastbound with dual left turn lanes, two through lanes and a right turn lane into the project driveway. right turn lane into the project's driveway.
    - South leg (Clearwater Parkway): The northbound approach, convert the existing right turn lane to a shared through-right lane, and retain the existing dual northbound left turn lanes.

3. Glen Helen Parkway / Devore Road / Cajon Boulevard (AWSC) – The all-way stop control is replaced with traffic signal control. Lane additions are needed above and beyond the traffic signal as described below:

    - The south leg or northbound approach of Glen Helen Parkway was widened to its ultimate width (four lane divided roadway) when the railroad overcrossing was replaced. However, only the two southbound departure lanes are open (one lane in each direction) and the northbound approach east of the median is closed until the bridge over the Cajon Wash is reconstructed. Once opened, the northbound approach should be striped to provide a left, a through, and a through-right lane.

    - The southbound approach (Devore Road) should mirror the lane geometrics of the northbound approach.

    - On the westbound approach (Cajon Boulevard) the existing through-right lane should be converted to an exclusive right turn lane with right turn overlap phasing.

    - The eastbound approach Cajon Boulevard) can remain in its current configuration.

4. Devore Road / I-215 Southbound Ramps (AWSC) – Mitigation to improve the level of service at this all-way stop controlled intersection includes installing a traffic signal and configuring the northbound approach (Devore Road) with two through lanes and a right turn lane onto the on-ramp to southbound I-215. The southbound approach (Devore Road) also requires two through lanes and a left turn lane to the I-215 southbound on-ramp.

   Devore Road requires a five-lane cross-section on the I-215 overpass between the two ramp intersections. Currently, the overpass has three lanes.

5. Devore Road / I-215 Northbound Ramps (AWSC) – This ramp intersection will require a traffic signal with the northbound approach (Devore Road) configured with dual left turn lanes onto northbound I-215. The second (inside) northbound left turn lane would turn into an existing on-ramp HOV bypass lane and needs to be restricted to HOV vehicles or merged into the non-HOV on-ramp lane. The southbound approach (Devore Road) will need to be reconfigured two through lanes and a right turn lane onto the northbound I-215 on-ramp.

8.3 Recommended Measures to Improve Long-Term (Year 2040) Level of Service Deficiencies

This section presents the recommended measures to improve the future year 2040 level of service deficiencies described in the previous section. This section also presents the resulting levels of service with implementation of the recommended measures.

Table 8-3 shows the conformance assessment for the long-term (year 2040) conditions at the deficient intersections in 2040. The project is found to cause deficiencies at two intersections (Glen Helen Parkway / Clearwater Parkway / Driveway A, and at Glen Helen Parkway at Devore Road/Cajon Boulevard in the AM peak hour) and contribute to deficiencies at three intersections (Glen Helen Parkway at I-15 Southbound Ramps, Glen Helen Parkway at Devore Road/Cajon Boulevard in the PM peak hour, and Devore Road at I-215 Southbound Ramps).

Table 8-3: Application of County Impact Criteria to Future (2040) Plus Project Conditions

Intersection	Background (Year 2028) Plus Project Conditions		
	Signalized Intersections		
	Project Causes Change from LOS D to LOS E/F	Project Increases Delay by 5.0+ Seconds at Intersection at LOS E/F Without Project	Mitigation Required
2. Glen Helen Pkwy / I-15 NB Ramps (TS)	YES	YES	Improve to LOS D
3. Glen Helen Pkwy / Clearwater Pkwy / Driveway A (TS)	YES	YES	Improve to LOS D
	Unsignalized Intersections		
	Project Causes Change from LOS D to LOS E/F	Project Increases Delay by 5.0+ Seconds at Intersection at LOS E/F Without Project	Project Adds 10+ Trips to Stop-Controlled Street and/or Satisfies Peak Hour Signal Warrant
1. Glen Helen Pkwy / I-15 SB Ramps (TWSC)	NO	YES	YES
4. Glen Helen Pkwy / Devore Rd/ Cajon Blvd (AWSC)	NO	YES	YES
5. Devore Rd / I-215 SB Ramps (AWSC)	NO	YES	YES
6. Devore Rd / I-215 NB Ramps	NO	YES	YES
7. Glen Helen Pkwy / Project Driveway B	Not Applicable		
8. Glen Helen Pkwy at Glen Helen Rd	NO	YES	YES

Notes:
Refer to Section 3.5 for detailed description of the county's criteria for determining level of service deficiencies and project responsibility.

Table 8-4 presents the recommended mitigation measures and resulting intersection level of service for the deficient intersections in the future year (2040) plus project scenario. The table also demonstrates that the recommended measures for each of the deficient intersections effectively mitigates the deficiencies resulting in LOS D or better operations.

The 2040 mitigation measures build upon the year 2028 mitigation measures. The table only presents measures if required in addition to the opening day (2028) mitigation measures. If the 2040 deficiency at a study intersection is improved to a LOS D or better with the 2028 mitigation measure, then the intersection is not included in the table.

Table 8-4: Recommended Measures to Improve Future (2040) + Project Deficient Intersection LOS

Intersection	Control Type	Future (2040) + Project Mitigated Level of Service				Project Responsibility
		AM Peak Hour		PM Peak Hour		
		Delay	LOS	Delay	LOS	
4. Glen Helen Pkwy / Devore Rd / Cajon Blvd	AWSC	467.1	F	477.0	F	FS
Mitigation: In addition to 2028 mitigations implement the following: Northbound approach (Glen Helen Pkwy): RT lane	TS	44.9	D	47.0	D	
5. Devore Rd / I-215 SB Ramps	AWSC	457.6	F	403.7	F	FS
Mitigation: In addition to 2028 mitigations implement the following: Eastbound approach (SB I-215 Off-ramp): Add 2nd RT lane	TS	42.2	D	27.4	C	
6. Devore Rd / I-215 NB Ramps	AWSC	235.1	F	102.8	F	FS
Mitigation: In addition to 2028 mitigation implement the following: Westbound approach (NB I-215 Off-ramp): Add 2nd WB LT Lane	TS	38.4	D	21.8	C	

Abbreviations:
Project responsibility: PS – Project Specific, FS – Fair-Share Contribution
Intersection control types: TS – Traffic signal-controlled intersection, AWSC – All-way stop-controlled intersection, TWSC (SSSC) – Two-way or Side-street stop-controlled intersection
Lane configurations: LT- Left turn lane, TH – Through lane, THR – Shared through-right turn lane, RT – Right turn lane, 2LT – Two left turn lanes, 2TH – Two through lanes

8.4 Fair-Share Calculations for Intersections with Deficiencies to Which the Project Contributes

Table 8-5 on the following page**,** presents the proportion of the project's traffic with respect to the total projected growth in traffic at each study intersection in the background (2028) plus project scenario based on the formula in the county's guidelines. **Table 8-5** is not applicable as a fair-share contribution, in accordance with county policy, so it presented for informational and comparative purposes only.

Table 8-6 on the following page**,** presents the calculation of the project's fair share contribution to each study intersection in the future year (2040) scenario. The project share of traffic using each intersection in 2040 is less than the share in 2028 because the increase in future background traffic dilutes the project's contribution of traffic.

The fair share calculations shown in **Table 8-6** are intended to be applied to any additional measures needed in 2040. The highlighted rows identify intersections that have mitigation measures in 2040 over and above the measures identified for opening year (2028) conditions.

Figure 10 presents the future year 2040 recommended intersection geometrics.

Table 8-5: Project Proportion of Total Projected Traffic Growth Under Near-Term (2028) Conditions

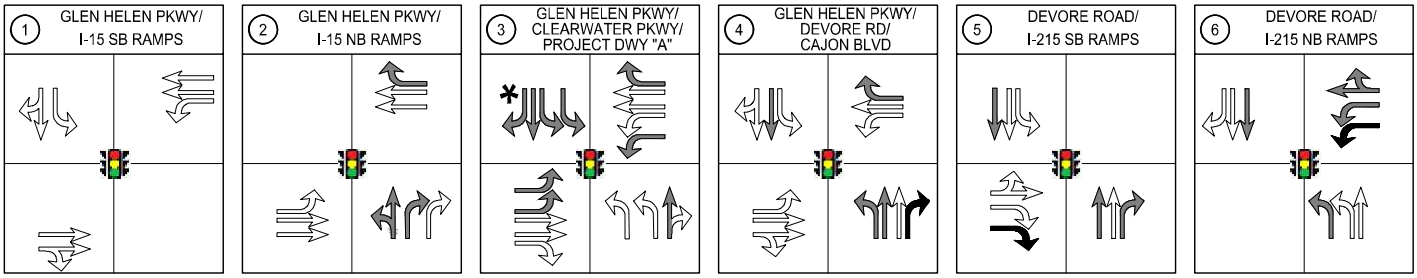
Intersection	Project Trips		Growth in Traffic (Background 2028 + Project Conditions)		Fair-Share Percentage	
	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
1. Glen Helen Pkwy / I-15 SB Ramps	513	330	654	481	78.44%	68.61%
2. Glen Helen Pkwy / I-15 NB Ramps	739	755	957	1004	77.22%	75.20%
3. Glen Helen Pkwy / Clearwater Pkwy / Project Driveway "A"	1445	1443	1863	1749	77.56%	82.50%
4. Glen Helen Pkwy / Devore Rd / Cajon Blvd	219	201	1532	1274	14.30%	15.78%
5. Devore Rd / I-215 SB Ramps	146	134	1445	1180	10.10%	11.36%
6. Devore Rd / I-215 NB Ramps	112	102	829	651	13.51%	15.67%
8. Glen Helen Pkwy / Glen Helen Rd	219	201	1014	824	21.60%	24.39%

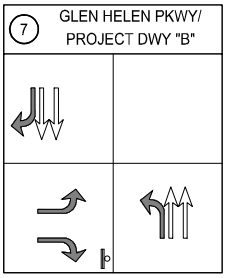
Notes:
Source of formula [% Proportion = (Project Trips) / (Project Trips + Growth (Ambient + Cumulative Development) - Existing Vols) X 100]: San Bernardino County Transportation Impact Guidelines (July 2019), Page 17.

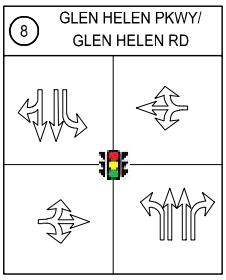
Table 8-6: Project Fair Share Contribution to Study Intersections Under Future 2040 Conditions

Intersection	Project Trips		Growth in Traffic (Future 2040 + Project Conditions)		Fair-Share Percentage	
	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
1. Glen Helen Pkwy at I-15 SB Ramps	513	330	876	623	**58.56%**	52.97%
2. Glen Helen Pkwy at I-15 NB Ramps	739	755	1177	1323	**62.79%**	57.07%
3. Glen Helen Pkwy at Clearwater Pkwy / Project Dwy "A"	1445	1443	1763	2015	**81.96%**	71.61%
4. Glen Helen Pkwy at Devore Rd/Cajon Blvd	219	201	1998	1664	10.96%	**12.08%**
5. Devore Rd at I-215 SB Ramps	146	134	1747	1377	8.36%	**9.73%**
6. Devore Rd at I-215 NB Ramps	112	102	960	832	11.67%	**12.26%**
8. Glen Helen Pkwy at Glen Helen Rd	219	201	1370	1177	15.99%	**17.08%**

Notes:
Source of fair-share formula [FS = (Project Trips) / (Project Trips + Future 2040 Projections - Existing Vols) X 100]: San Bernardino County Transportation Impact Guidelines (July 2019), Page 17.
Typically, the highest percentage of the AM and PM peak hours (**shown in bold**) is selected as the fair-share percentage for the intersection.







N

NOT TO SCALE

LEGEND

- EXISTING GEOMETRICS
- 2028 MITIGATION GEOMETRICS
- 2040 CUMULATIVE MITIGATION GEOMETRICS
- (#) STUDY INTERSECTIONS
- SIGNALIZED INTERSECTION
- STOP CONTROLLED APPROACH
- * FREE RIGHT TURN

DAVID EVANS AND ASSOCIATES INC.

FIGURE 10: FUTURE YEAR 2040 PLUS PROJECT MITIGATED INTERSECTION GEOMETRICS
OASIS AT GLEN HELEN PARKWAY
SAN BERNARDINO COUNTY, CALIFORNIA

Drawing Name: P:\UUCRG215T00030\0400CAD\TT\EXHIBITS\Traffic Study\Figure 10.dwg
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9 VEHICLE MILES TRAVELED (VMT SCREENING ASSESSMENT

This section of the scoping agreement assesses the proposed project to determine if a detailed vehicle miles traveled (VMT) analysis will be required to identify transportation impacts under CEQA using San Bernardino County's VMT screening criteria. This section demonstrates that the project satisfies the county's "local serving retail" criterion and therefore is screened from having to prepare a VMT analysis. To substantiate this claim, this section:

- Explains the background behind the VMT screening criteria employed by most local agencies in California as documented in their guidelines for conducting VMT analyses and assessing level of service conformity.
- Provides background on the Governor's Office of Planning and Research (OPR) guidelines regarding their determination that retail VMT impacts are caused by regional-serving retail, and OPR's conclusion that local serving retail (under 50,000 square feet) can be presumed to have a less-than-significant impact on the environment under CEQA supporting their decision to recommend a criterion to screen local-serving retail from requiring VMT analysis.
- Defines regional serving and local serving retail and shows how the proposed project is a combination of two types of local serving retail: community and freeway-oriented retail.
- Presents data from trip generation surveys of the types of land uses commonly found in community and freeway-oriented retail centers as evidence supporting their local serving characteristics.
- Concludes the VMT screening assessment by correlating the proposed project's land uses to the definitions and data that demonstrate the unique characteristics and context that result in the project satisfying the criteria for local serving retail.

San Bernardino County's VMT Analysis Screening Criteria[a]

1. Projects which serve the local community and have the potential to reduce VMT include the (partial) list of uses below[b]:
   - Local-serving retail less than 50,000 square feet
   - Local serving gas stations
2. Projects generating less than 110 daily vehicle trips.
3. Projects located within a Transit Priority Area (TPA) as identified in SCAG's RTP/SCS[c]
4. Projects located in a low-VMT generating area[d]

Notes:

[a] Source: San Bernardino Transportation Impact Study Guidelines (July 9, 2019).

[b] Other jurisdictions in San Bernardino County include more land uses in their local serving lists including:

- Local-serving hotels (non-destination) – Adelanto
- Community Institutions (libraries, police, and fire stations, etc.) – Adelanto
- Supermarkets – Fontana
- Restaurants / Cafes – Fontana
- Gyms / Health Clubs – Fontana

[c] To meet this criterion, projects within TPA's must meet site and building criteria related to floor area ratio, parking supply, and land use consistency with the region's SCS.

[d] The San Bernardino County Transportation Authority (SBCTA) has created an online VMT screening tool that identifies if specific parcels of land are located within a low-VMT generating TAZ.

Background of the County's VMT Screening Criteria

San Bernardino County's *Transportation Impact Study Guidelines* (July 2019) include the county's requirements and recommendations for analyzing development projects consistent with the intent of SB 743—the legislation which directed the Governor's Office of Planning and Research (OPR) to research and update the California Environmental Quality Act (CEQA) guidelines to deemphasize automobile level of service (LOS) as the key measure of environmental impact and which recommends (VMT) as the most appropriate metric for determining the transportation impacts from new development.

VMT Screening Criteria Recommended by the Governor's Office of Planning and Research (OPR)

The county, like most California agencies, has closely adhered to the OPR's recommendations published in its 2018 *Technical Advisory on Evaluating Transportation Impacts in CEQA* addressing methodology,

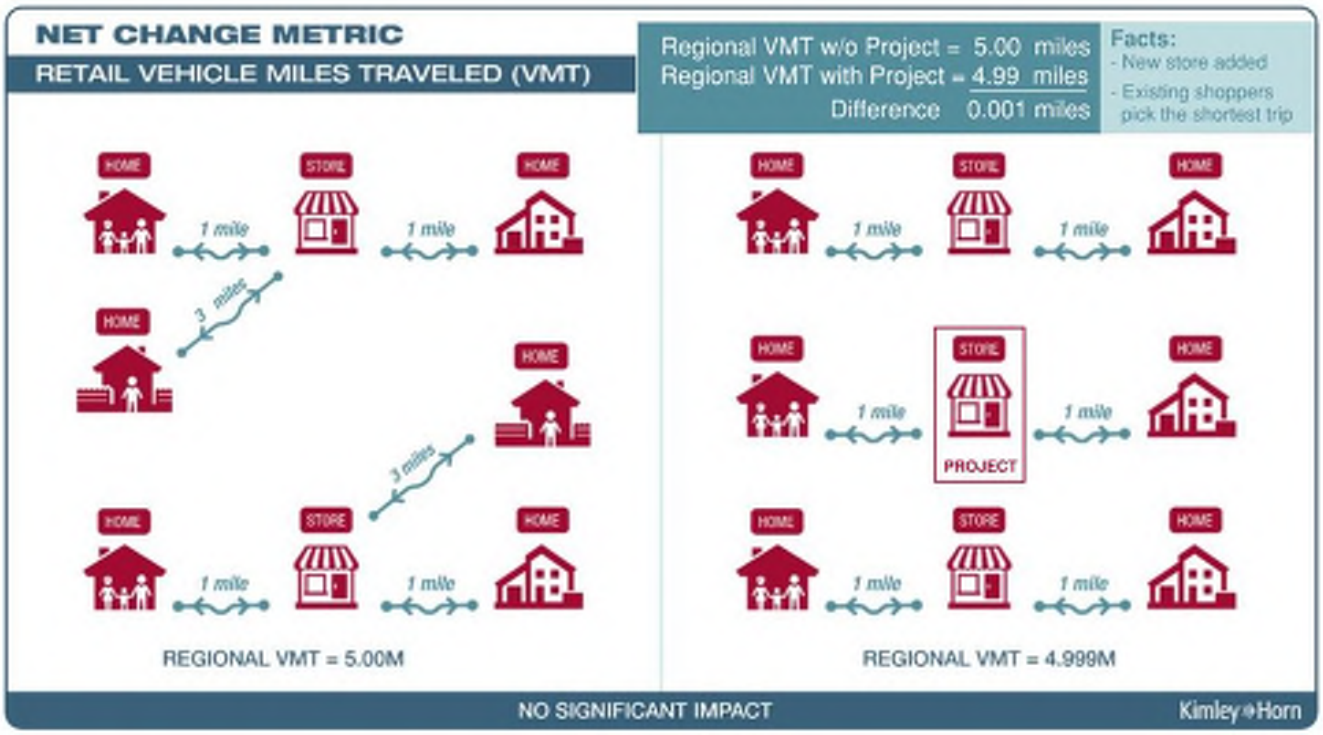
thresholds of significance, screening criteria for land use projects, and mitigating significant VMT impacts among other topics. OPR's Technical Advisory (as does the CEQA Guidelines) suggests screening thresholds to "quickly identify when a project should be expected to cause a less-than-significant impact without conducting a detailed study."

Connecting VMT Impacts to Regional Serving Retail

The OPR guidance is clear about the benefits of local serving retail within communities and differentiates between local and regional serving retail about the type of retail largely responsible for VMT impacts (regional) and attributes building floor area as the metric for screening retail development projects as local serving versus regional serving. The guidance presents its research and concludes with the following:

> *By adding retail opportunities into the urban fabric and thereby improving retail destination proximity, local-serving retail development tends to shorten trips and reduce VMT. Regional-serving retail development, on the other hand, which can lead to substitution of longer trips for shorter ones, may tend to have significant VMT impacts. Generally, retail development that includes [individual] stores larger than 50,000 square feet might be considered regional serving.*

The proposed project will attract most of its trips from existing users of the services offered by the project who are currently traveling further to obtain the same services, especially travelers on I-15 but also in the surrounding community. This is consistent with OPR's research which finds that new retail development typically redistributes shopping trips rather than creating new trips and that any reduction in VMT because of shorter trips lengths is beneficial—an assertion reflected in OPR's threshold for retail VMT impacts. The benefit of adding local-serving retail opportunities is illustrated in the figure below.



Concept of how the addition of retail reduces regional VMT.

Defining Regional Serving Versus Local / Community Serving Retail

Based on OPR's guidelines, the relationship between VMT and retail land uses is largely based on whether the project is regional serving versus local serving. There are various definitions of regional, community, and neighborhood (local serving) retail centers by organizations such as the American Planning Association (APA), Urban Land Institute (ULI), and the International Council of Shopping Centers (ICSC) to name a few, that agree on the common characteristics of regional and local serving retail centers.

The common characteristics of regional and local serving retail are shown in **Table 9-1**, while **Table 9-2** compares the defining characteristics of regional / destination and local serving / convenience hotels.

Table 9-1: Comparison of Defining Characteristics of Regional and Local Serving Retail Centers

Defining Characteristic	Regional Serving Retail	Local / Community Serving Retail
Retail anchors and types of supporting retail uses	Anchored by at least two nationally branded department stores (with a large percentage of which is apparel, mass merchant, discount outlets, or big box/warehouse club stores)	Anchored by a grocery store or drugstore (or both) and supported by sundry, personal services, and restaurants
Total Floor Area (including anchors in square feet)	400,00 to 800,000 +	30,000 to 150,000
Floor Area of Individual Buildings (in square feet)	Greater than 50,000 square feet (of largest anchor buildings)	Less than 50,000 square feet (of largest anchor buildings)
Primary trade area	5 to 25 miles	<1 to 6 miles
Customer attraction concept (what brings customers to retail center)	Variety of merchandise, specialty items, brands, higher-end merchandise, entertainment, ambiance	Convenience Minimal effort to get product / service needed
Sources: Urban Land Institute (ULI) retail center types, International Council of Shopping Centers (ICSC) shopping center definitions, basic configurations, and types.		

Table 9-2: Comparison of Destination Versus Local Serving Hotels

Regional Serving or "Destination" Hotels	Locally Serving or Convenience Hotels
Include resort (offers everything necessary for vacationing), boutique (incorporates unique design and personalized services), conference (caters to business travelers and large groups for trade shows, conventions, or other large events), and extended-stay (for people who stay for weeks or months). Stays are typically 3 to 7 or more nights.	Range from motels often located next to a freeway and offer basic amenities at a low price to chain hotels affiliated with a brand that may have strict guidelines for amenities and design and which customers are familiar with. Stays are usually limited to 1 to 2 nights.
Source: Hotel Tech Report. A hospitality industry professional organization used as a resource of information for hoteliers.	

As shown in **Table 9-1 and Table 9-2,** the proposed Glen Helen retail project does not have the characteristics of a regional serving retail center. Its land uses better align with the definition of local serving retail but also align with a subcategory of local serving retail known as freeway-oriented commercial[4].

The Glen Helen retail project, in fact, is a combination of local serving neighborhood/community retail and freeway-oriented commercial[5].

[4] Freeway-oriented commercial, as defined in many zoning codes, are those areas with uses and facilities which primarily serve the travelling public, such as automobile oriented and automotive facilities, tourist facilities, eating establishments, motels, hotels, drive-in facilities or to accommodate low intensity commercial activities which are conveniently located adjacent to, and visible from, a freeway interchange.

[5] The Glen Helen Specific Plan (Rev. December 2020) designates the project site as Destination Recreation (DR). This designation is intended to accommodate residential land uses, low-intensity service commercial, restaurants, limited retail commercial, and recreation entertainment uses. Conditional uses permitted with a Minor Use Permit (MUP) include retail trade / personal services, sit-down restaurants, specialty retail stores, coffee shops and cafes. Uses requiring a Conditional Use Permit (CUP) include retail trade / personal services, health clubs, and hotels.

The project is anchored by a supermarket, a drugstore, and a health club/gym all of which have floor areas less than 50,000 square feet and are land uses classified as neighborhood / community retail, or personal services. The hotel on the site is, by the definitions presented earlier, not a destination hotel but rather is a local serving / convenience hotel serving visitors to the Glen Helen recreational and entertainment venues or travelers on I-15.

The remaining uses on the site are either automobile-oriented fast-food restaurants with drive-through windows, casual sit-down restaurants, or convenience markets with gas stations, all of which are local serving or convenient to travelers on I-15 and to nearby residents and employees.

Freeway-Oriented Commercial is Locally Serving Retail

Most of the traffic generated for freeway-oriented land uses located at an interchange are "diverted" customer trips from the freeway for services important to freeway travelers (diverted link trips) or are travelers passing-by the site on an adjacent street (Glen Helen Parkway, Clearwater Parkway) who stop as an interim stop between their primary origin and destination (pass-by trips).

The VMT generated by the customers of the site's freeway-oriented land uses is the length of the route from the freeway interchange to the site and the return trip (less than a mile in total) multiplied by the number of diverted link trips. The VMT generated by pass-by trips is nearly negligible since it is the round-trip distance between the driveway entrance and the trip's selected parking space.

Trips that are neither diverted link trips or pass-by trips are "primary" trips defined as trips made specifically to the site from their origin. For the proposed project, primary trips will be new trips attracted to the site, mostly employees, as opposed to the redistribution of existing shopping trips made by customers. Primary trips will likely be longer than diverted-link and pass-by trips but are also the smallest component of total project generated trips—this is the case with all local-serving retail which, overall, is found to reduce VMT.

Supporting Empirical Data

The proportion of diverted-link and pass-by trips to total trips is well documented by the Institute of Transportation Engineers (ITE). The appendices for the 11th Edition of the ITE's Trip Generation includes substantial empirical data on the proportion of total trips classified as pass-by, diverted link, or primary trips for the freeway-oriented land uses found in the proposed project.

Table 9-3 on the following page, summarizes the ITE data for freeway-oriented retail as the average percentage of total trips that are pass-by, diverted link, or primary from the 11th Edition of Trip Generation. ITE's data from thousands of surveys shows that 24% to 70% of all trips to freeway-oriented retail land uses are pass-by, between 14% and 28% are diverted link trips, and from 16% to 48% are primary trips.

Table 9-3 also presents the proportion of the project's estimated PM peak hour trips (averaged across all the project's freeway-oriented uses) into the three trip types: pass-by (45%), diverted-link (23%) and primary (32%). This breakdown is applied to the project's estimated trip generation used in evaluating intersection level of service.

Conclusion of the VMT Screening Assessment for the Proposed Glen Helen Commercial Project

The preceding paragraphs presented the guidance prepared by the Governor's Office of Planning and Research (OPR) adopted by the county and incorporated (slightly modified) into their current VMT screening criteria. The discussion in this section focuses on the criterion demonstrating that local serving retail under 50,000 square feet (per building) can be presumed to have a less-than-significant VMT impact.

This assessment presents evidence that the proposed project meets the definition of local serving retail as well as freeway-oriented commercial (a sub-classification of local serving retail) that further reduces the VMT produced by the project when compared to a project alternative without freeway-oriented land uses. The assessment also recognizes the project's component of primary trips (which will be analyzed in the LOS

conformance analysis) but contends that it does not alter the conclusion that the project is locally-serving retail and subject to the county's screening criteria.

Table 9-3: Summary of Rates for Pass-By and Diverted Link Trips for Freeway-Oriented Uses in the Project

Land Use	ITE Land Use Code	Percent of Total Traffic by Trip Type		
		Pass-By	Non-Pass-By Trips	
			Primary	Diverted Link
Pass-By, Diverted Link, and Primary Trip Data from ITE Trip Generation				
Supermarket (Grocery Store)	821	24%	48%	28%
Pharmacy / Drugstore with Drive-Through	881	51%	40%	14%
High Turnover Sit-Down Restaurant	932	43%	37%	20%
Fast Food Restaurant with Drive-Through (AM Peak)	934	50%	27%	28%
Fast Food Restaurant with Drive-Through (PM Peak)		55%	30%	19%
Convenience Store/Gas Station (AM Peak)	945	70%	18%	22%
Convenience Store/Gas Station (PM Peak)		70%	16%	28%
Total PM Peak Hour Pass-By, Diverted Link, and Primary Trips Estimated for the Proposed Project				
Estimated Proportion of Trips by Type for Project Land Uses: Supermarket, pharmacy/drugstore with drive-through, high turnover sit-down restaurant, fast food restaurant with drive-through, and convenience market with gas station.	821, 881, 932, 934, 945	45%	32%	23%
Source: Institute of Transportation Engineers Trip Generation manual, 11th Edition. Appendix of land uses with vehicle pass-by rates and diverted link trip data compiled as of 2021.				

Based on the information provided in this section, the proposed project is comprised of local serving retail with buildings under 50,000 square feet which satisfy the county's criterion that local serving retail under 50,000 square feet (per building) is presumed to have a less-than-significant impact and does not require a detailed VMT analysis under CEQA.

11 APPENDICES

Appendix A: Approved County Scope Agreement
Appendix B: Turn Movement Count Volumes
Appendix C: Intersection Capacity Analysis Calculations
Appendix D: Project Trip Distribution and Assignment
Appendix E: Conceptual Geometric Plans for Glen Helen Parkway
Appendix F: Cumulative Development Project Descriptions and Estimated Trip Generation

Appendix A: Approved County Scope Agreement

DAVID EVANS AND ASSOCIATES INC.

December 14, 2022 Job No. UCRG215T-0003

Mr. Jim Mauge
215 Table Top, LLC.
PO Box 9716
Redlands, Ca 92375

RE: TRAFFIC IMPACT STUDY SCOPING MEMORANDUM – GLEN HELEN PARKWAY COMMERCIAL CENTER, UNINCORPORATED COMMUNITY OF DEVORE, SAN BERNARDINO COUNTY, CALIFORNIA – APNs 0239-031-04, 0239-031-32 [County-owned], 0239-031-37 and 0239-031-50

Dear Mr. Mauge,

David Evans and Associates, Inc. (DEA) is pleased to submit this Traffic Impact Study Scoping Memorandum for the proposed Glen Helen Parkway Commercial Center (the Project) in the unincorporated community of Devore, County of San Bernardino. This scope of work was prepared consistent with the County of San Bernardino Transportation Impact Study Guidelines dated July 9, 2019. The purpose of this submittal is for the San Bernardino County Engineering Department to review and approve our assumptions and methods prior to preparing the traffic impact study.

A. PROJECT DESCRIPTION

The proposed project is located along Glen Helen Parkway and the I-15 Freeway in the unincorporated community of Devore, in the County of San Bernardino. The project, located on a 33-acre site, consists of a mix of commercial land uses totaling, in aggregate, 201,500 square feet of retail and service uses, plus a 5,200 square foot fire station.

Regional and Local Access

The project site is situated in the northeast quadrant of the I-15 / Glen Helen Parkway interchange, which provides primary regional access to the site. Local access is provided by Clearwater Parkway and Glen Helen Parkway. Other streets and highways serving the area and providing secondary access to the site include the I-215 freeway, Cajon Boulevard, and Devore Road. The project is located approximately 1.5 miles south of the junction of the I-15 and I-215 freeways. **Exhibit A** provides a vicinity map identifying the site relative to the regional and local transportation corridors serving the area.

Proposed Development

The development proposal is comprised of the following individual land uses (including the applicable Institute of Transportation Engineers' (ITE)[1] land use category in parentheses):

Commercial Retail / Services / Hospitality

- 130-room hotel (ITE Category 310)
- 40,000 square foot fitness facility / gym (ITE Category 492)
- 30,500 square foot shopping plaza with a supermarket and retail shops (ITE Category 821)
- 15,000 square foot pharmacy/drugstore with drive-through window (ITE Category 881)
- 22,800 square feet of fast-food restaurants with drive through windows (ITE Category 934)
- 10,600 square feet of sit-down restaurants (ITE Category 932)

Convenience Store/Gas Station/ Carwash (ITE Category 945)

- 5,300 square foot convenience store with gas station (12 fueling stations) and drive-through carwash

[1] Land use categories from the 11th Edition of the Institute of Transportation Engineers' Trip Generation manual.

- 5,300 square foot convenience store with gas station (8 fueling stations)

Public Safety

- 5,200 square foot county fire/sheriff station

Exhibit B illustrates the proposed site plan. As shown on the site plan, access to the site is proposed from a signal controlled main driveway as part of the intersection of Clearwater Parkway / Glen Helen Parkway and a secondary driveway on Glen Helen Parkway located about 1,712 feet north of the main driveway. A pair of driveways, located at the northern end of the property provide exclusive ingress / egress for the fire/sheriff's facility.

The combination of the project's location adjacent to an interstate freeway and directly served by an interchange and the predominance of traveler-related land uses is frequently defined as "highway-oriented development". Highway-oriented development is comprised of commercial uses which rely on visual line-of-sight of vehicular traffic traveling on the adjacent highway. These uses typically include gas stations, convenience markets, sit-down and fast-food drive-through restaurants, and hotels. A large proportion of trips attracted to highway-oriented land uses are "diverted-link trips" from the adject highway. This well-established component of project trip generation is described in the next section.

B. PROJECT TRIP GENERATION

The project's trip generation was estimated using the 11th Edition of the Institute of Transportation Engineers (ITE) Trip Generation with trip rates for the AM and PM Peak Hours of the Adjacent Street Traffic. Most of the vehicle trips generated by highway-oriented development are trips that access the site as a convenient interim stop while traveling between an origin and destination that is their primary trip. These types of trips are either "diverted link trips" or "pass-by trips". The Institute of Transportation Engineers (ITE) Trip Generation Handbook defines a diverted trip as:

> *"A diverted trip is attracted from the traffic volume on roadways within the vicinity of the generator but without direct access to the site. A diverted trip requires a diversion from a roadway not adjacent to the site to another roadway to gain direct access to the site.* ***A diverted trip adds traffic to streets adjacent to a site and could remove a trip on streets from which it diverted.*** *A diverted trip may be part of multiple-stop chain of trips."*

Diverted link trips for the proposed project are diverted from the I-15 and I-215 freeways, and from Clearwater Parkway and then return to their original routes using the reverse of the same path of travel used to access the site.

ITE defines a pass-by trip as:

> *"A pass-by trip is made as an intermediate stop on the way from an origin to a primary trip destination without a route diversion.* ***Pass-by trips are attracted from traffic passing the site on an adjacent street or roadway that offers direct access to the generator.*** *Pass-by trips are not diverted from another roadway not adjacent to the site."*

Pass-by trips will come from Glen Helen Pkwy which fronts the project site and has direct access via two driveways.

Since the project is in a remote area with few nearby residents and businesses, most of the traffic traveling on I-15 freeway and I-215 freeway are long-distance automobile and truck trips for various purposes including commuting, freight hauling, intra and inter-regional travel, and tourism. These trip types are consistent with ITE data on the split between primary, pass-by, and diverted trips for convenience and highway-oriented land uses[2].

[2] Trip Generation Handbook (3rd Edition). Appendix E. Database on Pass-By, Diverted, and Primary Trips. Institute of Transportation Engineers. Washington DC. 2017.

The percentage split between primary, pass-by, and diverted trips is from the database of surveys found in the appendices of the 11th Edition of the Institute of Transportation Engineers (ITE) Trip Generation and provided by land use and peak period. Percentage splits are provided for the shopping plaza, pharmacy/drugstore with drive-through window, convenience store and gas station, and fast-food restaurant with drive-through window land uses. Further, the source of the of the various trip types is assumed as:

- Pass-by trips are from Glen Helen Parkway.
- Diverted-link trips are from the I-15 freeway, the I-215 freeway, and Clearwater Parkway. The routes the diverted-link trips use include the I-15 ramps at Glen Helen Parkway, the I-215 freeway ramps at Devore Road connecting to Glen Helen Parkway, and Clearwater Parkway from the Rosena Ranch community to the main driveway at the intersection of Glen Helen Parkway and Clearwater Parkway.

Table A summarizes the estimated trip generation for the proposed project site, for the AM (7-9 AM) and PM (4-6 PM) peak periods based on the Peak Hour of the Adjacent Street Traffic. As shown in **Table A**, the proposed project is estimated to generate 27,852 primary daily trips, 716 primary AM and 674 primary PM peak hour trips during the adjacent street peak hours. A 10% trip reduction representing internalization of trips between the site's land uses has been applied to the project trip generation.

Table A: Proposed Project - Trip Generation

	Use	Size/ Quantity	Daily	AM			PM		
				In	Out	Total	In	Out	Total
1	**Hotel - Land Use Category (ITE 310)**								
	Per 1,000 Sq. Ft. GLA	130	7.99	0.26	0.20	0.46	0.30	0.29	0.59
	Trips		1,039	33	27	60	40	38	78
	Internal Trip Capture (10%)		104	4	3	7	4	4	8
	Adjusted Sub-Total Trips		935	29	24	53	36	34	70
2	**Fitness Center - Land Use Category (ITE 492)**								
	Per 1,000 Sq. Ft. GLA	40,000	34.5(1)	0.67	0.64	1.31	1.97	1.48	3.45
	Trips		1,380	27	26	53	79	60	139
	Internal Trip Capture (10%)		138	3	3	6	8	6	14
	Adjusted Sub-Total Trips		1,242	24	23	47	71	54	125
3	**Shopping Plaza (40-150k) - Supermarket - Yes - Land Use Category (ITE 821)- 2 Buildings**								
	Per 1,000 Sq. Ft. GLA	30,500	94.49	2.19	1.34	3.53	4.33	4.70	9.03
	Trips		2,882	67	41	108	132	144	276
	Internal Trip Capture (10%)		288	7	4	11	13	14	28
	Adjusted Sub-Total Trips		2,594	61	37	98	119	129	248
	Diverted Link Trips (0 %/0%/29%)		0	0	0	0	35	38	73
	Pass-by Trips (0 %/0%/29%)		0	0	0	0	35	38	73
	Primary Trips (100%/100%/42%)		2,594	61	37	98	49	53	102
4	**Pharmacy/Drugstore with Drive-Through Window - Land Use Category (ITE 881)**								
	Per 1,000 Sq. Ft. GLA	15,000	108.4	1.94	1.80	3.74	5.13	5.13	10.25
	Trips		1,626	29	27	56	77	77	154
	Internal Trip Capture (10%)		163	3	3	6	8	8	15
	Adjusted Sub-Total Trips		1,463	27	25	52	70	70	140
	Diverted Link Trips (0 %/0%/13%)		0	0	0	0	9	9	18
	Pass-by Trips (0 %/0%/49%)		0	0	0	0	34	34	68
	Primary Trips (100%/100%/38%)		1,463	27	25	52	27	27	54

Table B: Proposed Project - Trip Generation (Continued)

	Use	Size/ Quantity	Daily	AM			PM		
				In	Out	Total	In	Out	Total
5	**Convenience Store/Gas Station (VFP 16-24) - Land Use Category (ITE 945) - PAD 7 and PAD 8**								
	Per 1,000 Sq. Ft. GLA	10,600	1283.38	45.68	45.68	91.35	39.48	39.48	78.95
	Trips		13,604	485	485	970	419	419	838
	Internal Trip Capture (10%)		1,360	49	49	97	42	42	84
	Adjusted Sub-Total Trips		12,244	436	436	872	377	377	754
	Diverted Link Trips (0 %/21%/31%)		0	92	92	184	117	117	234
	Pass-by Trips (0 %/63%/57%)		0	275	275	550	215	215	430
	Primary Trips (100%/16%/12%)		12,244	69	69	138	45	45	90
6	**Fast-Food Restaurant with Drive-Through Window - Land Use Category (ITE 934) - Pads 1-6**								
	Per 1,000 Sq. Ft. GLA	22,800	467.48	22.75	21.86	44.61	17.18	15.85	33.03
	Trips		10,659	519	498	1,017	392	362	754
	Internal Trip Capture		1,066	52	50	102	39	36	75
	Adjusted Sub-Total Trips		9,593	467	449	916	353	326	679
	Diverted Link Trips (0 %/21%/ 31%)		0	131	126	257	67	62	129
	Pass-by Trips (0 %/63%/57%)		0	215	207	422	180	166	346
	Primary Trips (100%/16%/12%)		9,593	121	116	237	106	98	204
7	**High-Turnover (Sit-Down) Restaurant - Land Use Category (ITE 932) - 2 Buildings**								
	Per 1,000 Sq. Ft. GLA	10,600	107.2	5.26	4.31	9.57	5.52	3.53	9.05
	Trips		1,137	56	46	102	59	38	97
	Internal Trip Capture		114	6	5	10	6	4	10
	Adjusted Sub-Total Trips		1,023	51	42	93	53	34	87
	Diverted Link Trips (0 %/0%/ 26%)		0	0	0	0	14	9	23
	Pass-by Trips (0 %/0%/38%)		0	0	0	0	21	13	34
	Primary Trips (100%/100%/36%)		1,023	51	42	93	18	12	30
	Sub-Total Trips		30,947	1,216	1,150	2,366	1,198	1,138	2,336
	Internal Trips (10%)		3,095	122	115	237	120	114	234
	Adjusted Sub-Total Trips		27,852	1,094	1,034	2,129	1,076	1,021	2,102
	Diverted Link Trips		0	223	218	441	242	235	477
	Pass-by Trips		0	490	482	972	485	466	951
	Primary Trips		**27,852**	381	334	**716**	349	320	**674**

Source: "Trip Generation, Institute of Transportation Engineers", 11th Edition

(1) The ITE Trip Generation Manual does not provide an ADT rate for the Fitness Center (LU - ITE 492). The ADT provided is an estimated value of 10 times the PM peak hour rate.

In addition to the above uses, the project proposes a Fire/Sheriff Station. ITE does not have land use categories for these uses or lacks sufficient data for accurate estimates. Fire/Sheriff Station's, particularly subsidiary locations with a focused public safety service area, generate negligible traffic during the peak hours and, therefore, were not included in the estimates.

C. PROJECT TRIP DISTRIBUTION AND ASSIGNMENT

The distribution of project trips to the surrounding street network is based on assumed origins of the project's employees and customers. The directional distribution patterns (east, west, north, and south) are consistent with area traffic patterns, and the source of the trip (i.e., primary, diverted link or pass-by) then assigned to the street system based on the type of trip or the most direct route on major streets.

The following exhibits illustrate both the directional distribution (percent direction) and the assignment of project traffic (peak hour trips) to the street system.

Exhibit C-1 presents the primary project trips distribution percentages at each study intersection. **Exhibit C-2** presents the distribution of diverted-link trips at each study intersection. **Exhibit D-1** presents the primary project trips assigned to each study intersection, and **Exhibit D-2** presents the diverted-link project trips assigned to each study intersection. **Exhibit D-3** shows the pass-by trips as assigned to each project driveway and study intersection. Finally, **Exhibit E** presents the total project trips assigned to each study intersection.

D. STUDY INTERSECTIONS

Study intersections for a focused traffic study include six existing intersections and proposed future driveway intersections for analysis.

1. Glen Helen Pkwy / I-15 SB Ramps
2. Glen Helen Pkwy / I-15 NB Ramps
3. Glen Helen Pkwy / Clearwater Pkwy / Project Dwy "A"
4. Glen Helen Pkwy / Devore Rd/Cajon Blvd
5. Devore Rd / I-215 SB Ramps
6. Devore Rd / I-215 NB Ramps
7. Glen Helen Pkwy / Project Dwy "B"

The intersections of Glen Helen Parkway at the I-15 Southbound Ramps, Glen Helen Parkway at I-15 Northbound Ramps, and Glen Helen Parkway at Clearwater Parkway are currently controlled with a traffic signal. The intersections of Glen Helen Parkway at Devore Road / Cajon Boulevard, Devore Road at the I-215 Southbound Ramps, and Devore Road at the I-215 Northbound Ramps are currently stop controlled intersections

E. METHODOLOGY

All study intersections will be analyzed to identify impacts to the county's general plan level of service (LOS) policies. The LOS calculations will be based on the Highway Capacity Manual (HCM6) for non-signalized and signalized intersections as appropriate. The study will be prepared in accordance with the County of San Bernardino Transportation Impact Study Guidelines dated July 9, 2019. The project study area is within the San Bernardino County Desert Zone. As such, the level of service threshold is LOS C.

Trucks will be provided as a percentage of the total turn movement count by movement. The capacity analysis calculations will utilize truck percentages based on existing conditions carried forward to all scenarios.

F. TRAFFIC STUDY SCENARIOS

The following outlines the analysis scenarios proposed for the study:

1. Existing Conditions
    a. Traffic Counts conducted during AM (7-9 AM) and PM (4-6 PM) peak periods
2. Background Conditions (Opening Year 2025 without Project)
    a. Growth (assume ambient growth rate of 2% per year)
    b. Planned / Approved Development (**as provided by the County**)
3. Project Conditions (Opening Year 2025 with Project)
    a. Project traffic added to background condition forecasts
4. Cumulative Conditions (Horizon Year 2040 without Project)
    a. Forecasts from the San Bernardino Transportation Analysis Model (SBTAM)
5. Cumulative + Project Conditions (Horizon Year 2040 with Project)
    a. Project traffic added to the forecasts developed for future year 2040 baseline conditions

G. VEHICLE MILES OF TRAVEL (VMT) SCREENING

This section of the scoping agreement assesses the proposed project to determine if a detailed vehicle miles traveled (VMT) analysis will be required to identify transportation impacts under CEQA using San Bernardino County's VMT screening criteria. This section demonstrates that the project satisfies the county's "local serving retail" criterion and therefore is screened from having to prepare a VMT analysis. To substantiate this claim, this section:

- Explains the background behind the VMT screening criteria employed by most local agencies in California as documented in their guidelines for conducting VMT analyses and assessing level of service conformity.
- Provides background on the Governor's Office of Planning and Research (OPR) guidelines regarding their determination that retail VMT impacts are caused by regional-serving retail, and OPR's conclusion that local serving retail (under 50,000 square feet) can be presumed to have a less-than-significant impact on the environment under CEQA supporting their decision to recommend a criterion to screen local-serving retail from requiring VMT analysis.
- Defines regional serving and local serving retail and shows how the proposed project is a combination of two types of local serving retail: community and freeway-oriented retail.
- Presents data from trip generation surveys of the types of land uses commonly found in community and freeway-oriented retail centers as evidence supporting their local serving characteristics.
- Concludes the VMT screening assessment by correlating the proposed project's land uses to the definitions and data that demonstrate the unique characteristics and context that result in the project satisfying the criteria for local serving retail.

San Bernardino County's VMT Analysis Screening Criteria[a]

1. Projects which serve the local community and have the potential to reduce VMT include the (partial) list of uses below[b]:
   - Local-serving retail less than 50,000 square feet
   - Local serving gas stations
2. Projects generating less than 110 daily vehicle trips.
3. Projects located within a Transit Priority Area (TPA) as identified in SCAG's RTP/SCS[c]
4. Projects located in a low-VMT generating area[d]

Notes:

[a] Source: San Bernardino Transportation Impact Study Guidelines (July 9, 2019).

[b] Other jurisdictions in San Bernardino County include more land uses in their local serving lists including:

- Local-serving hotels (non-destination) – Adelanto
- Community Institutions (libraries, police, and fire stations, etc.) – Adelanto
- Supermarkets – Fontana
- Restaurants / Cafes – Fontana
- Gyms / Health Clubs – Fontana

[c] To meet this criterion, projects within TPA's must meet site and building criteria related to floor area ratio, parking supply, and land use consistency with the region's SCS.

[d] The San Bernardino County Transportation Authority (SBCTA) has created an online VMT screening tool that identifies if specific parcels of land are located within a low-VMT generating TAZ.

Background of the County's VMT Screening Criteria

San Bernardino County's *Transportation Impact Study Guidelines* (July 2019) include the county's requirements and recommendations for analyzing development projects consistent with the intent of SB 743—the legislation which directed the Governor's Office of Planning and Research (OPR) to research and update the California Environmental Quality Act (CEQA) guidelines to deemphasize automobile level of service (LOS) as the key measure of environmental impact and which recommends (VMT) as the most appropriate metric for determining the transportation impacts from new development.

VMT Screening Criteria Recommended by the Governor's Office of Planning and Research (OPR)

The county, like most California agencies, has closely adhered to the OPR's recommendations published in its 2018 *Technical Advisory on Evaluating Transportation Impacts in CEQA* addressing methodology, thresholds of significance, screening criteria for land use projects, and mitigating significant VMT impacts among other

topics. OPR's Technical Advisory (as does the CEQA Guidelines) suggests screening thresholds to "quickly identify when a project should be expected to cause a less-than-significant impact without conducting a detailed study."

Connecting VMT Impacts to Regional Serving Retail

The OPR guidance is clear about the benefits of local serving retail within communities and differentiates between local and regional serving retail about the type of retail largely responsible for VMT impacts (regional) and attributes building floor area as the metric for screening retail development projects as local serving versus regional serving. The guidance presents its research and concludes with the following:

> *By adding retail opportunities into the urban fabric and thereby improving retail destination proximity, local-serving retail development tends to shorten trips and reduce VMT. Regional-serving retail development, on the other hand, which can lead to substitution of longer trips for shorter ones, may tend to have significant VMT impacts. Generally, retail development that includes [individual] stores larger than 50,000 square feet might be considered regional serving.*

The proposed project will attract most of its trips from existing users of the services offered by the project who are currently traveling further to obtain the same services, especially travelers on I-15 but also in the surrounding community. This is consistent with OPR's research which finds that new retail development typically redistributes shopping trips rather than creating new trips and that any reduction in VMT because of shorter trips lengths is beneficial—an assertion reflected in OPR's threshold for retail VMT impacts. The benefit of adding local-serving retail opportunities is illustrated in **Figure 1**.

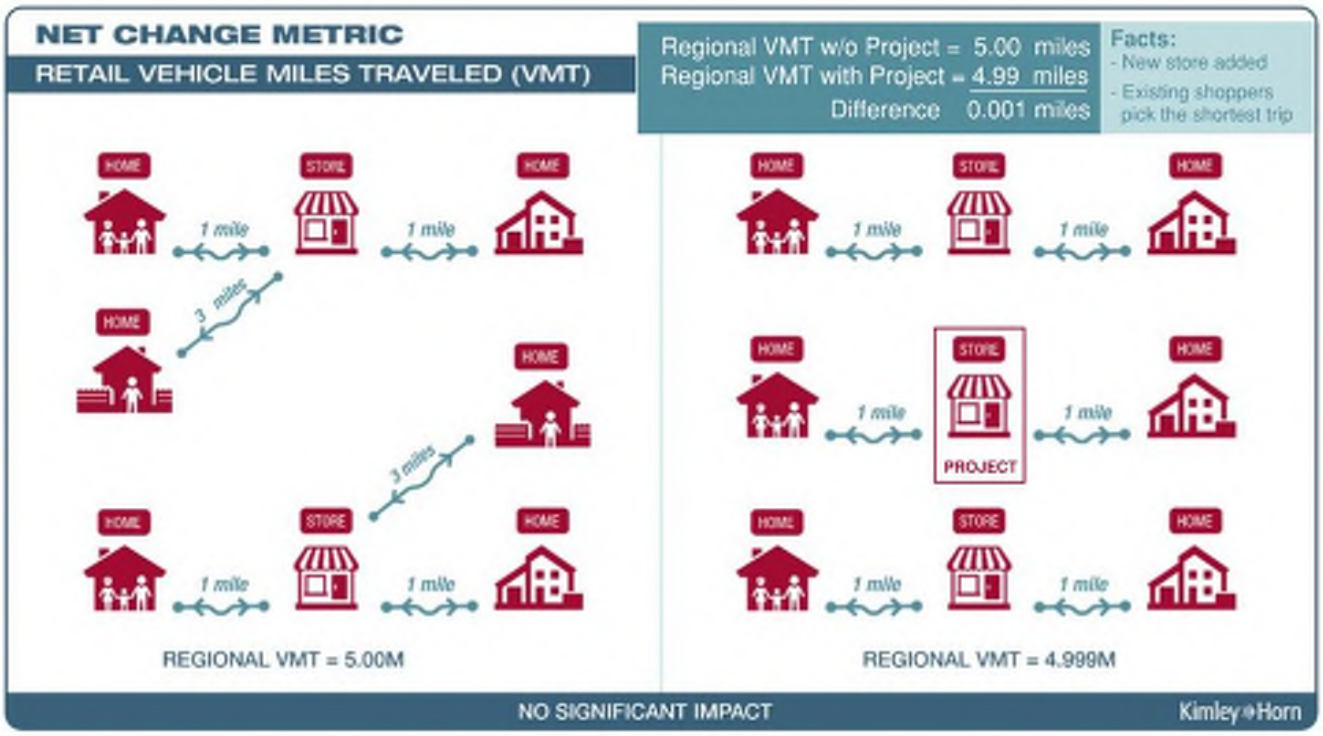


Figure 1: Concept of how the addition of retail reduces regional VMT.

Defining Regional Serving Versus Local / Community Serving Retail

Based on OPR's guidelines, the relationship between VMT and retail land uses is largely based on whether the project is regional serving versus local serving. There are various definitions of regional, community, and neighborhood (local serving) retail centers by organizations such as the American Planning Association (APA), Urban Land Institute (ULI), and the International Council of Shopping Centers (ICSC) to name a few, that agree on the common characteristics of regional and local serving retail centers.

The common characteristics of regional and local serving retail are shown in **Table 1**, while **Table 2** compares the defining characteristics of regional / destination and local serving / convenience hotels.

Table 1: Comparison of Defining Characteristics of Regional and Local Serving Retail Centers

Defining Characteristic	Regional Serving Retail	Local / Community Serving Retail
Retail anchors and types of supporting retail uses	Anchored by at least two nationally branded department stores (with a large percentage of which is apparel, mass merchant, discount outlets, or big box/warehouse club stores)	Anchored by a grocery store or drugstore (or both) and supported by sundry, personal services, and restaurants
Total Floor Area (including anchors in square feet)	400,00 to 800,000 +	30,000 to 150,000
Floor Area of Individual Buildings (in square feet)	Greater than 50,000 square feet (of largest anchor buildings)	Less than 50,000 square feet (of largest anchor buildings)
Primary trade area	5 to 25 miles	<1 to 6 miles
Customer attraction concept (what brings customers to retail center)	Variety of merchandise, specialty items, brands, higher-end merchandise, entertainment, ambiance	Convenience Minimal effort to get product / service needed
Sources: Urban Land Institute (ULI) retail center types, International Council of Shopping Centers (ICSC) shopping center definitions, basic configurations, and types.		

Table 2: Comparison of Destination Versus Local Serving Hotels

Regional Serving or "Destination" Hotels	Locally Serving or Convenience Hotels
Include resort (offers everything necessary for vacationing), boutique (incorporates unique design and personalized services), conference (caters to business travelers and large groups for trade shows, conventions, or other large events), and extended-stay (for people who stay for weeks or months). Stays are typically 3 to 7 or more nights.	Range from motels often located next to a freeway and offer basic amenities at a low price to chain hotels affiliated with a brand that may have strict guidelines for amenities and design and which customers are familiar with. Stays are usually limited to 1 to 2 nights.
Source: Hotel Tech Report. A hospitality industry professional organization used as a resource of information for hoteliers.	

As shown in **Tables 1 and 2,** the proposed Glen Helen retail project does not have the characteristics of a regional serving retail center. Its land uses better align with the definition of local serving retail but also align with a subcategory of local serving retail known as freeway-oriented commercial[3].

The Glen Helen retail project, in fact, is a combination of local serving neighborhood/community retail and freeway-oriented commercial[4].

The project is anchored by a supermarket, a drugstore, and a health club/gym all of which have floor areas less than 50,000 square feet and are land uses classified as neighborhood / community retail, or personal services. The hotel on the site is, by the definitions presented earlier, not a destination hotel but rather is a

[3] Freeway-oriented commercial, as defined in many zoning codes, are those areas with uses and facilities which primarily serve the travelling public, such as automobile oriented and automotive facilities, tourist facilities, eating establishments, motels, hotels, drive-in facilities or to accommodate low intensity commercial activities which are conveniently located adjacent to, and visible from, a freeway interchange.

[4] The Glen Helen Specific Plan (Rev. December 2020) designates the project site as Destination Recreation (DR). This designation is intended to accommodate residential land uses, low-intensity service commercial, restaurants, limited retail commercial, and recreation entertainment uses. Conditional uses permitted with a Minor Use Permit (MUP) include retail trade / personal services, sit-down restaurants, specialty retail stores, coffee shops and cafes. Uses requiring a Conditional Use Permit (CUP) include retail trade / personal services, health clubs, and hotels.

local serving / convenience hotel serving visitors to the Glen Helen recreational and entertainment venues or travelers on I-15.

The remaining uses on the site are either automobile-oriented fast-food restaurants with drive-through windows, casual sit-down restaurants, or convenience markets with gas stations, all of which are local serving or convenient to travelers on I-15 and to nearby residents and employees.

Freeway-Oriented Commercial is Locally Serving Retail

Most of the traffic generated for freeway-oriented land uses located at an interchange are "diverted" customer trips from the freeway for services important to freeway travelers (diverted link trips) or are travelers passing-by the site on an adjacent street (Glen Helen Parkway, Clearwater Parkway) who stop as an interim stop between their primary origin and destination (pass-by trips).

The VMT generated by the customers of the site's freeway-oriented land uses is the length of the route from the freeway interchange to the site and the return trip (less than a mile in total) multiplied by the number of diverted link trips. The VMT generated by pass-by trips is nearly negligible since it is the round-trip distance between the driveway entrance and the trip's selected parking space.

Trips that are neither diverted link trips or pass-by trips are "primary" trips defined as trips made specifically to the site from their origin. For the proposed project, primary trips will be new trips attracted to the site, mostly employees, as opposed to the redistribution of existing shopping trips made by customers. Primary trips will likely be longer than diverted-link and pass-by trips but are also the smallest component of total project generated trips—this is the case with all local-serving retail which, overall, is found to reduce VMT.

Supporting Empirical Data

The proportion of diverted-link and pass-by trips to total trips is well documented by the Institute of Transportation Engineers (ITE). The appendices for the 11th Edition of the ITE's Trip Generation includes substantial empirical data on the proportion of total trips classified as pass-by, diverted link, or primary trips for the freeway-oriented land uses found in the proposed project.

Table 3 summarizes the ITE data for freeway-oriented retail as the average percentage of total trips that are pass-by, diverted link, or primary from the 11th Edition of Trip Generation. ITE's data from thousands of surveys shows that 24% to 70% of all trips to freeway-oriented retail land uses are pass-by, between 14% and 28% are diverted link trips, and from 16% to 48% are primary trips.

Table 3: Summary of Rates for Pass-By and Diverted Link Trips for Freeway-Oriented Uses in the Project

Land Use	ITE Land Use Code	Percent of Total Traffic by Trip Type		
		Pass-By	Non-Pass-By Trips	
			Primary	Diverted Link
Pass-By, Diverted Link, and Primary Trip Data from ITE Trip Generation				
Supermarket (Grocery Store)	821	24%	48%	28%
Pharmacy / Drugstore with Drive-Through	881	51%	40%	14%
High Turnover Sit-Down Restaurant	932	43%	37%	20%
Fast Food Restaurant with Drive-Through (AM Peak)	934	50%	27%	28%
Fast Food Restaurant with Drive-Through (PM Peak)		55%	30%	19%
Convenience Store/Gas Station (AM Peak)	945	70%	18%	22%
Convenience Store/Gas Station (PM Peak)		70%	16%	28%
Total PM Peak Hour Pass-By, Diverted Link, and Primary Trips Estimated for the Proposed Project				
Estimated Proportion of Trips by Type for Project Land Uses: Supermarket, pharmacy/drugstore with drive-through, high turnover sit-down restaurant, fast food restaurant with drive-through, and convenience market with gas station.	821, 881, 932, 934, 945	45%	32%	23%
Source: Institute of Transportation Engineers Trip Generation manual, 11th Edition. Appendix of land uses with vehicle pass-by rates and diverted link trip data compiled as of 2021.				

Table 3 also presents the proportion of the project's estimated PM peak hour trips (averaged across all the project's freeway-oriented uses) into the three trip types: pass-by (45%), diverted-link (23%) and primary (32%). This breakdown is applied to the project's estimated trip generation used in evaluating intersection level of service.

Conclusion of the VMT Screening Assessment for the Proposed Glen Helen Commercial Project

The preceding paragraphs presented the guidance prepared by the Governor's Office of Planning and Research (OPR) adopted by the county and incorporated (slightly modified) into their current VMT screening criteria. The discussion in this section focuses on the criterion demonstrating that local serving retail under 50,000 square feet (per building) can be presumed to have a less-than-significant VMT impact.

This assessment presents evidence that the proposed project meets the definition of local serving retail as well as freeway-oriented commercial (a sub-classification of local serving retail) that further reduces the VMT produced by the project when compared to a project alternative without freeway-oriented land uses. The assessment also recognizes the project's component of primary trips (which will be analyzed in the LOS conformance analysis) but contends that it does not alter the conclusion that the project is locally-serving retail and subject to the county's screening criteria.

Based on the information provided in this section, the proposed project is comprised of local serving retail with buildings under 50,000 square feet which satisfy the county's criterion that local serving retail under 50,000 square feet (per building) is presumed to have a less-than-significant impact and does not require a detailed VMT analysis under CEQA.

We are pleased to have been of assistance to you in processing and obtaining approval for your project. If you have any questions or comments, please feel free to contact me at 909-912-7304.

Sincerely,

DAVID EVANS AND ASSOCIATES, INC.

James M. Daisa, PE
Senior Transportation Project Manager/Associate

Attachments:
- Exhibit A: Vicinity Map
- Exhibit B: Site Plan
- Exhibit C1: Primary Project Trip Generation
- Exhibit C2: Diverted Link Project Trip Generation
- Exhibit D1: Primary Project Trips
- Exhibit D2: Diverted Link Project Trips
- Exhibit D3: Pass-by Project Trips
- Exhibit E: Total Combined Project Trips
- Exhibit F: San Bernardino County Scope for Traffic Study

N
NOT TO SCALE

DAVID EVANS AND ASSOCIATES INC.

EXHIBIT A: VICINITY MAP
COMMERCIAL DEVELOPMENT
IN GLEN HELEN
SAN BERNARDINO COUNTY, CALIFORNIA

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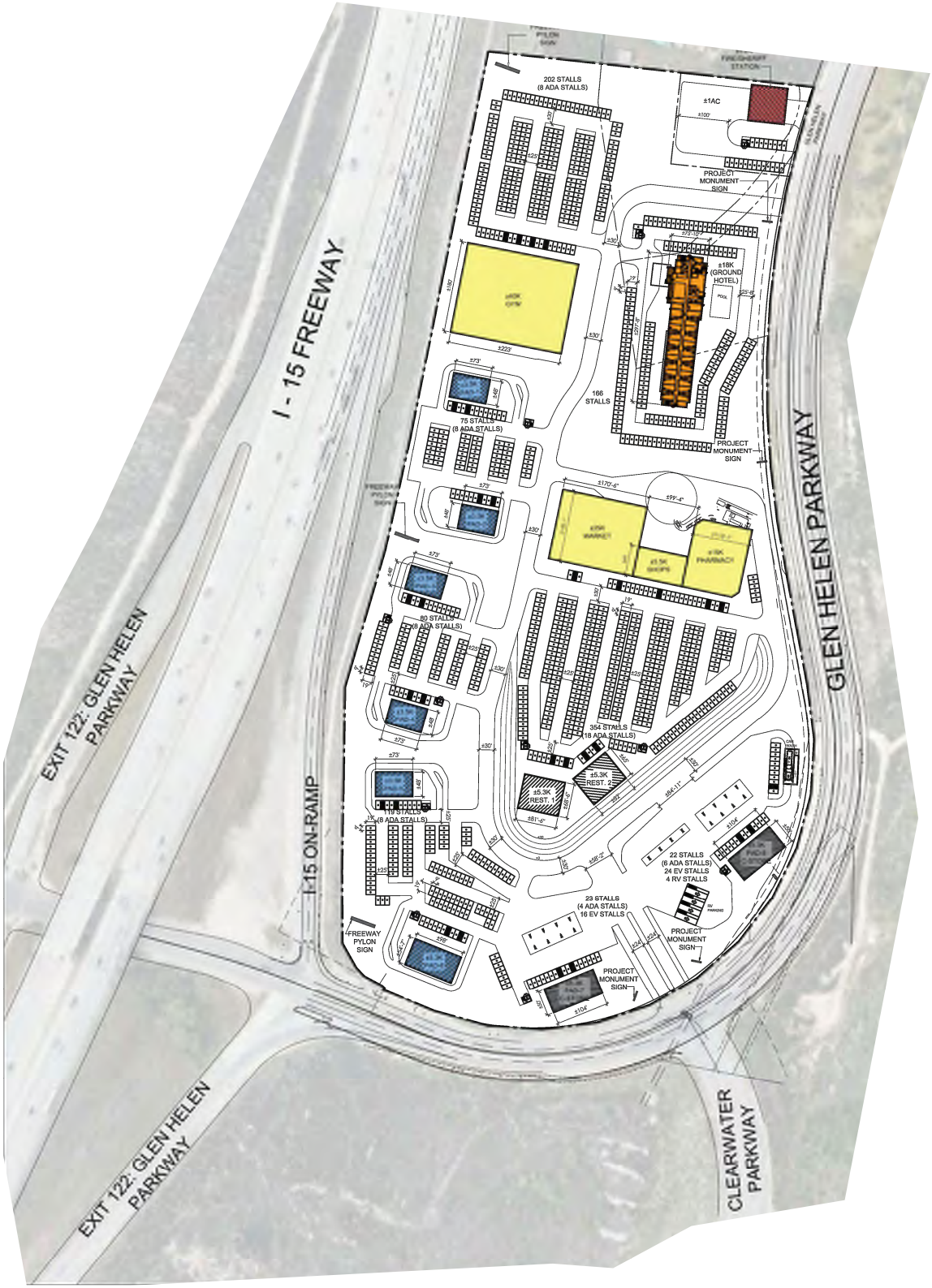

DAVID EVANS AND ASSOCIATES INC.

EXHIBIT B: SITE PLAN
COMMERCIAL DEVELOPMENT
IN GLEN HELEN
SAN BERNARDINO COUNTY, CALIFORNIA

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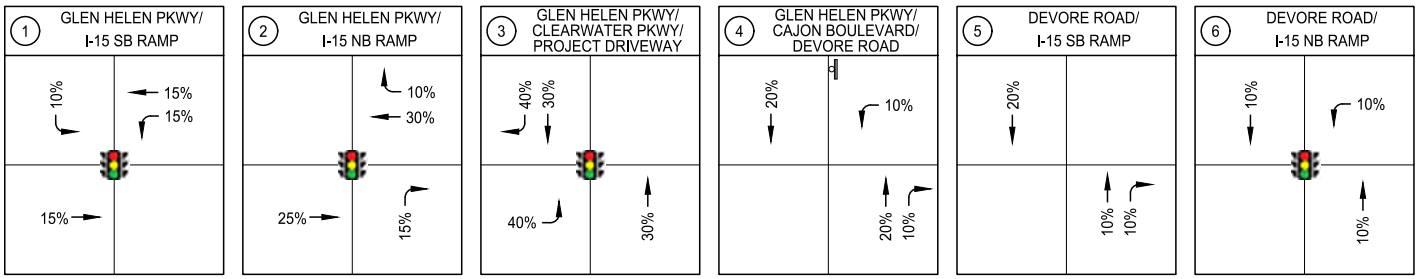

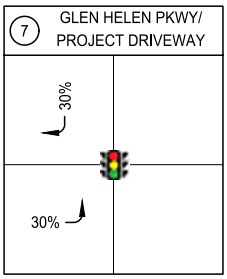

LEGEND

XX% - GENERAL PROJECT TRIP DISTRIBUTION

XX% - SPECIFIC PROJECT TRIP PERCENTAGE

(#) - STUDY INTERSECTIONS

- STOP CONTROLLED INTERSECTION

- SIGNAL CONTROLLED INTERSECTION

DAVID EVANS AND ASSOCIATES INC.

EXHIBIT C1: PRIMARY PROJECT TRIP DISTRIBUTION
COMMERCIAL DEVELOPMENT
IN GLEN HELEN
SAN BERNARDINO COUNTY, CALIFORNIA

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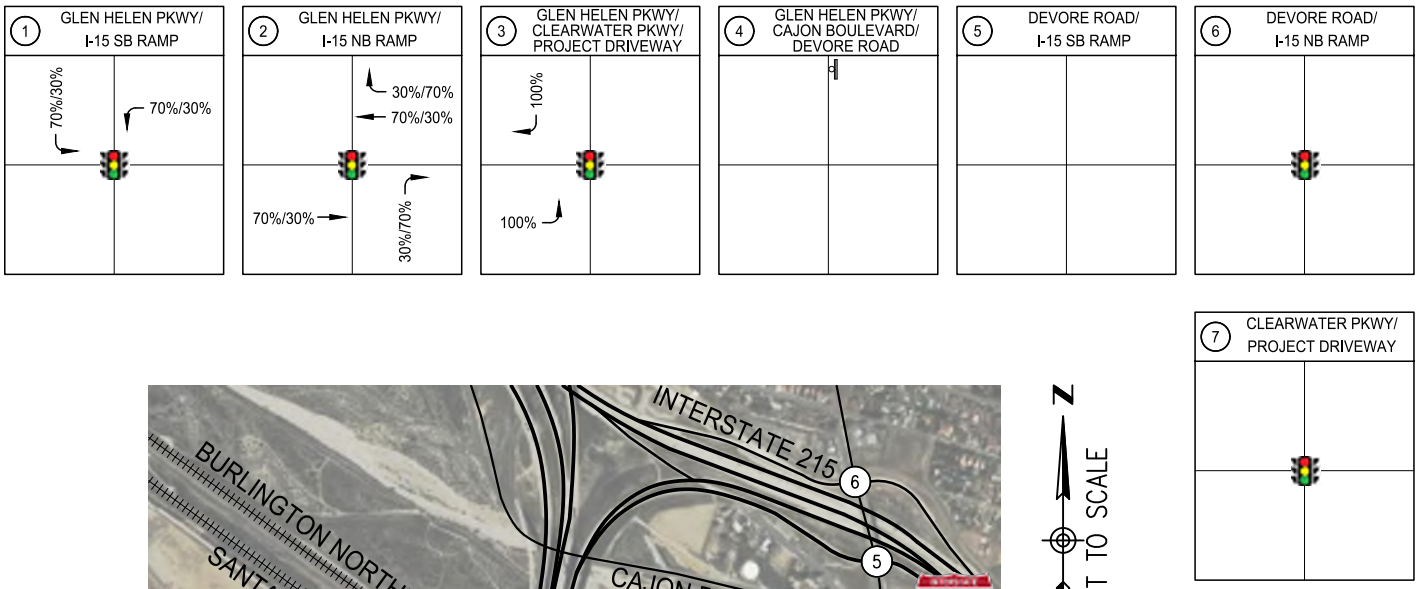

SUPRCEDED SEE APPENDIX D

N

NOT TO SCALE

LEGEND

XX% / XX% - GENERAL DIVERTED LINK PROJECT FRI PEAK/SUN PEAK TRIP DISTRIBUTION

XX% / XX% - SPECIFIC DIVERTED LINK PROJECT FRI PEAK/SUN PEAK TRIP PERCENTAGE

(#) - STUDY INTERSECTIONS

- STOP CONTROLLED INTERSECTION

- SIGNAL CONTROLLED INTERSECTION

DAVID EVANS AND ASSOCIATES INC.

EXHIBIT C-2: DIVERTED-LINK PROJECT TRIP DISTRIBUTION
COMMERCIAL DEVELOPMENT
IN GLEN HELEN
SAN BERNARDINO COUNTY, CALIFORNIA

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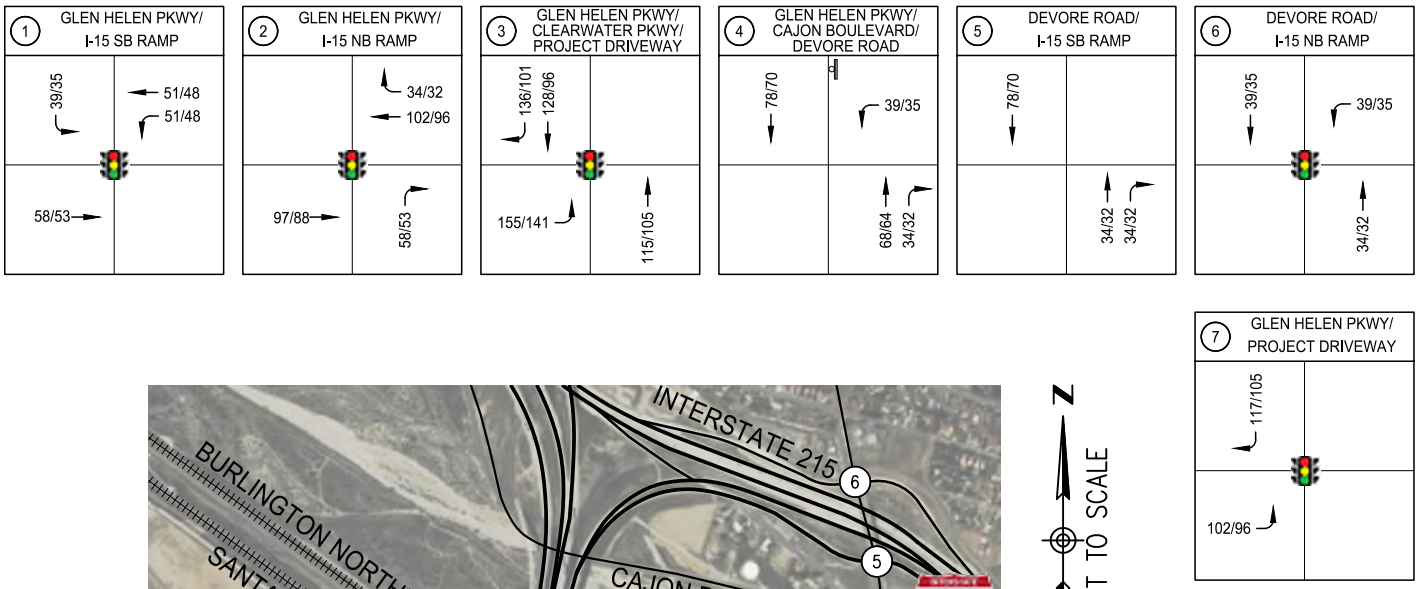

SUPRCEDED SEE APPENDIX D

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NOT TO SCALE

PRIMARY PROJECT TRIPS

AM PEAK HOUR TRIPS - 381 IN / 334 OUT
PM PEAK HOUR TRIPS - 349 IN / 320 OUT

LEGEND

XX/XX - AM/PM PRIMARY PROJECT TRIPS
(#) - STUDY INTERSECTIONS
- STOP CONTROLLED INTERSECTION
- SIGNAL CONTROLLED INTERSECTION

DAVID EVANS AND ASSOCIATES INC.

EXHIBIT D1: PRIMARY PROJECT TRIPS
COMMERCIAL DEVELOPMENT
IN GLEN HELEN
SAN BERNARDINO COUNTY, CALIFORNIA

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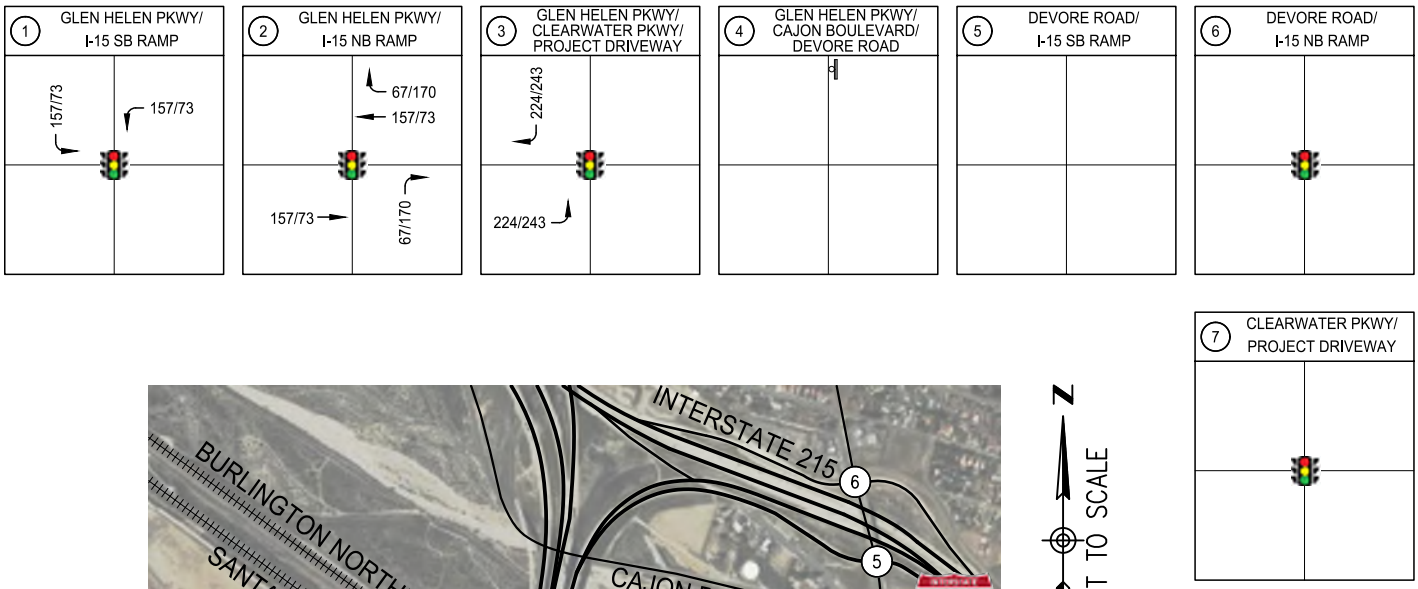

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NOT TO SCALE

SUPRCEDED SEE APPENDIX D

DIVERTED-LINK PROJECT TRIPS

AM PEAK HOUR TRIPS	- 223 IN / 218 OUT
PM PEAK HOUR TRIPS	- 242 IN / 235 OUT

LEGEND

XX/XX - AM/PM DIVERTED-LINK PROJECT TRIPS

(#) - STUDY INTERSECTIONS

- STOP CONTROLLED INTERSECTION

- SIGNAL CONTROLLED INTERSECTION

DAVID EVANS AND ASSOCIATES INC.

EXHIBIT D2: DIVERTED-LINK PROJECT TRIPS
COMMERCIAL DEVELOPMENT
IN GLEN HELEN
SAN BERNARDINO COUNTY, CALIFORNIA

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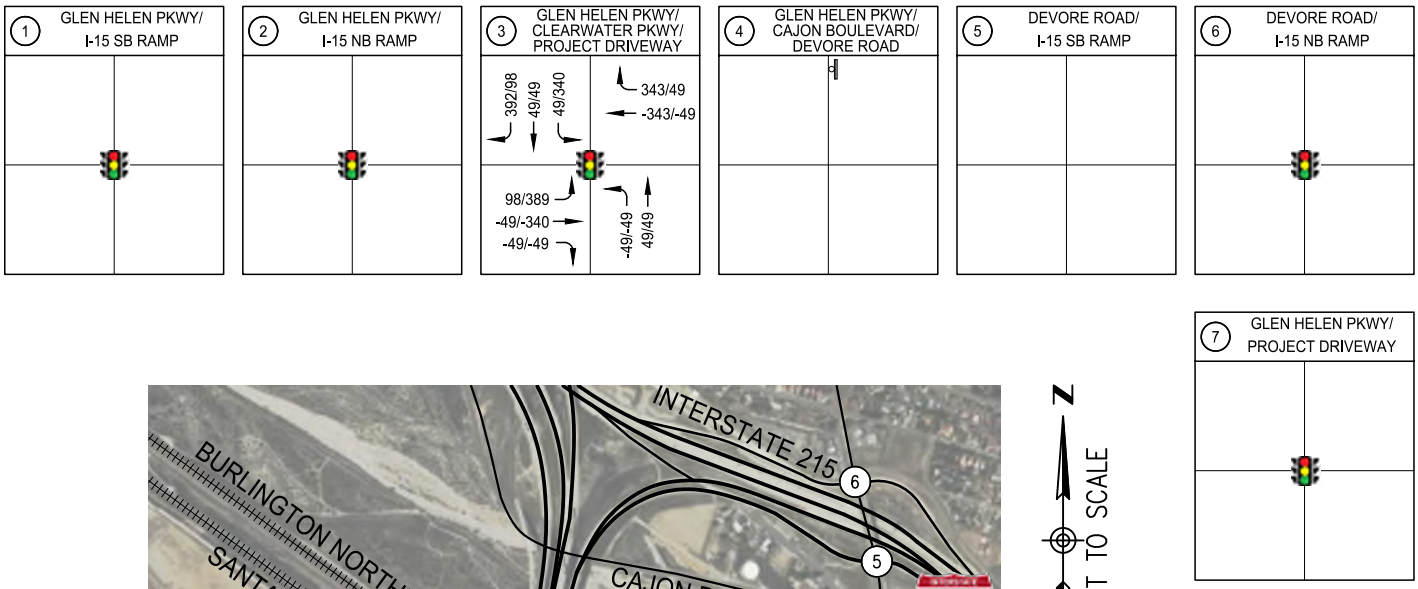


N

NOT TO SCALE

SUPPRCEDED SEE APPENDIX D

PASS BY PROJECT TRIPS

AM PEAK HOUR TRIPS - 490 IN / 482 OUT
PM PEAK HOUR TRIPS - 485 IN / 466 OUT

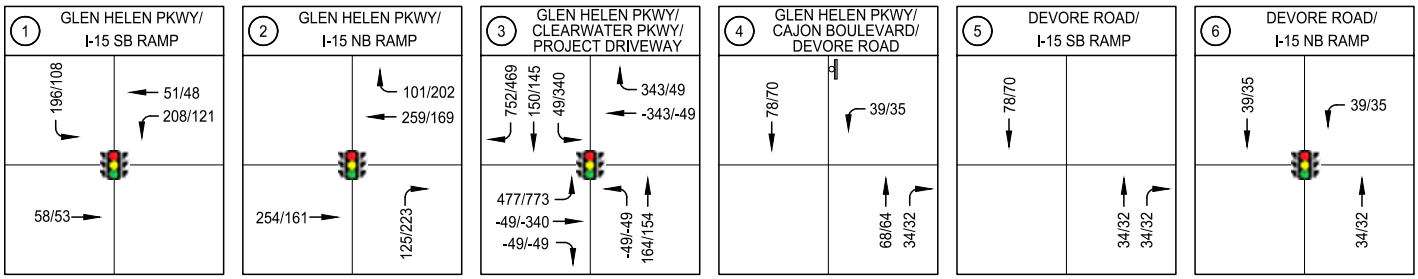
LEGEND

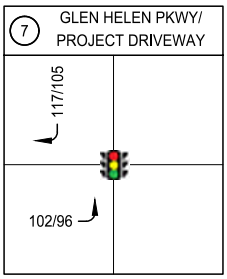
XX/XX - AM/PM PASS-BY PROJECT TRIPS
(#) - STUDY INTERSECTIONS
- STOP CONTROLLED INTERSECTION
- SIGNAL CONTROLLED INTERSECTION

DAVID EVANS AND ASSOCIATES INC.

EXHIBIT D3: PASS-BY PROJECT TRIPS
COMMERCIAL DEVELOPMENT
IN GLEN HELEN
SAN BERNARDINO COUNTY, CALIFORNIA

Drawing Name: P:\U\UCRG215T0003\0400CAD\TT\EXHIBITS\Scope Agreement\Exhibit D3.dwg
Last Opened: Nov 22, 2022 - 7:51am by: Pab





N

NOT TO SCALE

SUPRCEDED SEE APPENDIX D

TOTAL PROJECT TRIPS

AM PEAK HOUR TRIPS - 1,094 IN / 1,034 OUT
PM PEAK HOUR TRIPS - 1,076 IN / 1,021 OUT

LEGEND

XX/XX - AM/PM TOTAL PROJECT TRIPS

(#) - STUDY INTERSECTIONS

- STOP CONTROLLED INTERSECTION

- SIGNAL CONTROLLED INTERSECTION

DAVID EVANS AND ASSOCIATES INC.

EXHIBIT E: TOTAL PROJECT TRIPS
COMMERCIAL DEVELOPMENT
IN GLEN HELEN
SAN BERNARDINO COUNTY, CALIFORNIA

Drawing Name: P:\U\UCRG215T0003\0400CAD\TT\EXHIBITS\Scope Agreement\Exhibit E.dwg
Last Opened: Nov 22, 2022 - 7:53am by: Pab

EXHIBIT F
SCOPE FOR TRAFFIC STUDY

Project Name:	Glen Helen Parkway Commercial Center

This Scope for Traffic Study acknowledges San Bernardino County Department of Public Works, Traffic Division requirements of traffic impact analysis for the project and is subject to change:

Project Address:	APNs 0239-031-04, 0239-031-32 [County-owned}, 0239-031-37 and 0239-031-50		
Project Description:	The project, located on a 33-acre site, consists of a mix of commercial land uses totaling, in aggregate, 201,500 square feet of retail and service uses, plus a 5,200 square foot fire station.		
City:	San Bernardino County		
Project Buildout Year:	2024	**Ambient Growth Rate per Year:**	2%
Closest Intersection (Xtn) to the Project			
Xtn N/S Street Name:	Glen Helen Parkway		
Xtn E/W Street Name:	I-15 Freeway NB Ramps		
Thomas Guide Pg+Grid:		**County Supervisorial District:**	1

	Engineer	**Developer**
Company:	David Evans and Associates, Inc	215 Table Top, LLC.
Name:	James M. Daisa, PE Senior Project Manager	Mr. Jim Mauge
Address:	4141 E. Inland Empire Boulevards, Suite 250	PO Box 9716
City, State, Zip Code:	Ontario, CA 91764	Redlands, Ca 92375
Phone #:	909.912.7304	310.722.8692
Fax #:		
Email:	jim.daisa@deainc.com	jimmauge@gmail.com

By:	**Reviewed By:**
Print Name:	**Print Name:**
Consultant/Developer's Representative **Date**	**Traffic Division Representative** **Date**

EXHIBIT F
SCOPE FOR TRAFFIC STUDY

Project Name:	Glen Helen Parkway Commercial Center

1. Traffic Distribution: Please insert or attach Figure(s) illustrating project trip distribution in percentages and volumes at the study intersections analyzed. See attached scope Exhibits C-1 through E.

2. Trip Credit: Exact amount of credit subject to approval by Traffic Division.

Transportation Demand Management (TDM)	Yes/no	
Existing Active Land Use	Yes/no	
Previous Land Use	Yes/no	
Internal Trip Reduction	Yes/no	10%
Pass-by Trip Reduction	Yes/no	See attached scope varies by land use
Diverted-Link Trip Percentage	Yes/no	See attached scope varies by land use

3. Related Projects: Consultant should check with Planning in the San Bernardino County Department of Land Use Services and planning departments of adjoining Cities. Documentation of the consultation from these agencies shall be included in the traffic study. Related projects list shall be submitted to Traffic Division for our review and approval before being incorporated in the study.

4. Freeway Analysis: The potential traffic impact on the following Freeway(s) must be considered.

_____

_____

_____

The applicant shall consult with the State of California Department of Transportation (Caltrans) to determine the California Environmental Quality Act levels of significance with regard to traffic impacts on Caltrans' freeway facilities. This consultation shall also include a determination of Caltrans requirements for the study of traffic impacts to its facilities and the mitigation of any such impacts. This analysis must follow the most current Caltrans' Guide for the Preparation of Traffic Impact Studies (December 2002) and can be obtained from http://www.dot.ca.gov/hq/traffops/developserv/operationalsystems/reports/tiguide.pdf. If Caltrans finds that the project has a significant impact on the freeway, Caltrans shall be requested to include the basis for this finding in their response. If fees are proposed to mitigate the freeway impact, Caltrans shall be requested to identify the specific project to which the fees will apply. These written comments from Caltrans shall be included with the traffic study and submitted to Public Works for review and approval. If a documented good faith effort is made to consult with Caltrans and written comments cannot be obtained from within a reasonable amount of time, an analysis of the freeway impact shall be made using HCM procedures. Appendix A of the SANBAG CMP outlines allowable modifications to these procedures. The SANBAG CMP can be viewed online at:
http://www.sanbag.ca.gov/planning/subr_congestion.html

EXHIBIT G: SCOPE FOR TRAFFIC STUDY

Project Name:	Glen Helen Parkway Commercial Center

5. Trip Generation

Trip Generation Rate(s) Source: ITE Trip Generation		**I – Institute of Transportation Engineers; S – San Diego Traffic Generators; C – County; O – Other:**						**Edition:**		11th	
Land Use Code	**Land Use**	**Rate Based on**	**Qty**	***AVTE vs**	**ADT**	AM peak		PM peak		Weekend peak	
						In	Out	In	Out	In	Out
LU 310	Hotel	Peak Hour of Adjacent Street Traffic	130	Rooms	935	29	24	36	34		
LU 492	GYM	Peak Hour of Adjacent Street Traffic	40.0	Per 1,000 Sq. Ft. GLA	1,242[1]	24	23	71	54		
LU 821	Shopping Plaza (40-150k) - Supermarket - Yes	Peak Hour of Adjacent Street Traffic	30.5	Per 1,000 Sq. Ft. GLA	2,594	61	37	119	129		
				Diverted Link Trips (0%/0%/29%)	0	0	0	40	44		
				Pass-by Trips (0%/0%/29%)	0	0	0	40	44		
				Primary Trips (100%/100%/42%)	2,594	61	37	49	53		
LU 881	Pharmacy/Drugstore with Drive-Through Window	Peak Hour of Adjacent Street Traffic	15.0	Per 1,000 Sq. Ft. GLA	1,463	27	25	70	70		
				Diverted Link Trips (0%/0%/13%)	0	0	0	9	9		
				Pass-by Trips (0%/0%/49%)	0	0	0	34	34		
				Primary Trips (100%/100%/38%)	1,463	27	25	27	27		
LU 945	Convenience Store/Gas Station (VFP 16-24)	Peak Hour of Adjacent Street Traffic	10.6	Per 1,000 Sq. Ft. GLA	12,244	437	437	377	377		
				Diverted Link Trips (0%/21%/31%)	0	92	92	117	117		
				Pass-by Trips (0%/63%/57%)	0	275	275	215	215		
				Primary Trips (100%/16%/12%)	12,244	69	69	45	45		
LU 934	Fast-Food Restaurant with Drive-Through Window	Peak Hour of Adjacent Street Traffic	22.8	Per 1,000 Sq. Ft. GLA	9,593	467	448	353	326		
				Diverted Link Trips (0%/21%/31%)	0	131	125	67	62		
				Pass-by Trips (0%/63%/57%)	0	215	206	180	166		
				Primary Trips (100%/16%/12%)	9,593	121	116	106	98		
LU 932	High-Turnover (Sit-Down) Restaurant	Peak Hour of Adjacent Street Traffic	10.6	Per 1,000 Sq. Ft. GLA	1,023	51	42	53	34		
				Diverted Link Trips (0%/0%/26%)	0	0	0	14	9		
				Pass-by Trips (0%/0%/38%)	0	0	0	21	13		
				Primary Trips (100%/100%/36%)	1,023	51	42	18	12		
				Adjusted Sub-Total Trips	29,094	1,094	1,034	1,076	1,021		
				Diverted Link Trips	0	223	218	242	235		
				Pass-by Trips	0	490	482	485	466		
				Primary Trips	**29,094**	381	334	349	320		

* - Average Vehicle Trip Ends. For ITE Land Uses provide number and name of Land Use. e.g. LU 814 - Variety Store

[1] The ITE Trip Generation Manual does not provide an ADT rate for the Fitness Center (LU - ITE 492). The ADT provided is an estimated value of 10 times the PM peak hour rate.

EXHIBIT G: SCOPE FOR TRAFFIC STUDY

Project Name:	Glen Helen Parkway Commercial Center

6. Study Intersections: At minimum, the study shall include the following intersections. The list is subject to change after related projects, trip generation and distribution are determined. Consultant should check with adjoining Cities regarding their requirements in addition to the following County/City intersections. Documentation of the consultation from these agencies shall be included in the traffic study.

Xtn #	% County	Thomas Guide Page+Grid	N/S/E/W Street Name	City	Signalized	CMP
1	50%		1. Glen Helen Pkwy / I-15 SB Ramps	San Bernardino County / Caltrans	Yes/no	Yes/no
2	50%		2. Glen Helen Pkwy / I-15 NB Ramps	San Bernardino County / Caltrans	Yes/no	Yes/no
3	100%		3. Glen Helen Pkwy / Clearwater Pkwy / Project Dwy "A"	San Bernardino County	Yes/no	Yes/no
4	100%		4. Glen Helen Pkwy / Devore Rd/Cajon Blvd	San Bernardino County	Yes/no	Yes/no
5	50%		5. Devore Rd / I-215 SB Ramps	San Bernardino County / Caltrans	Yes/no	Yes/no
6	50%		6. Devore Rd / I-215 NB Ramps	San Bernardino County / Caltrans	Yes/no	Yes/no
7	100%		7. Glen Helen Pkwy / Project Dwy "B"	San Bernardino County	Yes/no	Yes/no
8					Yes/no	Yes/no
9					Yes/no	Yes/no
10					Yes/no	Yes/no

Cities to be consulted: _____

7. Other:

Traffic counts may be conducted immediately per the following:
• Must be taken on Tuesdays, Wednesdays or Thursdays.
• Must exclude holidays, and the first weekdays before and after the holiday.
• Must be taken on days when local schools or colleges are in session.
• Must be taken on days of good weather, and avoid atypical conditions (e.g., road construction, detours, or major traffic incidents).
• Traffic counts used for other traffic studies in the area shall **NOT** be reused again, unless 25% of the counts conducted for that particular traffic study are validated with new counts. The difference in volumes between the old and new counts at each corresponding movement should not be more than 10%.
• New traffic counts shall be checked to ensure the difference in volumes at corresponding approaches, if applicable, between two adjacent intersections is no more than 10% unless the difference can be justified.
• For all proposed mitigation measures, a conceptual plan for the improvements shall be submitted to our Traffic Studies section for review and approval prior to the approval of the Traffic Impact Analysis. All proposed improvements shall be within the right-of-way.
• For all cumulative mitigation measures, a cost estimate for the improvement shall be submitted.

This analysis must follow the most current Traffic Impact Study Guidelines for the County as stated in the County's Road Planning and Design Standards.

8. Fees

The County charges on an actual cost basis for review of traffic studies. An initial deposit of $3400 is required at the time that a land use application is filed with the Department of Land Use Services If the review costs exceed the initial deposit, the applicant will be expected to provide additional funds and the review will be suspended until the additional funds are deposited.

9. Contact Information:

Please submit a signed copy of this scope for approval by the Traffic Division. Draft scopes may be sent electronically. Final scope with signature should be submitted in person or by US Mail to:

County of San Bernardino
Dept. of Public Works, Traffic Division
825 E. 3rd Street, Rm 115
San Bernardino, CA 92415-0835

Phone: 909-387-8186
Fax: 909-387-7809
Email: Anthony.Pham@dpw.sbcounty.gov

Appendix B: Turn Movement Count Volumes

COUNTY OF SAN BERNARDINO –
DEPARTMENT OF PUBLIC WORKS
TRAFFIC ENGINEERING DIVISION
(909) 387-8186

REVIEW SUBMITTAL NUMBER: 2nd Submittal		**PROJECT: Traffic Study dated 04/12/23 for the Glen Helen Parkway Commercial Center**
REVIEWER: Eric Valencia	**SUPERVISOR: Osvaldo Roque, P.E.**	**LOCATION: Glen Helen Parkway at Clearwater Parkway, Devore APN: 0239-031-04; TRSTY-2022-00035; PROJ-2023-00012**
REVIEW TYPE: ☒ LAND DEV. ☐ PERMITS ☐ OTHER		**CONSULTANT: DAVID EVANS AND ASSOCIATES INC**
DATE: April 18, 2023	**RETURN DATE:**	**CONTACT INFO: Jim Daisa, O: (909) 912-7304 C: (925) 586-7075**

No.	Page	Comment	Initial Disp.	Response	Final Disp.	LS or NDC
1	Figure 3, Appendix B	Existing traffic volumes do not coincide with traffic counts on Appendix B. Verify that exhibit and calculation sheets match traffic counts, or elaborate procedure if traffic counts were processed (ambient growth, pce, etc.). 2nd Request.		The volumes shown in Figure 3 have been "balanced" between intersections. The process we use was described in our response to Comment #3 in your April 4, 2023, comments on your 1st submittal review of the February 20, 2023, draft report. Comment #2 in your April 4, 2023, review is the same as this comment and should have referenced our response to Comment #3. For each study intersection, Appendix C (which provides capacity analysis worksheets) provides a two-page worksheet which contains our balancing process and produces the balanced traffic volumes used in the analysis and presented in the figures. See Attachments 1 & 2 for an explanation of the source of balanced traffic volumes and where the data is in the report. After this was explained to county staff, they agreed there is no error.		
2	Figures 5-8, Appendix C	Traffic volumes/calculations on identified pages are based on existing volumes which do not coincide with counts contained in Appendix B. 2nd Request.		See response to Comment #1		

DESIGNERS INITIAL DISPOSITION CODES: **C** = Will Comply **D** = Discuss **N** = No Change **A** = Agency Action
REVIEWERS FINAL DISPOSITION CODES: **D** = Done or Approved **NC**= Not Complied **NCR** = No Change Required
LS =Revise in Later Submittal **NDC =** Revise Immediately

ATTACHMENT 1

THESE TWO PAGES ARE PROVIDED FOR EACH STUDY INTERSECTION AND ARE LOCATED IN APPENDIX C

PAGE 1 SUMMARIZES THE TRAFFIC VOLUMES DEVELOPED FOR EACH STAGE OF THE FORECASTING PROCESS FOR EACH SCENARIO BEING ANALYZED.

PAGE 2 IS USED TO BREAK OUT TRUCK AND AUTOMOBILE VOLUMES, CALCULATE TRUCK PERCENTAGES, AND PRESENTS THE BALANCED TRAFFIC VOLUMES USED IN THE ANALYSES AND REPORT FIGURES.

DAVID EVANS AND ASSOCIATES INC.

PAGE 1

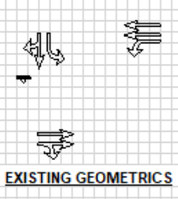
SUBJECT	BY	DATE	JOB NO.	SHEET	OF
TURN MOVEMENTS	TM	19-Apr-23	UCRG215T-0003	1	2

E/W STREET : GLEN HELEN PKWY
N/S STREET : I-15 SB RAMPS
CONDITION : AM PEAK HOUR

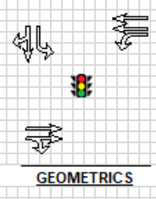
INTERSECTION : 1
PROJECTED GROWTH PER YEAR : 2.0%

CONDITION DIAGRAMS

Balanced Existing Volumes from Page 2



EXISTING GEOMETRICS



GEOMETRICS

TURN MOVEMENTS

Condition	Existing Condition	Ambient Growth	Other Area Project Trips	Background Condition	Project Trips	Project Condition	Cumulative Condition	Cumulative + Project Condition
Scenario #	1			3		5	7	9
GLEN HELEN PKWY								
EB LEFT	0	0	0	0	0	0	0	0
EB THRU	72	7	13	92	58	150	77	135
EB RIGHT	18	2	0	20	0	20	33	33
WB LEFT	373	37	37	447	208	655	605	813
WB THRU	56	6	14	76	51	127	75	126
WB RIGHT	0	0	0	0	0	0	0	0
I-15 SB RAMPS								
NB LEFT	0	0	0	0	0	0	0	0
NB THRU	0	0	0	0	0	0	0	0
NB RIGHT	0	0	0	0	0	0	0	0
SB LEFT	85	9	13	107	196	303	141	337
SB THRU	3	0	0	3	0	3	9	9
SB RIGHT	25	3	0	28	0	28	55	55
TOTALS	**632**	**64**	**77**	**773**	**513**	**1286**	**995**	**1508**

DAVID EVANS AND ASSOCIATES INC.

PAGE 2

SUBJECT	BY	DATE	JOB NO.	SHEET	OF
TURN VOLUME SUMMARY	TM	19-Apr-23	UCRG215T-0003	2	2

E/W STREET : GLEN HELEN PKWY
CONDITION : AM PEAK HOUR

N/S STREET : I-15 SB RAMPS
PHF : 0.93

Balanced Existing Volumes Shown in Figure 3. See Attachment 2 for the traffic volume balancing worksheet

Unbalanced Raw Traffic Counts

NORTH LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
5	0	18	0	0	0	0	0	1	0	1	2
5	0	23	0	0	0	0	0	0	0	0	0
7	0	20	0	0	1	0	0	0	0	0	0
2	2	16	0	0	0	1	0	1	5	0	3

SOUTH LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0

EAST LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
0	12	110	0	0	0	0	0	0	0	1	2
0	18	96	0	2	0	0	0	0	0	0	3
0	14	90	0	0	0	0	0	0	0	1	0
0	7	69	0	0	0	0	1	0	0	0	2

WEST LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
0	8	0	0	0	0	0	0	0	0	2	0
2	17	0	0	1	0	0	0	0	0	2	0
9	20	0	0	0	0	0	0	0	0	1	0
7	18	0	0	0	0	0	1	0	0	2	0

	Truck Volumes	Auto Volumes	Totals	Truck Percentage	Balanced Totals
GLEN HELEN PKWY					
EB LEFT	0	0	0	0%	0
EB THRU	9	63	72	13%	72
EB RIGHT	0	18	18	1%	18
WB LEFT	7	365	372	2%	373
WB THRU	5	51	56	9%	56
WB RIGHT	0	0	0	0%	0
I-15 SB RAMPS					
NB LEFT	0	0	0	0%	0
NB THRU	0	0	0	0%	0
NB RIGHT	0	0	0	0%	0
SB LEFT	8	77	85	9%	85
SB THRU	1	2	3	33%	3
SB RIGHT	6	19	25	24%	25

Existing raw traffic counts broken down by trucks and autos

From Figure 3

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: I-15 SB RAMPS
EAST-WEST STREET: GLEN HELEN PKWY
JURISDICTION: DEVORE

DATE: 11-29-22

PEAK HOUR: 07:15AM

NORTH LEG

	Rt	Thru	Lt	
TOTAL: 113	25	3	85	Total
	5	1	21	1st
	5	0	23	2nd
	7	0	21	3rd
	8	2	20	4th

EAST LEG TOTAL: 428

	1st	2nd	3rd	4th	Total
Rt					
Thru	13	20	15	8	56
Lt	112	99	90	71	372

	Total	1st	2nd	3rd	4th
Lt					
Thru	72	10	20	21	21
Rt	18	0	2	9	7

WEST LEG TOTAL: 90

PEAK HOUR FACTORS

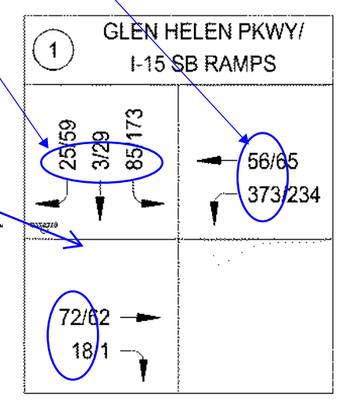
NORTH LEG = 0.94
SOUTH LEG =
EAST LEG = 0.86
WEST LEG = 0.75

ALL LEGS = 0.93

	Lt	Thru	Rt

TOTAL: 0

SOUTH LEG



Prepared by NEWPORT TRAFFIC STUDIES

ATTACHMENT 2

Existing Traffic Volumes Balance Worksheet

1

Raw Count Data

		25	3	85			
		59	29	173			
0	0					0	0
72	62		1			56	59
18	1					372	211
		0	0	0			
		0	0	0			

Directional Volume Comparison

Int #	1	2
EB	157	148
EB	235	234
WB	428	429
WB	270	268

Balanced Existing Count Volume for Figure 3

		25	3	85			
		59	29	173			
0	0					0	0
72	62		1			56	65
18	1					373	234
		0	0	0			
		0	0	0			

Directional Volume Check

Int #	1	2
EB	157	157
EB	235	235
WB	429	429
WB	299	299

2

Raw Count Data

		0	0	0			
		0	0	0			
70	61					183	63
78	173		2			421	262
0	0					0	0
		8	7	140			
		6	8	321			

Int #	2	3
EB	218	210
EB	494	444
WB	604	576
WB	325	364

Balanced Existing Count Volume for Figure 3

		0	0	0			
		0	0	0			
74	61					183	71
83	174		2			421	293
0	0					0	0
		8	7	140			
		6	8	321			

Int #	2	3
EB	223	223
EB	495	495
WB	604	604
WB	364	364

3

Raw Count Data

		0	0	0			
		0	0	0			
0	0					0	0
78	210		3			97	167
132	234					46	64
		479	0	73			
		197	0	50			

Int #	3	8
NB	151	156
NB	260	284
SB	143	148
SB	231	231

Balanced Existing Count Volume for Figure 3

		0	0	0			
		0	0	0			
0	0					0	0
83	234		3			102	167
140	261					46	64
		502	0	73			
		197	0	50			

Int #	3	8
NB	156	156
NB	284	284
SB	148	148
SB	231	231

4

Raw Count Data

		53	69	33			
		261	74	27			
139	68					37	16
7	21		4			5	6
42	141					8	8
		37	64	14			
		157	120	9			

Int #	4	5
NB	240	236
NB	204	221
SB	155	156
SB	362	365

Balanced Existing Count Volume for Figure 3

		53	70	33			
		264	74	27			
139	74					37	17
7	21		4			5	6
42	141					8	8
		37	64	14			
		157	130	9			

Int #	4	5
NB	240	240
NB	221	221
SB	156	156
SB	365	365

5

Raw Count Data

		0	91	71			
		0	146	48			
36	115					0	0
2	1		5			0	0
65	219					0	0
		0	58	178			
		0	138	83			

Int #	5	6
NB	94	94
NB	253	253
SB	162	162
SB	194	194

Balanced Existing Count Volume for Figure 3

		0	91	71			
		0	146	48			
36	115					0	0
2	1		5			0	0
65	219					0	0
		0	58	182			
		0	138	83			

Int #	5	6
NB	94	94
NB	253	253
SB	162	162
SB	194	194

6

Raw Count Data

		15	75	0			
		45	62	0			
0	0					23	28
0	0		6			1	5
0	0					87	132
		56	38	0			
		142	111	0			

Balanced Existing Count Volume for Figure 3

		15	75	0			
		45	62	0			
0	0					23	28
0	0		6			1	5
0	0					87	132
		56	38	0			
		142	111	0			

8

		2	116	2			
		2	219	2			
2	14					2	2
2	2		8			2	2
30	10					2	2
		43	111	2			
		2	280	2			

Int #	8	4
NB	156	115
NB	284	286
SB	120	119
SB	223	223

Balanced Existing Volume for Figure 3

		2	116	2			
		2	219	2			
2	14					2	2
2	2		8			2	2
30	10					2	2
		43	111	2			
		2	280	2			

Int #	8	4
NB	115	115
NB	296	296
SB	120	120
SB	223	223

Intersection numbers correspond to the intersection numbering convention used in the report

Note the volumes shown in red denote the directional volume that is the higher value between the two intersections. The count volumes are factored to this volume to balance

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: I-15 SB RAMPS
EAST-WEST STREET: GLEN HELEN PKWY
JURISDICTION: DEVORE

DATE: 11-29-22

PEAK HOUR: 07:15AM

NORTH LEG

TOTAL: 113

	Rt	Thru	Lt
Total	25	3	85
1st	5	1	21
2nd	5	0	23
3rd	7	0	21
4th	8	2	20

EAST LEG TOTAL: 428

	1st	2nd	3rd	4th	Total
Rt					
Thru	13	20	15	8	56
Lt	112	99	90	71	372

	Total	1st	2nd	3rd	4th
Lt					
Thru	72	10	20	21	21
Rt	18	0	2	9	7

WEST LEG TOTAL: 90

PEAK HOUR FACTORS

NORTH LEG = 0.94
SOUTH LEG =
EAST LEG = 0.86
WEST LEG = 0.75

ALL LEGS = 0.93

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

TOTAL: 0

SOUTH LEG

HOUR TOTAL: 631

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : I-15 SB RAMPS DEVORE

EAST-WEST STREET : GLEN HELEN PKWY 11-29-22

BEGINNING TIME : 07:00AM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
2	0	19	0	0	0	0	0	0	0	0	0	21
5	0	18	0	0	0	0	0	1	0	1	2	27
5	0	23	0	0	0	0	0	0	0	0	0	28
7	0	20	0	0	1	0	0	0	0	0	0	28
2	2	16	0	0	0	1	0	1	5	0	3	30
3	10	13	0	0	0	0	0	0	0	0	1	27
3	8	15	0	0	1	0	0	0	1	2	2	32
3	7	16	0	0	0	0	0	0	0	1	0	27
30	27	140	0	0	2	1	0	2	6	4	8	220
						SOUTH LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						EAST LEG						
0	7	71	0	0	0	0	0	0	0	0	2	80
0	12	110	0	0	0	0	0	0	0	1	2	125
0	18	96	0	2	0	0	0	0	0	0	3	119
0	14	90	0	0	0	0	0	0	0	1	0	105
0	7	69	0	0	0	0	1	0	0	0	2	79
0	4	52	0	0	0	0	1	0	0	0	4	61
0	2	40	0	0	0	0	0	0	0	1	3	46
0	11	40	0	0	0	0	0	0	0	0	1	52
0	75	568	0	2	0	0	2	0	0	3	17	667
						WEST LEG						
0	11	0	0	0	0	0	0	0	0	2	0	13
0	8	0	0	0	0	0	0	0	0	2	0	10
2	17	0	0	1	0	0	0	0	0	2	0	22
9	20	0	0	0	0	0	0	0	0	1	0	30
7	18	0	0	0	0	0	1	0	0	2	0	28
0	5	0	0	1	0	0	1	0	0	3	0	10
0	4	0	0	0	0	0	0	0	0	2	0	6
0	1	0	0	1	0	0	0	0	0	0	0	2
18	84	0	0	3	0	0	2	0	0	14	0	121

Prepared by Newport Traffic Studies

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: I-15 SB RAMPS

EAST-WEST STREET: GLEN HELEN PKWY

TIME: 07:00AM-08:00AM DATE: 11-29-22

NORTH LEG

Rt	Thru	Lt	
19	1	84	Total
2	0	19	1st
5	1	21	2nd
5	0	23	3rd
7	0	21	4th

	1st	2nd	3rd	4th	Total
Rt					
Thru	7	13	20	15	55
Lt	73	112	99	90	374

Total	1st	2nd	3rd	4th	
					Lt
64	13	10	20	21	Thru
11	0	0	2	9	Rt

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: I-15 SB RAMPS

EAST-WEST STREET: GLEN HELEN PKWY

TIME: 08:00AM-09:00AM DATE: 11-29-22

NORTH LEG

Rt	Thru	Lt	
18	30	68	Total
8	2	20	1st
3	10	14	2nd
4	10	18	3rd
3	8	16	4th

	1st	2nd	3rd	4th	Total
Rt					
Thru	8	5	3	11	27
Lt	71	56	43	41	211

Total	1st	2nd	3rd	4th	
					Lt
39	21	10	6	2	Thru
7	7	0	0	0	Rt

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: I-15 SB RAMPS
EAST-WEST STREET: GLEN HELEN PKWY
JURISDICTION: DEVORE

DATE: 11-29-22

PEAK HOUR: 05:00PM

NORTH LEG

TOTAL: 261

	Rt	Thru	Lt
Total	59	29	173
1st	8	2	42
2nd	13	3	37
3rd	21	13	33
4th	17	11	61

EAST LEG TOTAL: 270

	1st	2nd	3rd	4th	Total
Rt					
Thru	14	15	16	14	59
Lt	46	53	54	58	211

WEST LEG

	Total	1st	2nd	3rd	4th
Lt					
Thru	62	10	16	25	11
Rt		0	0	0	0

WEST LEG TOTAL: 62

PEAK HOUR FACTORS

NORTH LEG = 0.73
SOUTH LEG =
EAST LEG = 0.94
WEST LEG = 0.62

ALL LEGS = 0.86

SOUTH LEG

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

TOTAL: 0

HOUR TOTAL: 593

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : I-15 SB RAMPS DEVORE

EAST-WEST STREET : GLEN HELEN PKWY 11-29-22

BEGINNING TIME : 04:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
2	5	32	0	0	1	0	0	0	1	0	1	42
6	1	54	0	0	0	0	0	0	0	1	1	63
6	4	56	0	0	0	0	0	1	0	2	1	70
10	4	33	0	0	0	0	0	0	0	0	2	49
8	2	42	0	0	0	0	0	0	0	0	0	52
11	3	36	0	0	0	0	0	0	2	0	1	53
19	13	29	2	0	1	0	0	0	0	0	3	67
15	11	59	1	0	0	0	0	0	1	0	2	89
77	43	341	3	0	2	0	0	1	4	3	11	485
						SOUTH LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						EAST LEG						
0	4	46	0	0	1	0	0	0	0	0	1	52
0	12	66	0	0	0	0	0	1	0	0	1	80
0	8	70	0	0	0	0	0	0	0	0	8	86
0	7	48	0	0	0	0	0	1	0	0	4	60
0	14	46	0	0	0	0	0	0	0	0	0	60
0	13	51	0	0	1	0	0	0	0	2	1	68
0	15	53	0	0	1	0	0	0	0	1	0	70
0	14	53	0	0	0	0	0	1	0	0	4	72
0	87	433	0	0	3	0	0	3	0	3	19	548
						WEST LEG						
1	7	0	0	0	0	0	1	0	0	0	0	9
1	11	0	0	0	0	0	0	0	0	0	0	12
0	9	0	0	0	0	0	0	0	0	0	0	9
0	13	0	0	0	0	0	0	0	0	0	0	13
0	9	0	0	1	0	0	0	0	0	0	0	10
0	15	0	0	0	0	0	0	0	0	1	0	16
0	25	0	0	0	0	0	0	0	0	0	0	25
0	10	0	0	0	0	0	0	0	0	1	0	11
2	99	0	0	1	0	0	1	0	0	2	0	105

Prepared by Newport Traffic Studies

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: I-15 SB RAMPS

EAST-WEST STREET: GLEN HELEN PKWY

TIME: 04:00PM-05:00PM DATE: 11-29-22

NORTH LEG

Rt	Thru	Lt	
25	17	182	Total
3	5	34	1st
6	2	55	2nd
6	6	58	3rd
10	4	35	4th

	1st	2nd	3rd	4th	Total
Rt					
Thru	4	12	8	7	31
Lt	48	68	78	53	247

Total	1st	2nd	3rd	4th	
					Lt
41	8	11	9	13	Thru
2	1	1	0	0	Rt

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: I-15 SB RAMPS

EAST-WEST STREET: GLEN HELEN PKWY

TIME: 05:00PM-06:00PM DATE: 11-29-22

NORTH LEG

Rt	Thru	Lt	
59	29	173	Total
8	2	42	1st
13	3	37	2nd
21	13	33	3rd
17	11	61	4th

	1st	2nd	3rd	4th	Total
Rt					
Thru	14	15	16	14	59
Lt	46	53	54	58	211

Total	1st	2nd	3rd	4th	
					Lt
62	10	16	25	11	Thru
0	0	0	0	0	Rt

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: I-15 NB RAMPS
EAST-WEST STREET: GLEN HELEN PKWY
JURISDICTION: DEVORE

DATE: 11-29-22

PEAK HOUR: 07:00AM

NORTH LEG

TOTAL: 0

	Rt	Thru	Lt
Total			
1st			
2nd			
3rd			
4th			

EAST LEG TOTAL: 604

	1st	2nd	3rd	4th	Total
Rt	37	60	26	60	183
Thru	75	125	117	104	421
Lt					

	Total	1st	2nd	3rd	4th
Lt	70	13	11	24	22
Thru	78	19	20	19	20
Rt					

WEST LEG TOTAL: 148

PEAK HOUR FACTORS

NORTH LEG =
SOUTH LEG = 0.86
EAST LEG = 0.82
WEST LEG = 0.86

ALL LEGS = 0.90

	Lt	Thru	Rt
1st	5	1	31
2nd	0	1	32
3rd	2	5	33
4th	1	0	44
Total	8	7	140

TOTAL: 155

SOUTH LEG

HOUR TOTAL: 907

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : I-15 NB RAMPS DEVORE

EAST-WEST STREET : GLEN HELEN PKWY 11-29-22

BEGINNING TIME : 07:00AM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						SOUTH LEG						
28	0	5	1	0	0	2	0	0	0	1	0	37
29	0	0	1	0	0	0	0	0	2	1	0	33
32	5	1	0	0	1	0	0	0	1	0	0	40
43	0	1	0	0	0	0	0	0	1	0	0	45
36	1	0	0	0	0	0	0	0	1	2	0	40
27	2	1	1	0	0	2	1	0	2	1	0	37
27	1	1	0	0	0	0	0	0	0	1	0	30
21	0	1	1	0	0	1	0	0	1	0	0	25
243	9	10	4	0	1	5	1	0	8	6	0	287
						EAST LEG						
37	73	0	0	0	0	0	0	0	0	2	0	112
59	122	0	0	0	0	0	0	0	1	3	0	185
26	113	0	0	1	0	0	0	0	0	3	0	143
60	103	0	0	0	0	0	0	0	0	1	0	164
19	76	0	0	0	0	0	1	0	1	2	0	99
21	55	0	0	0	0	0	1	0	1	4	0	82
16	39	0	0	0	0	0	1	0	0	4	0	60
11	50	0	0	0	0	0	0	0	0	1	0	62
249	631	0	0	1	0	0	3	0	3	20	0	907
						WEST LEG						
0	19	11	0	0	0	0	0	0	0	0	2	32
0	17	9	0	0	0	0	1	0	0	2	2	31
0	19	21	0	0	1	0	0	0	0	0	2	43
0	18	21	0	1	0	0	1	0	0	0	1	42
0	13	22	0	0	0	0	0	1	0	0	5	41
0	14	6	0	0	1	0	1	0	0	0	4	26
0	12	8	0	0	1	0	0	0	0	1	3	25
0	7	8	0	0	1	0	0	0	0	0	0	16
0	119	106	0	1	4	0	3	1	0	3	19	256

Prepared by Newport Traffic Studies

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: I-15 NB RAMPS

EAST-WEST STREET: GLEN HELEN PKWY

TIME: 07:00AM-08:00AM DATE: 11-29-22

NORTH LEG

	Rt	Thru	Lt
Total			
1st			
2nd			
3rd			
4th			

	1st	2nd	3rd	4th	Total
Rt	37	60	26	60	183
Thru	75	125	117	104	421
Lt					

	Total	1st	2nd	3rd	4th
Lt	70	13	11	24	22
Thru	78	19	20	19	20
Rt					

	Lt	Thru	Rt
1st	5	1	31
2nd	0	1	32
3rd	2	5	33
4th	1	0	44
Total	8	7	140

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: I-15 NB RAMPS

EAST-WEST STREET: GLEN HELEN PKWY

TIME: 08:00AM-09:00AM DATE: 11-29-22

NORTH LEG

	Rt	Thru	Lt
Total			
1st			
2nd			
3rd			
4th			

	1st	2nd	3rd	4th	Total
Rt	20	22	16	11	69
Thru	79	60	44	51	234
Lt					

Total	1st	2nd	3rd	4th	
60	28	11	12	9	Lt
48	13	15	13	7	Thru
					Rt

	Lt	Thru	Rt
1st	0	3	37
2nd	1	4	32
3rd	1	2	27
4th	1	0	24
Total	3	9	120

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: I-15 NB RAMPS
EAST-WEST STREET: GLEN HELEN PKWY
JURISDICTION: DEVORE

DATE: 11-29-22

PEAK HOUR: 05:00PM

NORTH LEG

TOTAL: 0

	Rt	Thru	Lt
Total			
1st			
2nd			
3rd			
4th			

EAST LEG TOTAL: 325

	1st	2nd	3rd	4th	Total
Rt	22	19	7	15	63
Thru	59	68	67	68	262
Lt					

	Total	1st	2nd	3rd	4th
Lt	61	13	15	22	11
Thru	173	39	34	39	61
Rt					

WEST LEG TOTAL: 234

PEAK HOUR FACTORS

NORTH LEG =
SOUTH LEG = 0.95
EAST LEG = 0.93
WEST LEG = 0.81

ALL LEGS = 0.92

	Lt	Thru	Rt
1st	2	2	75
2nd	0	2	83
3rd	3	1	79
4th	1	3	84
Total	6	8	321

TOTAL: 335

SOUTH LEG

HOUR TOTAL: 894

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : I-15 NB RAMPS DEVORE

EAST-WEST STREET : GLEN HELEN PKWY 11-29-22

BEGINNING TIME : 04:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						SOUTH LEG						
76	1	0	0	0	0	1	0	0	1	1	0	80
65	2	4	0	0	0	0	0	0	0	0	0	71
70	8	1	0	0	0	0	0	0	3	0	0	82
62	1	0	0	0	0	0	1	0	2	0	0	66
70	0	2	0	0	0	0	0	0	5	2	0	79
83	1	0	0	0	0	0	0	0	0	1	0	85
77	1	1	0	0	1	0	0	0	2	0	1	83
83	2	1	0	0	0	0	0	0	1	1	0	88
586	16	9	0	0	1	1	1	0	14	5	1	634
						EAST LEG						
17	51	0	0	0	0	0	0	0	0	1	0	69
25	74	0	2	0	0	0	1	0	0	1	0	103
25	77	0	0	0	0	0	0	0	1	8	0	111
10	55	0	0	0	0	0	1	0	0	4	0	70
22	59	0	0	0	0	0	0	0	0	0	0	81
19	65	0	0	0	0	0	0	0	0	3	0	87
7	67	0	0	0	0	0	0	0	0	0	0	74
15	63	0	0	0	0	0	1	0	0	4	0	83
140	511	0	2	0	0	0	3	0	1	21	0	678
						WEST LEG						
0	29	10	0	1	0	0	0	1	0	1	0	42
0	49	16	0	0	0	0	0	0	0	1	0	66
0	39	17	0	0	0	0	1	0	0	1	0	58
0	36	10	0	0	0	0	0	0	0	0	2	48
0	39	11	0	0	1	0	0	0	0	0	1	52
0	34	11	0	0	0	0	0	0	0	0	4	49
0	38	19	0	1	0	0	0	0	0	0	3	61
0	61	7	0	0	0	0	0	0	0	0	4	72
0	325	101	0	2	1	0	1	1	0	3	14	448

Prepared by Newport Traffic Studies

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: I-15 NB RAMPS

EAST-WEST STREET: GLEN HELEN PKWY

TIME: 04:00PM-05:00PM DATE: 11-29-22

NORTH LEG

	Rt	Thru	Lt
Total			
1st			
2nd			
3rd			
4th			

	1st	2nd	3rd	4th	Total
Rt	17	27	26	10	80
Thru	52	76	85	60	273
Lt					

Total	1st	2nd	3rd	4th	
56	11	16	17	12	Lt
158	31	50	41	36	Thru
					Rt

	Lt	Thru	Rt
1st	0	2	78
2nd	4	2	65
3rd	1	8	73
4th	0	2	64
Total	5	14	280

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: I-15 NB RAMPS

EAST-WEST STREET: GLEN HELEN PKWY

TIME: 05:00PM-06:00PM DATE: 11-29-22

NORTH LEG

			Total
			1st
			2nd
			3rd
			4th
Rt	Thru	Lt	

	1st	2nd	3rd	4th	Total
Rt	22	19	7	15	63
Thru	59	68	67	68	262
Lt					

Total	1st	2nd	3rd	4th	
61	13	15	22	11	Lt
173	39	34	39	61	Thru
					Rt

	Lt	Thru	Rt
1st	2	2	75
2nd	0	2	83
3rd	3	1	79
4th	1	3	84
Total	6	8	321

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: CLEARWATER PKWY
EAST-WEST STREET: GLEN HELEN PKWY
JURISDICTION: DEVORE

DATE: 11-29-22

PEAK HOUR: 07:00AM

NORTH LEG

TOTAL: 0

	Rt	Thru	Lt
Total			
1st			
2nd			
3rd			
4th			

EAST LEG TOTAL: 143

	1st	2nd	3rd	4th	Total
Rt					
Thru	12	27	20	38	97
Lt	11	13	14	8	46

	Total	1st	2nd	3rd	4th
Lt					
Thru	78	18	20	16	24
Rt	132	32	32	26	42

WEST LEG TOTAL: 210

PEAK HOUR FACTORS

NORTH LEG =
SOUTH LEG = 0.78
EAST LEG = 0.78
WEST LEG = 0.80

ALL LEGS = 0.84

	Lt	Thru	Rt
1st	100		17
2nd	158		20
3rd	123		23
4th	98		13
Total	479		73

TOTAL: 552

SOUTH LEG

HOUR TOTAL: 905

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : CLEARWATER PKWY DEVORE

EAST-WEST STREET : GLEN HELEN PKWY 11-29-22

BEGINNING TIME : 07:00AM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						SOUTH LEG						
17	0	100	0	0	0	0	0	0	0	0	0	117
20	0	158	0	0	0	0	0	0	0	0	0	178
23	0	123	0	0	0	0	0	0	0	0	0	146
12	0	98	0	0	0	1	0	0	0	0	0	111
17	0	82	0	0	0	0	0	0	0	0	0	99
7	0	57	0	0	0	0	0	0	0	0	0	64
10	0	48	0	0	0	3	0	0	0	0	0	61
10	0	43	0	0	0	0	0	0	0	0	0	53
116	0	709	0	0	0	4	0	0	0	0	0	829
						EAST LEG						
0	10	11	0	0	0	0	0	0	0	2	0	23
0	23	13	0	0	0	0	0	0	0	4	0	40
0	16	14	0	1	0	0	0	0	0	3	0	34
0	37	8	0	0	0	0	0	0	0	1	0	46
0	13	4	0	0	0	0	1	0	0	3	0	21
0	19	4	0	0	0	0	1	0	0	5	0	29
0	8	2	0	0	0	0	0	0	0	4	0	14
0	18	9	0	0	0	0	0	0	0	1	0	28
0	144	65	0	1	0	0	2	0	0	23	0	235
						WEST LEG						
32	15	0	0	1	0	0	2	0	0	0	0	50
31	15	0	1	0	0	0	1	0	0	4	0	52
26	15	0	0	0	0	0	0	0	0	1	0	42
42	21	0	0	1	0	0	1	0	0	1	0	66
28	21	0	0	0	0	0	0	0	0	1	0	50
19	15	0	0	1	0	0	3	0	1	1	0	40
15	16	0	0	0	0	0	0	0	0	1	0	32
12	16	0	0	1	0	0	1	0	1	0	0	31
205	134	0	1	4	0	0	8	0	2	9	0	363

Prepared by Newport Traffic Studies

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: CLEARWATER PKWY

EAST-WEST STREET: GLEN HELEN PKWY

TIME: 07:00AM-08:00AM DATE: 11-29-22

NORTH LEG

	Rt	Thru	Lt
Total			
1st			
2nd			
3rd			
4th			

	1st	2nd	3rd	4th	Total
Rt					
Thru	12	27	20	38	97
Lt	11	13	14	8	46

	Total	1st	2nd	3rd	4th
Lt					
Thru	78	18	20	16	24
Rt	132	32	32	26	42

	Lt	Thru	Rt
1st	100		17
2nd	158		20
3rd	123		23
4th	98		13
Total	479		73

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: CLEARWATER PKWY

EAST-WEST STREET: GLEN HELEN PKWY

TIME: 08:00AM-09:00AM DATE: 11-29-22

NORTH LEG

	Rt	Thru	Lt
Total			
1st			
2nd			
3rd			
4th			

	1st	2nd	3rd	4th	Total
Rt					
Thru	17	25	12	19	73
Lt	4	4	2	9	19

	Total	1st	2nd	3rd	4th
Lt					
Thru	77	22	20	17	18
Rt	76	28	20	15	13

	Lt	Thru	Rt
1st	82		17
2nd	57		7
3rd	48		13
4th	43		10
Total	230		47

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: CLEARWATER PKWY
EAST-WEST STREET: GLEN HELEN PKWY
JURISDICTION: DEVORE

DATE: 11-29-22

PEAK HOUR: 04:15PM

NORTH LEG

TOTAL: 0

	Rt	Thru	Lt
Total			
1st			
2nd			
3rd			
4th			

EAST LEG TOTAL: 231

	1st	2nd	3rd	4th	Total
Rt					
Thru	42	51	37	37	167
Lt	19	18	15	12	64

	Total	1st	2nd	3rd	4th
Lt					
Thru	210	63	51	43	53
Rt	234	52	66	54	62

WEST LEG TOTAL: 444

PEAK HOUR FACTORS

NORTH LEG =
SOUTH LEG = 0.83
EAST LEG = 0.84
WEST LEG = 0.95

ALL LEGS = 0.90

	Lt	Thru	Rt
1st	60		14
2nd	60		11
3rd	33		10
4th	44		15
Total	197		50

SOUTH LEG

TOTAL: 247

HOUR TOTAL: 922

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : CLEARWATER PKWY DEVORE

EAST-WEST STREET : GLEN HELEN PKWY 11-29-22

BEGINNING TIME : 04:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						SOUTH LEG						
6	0	37	0	0	0	0	0	0	0	0	0	43
14	0	60	0	0	0	0	0	0	0	0	0	74
10	0	60	0	0	0	1	0	0	0	0	0	71
10	0	33	0	0	0	0	0	0	0	0	0	43
14	0	44	0	0	0	1	0	0	0	0	0	59
10	0	36	0	0	0	0	0	0	0	0	0	46
3	0	30	0	0	0	0	0	0	0	0	0	33
23	0	42	0	0	0	0	0	0	0	0	0	65
90	0	342	0	0	0	2	0	0	0	0	0	434
						EAST LEG						
0	31	13	0	0	0	0	0	1	0	1	1	47
0	38	19	0	2	0	0	1	0	0	1	0	61
0	42	18	0	0	0	0	0	0	0	9	0	69
0	31	15	0	0	0	0	1	0	0	5	0	52
0	37	12	0	0	0	0	0	0	0	0	0	49
0	48	9	0	0	0	0	0	0	0	3	0	60
0	44	12	0	0	0	0	0	0	0	0	0	56
0	36	13	0	0	0	0	1	0	0	4	0	54
0	307	111	0	2	0	0	3	1	0	23	1	448
						WEST LEG						
66	40	0	0	1	0	0	1	0	0	1	0	109
52	62	0	0	0	0	0	0	0	0	1	0	115
66	47	0	0	0	0	0	1	0	0	3	0	117
54	41	0	0	0	0	0	0	0	0	2	0	97
62	48	0	0	0	0	0	0	0	0	5	0	115
58	60	0	0	0	0	0	0	0	0	0	0	118
60	55	0	0	1	0	0	0	0	0	2	0	118
82	58	0	0	0	0	0	0	0	0	1	0	141
500	411	0	0	2	0	0	2	0	0	15	0	930

Prepared by Newport Traffic Studies

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: CLEARWATER PKWY

EAST-WEST STREET: GLEN HELEN PKWY

TIME: 04:00PM-05:00PM DATE: 11-29-22

NORTH LEG

			Total
			1st
			2nd
			3rd
			4th
Rt	Thru	Lt	

	1st	2nd	3rd	4th	Total
Rt					
Thru	32	42	51	37	162
Lt	15	19	18	15	67

Total	1st	2nd	3rd	4th	
					Lt
200	43	63	51	43	Thru
238	66	52	66	54	Rt

	Lt	Thru	Rt
1st	37		6
2nd	60		14
3rd	60		11
4th	33		10
Total	190		41

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: CLEARWATER PKWY

EAST-WEST STREET: GLEN HELEN PKWY

TIME: 05:00PM-06:00PM DATE: 11-29-22

NORTH LEG

	Rt	Thru	Lt
Total			
1st			
2nd			
3rd			
4th			

	1st	2nd	3rd	4th	Total
Rt					
Thru	37	51	44	41	173
Lt	12	9	12	13	46

	Total	1st	2nd	3rd	4th
Lt					
Thru	230	53	60	58	59
Rt	262	62	58	60	82

	Lt	Thru	Rt
1st	44		15
2nd	36		10
3rd	30		3
4th	42		23
Total	152		51

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: CAJON BLVD
EAST-WEST STREET: GLEN HELEN/DEVORE
JURISDICTION: DEVORE

DATE: 11-30-22

PEAK HOUR: 07:00AM

EB CAJON BLVD

NORTH LEG

TOTAL: 188

	Rt	Thru	Lt
Total	42	7	139
1st	4	0	31
2nd	6	3	33
3rd	14	3	44
4th	18	1	31

SB DEVORE RD

EAST LEG TOTAL: 155

	1st	2nd	3rd	4th	Total
Rt	16	13	14	10	53
Thru	19	17	18	15	69
Lt	5	10	8	10	33

	Total	1st	2nd	3rd	4th
Lt	37	6	10	10	11
Thru	64	15	21	18	10
Rt	14	3	3	5	3

WEST LEG TOTAL: 115

NB GLEN HELEN PARKWAY

PEAK HOUR FACTORS

NORTH LEG = 0.77
SOUTH LEG = 0.89
EAST LEG = 0.97
WEST LEG = 0.85

ALL LEGS = 0.88

	Lt	Thru	Rt
1st	3	1	8
2nd	2	0	11
3rd	1	0	10
4th	2	4	8
Total	8	5	37

TOTAL: 50

SOUTH LEG

WB CAJON BLVD

HOUR TOTAL: 508

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : CAJON BLVD DEVORE

EAST-WEST STREET : GLEN HELEN/DEVORE 11-30-22

BEGINNING TIME : 07:00AM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG EB CAJON BLVD						
1	0	27	1	0	2	0	0	0	2	0	2	35
6	3	30	0	0	1	0	0	0	0	0	2	42
12	3	44	0	0	0	0	0	0	2	0	0	61
13	1	30	0	0	0	2	0	0	3	0	1	50
22	5	5	1	0	2	0	0	0	0	0	4	39
11	3	4	2	0	5	1	0	2	1	0	5	34
11	0	16	0	0	4	0	0	0	0	0	4	35
16	3	20	0	0	0	0	0	0	0	0	1	40
92	18	176	4	0	14	3	0	2	8	0	19	336
						SOUTH LEG WB CAJON BLVD						
8	1	3	0	0	0	0	0	0	0	0	0	12
11	0	2	0	0	0	0	0	0	0	0	0	13
10	0	1	0	0	0	0	0	0	0	0	0	11
8	4	2	0	0	0	0	0	0	0	0	0	14
7	3	4	0	0	0	0	0	0	0	0	0	14
4	1	5	0	0	0	0	0	0	2	0	0	12
11	1	5	0	0	0	0	0	0	0	0	0	17
10	5	3	0	0	0	0	0	0	0	0	0	18
69	15	25	0	0	0	0	0	0	2	0	0	111
						EAST LEG SB DEVORE RD						
16	13	5	0	3	0	0	1	0	0	2	0	40
11	12	10	1	2	0	0	1	0	1	2	0	40
13	15	8	0	0	0	0	0	0	1	3	0	40
5	13	10	0	0	0	3	2	0	2	0	0	35
1	0	3	0	2	0	2	3	0	5	2	0	18
0	0	2	4	2	2	0	1	0	2	1	0	14
4	0	3	2	4	1	0	0	0	2	6	0	22
8	5	5	0	0	0	0	1	0	2	4	0	25
58	58	46	7	13	3	5	9	0	15	20	0	234
						WEST LEG NB GLEN HELEN PARKWAY						
3	5	6	0	2	0	0	0	0	0	8	0	24
3	7	10	0	2	0	0	0	0	0	12	0	34
5	11	10	0	2	0	0	0	0	0	5	0	33
3	7	11	0	0	0	0	1	0	0	2	0	24
4	0	19	0	1	0	0	0	0	0	8	0	32
6	2	21	0	3	0	0	1	0	0	10	0	43
8	7	20	0	3	0	0	1	0	0	9	0	48
8	17	16	0	0	0	0	0	0	0	2	0	43
40	56	113	0	13	0	0	3	0	0	56	0	281

Prepared by Newport Traffic Studies

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: CAJON BLVD

EAST-WEST STREET: GLEN HELEN/DEVORE

TIME: 07:00AM-08:00AM DATE: 11-30-22

EB CAJON BLVD

NORTH LEG

Rt	Thru	Lt	
42	7	139	Total
4	0	31	1st
6	3	33	2nd
14	3	44	3rd
18	1	31	4th

SB DEVORE RD

	1st	2nd	3rd	4th	Total
Rt	16	13	14	10	53
Thru	19	17	18	15	69
Lt	5	10	8	10	33

Total	1st	2nd	3rd	4th	
37	6	10	10	11	Lt
64	15	21	18	10	Thru
14	3	3	5	3	Rt

NB GLEN HELEN PARKWAY

	Lt	Thru	Rt
1st	3	1	8
2nd	2	0	11
3rd	1	0	10
4th	2	4	8
Total	8	5	37

WB CAJON BLVD

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: CAJON BLVD

EAST-WEST STREET: GLEN HELEN/DEVORE

TIME: 08:00AM-09:00AM DATE: 11-30-22

EB CAJON BLVD

NORTH LEG

Rt	Thru	Lt	
65	11	72	Total
23	5	11	1st
15	3	16	2nd
11	0	24	3rd
16	3	21	4th

SB DEVORE RD

	1st	2nd	3rd	4th	Total
Rt	8	6	8	10	32
Thru	7	4	10	10	31
Lt	3	4	4	5	16

Total	1st	2nd	3rd	4th	
76	19	21	20	16	Lt
64	9	16	20	19	Thru
26	4	6	8	8	Rt

NB GLEN HELEN PARKWAY

	Lt	Thru	Rt
1st	4	3	7
2nd	5	1	6
3rd	5	1	11
4th	3	5	10
Total	17	10	34

WB CAJON BLVD

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: CAJON BLVD
EAST-WEST STREET: GLEN HELEN/DEVORE
JURISDICTION: DEVORE

DATE: 11-30-22

PEAK HOUR: 04:15PM

EB CAJON BLVD

NORTH LEG

TOTAL: 230

Rt	Thru	Lt	
141	21	68	Total
33	8	16	1st
40	5	17	2nd
35	5	20	3rd
33	3	15	4th

SB DEVORE RD

EAST LEG TOTAL: 362

	1st	2nd	3rd	4th	Total
Rt	71	69	66	55	261
Thru	23	20	20	11	74
Lt	10	6	11	0	27

Total	1st	2nd	3rd	4th	
157	50	43	25	39	Lt
120	29	30	40	21	Thru
9	1	2	2	4	Rt

WEST LEG TOTAL: 286

NB GLEN HELEN PARKWAY

	Lt	Thru	Rt
1st	0	0	4
2nd	3	3	3
3rd	1	3	5
4th	4	0	4
Total	8	6	16

TOTAL: 30

SOUTH LEG

WB CAJON BLVD

PEAK HOUR FACTORS

NORTH LEG = 0.93
SOUTH LEG = 0.83
EAST LEG = 0.87
WEST LEG = 0.89

ALL LEGS = 0.93

HOUR TOTAL: 908

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : CAJON BLVD DEVORE

EAST-WEST STREET : GLEN HELEN/DEVORE 11-30-22

BEGINNING TIME : 04:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG EB CAJON BLVD						
24	3	18	0	0	0	1	0	1	1	0	2	50
31	8	14	1	0	0	0	0	0	1	0	2	57
38	5	16	1	0	0	0	0	0	1	0	1	62
34	5	20	0	0	0	1	0	0	0	0	0	60
33	3	14	0	0	1	0	0	0	0	0	0	51
38	3	12	0	0	0	0	0	0	2	0	0	55
37	0	7	0	0	0	0	0	0	0	0	0	44
41	1	49	0	0	0	0	0	0	0	0	0	91
276	28	150	2	0	1	2	0	1	5	0	5	470
						SOUTH LEG WB CAJON BLVD						
4	0	0	0	0	0	0	0	0	0	0	0	4
4	0	0	0	0	0	0	0	0	0	0	0	4
3	3	3	0	0	0	0	0	0	0	0	0	9
5	3	1	0	0	0	0	0	0	0	0	0	9
4	0	4	0	0	0	0	0	0	0	0	0	8
4	0	3	0	0	0	0	0	0	0	0	0	7
2	2	5	0	0	0	0	0	0	0	0	0	9
9	1	3	0	0	0	0	0	0	0	0	0	13
35	9	19	0	0	0	0	0	0	0	0	0	63
						EAST LEG SB DEVORE RD						
38	7	10	0	0	0	1	0	0	5	8	0	69
64	12	10	2	3	0	2	2	0	3	6	0	104
62	11	6	3	2	0	0	1	0	4	6	0	95
64	17	11	0	0	0	0	0	0	2	3	0	97
49	8	0	0	0	0	1	0	0	5	3	0	66
48	16	5	0	0	0	0	1	0	2	3	0	75
45	15	2	0	1	0	0	0	0	3	4	0	70
38	14	1	0	1	0	0	0	0	0	0	0	54
408	100	45	5	7	0	4	4	0	24	33	0	630
						WEST LEG NB GLEN HELEN PARKWAY						
5	17	20	0	0	0	0	1	0	0	3	0	46
1	24	49	0	0	0	0	1	0	0	4	1	80
2	25	42	0	2	0	0	1	0	0	2	1	75
2	40	25	0	0	0	0	0	0	0	0	0	67
4	19	39	0	2	0	0	0	0	0	0	0	64
3	16	51	0	0	0	0	0	0	0	1	0	71
4	13	43	0	0	0	0	0	0	0	2	0	62
0	21	50	0	0	0	0	0	0	0	0	0	71
21	175	319	0	4	0	0	3	0	0	12	2	536

Prepared by Newport Traffic Studies

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: CAJON BLVD

EAST-WEST STREET: GLEN HELEN/DEVORE

TIME: 04:00PM-05:00PM DATE: 11-30-22

EB CAJON BLVD

NORTH LEG

Rt	Thru	Lt	
134	21	74	Total
26	3	21	1st
33	8	16	2nd
40	5	17	3rd
35	5	20	4th

SB DEVORE RD

	1st	2nd	3rd	4th	Total
Rt	44	71	69	66	250
Thru	15	23	20	20	78
Lt	10	10	6	11	37

Total	1st	2nd	3rd	4th	
138	20	50	43	25	Lt
120	21	29	30	40	Thru
10	5	1	2	2	Rt

NB GLEN HELEN PARKWAY

	Lt	Thru	Rt
1st	0	0	4
2nd	0	0	4
3rd	3	3	3
4th	1	3	5
Total	4	6	16

WB CAJON BLVD

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: CAJON BLVD

EAST-WEST STREET: GLEN HELEN/DEVORE

TIME: 05:00PM-06:00PM DATE: 11-30-22

EB CAJON BLVD

NORTH LEG

	Rt	Thru	Lt
Total	151	7	83
1st	33	3	15
2nd	40	3	12
3rd	37	0	7
4th	41	1	49

SB DEVORE RD

	1st	2nd	3rd	4th	Total
Rt	55	50	48	38	191
Thru	11	20	20	15	66
Lt	0	5	2	1	8

	Total	1st	2nd	3rd	4th
Lt	183	39	51	43	50
Thru	74	21	17	15	21
Rt	11	4	3	4	0

NB GLEN HELEN PARKWAY

	Lt	Thru	Rt
1st	4	0	4
2nd	3	0	4
3rd	5	2	2
4th	3	1	9
Total	15	3	19

WB CAJON BLVD

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: I-215 SB RAMPS
EAST-WEST STREET: DEVORE/GLEN HELEN DATE: 11-30-22
JURISDICTION: DEVORE

PEAK HOUR: 07:00AM

SB DEVORE ROAD

NORTH LEG

TOTAL: 162

	Rt	Thru	Lt	
		91	71	Total
		24	9	1st
		19	22	2nd
		34	29	3rd
		14	11	4th

i-215 SB ON-RAMP

EAST LEG TOTAL: 0

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

	Total	1st	2nd	3rd	4th
Lt	36	9	11	6	10
Thru	2	0	0	2	0
Rt	65	16	21	7	21

WEST LEG TOTAL: 103

i-215 SB OFF-RAMP

PEAK HOUR FACTORS

NORTH LEG = 0.64
SOUTH LEG = 0.87
EAST LEG =
WEST LEG = 0.80

ALL LEGS = 0.86

	Lt	Thru	Rt
1st		10	44
2nd		24	41
3rd		14	54
4th		10	39
Total		58	178

TOTAL: 236

SOUTH LEG

NB DEVORE ROAD

HOUR TOTAL: 501

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : I-215 SB RAMPS DEVORE

EAST-WEST STREET : DEVORE/GLEN HELEN 11-30-22

BEGINNING TIME : 07:00AM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG SB DEVORE ROAD						
0	20	8	0	3	1	0	1	0	0	0	0	33
0	18	20	0	0	2	0	1	0	0	0	0	41
0	34	28	0	0	1	0	0	0	0	0	0	63
0	11	7	0	0	4	0	1	0	0	2	0	25
0	5	6	0	1	0	0	1	1	0	3	0	17
0	0	7	0	5	0	0	0	0	0	0	0	12
0	10	9	0	2	0	0	0	0	0	0	0	21
0	14	7	0	0	0	0	0	0	0	0	0	21
0	112	92	0	11	8	0	4	1	0	5	0	233
						SOUTH LEG NB DEVORE ROAD						
40	0	0	3	1	0	0	0	0	1	9	0	54
37	10	0	0	3	0	0	0	0	4	11	0	65
53	8	0	1	1	0	0	0	0	0	5	0	68
39	6	0	0	0	0	0	1	0	0	3	0	49
27	2	0	0	4	0	0	0	0	3	6	0	42
4	2	0	3	5	0	3	0	0	13	8	0	38
37	0	0	2	5	0	1	0	0	7	2	0	54
44	3	0	0	0	0	0	0	0	0	3	0	50
281	31	0	9	19	0	4	1	0	28	47	0	420
						EAST LEG i-215 SB ON-RAMP						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						WEST LEG i-215 SB OFF-RAMP						
14	0	9	0	0	0	0	0	0	2	0	0	25
14	0	10	3	0	0	0	0	0	4	0	1	32
3	1	4	0	1	0	0	0	1	4	0	1	15
17	0	5	0	0	1	3	0	1	1	0	3	31
0	0	0	1	0	0	5	0	2	1	0	4	13
0	0	2	6	0	1	1	0	0	2	0	4	16
1	0	0	5	0	2	0	0	1	4	1	3	17
4	1	3	0	0	1	1	0	0	6	0	1	17
53	2	33	15	1	5	10	0	5	24	1	17	166

Prepared by Newport Traffic Studies

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: I-215 SB RAMPS

EAST-WEST STREET: DEVORE/GLEN HELEN

TIME: 07:00AM-08:00AM DATE: 11-30-22

SB DEVORE ROAD

NORTH LEG

	91	71	Total
	24	9	1st
	19	22	2nd
	34	29	3rd
	14	11	4th
Rt	Thru	Lt	

i-215 SB ON-RAMP

Rt					
Thru					
Lt					
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
36	9	11	6	10	Lt
2	0	0	2	0	Thru
65	16	21	7	21	Rt

i-215 SB OFF-RAMP

	Lt	Thru	Rt
1st		10	44
2nd		24	41
3rd		14	54
4th		10	39
Total		58	178

NB DEVORE ROAD

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: I-215 SB RAMPS

EAST-WEST STREET: DEVORE/GLEN HELEN

TIME: 08:00AM-09:00AM DATE: 11-30-22

SB DEVORE ROAD

NORTH LEG

	Rt	Thru	Lt
Total		41	30
1st		10	7
2nd		5	7
3rd		12	9
4th		14	7

i-215 SB ON-RAMP

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

	Total	1st	2nd	3rd	4th
Lt	24	6	7	6	5
Thru	2	0	0	1	1
Rt	37	7	9	10	11

i-215 SB OFF-RAMP

	Lt	Thru	Rt
1st		12	30
2nd		15	23
3rd		7	47
4th		6	44
Total		40	144

NB DEVORE ROAD

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: I-215 SB RAMPS
EAST-WEST STREET: DEVORE/GLEN HELEN
JURISDICTION: DEVORE

DATE: 11-30-22

PEAK HOUR: 04:00PM

SB DEVORE ROAD

NORTH LEG

TOTAL: 194

	Rt	Thru	Lt
Total		146	48
1st		29	8
2nd		41	10
3rd		42	13
4th		34	17

i-215 SB ON-RAMP

EAST LEG TOTAL: 0

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

	Total	1st	2nd	3rd	4th
Lt	115	21	32	24	38
Thru	1	0	0	1	0
Rt	219	40	63	53	63

WEST LEG TOTAL: 335

i-215 SB OFF-RAMP

PEAK HOUR FACTORS

NORTH LEG = 0.88
SOUTH LEG = 0.85
EAST LEG =
WEST LEG = 0.83

ALL LEGS = 0.86

	Lt	Thru	Rt
1st		33	24
2nd		28	21
3rd		30	20
4th		47	18
Total		138	83

TOTAL: 221

SOUTH LEG

NB DEVORE ROAD

HOUR TOTAL: 750

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : I-215 SB RAMPS DEVORE

EAST-WEST STREET : DEVORE/GLEN HELEN 11-30-22

BEGINNING TIME : 04:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG SB DEVORE ROAD						
0	27	8	0	0	0	0	1	0	0	1	0	37
0	36	10	0	2	0	0	2	0	0	1	0	51
0	42	13	0	0	0	0	0	0	0	0	0	55
0	33	17	0	0	0	0	0	0	0	1	0	51
0	17	6	0	0	0	0	0	0	0	0	0	23
0	22	11	0	0	0	0	1	0	0	0	0	34
0	22	11	0	0	1	0	0	0	0	0	0	34
0	20	16	0	0	0	0	0	0	0	0	0	36
0	219	92	0	2	1	0	4	0	0	3	0	321
						SOUTH LEG NB DEVORE ROAD						
22	28	0	0	0	0	0	2	0	2	3	0	57
21	20	0	0	0	0	0	1	0	0	7	0	49
18	26	0	0	2	0	1	0	0	1	2	0	50
18	47	0	0	0	0	0	0	0	0	0	0	65
14	23	0	1	2	0	0	0	0	0	0	0	40
14	18	0	0	0	0	0	0	0	0	1	0	33
19	3	0	0	0	0	0	0	0	0	2	0	24
74	5	0	0	0	0	0	0	0	0	0	0	79
200	170	0	1	4	0	1	3	0	3	15	0	397
						EAST LEG i-215 SB ON-RAMP						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						WEST LEG i-215 SB OFF-RAMP						
28	0	21	0	0	0	0	0	0	12	0	0	61
50	0	32	3	0	0	2	0	0	8	0	0	95
36	0	24	5	0	0	1	1	0	11	0	0	78
58	0	38	0	0	0	0	0	0	5	0	0	101
40	0	18	0	0	0	1	0	0	8	0	0	67
46	0	24	1	0	0	0	0	0	5	0	0	76
40	0	17	1	0	0	0	0	0	7	0	0	65
34	0	21	0	0	0	0	0	0	0	0	0	55
332	0	195	10	0	0	4	1	0	56	0	0	598

Prepared by Newport Traffic Studies

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: I-215 SB RAMPS

EAST-WEST STREET: DEVORE/GLEN HELEN

TIME: 04:00PM-05:00PM DATE: 11-30-22

SB DEVORE ROAD

NORTH LEG

	Rt	Thru	Lt
Total		146	48
1st		29	8
2nd		41	10
3rd		42	13
4th		34	17

i-215 SB ON-RAMP

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

	Total	1st	2nd	3rd	4th
Lt	115	21	32	24	38
Thru	1	0	0	1	0
Rt	219	40	63	53	63

i-215 SB OFF-RAMP

	Lt	Thru	Rt
1st		33	24
2nd		28	21
3rd		30	20
4th		47	18
Total		138	83

NB DEVORE ROAD

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: I-215 SB RAMPS

EAST-WEST STREET: DEVORE/GLEN HELEN

TIME: 05:00PM-06:00PM DATE: 11-30-22

SB DEVORE ROAD

NORTH LEG

	Rt	Thru	Lt
Total		82	45
1st		17	6
2nd		23	11
3rd		22	12
4th		20	16

i-215 SB ON-RAMP

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

i-215 SB OFF-RAMP

	Total	1st	2nd	3rd	4th
Lt	80	18	24	17	21
Thru	0	0	0	0	0
Rt	183	49	52	48	34

NB DEVORE ROAD

	Lt	Thru	Rt
1st		25	15
2nd		19	14
3rd		5	19
4th		5	74
Total		54	122

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: I-215 NB RAMPS
EAST-WEST STREET: DEVORE/GLEN HELEN DATE: 11-30-22
JURISDICTION: DEVORE

PEAK HOUR: 07:00AM

SB DEVORE ROAD

NORTH LEG

TOTAL: 90

	Rt	Thru	Lt
Total	15	75	
1st	2	12	
2nd	3	23	
3rd	3	27	
4th	7	13	

i-215 NB OFF-RAMP

EAST LEG TOTAL: 111

	1st	2nd	3rd	4th	Total
Rt	4	4	6	9	23
Thru	0	0	0	1	1
Lt	21	18	36	12	87

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

WEST LEG TOTAL: 0

i-215 NB ON-RAMP

PEAK HOUR FACTORS

NORTH LEG = 0.75
SOUTH LEG = 0.67
EAST LEG = 0.66
WEST LEG =

ALL LEGS = 0.80

	Lt	Thru	Rt
1st	10	9	
2nd	22	13	
3rd	13	7	
4th	11	9	
Total	56	38	

TOTAL: 94

SOUTH LEG

NB DEVORE ROAD

HOUR TOTAL: 295

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : I-215 NB RAMPS DEVORE

EAST-WEST STREET : DEVORE/GLEN HELEN 11-30-22

BEGINNING TIME : 07:00AM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG SB DEVORE ROAD						
2	10	0	0	2	0	0	0	0	0	0	0	14
3	21	0	0	2	0	0	0	0	0	0	0	26
3	26	0	0	1	0	0	0	0	0	0	0	30
7	8	0	0	4	0	0	1	0	0	0	0	20
8	3	0	0	0	0	0	2	0	0	1	0	14
8	3	0	0	3	0	0	0	0	0	1	0	15
14	15	0	0	1	0	0	0	0	0	0	0	30
10	10	0	0	0	0	0	0	0	0	0	0	20
55	96	0	0	13	0	0	3	0	0	2	0	169
						SOUTH LEG NB DEVORE ROAD						
0	9	0	0	0	1	0	0	0	0	0	9	19
0	11	9	0	0	3	0	0	0	0	2	10	35
0	6	6	0	0	1	0	1	0	0	0	6	20
0	7	4	0	1	0	0	1	1	0	0	6	20
0	3	4	0	0	3	0	2	0	0	3	3	18
0	5	1	0	2	4	0	0	0	0	3	7	22
0	0	2	0	3	4	0	1	0	0	1	2	13
0	5	0	0	1	0	0	0	0	0	0	5	11
0	46	26	0	7	16	0	5	1	0	9	48	158
						EAST LEG i-215 NB OFF-RAMP						
4	0	19	0	0	1	0	0	1	0	0	0	25
4	0	17	0	0	0	0	0	1	0	0	0	22
4	0	36	0	0	0	1	0	0	1	0	0	42
7	1	11	0	0	0	0	0	0	2	0	1	22
11	1	8	0	0	1	1	0	0	0	0	2	24
10	0	2	0	0	2	0	0	0	0	0	1	15
13	0	24	0	0	1	0	0	0	1	0	0	39
9	1	11	0	0	0	0	0	0	1	0	0	22
62	3	128	0	0	5	2	0	2	5	0	4	211
						WEST LEG i-215 SB ON-RAMP						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0

Prepared by Newport Traffic Studies

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: I-215 NB RAMPS

EAST-WEST STREET: DEVORE/GLEN HELEN

TIME: 07:00AM-08:00AM DATE: 11-30-22

SB DEVORE ROAD
NORTH LEG

	Rt	Thru	Lt
Total	15	75	
1st	2	12	
2nd	3	23	
3rd	3	27	
4th	7	13	

i-215 NB OFF-RAMP

	1st	2nd	3rd	4th	Total
Rt	4	4	6	9	23
Thru	0	0	0	1	1
Lt	21	18	36	12	87

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

i-215 NB ON-RAMP

	Lt	Thru	Rt
1st	10	9	
2nd	22	13	
3rd	13	7	
4th	11	9	
Total	56	38	

NB DEVORE ROAD

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: I-215 NB RAMPS

EAST-WEST STREET: DEVORE/GLEN HELEN

TIME: 08:00AM-09:00AM DATE: 11-30-22

SB DEVORE ROAD

NORTH LEG

	Rt	Thru	Lt
Total	40	39	
1st	8	6	
2nd	8	7	
3rd	14	16	
4th	10	10	

i-215 NB OFF-RAMP

	1st	2nd	3rd	4th	Total
Rt	12	10	14	10	46
Thru	1	0	0	1	2
Lt	11	5	25	11	52

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

i-215 NB ON-RAMP

	Lt	Thru	Rt
1st	10	8	
2nd	12	10	
3rd	8	5	
4th	5	6	
Total	35	29	

NB DEVORE ROAD

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: I-215 NB RAMPS
EAST-WEST STREET: DEVORE/GLEN HELEN DATE: 11-30-22
JURISDICTION: DEVORE

PEAK HOUR: 04:00PM

SB DEVORE ROAD

NORTH LEG

TOTAL: 107

	Rt	Thru	Lt
Total	45	62	
1st	8	10	
2nd	16	14	
3rd	11	18	
4th	10	20	

i-215 NB OFF-RAMP

EAST LEG TOTAL: 165

	1st	2nd	3rd	4th	Total
Rt	5	10	7	6	28
Thru	0	3	2	0	5
Lt	27	37	37	31	132

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

WEST LEG TOTAL: 0

i-215 NB ON-RAMP

PEAK HOUR FACTORS

NORTH LEG = 0.89
SOUTH LEG = 0.74
EAST LEG = 0.83
WEST LEG =

ALL LEGS = 0.86

	Lt	Thru	Rt
1st	32	22	
2nd	29	31	
3rd	29	25	
4th	52	33	
Total	142	111	

TOTAL: 253

SOUTH LEG

NB DEVORE ROAD

HOUR TOTAL: 525

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : I-215 NB RAMPS DEVORE

EAST-WEST STREET : DEVORE/GLEN HELEN 11-30-22

BEGINNING TIME : 04:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG SB DEVORE ROAD						
8	10	0	0	0	0	0	0	0	0	0	0	18
16	14	0	0	0	0	0	0	0	0	0	0	30
11	17	0	0	0	0	0	0	0	0	1	0	29
10	20	0	0	0	0	0	0	0	0	0	0	30
18	10	0	0	0	0	0	0	0	0	0	0	28
14	13	0	0	0	0	0	0	0	0	0	0	27
11	14	0	0	1	0	0	0	0	0	0	0	26
11	17	0	0	0	0	0	0	0	0	0	0	28
99	115	0	0	1	0	0	0	0	0	1	0	216
						SOUTH LEG NB DEVORE ROAD						
0	21	28	0	0	0	0	0	2	0	1	2	54
0	31	21	0	0	0	0	0	1	0	0	7	60
0	24	26	0	0	2	0	0	0	0	1	1	54
0	33	52	0	0	0	0	0	0	0	0	0	85
0	22	19	0	0	2	0	0	0	0	0	0	43
0	26	16	0	0	0	0	0	0	0	1	0	43
0	16	4	0	0	0	0	0	0	0	0	2	22
0	20	6	0	0	0	0	0	0	0	0	0	26
0	193	172	0	0	4	0	0	3	0	3	12	387
						EAST LEG i-215 NB OFF-RAMP						
5	0	25	0	0	0	0	0	1	0	0	1	32
10	3	32	0	0	2	0	0	2	0	0	1	50
7	2	37	0	0	0	0	0	0	0	0	0	46
6	0	31	0	0	0	0	0	0	0	0	0	37
13	1	13	1	0	0	0	0	0	0	0	0	28
10	1	19	1	0	0	0	0	1	0	0	0	32
8	2	19	0	0	0	0	0	0	0	0	0	29
7	0	29	1	0	0	0	0	0	0	0	0	37
66	9	205	3	0	2	0	0	4	0	0	2	291
						WEST LEG i-215 SB ON-RAMP						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0

Prepared by Newport Traffic Studies

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: I-215 NB RAMPS

EAST-WEST STREET: DEVORE/GLEN HELEN

TIME: 04:00PM-05:00PM DATE: 11-30-22

SB DEVORE ROAD
NORTH LEG

	Rt	Thru	Lt
Total	45	62	
1st	8	10	
2nd	16	14	
3rd	11	18	
4th	10	20	

i-215 NB OFF-RAMP

	1st	2nd	3rd	4th	Total
Rt	5	10	7	6	28
Thru	0	3	2	0	5
Lt	27	37	37	31	132

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

i-215 NB ON-RAMP

	Lt	Thru	Rt
1st	32	22	
2nd	29	31	
3rd	29	25	
4th	52	33	
Total	142	111	

NB DEVORE ROAD

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: I-215 NB RAMPS

EAST-WEST STREET: DEVORE/GLEN HELEN

TIME: 05:00PM-06:00PM DATE: 11-30-22

SB DEVORE ROAD

NORTH LEG

	Rt	Thru	Lt
Total	54	55	
1st	18	10	
2nd	14	13	
3rd	11	15	
4th	11	17	

i-215 NB OFF-RAMP

	1st	2nd	3rd	4th	Total
Rt	14	11	8	8	41
Thru	1	1	2	0	4
Lt	13	20	19	29	81

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

i-215 NB ON-RAMP

	Lt	Thru	Rt
1st	21	22	
2nd	16	27	
3rd	6	16	
4th	6	20	
Total	49	85	

NB DEVORE ROAD

Prepared by NEWPORT TRAFFIC STUDIES

Appendix C: Intersection Capacity Analysis Calculations

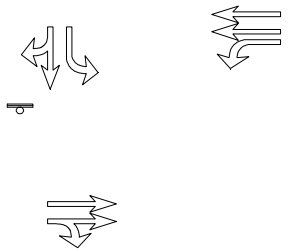
DAVID EVANS AND ASSOCIATES INC.

SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENTS	TM	11-Apr-23	UCRG215T-0003	1 OF 2

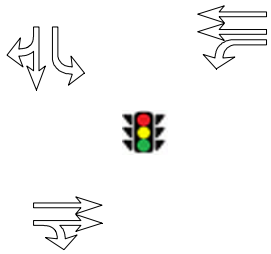
E/W STREET : GLEN HELEN PKWY
N/S STREET : I-15 SB RAMPS
CONDITION : AM PEAK HOUR

INTERSECTION : 1
PROJECTED GROWTH PER YEAR : 2.0%

CONDITION DIAGRAMS



EXISTING GEOMETRICS



MITIGATION GEOMETRICS

TURN MOVEMENTS

Condition	Existing Condition	Ambient Growth	Other Area Project Trips	Background Condition	Project Trips	Project Condition	Cumulative Condition	Cumulative + Project Condition
Scenario #	1			3		5	7	9
GLEN HELEN PKWY								
EB LEFT	0	0	0	0	0	0	0	0
EB THRU	72	7	13	92	58	150	77	135
EB RIGHT	18	2	0	20	0	20	33	33
WB LEFT	373	37	37	447	208	655	605	813
WB THRU	56	6	14	76	51	127	75	126
WB RIGHT	0	0	0	0	0	0	0	0
I-15 SB RAMPS								
NB LEFT	0	0	0	0	0	0	0	0
NB THRU	0	0	0	0	0	0	0	0
NB RIGHT	0	0	0	0	0	0	0	0
SB LEFT	85	9	13	107	196	303	141	337
SB THRU	3	0	0	3	0	3	9	9
SB RIGHT	25	3	0	28	0	28	55	55
TOTALS	**632**	**64**	**77**	**773**	**513**	**1286**	**995**	**1508**

DAVID EVANS AND ASSOCIATES INC.

SUBJECT	BY	DATE	JOB NO.	SHEET	OF
TURN VOLUME SUMMARY	TM	11-Apr-23	UCRG215T-0003	2	2

E/W STREET : GLEN HELEN PKWY
CONDITION : AM PEAK HOUR

N/S STREET : I-15 SB RAMPS
PHF : 0.93

NORTH LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
5	0	18	0	0	0	0	0	1	0	1	2
5	0	23	0	0	0	0	0	0	0	0	0
7	0	20	0	0	1	0	0	0	0	0	0
2	2	16	0	0	0	1	0	1	5	0	3

SOUTH LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0

EAST LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
0	12	110	0	0	0	0	0	0	0	1	2
0	18	96	0	2	0	0	0	0	0	0	3
0	14	90	0	0	0	0	0	0	0	1	0
0	7	69	0	0	0	0	1	0	0	0	2

WEST LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
0	8	0	0	0	0	0	0	0	0	2	0
2	17	0	0	1	0	0	0	0	0	2	0
9	20	0	0	0	0	0	0	0	0	1	0
7	18	0	0	0	0	0	1	0	0	2	0

	Truck Volumes	Auto Volumes	Totals	Truck Percentage	Balanced Totals
GLEN HELEN PKWY					
EB LEFT	0	0	**0**	**0%**	**0**
EB THRU	9	63	**72**	**13%**	**72**
EB RIGHT	0	18	**18**	**1%**	**18**
WB LEFT	7	365	**372**	**2%**	**373**
WB THRU	5	51	**56**	**9%**	**56**
WB RIGHT	0	0	**0**	**0%**	**0**
I-15 SB RAMPS					
NB LEFT	0	0	**0**	**0%**	**0**
NB THRU	0	0	**0**	**0%**	**0**
NB RIGHT	0	0	**0**	**0%**	**0**
SB LEFT	8	77	**85**	**9%**	**85**
SB THRU	1	2	**3**	**33%**	**3**
SB RIGHT	6	19	**25**	**24%**	**25**

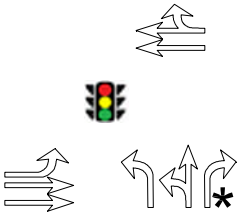
DAVID EVANS AND ASSOCIATES INC.

SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENTS	TM	11-Apr-23	UCRG215T-0003	1 OF 2

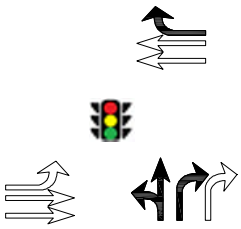
E/W STREET : GLEN HELEN PKWY
N/S STREET : I-15 NB RAMPS
CONDITION : AM PEAK HOUR

INTERSECTION : 2
PROJECTED GROWTH PER YEAR : 2.0%

CONDITION DIAGRAMS



EXISTING GEOMETRICS



MITIGATION GEOMETRICS

TURN MOVEMENTS

Condition	Existing Condition	Ambient Growth	Other Area Project Trips	Background Condition	Project Trips	Project Condition	Cumulative Condition	Cumulative + Project Condition
Scenario #	1			3		5	7	9
GLEN HELEN PKWY								
EB LEFT	74	7	0	81	0	81	120	120
EB THRU	83	8	26	117	254	371	98	352
EB RIGHT	0	0	0	0	0	0	0	0
WB LEFT	0	0	0	0	0	0	0	0
WB THRU	421	42	51	514	259	773	630	889
WB RIGHT	183	18	37	238	101	339	171	272
I-15 NB RAMPS								
NB LEFT	8	1	0	9	0	9	50	50
NB THRU	7	1	0	8	0	8	23	23
NB RIGHT	140	14	13	167	125	292	262	387
SB LEFT	0	0	0	0	0	0	0	0
SB THRU	0	0	0	0	0	0	0	0
SB RIGHT	0	0	0	0	0	0	0	0
TOTALS	**916**	**91**	**127**	**1134**	**739**	**1873**	**1354**	**2093**

DAVID EVANS AND ASSOCIATES INC.

SUBJECT	BY	DATE	JOB NO.	SHEET	OF
TURN VOLUME SUMMARY	TM	11-Apr-23	UCRG215T-0003	2	2

E/W STREET : GLEN HELEN PKWY
CONDITION : AM PEAK HOUR

N/S STREET : I-15 NB RAMPS
PHF : 0.90

NORTH LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0

SOUTH LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
28	0	5	1	0	0	2	0	0	0	1	0
29	0	0	1	0	0	0	0	0	2	1	0
32	5	1	0	0	1	0	0	0	1	0	0
43	0	1	0	0	0	0	0	0	1	0	0

EAST LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
37	73	0	0	0	0	0	0	0	0	2	0
59	122	0	0	0	0	0	0	0	1	3	0
26	113	0	0	1	0	0	0	0	0	3	0
60	103	0	0	0	0	0	0	0	0	1	0

WEST LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
0	19	11	0	0	0	0	0	0	0	0	2
0	17	9	0	0	0	0	1	0	0	2	2
0	19	21	0	0	1	0	0	0	0	0	2
0	18	21	0	1	0	0	1	0	0	0	1

	Truck Volumes	Auto Volumes	Totals	Truck Percentage	Balanced Totals
GLEN HELEN PKWY					
EB LEFT	8	62	**70**	**11%**	**74**
EB THRU	5	73	**78**	**6%**	**83**
EB RIGHT	0	0	**0**	**0%**	**0**
WB LEFT	0	0	**0**	**0%**	**0**
WB THRU	10	411	**421**	**2%**	**421**
WB RIGHT	1	182	**183**	**1%**	**183**
I-15 NB RAMPS					
NB LEFT	1	7	**8**	**13%**	**8**
NB THRU	2	5	**7**	**29%**	**7**
NB RIGHT	8	132	**140**	**6%**	**140**
SB LEFT	0	0	**0**	**0%**	**0**
SB THRU	0	0	**0**	**0%**	**0**
SB RIGHT	0	0	**0**	**0%**	**0**

DAVID EVANS AND ASSOCIATES INC.

SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENTS	TM	11-Apr-23	UCRG215T-0003	1 OF 2

E/W STREET : GLEN HELEN PKWY
N/S STREET : I-15 NB RAMPS
CONDITION : PM PEAK HOUR

INTERSECTION : 2
PROJECTED GROWTH PER YEAR : 2.0%

TURN MOVEMENTS

Condition	Existing Condition	Ambient Growth	Other Area Project Trips	Background Condition	Project Trips	Project Condition	Cumulative Condition	Cumulative + Project Condition
Scenario #	2			4		6	8	10
GLEN HELEN PKWY								
EB LEFT	61	6	0	67	0	67	111	111
EB THRU	174	17	53	244	161	405	207	368
EB RIGHT	0	0	0	0	0	0	0	0
WB LEFT	0	0	0	0	0	0	0	0
WB THRU	293	29	36	358	169	527	485	654
WB RIGHT	71	7	25	103	202	305	104	306
I-15 NB RAMPS								
NB LEFT	6	1	0	7	0	7	25	25
NB THRU	8	1	0	9	0	9	24	24
NB RIGHT	321	32	42	395	223	618	546	769
SB LEFT	0	0	0	0	0	0	0	0
SB THRU	0	0	0	0	0	0	0	0
SB RIGHT	0	0	0	0	0	0	0	0
TOTALS	**934**	**93**	**156**	**1183**	**755**	**1938**	**1502**	**2257**

DAVID EVANS AND ASSOCIATES INC.

SUBJECT	BY	DATE	JOB NO.	SHEET	OF
TURN VOLUME SUMMARY	TM	11-Apr-23	UCRG215T-0003	2	2

E/W STREET : GLEN HELEN PKWY
CONDITION : PM PEAK HOUR

N/S STREET : I-15 NB RAMPS
PHF : 0.92

NORTH LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0

SOUTH LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
70	0	2	0	0	0	0	0	0	5	2	0
83	1	0	0	0	0	0	0	0	0	1	0
77	1	1	0	0	1	0	0	0	2	0	1
83	2	1	0	0	0	0	0	0	1	1	0

EAST LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
22	59	0	0	0	0	0	0	0	0	0	0
19	65	0	0	0	0	0	0	0	0	3	0
7	67	0	0	0	0	0	0	0	0	0	0
15	63	0	0	0	0	0	1	0	0	4	0

WEST LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
0	39	11	0	0	1	0	0	0	0	0	1
0	34	11	0	0	0	0	0	0	0	0	4
0	38	19	0	1	0	0	0	0	0	0	3
0	61	7	0	0	0	0	0	0	0	0	4

	Truck Volumes	Auto Volumes	Totals	Truck Percentage	Balanced Totals
GLEN HELEN PKWY					
EB LEFT	13	48	**61**	**21%**	**61**
EB THRU	1	172	**173**	**1%**	**174**
EB RIGHT	0	0	**0**	**0%**	**0**
WB LEFT	0	0	**0**	**0%**	**0**
WB THRU	8	254	**262**	**3%**	**293**
WB RIGHT	0	63	**63**	**1%**	**71**
I-15 NB RAMPS					
NB LEFT	2	4	**6**	**33%**	**6**
NB THRU	4	4	**8**	**50%**	**8**
NB RIGHT	8	313	**321**	**2%**	**321**
SB LEFT	0	0	**0**	**0%**	**0**
SB THRU	0	0	**0**	**0%**	**0**
SB RIGHT	0	0	**0**	**0%**	**0**

CALCULATION OF FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES (NCHRP 255)

Intersection No.: 2
North/South Street: I-15 NB RAMPS
East/West Street: GLEN HELEN PKWY

Analysis Condition: YEAR 2040 FUTURE TRAFFIC

A.M. Peak Hour

Approach Direction		Base Year Count	Forecast Future Year Link Volume			Turn Volume	Rounded Volume
South leg	Left	8	Approach	192	Left	50	50
NB	Through	7	Departure	0	Through	23	23
	Right	140			Right	212	249
North leg	Left	0	Approach	0	Left	0	0
SB	Through	0	Departure	278	Through	0	0
	Right	0			Right	0	0
West leg	Left	74	Approach	177	Left	120	120
EB	Through	83	Departure	624	Through	61	72
	Right	0			Right	0	0
East leg	Left	0	Approach	677	Left	0	0
WB	Through	421	Departure	273	Through	574	579
	Right	183			Right	134	134

P.M. Peak Hour

Approach Direction		Base Year Count	Forecast Future Year Link Volume			Turn Volume	Rounded Volume
South leg	Left	6	Approach	572	Left	25	25
NB	Through	8	Departure	0	Through	24	24
	Right	321			Right	468	504
North leg	Left	0	Approach	0	Left	0	0
SB	Through	0	Departure	200	Through	0	0
	Right	0			Right	0	0
West leg	Left	61	Approach	265	Left	101	111
EB	Through	174	Departure	454	Through	140	154
	Right	0			Right	0	0
East leg	Left	0	Approach	528	Left	0	0
WB	Through	293	Departure	608	Through	429	449
	Right	71			Right	75	79

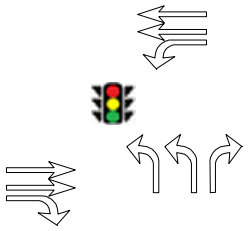
DAVID EVANS AND ASSOCIATES INC.

SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENTS	TM	11-Apr-23	UCRG215T-0003	1 OF 2

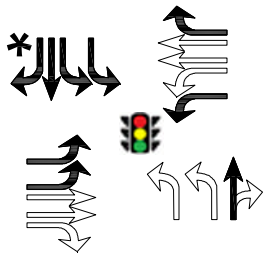
E/W STREET : GLEN HELEN PKWY
N/S STREET : CLEARWATER PKWY / PROJECT DWY "A"
CONDITION : AM PEAK HOUR

INTERSECTION : 3
PROJECTED GROWTH PER YEAR : 2.0%

CONDITION DIAGRAMS



EXISTING GEOMETRICS



MITIGATION GEOMETRICS

TURN MOVEMENTS

Condition	Existing Condition	Ambient Growth	Other Area Project Trips	Background Condition	Project Trips	Project Condition	Cumulative Condition	Cumulative + Project Condition
Scenario #	1			3		5	7	9
GLEN HELEN PKWY								
EB LEFT	0	0	0	0	438	438	0	438
EB THRU	83	8	13	104	-10	94	173	163
EB RIGHT	140	14	26	180	-49	131	187	138
WB LEFT	46	5	2	53	0	53	63	63
WB THRU	102	10	14	126	-309	0	402	93
WB RIGHT	0	0	0	0	343	343	0	343
CLEARWATER PKWY / PROJECT DWY "A"								
NB LEFT	502	50	74	626	-49	577	399	350
NB THRU	0	0	5	0	164	169	0	169
NB RIGHT	73	7	5	85	0	85	33	33
SB LEFT	0	0	0	0	49	49	0	49
SB THRU	0	0	2	0	150	152	0	152
SB RIGHT	0	0	0	0	718	718	0	718
TOTALS	**946**	**94**	**141**	**1174**	**1445**	**2809**	**1257**	**2709**

DAVID EVANS AND ASSOCIATES INC.

SUBJECT	BY	DATE	JOB NO.	SHEET	OF
TURN VOLUME SUMMARY	TM	11-Apr-23	UCRG215T-0003	2	OF 2

E/W STREET : GLEN HELEN PKWY
CONDITION : AM PEAK HOUR

N/S STREET : CLEARWATER PKWY / PROJECT
PHF : 0.84

NORTH LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0

SOUTH LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
17	0	100	0	0	0	0	0	0	0	0	0
20	0	158	0	0	0	0	0	0	0	0	0
23	0	123	0	0	0	0	0	0	0	0	0
12	0	98	0	0	0	1	0	0	0	0	0

EAST LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
0	10	11	0	0	0	0	0	0	0	2	0
0	23	13	0	0	0	0	0	0	0	4	0
0	16	14	0	1	0	0	0	0	0	3	0
0	37	8	0	0	0	0	0	0	0	1	0

WEST LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
32	15	0	0	1	0	0	2	0	0	0	0
31	15	0	1	0	0	0	1	0	0	4	0
26	15	0	0	0	0	0	0	0	0	1	0
42	21	0	0	1	0	0	1	0	0	1	0

	Truck Volumes	Auto Volumes	Totals	Truck Percentage	Balanced Totals
GLEN HELEN PKWY					
EB LEFT	0	0	**0**	**0%**	**0**
EB THRU	12	66	**78**	**15%**	**83**
EB RIGHT	1	131	**132**	**1%**	**140**
WB LEFT	0	46	**46**	**1%**	**46**
WB THRU	11	86	**97**	**11%**	**102**
WB RIGHT	0	0	**0**	**0%**	**0**
CLEARWATER PKWY / PROJECT					
NB LEFT	0	479	**479**	**1%**	**502**
NB THRU	0	0	**0**	**0%**	**0**
NB RIGHT	1	72	**73**	**1%**	**73**
SB LEFT	0	0	**0**	**0%**	**0**
SB THRU	0	0	**0**	**0%**	**0**
SB RIGHT	0	0	**0**	**0%**	**0**

DAVID EVANS AND ASSOCIATES INC.

SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENTS	TM	11-Apr-23	UCRG215T-0003	1 OF 2

E/W STREET : GLEN HELEN PKWY
N/S STREET : CLEARWATER PKWY / PROJECT DWY "A"
CONDITION : PM PEAK HOUR

INTERSECTION : 3
PROJECTED GROWTH PER YEAR : 2.0%

TURN MOVEMENTS

Condition	Existing Condition	Ambient Growth	Other Area Project Trips	Background Condition	Project Trips	Project Condition	Cumulative Condition	Cumulative + Project Condition
Scenario #	2			4		6	8	10
GLEN HELEN PKWY								
EB LEFT	0	0	0	0	738	738	0	738
EB THRU	234	23	11	268	-305	0	432	127
EB RIGHT	261	26	84	371	-49	322	321	272
WB LEFT	64	6	5	75	0	75	103	103
WB THRU	167	17	11	195	-17	178	323	306
WB RIGHT	0	0	0	0	49	49	0	49
CLEARWATER PKWY / PROJECT DWY "A"								
NB LEFT	197	20	50	267	-49	218	266	217
NB THRU	0	0	3	0	154	157	0	157
NB RIGHT	50	5	3	58	0	58	92	92
SB LEFT	0	0	0	0	340	340	0	340
SB THRU	0	0	5	0	145	150	0	150
SB RIGHT	0	0	0	0	437	437	0	437
TOTALS	**973**	**97**	**172**	**1234**	**1443**	**2722**	**1537**	**2988**

DAVID EVANS AND ASSOCIATES INC.

SUBJECT	BY	DATE	JOB NO.	SHEET	OF
TURN VOLUME SUMMARY	TM	11-Apr-23	UCRG215T-0003	2	OF 2

E/W STREET : GLEN HELEN PKWY
N/S STREET : CLEARWATER PKWY / PROJECT
CONDITION : PM PEAK HOUR
PHF : 0.90

NORTH LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0

SOUTH LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
14	0	60	0	0	0	0	0	0	0	0	0
10	0	60	0	0	0	1	0	0	0	0	0
10	0	33	0	0	0	0	0	0	0	0	0
14	0	44	0	0	0	1	0	0	0	0	0

EAST LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
0	38	19	0	2	0	0	1	0	0	1	0
0	42	18	0	0	0	0	0	0	0	9	0
0	31	15	0	0	0	0	1	0	0	5	0
0	37	12	0	0	0	0	0	0	0	0	0

WEST LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
52	62	0	0	0	0	0	0	0	0	1	0
66	47	0	0	0	0	0	1	0	0	3	0
54	41	0	0	0	0	0	0	0	0	2	0
62	48	0	0	0	0	0	0	0	0	5	0

	Truck Volumes	Auto Volumes	Totals	Truck Percentage	Balanced Totals
GLEN HELEN PKWY					
EB LEFT	0	0	**0**	**0%**	**0**
EB THRU	12	198	**210**	**6%**	**234**
EB RIGHT	0	234	**234**	**1%**	**261**
WB LEFT	0	64	**64**	**1%**	**64**
WB THRU	19	148	**167**	**11%**	**167**
WB RIGHT	0	0	**0**	**0%**	**0**
CLEARWATER PKWY / P					
NB LEFT	0	197	**197**	**1%**	**197**
NB THRU	0	0	**0**	**0%**	**0**
NB RIGHT	2	48	**50**	**4%**	**50**
SB LEFT	0	0	**0**	**0%**	**0**
SB THRU	0	0	**0**	**0%**	**0**
SB RIGHT	0	0	**0**	**0%**	**0**

CALCULATION OF FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES (NCHRP 255)

Intersection No.: 3
North/South Street: CLEARWATER PKWY / PROJECT DWY "A"
East/West Street: GLEN HELEN PKWY

Analysis Condition: YEAR 2040 FUTURE TRAFFIC

A.M. Peak Hour

Approach Direction		Base Year Count	Forecast Future Year Link Volume			Turn Volume	Rounded Volume
South leg	Left	502	Approach	588	Left	309	325
NB	Through	0	Departure	222	Through	0	0
	Right	73			Right	28	28
North leg	Left	0	Approach	0	Left	0	0
SB	Through	0	Departure	0	Through	0	0
	Right	0			Right	0	0
West leg	Left	0	Approach	273	Left	0	0
EB	Through	83	Departure	677	Through	160	160
	Right	140			Right	161	161
East leg	Left	46	Approach	356	Left	61	61
WB	Through	102	Departure	188	Through	368	388
	Right	0			Right	0	0

P.M. Peak Hour

Approach Direction		Base Year Count	Forecast Future Year Link Volume			Turn Volume	Rounded Volume
South leg	Left	197	Approach	283	Left	216	216
NB	Through	0	Departure	335	Through	0	0
	Right	50			Right	89	89
North leg	Left	0	Approach	0	Left	0	0
SB	Through	0	Departure	0	Through	0	0
	Right	0			Right	0	0
West leg	Left	0	Approach	608	Left	0	0
EB	Through	234	Departure	528	Through	421	421
	Right	261			Right	237	237
East leg	Left	64	Approach	380	Left	98	98
WB	Through	167	Departure	510	Through	312	312
	Right	0			Right	0	0

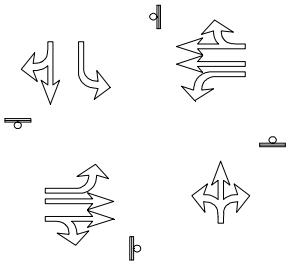
DAVID EVANS AND ASSOCIATES INC.

SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENTS	TM	11-Apr-23	UCRG215T-0003	1 OF 2

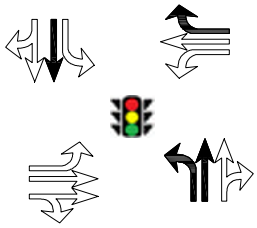
E/W STREET : CAJON BLVD
N/S STREET : GLEN HELEN PKWY/ DEVORE RD
CONDITION : AM PEAK HOUR

INTERSECTION : 4
PROJECTED GROWTH PER YEAR : 2.0%

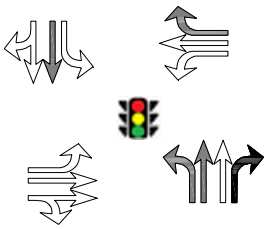
CONDITION DIAGRAMS



EXISTING GEOMETRICS



MITIGATION GEOMETRICS



CUMULATIVE MITIGATION GEOMETRICS

TURN MOVEMENTS

Condition	Existing Condition	Ambient Growth	Other Area Project Trips	Background Condition	Project Trips	Project Condition	Cumulative Condition	Cumulative + Project Condition
Scenario #	1			3		5	7	9
CAJON BLVD								
EB LEFT	139	14	12	165	0	165	157	157
EB THRU	7	1	0	8	0	8	59	59
EB RIGHT	42	4	0	46	0	46	185	185
WB LEFT	8	1	7	16	39	55	55	94
WB THRU	5	1	0	6	0	6	14	14
WB RIGHT	37	4	178	219	0	219	230	230
GLEN HELEN PKWY/ DEVORE RD								
NB LEFT	37	4	0	41	0	41	70	70
NB THRU	64	6	554	624	68	692	616	684
NB RIGHT	14	1	7	22	34	56	117	151
SB LEFT	33	3	151	187	0	187	264	264
SB THRU	70	7	339	416	78	494	464	542
SB RIGHT	53	5	14	72	0	72	57	57
TOTALS	**509**	**51**	**1262**	**1822**	**219**	**2041**	**2288**	**2507**

DAVID EVANS AND ASSOCIATES INC.

SUBJECT	BY	DATE	JOB NO.	SHEET	OF
TURN VOLUME SUMMARY	TM	11-Apr-23	UCRG215T-0003	2	OF 2

E/W STREET : CAJON BLVD
CONDITION : AM PEAK HOUR

N/S STREET : GLEN HELEN PKWY/ DEVORE RD
PHF : 0.88

NORTH LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
16	13	5	0	3	0	0	1	0	0	2	0
11	12	10	1	2	0	0	1	0	1	2	0
13	15	8	0	0	0	0	0	0	1	3	0
5	13	10	0	0	0	3	2	0	2	0	0

SOUTH LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
3	5	6	0	2	0	0	0	0	0	8	0
3	7	10	0	2	0	0	0	0	0	12	0
5	11	10	0	2	0	0	0	0	0	5	0
3	7	11	0	0	0	0	1	0	0	2	0

EAST LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
8	1	3	0	0	0	0	0	0	0	0	0
11	0	2	0	0	0	0	0	0	0	0	0
10	0	1	0	0	0	0	0	0	0	0	0
8	4	2	0	0	0	0	0	0	0	0	0

WEST LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
1	0	27	1	0	2	0	0	0	2	0	2
6	3	30	0	0	1	0	0	0	0	0	2
12	3	44	0	0	0	0	0	0	2	0	0
13	1	30	0	0	0	2	0	0	3	0	1

	Truck Volumes	Auto Volumes	Totals	Truck Percentage	Balanced Totals
CAJON BLVD					
EB LEFT	8	131	**139**	**6%**	**139**
EB THRU	0	7	**7**	**1%**	**7**
EB RIGHT	10	32	**42**	**24%**	**42**
WB LEFT	0	8	**8**	**1%**	**8**
WB THRU	0	5	**5**	**1%**	**5**
WB RIGHT	0	37	**37**	**1%**	**37**
GLEN HELEN PKWY/ DEVORE RI					
NB LEFT	0	37	**37**	**1%**	**37**
NB THRU	34	30	**64**	**53%**	**64**
NB RIGHT	0	14	**14**	**1%**	**14**
SB LEFT	0	33	**33**	**1%**	**33**
SB THRU	16	53	**69**	**23%**	**70**
SB RIGHT	8	45	**53**	**15%**	**53**

DAVID EVANS AND ASSOCIATES INC.

SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENTS	TM	11-Apr-23	UCRG215T-0003	1 OF 2

E/W STREET : CAJON BLVD
N/S STREET : GLEN HELEN PKWY/ DEVORE RD
CONDITION : PM PEAK HOUR

INTERSECTION : 4
PROJECTED GROWTH PER YEAR : 2.0%

TURN MOVEMENTS

Condition	Existing Condition	Ambient Growth	Other Area Project Trips	Background Condition	Project Trips	Project Condition	Cumulative Condition	Cumulative + Project Condition
Scenario #	2			4		6	8	10
CAJON BLVD								
EB LEFT	74	7	10	91	0	91	68	68
EB THRU	21	2	0	23	0	23	44	44
EB RIGHT	141	14	0	155	0	155	162	162
WB LEFT	8	1	5	14	35	49	92	127
WB THRU	6	1	0	7	0	7	32	32
WB RIGHT	17	2	148	167	0	167	274	274
GLEN HELEN PKWY/ DEVORE RD								
NB LEFT	157	16	0	173	0	173	222	222
NB THRU	130	13	342	485	64	549	600	664
NB RIGHT	9	1	5	15	32	47	53	85
SB LEFT	27	3	131	161	0	161	204	204
SB THRU	74	7	325	406	70	476	435	505
SB RIGHT	264	26	14	304	0	304	205	205
TOTALS	**928**	**93**	**980**	**2001**	**201**	**2202**	**2391**	**2592**

DAVID EVANS AND ASSOCIATES INC.

SUBJECT	BY	DATE	JOB NO.	SHEET	OF
TURN VOLUME SUMMARY	TM	11-Apr-23	UCRG215T-0003	2	OF 2

E/W STREET : CAJON BLVD
CONDITION : PM PEAK HOUR

N/S STREET : GLEN HELEN PKWY/ DEVORE RD
PHF : 0.93

NORTH LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
64	12	10	2	3	0	2	2	0	3	6	0
62	11	6	3	2	0	0	1	0	4	6	0
64	17	11	0	0	0	0	0	0	2	3	0
49	8	0	0	0	0	1	0	0	5	3	0

SOUTH LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
1	24	49	0	0	0	0	1	0	0	4	1
2	25	42	0	2	0	0	1	0	0	2	1
2	40	25	0	0	0	0	0	0	0	0	0
4	19	39	0	2	0	0	0	0	0	0	0

EAST LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
4	0	0	0	0	0	0	0	0	0	0	0
3	3	3	0	0	0	0	0	0	0	0	0
5	3	1	0	0	0	0	0	0	0	0	0
4	0	4	0	0	0	0	0	0	0	0	0

WEST LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
31	8	14	1	0	0	0	0	0	1	0	2
38	5	16	1	0	0	0	0	0	1	0	1
34	5	20	0	0	0	1	0	0	0	0	0
33	3	14	0	0	1	0	0	0	0	0	0

	Truck Volumes	Auto Volumes	Totals	Truck Percentage	Balanced Totals
CAJON BLVD					
EB LEFT	4	64	**68**	**6%**	**74**
EB THRU	0	21	**21**	**1%**	**21**
EB RIGHT	5	136	**141**	**4%**	**141**
WB LEFT	0	8	**8**	**1%**	**8**
WB THRU	0	6	**6**	**1%**	**6**
WB RIGHT	0	16	**16**	**1%**	**17**
GLEN HELEN PKWY/ DE					
NB LEFT	2	155	**157**	**1%**	**157**
NB THRU	12	108	**120**	**10%**	**130**
NB RIGHT	0	9	**9**	**1%**	**9**
SB LEFT	0	27	**27**	**1%**	**27**
SB THRU	26	48	**74**	**35%**	**74**
SB RIGHT	22	239	**261**	**8%**	**264**

CALCULATION OF FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES (NCHRP 255)

Intersection No.: 4
North/South Street: GLEN HELEN PKWY/ DEVORE RD
East/West Street: CAJON BLVD

Analysis Condition: YEAR 2040 FUTURE TRAFFIC

A.M. Peak Hour

Approach Direction		Base Year Count	Forecast Future Year Link Volume			Turn Volume	Rounded Volume
South leg	Left	37	Approach	72	Left	70	70
NB	Through	64	Departure	264	Through	62	62
	Right	14			Right	110	110
North leg	Left	33	Approach	287	Left	89	113
SB	Through	70	Departure	255	Through	98	125
	Right	53			Right	34	43
West leg	Left	139	Approach	431	Left	145	145
EB	Through	7	Departure	142	Through	59	59
	Right	42			Right	185	185
East leg	Left	8	Approach	315	Left	48	48
WB	Through	5	Departure	444	Through	14	14
	Right	37			Right	52	52

P.M. Peak Hour

Approach Direction		Base Year Count	Forecast Future Year Link Volume			Turn Volume	Rounded Volume
South leg	Left	157	Approach	255	Left	222	222
NB	Through	130	Departure	205	Through	250	258
	Right	9			Right	48	48
North leg	Left	27	Approach	374	Left	73	73
SB	Through	74	Departure	631	Through	110	110
	Right	264			Right	190	191
West leg	Left	74	Approach	312	Left	56	58
EB	Through	21	Departure	323	Through	44	44
	Right	141			Right	162	162
East leg	Left	8	Approach	572	Left	87	87
WB	Through	6	Departure	352	Through	32	32
	Right	17			Right	122	126

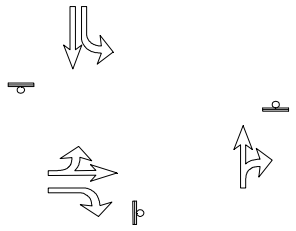
DAVID EVANS AND ASSOCIATES INC.

SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENTS	TM	11-Apr-23	UCRG215T-0003	1 OF 2

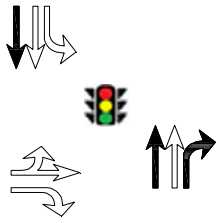
E/W STREET : I-215 SB RAMPS
N/S STREET : DEVORE RD
CONDITION : AM PEAK HOUR

INTERSECTION : 5
PROJECTED GROWTH PER YEAR : 2.0%

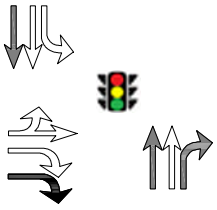
CONDITION DIAGRAMS



EXISTING GEOMETRICS



MITIGATION GEOMETRICS



CUMULATIVE MITIGATION GEOMETRICS

TURN MOVEMENTS

Condition	Existing Condition	Ambient Growth	Other Area Project Trips	Background Condition	Project Trips	Project Condition	Cumulative Condition	Cumulative + Project Condition
Scenario #	1			3		5	7	9
I-215 SB RAMPS								
EB LEFT	36	4	0	40	0	40	152	152
EB THRU	2	0	0	2	0	2	10	10
EB RIGHT	65	7	373	445	0	445	549	549
WB LEFT	0	0	0	0	0	0	0	0
WB THRU	0	0	0	0	0	0	0	0
WB RIGHT	0	0	0	0	0	0	0	0
DEVORE RD								
NB LEFT	0	0	0	0	0	0	0	0
NB THRU	58	6	555	619	34	653	588	622
NB RIGHT	182	18	189	389	34	423	415	449
SB LEFT	71	7	0	78	0	78	156	156
SB THRU	91	9	131	231	78	309	236	314
SB RIGHT	0	0	0	0	0	0	0	0
TOTALS	**505**	**51**	**1248**	**1804**	**146**	**1950**	**2106**	**2252**

DAVID EVANS AND ASSOCIATES INC.

SUBJECT	BY	DATE	JOB NO.	SHEET	OF
TURN VOLUME SUMMARY	TM	11-Apr-23	UCRG215T-0003	2	2

E/W STREET : I-215 SB RAMPS
CONDITION : AM PEAK HOUR

N/S STREET : DEVORE RD
PHF : 0.86

NORTH LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
0	20	8	0	3	1	0	1	0	0	0	0
0	18	20	0	0	2	0	1	0	0	0	0
0	34	28	0	0	1	0	0	0	0	0	0
0	11	7	0	0	4	0	1	0	0	2	0

SOUTH LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
40	0	0	3	1	0	0	0	0	1	9	0
37	10	0	0	3	0	0	0	0	4	11	0
53	8	0	1	1	0	0	0	0	0	5	0
39	6	0	0	0	0	0	1	0	0	3	0

EAST LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0

WEST LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
14	0	9	0	0	0	0	0	0	2	0	0
14	0	10	3	0	0	0	0	0	4	0	1
3	1	4	0	1	0	0	0	1	4	0	1
17	0	5	0	0	1	3	0	1	1	0	3

	Truck Volumes	Auto Volumes	Totals	Truck Percentage	Balanced Totals
I-215 SB RAMPS					
EB LEFT	8	28	**36**	**22%**	**36**
EB THRU	1	1	**2**	**50%**	**2**
EB RIGHT	17	48	**65**	**26%**	**65**
WB LEFT	0	0	**0**	**0%**	**0**
WB THRU	0	0	**0**	**0%**	**0**
WB RIGHT	0	0	**0**	**0%**	**0**
DEVORE RD					
NB LEFT	0	0	**0**	**0%**	**0**
NB THRU	34	24	**58**	**59%**	**58**
NB RIGHT	9	169	**178**	**5%**	**182**
SB LEFT	8	63	**71**	**11%**	**71**
SB THRU	8	83	**91**	**9%**	**91**
SB RIGHT	0	0	**0**	**0%**	**0**

DAVID EVANS AND ASSOCIATES INC.

SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENTS	TM	11-Apr-23	UCRG215T-0003	1 OF 2

E/W STREET : I-215 SB RAMPS
N/S STREET : DEVORE RD
CONDITION : PM PEAK HOUR

INTERSECTION : 5
PROJECTED GROWTH PER YEAR : 2.0%

TURN MOVEMENTS

Condition	Existing Condition	Ambient Growth	Other Area Project Trips	Background Condition	Project Trips	Project Condition	Cumulative Condition	Cumulative + Project Condition
Scenario #	2			4		6	8	10
I-215 SB RAMPS								
EB LEFT	115	12	0	127	0	127	154	154
EB THRU	1	0	0	1	0	1	1	1
EB RIGHT	219	22	346	587	0	587	563	563
WB LEFT	0	0	0	0	0	0	0	0
WB THRU	0	0	0	0	0	0	0	0
WB RIGHT	0	0	0	0	0	0	0	0
DEVORE RD								
NB LEFT	0	0	0	0	0	0	0	0
NB THRU	138	14	372	524	32	556	678	710
NB RIGHT	83	8	128	219	32	251	264	296
SB LEFT	48	5	0	53	0	53	52	52
SB THRU	146	15	124	285	70	355	281	351
SB RIGHT	0	0	0	0	0	0	0	0
TOTALS	**750**	**76**	**970**	**1796**	**134**	**1930**	**1993**	**2127**

DAVID EVANS AND ASSOCIATES INC.

SUBJECT	BY	DATE	JOB NO.	SHEET	OF
TURN VOLUME SUMMARY	TM	11-Apr-23	UCRG215T-0003	2	2

E/W STREET : I-215 SB RAMPS
CONDITION : PM PEAK HOUR

N/S STREET : DEVORE RD
PHF : 0.86

NORTH LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
0	27	8	0	0	0	0	1	0	0	1	0
0	36	10	0	2	0	0	2	0	0	1	0
0	42	13	0	0	0	0	0	0	0	0	0
0	33	17	0	0	0	0	0	0	0	1	0

SOUTH LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
22	28	0	0	0	0	0	2	0	2	3	0
21	20	0	0	0	0	0	1	0	0	7	0
18	26	0	0	2	0	1	0	0	1	2	0
18	47	0	0	0	0	0	0	0	0	0	0

EAST LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0

WEST LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
28	0	21	0	0	0	0	0	0	12	0	0
50	0	32	3	0	0	2	0	0	8	0	0
36	0	24	5	0	0	1	1	0	11	0	0
58	0	38	0	0	0	0	0	0	5	0	0

	Truck Volumes	Auto Volumes	Totals	Truck Percentage	Balanced Totals
I-215 SB RAMPS					
EB LEFT	0	115	**115**	**1%**	**115**
EB THRU	1	0	**1**	**100%**	**1**
EB RIGHT	47	172	**219**	**21%**	**219**
WB LEFT	0	0	**0**	**0%**	**0**
WB THRU	0	0	**0**	**0%**	**0**
WB RIGHT	0	0	**0**	**0%**	**0**
DEVORE RD					
NB LEFT	0	0	**0**	**0%**	**0**
NB THRU	17	121	**138**	**12%**	**138**
NB RIGHT	4	79	**83**	**5%**	**83**
SB LEFT	0	48	**48**	**1%**	**48**
SB THRU	8	138	**146**	**5%**	**146**
SB RIGHT	0	0	**0**	**0%**	**0**

CALCULATION OF FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES (NCHRP 255)

Intersection No.: 5
North/South Street: DEVORE RD
East/West Street: I-215 SB RAMPS

Analysis Condition: YEAR 2040 FUTURE TRAFFIC

A.M. Peak Hour

Approach Direction		Base Year Count	Forecast Future Year Link Volume			Turn Volume	Rounded Volume
South leg	Left	0	Approach	259	Left	0	0
NB	Through	58	Departure	255	Through	27	33
	Right	182			Right	184	226
North leg	Left	71	Approach	261	Left	118	156
SB	Through	91	Departure	113	Through	79	105
	Right	0			Right	0	0
West leg	Left	36	Approach	364	Left	86	152
EB	Through	2	Departure	0	Through	10	10
	Right	65			Right	176	176
East leg	Left	0	Approach	0	Left	0	0
WB	Through	0	Departure	312	Through	0	0
	Right	0			Right	0	0

P.M. Peak Hour

Approach Direction		Base Year Count	Forecast Future Year Link Volume			Turn Volume	Rounded Volume
South leg	Left	0	Approach	428	Left	0	0
NB	Through	138	Departure	374	Through	306	306
	Right	83			Right	136	136
North leg	Left	48	Approach	203	Left	52	52
SB	Through	146	Departure	460	Through	157	157
	Right	0			Right	0	0
West leg	Left	115	Approach	361	Left	154	154
EB	Through	1	Departure	0	Through	1	1
	Right	219			Right	217	217
East leg	Left	0	Approach	0	Left	0	0
WB	Through	0	Departure	189	Through	0	0
	Right	0			Right	0	0

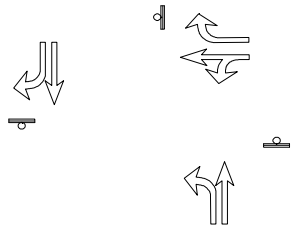
DAVID EVANS AND ASSOCIATES INC.

SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENTS	TM	11-Apr-23	UCRG215T-0003	1 OF 2

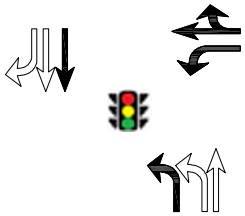
E/W STREET : I-215 NB RAMPS
N/S STREET : DEVORE RD
CONDITION : AM PEAK HOUR

INTERSECTION : 6
PROJECTED GROWTH PER YEAR : 2.0%

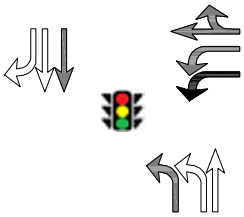
CONDITION DIAGRAMS



EXISTING GEOMETRICS



MITIGATION GEOMETRICS



CUMULATIVE MITIGATION GEOMETRICS

TURN MOVEMENTS

Condition	Existing Condition	Ambient Growth	Other Area Project Trips	Background Condition	Project Trips	Project Condition	Cumulative Condition	Cumulative + Project Condition
Scenario #	1			3		5	7	9
I-215 NB RAMPS								
EB LEFT	0	0	0	0	0	0	0	0
EB THRU	0	0	0	0	0	0	0	0
EB RIGHT	0	0	0	0	0	0	0	0
WB LEFT	87	9	129	225	39	264	225	264
WB THRU	1	0	0	1	0	1	1	1
WB RIGHT	23	2	0	25	0	25	4	4
DEVORE RD								
NB LEFT	56	6	550	612	0	612	668	668
NB THRU	38	4	5	47	34	81	72	106
NB RIGHT	0	0	0	0	0	0	0	0
SB LEFT	0	0	0	0	0	0	0	0
SB THRU	75	8	2	85	39	124	167	206
SB RIGHT	15	2	0	17	0	17	6	6
TOTALS	**295**	**31**	**686**	**1012**	**112**	**1124**	**1143**	**1255**

DAVID EVANS AND ASSOCIATES INC.

SUBJECT	BY	DATE	JOB NO.	SHEET	OF
TURN VOLUME SUMMARY	TM	11-Apr-23	UCRG215T-0003	2	2

E/W STREET : I-215 NB RAMPS
CONDITION : AM PEAK HOUR

N/S STREET : DEVORE RD
PHF : 0.80

NORTH LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
2	10	0	0	2	0	0	0	0	0	0	0
3	21	0	0	2	0	0	0	0	0	0	0
3	26	0	0	1	0	0	0	0	0	0	0
7	8	0	0	4	0	0	1	0	0	0	0

SOUTH LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
0	9	0	0	0	1	0	0	0	0	0	9
0	11	9	0	0	3	0	0	0	0	2	10
0	6	6	0	0	1	0	1	0	0	0	6
0	7	4	0	1	0	0	1	1	0	0	6

EAST LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
4	0	19	0	0	1	0	0	1	0	0	0
4	0	17	0	0	0	0	0	1	0	0	0
4	0	36	0	0	0	1	0	0	1	0	0
7	1	11	0	0	0	0	0	0	2	0	1

WEST LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0

	Truck Volumes	Auto Volumes	Totals	Truck Percentage	Balanced Totals
I-215 NB RAMPS					
EB LEFT	0	0	**0**	**0%**	**0**
EB THRU	0	0	**0**	**0%**	**0**
EB RIGHT	0	0	**0**	**0%**	**0**
WB LEFT	4	83	**87**	**5%**	**87**
WB THRU	0	1	**1**	**1%**	**1**
WB RIGHT	4	19	**23**	**17%**	**23**
DEVORE RD					
NB LEFT	37	19	**56**	**66%**	**56**
NB THRU	5	33	**38**	**13%**	**38**
NB RIGHT	0	0	**0**	**0%**	**0**
SB LEFT	0	0	**0**	**0%**	**0**
SB THRU	10	65	**75**	**13%**	**75**
SB RIGHT	0	15	**15**	**1%**	**15**

DAVID EVANS AND ASSOCIATES INC.

SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENTS	TM	11-Apr-23	UCRG215T-0003	1 OF 2

E/W STREET : I-215 NB RAMPS
N/S STREET : DEVORE RD
CONDITION : PM PEAK HOUR

INTERSECTION : 6
PROJECTED GROWTH PER YEAR : 2.0%

TURN MOVEMENTS

Condition	Existing Condition	Ambient Growth	Other Area Project Trips	Background Condition	Project Trips	Project Condition	Cumulative Condition	Cumulative + Project Condition
Scenario #	2			4		6	8	10
I-215 NB RAMPS								
EB LEFT	0	0	0	0	0	0	0	0
EB THRU	0	0	0	0	0	0	0	0
EB RIGHT	0	0	0	0	0	0	0	0
WB LEFT	132	13	119	264	35	299	253	288
WB THRU	5	1	0	6	0	6	5	5
WB RIGHT	28	3	0	31	0	31	33	33
DEVORE RD								
NB LEFT	142	14	369	525	0	525	606	606
NB THRU	111	11	3	125	32	157	226	258
NB RIGHT	0	0	0	0	0	0	0	0
SB LEFT	0	0	0	0	0	0	0	0
SB THRU	62	6	5	73	35	108	80	115
SB RIGHT	45	5	0	50	0	50	52	52
TOTALS	**525**	**53**	**496**	**1074**	**102**	**1176**	**1255**	**1357**

DAVID EVANS AND ASSOCIATES INC.

SUBJECT	BY	DATE	JOB NO.	SHEET	OF
TURN VOLUME SUMMARY	TM	11-Apr-23	UCRG215T-0003	2	2

E/W STREET : I-215 NB RAMPS
CONDITION : PM PEAK HOUR
N/S STREET : DEVORE RD
PHF : 0.86

NORTH LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
8	10	0	0	0	0	0	0	0	0	0	0
16	14	0	0	0	0	0	0	0	0	0	0
11	17	0	0	0	0	0	0	0	0	1	0
10	20	0	0	0	0	0	0	0	0	0	0

SOUTH LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
0	21	28	0	0	0	0	0	2	0	1	2
0	31	21	0	0	0	0	0	1	0	0	7
0	24	26	0	0	2	0	0	0	0	1	1
0	33	52	0	0	0	0	0	0	0	0	0

EAST LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
5	0	25	0	0	0	0	0	1	0	0	1
10	3	32	0	0	2	0	0	2	0	0	1
7	2	37	0	0	0	0	0	0	0	0	0
6	0	31	0	0	0	0	0	0	0	0	0

WEST LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0

	Truck Volumes	Auto Volumes	Totals	Truck Percentage	Balanced Totals
I-215 NB RAMPS					
EB LEFT	0	0	**0**	**0%**	**0**
EB THRU	0	0	**0**	**0%**	**0**
EB RIGHT	0	0	**0**	**0%**	**0**
WB LEFT	7	125	**132**	**5%**	**132**
WB THRU	0	5	**5**	**1%**	**5**
WB RIGHT	0	28	**28**	**1%**	**28**
DEVORE RD					
NB LEFT	15	127	**142**	**11%**	**142**
NB THRU	2	109	**111**	**2%**	**111**
NB RIGHT	0	0	**0**	**0%**	**0**
SB LEFT	0	0	**0**	**0%**	**0**
SB THRU	1	61	**62**	**2%**	**62**
SB RIGHT	0	45	**45**	**1%**	**45**

CALCULATION OF FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES (NCHRP 255)

Intersection No.: 6
North/South Street: DEVORE RD
East/West Street: I-215 NB RAMPS

Analysis Condition: YEAR 2040 FUTURE TRAFFIC

A.M. Peak Hour

Approach Direction		Base Year Count	Forecast Future Year Link Volume			Turn Volume	Rounded Volume
South leg	Left	56	Approach	113	Left	118	118
NB	Through	38	Departure	261	Through	67	67
	Right	0			Right	0	0
North leg	Left	0	Approach	222	Left	0	0
SB	Through	75	Departure	71	Through	165	165
	Right	15			Right	6	6
West leg	Left	0	Approach	0	Left	0	0
EB	Through	0	Departure	124	Through	0	0
	Right	0			Right	0	0
East leg	Left	87	Approach	129	Left	96	96
WB	Through	1	Departure	0	Through	0	1
	Right	23			Right	4	4

P.M. Peak Hour

Approach Direction		Base Year Count	Forecast Future Year Link Volume			Turn Volume	Rounded Volume
South leg	Left	142	Approach	460	Left	237	237
NB	Through	111	Departure	203	Through	223	223
	Right	0			Right	0	0
North leg	Left	0	Approach	125	Left	0	0
SB	Through	62	Departure	256	Through	73	75
	Right	45			Right	52	52
West leg	Left	0	Approach	0	Left	0	0
EB	Through	0	Departure	294	Through	0	0
	Right	0			Right	0	0
East leg	Left	132	Approach	168	Left	130	134
WB	Through	5	Departure	0	Through	5	5
	Right	28			Right	33	33

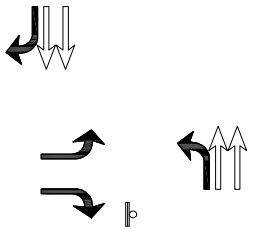
DAVID EVANS AND ASSOCIATES INC.

SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENTS	TM	11-Apr-23	UCRG215T-0003	1 OF 2

E/W STREET : GLEN HELEN PKWY
N/S STREET : PROJECT DWY "B"
CONDITION : AM PEAK HOUR

INTERSECTION : 7
PROJECTED GROWTH PER YEAR : 2.0%

CONDITION DIAGRAMS



MITIGATION GEOMETRICS

TURN MOVEMENTS

Condition	Existing Condition	Ambient Growth	Other Area Project Trips	Background Condition	Project Trips	Project Condition	Cumulative Condition	Cumulative + Project Condition
Scenario #	1			3		5	7	9
GLEN HELEN PKWY								
EB LEFT	0	0	0	0	102	102	0	102
EB THRU	0	0	0	0	0	0	0	0
EB RIGHT	0	0	0	0	34	34	0	34
WB LEFT	0	0	0	0	0	0	0	0
WB THRU	0	0	0	0	0	0	0	0
WB RIGHT	0	0	0	0	0	0	0	0
PROJECT DWY "B"								
NB LEFT	0	0	0	0	39	39	0	39
NB THRU	156	15	18	189	0	189	206	206
NB RIGHT	0	0	0	0	0	0	0	0
SB LEFT	0	0	0	0	0	0	0	0
SB THRU	148	15	16	179	0	179	465	465
SB RIGHT	0	0	0	0	117	117	0	117
TOTALS	**304**	**30**	**34**	**368**	**292**	**660**	**671**	**963**

DAVID EVANS AND ASSOCIATES INC.

SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENTS	TM	11-Apr-23	UCRG215T-0003	1 OF 2

E/W STREET : GLEN HELEN PKWY
N/S STREET : PROJECT DWY "B"
CONDITION : PM PEAK HOUR

INTERSECTION : 7
PROJECTED GROWTH PER YEAR : 2.0%

TURN MOVEMENTS

Condition	Existing Condition	Ambient Growth	Other Area Project Trips	Background Condition	Project Trips	Project Condition	Cumulative Condition	Cumulative + Project Condition
Scenario #	2			4		6	8	10
GLEN HELEN PKWY								
EB LEFT	0	0	0	0	96	96	0	96
EB THRU	0	0	0	0	0	0	0	0
EB RIGHT	0	0	0	0	32	32	0	32
WB LEFT	0	0	0	0	0	0	0	0
WB THRU	0	0	0	0	0	0	0	0
WB RIGHT	0	0	0	0	0	0	0	0
PROJECT DWY "B"								
NB LEFT	0	0	0	0	35	35	0	35
NB THRU	284	28	14	326	0	326	524	524
NB RIGHT	0	0	0	0	0	0	0	0
SB LEFT	0	0	0	0	0	0	0	0
SB THRU	231	23	16	270	0	270	426	426
SB RIGHT	0	0	0	0	105	105	0	105
TOTALS	**515**	**51**	**30**	**596**	**268**	**864**	**950**	**1218**

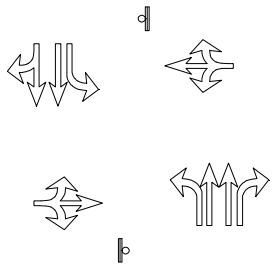
DAVID EVANS AND ASSOCIATES INC.

SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENTS	TM	11-Apr-23	UCRG215T-0003	1 OF 2

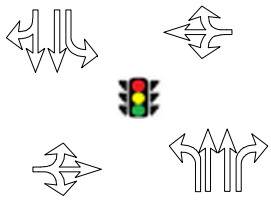
E/W STREET : GLEN HELEN ROAD
N/S STREET : GLEN HELEN PKWY
CONDITION : AM PEAK HOUR

INTERSECTION : 8
PROJECTED GROWTH PER YEAR : 2.0%

CONDITION DIAGRAMS



EXISTING GEOMETRICS



MITIGATION GEOMETRICS

TURN MOVEMENTS

Condition	Existing Condition	Ambient Growth	Other Area Project Trips	Background Condition	Project Trips	Project Condition	Cumulative Condition	Cumulative + Project Condition
Scenario #	1			3		5	7	9
GLEN HELEN ROAD								
EB LEFT	2	1	471	474	0	474	478	478
EB THRU	2	1	0	3	0	3	7	7
EB RIGHT	30	3	0	33	0	33	42	42
WB LEFT	2	1	0	3	0	3	30	30
WB THRU	2	1	0	3	0	3	7	7
WB RIGHT	2	1	0	3	0	3	7	7
GLEN HELEN PKWY								
NB LEFT	43	4	0	47	0	47	13	13
NB THRU	111	9	18	138	102	240	246	348
NB RIGHT	2	1	0	3	0	3	7	7
SB LEFT	2	1	0	3	0	3	7	7
SB THRU	116	10	16	142	117	259	360	477
SB RIGHT	2	1	256	259	0	259	263	263
TOTALS	**316**	**34**	**761**	**1111**	**219**	**1330**	**1467**	**1686**

DAVID EVANS AND ASSOCIATES INC.

SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENTS	TM	11-Apr-23	UCRG215T-0003	1 OF 2

E/W STREET : GLEN HELEN ROAD
N/S STREET : GLEN HELEN PKWY
CONDITION : PM PEAK HOUR

INTERSECTION : 8
PROJECTED GROWTH PER YEAR : 2.0%

TURN MOVEMENTS

Condition	Existing Condition	Ambient Growth	Other Area Project Trips	Background Condition	Project Trips	Project Condition	Cumulative Condition	Cumulative + Project Condition
Scenario #	1			4		6	8	10
GLEN HELEN ROAD								
EB LEFT	14	1	279	294	0	294	300	300
EB THRU	2	1	0	3	0	3	7	7
EB RIGHT	10	1	0	11	0	11	20	20
WB LEFT	2	1	0	3	0	3	15	15
WB THRU	2	1	0	3	0	3	7	7
WB RIGHT	2	1	0	3	0	3	7	7
GLEN HELEN PKWY								
NB LEFT	2	1	0	3	0	3	7	7
NB THRU	280	28	14	322	96	418	514	610
NB RIGHT	2	1	0	3	0	3	7	7
SB LEFT	2	1	0	3	0	3	7	7
SB THRU	219	20	16	255	105	360	361	466
SB RIGHT	2	1	256	259	0	259	263	263
TOTALS	**539**	**58**	**565**	**1162**	**201**	**1363**	**1515**	**1716**

DAVID EVANS AND ASSOCIATES INC.

SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENTS	TM	11-Apr-23	UCRG215T-0003	1 OF 2

E/W STREET : GLEN HELEN PKWY
N/S STREET : I-15 SB RAMPS
CONDITION : PM PEAK HOUR

INTERSECTION : 1
PROJECTED GROWTH PER YEAR : 2.0%

TURN MOVEMENTS

Condition	Existing Condition	Ambient Growth	Other Area Project Trips	Background Condition	Project Trips	Project Condition	Cumulative Condition	Cumulative + Project Condition
Scenario #	2			4		6	8	10
GLEN HELEN PKWY								
EB LEFT	0	0	0	0	0	0	0	0
EB THRU	62	6	11	79	53	132	99	152
EB RIGHT	1	0	0	1	0	1	2	2
WB LEFT	234	23	25	282	121	403	420	541
WB THRU	65	7	11	83	48	131	90	138
WB RIGHT	0	0	0	0	0	0	0	0
I-15 SB RAMPS								
NB LEFT	0	0	0	0	0	0	0	0
NB THRU	0	0	0	0	0	0	0	0
NB RIGHT	0	0	0	0	0	0	0	0
SB LEFT	173	17	42	232	108	340	219	327
SB THRU	29	3	0	32	0	32	35	35
SB RIGHT	59	6	0	65	0	65	51	51
TOTALS	**623**	**62**	**89**	**774**	**330**	**1104**	**916**	**1246**

DAVID EVANS AND ASSOCIATES INC.

SUBJECT	BY	DATE	JOB NO.	SHEET	OF
TURN VOLUME SUMMARY	TM	11-Apr-23	UCRG215T-0003	2	2

E/W STREET : GLEN HELEN PKWY
CONDITION : PM PEAK HOUR

N/S STREET : I-15 SB RAMPS
PHF : 0.86

NORTH LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
8	2	42	0	0	0	0	0	0	0	0	0
11	3	36	0	0	0	0	0	0	2	0	1
19	13	29	2	0	1	0	0	0	0	0	3
15	11	59	1	0	0	0	0	0	1	0	2

SOUTH LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0

EAST LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
0	14	46	0	0	0	0	0	0	0	0	0
0	13	51	0	0	1	0	0	0	0	2	1
0	15	53	0	0	1	0	0	0	0	1	0
0	14	53	0	0	0	0	0	1	0	0	4

WEST LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
0	9	0	0	1	0	0	0	0	0	0	0
0	15	0	0	0	0	0	0	0	0	1	0
0	25	0	0	0	0	0	0	0	0	0	0
0	10	0	0	0	0	0	0	0	0	1	0

	Truck Volumes	Auto Volumes	Totals	Truck Percentage	Balanced Totals
GLEN HELEN PKWY					
EB LEFT	0	0	**0**	**0%**	**0**
EB THRU	3	59	**62**	**5%**	**62**
EB RIGHT	0	0	**1**	**1%**	**1**
WB LEFT	8	203	**211**	**4%**	**234**
WB THRU	3	56	**59**	**5%**	**65**
WB RIGHT	0	0	**0**	**0%**	**0**
I-15 SB RAMPS					
NB LEFT	0	0	**0**	**0%**	**0**
NB THRU	0	0	**0**	**0%**	**0**
NB RIGHT	0	0	**0**	**0%**	**0**
SB LEFT	7	166	**173**	**4%**	**173**
SB THRU	0	29	**29**	**1%**	**29**
SB RIGHT	6	53	**59**	**10%**	**59**

CALCULATION OF FUTURE DIRECTIONAL TURN VOLUMES FROM FUTURE DIRECTIONAL LINK VOLUMES (NCHRP 255)

Intersection No.: 1
North/South Street: I-15 SB RAMPS
East/West Street: GLEN HELEN PKWY

Analysis Condition: YEAR 2040 FUTURE TRAFFIC

A.M. Peak Hour

Approach Direction		Base Year Count	Forecast Future Year Link Volume			Turn Volume	Rounded Volume
South leg	Left	0	Approach	0	Left	0	0
NB	Through	0	Departure	610	Through	0	0
	Right	0			Right	0	0
North leg	Left	85	Approach	185	Left	118	128
SB	Through	3	Departure	0	Through	9	9
	Right	25			Right	55	55
West leg	Left	0	Approach	93	Left	0	0
EB	Through	72	Departure	116	Through	59	64
	Right	18			Right	33	33
East leg	Left	373	Approach	624	Left	568	568
WB	Through	56	Departure	177	Through	61	61
	Right	0			Right	0	0

P.M. Peak Hour

Approach Direction		Base Year Count	Forecast Future Year Link Volume			Turn Volume	Rounded Volume
South leg	Left	0	Approach	0	Left	0	0
NB	Through	0	Departure	416	Through	0	0
	Right	0			Right	0	0
North leg	Left	173	Approach	264	Left	177	177
SB	Through	29	Departure	0	Through	35	35
	Right	59			Right	51	51
West leg	Left	0	Approach	90	Left	0	0
EB	Through	62	Departure	127	Through	88	88
	Right	1			Right	2	2
East leg	Left	234	Approach	454	Left	379	395
WB	Through	65	Departure	265	Through	76	79
	Right	0			Right	0	0

Intersection	
Int Delay, s/veh	10.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	72	18	373	56	0	0	0	0	85	3	25
Future Vol, veh/h	0	72	18	373	56	0	0	0	0	85	3	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	200	-	-	-	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	13	1	2	9	0	0	0	0	9	33	24
Mvmt Flow	0	77	19	401	60	0	0	0	0	91	3	27

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	96	0	0	901	958	30
Stage 1	-	-	-	-	-	-	862	862	-
Stage 2	-	-	-	-	-	-	39	96	-
Critical Hdwy	-	-	-	4.14	-	-	6.98	7.16	7.38
Critical Hdwy Stg 1	-	-	-	-	-	-	5.98	6.16	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.98	6.16	-
Follow-up Hdwy	-	-	-	2.22	-	-	3.59	4.33	3.54
Pot Cap-1 Maneuver	0	-	-	1496	-	0	265	208	970
Stage 1	0	-	-	-	-	0	357	306	-
Stage 2	0	-	-	-	-	0	958	747	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	1496	-	-	194	0	970
Mov Cap-2 Maneuver	-	-	-	-	-	-	194	0	-
Stage 1	-	-	-	-	-	-	357	0	-
Stage 2	-	-	-	-	-	-	701	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	7.2	31.6
HCM LOS			D

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	1496	-	194	970
HCM Lane V/C Ratio	-	-	0.268	-	0.471	0.031
HCM Control Delay (s)	-	-	8.3	-	39.1	8.8
HCM Lane LOS	-	-	A	-	E	A
HCM 95th %tile Q(veh)	-	-	1.1	-	2.3	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	74	83	0	0	421	183	8	7	140	0	0	0
Future Volume (veh/h)	74	83	0	0	421	183	8	7	140	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1616	1716	0	0	1772	1786	1528	1393	1716			
Adj Flow Rate, veh/h	82	92	0	0	468	203	8	9	0			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90			
Percent Heavy Veh, %	11	6	0	0	2	1	13	29	6			
Cap, veh/h	100	1288	0	0	604	260	686	657				
Arrive On Green	0.06	0.39	0.00	0.00	0.26	0.26	0.47	0.47	0.00			
Sat Flow, veh/h	1539	3346	0	0	2380	987	1455	1393	1454			
Grp Volume(v), veh/h	82	92	0	0	343	328	8	9	0			
Grp Sat Flow(s),veh/h/ln	1539	1630	0	0	1683	1594	1455	1393	1454			
Q Serve(g_s), s	3.2	1.1	0.0	0.0	11.3	11.4	0.2	0.2	0.0			
Cycle Q Clear(g_c), s	3.2	1.1	0.0	0.0	11.3	11.4	0.2	0.2	0.0			
Prop In Lane	1.00		0.00	0.00		0.62	1.00		1.00			
Lane Grp Cap(c), veh/h	100	1288	0	0	444	420	686	657				
V/C Ratio(X)	0.82	0.07	0.00	0.00	0.77	0.78	0.01	0.01				
Avail Cap(c_a), veh/h	231	1847	0	0	589	558	686	657				
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	0.69	0.69	1.00	1.00	0.00			
Uniform Delay (d), s/veh	27.7	11.3	0.0	0.0	20.4	20.5	8.4	8.4	0.0			
Incr Delay (d2), s/veh	15.3	0.0	0.0	0.0	3.2	3.6	0.0	0.0	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.5	0.3	0.0	0.0	4.2	4.1	0.0	0.1	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	43.1	11.3	0.0	0.0	23.6	24.1	8.4	8.4	0.0			
LnGrp LOS	D	B	A	A	C	C	A	A				
Approach Vol, veh/h		174			671			17	A			
Approach Delay, s/veh		26.3			23.8			8.4				
Approach LOS		C			C			A				

Timer - Assigned Phs		2		4			7	8				
Phs Duration (G+Y+Rc), s		32.3		27.7			7.9	19.8				
Change Period (Y+Rc), s		4.0		4.0			4.0	4.0				
Max Green Setting (Gmax), s		18.0		34.0			9.0	21.0				
Max Q Clear Time (g_c+I1), s		2.2		3.1			5.2	13.4				
Green Ext Time (p_c), s		0.0		0.5			0.0	2.4				

Intersection Summary	
HCM 6th Ctrl Delay	24.0
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	83	140	46	102	502	73
Future Volume (veh/h)	83	140	46	102	502	73
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1589	1687	1786	1646	1588	1786
Adj Flow Rate, veh/h	99	167	55	121	598	87
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	15	1	1	11	1	1
Cap, veh/h	1778	842	69	2107	696	359
Arrive On Green	0.59	0.59	0.04	0.67	0.24	0.24
Sat Flow, veh/h	3099	1429	1701	3209	2933	1514
Grp Volume(v), veh/h	99	167	55	121	598	87
Grp Sat Flow(s),veh/h/ln	1510	1429	1701	1563	1467	1514
Q Serve(g_s), s	1.3	4.9	2.9	1.2	17.6	4.2
Cycle Q Clear(g_c), s	1.3	4.9	2.9	1.2	17.6	4.2
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1778	842	69	2107	696	359
V/C Ratio(X)	0.06	0.20	0.79	0.06	0.86	0.24
Avail Cap(c_a), veh/h	1778	842	170	2107	913	471
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	7.9	8.6	42.8	5.0	32.9	27.8
Incr Delay (d2), s/veh	0.1	0.5	18.0	0.1	6.6	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	1.4	1.5	0.3	6.6	1.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	7.9	9.1	60.8	5.0	39.5	28.1
LnGrp LOS	A	A	E	A	D	C
Approach Vol, veh/h	266			176	685	
Approach Delay, s/veh	8.7			22.5	38.0	
Approach LOS	A			C	D	

Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	7.7	57.0			64.7	25.3
Change Period (Y+Rc), s	4.0	4.0			4.0	4.0
Max Green Setting (Gmax), s	9.6	41.0			54.0	28.0
Max Q Clear Time (g_c+I1), s	4.9	6.9			3.2	19.6
Green Ext Time (p_c), s	0.0	1.1			0.8	1.8

Intersection Summary	
HCM 6th Ctrl Delay	28.7
HCM 6th LOS	C

Intersection	
Intersection Delay, s/veh	9.8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	139	7	42	8	5	37	37	64	14	33	70	53
Future Vol, veh/h	139	7	42	8	5	37	37	64	14	33	70	53
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles, %	1	53	1	1	23	15	1	1	1	6	1	24
Mvmt Flow	158	8	48	9	6	42	42	73	16	38	80	60
Number of Lanes	1	2	0	1	2	0	0	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	3	3
HCM Control Delay	10.3	8.8	10	9.4
HCM LOS	B	A	A	A

Lane	NBLn1	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	32%	100%	0%	0%	100%	0%	0%	100%	0%
Vol Thru, %	56%	0%	100%	5%	0%	100%	4%	0%	57%
Vol Right, %	12%	0%	0%	95%	0%	0%	96%	0%	43%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	115	139	5	44	8	3	39	33	123
LT Vol	37	139	0	0	8	0	0	33	0
Through Vol	64	0	5	2	0	3	2	0	70
RT Vol	14	0	0	42	0	0	37	0	53
Lane Flow Rate	131	158	5	50	9	4	44	38	140
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.208	0.266	0.01	0.069	0.017	0.007	0.068	0.064	0.205
Departure Headway (Hd)	5.732	6.069	6.457	4.895	6.535	6.408	5.592	6.168	5.281
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	619	588	550	723	551	562	645	576	672
Service Time	3.525	3.859	4.247	2.683	4.235	4.108	3.292	3.957	3.07
HCM Lane V/C Ratio	0.212	0.269	0.009	0.069	0.016	0.007	0.068	0.066	0.208
HCM Control Delay	10	11.1	9.3	8.1	9.3	9.2	8.7	9.4	9.4
HCM Lane LOS	A	B	A	A	A	A	A	A	A
HCM 95th-tile Q	0.8	1.1	0	0.2	0.1	0	0.2	0.2	0.8

Intersection	
Intersection Delay, s/veh	11.1
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	36	2	65	0	0	0	0	58	182	71	91	0
Future Vol, veh/h	36	2	65	0	0	0	0	58	182	71	91	0
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	22	50	26	0	0	0	0	59	5	11	9	0
Mvmt Flow	42	2	76	0	0	0	0	67	212	83	106	0
Number of Lanes	0	1	1	0	0	0	0	1	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	9.6	13	9.2
HCM LOS	A	B	A

Lane	NBLn1	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	95%	0%	100%	0%
Vol Thru, %	24%	5%	0%	0%	100%
Vol Right, %	76%	0%	100%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	240	38	65	71	91
LT Vol	0	36	0	71	0
Through Vol	58	2	0	0	91
RT Vol	182	0	65	0	0
Lane Flow Rate	279	44	76	83	106
Geometry Grp	6	7	7	7	7
Degree of Util (X)	0.437	0.081	0.124	0.134	0.156
Departure Headway (Hd)	5.638	6.601	5.897	5.831	5.294
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	639	541	605	613	675
Service Time	3.682	4.359	3.655	3.579	3.041
HCM Lane V/C Ratio	0.437	0.081	0.126	0.135	0.157
HCM Control Delay	13	9.9	9.5	9.5	9
HCM Lane LOS	B	A	A	A	A
HCM 95th-tile Q	2.2	0.3	0.4	0.5	0.6

Intersection	
Intersection Delay, s/veh	9
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	87	1	23	56	38	0	0	75	15
Future Vol, veh/h	0	0	0	87	1	23	56	38	0	0	75	15
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehicles, %	0	0	0	5	1	17	66	13	0	0	13	1
Mvmt Flow	0	0	0	109	1	29	70	48	0	0	94	19
Number of Lanes	0	0	0	0	1	1	1	1	0	0	1	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	2
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	2	0	2
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	2	2	0
HCM Control Delay	9.1	9.5	8.5
HCM LOS	A	A	A

Lane	NBLn1	NBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	99%	0%	0%	0%
Vol Thru, %	0%	100%	1%	0%	100%	0%
Vol Right, %	0%	0%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	56	38	88	23	75	15
LT Vol	56	0	87	0	0	0
Through Vol	0	38	1	0	75	0
RT Vol	0	0	0	23	0	15
Lane Flow Rate	70	48	110	29	94	19
Geometry Grp	7	7	7	7	7	7
Degree of Util (X)	0.129	0.069	0.174	0.035	0.136	0.023
Departure Headway (Hd)	6.62	5.212	5.705	4.439	5.24	4.332
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	543	688	630	807	685	827
Service Time	4.343	2.935	3.429	2.163	2.963	2.055
HCM Lane V/C Ratio	0.129	0.07	0.175	0.036	0.137	0.023
HCM Control Delay	10.3	8.3	9.6	7.3	8.8	7.2
HCM Lane LOS	B	A	A	A	A	A
HCM 95th-tile Q	0.4	0.2	0.6	0.1	0.5	0.1

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	2	30	2	2	2	43	111	2	2	116	2
Future Vol, veh/h	2	2	30	2	2	2	43	111	2	2	116	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	100	225	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	1	1	1
Mvmt Flow	2	2	34	2	2	2	49	126	2	2	132	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	299	363	67	295	362	63	134	0	0	128	0	0
Stage 1	137	137	-	224	224	-	-	-	-	-	-	-
Stage 2	162	226	-	71	138	-	-	-	-	-	-	-
Critical Hdwy	7.52	6.52	6.92	7.52	6.52	6.92	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.52	5.52	-	6.52	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.52	5.52	-	6.52	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.51	4.01	3.31	3.51	4.01	3.31	2.21	-	-	2.21	-	-
Pot Cap-1 Maneuver	633	566	986	637	566	992	1456	-	-	1463	-	-
Stage 1	855	785	-	761	720	-	-	-	-	-	-	-
Stage 2	827	718	-	933	784	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	613	546	986	597	546	992	1456	-	-	1463	-	-
Mov Cap-2 Maneuver	613	546	-	597	546	-	-	-	-	-	-	-
Stage 1	826	784	-	735	696	-	-	-	-	-	-	-
Stage 2	795	694	-	897	783	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.1	10.5	2.1	0.1
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1456	-	-	910	665	1463	-	-
HCM Lane V/C Ratio	0.034	-	-	0.042	0.01	0.002	-	-
HCM Control Delay (s)	7.6	-	-	9.1	10.5	7.5	-	-
HCM Lane LOS	A	-	-	A	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.1	0	0	-	-

Intersection	
Int Delay, s/veh	13.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↱		↰	↑↑					↰	↱	
Traffic Vol, veh/h	0	62	1	234	65	0	0	0	0	173	29	59
Future Vol, veh/h	0	62	1	234	65	0	0	0	0	173	29	59
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	200	-	-	-	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	0	5	1	4	5	0	0	0	0	4	1	10
Mvmt Flow	0	72	1	272	76	0	0	0	0	201	34	69

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	73	0	0	656	693	38
Stage 1	-	-	-	-	-	-	620	620	-
Stage 2	-	-	-	-	-	-	36	73	-
Critical Hdwy	-	-	-	4.18	-	-	6.88	6.52	7.1
Critical Hdwy Stg 1	-	-	-	-	-	-	5.88	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.88	5.52	-
Follow-up Hdwy	-	-	-	2.24	-	-	3.54	4.01	3.4
Pot Cap-1 Maneuver	0	-	-	1510	-	0	394	367	1000
Stage 1	0	-	-	-	-	0	493	480	-
Stage 2	0	-	-	-	-	0	976	836	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	1510	-	-	323	0	1000
Mov Cap-2 Maneuver	-	-	-	-	-	-	323	0	-
Stage 1	-	-	-	-	-	-	493	0	-
Stage 2	-	-	-	-	-	-	800	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	6.2	24.8
HCM LOS			C

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	1510	-	323	1000
HCM Lane V/C Ratio	-	-	0.18	-	0.623	0.102
HCM Control Delay (s)	-	-	7.9	-	32.9	9
HCM Lane LOS	-	-	A	-	D	A
HCM 95th %tile Q(veh)	-	-	0.7	-	3.9	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	61	174	0	0	293	71	6	8	321	0	0	0
Future Volume (veh/h)	61	174	0	0	293	71	6	8	321	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1478	1786	0	0	1758	1786	1262	1098	1772			
Adj Flow Rate, veh/h	66	189	0	0	318	77	7	9	0			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	21	1	0	0	3	1	33	50	2			
Cap, veh/h	76	998	0	0	464	111	689	629				
Arrive On Green	0.05	0.29	0.00	0.00	0.17	0.17	0.57	0.57	0.00			
Sat Flow, veh/h	1408	3483	0	0	2763	638	1202	1098	1502			
Grp Volume(v), veh/h	66	189	0	0	197	198	7	9	0			
Grp Sat Flow(s),veh/h/ln	1408	1697	0	0	1670	1643	1202	1098	1502			
Q Serve(g_s), s	2.8	2.5	0.0	0.0	6.6	6.8	0.2	0.2	0.0			
Cycle Q Clear(g_c), s	2.8	2.5	0.0	0.0	6.6	6.8	0.2	0.2	0.0			
Prop In Lane	1.00		0.00	0.00		0.39	1.00		1.00			
Lane Grp Cap(c), veh/h	76	998	0	0	290	285	689	629				
V/C Ratio(X)	0.87	0.19	0.00	0.00	0.68	0.69	0.01	0.01				
Avail Cap(c_a), veh/h	211	1866	0	0	557	548	689	629				
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	0.95	0.95	1.00	1.00	0.00			
Uniform Delay (d), s/veh	28.2	15.8	0.0	0.0	23.2	23.3	5.5	5.5	0.0			
Incr Delay (d2), s/veh	24.7	0.1	0.0	0.0	2.6	2.9	0.0	0.0	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.4	0.9	0.0	0.0	2.5	2.6	0.0	0.0	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.9	15.9	0.0	0.0	25.9	26.2	5.5	5.5	0.0			
LnGrp LOS	D	B	A	A	C	C	A	A				
Approach Vol, veh/h		255			395			16	A			
Approach Delay, s/veh		25.5			26.0			5.5				
Approach LOS		C			C			A				

Timer - Assigned Phs		2		4			7	8				
Phs Duration (G+Y+Rc), s		38.4		21.6			7.2	14.4				
Change Period (Y+Rc), s		4.0		4.0			4.0	4.0				
Max Green Setting (Gmax), s		19.0		33.0			9.0	20.0				
Max Q Clear Time (g_c+I1), s		2.2		4.5			4.8	8.8				
Green Ext Time (p_c), s		0.0		1.1			0.0	1.6				

Intersection Summary	
HCM 6th Ctrl Delay	25.3
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	234	261	64	167	197	50
Future Volume (veh/h)	234	261	64	167	197	50
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1716	1786	1687	1646	1588	1744
Adj Flow Rate, veh/h	260	290	71	186	219	56
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	6	1	1	11	1	4
Cap, veh/h	2317	1076	89	2534	295	149
Arrive On Green	0.71	0.71	0.06	0.81	0.10	0.10
Sat Flow, veh/h	3346	1514	1606	3209	2933	1478
Grp Volume(v), veh/h	260	290	71	186	219	56
Grp Sat Flow(s),veh/h/ln	1630	1514	1606	1563	1467	1478
Q Serve(g_s), s	2.3	6.2	3.9	1.1	6.5	3.2
Cycle Q Clear(g_c), s	2.3	6.2	3.9	1.1	6.5	3.2
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2317	1076	89	2534	295	149
V/C Ratio(X)	0.11	0.27	0.80	0.07	0.74	0.38
Avail Cap(c_a), veh/h	2317	1076	232	2534	521	263
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.99	0.99	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	4.1	4.7	42.0	1.7	39.3	37.8
Incr Delay (d2), s/veh	0.1	0.6	14.9	0.1	3.7	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	1.6	1.9	0.2	2.4	1.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	4.2	5.3	56.9	1.8	43.0	39.4
LnGrp LOS	A	A	E	A	D	D
Approach Vol, veh/h	550			257	275	
Approach Delay, s/veh	4.8			17.0	42.3	
Approach LOS	A			B	D	

Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	9.0	68.0			76.9	13.1
Change Period (Y+Rc), s	4.0	4.0			4.0	4.0
Max Green Setting (Gmax), s	13.0	49.0			66.0	16.0
Max Q Clear Time (g_c+I1), s	5.3	8.2			3.1	8.5
Green Ext Time (p_c), s	0.1	2.7			1.2	0.5

Intersection Summary	
HCM 6th Ctrl Delay	17.2
HCM 6th LOS	B

Intersection	
Intersection Delay, s/veh	15.5
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	74	21	141	8	6	17	157	130	9	27	74	264
Future Vol, veh/h	74	21	141	8	6	17	157	130	9	27	74	264
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	1	10	1	1	35	8	1	1	1	6	1	4
Mvmt Flow	80	23	152	9	6	18	169	140	10	29	80	284
Number of Lanes	1	2	0	1	2	0	0	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	3	3
HCM Control Delay	11.5	10.5	18.5	16.1
HCM LOS	B	B	C	C

Lane	NBLn1	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	53%	100%	0%	0%	100%	0%	0%	100%	0%
Vol Thru, %	44%	0%	100%	5%	0%	100%	11%	0%	22%
Vol Right, %	3%	0%	0%	95%	0%	0%	89%	0%	78%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	296	74	14	148	8	4	19	27	338
LT Vol	157	74	0	0	8	0	0	27	0
Through Vol	130	0	14	7	0	4	2	0	74
RT Vol	9	0	0	141	0	0	17	0	264
Lane Flow Rate	318	80	15	159	9	4	20	29	363
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.587	0.166	0.03	0.279	0.02	0.01	0.041	0.056	0.587
Departure Headway (Hd)	6.645	7.497	7.141	6.301	8.241	8.321	7.2	6.955	5.816
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	541	476	498	567	437	433	500	513	618
Service Time	4.419	5.283	4.927	4.086	5.941	6.021	4.9	4.728	3.589
HCM Lane V/C Ratio	0.588	0.168	0.03	0.28	0.021	0.009	0.04	0.057	0.587
HCM Control Delay	18.5	11.8	10.2	11.5	11.1	11.1	10.2	10.1	16.6
HCM Lane LOS	C	B	B	B	B	B	B	B	C
HCM 95th-tile Q	3.8	0.6	0.1	1.1	0.1	0	0.1	0.2	3.8

Intersection	
Intersection Delay, s/veh	13.4
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	115	1	219	0	0	0	0	138	83	48	146	0
Future Vol, veh/h	115	1	219	0	0	0	0	138	83	48	146	0
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	1	100	21	0	0	0	0	12	5	1	5	0
Mvmt Flow	134	1	255	0	0	0	0	160	97	56	170	0
Number of Lanes	0	1	1	0	0	0	0	1	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	14.5	13.7	11.3
HCM LOS	B	B	B

Lane	NBLn1	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	99%	0%	100%	0%
Vol Thru, %	62%	1%	0%	0%	100%
Vol Right, %	38%	0%	100%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	221	116	219	48	146
LT Vol	0	115	0	48	0
Through Vol	138	1	0	0	146
RT Vol	83	0	219	0	0
Lane Flow Rate	257	135	255	56	170
Geometry Grp	6	7	7	7	7
Degree of Util (X)	0.433	0.242	0.491	0.104	0.295
Departure Headway (Hd)	6.067	6.456	6.948	6.689	6.251
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	594	557	519	536	576
Service Time	4.099	4.185	4.677	4.425	3.986
HCM Lane V/C Ratio	0.433	0.242	0.491	0.104	0.295
HCM Control Delay	13.7	11.2	16.2	10.2	11.6
HCM Lane LOS	B	B	C	B	B
HCM 95th-tile Q	2.2	0.9	2.7	0.3	1.2

Intersection	
Intersection Delay, s/veh	9.9
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	132	5	28	142	111	0	0	62	45
Future Vol, veh/h	0	0	0	132	5	28	142	111	0	0	62	45
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	0	0	0	5	1	1	11	2	0	0	2	1
Mvmt Flow	0	0	0	153	6	33	165	129	0	0	72	52
Number of Lanes	0	0	0	0	1	1	1	1	0	0	1	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	2
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	2	0	2
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	2	2	0
HCM Control Delay	10.5	10.1	8.4
HCM LOS	B	B	A

Lane	NBLn1	NBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	96%	0%	0%	0%
Vol Thru, %	0%	100%	4%	0%	100%	0%
Vol Right, %	0%	0%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	142	111	137	28	62	45
LT Vol	142	0	132	0	0	0
Through Vol	0	111	5	0	62	0
RT Vol	0	0	0	28	0	45
Lane Flow Rate	165	129	159	33	72	52
Geometry Grp	7	7	7	7	7	7
Degree of Util (X)	0.27	0.187	0.27	0.044	0.109	0.068
Departure Headway (Hd)	5.882	5.225	6.11	4.855	5.431	4.708
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	609	684	586	734	657	756
Service Time	3.63	2.973	3.867	2.611	3.189	2.466
HCM Lane V/C Ratio	0.271	0.189	0.271	0.045	0.11	0.069
HCM Control Delay	10.8	9.2	11.1	7.8	8.9	7.8
HCM Lane LOS	B	A	B	A	A	A
HCM 95th-tile Q	1.1	0.7	1.1	0.1	0.4	0.2

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	14	2	10	2	2	2	2	280	2	2	219	2
Future Vol, veh/h	14	2	10	2	2	2	2	280	2	2	219	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	100	225	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	1	1	1
Mvmt Flow	15	2	11	2	2	2	2	301	2	2	235	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	396	547	119	428	546	151	237	0	0	303	0	0
Stage 1	240	240	-	305	305	-	-	-	-	-	-	-
Stage 2	156	307	-	123	241	-	-	-	-	-	-	-
Critical Hdwy	7.52	6.52	6.92	7.52	6.52	6.92	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.52	5.52	-	6.52	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.52	5.52	-	6.52	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.51	4.01	3.31	3.51	4.01	3.31	2.21	-	-	2.21	-	-
Pot Cap-1 Maneuver	541	445	913	513	446	871	1335	-	-	1262	-	-
Stage 1	745	708	-	682	663	-	-	-	-	-	-	-
Stage 2	833	662	-	871	707	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	537	444	913	504	445	871	1335	-	-	1262	-	-
Mov Cap-2 Maneuver	537	444	-	504	445	-	-	-	-	-	-	-
Stage 1	744	707	-	681	662	-	-	-	-	-	-	-
Stage 2	827	661	-	857	706	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11	11.5	0.1	0.1
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1335	-	-	626	558	1262	-	-
HCM Lane V/C Ratio	0.002	-	-	0.045	0.012	0.002	-	-
HCM Control Delay (s)	7.7	-	-	11	11.5	7.9	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0	0	-	-

Intersection	
Int Delay, s/veh	20.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↱		↰	↑↑					↰	↱	
Traffic Vol, veh/h	0	92	20	447	76	0	0	0	0	107	3	28
Future Vol, veh/h	0	92	20	447	76	0	0	0	0	107	3	28
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	200	-	-	-	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	13	1	2	9	0	0	0	0	9	33	24
Mvmt Flow	0	99	22	481	82	0	0	0	0	115	3	30

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	121	0	0	1094	1165	41
Stage 1	-	-	-	-	-	-	1044	1044	-
Stage 2	-	-	-	-	-	-	50	121	-
Critical Hdwy	-	-	-	4.14	-	-	6.98	7.16	7.38
Critical Hdwy Stg 1	-	-	-	-	-	-	5.98	6.16	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.98	6.16	-
Follow-up Hdwy	-	-	-	2.22	-	-	3.59	4.33	3.54
Pot Cap-1 Maneuver	0	-	-	1464	-	0	198	152	954
Stage 1	0	-	-	-	-	0	285	245	-
Stage 2	0	-	-	-	-	0	946	726	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	1464	-	-	133	0	954
Mov Cap-2 Maneuver	-	-	-	-	-	-	133	0	-
Stage 1	-	-	-	-	-	-	285	0	-
Stage 2	-	-	-	-	-	-	635	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	7.4	86.4
HCM LOS			F

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	1464	-	133	954
HCM Lane V/C Ratio	-	-	0.328	-	0.865	0.035
HCM Control Delay (s)	-	-	8.7	-	108.8	8.9
HCM Lane LOS	-	-	A	-	F	A
HCM 95th %tile Q(veh)	-	-	1.4	-	5.5	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	81	117	0	0	514	238	9	8	167	0	0	0
Future Volume (veh/h)	81	117	0	0	514	238	9	8	167	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1616	1716	0	0	1772	1786	1528	1393	1716			
Adj Flow Rate, veh/h	90	130	0	0	571	264	10	10	0			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90			
Percent Heavy Veh, %	11	6	0	0	2	1	13	29	6			
Cap, veh/h	110	1450	0	0	686	317	614	588				
Arrive On Green	0.07	0.44	0.00	0.00	0.31	0.31	0.42	0.42	0.00			
Sat Flow, veh/h	1539	3346	0	0	2325	1033	1455	1393	1454			
Grp Volume(v), veh/h	90	130	0	0	429	406	10	10	0			
Grp Sat Flow(s),veh/h/ln	1539	1630	0	0	1683	1586	1455	1393	1454			
Q Serve(g_s), s	3.5	1.4	0.0	0.0	14.2	14.3	0.2	0.3	0.0			
Cycle Q Clear(g_c), s	3.5	1.4	0.0	0.0	14.2	14.3	0.2	0.3	0.0			
Prop In Lane	1.00		0.00	0.00		0.65	1.00		1.00			
Lane Grp Cap(c), veh/h	110	1450	0	0	516	486	614	588				
V/C Ratio(X)	0.82	0.09	0.00	0.00	0.83	0.83	0.02	0.02				
Avail Cap(c_a), veh/h	231	1847	0	0	589	555	614	588				
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	0.59	0.59	1.00	1.00	0.00			
Uniform Delay (d), s/veh	27.5	9.6	0.0	0.0	19.4	19.4	10.1	10.1	0.0			
Incr Delay (d2), s/veh	13.7	0.0	0.0	0.0	5.5	5.9	0.0	0.0	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.6	0.4	0.0	0.0	5.5	5.3	0.1	0.1	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	41.2	9.7	0.0	0.0	24.8	25.2	10.1	10.1	0.0			
LnGrp LOS	D	A	A	A	C	C	B	B				
Approach Vol, veh/h		220			835			20	A			
Approach Delay, s/veh		22.6			25.0			10.1				
Approach LOS		C			C			B				

Timer - Assigned Phs		2		4			7	8				
Phs Duration (G+Y+Rc), s		29.3		30.7			8.3	22.4				
Change Period (Y+Rc), s		4.0		4.0			4.0	4.0				
Max Green Setting (Gmax), s		18.0		34.0			9.0	21.0				
Max Q Clear Time (g_c+I1), s		2.3		3.4			5.5	16.3				
Green Ext Time (p_c), s		0.0		0.7			0.1	2.1				

Intersection Summary	
HCM 6th Ctrl Delay	24.2
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	104	180	53	126	626	85
Future Volume (veh/h)	104	180	53	126	626	85
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1589	1687	1786	1646	1588	1786
Adj Flow Rate, veh/h	124	214	63	150	745	101
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	15	1	1	11	1	1
Cap, veh/h	1624	769	80	1967	827	427
Arrive On Green	0.54	0.54	0.05	0.63	0.28	0.28
Sat Flow, veh/h	3099	1429	1701	3209	2933	1514
Grp Volume(v), veh/h	124	214	63	150	745	101
Grp Sat Flow(s),veh/h/ln	1510	1429	1701	1563	1467	1514
Q Serve(g_s), s	1.8	7.3	3.3	1.7	22.0	4.6
Cycle Q Clear(g_c), s	1.8	7.3	3.3	1.7	22.0	4.6
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1624	769	80	1967	827	427
V/C Ratio(X)	0.08	0.28	0.79	0.08	0.90	0.24
Avail Cap(c_a), veh/h	1624	769	170	1967	913	471
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	10.0	11.3	42.4	6.5	31.1	24.9
Incr Delay (d2), s/veh	0.1	0.9	15.6	0.1	11.3	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	2.3	1.7	0.5	8.7	1.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	10.1	12.2	58.1	6.6	42.4	25.1
LnGrp LOS	B	B	E	A	D	C
Approach Vol, veh/h	338			213	846	
Approach Delay, s/veh	11.4			21.8	40.3	
Approach LOS	B			C	D	

Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	8.2	52.4			60.6	29.4
Change Period (Y+Rc), s	4.0	4.0			4.0	4.0
Max Green Setting (Gmax), s	9.6	41.0			54.0	28.0
Max Q Clear Time (g_c+I1), s	5.3	9.3			3.7	24.0
Green Ext Time (p_c), s	0.0	1.5			0.9	1.4

Intersection Summary	
HCM 6th Ctrl Delay	30.5
HCM 6th LOS	C

Intersection	
Intersection Delay, s/veh	234.2
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	165	8	46	16	6	219	41	624	22	187	416	72
Future Vol, veh/h	165	8	46	16	6	219	41	624	22	187	416	72
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles, %	1	53	1	1	23	15	1	1	1	6	1	24
Mvmt Flow	188	9	52	18	7	249	47	709	25	213	473	82
Number of Lanes	1	2	0	1	2	0	0	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	3	3
HCM Control Delay	26.8	32.6	461.9	141.8
HCM LOS	D	D	F	F

Lane	NBLn1	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	6%	100%	0%	0%	100%	0%	0%	100%	0%
Vol Thru, %	91%	0%	100%	5%	0%	100%	1%	0%	85%
Vol Right, %	3%	0%	0%	95%	0%	0%	99%	0%	15%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	687	165	5	49	16	4	221	187	488
LT Vol	41	165	0	0	16	0	0	187	0
Through Vol	624	0	5	3	0	4	2	0	416
RT Vol	22	0	0	46	0	0	219	0	72
Lane Flow Rate	781	188	6	55	18	5	251	212	555
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	1.958	0.537	0.018	0.141	0.052	0.013	0.646	0.541	1.305
Departure Headway (Hd)	9.49	13.183	13.602	11.916	12.995	12.858	11.955	11.212	10.483
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	390	276	265	303	277	280	304	325	349
Service Time	7.19	10.883	11.302	9.616	10.695	10.558	9.655	8.912	8.183
HCM Lane V/C Ratio	2.003	0.681	0.023	0.182	0.065	0.018	0.826	0.652	1.59
HCM Control Delay	461.9	30.2	16.6	16.6	16.4	15.7	34.1	26.4	186
HCM Lane LOS	F	D	C	C	C	C	D	D	F
HCM 95th-tile Q	50.9	2.9	0.1	0.5	0.2	0	4.2	3	21.1

Intersection	
Intersection Delay, s/veh	443.8
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	40	2	445	0	0	0	0	619	389	78	231	0
Future Vol, veh/h	40	2	445	0	0	0	0	619	389	78	231	0
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	22	50	26	0	0	0	0	59	5	11	9	0
Mvmt Flow	47	2	517	0	0	0	0	720	452	91	269	0
Number of Lanes	0	1	1	0	0	0	0	1	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	88.4	744.4	23.4
HCM LOS	F	F	C

Lane	NBLn1	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	95%	0%	100%	0%
Vol Thru, %	61%	5%	0%	0%	100%
Vol Right, %	39%	0%	100%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	1008	42	445	78	231
LT Vol	0	40	0	78	0
Through Vol	619	2	0	0	231
RT Vol	389	0	445	0	0
Lane Flow Rate	1172	49	517	91	269
Geometry Grp	6	7	7	7	7
Degree of Util (X)	2.6	0.109	1.059	0.209	0.579
Departure Headway (Hd)	8.251	10.54	9.803	10.686	10.116
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	457	342	373	338	360
Service Time	6.251	8.24	7.503	8.386	7.816
HCM Lane V/C Ratio	2.565	0.143	1.386	0.269	0.747
HCM Control Delay	744.4	14.5	95.4	16.2	25.8
HCM Lane LOS	F	B	F	C	D
HCM 95th-tile Q	91.9	0.4	13.5	0.8	3.5

Intersection	
Intersection Delay, s/veh	188.9
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	225	1	25	612	47	0	0	85	17
Future Vol, veh/h	0	0	0	225	1	25	612	47	0	0	85	17
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehicles, %	0	0	0	5	1	17	66	13	0	0	13	1
Mvmt Flow	0	0	0	281	1	31	765	59	0	0	106	21
Number of Lanes	0	0	0	0	1	1	1	1	0	0	1	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	2
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	2	0	2
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	2	2	0
HCM Control Delay	20.5	280.5	11.7
HCM LOS	C	F	B

Lane	NBLn1	NBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	100%	0%	0%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%
Vol Right, %	0%	0%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	612	47	226	25	85	17
LT Vol	612	0	225	0	0	0
Through Vol	0	47	1	0	85	0
RT Vol	0	0	0	25	0	17
Lane Flow Rate	765	59	282	31	106	21
Geometry Grp	7	7	7	7	7	7
Degree of Util (X)	1.605	0.1	0.569	0.052	0.202	0.035
Departure Headway (Hd)	7.553	6.133	8.375	7.086	7.505	6.573
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	490	587	435	508	481	548
Service Time	5.259	3.839	6.075	4.786	5.205	4.273
HCM Lane V/C Ratio	1.561	0.101	0.648	0.061	0.22	0.038
HCM Control Delay	301.3	9.5	21.6	10.2	12.1	9.5
HCM Lane LOS	F	A	C	B	B	A
HCM 95th-tile Q	42.7	0.3	3.4	0.2	0.7	0.1

Intersection	
Int Delay, s/veh	81

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	474	3	33	3	3	3	47	138	3	3	142	259
Future Vol, veh/h	474	3	33	3	3	3	47	138	3	3	142	259
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	100	225	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	1	1	1
Mvmt Flow	539	3	38	3	3	3	53	157	3	3	161	294

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	500	580	228	351	724	79	455	0	0	160	0	0
Stage 1	314	314	-	263	263	-	-	-	-	-	-	-
Stage 2	186	266	-	88	461	-	-	-	-	-	-	-
Critical Hdwy	7.52	6.52	6.92	7.52	6.52	6.92	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.52	5.52	-	6.52	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.52	5.52	-	6.52	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.51	4.01	3.31	3.51	4.01	3.31	2.21	-	-	2.21	-	-
Pot Cap-1 Maneuver	~ 456	426	778	582	352	969	1109	-	-	1424	-	-
Stage 1	674	657	-	722	692	-	-	-	-	-	-	-
Stage 2	801	690	-	913	566	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 434	405	778	530	334	969	1109	-	-	1424	-	-
Mov Cap-2 Maneuver	~ 434	405	-	530	334	-	-	-	-	-	-	-
Stage 1	642	656	-	687	659	-	-	-	-	-	-	-
Stage 2	756	657	-	863	565	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	175.4	12.2	2.1	0.1
HCM LOS	F	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1109	-	-	447	507	1424	-	-
HCM Lane V/C Ratio	0.048	-	-	1.297	0.02	0.002	-	-
HCM Control Delay (s)	8.4	-	-	175.4	12.2	7.5	-	-
HCM Lane LOS	A	-	-	F	B	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	25.2	0.1	0	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	41.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	79	1	282	83	0	0	0	0	232	32	65
Future Vol, veh/h	0	79	1	282	83	0	0	0	0	232	32	65
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	200	-	-	-	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	0	5	1	4	5	0	0	0	0	4	1	10
Mvmt Flow	0	92	1	328	97	0	0	0	0	270	37	76

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	93	0	0	799	846	49
Stage 1	-	-	-	-	-	-	753	753	-
Stage 2	-	-	-	-	-	-	46	93	-
Critical Hdwy	-	-	-	4.18	-	-	6.88	6.52	7.1
Critical Hdwy Stg 1	-	-	-	-	-	-	5.88	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.88	5.52	-
Follow-up Hdwy	-	-	-	2.24	-	-	3.54	4.01	3.4
Pot Cap-1 Maneuver	0	-	-	1485	-	0	319	300	984
Stage 1	0	-	-	-	-	0	421	418	-
Stage 2	0	-	-	-	-	0	965	819	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	1485	-	-	~ 249	0	984
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 249	0	-
Stage 1	-	-	-	-	-	-	421	0	-
Stage 2	-	-	-	-	-	-	752	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	6.3	90.3
HCM LOS			F

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	1485	-	249	984
HCM Lane V/C Ratio	-	-	0.221	-	1.083	0.115
HCM Control Delay (s)	-	-	8.1	-	124.3	9.1
HCM Lane LOS	-	-	A	-	F	A
HCM 95th %tile Q(veh)	-	-	0.8	-	11.4	0.4

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	67	244	0	0	358	103	7	9	395	0	0	0
Future Volume (veh/h)	67	244	0	0	358	103	7	9	395	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1478	1786	0	0	1758	1786	1262	1098	1772			
Adj Flow Rate, veh/h	73	265	0	0	389	112	8	10	0			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	21	1	0	0	3	1	33	50	2			
Cap, veh/h	85	1139	0	0	536	153	638	583				
Arrive On Green	0.06	0.34	0.00	0.00	0.21	0.21	0.53	0.53	0.00			
Sat Flow, veh/h	1408	3483	0	0	2654	730	1202	1098	1502			
Grp Volume(v), veh/h	73	265	0	0	252	249	8	10	0			
Grp Sat Flow(s),veh/h/ln	1408	1697	0	0	1670	1626	1202	1098	1502			
Q Serve(g_s), s	3.1	3.4	0.0	0.0	8.4	8.6	0.2	0.3	0.0			
Cycle Q Clear(g_c), s	3.1	3.4	0.0	0.0	8.4	8.6	0.2	0.3	0.0			
Prop In Lane	1.00		0.00	0.00		0.45	1.00		1.00			
Lane Grp Cap(c), veh/h	85	1139	0	0	349	340	638	583				
V/C Ratio(X)	0.86	0.23	0.00	0.00	0.72	0.73	0.01	0.02				
Avail Cap(c_a), veh/h	211	1866	0	0	557	542	638	583				
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	0.91	0.91	1.00	1.00	0.00			
Uniform Delay (d), s/veh	28.0	14.4	0.0	0.0	22.1	22.2	6.6	6.7	0.0			
Incr Delay (d2), s/veh	21.4	0.1	0.0	0.0	2.6	2.8	0.0	0.0	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.5	1.1	0.0	0.0	3.2	3.2	0.0	0.1	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.4	14.5	0.0	0.0	24.7	25.0	6.7	6.7	0.0			
LnGrp LOS	D	B	A	A	C	C	A	A				
Approach Vol, veh/h		338			501			18	A			
Approach Delay, s/veh		22.0			24.8			6.7				
Approach LOS		C			C			A				

Timer - Assigned Phs		2		4			7	8				
Phs Duration (G+Y+Rc), s		35.9		24.1			7.6	16.5				
Change Period (Y+Rc), s		4.0		4.0			4.0	4.0				
Max Green Setting (Gmax), s		19.0		33.0			9.0	20.0				
Max Q Clear Time (g_c+I1), s		2.3		5.4			5.1	10.6				
Green Ext Time (p_c), s		0.0		1.6			0.0	1.9				

Intersection Summary	
HCM 6th Ctrl Delay	23.3
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	268	371	75	195	267	58
Future Volume (veh/h)	268	371	75	195	267	58
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1716	1786	1687	1646	1588	1744
Adj Flow Rate, veh/h	298	412	83	217	297	64
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	6	1	1	11	1	4
Cap, veh/h	2200	1021	104	2451	373	188
Arrive On Green	0.67	0.67	0.06	0.78	0.13	0.13
Sat Flow, veh/h	3346	1514	1606	3209	2933	1478
Grp Volume(v), veh/h	298	412	83	217	297	64
Grp Sat Flow(s),veh/h/ln	1630	1514	1606	1563	1467	1478
Q Serve(g_s), s	2.9	10.9	4.6	1.5	8.9	3.6
Cycle Q Clear(g_c), s	2.9	10.9	4.6	1.5	8.9	3.6
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2200	1021	104	2451	373	188
V/C Ratio(X)	0.14	0.40	0.80	0.09	0.80	0.34
Avail Cap(c_a), veh/h	2200	1021	232	2451	521	263
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.98	0.98	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	5.2	6.5	41.5	2.3	38.1	35.8
Incr Delay (d2), s/veh	0.1	1.2	13.0	0.1	5.8	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	3.0	2.1	0.3	3.4	1.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	5.4	7.7	54.5	2.3	43.9	36.9
LnGrp LOS	A	A	D	A	D	D
Approach Vol, veh/h	710			300	361	
Approach Delay, s/veh	6.7			16.8	42.7	
Approach LOS	A			B	D	

Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	9.8	64.7			74.6	15.4
Change Period (Y+Rc), s	4.0	4.0			4.0	4.0
Max Green Setting (Gmax), s	13.0	49.0			66.0	16.0
Max Q Clear Time (g_c+I1), s	6.6	12.9			3.5	10.9
Green Ext Time (p_c), s	0.1	3.5			1.4	0.6

Intersection Summary	
HCM 6th Ctrl Delay	18.4
HCM 6th LOS	B

Intersection	
Intersection Delay, s/veh	251.2
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	91	23	155	14	7	167	173	485	15	161	406	304
Future Vol, veh/h	91	23	155	14	7	167	173	485	15	161	406	304
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	1	10	1	1	35	8	1	1	1	6	1	4
Mvmt Flow	98	25	167	15	8	180	186	522	16	173	437	327
Number of Lanes	1	2	0	1	2	0	0	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	3	3
HCM Control Delay	20.9	23.4	364.5	284
HCM LOS	C	C	F	F

Lane	NBLn1	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	26%	100%	0%	0%	100%	0%	0%	100%	0%
Vol Thru, %	72%	0%	100%	5%	0%	100%	1%	0%	57%
Vol Right, %	2%	0%	0%	95%	0%	0%	99%	0%	43%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	673	91	15	163	14	5	169	161	710
LT Vol	173	91	0	0	14	0	0	161	0
Through Vol	485	0	15	8	0	5	2	0	406
RT Vol	15	0	0	155	0	0	167	0	304
Lane Flow Rate	724	98	16	175	15	5	182	173	763
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	1.735	0.268	0.044	0.422	0.042	0.014	0.46	0.425	1.689
Departure Headway (Hd)	9.651	12.534	12.159	11.271	12.982	13.067	11.818	10.356	9.431
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	384	289	296	322	278	276	308	350	389
Service Time	7.351	10.234	9.859	8.971	10.682	10.767	9.518	8.056	7.131
HCM Lane V/C Ratio	1.885	0.339	0.054	0.543	0.054	0.018	0.591	0.494	1.961
HCM Control Delay	364.5	19.8	15.4	22	16.3	16	24.2	20.5	343.8
HCM Lane LOS	F	C	C	C	C	C	C	C	F
HCM 95th-tile Q	40.3	1.1	0.1	2	0.1	0	2.3	2	39.1

Intersection	
Intersection Delay, s/veh	256.7
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	127	1	587	0	0	0	0	524	219	53	285	0
Future Vol, veh/h	127	1	587	0	0	0	0	524	219	53	285	0
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	1	100	21	0	0	0	0	12	5	1	5	0
Mvmt Flow	148	1	683	0	0	0	0	609	255	62	331	0
Number of Lanes	0	1	1	0	0	0	0	1	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	245.7	370	30.9
HCM LOS	F	F	D

Lane	NBLn1	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	99%	0%	100%	0%
Vol Thru, %	71%	1%	0%	0%	100%
Vol Right, %	29%	0%	100%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	743	128	587	53	285
LT Vol	0	127	0	53	0
Through Vol	524	1	0	0	285
RT Vol	219	0	587	0	0
Lane Flow Rate	864	149	683	62	331
Geometry Grp	6	7	7	7	7
Degree of Util (X)	1.756	0.324	1.577	0.14	0.712
Departure Headway (Hd)	8.382	9.036	9.542	10.44	9.982
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	441	400	389	346	365
Service Time	6.382	6.736	7.242	8.14	7.682
HCM Lane V/C Ratio	1.959	0.372	1.756	0.179	0.907
HCM Control Delay	370	16	295.8	14.8	33.9
HCM Lane LOS	F	C	F	B	D
HCM 95th-tile Q	46.6	1.4	33.8	0.5	5.3

Intersection	
Intersection Delay, s/veh	63.7
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	264	6	31	525	125	0	0	73	50
Future Vol, veh/h	0	0	0	264	6	31	525	125	0	0	73	50
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	0	0	0	5	1	1	11	2	0	0	2	1
Mvmt Flow	0	0	0	307	7	36	610	145	0	0	85	58
Number of Lanes	0	0	0	0	1	1	1	1	0	0	1	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	2
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	2	0	2
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	2	2	0
HCM Control Delay	22	93	10.7
HCM LOS	C	F	B

Lane	NBLn1	NBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	98%	0%	0%	0%
Vol Thru, %	0%	100%	2%	0%	100%	0%
Vol Right, %	0%	0%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	525	125	270	31	73	50
LT Vol	525	0	264	0	0	0
Through Vol	0	125	6	0	73	0
RT Vol	0	0	0	31	0	50
Lane Flow Rate	610	145	314	36	85	58
Geometry Grp	7	7	7	7	7	7
Degree of Util (X)	1.153	0.248	0.645	0.061	0.163	0.1
Departure Headway (Hd)	6.798	6.135	7.711	6.436	7.175	6.438
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	537	589	471	560	503	560
Service Time	4.502	3.839	5.411	4.136	4.875	4.138
HCM Lane V/C Ratio	1.136	0.246	0.667	0.064	0.169	0.104
HCM Control Delay	112.6	10.9	23.4	9.6	11.3	9.9
HCM Lane LOS	F	B	C	A	B	A
HCM 95th-tile Q	21	1	4.5	0.2	0.6	0.3

Intersection	
Int Delay, s/veh	13.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	294	3	11	3	3	3	3	322	3	3	255	259
Future Vol, veh/h	294	3	11	3	3	3	3	322	3	3	255	259
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	100	225	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	1	1	1
Mvmt Flow	316	3	12	3	3	3	3	346	3	3	274	278

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	600	774	276	497	910	173	552	0	0	349	0	0
Stage 1	419	419	-	352	352	-	-	-	-	-	-	-
Stage 2	181	355	-	145	558	-	-	-	-	-	-	-
Critical Hdwy	7.52	6.52	6.92	7.52	6.52	6.92	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.52	5.52	-	6.52	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.52	5.52	-	6.52	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.51	4.01	3.31	3.51	4.01	3.31	2.21	-	-	2.21	-	-
Pot Cap-1 Maneuver	387	330	724	458	275	844	1021	-	-	1214	-	-
Stage 1	585	591	-	641	633	-	-	-	-	-	-	-
Stage 2	806	631	-	846	512	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	380	328	724	445	274	844	1021	-	-	1214	-	-
Mov Cap-2 Maneuver	380	328	-	445	274	-	-	-	-	-	-	-
Stage 1	583	590	-	639	631	-	-	-	-	-	-	-
Stage 2	796	629	-	826	511	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	50.4	13.7	0.1	0
HCM LOS	F	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1021	-	-	386	424	1214	-	-
HCM Lane V/C Ratio	0.003	-	-	0.858	0.023	0.003	-	-
HCM Control Delay (s)	8.5	-	-	50.4	13.7	8	-	-
HCM Lane LOS	A	-	-	F	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	8.2	0.1	0	-	-

Intersection	
Int Delay, s/veh	745.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↳		↰	↑↑					↰	↳	
Traffic Vol, veh/h	0	150	20	655	127	0	0	0	0	303	3	28
Future Vol, veh/h	0	150	20	655	127	0	0	0	0	303	3	28
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	200	-	-	-	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	13	1	2	9	0	0	0	0	9	33	24
Mvmt Flow	0	161	22	704	137	0	0	0	0	326	3	30

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	183	0	0	1626	1728	69
Stage 1	-	-	-	-	-	-	1545	1545	-
Stage 2	-	-	-	-	-	-	81	183	-
Critical Hdwy	-	-	-	4.14	-	-	6.98	7.16	7.38
Critical Hdwy Stg 1	-	-	-	-	-	-	5.98	6.16	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.98	6.16	-
Follow-up Hdwy	-	-	-	2.22	-	-	3.59	4.33	3.54
Pot Cap-1 Maneuver	0	-	-	1389	-	0	~ 87	64	913
Stage 1	0	-	-	-	-	0	~ 151	130	-
Stage 2	0	-	-	-	-	0	912	677	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	1389	-	-	~ 43	0	913
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 43	0	-
Stage 1	-	-	-	-	-	-	~ 151	0	-
Stage 2	-	-	-	-	-	-	450	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	8.6	$ 2851
HCM LOS			F

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	1389	-	43	913
HCM Lane V/C Ratio	-	-	0.507	-	7.577	0.037
HCM Control Delay (s)	-	-	10.2	$	3141.8	9.1
HCM Lane LOS	-	-	B	-	F	A
HCM 95th %tile Q(veh)	-	-	3	-	38.5	0.1

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	81	371	0	0	773	339	9	8	292	0	0	0
Future Volume (veh/h)	81	371	0	0	773	339	9	8	292	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1616	1716	0	0	1772	1786	1528	1393	1716			
Adj Flow Rate, veh/h	90	412	0	0	859	377	10	10	0			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90			
Percent Heavy Veh, %	11	6	0	0	2	1	13	29	6			
Cap, veh/h	110	1591	0	0	798	348	551	527				
Arrive On Green	0.07	0.49	0.00	0.00	0.35	0.35	0.38	0.38	0.00			
Sat Flow, veh/h	1539	3346	0	0	2369	995	1455	1393	1454			
Grp Volume(v), veh/h	90	412	0	0	633	603	10	10	0			
Grp Sat Flow(s),veh/h/ln	1539	1630	0	0	1683	1593	1455	1393	1454			
Q Serve(g_s), s	3.5	4.4	0.0	0.0	21.0	21.0	0.3	0.3	0.0			
Cycle Q Clear(g_c), s	3.5	4.4	0.0	0.0	21.0	21.0	0.3	0.3	0.0			
Prop In Lane	1.00		0.00	0.00		0.62	1.00		1.00			
Lane Grp Cap(c), veh/h	110	1591	0	0	589	557	551	527				
V/C Ratio(X)	0.82	0.26	0.00	0.00	1.07	1.08	0.02	0.02				
Avail Cap(c_a), veh/h	231	1847	0	0	589	557	551	527				
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	0.09	0.09	1.00	1.00	0.00			
Uniform Delay (d), s/veh	27.5	9.0	0.0	0.0	19.5	19.5	11.7	11.7	0.0			
Incr Delay (d2), s/veh	13.7	0.1	0.0	0.0	36.9	40.4	0.0	0.0	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.6	1.2	0.0	0.0	12.8	12.7	0.1	0.1	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	41.2	9.1	0.0	0.0	56.4	59.9	11.7	11.7	0.0			
LnGrp LOS	D	A	A	A	F	F	B	B				
Approach Vol, veh/h		502			1236			20	A			
Approach Delay, s/veh		14.8			58.1			11.7				
Approach LOS		B			E			B				

Timer - Assigned Phs		2		4			7	8				
Phs Duration (G+Y+Rc), s		26.7		33.3			8.3	25.0				
Change Period (Y+Rc), s		4.0		4.0			4.0	4.0				
Max Green Setting (Gmax), s		18.0		34.0			9.0	21.0				
Max Q Clear Time (g_c+I1), s		2.3		6.4			5.5	23.0				
Green Ext Time (p_c), s		0.0		2.6			0.1	0.0				

Intersection Summary	
HCM 6th Ctrl Delay	45.2
HCM 6th LOS	D

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	438	94	131	53	0	343	577	169	85	49	152	718
Future Volume (veh/h)	438	94	131	53	0	343	577	169	85	49	152	718
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1687	1589	1786	1687	1646	1786	1588	1786	1786	1687	1786	1786
Adj Flow Rate, veh/h	521	112	156	63	0	408	687	201	101	58	181	855
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	1	15	1	1	11	1	1	1	1	1	1	1
Cap, veh/h	266	1103	553	78	388	346	324	483	243	72	99	469
Arrive On Green	0.17	0.37	0.37	0.05	0.00	0.25	0.11	0.43	0.43	0.04	0.37	0.37
Sat Flow, veh/h	1606	3020	1514	1606	1563	1395	2933	1121	563	1606	272	1283
Grp Volume(v), veh/h	521	112	156	63	0	408	687	0	302	58	0	1036
Grp Sat Flow(s),veh/h/ln	1606	1510	1514	1606	1563	1395	1467	0	1685	1606	0	1555
Q Serve(g_s), s	24.0	3.5	10.6	5.6	0.0	36.0	16.0	0.0	18.0	5.2	0.0	53.0
Cycle Q Clear(g_c), s	24.0	3.5	10.6	5.6	0.0	36.0	16.0	0.0	18.0	5.2	0.0	53.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.33	1.00		0.83
Lane Grp Cap(c), veh/h	266	1103	553	78	388	346	324	0	726	72	0	568
V/C Ratio(X)	1.96	0.10	0.28	0.81	0.00	1.18	2.12	0.00	0.42	0.80	0.00	1.82
Avail Cap(c_a), veh/h	266	1103	553	133	388	346	324	0	726	133	0	568
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.98	0.98	0.98	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	60.5	30.3	32.6	68.3	0.0	54.5	64.5	0.0	28.6	68.6	0.0	46.0
Incr Delay (d2), s/veh	444.9	0.2	1.3	17.2	0.0	106.2	515.5	0.0	0.4	18.2	0.0	377.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	42.5	1.3	4.1	2.7	0.0	22.6	29.1	0.0	7.4	2.5	0.0	79.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	505.4	30.5	33.8	85.5	0.0	160.7	580.0	0.0	29.0	86.8	0.0	423.1
LnGrp LOS	F	C	C	F	A	F	F	A	C	F	A	F
Approach Vol, veh/h		789			471			989			1094	
Approach Delay, s/veh		344.8			150.7			411.7			405.3	
Approach LOS		F			F			F			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.1	56.9	20.0	57.0	28.0	40.0	10.5	66.5
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	12.0	48.0	16.0	53.0	24.0	36.0	12.0	57.0
Max Q Clear Time (g_c+I1), s	7.6	12.6	18.0	55.0	26.0	38.0	7.2	20.0
Green Ext Time (p_c), s	0.0	1.2	0.0	0.0	0.0	0.0	0.0	1.9

Intersection Summary	
HCM 6th Ctrl Delay	357.0
HCM 6th LOS	F

Intersection	
Intersection Delay, s/veh	321.7
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	165	8	46	55	6	219	41	692	56	187	494	72
Future Vol, veh/h	165	8	46	55	6	219	41	692	56	187	494	72
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles, %	1	53	1	1	23	15	1	1	1	6	1	24
Mvmt Flow	188	9	52	63	7	249	47	786	64	213	561	82
Number of Lanes	1	2	0	1	2	0	0	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	3	3
HCM Control Delay	29.4	33.1	597.4	225.1
HCM LOS	D	D	F	F

Lane	NBLn1	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	5%	100%	0%	0%	100%	0%	0%	100%	0%
Vol Thru, %	88%	0%	100%	5%	0%	100%	1%	0%	87%
Vol Right, %	7%	0%	0%	95%	0%	0%	99%	0%	13%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	789	165	5	49	55	4	221	187	566
LT Vol	41	165	0	0	55	0	0	187	0
Through Vol	692	0	5	3	0	4	2	0	494
RT Vol	56	0	0	46	0	0	219	0	72
Lane Flow Rate	897	188	6	55	62	5	251	212	643
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	2.261	0.546	0.018	0.143	0.178	0.013	0.649	0.552	1.55
Departure Headway (Hd)	9.944	14.373	14.796	13.092	13.967	13.828	12.918	12.013	11.292
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	377	253	243	276	259	260	281	304	328
Service Time	7.644	12.073	12.496	10.792	11.667	11.528	10.618	9.713	8.992
HCM Lane V/C Ratio	2.379	0.743	0.025	0.199	0.239	0.019	0.893	0.697	1.96
HCM Control Delay	597.4	33.1	17.8	18	19.7	16.7	36.7	28.6	290
HCM Lane LOS	F	D	C	C	C	C	E	D	F
HCM 95th-tile Q	62	3	0.1	0.5	0.6	0	4.1	3.1	28.4

Intersection	
Intersection Delay, s/veh	499.3
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	40	2	445	0	0	0	0	653	423	78	309	0
Future Vol, veh/h	40	2	445	0	0	0	0	653	423	78	309	0
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	22	50	26	0	0	0	0	59	5	11	9	0
Mvmt Flow	47	2	517	0	0	0	0	759	492	91	359	0
Number of Lanes	0	1	1	0	0	0	0	1	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	97.7	847.5	36.5
HCM LOS	F	F	E

Lane	NBLn1	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	95%	0%	100%	0%
Vol Thru, %	61%	5%	0%	0%	100%
Vol Right, %	39%	0%	100%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	1076	42	445	78	309
LT Vol	0	40	0	78	0
Through Vol	653	2	0	0	309
RT Vol	423	0	445	0	0
Lane Flow Rate	1251	49	517	91	359
Geometry Grp	6	7	7	7	7
Degree of Util (X)	2.829	0.112	1.087	0.209	0.775
Departure Headway (Hd)	8.513	10.869	10.126	11.076	10.504
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	438	332	362	327	349
Service Time	6.513	8.569	7.826	8.776	8.204
HCM Lane V/C Ratio	2.856	0.148	1.428	0.278	1.029
HCM Control Delay	847.5	14.9	105.5	16.7	41.5
HCM Lane LOS	F	B	F	C	E
HCM 95th-tile Q	101.1	0.4	14.1	0.8	6.3

Intersection	
Intersection Delay, s/veh	191.2
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	264	1	25	612	81	0	0	124	17
Future Vol, veh/h	0	0	0	264	1	25	612	81	0	0	124	17
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehicles, %	0	0	0	5	1	17	66	13	0	0	13	1
Mvmt Flow	0	0	0	330	1	31	765	101	0	0	155	21
Number of Lanes	0	0	0	0	1	1	1	1	0	0	1	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	2
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	2	0	2
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	2	2	0
HCM Control Delay	26.1	296.4	13.6
HCM LOS	D	F	B

Lane	NBLn1	NBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	100%	0%	0%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%
Vol Right, %	0%	0%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	612	81	265	25	124	17
LT Vol	612	0	264	0	0	0
Through Vol	0	81	1	0	124	0
RT Vol	0	0	0	25	0	17
Lane Flow Rate	765	101	331	31	155	21
Geometry Grp	7	7	7	7	7	7
Degree of Util (X)	1.678	0.182	0.68	0.053	0.307	0.037
Departure Headway (Hd)	7.896	6.471	8.578	7.284	7.913	6.976
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	467	557	424	495	457	516
Service Time	5.604	4.179	6.278	4.984	5.613	4.676
HCM Lane V/C Ratio	1.638	0.181	0.781	0.063	0.339	0.041
HCM Control Delay	334.2	10.6	27.6	10.4	14.1	9.9
HCM Lane LOS	F	B	D	B	B	A
HCM 95th-tile Q	45	0.7	4.9	0.2	1.3	0.1

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	102	34	39	189	179	117
Future Vol, veh/h	102	34	39	189	179	117
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	1	1	1	6	2	1
Mvmt Flow	121	40	46	225	213	139

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	488	176	352	0	-	0
Stage 1	283	-	-	-	-	-
Stage 2	205	-	-	-	-	-
Critical Hdwy	6.82	6.92	4.12	-	-	-
Critical Hdwy Stg 1	5.82	-	-	-	-	-
Critical Hdwy Stg 2	5.82	-	-	-	-	-
Follow-up Hdwy	3.51	3.31	2.21	-	-	-
Pot Cap-1 Maneuver	511	840	1211	-	-	-
Stage 1	743	-	-	-	-	-
Stage 2	812	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	489	840	1211	-	-	-
Mov Cap-2 Maneuver	489	-	-	-	-	-
Stage 1	711	-	-	-	-	-
Stage 2	812	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.5	1.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1211	-	489	840	-	-
HCM Lane V/C Ratio	0.038	-	0.248	0.048	-	-
HCM Control Delay (s)	8.1	0.1	14.8	9.5	-	-
HCM Lane LOS	A	A	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	1	0.2	-	-

Intersection	
Int Delay, s/veh	149.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	474	3	33	3	3	3	47	240	3	3	259	259
Future Vol, veh/h	474	3	33	3	3	3	47	240	3	3	259	259
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	100	225	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	1	1	1
Mvmt Flow	539	3	38	3	3	3	53	273	3	3	294	294

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	691	829	294	534	973	137	588	0	0	276	0	0
Stage 1	447	447	-	379	379	-	-	-	-	-	-	-
Stage 2	244	382	-	155	594	-	-	-	-	-	-	-
Critical Hdwy	7.52	6.52	6.92	7.52	6.52	6.92	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.52	5.52	-	6.52	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.52	5.52	-	6.52	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.51	4.01	3.31	3.51	4.01	3.31	2.21	-	-	2.21	-	-
Pot Cap-1 Maneuver	~ 333	306	705	431	252	890	990	-	-	1291	-	-
Stage 1	563	574	-	618	615	-	-	-	-	-	-	-
Stage 2	741	614	-	835	494	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 314	289	705	387	238	890	990	-	-	1291	-	-
Mov Cap-2 Maneuver	~ 314	289	-	387	238	-	-	-	-	-	-	-
Stage 1	~ 533	573	-	585	582	-	-	-	-	-	-	-
Stage 2	695	581	-	784	493	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 389.7	14.8	1.4	0
HCM LOS	F	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	990	-	-	326	379	1291	-	-
HCM Lane V/C Ratio	0.054	-	-	1.778	0.027	0.003	-	-
HCM Control Delay (s)	8.8	-	-	$ 389.7	14.8	7.8	-	-
HCM Lane LOS	A	-	-	F	B	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	37.5	0.1	0	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	150	20	655	127	0	0	0	0	303	3	28
Future Volume (veh/h)	0	150	20	655	127	0	0	0	0	303	3	28
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1617	1786	1673	1674	0				1581	1337	1463
Adj Flow Rate, veh/h	0	161	22	704	137	0				326	3	30
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93				0.93	0.93	0.93
Percent Heavy Veh, %	0	13	1	2	9	0				9	33	24
Cap, veh/h	0	242	33	726	1873	0				485	34	337
Arrive On Green	0.00	0.09	0.09	0.15	0.19	0.00				0.32	0.32	0.32
Sat Flow, veh/h	0	2803	366	1594	3264	0				1505	104	1044
Grp Volume(v), veh/h	0	90	93	704	137	0				326	0	33
Grp Sat Flow(s),veh/h/ln	0	1537	1552	1594	1590	0				1505	0	1149
Q Serve(g_s), s	0.0	5.1	5.2	39.5	3.2	0.0				16.9	0.0	1.8
Cycle Q Clear(g_c), s	0.0	5.1	5.2	39.5	3.2	0.0				16.9	0.0	1.8
Prop In Lane	0.00		0.24	1.00		0.00				1.00		0.91
Lane Grp Cap(c), veh/h	0	137	138	726	1873	0				485	0	370
V/C Ratio(X)	0.00	0.66	0.68	0.97	0.07	0.00				0.67	0.00	0.09
Avail Cap(c_a), veh/h	0	273	276	726	2155	0				485	0	370
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.65	0.65	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	39.7	39.7	37.6	16.2	0.0				26.4	0.0	21.3
Incr Delay (d2), s/veh	0.0	5.3	5.7	19.9	0.0	0.0				3.6	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.0	2.1	20.6	1.0	0.0				6.3	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	45.0	45.4	57.5	16.2	0.0				30.0	0.0	21.4
LnGrp LOS	A	D	D	E	B	A				C	A	C
Approach Vol, veh/h		183			841						359	
Approach Delay, s/veh		45.2			50.8						29.2	
Approach LOS		D			D						C	

Timer - Assigned Phs		3	4		6		8					
Phs Duration (G+Y+Rc), s		45.0	12.0		33.0		57.0					
Change Period (Y+Rc), s		4.0	4.0		4.0		4.0					
Max Green Setting (Gmax), s		41.0	16.0		21.0		61.0					
Max Q Clear Time (g_c+I1), s		41.5	7.2		18.9		5.2					
Green Ext Time (p_c), s		0.0	0.5		0.3		0.9					

Intersection Summary	
HCM 6th Ctrl Delay	44.5
HCM 6th LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	81	371	0	0	773	339	9	8	292	0	0	0
Future Volume (veh/h)	81	371	0	0	773	339	9	8	292	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1616	1716	0	0	1772	1786	1528	1393	1716			
Adj Flow Rate, veh/h	90	412	0	0	859	377	10	9	324			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90			
Percent Heavy Veh, %	11	6	0	0	2	1	13	29	6			
Cap, veh/h	111	1369	0	0	1021	459	351	316	1257			
Arrive On Green	0.07	0.42	0.00	0.00	0.30	0.30	0.49	0.49	0.49			
Sat Flow, veh/h	1539	3346	0	0	3455	1514	714	643	2559			
Grp Volume(v), veh/h	90	412	0	0	859	377	19	0	324			
Grp Sat Flow(s),veh/h/ln	1539	1630	0	0	1683	1514	1357	0	1280			
Q Serve(g_s), s	5.2	7.6	0.0	0.0	21.5	20.8	0.7	0.0	6.6			
Cycle Q Clear(g_c), s	5.2	7.6	0.0	0.0	21.5	20.8	0.7	0.0	6.6			
Prop In Lane	1.00		0.00	0.00		1.00	0.53		1.00			
Lane Grp Cap(c), veh/h	111	1369	0	0	1021	459	667	0	1257			
V/C Ratio(X)	0.81	0.30	0.00	0.00	0.84	0.82	0.03	0.00	0.26			
Avail Cap(c_a), veh/h	239	2173	0	0	1571	706	667	0	1257			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.61	0.61	0.00	0.00	0.63	0.63	1.00	0.00	1.00			
Uniform Delay (d), s/veh	41.1	17.3	0.0	0.0	29.3	29.1	11.8	0.0	13.3			
Incr Delay (d2), s/veh	8.2	0.1	0.0	0.0	1.7	2.9	0.1	0.0	0.5			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	2.2	2.6	0.0	0.0	8.4	7.5	0.2	0.0	1.9			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.3	17.4	0.0	0.0	31.0	32.0	11.9	0.0	13.8			
LnGrp LOS	D	B	A	A	C	C	B	A	B			
Approach Vol, veh/h		502			1236			343				
Approach Delay, s/veh		23.1			31.3			13.7				
Approach LOS		C			C			B				

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	48.2	41.8	10.5	31.3
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	22.0	60.0	14.0	42.0
Max Q Clear Time (g_c+I1), s	8.6	9.6	7.2	23.5
Green Ext Time (p_c), s	1.2	2.8	0.1	3.8

Intersection Summary	
HCM 6th Ctrl Delay	26.4
HCM 6th LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	438	94	131	53	0	343	577	169	85	49	152	718
Future Volume (veh/h)	438	94	131	53	0	343	577	169	85	49	152	718
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1588	1589	1786	1588	1646	1786	1588	1786	1786	1687	1786	1786
Adj Flow Rate, veh/h	521	112	156	63	0	408	687	201	101	58	181	0
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	1	15	1	1	11	1	1	1	1	1	1	1
Cap, veh/h	573	1307	655	123	874	470	749	392	197	97	224	
Arrive On Green	0.20	0.43	0.43	0.04	0.00	0.28	0.26	0.35	0.35	0.03	0.13	0.00
Sat Flow, veh/h	2933	3020	1514	2933	3127	1514	2933	1121	563	3116	1786	1514
Grp Volume(v), veh/h	521	112	156	63	0	408	687	0	302	58	181	0
Grp Sat Flow(s),veh/h/ln	1467	1510	1514	1467	1563	1514	1467	0	1685	1558	1786	1514
Q Serve(g_s), s	19.3	2.4	7.2	2.3	0.0	28.2	25.3	0.0	15.8	2.0	10.9	0.0
Cycle Q Clear(g_c), s	19.3	2.4	7.2	2.3	0.0	28.2	25.3	0.0	15.8	2.0	10.9	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.33	1.00		1.00
Lane Grp Cap(c), veh/h	573	1307	655	123	874	470	749	0	589	97	224	
V/C Ratio(X)	0.91	0.09	0.24	0.51	0.00	0.87	0.92	0.00	0.51	0.60	0.81	
Avail Cap(c_a), veh/h	608	1307	655	159	874	470	820	0	790	506	628	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	43.7	18.5	19.9	52.0	0.0	36.1	40.2	0.0	28.6	53.0	47.2	0.0
Incr Delay (d2), s/veh	17.2	0.1	0.9	3.2	0.0	19.1	14.4	0.0	0.7	5.8	6.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.2	0.8	2.7	0.9	0.0	12.6	10.4	0.0	6.3	0.9	5.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	60.8	18.7	20.7	55.2	0.0	55.1	54.6	0.0	29.3	58.9	53.9	0.0
LnGrp LOS	E	B	C	E	A	E	D	A	C	E	D	
Approach Vol, veh/h		789			471			989			239	A
Approach Delay, s/veh		46.9			55.2			46.8			55.1	
Approach LOS		D			E			D			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.7	52.0	32.3	17.9	25.7	35.0	7.4	42.8
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	6.0	48.0	31.0	39.0	23.0	31.0	18.0	52.0
Max Q Clear Time (g_c+I1), s	4.3	9.2	27.3	12.9	21.3	0.0	4.0	17.8
Green Ext Time (p_c), s	0.0	1.2	1.0	1.0	0.4	0.0	0.1	1.9

Intersection Summary	
HCM 6th Ctrl Delay	49.2
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	165	8	46	55	6	219	41	692	56	187	494	72
Future Volume (veh/h)	165	8	46	55	6	219	41	692	56	187	494	72
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1687	1056	1786	1687	1477	1589	1687	1786	1786	1620	1786	1463
Adj Flow Rate, veh/h	188	9	52	62	7	249	47	786	64	212	561	82
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	1	53	1	1	23	15	1	1	1	6	1	24
Cap, veh/h	201	206	184	78	191	379	87	1462	119	236	1659	242
Arrive On Green	0.13	0.21	0.21	0.05	0.13	0.13	0.05	0.46	0.46	0.31	1.00	1.00
Sat Flow, veh/h	1606	1003	895	1606	1477	1347	1606	3177	259	1543	2972	433
Grp Volume(v), veh/h	188	9	52	62	7	249	47	420	430	212	320	323
Grp Sat Flow(s),veh/h/ln	1606	1003	895	1606	1477	1347	1606	1697	1739	1543	1697	1708
Q Serve(g_s), s	13.9	0.9	5.9	4.6	0.5	13.4	3.4	21.3	21.3	15.8	0.0	0.0
Cycle Q Clear(g_c), s	13.9	0.9	5.9	4.6	0.5	13.4	3.4	21.3	21.3	15.8	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.15	1.00		0.25
Lane Grp Cap(c), veh/h	201	206	184	78	191	379	87	781	800	236	947	954
V/C Ratio(X)	0.94	0.04	0.28	0.80	0.04	0.66	0.54	0.54	0.54	0.90	0.34	0.34
Avail Cap(c_a), veh/h	201	206	184	187	197	385	87	781	800	476	947	954
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.87	0.87	0.87
Uniform Delay (d), s/veh	52.0	38.2	40.2	56.5	45.7	19.8	55.3	23.2	23.2	40.8	0.0	0.0
Incr Delay (d2), s/veh	45.7	0.1	0.8	16.8	0.1	3.9	6.5	2.6	2.6	10.5	0.8	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.1	0.2	1.3	2.2	0.2	4.6	1.5	8.7	9.0	5.6	0.2	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	97.7	38.3	41.0	73.3	45.8	23.7	61.7	25.9	25.8	51.3	0.8	0.8
LnGrp LOS	F	D	D	E	D	C	E	C	C	D	A	A
Approach Vol, veh/h		249			318			897			855	
Approach Delay, s/veh		83.7			33.9			27.7			13.4	
Approach LOS		F			C			C			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	22.3	59.2	9.8	28.7	10.5	71.0	19.0	19.5
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	17.6	36.0	14.0	17.0	6.0	67.0	15.0	16.0
Max Q Clear Time (g_c+I1), s	17.8	23.3	6.6	7.9	5.4	2.0	15.9	15.4
Green Ext Time (p_c), s	0.5	4.1	0.1	0.1	0.0	4.1	0.0	0.1

Intersection Summary	
HCM 6th Ctrl Delay	29.3
HCM 6th LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	2	445	0	0	0	0	653	423	78	309	0
Future Volume (veh/h)	40	2	445	0	0	0	0	653	423	78	309	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1408	1098	1435				0	972	1730	1554	1674	0
Adj Flow Rate, veh/h	47	2	517				0	759	492	91	359	0
Peak Hour Factor	0.86	0.86	0.86				0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	22	50	26				0	59	5	11	9	0
Cap, veh/h	403	17	487				0	785	623	110	1694	0
Arrive On Green	0.40	0.40	0.40				0.00	0.57	0.57	0.07	0.53	0.00
Sat Flow, veh/h	1005	43	1216				0	1895	1466	1480	3264	0
Grp Volume(v), veh/h	49	0	517				0	759	492	91	359	0
Grp Sat Flow(s),veh/h/ln	1048	0	1216				0	923	1466	1480	1590	0
Q Serve(g_s), s	3.5	0.0	48.1				0.0	47.3	31.6	7.3	7.1	0.0
Cycle Q Clear(g_c), s	3.5	0.0	48.1				0.0	47.3	31.6	7.3	7.1	0.0
Prop In Lane	0.96		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	420	0	487				0	785	623	110	1694	0
V/C Ratio(X)	0.12	0.00	1.06				0.00	0.97	0.79	0.83	0.21	0.00
Avail Cap(c_a), veh/h	420	0	487				0	800	635	160	1828	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.33	1.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	0.80	0.80	0.79	0.79	0.00
Uniform Delay (d), s/veh	22.6	0.0	36.0				0.0	25.2	21.8	54.8	14.8	0.0
Incr Delay (d2), s/veh	0.6	0.0	57.9				0.0	20.6	5.3	16.8	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	21.7				0.0	10.7	9.8	3.2	2.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.2	0.0	93.9				0.0	45.9	27.1	71.6	14.8	0.0
LnGrp LOS	C	A	F				A	D	C	E	B	A
Approach Vol, veh/h		566						1251			450	
Approach Delay, s/veh		87.8						38.5			26.3	
Approach LOS		F						D			C	

Timer - Assigned Phs		2		4			7	8				
Phs Duration (G+Y+Rc), s		52.1		67.9			12.9	55.0				
Change Period (Y+Rc), s		4.0		4.0			4.0	4.0				
Max Green Setting (Gmax), s		43.0		69.0			13.0	52.0				
Max Q Clear Time (g_c+I1), s		50.1		9.1			9.3	49.3				
Green Ext Time (p_c), s		0.0		2.4			0.1	1.7				

Intersection Summary			
HCM 6th Ctrl Delay			48.4
HCM 6th LOS			D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	264	1	25	612	81	0	0	124	17
Future Volume (veh/h)	0	0	0	264	1	25	612	81	0	0	124	17
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1634	1786	1561	825	1617	0	0	1617	1786
Adj Flow Rate, veh/h				330	1	31	765	101	0	0	155	21
Peak Hour Factor				0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Percent Heavy Veh, %				5	1	17	66	13	0	0	13	1
Cap, veh/h				540	17	512	762	963	0	0	206	102
Arrive On Green				0.35	0.35	0.35	0.50	0.60	0.00	0.00	0.07	0.07
Sat Flow, veh/h				1556	48	1473	1524	1617	0	0	3154	1514
Grp Volume(v), veh/h				330	0	32	765	101	0	0	155	21
Grp Sat Flow(s),veh/h/ln				1556	0	1521	762	1617	0	0	1537	1514
Q Serve(g_s), s				24.6	0.0	2.0	70.0	3.8	0.0	0.0	6.9	1.0
Cycle Q Clear(g_c), s				24.6	0.0	2.0	70.0	3.8	0.0	0.0	6.9	1.0
Prop In Lane				1.00		0.97	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				540	0	528	762	963	0	0	206	102
V/C Ratio(X)				0.61	0.00	0.06	1.00	0.10	0.00	0.00	0.75	0.21
Avail Cap(c_a), veh/h				540	0	528	762	1040	0	0	351	173
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.37	0.37	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				37.9	0.0	30.5	35.0	12.2	0.0	0.0	64.2	19.8
Incr Delay (d2), s/veh				2.0	0.0	0.0	20.8	0.0	0.0	0.0	5.5	1.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				9.7	0.0	0.7	14.5	1.3	0.0	0.0	2.8	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				39.9	0.0	30.5	55.8	12.2	0.0	0.0	69.6	20.8
LnGrp LOS				D	A	C	F	B	A	A	E	C
Approach Vol, veh/h					362			866			176	
Approach Delay, s/veh					39.0			50.7			63.8	
Approach LOS					D			D			E	

Timer - Assigned Phs	2	3	4				8					
Phs Duration (G+Y+Rc), s	52.6	74.0	13.4				87.4					
Change Period (Y+Rc), s	4.0	4.0	4.0				4.0					
Max Green Setting (Gmax), s	42.0	70.0	16.0				90.0					
Max Q Clear Time (g_c+I1), s	26.6	72.0	8.9				5.8					
Green Ext Time (p_c), s	1.1	0.0	0.5				0.6					

Intersection Summary	
HCM 6th Ctrl Delay	49.3
HCM 6th LOS	D

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	102	34	39	189	179	117
Future Vol, veh/h	102	34	39	189	179	117
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	300	-	-	150
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	1	1	1	6	2	1
Mvmt Flow	121	40	46	225	213	139

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	418	107	352	0	-	0
Stage 1	213	-	-	-	-	-
Stage 2	205	-	-	-	-	-
Critical Hdwy	6.82	6.92	4.12	-	-	-
Critical Hdwy Stg 1	5.82	-	-	-	-	-
Critical Hdwy Stg 2	5.82	-	-	-	-	-
Follow-up Hdwy	3.51	3.31	2.21	-	-	-
Pot Cap-1 Maneuver	566	930	1211	-	-	-
Stage 1	805	-	-	-	-	-
Stage 2	812	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	544	930	1211	-	-	-
Mov Cap-2 Maneuver	544	-	-	-	-	-
Stage 1	774	-	-	-	-	-
Stage 2	812	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.4	1.4	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1211	-	544	930	-	-
HCM Lane V/C Ratio	0.038	-	0.223	0.044	-	-
HCM Control Delay (s)	8.1	-	13.5	9	-	-
HCM Lane LOS	A	-	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.8	0.1	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	474	3	33	3	3	3	47	240	3	3	259	259
Future Volume (veh/h)	474	3	33	3	3	3	47	240	3	3	259	259
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1786	1786	1786	1786	1786	1786	1786	1786	1786	1786	1786	1786
Adj Flow Rate, veh/h	539	3	38	3	3	3	53	273	3	3	294	294
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	626	3	44	10	10	10	65	832	371	156	507	453
Arrive On Green	0.40	0.40	0.40	0.02	0.02	0.02	0.04	0.25	0.25	0.09	0.30	0.30
Sat Flow, veh/h	1568	9	111	553	553	553	1701	3393	1514	1701	1697	1514
Grp Volume(v), veh/h	580	0	0	9	0	0	53	273	3	3	294	294
Grp Sat Flow(s),veh/h/ln	1688	0	0	1659	0	0	1701	1697	1514	1701	1697	1514
Q Serve(g_s), s	20.5	0.0	0.0	0.3	0.0	0.0	2.0	4.3	0.1	0.1	9.6	11.0
Cycle Q Clear(g_c), s	20.5	0.0	0.0	0.3	0.0	0.0	2.0	4.3	0.1	0.1	9.6	11.0
Prop In Lane	0.93		0.07	0.33		0.33	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	674	0	0	31	0	0	65	832	371	156	507	453
V/C Ratio(X)	0.86	0.00	0.00	0.29	0.00	0.00	0.82	0.33	0.01	0.02	0.58	0.65
Avail Cap(c_a), veh/h	931	0	0	407	0	0	156	832	371	156	507	453
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.9	0.0	0.0	31.6	0.0	0.0	31.2	20.2	18.6	26.9	19.4	19.9
Incr Delay (d2), s/veh	6.2	0.0	0.0	5.2	0.0	0.0	21.3	1.1	0.0	0.2	4.8	7.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.4	0.0	0.0	0.2	0.0	0.0	1.2	1.7	0.0	0.0	4.0	4.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.1	0.0	0.0	36.8	0.0	0.0	52.4	21.3	18.7	27.2	24.2	27.0
LnGrp LOS	C	A	A	D	A	A	D	C	B	C	C	C
Approach Vol, veh/h		580			9			329			591	
Approach Delay, s/veh		24.1			36.8			26.3			25.6	
Approach LOS		C			D			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.0	20.0		30.0	6.5	23.5		5.2
Change Period (Y+Rc), s	4.0	4.0		4.0	4.0	4.0		4.0
Max Green Setting (Gmax), s	6.0	16.0		36.0	6.0	16.0		16.0
Max Q Clear Time (g_c+I1), s	2.1	6.3		22.5	4.0	13.0		2.3
Green Ext Time (p_c), s	0.0	1.1		3.5	0.0	1.0		0.0

Intersection Summary	
HCM 6th Ctrl Delay	25.2
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	334

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↳		↰	↑↑					↰	↳	
Traffic Vol, veh/h	0	132	1	403	131	0	0	0	0	340	32	65
Future Vol, veh/h	0	132	1	403	131	0	0	0	0	340	32	65
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	200	-	-	-	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	0	5	1	4	5	0	0	0	0	4	1	10
Mvmt Flow	0	153	1	469	152	0	0	0	0	395	37	76

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	154	0	0	1167	1244	76
Stage 1	-	-	-	-	-	-	1090	1090	-
Stage 2	-	-	-	-	-	-	77	154	-
Critical Hdwy	-	-	-	4.18	-	-	6.88	6.52	7.1
Critical Hdwy Stg 1	-	-	-	-	-	-	5.88	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.88	5.52	-
Follow-up Hdwy	-	-	-	2.24	-	-	3.54	4.01	3.4
Pot Cap-1 Maneuver	0	-	-	1409	-	0	~ 184	174	945
Stage 1	0	-	-	-	-	0	~ 279	291	-
Stage 2	0	-	-	-	-	0	931	771	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	1409	-	-	~ 123	0	945
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 123	0	-
Stage 1	-	-	-	-	-	-	~ 279	0	-
Stage 2	-	-	-	-	-	-	621	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	6.7	$ 835.7
HCM LOS			F

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	1409	-	123	945
HCM Lane V/C Ratio	-	-	0.333	-	3.214	0.119
HCM Control Delay (s)	-	-	8.8	$	1071.5	9.3
HCM Lane LOS	-	-	A	-	F	A
HCM 95th %tile Q(veh)	-	-	1.5	-	38	0.4

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	67	405	0	0	527	305	7	9	618	0	0	0
Future Volume (veh/h)	67	405	0	0	527	305	7	9	618	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1478	1786	0	0	1758	1786	1262	1098	1772			
Adj Flow Rate, veh/h	73	440	0	0	573	332	8	10	0			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	21	1	0	0	3	1	33	50	2			
Cap, veh/h	85	1533	0	0	662	383	499	456				
Arrive On Green	0.06	0.45	0.00	0.00	0.32	0.32	0.41	0.41	0.00			
Sat Flow, veh/h	1408	3483	0	0	2124	1179	1202	1098	1502			
Grp Volume(v), veh/h	73	440	0	0	470	435	8	10	0			
Grp Sat Flow(s),veh/h/ln	1408	1697	0	0	1670	1546	1202	1098	1502			
Q Serve(g_s), s	3.1	4.9	0.0	0.0	15.9	15.9	0.2	0.3	0.0			
Cycle Q Clear(g_c), s	3.1	4.9	0.0	0.0	15.9	15.9	0.2	0.3	0.0			
Prop In Lane	1.00		0.00	0.00		0.76	1.00		1.00			
Lane Grp Cap(c), veh/h	85	1533	0	0	543	502	499	456				
V/C Ratio(X)	0.86	0.29	0.00	0.00	0.87	0.87	0.02	0.02				
Avail Cap(c_a), veh/h	211	1923	0	0	584	541	499	456				
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	0.33	0.33	1.00	1.00	0.00			
Uniform Delay (d), s/veh	28.0	10.4	0.0	0.0	19.0	19.0	10.3	10.4	0.0			
Incr Delay (d2), s/veh	21.4	0.1	0.0	0.0	4.5	4.9	0.0	0.0	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.5	1.5	0.0	0.0	5.9	5.5	0.1	0.1	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.4	10.5	0.0	0.0	23.6	23.9	10.4	10.4	0.0			
LnGrp LOS	D	B	A	A	C	C	B	B				
Approach Vol, veh/h		513			905			18	A			
Approach Delay, s/veh		16.0			23.7			10.4				
Approach LOS		B			C			B				

Timer - Assigned Phs		2		4			7	8				
Phs Duration (G+Y+Rc), s		28.9		31.1			7.6	23.5				
Change Period (Y+Rc), s		4.0		4.0			4.0	4.0				
Max Green Setting (Gmax), s		18.0		34.0			9.0	21.0				
Max Q Clear Time (g_c+I1), s		2.3		6.9			5.1	17.9				
Green Ext Time (p_c), s		0.0		2.8			0.0	1.6				

Intersection Summary	
HCM 6th Ctrl Delay	20.8
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	738	0	322	75	178	49	218	157	58	340	150	437
Future Volume (veh/h)	738	0	322	75	178	49	218	157	58	340	150	437
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1687	1716	1786	1687	1646	1786	1588	1786	1744	1687	1786	1786
Adj Flow Rate, veh/h	820	0	358	83	198	54	242	174	64	378	167	486
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	1	6	1	1	11	1	1	1	4	1	1	1
Cap, veh/h	399	1459	677	101	640	170	162	326	120	188	131	380
Arrive On Green	0.25	0.00	0.45	0.06	0.26	0.26	0.06	0.26	0.26	0.12	0.32	0.32
Sat Flow, veh/h	1606	3260	1514	1606	2442	649	2933	1245	458	1606	403	1172
Grp Volume(v), veh/h	820	0	358	83	125	127	242	0	238	378	0	653
Grp Sat Flow(s),veh/h/ln	1606	1630	1514	1606	1563	1529	1467	0	1704	1606	0	1575
Q Serve(g_s), s	36.0	0.0	24.8	7.4	9.3	9.7	8.0	0.0	17.4	17.0	0.0	47.0
Cycle Q Clear(g_c), s	36.0	0.0	24.8	7.4	9.3	9.7	8.0	0.0	17.4	17.0	0.0	47.0
Prop In Lane	1.00		1.00	1.00		0.42	1.00		0.27	1.00		0.74
Lane Grp Cap(c), veh/h	399	1459	677	101	410	401	162	0	446	188	0	511
V/C Ratio(X)	2.06	0.00	0.53	0.82	0.30	0.32	1.50	0.00	0.53	2.01	0.00	1.28
Avail Cap(c_a), veh/h	399	1459	677	144	410	401	162	0	446	188	0	511
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.93	0.00	0.93	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	54.5	0.0	29.0	67.1	42.9	43.1	68.5	0.0	45.9	64.0	0.0	49.0
Incr Delay (d2), s/veh	483.2	0.0	2.7	21.7	1.9	2.1	252.6	0.0	1.2	471.5	0.0	140.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	67.8	0.0	9.5	3.6	3.8	3.9	8.7	0.0	7.5	31.6	0.0	38.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	537.7	0.0	31.7	88.9	44.8	45.1	321.1	0.0	47.1	535.5	0.0	189.1
LnGrp LOS	F	A	C	F	D	D	F	A	D	F	A	F
Approach Vol, veh/h		1178			335			480			1031	
Approach Delay, s/veh		384.0			55.9			185.2			316.1	
Approach LOS		F			E			F			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.1	68.9	12.0	51.0	40.0	42.0	21.0	42.0
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	13.0	61.0	8.0	47.0	36.0	38.0	17.0	38.0
Max Q Clear Time (g_c+I1), s	19.4	26.8	10.0	49.0	38.0	11.7	19.0	19.4
Green Ext Time (p_c), s	0.0	1.3	0.0	0.0	0.0	1.4	0.0	1.2

Intersection Summary	
HCM 6th Ctrl Delay	292.9
HCM 6th LOS	F

Intersection	
Intersection Delay, s/veh	333.1
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	91	23	155	49	7	167	173	549	47	161	476	304
Future Vol, veh/h	91	23	155	49	7	167	173	549	47	161	476	304
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	1	10	1	1	35	8	1	1	1	6	1	4
Mvmt Flow	98	25	167	53	8	180	186	590	51	173	512	327
Number of Lanes	1	2	0	1	2	0	0	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	3	3
HCM Control Delay	22.7	24.1	488.3	368.2
HCM LOS	C	C	F	F

Lane	NBLn1	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	22%	100%	0%	0%	100%	0%	0%	100%	0%
Vol Thru, %	71%	0%	100%	5%	0%	100%	1%	0%	61%
Vol Right, %	6%	0%	0%	95%	0%	0%	99%	0%	39%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	769	91	15	163	49	5	169	161	780
LT Vol	173	91	0	0	49	0	0	161	0
Through Vol	549	0	15	8	0	5	2	0	476
RT Vol	47	0	0	155	0	0	167	0	304
Lane Flow Rate	827	98	16	175	53	5	182	173	839
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	2.014	0.273	0.044	0.431	0.149	0.014	0.461	0.434	1.903
Departure Headway (Hd)	10.077	13.58	13.2	12.303	13.85	13.935	12.675	11.079	10.174
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	372	266	273	296	261	258	286	327	369
Service Time	7.777	11.28	10.9	10.003	11.55	11.635	10.375	8.779	7.874
HCM Lane V/C Ratio	2.223	0.368	0.059	0.591	0.203	0.019	0.636	0.529	2.274
HCM Control Delay	488.3	21.3	16.5	24	19	16.8	25.8	22	439.6
HCM Lane LOS	F	C	C	C	C	C	D	C	F
HCM 95th-tile Q	50.6	1.1	0.1	2.1	0.5	0	2.3	2.1	45.5

Intersection	
Intersection Delay, s/veh	298
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	127	1	587	0	0	0	0	556	251	53	355	0
Future Vol, veh/h	127	1	587	0	0	0	0	556	251	53	355	0
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	1	100	21	0	0	0	0	12	5	1	5	0
Mvmt Flow	148	1	683	0	0	0	0	647	292	62	413	0
Number of Lanes	0	1	1	0	0	0	0	1	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	259.2	457.1	51.1
HCM LOS	F	F	F

Lane	NBLn1	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	99%	0%	100%	0%
Vol Thru, %	69%	1%	0%	0%	100%
Vol Right, %	31%	0%	100%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	807	128	587	53	355
LT Vol	0	127	0	53	0
Through Vol	556	1	0	0	355
RT Vol	251	0	587	0	0
Lane Flow Rate	938	149	683	62	413
Geometry Grp	6	7	7	7	7
Degree of Util (X)	1.952	0.331	1.612	0.14	0.887
Departure Headway (Hd)	8.64	9.414	9.925	10.754	10.293
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	432	384	375	336	355
Service Time	6.64	7.114	7.625	8.454	7.993
HCM Lane V/C Ratio	2.171	0.388	1.821	0.185	1.163
HCM Control Delay	457.1	16.7	312.1	15.2	56.5
HCM Lane LOS	F	C	F	C	F
HCM 95th-tile Q	55.1	1.4	34.2	0.5	8.6

Intersection	
Intersection Delay, s/veh	69.8
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	299	6	31	525	157	0	0	108	50
Future Vol, veh/h	0	0	0	299	6	31	525	157	0	0	108	50
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	0	0	0	5	1	1	11	2	0	0	2	1
Mvmt Flow	0	0	0	348	7	36	610	183	0	0	126	58
Number of Lanes	0	0	0	0	1	1	1	1	0	0	1	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	2
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	2	0	2
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	2	2	0
HCM Control Delay	28.3	103.7	11.9
HCM LOS	D	F	B

Lane	NBLn1	NBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	98%	0%	0%	0%
Vol Thru, %	0%	100%	2%	0%	100%	0%
Vol Right, %	0%	0%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	525	157	305	31	108	50
LT Vol	525	0	299	0	0	0
Through Vol	0	157	6	0	108	0
RT Vol	0	0	0	31	0	50
Lane Flow Rate	610	183	355	36	126	58
Geometry Grp	7	7	7	7	7	7
Degree of Util (X)	1.199	0.325	0.744	0.063	0.25	0.104
Departure Headway (Hd)	7.069	6.404	7.904	6.625	7.488	6.748
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	519	562	461	544	482	534
Service Time	4.803	4.138	5.604	4.325	5.188	4.448
HCM Lane V/C Ratio	1.175	0.326	0.77	0.066	0.261	0.109
HCM Control Delay	131	12.2	30.2	9.8	12.7	10.2
HCM Lane LOS	F	B	D	A	B	B
HCM 95th-tile Q	22.7	1.4	6.1	0.2	1	0.3

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	96	32	35	326	270	105
Future Vol, veh/h	96	32	35	326	270	105
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	1	1	1	3	5	1
Mvmt Flow	107	36	39	362	300	117

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	618	209	417	0	-	0
Stage 1	359	-	-	-	-	-
Stage 2	259	-	-	-	-	-
Critical Hdwy	6.82	6.92	4.12	-	-	-
Critical Hdwy Stg 1	5.82	-	-	-	-	-
Critical Hdwy Stg 2	5.82	-	-	-	-	-
Follow-up Hdwy	3.51	3.31	2.21	-	-	-
Pot Cap-1 Maneuver	423	800	1146	-	-	-
Stage 1	680	-	-	-	-	-
Stage 2	764	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	405	800	1146	-	-	-
Mov Cap-2 Maneuver	405	-	-	-	-	-
Stage 1	651	-	-	-	-	-
Stage 2	764	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.2	0.9	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1146	-	405	800	-	-
HCM Lane V/C Ratio	0.034	-	0.263	0.044	-	-
HCM Control Delay (s)	8.3	0.1	17	9.7	-	-
HCM Lane LOS	A	A	C	A	-	-
HCM 95th %tile Q(veh)	0.1	-	1	0.1	-	-

Intersection	
Int Delay, s/veh	29.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	294	3	11	3	3	3	3	418	3	3	360	259
Future Vol, veh/h	294	3	11	3	3	3	3	418	3	3	360	259
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	100	225	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	1	1	1
Mvmt Flow	316	3	12	3	3	3	3	449	3	3	387	278

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	764	990	333	656	1126	225	665	0	0	452	0	0
Stage 1	532	532	-	455	455	-	-	-	-	-	-	-
Stage 2	232	458	-	201	671	-	-	-	-	-	-	-
Critical Hdwy	7.52	6.52	6.92	7.52	6.52	6.92	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.52	5.52	-	6.52	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.52	5.52	-	6.52	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.51	4.01	3.31	3.51	4.01	3.31	2.21	-	-	2.21	-	-
Pot Cap-1 Maneuver	~ 295	247	666	353	205	781	927	-	-	1112	-	-
Stage 1	502	526	-	557	570	-	-	-	-	-	-	-
Stage 2	753	568	-	785	456	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 289	246	666	342	204	781	927	-	-	1112	-	-
Mov Cap-2 Maneuver	~ 289	246	-	342	204	-	-	-	-	-	-	-
Stage 1	500	524	-	555	568	-	-	-	-	-	-	-
Stage 2	743	566	-	764	455	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	129.5	16.3	0.1	0
HCM LOS	F	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	927	-	-	294	329	1112	-	-
HCM Lane V/C Ratio	0.003	-	-	1.126	0.029	0.003	-	-
HCM Control Delay (s)	8.9	-	-	129.5	16.3	8.2	-	-
HCM Lane LOS	A	-	-	F	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	13.7	0.1	0	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	132	1	403	131	0	0	0	0	340	32	65
Future Volume (veh/h)	0	132	1	403	131	0	0	0	0	340	32	65
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1730	1786	1647	1730	0				1647	1786	1660
Adj Flow Rate, veh/h	0	153	1	469	152	0				395	37	76
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86				0.86	0.86	0.86
Percent Heavy Veh, %	0	5	1	4	5	0				4	1	10
Cap, veh/h	0	444	3	418	1531	0				629	209	429
Arrive On Green	0.00	0.13	0.13	0.27	0.47	0.00				0.40	0.40	0.40
Sat Flow, veh/h	0	3434	22	1569	3373	0				1569	522	1071
Grp Volume(v), veh/h	0	75	79	469	152	0				395	0	113
Grp Sat Flow(s),veh/h/ln	0	1643	1726	1569	1643	0				1569	0	1593
Q Serve(g_s), s	0.0	2.5	2.5	16.0	1.6	0.0				12.1	0.0	2.7
Cycle Q Clear(g_c), s	0.0	2.5	2.5	16.0	1.6	0.0				12.1	0.0	2.7
Prop In Lane	0.00		0.01	1.00		0.00				1.00		0.67
Lane Grp Cap(c), veh/h	0	218	229	418	1531	0				629	0	639
V/C Ratio(X)	0.00	0.34	0.35	1.12	0.10	0.00				0.63	0.00	0.18
Avail Cap(c_a), veh/h	0	438	460	418	1972	0				629	0	639
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.74	0.74	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	23.7	23.7	22.0	9.0	0.0				14.4	0.0	11.6
Incr Delay (d2), s/veh	0.0	0.9	0.9	75.8	0.0	0.0				2.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.9	1.0	13.9	0.4	0.0				4.1	0.0	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	24.6	24.6	97.8	9.0	0.0				16.4	0.0	11.7
LnGrp LOS	A	C	C	F	A	A				B	A	B
Approach Vol, veh/h		154			621						508	
Approach Delay, s/veh		24.6			76.0						15.4	
Approach LOS		C			E						B	

Timer - Assigned Phs		3	4		6		8					
Phs Duration (G+Y+Rc), s		20.0	12.0		28.0		32.0					
Change Period (Y+Rc), s		4.0	4.0		4.0		4.0					
Max Green Setting (Gmax), s		16.0	16.0		16.0		36.0					
Max Q Clear Time (g_c+I1), s		18.0	4.5		14.1		3.6					
Green Ext Time (p_c), s		0.0	0.5		0.4		0.9					

Intersection Summary	
HCM 6th Ctrl Delay	45.8
HCM 6th LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	67	405	0	0	527	305	7	9	618	0	0	0
Future Volume (veh/h)	67	405	0	0	527	305	7	9	618	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1478	1786	0	0	1758	1786	1262	1098	1772			
Adj Flow Rate, veh/h	73	440	0	0	573	332	8	10	672			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	21	1	0	0	3	1	33	50	2			
Cap, veh/h	84	1177	0	0	736	334	248	310	1374			
Arrive On Green	0.06	0.35	0.00	0.00	0.22	0.22	0.52	0.52	0.52			
Sat Flow, veh/h	1408	3483	0	0	3428	1514	477	597	2643			
Grp Volume(v), veh/h	73	440	0	0	573	332	18	0	672			
Grp Sat Flow(s),veh/h/ln	1408	1697	0	0	1670	1514	1074	0	1321			
Q Serve(g_s), s	3.1	5.8	0.0	0.0	9.7	13.1	0.5	0.0	9.8			
Cycle Q Clear(g_c), s	3.1	5.8	0.0	0.0	9.7	13.1	0.5	0.0	9.8			
Prop In Lane	1.00		0.00	0.00		1.00	0.44		1.00			
Lane Grp Cap(c), veh/h	84	1177	0	0	736	334	558	0	1374			
V/C Ratio(X)	0.87	0.37	0.00	0.00	0.78	1.00	0.03	0.00	0.49			
Avail Cap(c_a), veh/h	164	1697	0	0	1058	479	558	0	1374			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.84	0.84	0.00	0.00	0.94	0.94	1.00	0.00	1.00			
Uniform Delay (d), s/veh	28.0	14.7	0.0	0.0	22.0	23.4	7.0	0.0	9.3			
Incr Delay (d2), s/veh	19.0	0.2	0.0	0.0	2.2	33.3	0.0	0.0	0.3			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.4	1.9	0.0	0.0	3.6	7.2	0.1	0.0	2.4			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.0	14.9	0.0	0.0	24.2	56.7	7.1	0.0	9.5			
LnGrp LOS	D	B	A	A	C	E	A	A	A			
Approach Vol, veh/h		513			905			690				
Approach Delay, s/veh		19.4			36.1			9.5				
Approach LOS		B			D			A				

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	35.2	24.8	7.6	17.2
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	22.0	30.0	7.0	19.0
Max Q Clear Time (g_c+I1), s	11.8	7.8	5.1	11.7
Green Ext Time (p_c), s	2.3	2.7	0.0	1.5

Intersection Summary	
HCM 6th Ctrl Delay	23.3
HCM 6th LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	738	0	322	75	178	49	218	157	58	340	150	437
Future Volume (veh/h)	738	0	322	75	178	49	218	157	58	340	150	437
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1588	1716	1786	1588	1646	1786	1588	1786	1744	1687	1786	1786
Adj Flow Rate, veh/h	820	0	358	83	198	54	242	174	64	378	167	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	1	6	1	1	11	1	1	1	4	1	1	1
Cap, veh/h	884	1715	1065	124	835	404	520	205	75	403	208	
Arrive On Green	0.30	0.00	0.53	0.04	0.27	0.27	0.18	0.16	0.16	0.13	0.12	0.00
Sat Flow, veh/h	2933	3260	1514	2933	3127	1514	2933	1245	458	3116	1786	1514
Grp Volume(v), veh/h	820	0	358	83	198	54	242	0	238	378	167	0
Grp Sat Flow(s),veh/h/ln	1467	1630	1514	1467	1563	1514	1467	0	1704	1558	1786	1514
Q Serve(g_s), s	31.5	0.0	2.8	3.2	5.8	2.3	8.6	0.0	15.8	14.0	10.6	0.0
Cycle Q Clear(g_c), s	31.5	0.0	2.8	3.2	5.8	2.3	8.6	0.0	15.8	14.0	10.6	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.27	1.00		1.00
Lane Grp Cap(c), veh/h	884	1715	1065	124	835	404	520	0	280	403	208	
V/C Ratio(X)	0.93	0.00	0.34	0.67	0.24	0.13	0.47	0.00	0.85	0.94	0.80	
Avail Cap(c_a), veh/h	884	1715	1065	202	835	404	520	0	631	403	631	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	39.3	0.0	2.2	54.8	33.3	17.2	42.8	0.0	47.1	50.1	50.0	0.0
Incr Delay (d2), s/veh	17.1	0.0	0.9	6.1	0.7	0.7	3.0	0.0	7.1	29.8	7.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	13.0	0.0	1.1	1.3	2.2	1.2	3.3	0.0	7.1	7.1	5.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	56.4	0.0	3.0	60.8	34.0	17.9	45.8	0.0	54.2	79.9	57.1	0.0
LnGrp LOS	E	A	A	E	C	B	D	A	D	E	E	
Approach Vol, veh/h		1178			335			480			545	A
Approach Delay, s/veh		40.2			38.0			49.9			72.9	
Approach LOS		D			D			D			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.9	65.1	24.6	17.5	39.0	35.0	19.0	23.1
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	8.0	58.0	17.0	41.0	35.0	31.0	15.0	43.0
Max Q Clear Time (g_c+I1), s	5.3	4.8	10.6	12.6	33.5	7.8	16.0	17.8
Green Ext Time (p_c), s	0.0	1.3	0.4	0.9	0.6	0.9	0.0	1.4

Intersection Summary	
HCM 6th Ctrl Delay	48.8
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	91	23	155	49	7	167	173	549	47	161	476	304
Future Volume (veh/h)	91	23	155	49	7	167	173	549	47	161	476	304
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1687	1660	1786	1687	1309	1688	1687	1786	1786	1620	1786	1744
Adj Flow Rate, veh/h	98	25	167	53	8	180	186	590	51	173	512	327
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	1	10	1	1	35	8	1	1	1	6	1	4
Cap, veh/h	135	256	228	64	155	366	142	1340	116	212	940	599
Arrive On Green	0.08	0.16	0.16	0.04	0.12	0.12	0.09	0.42	0.42	0.14	0.47	0.47
Sat Flow, veh/h	1606	1577	1406	1606	1309	1430	1606	3161	273	1543	1988	1267
Grp Volume(v), veh/h	98	25	167	53	8	180	186	316	325	173	437	402
Grp Sat Flow(s),veh/h/ln	1606	1577	1406	1606	1309	1430	1606	1697	1737	1543	1697	1558
Q Serve(g_s), s	4.0	0.9	7.6	2.2	0.4	4.7	6.0	8.9	9.0	7.4	12.4	12.4
Cycle Q Clear(g_c), s	4.0	0.9	7.6	2.2	0.4	4.7	6.0	8.9	9.0	7.4	12.4	12.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.16	1.00		0.81
Lane Grp Cap(c), veh/h	135	256	228	64	155	366	142	719	736	212	802	737
V/C Ratio(X)	0.73	0.10	0.73	0.83	0.05	0.49	1.31	0.44	0.44	0.81	0.54	0.55
Avail Cap(c_a), veh/h	1139	1258	1122	285	348	577	142	719	736	456	802	737
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.2	24.1	26.9	32.3	26.5	9.8	30.8	13.8	13.8	28.3	12.7	12.7
Incr Delay (d2), s/veh	7.3	0.2	4.5	22.9	0.1	1.0	179.1	1.9	1.9	7.4	2.6	2.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	0.3	2.7	1.2	0.1	1.8	9.2	3.3	3.4	2.9	4.5	4.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	37.5	24.3	31.4	55.2	26.6	10.8	210.0	15.7	15.7	35.8	15.3	15.6
LnGrp LOS	D	C	C	E	C	B	F	B	B	D	B	B
Approach Vol, veh/h		290			241			827			1012	
Approach Delay, s/veh		32.9			21.1			59.4			18.9	
Approach LOS		C			C			E			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.3	32.7	6.7	15.0	10.0	36.0	9.7	12.0
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	20.0	18.0	12.0	54.0	6.0	32.0	48.0	18.0
Max Q Clear Time (g_c+I1), s	9.4	11.0	4.2	9.6	8.0	14.4	6.0	6.7
Green Ext Time (p_c), s	0.3	2.1	0.0	1.3	0.0	4.9	0.3	0.4

Intersection Summary	
HCM 6th Ctrl Delay	35.0
HCM 6th LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	127	1	587	0	0	0	0	556	251	53	355	0
Future Volume (veh/h)	127	1	587	0	0	0	0	556	251	53	355	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1687	396	1505				0	1632	1730	1687	1730	0
Adj Flow Rate, veh/h	148	1	683				0	647	292	62	413	0
Peak Hour Factor	0.86	0.86	0.86				0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	1	100	21				0	12	5	1	5	0
Cap, veh/h	186	1	635				0	794	376	74	1214	0
Arrive On Green	0.50	0.50	0.50				0.00	0.26	0.26	0.05	0.37	0.00
Sat Flow, veh/h	375	3	1276				0	3181	1466	1606	3373	0
Grp Volume(v), veh/h	149	0	683				0	647	292	62	413	0
Grp Sat Flow(s),veh/h/ln	377	0	1276				0	1550	1466	1606	1643	0
Q Serve(g_s), s	19.7	0.0	29.8				0.0	11.8	11.1	2.3	5.4	0.0
Cycle Q Clear(g_c), s	19.7	0.0	29.8				0.0	11.8	11.1	2.3	5.4	0.0
Prop In Lane	0.99		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	188	0	635				0	794	376	74	1214	0
V/C Ratio(X)	0.79	0.00	1.08				0.00	0.81	0.78	0.83	0.34	0.00
Avail Cap(c_a), veh/h	188	0	635				0	878	415	161	1479	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	0.89	0.89	0.87	0.87	0.00
Uniform Delay (d), s/veh	12.5	0.0	15.1				0.0	21.0	20.7	28.4	13.7	0.0
Incr Delay (d2), s/veh	28.3	0.0	58.1				0.0	4.9	7.4	18.3	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.8	0.0	17.2				0.0	4.2	4.1	1.2	1.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.8	0.0	73.1				0.0	25.9	28.1	46.7	13.8	0.0
LnGrp LOS	D	A	F				A	C	C	D	B	A
Approach Vol, veh/h		832						939			475	
Approach Delay, s/veh		67.4						26.6			18.1	
Approach LOS		E						C			B	

Timer - Assigned Phs		2		4			7	8				
Phs Duration (G+Y+Rc), s		33.8		26.2			6.8	19.4				
Change Period (Y+Rc), s		4.0		4.0			4.0	4.0				
Max Green Setting (Gmax), s		25.0		27.0			6.0	17.0				
Max Q Clear Time (g_c+I1), s		31.8		7.4			4.3	13.8				
Green Ext Time (p_c), s		0.0		2.4			0.0	1.6				

Intersection Summary			
HCM 6th Ctrl Delay			39.9
HCM 6th LOS			D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	299	6	31	525	157	0	0	108	50
Future Volume (veh/h)	0	0	0	299	6	31	525	157	0	0	108	50
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1634	1786	1786	1554	1772	0	0	1772	1786
Adj Flow Rate, veh/h				348	7	36	610	183	0	0	126	58
Peak Hour Factor				0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %				5	1	1	11	2	0	0	2	1
Cap, veh/h				659	107	550	699	785	0	0	448	201
Arrive On Green				0.42	0.42	0.42	0.16	0.30	0.00	0.00	0.13	0.13
Sat Flow, veh/h				1556	253	1299	2871	1772	0	0	3455	1514
Grp Volume(v), veh/h				348	0	43	610	183	0	0	126	58
Grp Sat Flow(s),veh/h/ln				1556	0	1552	1436	1772	0	0	1683	1514
Q Serve(g_s), s				10.0	0.0	1.0	12.4	4.7	0.0	0.0	2.0	0.7
Cycle Q Clear(g_c), s				10.0	0.0	1.0	12.4	4.7	0.0	0.0	2.0	0.7
Prop In Lane				1.00		0.84	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				659	0	657	699	785	0	0	448	201
V/C Ratio(X)				0.53	0.00	0.07	0.87	0.23	0.00	0.00	0.28	0.29
Avail Cap(c_a), veh/h				659	0	657	718	1034	0	0	898	404
HCM Platoon Ratio				1.00	1.00	1.00	0.67	0.67	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.53	0.53	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				12.8	0.0	10.3	24.2	13.4	0.0	0.0	23.4	3.0
Incr Delay (d2), s/veh				0.8	0.0	0.0	6.4	0.1	0.0	0.0	0.3	0.8
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				3.2	0.0	0.3	4.7	1.6	0.0	0.0	0.7	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				13.6	0.0	10.3	30.6	13.5	0.0	0.0	23.8	3.8
LnGrp LOS				B	A	B	C	B	A	A	C	A
Approach Vol, veh/h					391			793			184	
Approach Delay, s/veh					13.3			26.7			17.5	
Approach LOS					B			C			B	

Timer - Assigned Phs	2	3	4				8					
Phs Duration (G+Y+Rc), s	29.4	18.6	12.0				30.6					
Change Period (Y+Rc), s	4.0	4.0	4.0				4.0					
Max Green Setting (Gmax), s	17.0	15.0	16.0				35.0					
Max Q Clear Time (g_c+I1), s	12.0	14.4	4.0				6.7					
Green Ext Time (p_c), s	0.6	0.2	0.6				0.9					

Intersection Summary	
HCM 6th Ctrl Delay	21.6
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	96	32	35	326	270	105
Future Vol, veh/h	96	32	35	326	270	105
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	300	-	-	150
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	1	1	1	3	5	1
Mvmt Flow	107	36	39	362	300	117

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	559	150	417	0	-	0
Stage 1	300	-	-	-	-	-
Stage 2	259	-	-	-	-	-
Critical Hdwy	6.82	6.92	4.12	-	-	-
Critical Hdwy Stg 1	5.82	-	-	-	-	-
Critical Hdwy Stg 2	5.82	-	-	-	-	-
Follow-up Hdwy	3.51	3.31	2.21	-	-	-
Pot Cap-1 Maneuver	461	873	1146	-	-	-
Stage 1	728	-	-	-	-	-
Stage 2	764	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	445	873	1146	-	-	-
Mov Cap-2 Maneuver	445	-	-	-	-	-
Stage 1	703	-	-	-	-	-
Stage 2	764	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14	0.8	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1146	-	445	873	-	-
HCM Lane V/C Ratio	0.034	-	0.24	0.041	-	-
HCM Control Delay (s)	8.3	-	15.6	9.3	-	-
HCM Lane LOS	A	-	C	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.9	0.1	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	294	3	11	3	3	3	3	418	3	3	360	259
Future Volume (veh/h)	294	3	11	3	3	3	3	418	3	3	360	259
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1786	1786	1786	1786	1786	1786	1786	1786	1786	1786	1786	1786
Adj Flow Rate, veh/h	316	3	12	3	3	3	3	449	3	3	387	278
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	415	4	16	11	11	11	6	1007	449	6	562	399
Arrive On Green	0.26	0.26	0.26	0.02	0.02	0.02	0.00	0.30	0.30	0.00	0.30	0.30
Sat Flow, veh/h	1617	15	61	553	553	553	1701	3393	1514	1701	1895	1345
Grp Volume(v), veh/h	331	0	0	9	0	0	3	449	3	3	346	319
Grp Sat Flow(s),veh/h/ln	1694	0	0	1659	0	0	1701	1697	1514	1701	1697	1544
Q Serve(g_s), s	6.8	0.0	0.0	0.2	0.0	0.0	0.1	4.0	0.1	0.1	6.8	6.9
Cycle Q Clear(g_c), s	6.8	0.0	0.0	0.2	0.0	0.0	0.1	4.0	0.1	0.1	6.8	6.9
Prop In Lane	0.95		0.04	0.33		0.33	1.00		1.00	1.00		0.87
Lane Grp Cap(c), veh/h	435	0	0	32	0	0	6	1007	449	6	503	458
V/C Ratio(X)	0.76	0.00	0.00	0.28	0.00	0.00	0.54	0.45	0.01	0.54	0.69	0.70
Avail Cap(c_a), veh/h	719	0	0	704	0	0	271	1440	642	271	720	655
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	12.9	0.0	0.0	18.2	0.0	0.0	18.8	10.7	9.3	18.8	11.7	11.8
Incr Delay (d2), s/veh	2.8	0.0	0.0	4.8	0.0	0.0	62.3	0.3	0.0	62.3	1.7	1.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	0.0	0.0	0.1	0.0	0.0	0.1	1.1	0.0	0.1	2.0	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.7	0.0	0.0	23.0	0.0	0.0	81.1	11.1	9.4	81.1	13.4	13.7
LnGrp LOS	B	A	A	C	A	A	F	B	A	F	B	B
Approach Vol, veh/h		331			9			455			668	
Approach Delay, s/veh		15.7			23.0			11.5			13.8	
Approach LOS		B			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.1	15.2		13.7	4.1	15.2		4.7
Change Period (Y+Rc), s	4.0	4.0		4.0	4.0	4.0		4.0
Max Green Setting (Gmax), s	6.0	16.0		16.0	6.0	16.0		16.0
Max Q Clear Time (g_c+I1), s	2.1	6.0		8.8	2.1	8.9		2.2
Green Ext Time (p_c), s	0.0	1.9		1.2	0.0	2.3		0.0

Intersection Summary	
HCM 6th Ctrl Delay	13.6
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	109.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↳		↰	↑↑					↰	↳	
Traffic Vol, veh/h	0	77	33	605	75	0	0	0	0	141	9	55
Future Vol, veh/h	0	77	33	605	75	0	0	0	0	141	9	55
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	200	-	-	-	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	13	1	2	9	0	0	0	0	9	33	24
Mvmt Flow	0	83	35	651	81	0	0	0	0	152	10	59

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	118	0	0	1425	1501	41
Stage 1	-	-	-	-	-	-	1383	1383	-
Stage 2	-	-	-	-	-	-	42	118	-
Critical Hdwy	-	-	-	4.14	-	-	6.98	7.16	7.38
Critical Hdwy Stg 1	-	-	-	-	-	-	5.98	6.16	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.98	6.16	-
Follow-up Hdwy	-	-	-	2.22	-	-	3.59	4.33	3.54
Pot Cap-1 Maneuver	0	-	-	1468	-	0	~ 119	91	954
Stage 1	0	-	-	-	-	0	186	160	-
Stage 2	0	-	-	-	-	0	955	729	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	1468	-	-	~ 66	0	954
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 66	0	-
Stage 1	-	-	-	-	-	-	186	0	-
Stage 2	-	-	-	-	-	-	532	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	8.4	$ 503.4
HCM LOS			F

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	1468	-	66	954
HCM Lane V/C Ratio	-	-	0.443	-	2.297	0.072
HCM Control Delay (s)	-	-	9.4	-	$ 727.7	9.1
HCM Lane LOS	-	-	A	-	F	A
HCM 95th %tile Q(veh)	-	-	2.3	-	14.6	0.2

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	98	0	0	630	171	50	23	262	0	0	0
Future Volume (veh/h)	120	98	0	0	630	171	50	23	262	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1616	1716	0	0	1772	1786	1528	1393	1716			
Adj Flow Rate, veh/h	133	109	0	0	700	190	41	47	0			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90			
Percent Heavy Veh, %	11	6	0	0	2	1	13	29	6			
Cap, veh/h	163	1592	0	0	826	224	550	527				
Arrive On Green	0.11	0.49	0.00	0.00	0.32	0.32	0.38	0.38	0.00			
Sat Flow, veh/h	1539	3346	0	0	2706	710	1455	1393	1454			
Grp Volume(v), veh/h	133	109	0	0	450	440	41	47	0			
Grp Sat Flow(s),veh/h/ln	1539	1630	0	0	1683	1644	1455	1393	1454			
Q Serve(g_s), s	5.1	1.1	0.0	0.0	15.0	15.0	1.1	1.3	0.0			
Cycle Q Clear(g_c), s	5.1	1.1	0.0	0.0	15.0	15.0	1.1	1.3	0.0			
Prop In Lane	1.00		0.00	0.00		0.43	1.00		1.00			
Lane Grp Cap(c), veh/h	163	1592	0	0	532	519	550	527				
V/C Ratio(X)	0.82	0.07	0.00	0.00	0.85	0.85	0.07	0.09				
Avail Cap(c_a), veh/h	231	1847	0	0	589	575	550	527				
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	0.87	0.87	1.00	1.00	0.00			
Uniform Delay (d), s/veh	26.3	8.1	0.0	0.0	19.2	19.2	11.9	12.0	0.0			
Incr Delay (d2), s/veh	14.0	0.0	0.0	0.0	9.1	9.3	0.1	0.1	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	2.3	0.3	0.0	0.0	6.3	6.2	0.3	0.4	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.3	8.1	0.0	0.0	28.2	28.5	12.0	12.1	0.0			
LnGrp LOS	D	A	A	A	C	C	B	B				
Approach Vol, veh/h		242			890			88	A			
Approach Delay, s/veh		25.8			28.4			12.0				
Approach LOS		C			C			B				

Timer - Assigned Phs		2		4			7	8				
Phs Duration (G+Y+Rc), s		26.7		33.3			10.4	22.9				
Change Period (Y+Rc), s		4.0		4.0			4.0	4.0				
Max Green Setting (Gmax), s		18.0		34.0			9.0	21.0				
Max Q Clear Time (g_c+I1), s		3.3		3.1			7.1	17.0				
Green Ext Time (p_c), s		0.2		0.6			0.1	1.9				

Intersection Summary	
HCM 6th Ctrl Delay	26.7
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	173	187	63	402	399	33
Future Volume (veh/h)	173	187	63	402	399	33
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1589	1687	1786	1646	1588	1786
Adj Flow Rate, veh/h	206	223	75	479	475	39
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	15	1	1	11	1	1
Cap, veh/h	1860	881	95	2240	571	295
Arrive On Green	0.62	0.62	0.06	0.72	0.19	0.19
Sat Flow, veh/h	3099	1429	1701	3209	2933	1514
Grp Volume(v), veh/h	206	223	75	479	475	39
Grp Sat Flow(s),veh/h/ln	1510	1429	1701	1563	1467	1514
Q Serve(g_s), s	2.5	6.4	3.9	4.6	14.0	1.9
Cycle Q Clear(g_c), s	2.5	6.4	3.9	4.6	14.0	1.9
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1860	881	95	2240	571	295
V/C Ratio(X)	0.11	0.25	0.79	0.21	0.83	0.13
Avail Cap(c_a), veh/h	1860	881	170	2240	913	471
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.99	0.99	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	7.1	7.9	42.0	4.3	34.8	30.0
Incr Delay (d2), s/veh	0.1	0.7	13.3	0.2	3.7	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	1.8	1.9	1.1	5.1	0.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	7.2	8.5	55.2	4.5	38.5	30.2
LnGrp LOS	A	A	E	A	D	C
Approach Vol, veh/h	429			554	514	
Approach Delay, s/veh	7.9			11.4	37.9	
Approach LOS	A			B	D	

Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	9.0	59.4			68.5	21.5
Change Period (Y+Rc), s	4.0	4.0			4.0	4.0
Max Green Setting (Gmax), s	9.0	41.0			54.0	28.0
Max Q Clear Time (g_c+I1), s	5.9	8.4			6.6	16.0
Green Ext Time (p_c), s	0.0	2.0			3.3	1.5

Intersection Summary	
HCM 6th Ctrl Delay	19.5
HCM 6th LOS	B

Intersection	
Intersection Delay, s/veh	363.3
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	157	59	185	55	14	230	70	616	117	264	464	57
Future Vol, veh/h	157	59	185	55	14	230	70	616	117	264	464	57
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles, %	1	53	1	1	23	15	1	1	1	6	1	24
Mvmt Flow	178	67	210	63	16	261	80	700	133	300	527	65
Number of Lanes	1	2	0	1	2	0	0	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	3	3
HCM Control Delay	37.2	47.2	767.7	236.7
HCM LOS	E	E	F	F

Lane	NBLn1	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	9%	100%	0%	0%	100%	0%	0%	100%	0%
Vol Thru, %	77%	0%	100%	10%	0%	100%	2%	0%	89%
Vol Right, %	15%	0%	0%	90%	0%	0%	98%	0%	11%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	803	157	39	205	55	9	235	264	521
LT Vol	70	157	0	0	55	0	0	264	0
Through Vol	616	0	39	20	0	9	5	0	464
RT Vol	117	0	0	185	0	0	230	0	57
Lane Flow Rate	912	178	45	233	62	11	267	300	592
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	2.636	0.548	0.142	0.642	0.197	0.033	0.77	0.87	1.609
Departure Headway (Hd)	11.188	16.007	16.435	14.744	15.86	15.719	14.801	14.249	13.522
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	338	228	220	247	228	229	248	258	272
Service Time	8.888	13.707	14.135	12.444	13.56	13.419	12.501	11.949	11.222
HCM Lane V/C Ratio	2.698	0.781	0.205	0.943	0.272	0.048	1.077	1.163	2.176
HCM Control Delay	767.7	36.5	21.8	40.6	22.4	19	54.1	67.9	322.3
HCM Lane LOS	F	E	C	E	C	C	F	F	F
HCM 95th-tile Q	70.3	3	0.5	4	0.7	0.1	5.6	7.3	26.4

Intersection	
Intersection Delay, s/veh	406.7
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	152	10	549	0	0	0	0	588	415	156	236	0
Future Vol, veh/h	152	10	549	0	0	0	0	588	415	156	236	0
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	22	50	26	0	0	0	0	59	5	11	9	0
Mvmt Flow	177	12	638	0	0	0	0	684	483	181	274	0
Number of Lanes	0	1	1	0	0	0	0	1	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	149.5	738.3	24.8
HCM LOS	F	F	C

Lane	NBLn1	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	94%	0%	100%	0%
Vol Thru, %	59%	6%	0%	0%	100%
Vol Right, %	41%	0%	100%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	1003	162	549	156	236
LT Vol	0	152	0	156	0
Through Vol	588	10	0	0	236
RT Vol	415	0	549	0	0
Lane Flow Rate	1166	188	638	181	274
Geometry Grp	6	7	7	7	7
Degree of Util (X)	2.584	0.424	1.316	0.421	0.597
Departure Headway (Hd)	8.672	10.447	9.715	10.844	10.273
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	432	347	383	336	354
Service Time	6.672	8.147	7.415	8.544	7.973
HCM Lane V/C Ratio	2.699	0.542	1.666	0.539	0.774
HCM Control Delay	738.3	20.6	187.5	21.2	27.1
HCM Lane LOS	F	C	F	C	D
HCM 95th-tile Q	86.8	2	22.7	2	3.7

Intersection	
Intersection Delay, s/veh	230.1
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	225	1	4	668	72	0	0	167	6
Future Vol, veh/h	0	0	0	225	1	4	668	72	0	0	167	6
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehicles, %	0	0	0	5	1	17	66	13	0	0	13	1
Mvmt Flow	0	0	0	281	1	5	835	90	0	0	209	8
Number of Lanes	0	0	0	0	1	1	1	1	0	0	1	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	2
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	2	0	2
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	2	2	0
HCM Control Delay	23	344.7	15.2
HCM LOS	C	F	C

Lane	NBLn1	NBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	100%	0%	0%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%
Vol Right, %	0%	0%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	668	72	226	4	167	6
LT Vol	668	0	225	0	0	0
Through Vol	0	72	1	0	167	0
RT Vol	0	0	0	4	0	6
Lane Flow Rate	835	90	282	5	209	8
Geometry Grp	7	7	7	7	7	7
Degree of Util (X)	1.786	0.157	0.585	0.009	0.397	0.012
Departure Headway (Hd)	7.702	6.279	8.805	7.506	7.686	6.752
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	476	574	412	480	472	533
Service Time	5.409	3.986	6.505	5.206	5.386	4.452
HCM Lane V/C Ratio	1.754	0.157	0.684	0.01	0.443	0.015
HCM Control Delay	380.8	10.2	23.2	10.3	15.4	9.5
HCM Lane LOS	F	B	C	B	C	A
HCM 95th-tile Q	51.9	0.6	3.6	0	1.9	0

Intersection	
Int Delay, s/veh	177.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	478	7	42	30	7	7	13	246	7	7	360	263
Future Vol, veh/h	478	7	42	30	7	7	13	246	7	7	360	263
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	100	225	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	1	1	1
Mvmt Flow	543	8	48	34	8	8	15	280	8	8	409	299

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	749	893	354	535	1034	140	708	0	0	288	0	0
Stage 1	575	575	-	310	310	-	-	-	-	-	-	-
Stage 2	174	318	-	225	724	-	-	-	-	-	-	-
Critical Hdwy	7.52	6.52	6.92	7.52	6.52	6.92	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.52	5.52	-	6.52	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.52	5.52	-	6.52	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.51	4.01	3.31	3.51	4.01	3.31	2.21	-	-	2.21	-	-
Pot Cap-1 Maneuver	~ 302	281	645	431	232	886	893	-	-	1278	-	-
Stage 1	~ 473	503	-	678	660	-	-	-	-	-	-	-
Stage 2	814	655	-	760	431	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 286	275	645	384	227	886	893	-	-	1278	-	-
Mov Cap-2 Maneuver	~ 286	275	-	384	227	-	-	-	-	-	-	-
Stage 1	~ 465	500	-	666	649	-	-	-	-	-	-	-
Stage 2	783	644	-	688	428	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 491.2	16	0.4	0.1
HCM LOS	F	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	893	-	-	299	377	1278	-	-
HCM Lane V/C Ratio	0.017	-	-	2.003	0.133	0.006	-	-
HCM Control Delay (s)	9.1	-	-	$ 491.2	16	7.8	-	-
HCM Lane LOS	A	-	-	F	C	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	42.7	0.5	0	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	131.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↳		↰	↑↑					↰	↳	
Traffic Vol, veh/h	0	99	2	420	90	0	0	0	0	219	35	51
Future Vol, veh/h	0	99	2	420	90	0	0	0	0	219	35	51
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	200	-	-	-	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	0	5	1	4	5	0	0	0	0	4	1	10
Mvmt Flow	0	115	2	488	105	0	0	0	0	255	41	59

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	117	0	0	1139	1198	53
Stage 1	-	-	-	-	-	-	1081	1081	-
Stage 2	-	-	-	-	-	-	58	117	-
Critical Hdwy	-	-	-	4.18	-	-	6.88	6.52	7.1
Critical Hdwy Stg 1	-	-	-	-	-	-	5.88	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.88	5.52	-
Follow-up Hdwy	-	-	-	2.24	-	-	3.54	4.01	3.4
Pot Cap-1 Maneuver	0	-	-	1455	-	0	~ 192	186	978
Stage 1	0	-	-	-	-	0	283	294	-
Stage 2	0	-	-	-	-	0	952	800	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	1455	-	-	~ 128	0	978
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 128	0	-
Stage 1	-	-	-	-	-	-	283	0	-
Stage 2	-	-	-	-	-	-	633	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	7.2	$ 382.5
HCM LOS			F

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	1455	-	128	978
HCM Lane V/C Ratio	-	-	0.336	-	1.989	0.102
HCM Control Delay (s)	-	-	8.7	-	$ 529.1	9.1
HCM Lane LOS	-	-	A	-	F	A
HCM 95th %tile Q(veh)	-	-	1.5	-	20.5	0.3

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	111	207	0	0	485	104	25	24	546	0	0	0
Future Volume (veh/h)	111	207	0	0	485	104	25	24	546	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1478	1786	0	0	1758	1786	1262	1098	1772			
Adj Flow Rate, veh/h	121	225	0	0	527	113	26	27	0			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	21	1	0	0	3	1	33	50	2			
Cap, veh/h	145	1420	0	0	682	146	539	492				
Arrive On Green	0.10	0.42	0.00	0.00	0.25	0.25	0.45	0.45	0.00			
Sat Flow, veh/h	1408	3483	0	0	2826	585	1202	1098	1502			
Grp Volume(v), veh/h	121	225	0	0	321	319	26	27	0			
Grp Sat Flow(s),veh/h/ln	1408	1697	0	0	1670	1653	1202	1098	1502			
Q Serve(g_s), s	5.1	2.5	0.0	0.0	10.7	10.8	0.7	0.8	0.0			
Cycle Q Clear(g_c), s	5.1	2.5	0.0	0.0	10.7	10.8	0.7	0.8	0.0			
Prop In Lane	1.00		0.00	0.00		0.35	1.00		1.00			
Lane Grp Cap(c), veh/h	145	1420	0	0	416	412	539	492				
V/C Ratio(X)	0.84	0.16	0.00	0.00	0.77	0.78	0.05	0.05				
Avail Cap(c_a), veh/h	211	1866	0	0	557	551	539	492				
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	0.93	0.93	1.00	1.00	0.00			
Uniform Delay (d), s/veh	26.4	10.9	0.0	0.0	20.9	21.0	9.3	9.4	0.0			
Incr Delay (d2), s/veh	17.1	0.1	0.0	0.0	4.3	4.6	0.0	0.0	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	2.2	0.8	0.0	0.0	4.1	4.2	0.2	0.2	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	43.5	10.9	0.0	0.0	25.3	25.6	9.4	9.4	0.0			
LnGrp LOS	D	B	A	A	C	C	A	A				
Approach Vol, veh/h		346			640			53	A			
Approach Delay, s/veh		22.3			25.4			9.4				
Approach LOS		C			C			A				

Timer - Assigned Phs		2		4			7	8				
Phs Duration (G+Y+Rc), s		30.9		29.1			10.2	18.9				
Change Period (Y+Rc), s		4.0		4.0			4.0	4.0				
Max Green Setting (Gmax), s		19.0		33.0			9.0	20.0				
Max Q Clear Time (g_c+I1), s		2.8		4.5			7.1	12.8				
Green Ext Time (p_c), s		0.1		1.3			0.0	2.2				

Intersection Summary	
HCM 6th Ctrl Delay	23.6
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	432	321	103	323	266	92
Future Volume (veh/h)	432	321	103	323	266	92
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1716	1786	1687	1646	1588	1744
Adj Flow Rate, veh/h	480	357	114	359	296	102
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	6	1	1	11	1	4
Cap, veh/h	2124	986	141	2450	374	189
Arrive On Green	0.65	0.65	0.09	0.78	0.13	0.13
Sat Flow, veh/h	3346	1514	1606	3209	2933	1478
Grp Volume(v), veh/h	480	357	114	359	296	102
Grp Sat Flow(s),veh/h/ln	1630	1514	1606	1563	1467	1478
Q Serve(g_s), s	5.4	9.7	6.3	2.5	8.8	5.8
Cycle Q Clear(g_c), s	5.4	9.7	6.3	2.5	8.8	5.8
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2124	986	141	2450	374	189
V/C Ratio(X)	0.23	0.36	0.81	0.15	0.79	0.54
Avail Cap(c_a), veh/h	2124	986	232	2450	521	263
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.95	0.95	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	6.4	7.2	40.3	2.4	38.1	36.8
Incr Delay (d2), s/veh	0.2	1.0	10.5	0.1	5.5	2.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	2.8	2.8	0.5	3.4	2.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	6.6	8.1	50.8	2.5	43.6	39.2
LnGrp LOS	A	A	D	A	D	D
Approach Vol, veh/h	837			473	398	
Approach Delay, s/veh	7.3			14.2	42.5	
Approach LOS	A			B	D	

Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	11.9	62.6			74.5	15.5
Change Period (Y+Rc), s	4.0	4.0			4.0	4.0
Max Green Setting (Gmax), s	13.0	49.0			66.0	16.0
Max Q Clear Time (g_c+I1), s	7.3	11.7			4.5	10.8
Green Ext Time (p_c), s	0.1	4.7			2.4	0.7

Intersection Summary	
HCM 6th Ctrl Delay	17.4
HCM 6th LOS	B

Intersection	
Intersection Delay, s/veh	389.6
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	68	44	162	92	32	274	222	600	53	204	435	205
Future Vol, veh/h	68	44	162	92	32	274	222	600	53	204	435	205
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	1	10	1	1	35	8	1	1	1	6	1	4
Mvmt Flow	73	47	174	99	34	295	239	645	57	219	468	220
Number of Lanes	1	2	0	1	2	0	0	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	3	3
HCM Control Delay	28.8	46.1	745.7	299.5
HCM LOS	D	E	F	F

Lane	NBLn1	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	25%	100%	0%	0%	100%	0%	0%	100%	0%
Vol Thru, %	69%	0%	100%	8%	0%	100%	4%	0%	68%
Vol Right, %	6%	0%	0%	92%	0%	0%	96%	0%	32%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	875	68	29	177	92	21	285	204	640
LT Vol	222	68	0	0	92	0	0	204	0
Through Vol	600	0	29	15	0	21	11	0	435
RT Vol	53	0	0	162	0	0	274	0	205
Lane Flow Rate	941	73	32	190	99	23	306	219	688
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	2.588	0.222	0.093	0.518	0.287	0.067	0.798	0.61	1.759
Departure Headway (Hd)	10.956	16.081	15.692	14.802	15.122	15.209	13.953	13.442	12.561
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	339	225	230	247	239	237	263	272	296
Service Time	8.656	13.781	13.392	12.502	12.822	12.909	11.653	11.142	10.261
HCM Lane V/C Ratio	2.776	0.324	0.139	0.769	0.414	0.097	1.163	0.805	2.324
HCM Control Delay	745.7	23.3	20	32.4	23.8	19	55.3	35.1	383.8
HCM Lane LOS	F	C	C	D	C	C	F	E	F
HCM 95th-tile Q	69.8	0.8	0.3	2.7	1.1	0.2	6.1	3.7	32.9

Intersection	
Intersection Delay, s/veh	347.8
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	154	1	563	0	0	0	0	678	264	52	281	0
Future Vol, veh/h	154	1	563	0	0	0	0	678	264	52	281	0
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	1	100	21	0	0	0	0	12	5	1	5	0
Mvmt Flow	179	1	655	0	0	0	0	788	307	60	327	0
Number of Lanes	0	1	1	0	0	0	0	1	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	209.5	565.3	30.9
HCM LOS	F	F	D

Lane	NBLn1	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	99%	0%	100%	0%
Vol Thru, %	72%	1%	0%	0%	100%
Vol Right, %	28%	0%	100%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	942	155	563	52	281
LT Vol	0	154	0	52	0
Through Vol	678	1	0	0	281
RT Vol	264	0	563	0	0
Lane Flow Rate	1095	180	655	60	327
Geometry Grp	6	7	7	7	7
Degree of Util (X)	2.199	0.387	1.493	0.137	0.704
Departure Headway (Hd)	8.175	9.66	10.17	10.662	10.2
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	460	375	367	339	359
Service Time	6.175	7.36	7.87	8.362	7.9
HCM Lane V/C Ratio	2.38	0.48	1.785	0.177	0.911
HCM Control Delay	565.3	18.3	262.1	15	33.9
HCM Lane LOS	F	C	F	B	D
HCM 95th-tile Q	71.1	1.8	28.7	0.5	5.1

Intersection	
Intersection Delay, s/veh	95.7
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	253	5	33	606	226	0	0	80	52
Future Vol, veh/h	0	0	0	253	5	33	606	226	0	0	80	52
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	0	0	0	5	1	1	11	2	0	0	2	1
Mvmt Flow	0	0	0	294	6	38	705	263	0	0	93	60
Number of Lanes	0	0	0	0	1	1	1	1	0	0	1	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	2
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	2	0	2
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	2	2	0
HCM Control Delay	21.7	135	11.1
HCM LOS	C	F	B

Lane	NBLn1	NBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	98%	0%	0%	0%
Vol Thru, %	0%	100%	2%	0%	100%	0%
Vol Right, %	0%	0%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	606	226	258	33	80	52
LT Vol	606	0	253	0	0	0
Through Vol	0	226	5	0	80	0
RT Vol	0	0	0	33	0	52
Lane Flow Rate	705	263	300	38	93	60
Geometry Grp	7	7	7	7	7	7
Degree of Util (X)	1.327	0.446	0.623	0.066	0.181	0.105
Departure Headway (Hd)	6.777	6.114	8.053	6.775	7.376	6.638
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	543	591	453	532	489	543
Service Time	4.485	3.822	5.753	4.475	5.076	4.338
HCM Lane V/C Ratio	1.298	0.445	0.662	0.071	0.19	0.11
HCM Control Delay	180.3	13.7	23.2	10	11.7	10.1
HCM Lane LOS	F	B	C	A	B	B
HCM 95th-tile Q	30.4	2.3	4.1	0.2	0.7	0.3

Intersection	
Int Delay, s/veh	51.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	300	7	20	15	7	7	7	514	7	7	361	263
Future Vol, veh/h	300	7	20	15	7	7	7	514	7	7	361	263
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	100	225	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	1	1	1
Mvmt Flow	323	8	22	16	8	8	8	553	8	8	388	283

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	843	1123	336	783	1256	277	671	0	0	561	0	0
Stage 1	546	546	-	569	569	-	-	-	-	-	-	-
Stage 2	297	577	-	214	687	-	-	-	-	-	-	-
Critical Hdwy	7.52	6.52	6.92	7.52	6.52	6.92	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.52	5.52	-	6.52	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.52	5.52	-	6.52	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.51	4.01	3.31	3.51	4.01	3.31	2.21	-	-	2.21	-	-
Pot Cap-1 Maneuver	~ 259	206	663	286	171	723	922	-	-	1013	-	-
Stage 1	492	519	-	477	507	-	-	-	-	-	-	-
Stage 2	690	502	-	771	448	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 244	202	663	265	168	723	922	-	-	1013	-	-
Mov Cap-2 Maneuver	~ 244	202	-	265	168	-	-	-	-	-	-	-
Stage 1	488	515	-	473	502	-	-	-	-	-	-	-
Stage 2	667	497	-	729	444	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	235.7	20.1	0.1	0.1
HCM LOS	F	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	922	-	-	253	269	1013	-	-
HCM Lane V/C Ratio	0.008	-	-	1.39	0.116	0.007	-	-
HCM Control Delay (s)	8.9	-	-	235.7	20.1	8.6	-	-
HCM Lane LOS	A	-	-	F	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	19.2	0.4	0	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	1911.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	135	33	813	126	0	0	0	0	337	9	55
Future Vol, veh/h	0	135	33	813	126	0	0	0	0	337	9	55
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	200	-	-	-	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	13	1	2	9	0	0	0	0	9	33	24
Mvmt Flow	0	145	35	874	135	0	0	0	0	362	10	59

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	180	0	0	1956	2063	68
Stage 1	-	-	-	-	-	-	1883	1883	-
Stage 2	-	-	-	-	-	-	73	180	-
Critical Hdwy	-	-	-	4.14	-	-	6.98	7.16	7.38
Critical Hdwy Stg 1	-	-	-	-	-	-	5.98	6.16	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.98	6.16	-
Follow-up Hdwy	-	-	-	2.22	-	-	3.59	4.33	3.54
Pot Cap-1 Maneuver	0	-	-	1393	-	0	~ 51	37	915
Stage 1	0	-	-	-	-	0	~ 97	84	-
Stage 2	0	-	-	-	-	0	921	680	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	1393	-	-	~ 19	0	915
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 19	0	-
Stage 1	-	-	-	-	-	-	~ 97	0	-
Stage 2	-	-	-	-	-	-	~ 344	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	10.2	$ 7163.4
HCM LOS			F

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	1393	-	19	915
HCM Lane V/C Ratio	-	-	0.628	-	19.072	0.075
HCM Control Delay (s)	-	-	11.8	$	8522.1	9.3
HCM Lane LOS	-	-	B	-	F	A
HCM 95th %tile Q(veh)	-	-	4.7	-	45.9	0.2

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	352	0	0	889	272	50	23	387	0	0	0
Future Volume (veh/h)	120	352	0	0	889	272	50	23	387	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1616	1716	0	0	1772	1786	1528	1393	1716			
Adj Flow Rate, veh/h	133	391	0	0	988	302	41	47	0			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90			
Percent Heavy Veh, %	11	6	0	0	2	1	13	29	6			
Cap, veh/h	163	1703	0	0	890	271	501	479				
Arrive On Green	0.11	0.52	0.00	0.00	0.35	0.35	0.34	0.34	0.00			
Sat Flow, veh/h	1539	3346	0	0	2632	773	1455	1393	1454			
Grp Volume(v), veh/h	133	391	0	0	652	638	41	47	0			
Grp Sat Flow(s),veh/h/ln	1539	1630	0	0	1683	1633	1455	1393	1454			
Q Serve(g_s), s	5.1	3.9	0.0	0.0	21.0	21.0	1.1	1.4	0.0			
Cycle Q Clear(g_c), s	5.1	3.9	0.0	0.0	21.0	21.0	1.1	1.4	0.0			
Prop In Lane	1.00		0.00	0.00		0.47	1.00		1.00			
Lane Grp Cap(c), veh/h	163	1703	0	0	589	571	501	479				
V/C Ratio(X)	0.82	0.23	0.00	0.00	1.11	1.12	0.08	0.10				
Avail Cap(c_a), veh/h	231	1847	0	0	589	571	501	479				
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	0.40	0.40	1.00	1.00	0.00			
Uniform Delay (d), s/veh	26.3	7.8	0.0	0.0	19.5	19.5	13.3	13.4	0.0			
Incr Delay (d2), s/veh	14.0	0.1	0.0	0.0	58.5	62.4	0.1	0.1	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	2.3	1.0	0.0	0.0	16.4	16.5	0.3	0.4	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.3	7.8	0.0	0.0	78.0	81.9	13.3	13.4	0.0			
LnGrp LOS	D	A	A	A	F	F	B	B				
Approach Vol, veh/h		524			1290			88	A			
Approach Delay, s/veh		16.1			79.9			13.4				
Approach LOS		B			E			B				

Timer - Assigned Phs		2		4			7	8				
Phs Duration (G+Y+Rc), s		24.6		35.4			10.4	25.0				
Change Period (Y+Rc), s		4.0		4.0			4.0	4.0				
Max Green Setting (Gmax), s		18.0		34.0			9.0	21.0				
Max Q Clear Time (g_c+I1), s		3.4		5.9			7.1	23.0				
Green Ext Time (p_c), s		0.2		2.5			0.1	0.0				

Intersection Summary	
HCM 6th Ctrl Delay	59.3
HCM 6th LOS	E

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	438	163	138	63	93	343	350	169	33	49	152	718
Future Volume (veh/h)	438	163	138	63	93	343	350	169	33	49	152	718
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1687	1589	1786	1687	1646	1786	1588	1786	1786	1687	1786	1786
Adj Flow Rate, veh/h	521	194	164	75	111	408	417	201	39	58	181	855
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	1	15	1	1	11	1	1	1	1	1	1	1
Cap, veh/h	266	1077	540	92	388	346	324	626	121	72	99	469
Arrive On Green	0.17	0.36	0.36	0.06	0.25	0.25	0.11	0.43	0.43	0.04	0.37	0.37
Sat Flow, veh/h	1606	3020	1514	1606	1563	1395	2933	1453	282	1606	272	1283
Grp Volume(v), veh/h	521	194	164	75	111	408	417	0	240	58	0	1036
Grp Sat Flow(s),veh/h/ln	1606	1510	1514	1606	1563	1395	1467	0	1735	1606	0	1555
Q Serve(g_s), s	24.0	6.4	11.3	6.7	8.3	36.0	16.0	0.0	13.2	5.2	0.0	53.0
Cycle Q Clear(g_c), s	24.0	6.4	11.3	6.7	8.3	36.0	16.0	0.0	13.2	5.2	0.0	53.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.16	1.00		0.83
Lane Grp Cap(c), veh/h	266	1077	540	92	388	346	324	0	748	72	0	568
V/C Ratio(X)	1.96	0.18	0.30	0.82	0.29	1.18	1.29	0.00	0.32	0.80	0.00	1.82
Avail Cap(c_a), veh/h	266	1077	540	133	388	346	324	0	748	133	0	568
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.98	0.98	0.98	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	60.5	32.1	33.7	67.6	44.1	54.5	64.5	0.0	27.3	68.6	0.0	46.0
Incr Delay (d2), s/veh	444.9	0.4	1.4	21.7	1.8	106.2	151.1	0.0	0.2	18.2	0.0	377.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	42.5	2.4	4.4	3.3	3.4	22.6	12.7	0.0	5.6	2.5	0.0	79.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	505.4	32.4	35.1	89.3	45.9	160.7	215.6	0.0	27.5	86.8	0.0	423.1
LnGrp LOS	F	C	D	F	D	F	F	A	C	F	A	F
Approach Vol, veh/h		879			594			657			1094	
Approach Delay, s/veh		313.3			130.3			146.9			405.3	
Approach LOS		F			F			F			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.3	55.7	20.0	57.0	28.0	40.0	10.5	66.5
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	12.0	48.0	16.0	53.0	24.0	36.0	12.0	57.0
Max Q Clear Time (g_c+I1), s	8.7	13.3	18.0	55.0	26.0	38.0	7.2	15.2
Green Ext Time (p_c), s	0.0	1.8	0.0	0.0	0.0	0.0	0.0	1.5

Intersection Summary	
HCM 6th Ctrl Delay	276.9
HCM 6th LOS	F

Intersection	
Intersection Delay, s/veh	467.1
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	157	59	185	94	14	230	70	684	151	264	542	57
Future Vol, veh/h	157	59	185	94	14	230	70	684	151	264	542	57
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles, %	1	53	1	1	23	15	1	1	1	6	1	24
Mvmt Flow	178	67	210	107	16	261	80	777	172	300	616	65
Number of Lanes	1	2	0	1	2	0	0	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	3	3
HCM Control Delay	40.3	48.3	942.2	331.3
HCM LOS	E	E	F	F

Lane	NBLn1	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	8%	100%	0%	0%	100%	0%	0%	100%	0%
Vol Thru, %	76%	0%	100%	10%	0%	100%	2%	0%	90%
Vol Right, %	17%	0%	0%	90%	0%	0%	98%	0%	10%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	905	157	39	205	94	9	235	264	599
LT Vol	70	157	0	0	94	0	0	264	0
Through Vol	684	0	39	20	0	9	5	0	542
RT Vol	151	0	0	185	0	0	230	0	57
Lane Flow Rate	1028	178	45	233	107	11	267	300	681
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	3.024	0.555	0.144	0.651	0.337	0.033	0.773	0.885	1.885
Departure Headway (Hd)	11.646	17.226	17.659	15.948	16.926	16.784	15.855	15.299	14.574
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	329	212	205	230	215	215	232	240	259
Service Time	9.346	14.926	15.359	13.648	14.626	14.484	13.555	12.999	12.274
HCM Lane V/C Ratio	3.125	0.84	0.22	1.013	0.498	0.051	1.151	1.25	2.629
HCM Control Delay	942.2	39.5	23.3	44.2	28	20.1	57.6	74.4	444.5
HCM Lane LOS	F	E	C	E	D	C	F	F	F
HCM 95th-tile Q	82.5	3	0.5	4	1.4	0.1	5.5	7.3	32.7

Intersection	
Intersection Delay, s/veh	457.6
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	152	10	549	0	0	0	0	622	449	156	314	0
Future Vol, veh/h	152	10	549	0	0	0	0	622	449	156	314	0
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	22	50	26	0	0	0	0	59	5	11	9	0
Mvmt Flow	177	12	638	0	0	0	0	723	522	181	365	0
Number of Lanes	0	1	1	0	0	0	0	1	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	164	837.3	36.5
HCM LOS	F	F	E

Lane	NBLn1	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	94%	0%	100%	0%
Vol Thru, %	58%	6%	0%	0%	100%
Vol Right, %	42%	0%	100%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	1071	162	549	156	314
LT Vol	0	152	0	156	0
Through Vol	622	10	0	0	314
RT Vol	449	0	549	0	0
Lane Flow Rate	1245	188	638	181	365
Geometry Grp	6	7	7	7	7
Degree of Util (X)	2.804	0.437	1.36	0.421	0.794
Departure Headway (Hd)	8.878	10.689	9.952	11.143	10.569
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	423	339	370	327	347
Service Time	6.878	8.389	7.652	8.843	8.269
HCM Lane V/C Ratio	2.943	0.555	1.724	0.554	1.052
HCM Control Delay	837.3	21.4	206.1	21.7	43.9
HCM Lane LOS	F	C	F	C	E
HCM 95th-tile Q	95.9	2.1	24	2	6.6

Intersection	
Intersection Delay, s/veh	235.1
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	264	1	4	668	106	0	0	206	6
Future Vol, veh/h	0	0	0	264	1	4	668	106	0	0	206	6
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehicles, %	0	0	0	5	1	17	66	13	0	0	13	1
Mvmt Flow	0	0	0	330	1	5	835	133	0	0	258	8
Number of Lanes	0	0	0	0	1	1	1	1	0	0	1	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	2
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	2	0	2
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	2	2	0
HCM Control Delay	30.4	365.5	18.8
HCM LOS	D	F	C

Lane	NBLn1	NBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	100%	0%	0%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%
Vol Right, %	0%	0%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	668	106	265	4	206	6
LT Vol	668	0	264	0	0	0
Through Vol	0	106	1	0	206	0
RT Vol	0	0	0	4	0	6
Lane Flow Rate	835	132	331	5	258	8
Geometry Grp	7	7	7	7	7	7
Degree of Util (X)	1.876	0.245	0.708	0.009	0.513	0.013
Departure Headway (Hd)	8.086	6.656	8.984	7.681	8.138	7.199
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	459	541	404	469	445	500
Service Time	5.819	4.389	6.684	5.381	5.838	4.899
HCM Lane V/C Ratio	1.819	0.244	0.819	0.011	0.58	0.016
HCM Control Delay	421.7	11.5	30.7	10.5	19.1	10
HCM Lane LOS	F	B	D	B	C	A
HCM 95th-tile Q	54.3	1	5.3	0	2.9	0

Intersection	
Int Delay, s/veh	3.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	102	34	39	206	465	117
Future Vol, veh/h	102	34	39	206	465	117
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	1	1	1	6	2	1
Mvmt Flow	121	40	46	245	554	139

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	839	347	693	0	-	0
Stage 1	624	-	-	-	-	-
Stage 2	215	-	-	-	-	-
Critical Hdwy	6.82	6.92	4.12	-	-	-
Critical Hdwy Stg 1	5.82	-	-	-	-	-
Critical Hdwy Stg 2	5.82	-	-	-	-	-
Follow-up Hdwy	3.51	3.31	2.21	-	-	-
Pot Cap-1 Maneuver	306	652	905	-	-	-
Stage 1	499	-	-	-	-	-
Stage 2	803	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	288	652	905	-	-	-
Mov Cap-2 Maneuver	288	-	-	-	-	-
Stage 1	470	-	-	-	-	-
Stage 2	803	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	22.5	1.6	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	905	-	288	652	-	-
HCM Lane V/C Ratio	0.051	-	0.422	0.062	-	-
HCM Control Delay (s)	9.2	0.2	26.3	10.9	-	-
HCM Lane LOS	A	A	D	B	-	-
HCM 95th %tile Q(veh)	0.2	-	2	0.2	-	-

Intersection	
Int Delay, s/veh	264.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	478	7	42	30	7	7	13	348	7	7	477	263
Future Vol, veh/h	478	7	42	30	7	7	13	348	7	7	477	263
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	100	225	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	1	1	1
Mvmt Flow	543	8	48	34	8	8	15	395	8	8	542	299

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	940	1141	421	716	1282	198	841	0	0	403	0	0
Stage 1	708	708	-	425	425	-	-	-	-	-	-	-
Stage 2	232	433	-	291	857	-	-	-	-	-	-	-
Critical Hdwy	7.52	6.52	6.92	7.52	6.52	6.92	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.52	5.52	-	6.52	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.52	5.52	-	6.52	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.51	4.01	3.31	3.51	4.01	3.31	2.21	-	-	2.21	-	-
Pot Cap-1 Maneuver	~ 220	201	584	319	165	813	797	-	-	1159	-	-
Stage 1	~ 394	438	-	580	587	-	-	-	-	-	-	-
Stage 2	753	583	-	695	374	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 205	196	584	278	161	813	797	-	-	1159	-	-
Mov Cap-2 Maneuver	~ 205	196	-	278	161	-	-	-	-	-	-	-
Stage 1	~ 387	435	-	569	576	-	-	-	-	-	-	-
Stage 2	721	572	-	622	371	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 844.6	21	0.3	0.1
HCM LOS	F	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	797	-	-	216	275	1159	-	-
HCM Lane V/C Ratio	0.019	-	-	2.773	0.182	0.007	-	-
HCM Control Delay (s)	9.6	-	-	$ 844.6	21	8.1	-	-
HCM Lane LOS	A	-	-	F	C	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	52.2	0.7	0	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	135	33	813	126	0	0	0	0	337	9	55
Future Volume (veh/h)	0	135	33	813	126	0	0	0	0	337	9	55
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1617	1786	1673	1674	0				1581	1337	1463
Adj Flow Rate, veh/h	0	145	35	874	135	0				362	10	59
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93				0.93	0.93	0.93
Percent Heavy Veh, %	0	13	1	2	9	0				9	33	24
Cap, veh/h	0	192	45	858	2057	0				439	49	289
Arrive On Green	0.00	0.08	0.08	0.54	0.65	0.00				0.29	0.29	0.29
Sat Flow, veh/h	0	2550	580	1594	3264	0				1505	168	991
Grp Volume(v), veh/h	0	89	91	874	135	0				362	0	69
Grp Sat Flow(s),veh/h/ln	0	1537	1513	1594	1590	0				1505	0	1158
Q Serve(g_s), s	0.0	7.3	7.7	70.0	2.0	0.0				29.2	0.0	5.8
Cycle Q Clear(g_c), s	0.0	7.3	7.7	70.0	2.0	0.0				29.2	0.0	5.8
Prop In Lane	0.00		0.38	1.00		0.00				1.00		0.86
Lane Grp Cap(c), veh/h	0	119	118	858	2057	0				439	0	338
V/C Ratio(X)	0.00	0.74	0.78	1.02	0.07	0.00				0.82	0.00	0.20
Avail Cap(c_a), veh/h	0	189	186	858	2201	0				439	0	338
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.58	0.58	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	58.7	58.8	30.0	8.5	0.0				42.9	0.0	34.7
Incr Delay (d2), s/veh	0.0	8.8	10.4	28.1	0.0	0.0				12.1	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	3.1	3.2	31.4	0.7	0.0				12.3	0.0	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	67.5	69.3	58.1	8.5	0.0				55.1	0.0	35.0
LnGrp LOS	A	E	E	F	A	A				E	A	C
Approach Vol, veh/h		180			1009						431	
Approach Delay, s/veh		68.4			51.5						51.9	
Approach LOS		E			D						D	

Timer - Assigned Phs		3	4		6		8					
Phs Duration (G+Y+Rc), s		74.0	14.1		41.9		88.1					
Change Period (Y+Rc), s		4.0	4.0		4.0		4.0					
Max Green Setting (Gmax), s		70.0	16.0		32.0		90.0					
Max Q Clear Time (g_c+I1), s		72.0	9.7		31.2		4.0					
Green Ext Time (p_c), s		0.0	0.4		0.2		0.9					

Intersection Summary	
HCM 6th Ctrl Delay	53.5
HCM 6th LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	352	0	0	889	272	50	23	387	0	0	0
Future Volume (veh/h)	120	352	0	0	889	272	50	23	387	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1616	1716	0	0	1772	1786	1528	1393	1716			
Adj Flow Rate, veh/h	133	391	0	0	988	302	56	26	430			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90			
Percent Heavy Veh, %	11	6	0	0	2	1	13	29	6			
Cap, veh/h	162	1641	0	0	1171	526	365	169	1015			
Arrive On Green	0.11	0.50	0.00	0.00	0.35	0.35	0.40	0.40	0.40			
Sat Flow, veh/h	1539	3346	0	0	3455	1514	920	427	2559			
Grp Volume(v), veh/h	133	391	0	0	988	302	82	0	430			
Grp Sat Flow(s),veh/h/ln	1539	1630	0	0	1683	1514	1347	0	1280			
Q Serve(g_s), s	6.8	5.4	0.0	0.0	21.7	13.0	3.1	0.0	9.7			
Cycle Q Clear(g_c), s	6.8	5.4	0.0	0.0	21.7	13.0	3.1	0.0	9.7			
Prop In Lane	1.00		0.00	0.00		1.00	0.68		1.00			
Lane Grp Cap(c), veh/h	162	1641	0	0	1171	526	534	0	1015			
V/C Ratio(X)	0.82	0.24	0.00	0.00	0.84	0.57	0.15	0.00	0.42			
Avail Cap(c_a), veh/h	269	2160	0	0	1473	662	534	0	1015			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.39	0.39	0.00	0.00	0.73	0.73	1.00	0.00	1.00			
Uniform Delay (d), s/veh	35.0	11.2	0.0	0.0	24.1	21.3	15.5	0.0	17.5			
Incr Delay (d2), s/veh	4.0	0.0	0.0	0.0	2.8	0.7	0.6	0.0	1.3			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	2.6	1.7	0.0	0.0	8.3	4.3	1.0	0.0	2.9			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	39.1	11.2	0.0	0.0	26.9	22.0	16.1	0.0	18.8			
LnGrp LOS	D	B	A	A	C	C	B	A	B			
Approach Vol, veh/h		524			1290			512				
Approach Delay, s/veh		18.3			25.8			18.4				
Approach LOS		B			C			B				

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	35.7	44.3	12.4	31.8
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	19.0	53.0	14.0	35.0
Max Q Clear Time (g_c+I1), s	11.7	7.4	8.8	23.7
Green Ext Time (p_c), s	1.4	2.6	0.1	4.2

Intersection Summary	
HCM 6th Ctrl Delay	22.4
HCM 6th LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	438	163	138	63	93	343	350	169	33	49	152	718
Future Volume (veh/h)	438	163	138	63	93	343	350	169	33	49	152	718
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1588	1589	1786	1588	1646	1786	1588	1786	1786	1687	1786	1786
Adj Flow Rate, veh/h	521	194	164	75	111	408	417	201	39	58	181	0
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	1	15	1	1	11	1	1	1	1	1	1	1
Cap, veh/h	567	1395	699	221	1075	571	471	375	73	104	233	
Arrive On Green	0.19	0.46	0.46	0.08	0.34	0.34	0.16	0.26	0.26	0.03	0.13	0.00
Sat Flow, veh/h	2933	3020	1514	2933	3127	1514	2933	1453	282	3116	1786	1514
Grp Volume(v), veh/h	521	194	164	75	111	408	417	0	240	58	181	0
Grp Sat Flow(s),veh/h/ln	1467	1510	1514	1467	1563	1514	1467	0	1735	1558	1786	1514
Q Serve(g_s), s	16.2	3.4	6.1	2.3	2.2	21.4	13.0	0.0	11.1	1.7	9.1	0.0
Cycle Q Clear(g_c), s	16.2	3.4	6.1	2.3	2.2	21.4	13.0	0.0	11.1	1.7	9.1	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.16	1.00		1.00
Lane Grp Cap(c), veh/h	567	1395	699	221	1075	571	471	0	447	104	233	
V/C Ratio(X)	0.92	0.14	0.23	0.34	0.10	0.71	0.88	0.00	0.54	0.56	0.78	
Avail Cap(c_a), veh/h	567	1395	699	221	1075	571	473	0	820	335	748	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	36.8	14.4	15.1	40.9	20.8	24.7	38.2	0.0	29.8	44.3	39.2	0.0
Incr Delay (d2), s/veh	20.2	0.2	0.8	0.9	0.2	7.5	17.8	0.0	1.0	4.6	5.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.1	1.1	2.1	0.8	0.8	8.4	5.7	0.0	4.6	0.7	4.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.0	14.6	15.9	41.8	21.0	32.2	56.0	0.0	30.8	48.9	44.7	0.0
LnGrp LOS	E	B	B	D	C	C	E	A	C	D	D	
Approach Vol, veh/h		879			594			657			239	A
Approach Delay, s/veh		40.0			31.3			46.8			45.7	
Approach LOS		D			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.0	47.0	19.0	16.1	22.0	36.0	7.1	28.0
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	7.0	43.0	15.0	39.0	18.0	32.0	10.0	44.0
Max Q Clear Time (g_c+I1), s	14.3	8.1	15.0	11.1	18.2	4.2	3.7	13.1
Green Ext Time (p_c), s	0.0	1.8	0.0	1.0	0.0	0.1	0.1	1.4

Intersection Summary	
HCM 6th Ctrl Delay	40.3
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	157	59	185	94	14	230	70	684	151	264	542	57
Future Volume (veh/h)	157	59	185	94	14	230	70	684	151	264	542	57
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1687	1056	1786	1687	1477	1589	1687	1786	1786	1620	1786	1463
Adj Flow Rate, veh/h	178	67	210	107	16	261	80	777	172	300	616	65
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	1	53	1	1	23	15	1	1	1	6	1	24
Cap, veh/h	205	160	143	148	183	450	174	1282	572	324	1487	157
Arrive On Green	0.13	0.16	0.16	0.09	0.12	0.12	0.11	0.38	0.38	0.42	0.96	0.96
Sat Flow, veh/h	1606	1003	895	1606	1477	1347	1606	3393	1514	1543	3098	326
Grp Volume(v), veh/h	178	67	210	107	16	261	80	777	172	300	337	344
Grp Sat Flow(s),veh/h/ln	1606	1003	895	1606	1477	1347	1606	1697	1514	1543	1697	1727
Q Serve(g_s), s	10.9	6.0	16.0	6.5	1.0	10.0	4.7	18.5	5.8	18.4	1.3	1.3
Cycle Q Clear(g_c), s	10.9	6.0	16.0	6.5	1.0	10.0	4.7	18.5	5.8	18.4	1.3	1.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.19
Lane Grp Cap(c), veh/h	205	160	143	148	183	450	174	1282	572	324	814	829
V/C Ratio(X)	0.87	0.42	1.47	0.72	0.09	0.58	0.46	0.61	0.30	0.93	0.41	0.41
Avail Cap(c_a), veh/h	209	160	143	209	236	499	174	1282	572	448	814	829
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.90	0.90	0.90
Uniform Delay (d), s/veh	42.8	37.8	42.0	44.2	38.8	12.6	41.9	25.1	11.4	28.2	1.1	1.1
Incr Delay (d2), s/veh	29.4	1.7	244.1	7.1	0.2	1.4	1.9	2.1	1.3	19.0	1.4	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.9	1.5	13.2	2.9	0.4	3.0	1.9	7.4	2.9	6.5	0.6	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	72.2	39.5	286.1	51.3	39.0	14.0	43.8	27.2	12.8	47.3	2.5	2.4
LnGrp LOS	E	D	F	D	D	B	D	C	B	D	A	A
Approach Vol, veh/h		455			384			1029			981	
Approach Delay, s/veh		166.1			25.4			26.1			16.2	
Approach LOS		F			C			C			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	25.0	41.8	13.2	20.0	14.8	52.0	16.8	16.4
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	29.0	26.0	13.0	16.0	7.0	48.0	13.0	16.0
Max Q Clear Time (g_c+I1), s	20.4	20.5	8.5	18.0	6.7	3.3	12.9	12.0
Green Ext Time (p_c), s	0.6	2.6	0.1	0.0	0.0	4.4	0.0	0.4

Intersection Summary	
HCM 6th Ctrl Delay	44.9
HCM 6th LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	152	10	549	0	0	0	0	622	449	156	314	0
Future Volume (veh/h)	152	10	549	0	0	0	0	622	449	156	314	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1408	1098	1435				0	972	1730	1554	1674	0
Adj Flow Rate, veh/h	177	12	638				0	723	522	181	365	0
Peak Hour Factor	0.86	0.86	0.86				0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	22	50	26				0	59	5	11	9	0
Cap, veh/h	305	21	665				0	791	628	209	1938	0
Arrive On Green	0.31	0.31	0.31				0.00	0.29	0.29	0.14	0.61	0.00
Sat Flow, veh/h	982	67	2140				0	1895	1466	1480	3264	0
Grp Volume(v), veh/h	189	0	638				0	723	522	181	365	0
Grp Sat Flow(s),veh/h/ln	1049	0	1070				0	923	1466	1480	1590	0
Q Serve(g_s), s	15.2	0.0	29.3				0.0	37.9	33.3	12.0	5.1	0.0
Cycle Q Clear(g_c), s	15.2	0.0	29.3				0.0	37.9	33.3	12.0	5.1	0.0
Prop In Lane	0.94		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	326	0	665				0	791	628	209	1938	0
V/C Ratio(X)	0.58	0.00	0.96				0.00	0.91	0.83	0.87	0.19	0.00
Avail Cap(c_a), veh/h	326	0	665				0	831	660	296	2194	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	0.67	0.67	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	0.78	0.78	0.83	0.83	0.00
Uniform Delay (d), s/veh	29.0	0.0	33.9				0.0	33.9	32.3	42.0	8.6	0.0
Incr Delay (d2), s/veh	2.6	0.0	25.3				0.0	11.6	6.8	14.6	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.0	0.0	9.7				0.0	9.9	13.2	5.1	1.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.6	0.0	59.2				0.0	45.4	39.1	56.7	8.7	0.0
LnGrp LOS	C	A	E				A	D	D	E	A	A
Approach Vol, veh/h		827						1245			546	
Approach Delay, s/veh		52.9						42.8			24.6	
Approach LOS		D						D			C	

Timer - Assigned Phs		2		4			7	8				
Phs Duration (G+Y+Rc), s		35.0		65.0			18.1	46.8				
Change Period (Y+Rc), s		4.0		4.0			4.0	4.0				
Max Green Setting (Gmax), s		23.0		69.0			20.0	45.0				
Max Q Clear Time (g_c+I1), s		31.3		7.1			14.0	39.9				
Green Ext Time (p_c), s		0.0		2.5			0.2	3.0				

Intersection Summary			
HCM 6th Ctrl Delay			42.2
HCM 6th LOS			D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	264	1	4	668	106	0	0	206	6
Future Volume (veh/h)	0	0	0	264	1	4	668	106	0	0	206	6
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1634	1786	1561	825	1617	0	0	1617	1786
Adj Flow Rate, veh/h				330	1	5	835	132	0	0	258	8
Peak Hour Factor				0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Percent Heavy Veh, %				5	1	17	66	13	0	0	13	1
Cap, veh/h				668	57	286	838	1130	0	0	334	165
Arrive On Green				0.22	0.22	0.22	0.55	0.70	0.00	0.00	0.11	0.11
Sat Flow, veh/h				3018	259	1294	1524	1617	0	0	3154	1514
Grp Volume(v), veh/h				330	0	6	835	132	0	0	258	8
Grp Sat Flow(s),veh/h/ln				1509	0	1553	762	1617	0	0	1537	1514
Q Serve(g_s), s				9.6	0.0	0.3	54.5	2.7	0.0	0.0	8.2	0.5
Cycle Q Clear(g_c), s				9.6	0.0	0.3	54.5	2.7	0.0	0.0	8.2	0.5
Prop In Lane				1.00		0.83	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				668	0	344	838	1130	0	0	334	165
V/C Ratio(X)				0.49	0.00	0.02	1.00	0.12	0.00	0.00	0.77	0.05
Avail Cap(c_a), veh/h				668	0	344	838	1213	0	0	492	242
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.45	0.45	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				34.0	0.0	30.4	22.4	4.9	0.0	0.0	43.4	39.9
Incr Delay (d2), s/veh				0.6	0.0	0.0	19.9	0.0	0.0	0.0	4.5	0.1
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				3.5	0.0	0.1	10.8	0.7	0.0	0.0	3.2	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				34.6	0.0	30.5	42.3	5.0	0.0	0.0	47.8	40.0
LnGrp LOS				C	A	C	D	A	A	A	D	D
Approach Vol, veh/h					336			967			266	
Approach Delay, s/veh					34.5			37.2			47.6	
Approach LOS					C			D			D	

Timer - Assigned Phs		2	3	4				8				
Phs Duration (G+Y+Rc), s		26.1	59.0	14.9				73.9				
Change Period (Y+Rc), s		4.0	4.0	4.0				4.0				
Max Green Setting (Gmax), s		17.0	55.0	16.0				75.0				
Max Q Clear Time (g_c+I1), s		11.6	56.5	10.2				4.7				
Green Ext Time (p_c), s		0.6	0.0	0.7				0.7				

Intersection Summary	
HCM 6th Ctrl Delay	38.4
HCM 6th LOS	D

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	102	34	39	206	465	117
Future Vol, veh/h	102	34	39	206	465	117
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	300	-	-	150
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	1	1	1	6	2	1
Mvmt Flow	121	40	46	245	554	139

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	769	277	693	0	-	0
Stage 1	554	-	-	-	-	-
Stage 2	215	-	-	-	-	-
Critical Hdwy	6.82	6.92	4.12	-	-	-
Critical Hdwy Stg 1	5.82	-	-	-	-	-
Critical Hdwy Stg 2	5.82	-	-	-	-	-
Follow-up Hdwy	3.51	3.31	2.21	-	-	-
Pot Cap-1 Maneuver	340	723	905	-	-	-
Stage 1	542	-	-	-	-	-
Stage 2	803	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	323	723	905	-	-	-
Mov Cap-2 Maneuver	323	-	-	-	-	-
Stage 1	514	-	-	-	-	-
Stage 2	803	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	19.6	1.5	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	905	-	323	723	-	-
HCM Lane V/C Ratio	0.051	-	0.376	0.056	-	-
HCM Control Delay (s)	9.2	-	22.7	10.3	-	-
HCM Lane LOS	A	-	C	B	-	-
HCM 95th %tile Q(veh)	0.2	-	1.7	0.2	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	478	7	42	30	7	7	13	348	7	7	477	263
Future Volume (veh/h)	478	7	42	30	7	7	13	348	7	7	477	263
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1786	1786	1786	1786	1786	1786	1786	1786	1786	1786	1786	1786
Adj Flow Rate, veh/h	543	8	48	34	8	8	15	395	8	8	542	299
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	613	9	54	80	19	19	24	755	337	142	615	339
Arrive On Green	0.40	0.40	0.40	0.07	0.07	0.07	0.01	0.22	0.22	0.08	0.29	0.29
Sat Flow, veh/h	1528	23	135	1143	269	269	1701	3393	1514	1701	2111	1162
Grp Volume(v), veh/h	599	0	0	50	0	0	15	395	8	8	435	406
Grp Sat Flow(s),veh/h/ln	1685	0	0	1680	0	0	1701	1697	1514	1701	1697	1577
Q Serve(g_s), s	23.7	0.0	0.0	2.1	0.0	0.0	0.6	7.4	0.3	0.3	17.6	17.6
Cycle Q Clear(g_c), s	23.7	0.0	0.0	2.1	0.0	0.0	0.6	7.4	0.3	0.3	17.6	17.6
Prop In Lane	0.91		0.08	0.68		0.16	1.00		1.00	1.00		0.74
Lane Grp Cap(c), veh/h	676	0	0	118	0	0	24	755	337	142	495	460
V/C Ratio(X)	0.89	0.00	0.00	0.42	0.00	0.00	0.61	0.52	0.02	0.06	0.88	0.88
Avail Cap(c_a), veh/h	844	0	0	374	0	0	142	755	337	142	495	460
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.0	0.0	0.0	32.0	0.0	0.0	35.2	24.6	21.9	30.4	24.3	24.3
Incr Delay (d2), s/veh	9.5	0.0	0.0	2.4	0.0	0.0	22.2	2.6	0.1	0.8	19.6	21.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.4	0.0	0.0	0.9	0.0	0.0	0.4	3.0	0.1	0.2	9.0	8.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.5	0.0	0.0	34.4	0.0	0.0	57.5	27.2	22.0	31.1	43.9	45.3
LnGrp LOS	C	A	A	C	A	A	E	C	C	C	D	D
Approach Vol, veh/h		599			50			418			849	
Approach Delay, s/veh		29.5			34.4			28.2			44.5	
Approach LOS		C			C			C			D	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.0	20.0		32.9	5.0	25.0		9.1				
Change Period (Y+Rc), s	4.0	4.0		4.0	4.0	4.0		4.0				
Max Green Setting (Gmax), s	6.0	16.0		36.0	6.0	16.0		16.0				
Max Q Clear Time (g_c+I1), s	2.3	9.4		25.7	2.6	19.6		4.1				
Green Ext Time (p_c), s	0.0	1.3		3.1	0.0	0.0		0.1				

Intersection Summary			
HCM 6th Ctrl Delay			36.0
HCM 6th LOS			D

Intersection	
Int Delay, s/veh	683.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↳		↰	↑↑					↰	↳	
Traffic Vol, veh/h	0	152	2	541	138	0	0	0	0	327	35	51
Future Vol, veh/h	0	152	2	541	138	0	0	0	0	327	35	51
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	200	-	-	-	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	0	5	1	4	5	0	0	0	0	4	1	10
Mvmt Flow	0	177	2	629	160	0	0	0	0	380	41	59

Major/Minor	Major1			Major2			Minor2		
Conflicting Flow All	-	0	0	179	0	0	1507	1597	80
Stage 1	-	-	-	-	-	-	1418	1418	-
Stage 2	-	-	-	-	-	-	89	179	-
Critical Hdwy	-	-	-	4.18	-	-	6.88	6.52	7.1
Critical Hdwy Stg 1	-	-	-	-	-	-	5.88	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.88	5.52	-
Follow-up Hdwy	-	-	-	2.24	-	-	3.54	4.01	3.4
Pot Cap-1 Maneuver	0	-	-	1380	-	0	~ 109	107	939
Stage 1	0	-	-	-	-	0	~ 186	203	-
Stage 2	0	-	-	-	-	0	918	753	-
Platoon blocked, %		-	-		-				
Mov Cap-1 Maneuver	-	-	-	1380	-	-	~ 59	0	939
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 59	0	-
Stage 1	-	-	-	-	-	-	~ 186	0	-
Stage 2	-	-	-	-	-	-	499	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	7.8	$ 2049.7
HCM LOS			F

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	1380	-	59	939
HCM Lane V/C Ratio	-	-	0.456	-	6.445	0.106
HCM Control Delay (s)	-	-	9.8	$	2586.3	9.3
HCM Lane LOS	-	-	A	-	F	A
HCM 95th %tile Q(veh)	-	-	2.4	-	43.4	0.4

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	111	368	0	0	654	306	25	24	769	0	0	0
Future Volume (veh/h)	111	368	0	0	654	306	25	24	769	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1478	1786	0	0	1758	1786	1262	1098	1772			
Adj Flow Rate, veh/h	121	400	0	0	711	333	26	27	0			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	21	1	0	0	3	1	33	50	2			
Cap, veh/h	145	1755	0	0	768	359	420	384				
Arrive On Green	0.10	0.52	0.00	0.00	0.35	0.35	0.35	0.35	0.00			
Sat Flow, veh/h	1408	3483	0	0	2296	1034	1202	1098	1502			
Grp Volume(v), veh/h	121	400	0	0	538	506	26	27	0			
Grp Sat Flow(s),veh/h/ln	1408	1697	0	0	1670	1572	1202	1098	1502			
Q Serve(g_s), s	5.1	3.9	0.0	0.0	18.6	18.6	0.9	1.0	0.0			
Cycle Q Clear(g_c), s	5.1	3.9	0.0	0.0	18.6	18.6	0.9	1.0	0.0			
Prop In Lane	1.00		0.00	0.00		0.66	1.00		1.00			
Lane Grp Cap(c), veh/h	145	1755	0	0	581	547	420	384				
V/C Ratio(X)	0.84	0.23	0.00	0.00	0.93	0.93	0.06	0.07				
Avail Cap(c_a), veh/h	211	1923	0	0	584	550	420	384				
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	0.37	0.37	1.00	1.00	0.00			
Uniform Delay (d), s/veh	26.4	7.9	0.0	0.0	18.8	18.8	13.0	13.0	0.0			
Incr Delay (d2), s/veh	17.1	0.1	0.0	0.0	9.7	10.3	0.1	0.1	0.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	2.2	1.1	0.0	0.0	7.6	7.2	0.2	0.2	0.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	43.5	8.0	0.0	0.0	28.5	29.1	13.0	13.1	0.0			
LnGrp LOS	D	A	A	A	C	C	B	B				
Approach Vol, veh/h		521			1044			53	A			
Approach Delay, s/veh		16.2			28.8			13.1				
Approach LOS		B			C			B				

Timer - Assigned Phs		2		4			7	8				
Phs Duration (G+Y+Rc), s		25.0		35.0			10.2	24.9				
Change Period (Y+Rc), s		4.0		4.0			4.0	4.0				
Max Green Setting (Gmax), s		18.0		34.0			9.0	21.0				
Max Q Clear Time (g_c+I1), s		3.0		5.9			7.1	20.6				
Green Ext Time (p_c), s		0.1		2.5			0.0	0.3				

Intersection Summary	
HCM 6th Ctrl Delay	24.2
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	738	127	272	103	306	49	217	157	92	340	150	437
Future Volume (veh/h)	738	127	272	103	306	49	217	157	92	340	150	437
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1687	1716	1786	1687	1646	1786	1588	1786	1744	1687	1786	1786
Adj Flow Rate, veh/h	820	141	302	114	340	54	241	174	102	378	167	486
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	1	6	1	1	11	1	1	1	4	1	1	1
Cap, veh/h	399	1393	647	134	709	112	162	277	162	188	131	380
Arrive On Green	0.25	0.43	0.43	0.08	0.26	0.26	0.06	0.26	0.26	0.12	0.32	0.32
Sat Flow, veh/h	1606	3260	1514	1606	2706	426	2933	1056	619	1606	403	1172
Grp Volume(v), veh/h	820	141	302	114	195	199	241	0	276	378	0	653
Grp Sat Flow(s),veh/h/ln	1606	1630	1514	1606	1563	1569	1467	0	1675	1606	0	1575
Q Serve(g_s), s	36.0	3.8	20.7	10.2	15.2	15.5	8.0	0.0	21.1	17.0	0.0	47.0
Cycle Q Clear(g_c), s	36.0	3.8	20.7	10.2	15.2	15.5	8.0	0.0	21.1	17.0	0.0	47.0
Prop In Lane	1.00		1.00	1.00		0.27	1.00		0.37	1.00		0.74
Lane Grp Cap(c), veh/h	399	1393	647	134	410	411	162	0	439	188	0	511
V/C Ratio(X)	2.06	0.10	0.47	0.85	0.48	0.48	1.49	0.00	0.63	2.01	0.00	1.28
Avail Cap(c_a), veh/h	399	1393	647	144	410	411	162	0	439	188	0	511
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.89	0.89	0.89	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	54.5	24.9	29.7	65.6	45.1	45.2	68.5	0.0	47.3	64.0	0.0	49.0
Incr Delay (d2), s/veh	482.9	0.1	2.2	34.7	3.9	4.0	250.0	0.0	2.9	471.5	0.0	140.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	67.8	1.5	7.9	5.4	6.3	6.5	8.6	0.0	9.1	31.6	0.0	38.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	537.4	25.0	31.9	100.3	49.0	49.2	318.5	0.0	50.1	535.5	0.0	189.1
LnGrp LOS	F	C	C	F	D	D	F	A	D	F	A	F
Approach Vol, veh/h		1263			508			517			1031	
Approach Delay, s/veh		359.3			60.6			175.2			316.1	
Approach LOS		F			E			F			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.1	65.9	12.0	51.0	40.0	42.0	21.0	42.0
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	13.0	61.0	8.0	47.0	36.0	38.0	17.0	38.0
Max Q Clear Time (g_c+I1), s	12.3	22.7	10.0	49.0	38.0	17.5	19.0	23.1
Green Ext Time (p_c), s	0.0	1.9	0.0	0.0	0.0	2.1	0.0	1.3

Intersection Summary	
HCM 6th Ctrl Delay	271.5
HCM 6th LOS	F

Intersection	
Intersection Delay, s/veh	477
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	68	44	162	127	32	274	222	664	85	204	505	205
Future Vol, veh/h	68	44	162	127	32	274	222	664	85	204	505	205
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	1	10	1	1	35	8	1	1	1	6	1	4
Mvmt Flow	73	47	174	137	34	295	239	714	91	219	543	220
Number of Lanes	1	2	0	1	2	0	0	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	3	3	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	3	3
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	3	3
HCM Control Delay	30.9	48	887.3	378.1
HCM LOS	D	E	F	F

Lane	NBLn1	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	23%	100%	0%	0%	100%	0%	0%	100%	0%
Vol Thru, %	68%	0%	100%	8%	0%	100%	4%	0%	71%
Vol Right, %	9%	0%	0%	92%	0%	0%	96%	0%	29%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	971	68	29	177	127	21	285	204	710
LT Vol	222	68	0	0	127	0	0	204	0
Through Vol	664	0	29	15	0	21	11	0	505
RT Vol	85	0	0	162	0	0	274	0	205
Lane Flow Rate	1044	73	32	190	137	23	306	219	763
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	2.903	0.225	0.094	0.524	0.397	0.067	0.801	0.612	1.965
Departure Headway (Hd)	11.319	17.15	16.757	15.858	16.055	16.143	14.876	14.259	13.394
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	334	211	215	230	227	223	248	257	282
Service Time	9.019	14.85	14.457	13.558	13.755	13.843	12.576	11.959	11.094
HCM Lane V/C Ratio	3.126	0.346	0.149	0.826	0.604	0.103	1.234	0.852	2.706
HCM Control Delay	887.3	24.8	21.2	34.8	28.9	20	58.6	37.1	476.1
HCM Lane LOS	F	C	C	D	D	C	F	E	F
HCM 95th-tile Q	80	0.8	0.3	2.7	1.8	0.2	6	3.6	37.7

Intersection	
Intersection Delay, s/veh	403.7
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	154	1	563	0	0	0	0	710	296	52	351	0
Future Vol, veh/h	154	1	563	0	0	0	0	710	296	52	351	0
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	1	100	21	0	0	0	0	12	5	1	5	0
Mvmt Flow	179	1	655	0	0	0	0	826	344	60	408	0
Number of Lanes	0	1	1	0	0	0	0	1	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	2	2	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	2
HCM Control Delay	227.6	670.8	50.8
HCM LOS	F	F	F

Lane	NBLn1	EBLn1	EBLn2	SBLn1	SBLn2
Vol Left, %	0%	99%	0%	100%	0%
Vol Thru, %	71%	1%	0%	0%	100%
Vol Right, %	29%	0%	100%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	1006	155	563	52	351
LT Vol	0	154	0	52	0
Through Vol	710	1	0	0	351
RT Vol	296	0	563	0	0
Lane Flow Rate	1170	180	655	60	408
Geometry Grp	6	7	7	7	7
Degree of Util (X)	2.434	0.401	1.544	0.137	0.879
Departure Headway (Hd)	8.44	10.044	10.558	11.006	10.542
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	445	360	354	328	347
Service Time	6.44	7.744	8.258	8.706	8.242
HCM Lane V/C Ratio	2.629	0.5	1.85	0.183	1.176
HCM Control Delay	670.8	19.3	285	15.4	56.1
HCM Lane LOS	F	C	F	C	F
HCM 95th-tile Q	81.2	1.9	29.8	0.5	8.3

Intersection	
Intersection Delay, s/veh	102.8
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	288	5	33	606	258	0	0	115	52
Future Vol, veh/h	0	0	0	288	5	33	606	258	0	0	115	52
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	0	0	0	5	1	1	11	2	0	0	2	1
Mvmt Flow	0	0	0	335	6	38	705	300	0	0	134	60
Number of Lanes	0	0	0	0	1	1	1	1	0	0	1	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	2
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	2	0	2
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	2	2	0
HCM Control Delay	28	148.5	12.4
HCM LOS	D	F	B

Lane	NBLn1	NBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	98%	0%	0%	0%
Vol Thru, %	0%	100%	2%	0%	100%	0%
Vol Right, %	0%	0%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	606	258	293	33	115	52
LT Vol	606	0	288	0	0	0
Through Vol	0	258	5	0	115	0
RT Vol	0	0	0	33	0	52
Lane Flow Rate	705	300	341	38	134	60
Geometry Grp	7	7	7	7	7	7
Degree of Util (X)	1.383	0.533	0.729	0.069	0.268	0.109
Departure Headway (Hd)	7.065	6.4	8.219	6.937	7.681	6.941
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	514	564	443	520	471	519
Service Time	4.8	4.135	5.919	4.637	5.381	4.641
HCM Lane V/C Ratio	1.372	0.532	0.77	0.073	0.285	0.116
HCM Control Delay	204.8	16.2	30	10.2	13.2	10.5
HCM Lane LOS	F	C	D	B	B	B
HCM 95th-tile Q	32.4	3.1	5.8	0.2	1.1	0.4

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	96	32	35	524	426	105
Future Vol, veh/h	96	32	35	524	426	105
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	1	1	1	3	5	1
Mvmt Flow	107	36	39	582	473	117

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	901	295	590	0	-	0
Stage 1	532	-	-	-	-	-
Stage 2	369	-	-	-	-	-
Critical Hdwy	6.82	6.92	4.12	-	-	-
Critical Hdwy Stg 1	5.82	-	-	-	-	-
Critical Hdwy Stg 2	5.82	-	-	-	-	-
Follow-up Hdwy	3.51	3.31	2.21	-	-	-
Pot Cap-1 Maneuver	280	704	988	-	-	-
Stage 1	556	-	-	-	-	-
Stage 2	673	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	264	704	988	-	-	-
Mov Cap-2 Maneuver	264	-	-	-	-	-
Stage 1	524	-	-	-	-	-
Stage 2	673	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	23.3	0.7	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	988	-	264	704	-	-
HCM Lane V/C Ratio	0.039	-	0.404	0.051	-	-
HCM Control Delay (s)	8.8	0.2	27.6	10.4	-	-
HCM Lane LOS	A	A	D	B	-	-
HCM 95th %tile Q(veh)	0.1	-	1.9	0.2	-	-

Intersection	
Int Delay, s/veh	86

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	300	7	20	15	7	7	7	610	7	7	466	263
Future Vol, veh/h	300	7	20	15	7	7	7	610	7	7	466	263
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	100	225	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	1	1	1
Mvmt Flow	323	8	22	16	8	8	8	656	8	8	501	283

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1007	1339	392	943	1472	328	784	0	0	664	0	0
Stage 1	659	659	-	672	672	-	-	-	-	-	-	-
Stage 2	348	680	-	271	800	-	-	-	-	-	-	-
Critical Hdwy	7.52	6.52	6.92	7.52	6.52	6.92	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.52	5.52	-	6.52	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.52	5.52	-	6.52	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.51	4.01	3.31	3.51	4.01	3.31	2.21	-	-	2.21	-	-
Pot Cap-1 Maneuver	~ 196	153	610	219	127	671	837	-	-	928	-	-
Stage 1	421	461	-	414	455	-	-	-	-	-	-	-
Stage 2	644	451	-	714	398	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 182	150	610	200	125	671	837	-	-	928	-	-
Mov Cap-2 Maneuver	~ 182	150	-	200	125	-	-	-	-	-	-	-
Stage 1	417	457	-	410	450	-	-	-	-	-	-	-
Stage 2	620	446	-	672	394	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 448.8	25.7	0.1	0.1
HCM LOS	F	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	837	-	-	189	205	928	-	-
HCM Lane V/C Ratio	0.009	-	-	1.86	0.152	0.008	-	-
HCM Control Delay (s)	9.3	-	-	$ 448.8	25.7	8.9	-	-
HCM Lane LOS	A	-	-	F	D	A	-	-
HCM 95th %tile Q(veh)	0	-	-	25.5	0.5	0	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	152	2	541	138	0	0	0	0	327	35	51
Future Volume (veh/h)	0	152	2	541	138	0	0	0	0	327	35	51
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1730	1786	1647	1730	0				1647	1786	1660
Adj Flow Rate, veh/h	0	177	2	629	160	0				380	41	59
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86				0.86	0.86	0.86
Percent Heavy Veh, %	0	5	1	4	5	0				4	1	10
Cap, veh/h	0	296	3	652	1805	0				568	240	345
Arrive On Green	0.00	0.09	0.09	0.42	0.55	0.00				0.36	0.36	0.36
Sat Flow, veh/h	0	3415	38	1569	3373	0				1569	662	953
Grp Volume(v), veh/h	0	87	92	629	160	0				380	0	100
Grp Sat Flow(s),veh/h/ln	0	1643	1723	1569	1643	0				1569	0	1615
Q Serve(g_s), s	0.0	4.6	4.6	35.2	2.1	0.0				18.4	0.0	3.8
Cycle Q Clear(g_c), s	0.0	4.6	4.6	35.2	2.1	0.0				18.4	0.0	3.8
Prop In Lane	0.00		0.02	1.00		0.00				1.00		0.59
Lane Grp Cap(c), veh/h	0	146	153	652	1805	0				568	0	584
V/C Ratio(X)	0.00	0.60	0.60	0.96	0.09	0.00				0.67	0.00	0.17
Avail Cap(c_a), veh/h	0	292	306	662	2118	0				568	0	584
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.61	0.61	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	39.5	39.5	25.6	9.6	0.0				24.2	0.0	19.5
Incr Delay (d2), s/veh	0.0	3.9	3.7	19.1	0.0	0.0				3.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.9	2.0	15.3	0.7	0.0				7.0	0.0	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	43.3	43.2	44.8	9.6	0.0				27.2	0.0	19.7
LnGrp LOS	A	D	D	D	A	A				C	A	B
Approach Vol, veh/h		179			789						480	
Approach Delay, s/veh		43.2			37.6						25.6	
Approach LOS		D			D						C	

Timer - Assigned Phs		3	4		6		8					
Phs Duration (G+Y+Rc), s		41.4	12.0		36.6		53.4					
Change Period (Y+Rc), s		4.0	4.0		4.0		4.0					
Max Green Setting (Gmax), s		38.0	16.0		24.0		58.0					
Max Q Clear Time (g_c+I1), s		37.2	6.6		20.4		4.1					
Green Ext Time (p_c), s		0.2	0.5		0.7		1.0					

Intersection Summary	
HCM 6th Ctrl Delay	34.4
HCM 6th LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	111	368	0	0	654	306	25	24	769	0	0	0
Future Volume (veh/h)	111	368	0	0	654	306	25	24	769	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1478	1786	0	0	1758	1786	1262	1098	1772			
Adj Flow Rate, veh/h	121	400	0	0	711	333	27	26	836			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	21	1	0	0	3	1	33	50	2			
Cap, veh/h	145	1353	0	0	840	381	279	269	1354			
Arrive On Green	0.10	0.40	0.00	0.00	0.25	0.25	0.51	0.51	0.51			
Sat Flow, veh/h	1408	3483	0	0	3428	1514	545	525	2643			
Grp Volume(v), veh/h	121	400	0	0	711	333	53	0	836			
Grp Sat Flow(s),veh/h/ln	1408	1697	0	0	1670	1514	1071	0	1321			
Q Serve(g_s), s	7.6	7.2	0.0	0.0	18.2	19.0	2.3	0.0	20.3			
Cycle Q Clear(g_c), s	7.6	7.2	0.0	0.0	18.2	19.0	2.3	0.0	20.3			
Prop In Lane	1.00		0.00	0.00		1.00	0.51		1.00			
Lane Grp Cap(c), veh/h	145	1353	0	0	840	381	549	0	1354			
V/C Ratio(X)	0.84	0.30	0.00	0.00	0.85	0.88	0.10	0.00	0.62			
Avail Cap(c_a), veh/h	250	1885	0	0	1113	505	549	0	1354			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.71	0.71	0.00	0.00	0.93	0.93	1.00	0.00	1.00			
Uniform Delay (d), s/veh	39.6	18.4	0.0	0.0	32.0	32.3	11.3	0.0	15.6			
Incr Delay (d2), s/veh	8.7	0.1	0.0	0.0	4.5	11.9	0.1	0.0	0.9			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	2.9	2.7	0.0	0.0	7.5	7.8	0.5	0.0	5.9			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.3	18.5	0.0	0.0	36.5	44.2	11.3	0.0	16.5			
LnGrp LOS	D	B	A	A	D	D	B	A	B			
Approach Vol, veh/h		521			1044			889				
Approach Delay, s/veh		25.4			39.0			16.2				
Approach LOS		C			D			B				

Timer - Assigned Phs	2	4	7	8
Phs Duration (G+Y+Rc), s	50.1	39.9	13.3	26.6
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	32.0	50.0	16.0	30.0
Max Q Clear Time (g_c+I1), s	22.3	9.2	9.6	20.2
Green Ext Time (p_c), s	3.0	2.7	0.1	2.4

Intersection Summary	
HCM 6th Ctrl Delay	27.8
HCM 6th LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	738	127	272	103	306	49	217	157	92	340	150	437
Future Volume (veh/h)	738	127	272	103	306	49	217	157	92	340	150	437
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1588	1716	1786	1588	1646	1786	1588	1786	1744	1687	1786	1786
Adj Flow Rate, veh/h	820	141	302	114	340	54	241	174	102	378	167	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	1	6	1	1	11	1	1	1	4	1	1	1
Cap, veh/h	858	1620	1054	160	810	392	585	200	117	391	206	
Arrive On Green	0.29	0.50	0.50	0.05	0.26	0.26	0.20	0.19	0.19	0.13	0.12	0.00
Sat Flow, veh/h	2933	3260	1514	2933	3127	1514	2933	1056	619	3116	1786	1514
Grp Volume(v), veh/h	820	141	302	114	340	54	241	0	276	378	167	0
Grp Sat Flow(s),veh/h/ln	1467	1630	1514	1467	1563	1514	1467	0	1675	1558	1786	1514
Q Serve(g_s), s	32.9	2.7	2.6	4.6	10.8	2.4	8.6	0.0	19.1	14.5	10.9	0.0
Cycle Q Clear(g_c), s	32.9	2.7	2.6	4.6	10.8	2.4	8.6	0.0	19.1	14.5	10.9	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.37	1.00		1.00
Lane Grp Cap(c), veh/h	858	1620	1054	160	810	392	585	0	318	391	206	
V/C Ratio(X)	0.96	0.09	0.29	0.71	0.42	0.14	0.41	0.00	0.87	0.97	0.81	
Avail Cap(c_a), veh/h	858	1620	1054	245	810	392	585	0	602	391	597	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	41.6	15.8	2.2	55.7	36.9	18.7	41.8	0.0	47.1	52.1	51.6	0.0
Incr Delay (d2), s/veh	21.8	0.1	0.7	5.8	1.6	0.7	2.1	0.0	7.2	37.1	7.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	14.1	1.0	0.9	1.8	4.2	1.3	3.3	0.0	8.5	7.6	5.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	63.4	15.9	2.9	61.5	38.5	19.4	43.9	0.0	54.3	89.2	59.0	0.0
LnGrp LOS	E	B	A	E	D	B	D	A	D	F	E	
Approach Vol, veh/h		1263			508			517			545	A
Approach Delay, s/veh		43.6			41.6			49.5			79.9	
Approach LOS		D			D			D			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.5	63.5	27.9	17.8	39.0	35.0	19.0	26.7
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	10.0	56.0	18.0	40.0	35.0	31.0	15.0	43.0
Max Q Clear Time (g_c+I1), s	16.6	4.7	10.6	12.9	34.9	12.8	16.5	21.1
Green Ext Time (p_c), s	0.1	2.0	0.5	0.9	0.1	1.7	0.0	1.6

Intersection Summary	
HCM 6th Ctrl Delay	51.3
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	68	44	162	127	32	274	222	664	85	204	505	205
Future Volume (veh/h)	68	44	162	127	32	274	222	664	85	204	505	205
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1687	1660	1786	1687	1309	1688	1687	1786	1786	1620	1786	1744
Adj Flow Rate, veh/h	73	47	174	137	34	295	239	714	91	219	543	220
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	1	10	1	1	35	8	1	1	1	6	1	4
Cap, veh/h	227	274	245	174	184	434	157	997	608	252	847	342
Arrive On Green	0.14	0.17	0.17	0.11	0.14	0.14	0.10	0.29	0.29	0.16	0.36	0.36
Sat Flow, veh/h	1606	1577	1406	1606	1309	1430	1606	3393	1514	1543	2359	953
Grp Volume(v), veh/h	73	47	174	137	34	295	239	714	91	219	390	373
Grp Sat Flow(s),veh/h/ln	1606	1577	1406	1606	1309	1430	1606	1697	1514	1543	1697	1615
Q Serve(g_s), s	2.5	1.6	7.1	5.1	1.4	5.7	6.0	11.5	2.3	8.5	11.7	11.8
Cycle Q Clear(g_c), s	2.5	1.6	7.1	5.1	1.4	5.7	6.0	11.5	2.3	8.5	11.7	11.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.59
Lane Grp Cap(c), veh/h	227	274	245	174	184	434	157	997	608	252	609	580
V/C Ratio(X)	0.32	0.17	0.71	0.79	0.18	0.68	1.52	0.72	0.15	0.87	0.64	0.64
Avail Cap(c_a), veh/h	1258	1235	1101	472	384	653	157	997	608	252	609	580
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.7	21.5	23.9	26.7	23.2	6.6	27.6	19.4	11.7	25.0	16.4	16.4
Incr Delay (d2), s/veh	0.8	0.3	3.8	7.7	0.5	1.9	263.6	4.4	0.5	26.2	5.1	5.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.6	2.5	2.2	0.4	2.1	13.6	4.5	0.8	4.6	4.7	4.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.5	21.8	27.7	34.4	23.7	8.5	291.3	23.8	12.2	51.3	21.5	21.8
LnGrp LOS	C	C	C	C	C	A	F	C	B	D	C	C
Approach Vol, veh/h		294			466			1044			982	
Approach Delay, s/veh		25.9			17.2			84.0			28.2	
Approach LOS		C			B			F			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.0	22.0	10.6	14.7	10.0	26.0	12.7	12.6
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	10.0	18.0	18.0	48.0	6.0	22.0	48.0	18.0
Max Q Clear Time (g_c+I1), s	10.5	13.5	7.1	9.1	8.0	13.8	4.5	7.7
Green Ext Time (p_c), s	0.0	1.9	0.2	1.5	0.0	2.9	0.2	0.9

Intersection Summary	
HCM 6th Ctrl Delay	47.0
HCM 6th LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	154	1	563	0	0	0	0	710	296	52	351	0
Future Volume (veh/h)	154	1	563	0	0	0	0	710	296	52	351	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1687	396	1505				0	1632	1730	1687	1730	0
Adj Flow Rate, veh/h	179	1	655				0	826	344	60	408	0
Peak Hour Factor	0.86	0.86	0.86				0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	1	100	21				0	12	5	1	5	0
Cap, veh/h	153	1	916				0	1077	509	72	1508	0
Arrive On Green	0.41	0.41	0.41				0.00	0.35	0.35	0.04	0.46	0.00
Sat Flow, veh/h	375	2	2245				0	3181	1466	1606	3373	0
Grp Volume(v), veh/h	180	0	655				0	826	344	60	408	0
Grp Sat Flow(s),veh/h/ln	377	0	1122				0	1550	1466	1606	1643	0
Q Serve(g_s), s	24.5	0.0	14.6				0.0	14.2	12.0	2.2	4.6	0.0
Cycle Q Clear(g_c), s	24.5	0.0	14.6				0.0	14.2	12.0	2.2	4.6	0.0
Prop In Lane	0.99		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	154	0	916				0	1077	509	72	1508	0
V/C Ratio(X)	1.17	0.00	0.72				0.00	0.77	0.68	0.84	0.27	0.00
Avail Cap(c_a), veh/h	154	0	916				0	1343	635	161	1972	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	0.75	0.75	0.96	0.96	0.00
Uniform Delay (d), s/veh	17.8	0.0	14.9				0.0	17.4	16.7	28.4	10.0	0.0
Incr Delay (d2), s/veh	125.6	0.0	4.8				0.0	1.6	1.5	20.8	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.2	0.0	3.8				0.0	4.5	3.6	1.2	1.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	143.3	0.0	19.6				0.0	19.0	18.2	49.2	10.1	0.0
LnGrp LOS	F	A	B				A	B	B	D	B	A
Approach Vol, veh/h		835						1170			468	
Approach Delay, s/veh		46.3						18.8			15.1	
Approach LOS		D						B			B	

Timer - Assigned Phs		2		4			7	8				
Phs Duration (G+Y+Rc), s		28.5		31.5			6.7	24.9				
Change Period (Y+Rc), s		4.0		4.0			4.0	4.0				
Max Green Setting (Gmax), s		16.0		36.0			6.0	26.0				
Max Q Clear Time (g_c+I1), s		26.5		6.6			4.2	16.2				
Green Ext Time (p_c), s		0.0		2.6			0.0	4.6				

Intersection Summary												
HCM 6th Ctrl Delay			27.4									
HCM 6th LOS			C									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	288	5	33	606	258	0	0	115	52
Future Volume (veh/h)	0	0	0	288	5	33	606	258	0	0	115	52
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1634	1786	1786	1554	1772	0	0	1772	1786
Adj Flow Rate, veh/h				335	6	38	705	300	0	0	134	60
Peak Hour Factor				0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %				5	1	1	11	2	0	0	2	1
Cap, veh/h				1207	84	534	766	827	0	0	449	202
Arrive On Green				0.40	0.40	0.40	0.27	0.47	0.00	0.00	0.13	0.13
Sat Flow, veh/h				3018	211	1335	2871	1772	0	0	3455	1514
Grp Volume(v), veh/h				335	0	44	705	300	0	0	134	60
Grp Sat Flow(s),veh/h/ln				1509	0	1546	1436	1772	0	0	1683	1514
Q Serve(g_s), s				4.5	0.0	1.1	14.3	6.5	0.0	0.0	2.2	0.8
Cycle Q Clear(g_c), s				4.5	0.0	1.1	14.3	6.5	0.0	0.0	2.2	0.8
Prop In Lane				1.00		0.86	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				1207	0	618	766	827	0	0	449	202
V/C Ratio(X)				0.28	0.00	0.07	0.92	0.36	0.00	0.00	0.30	0.30
Avail Cap(c_a), veh/h				1207	0	618	766	1063	0	0	898	404
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.64	0.64	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				12.1	0.0	11.1	21.4	10.3	0.0	0.0	23.5	3.5
Incr Delay (d2), s/veh				0.1	0.0	0.0	11.6	0.2	0.0	0.0	0.4	0.8
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				1.4	0.0	0.3	5.4	2.0	0.0	0.0	0.8	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				12.3	0.0	11.2	32.9	10.4	0.0	0.0	23.8	4.3
LnGrp LOS				B	A	B	C	B	A	A	C	A
Approach Vol, veh/h					379			1005			194	
Approach Delay, s/veh					12.1			26.2			17.8	
Approach LOS					B			C			B	

Timer - Assigned Phs	2	3	4			8
Phs Duration (G+Y+Rc), s	28.0	20.0	12.0			32.0
Change Period (Y+Rc), s	4.0	4.0	4.0			4.0
Max Green Setting (Gmax), s	16.0	16.0	16.0			36.0
Max Q Clear Time (g_c+I1), s	6.5	16.3	4.2			8.5
Green Ext Time (p_c), s	1.0	0.0	0.7			1.7

Intersection Summary	
HCM 6th Ctrl Delay	21.8
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	96	32	35	524	426	105
Future Vol, veh/h	96	32	35	524	426	105
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	300	-	-	150
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	1	1	1	3	5	1
Mvmt Flow	107	36	39	582	473	117

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	842	237	590	0	-	0
Stage 1	473	-	-	-	-	-
Stage 2	369	-	-	-	-	-
Critical Hdwy	6.82	6.92	4.12	-	-	-
Critical Hdwy Stg 1	5.82	-	-	-	-	-
Critical Hdwy Stg 2	5.82	-	-	-	-	-
Follow-up Hdwy	3.51	3.31	2.21	-	-	-
Pot Cap-1 Maneuver	305	768	988	-	-	-
Stage 1	596	-	-	-	-	-
Stage 2	673	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	293	768	988	-	-	-
Mov Cap-2 Maneuver	293	-	-	-	-	-
Stage 1	573	-	-	-	-	-
Stage 2	673	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	20.6	0.6	0
HCM LOS	C		

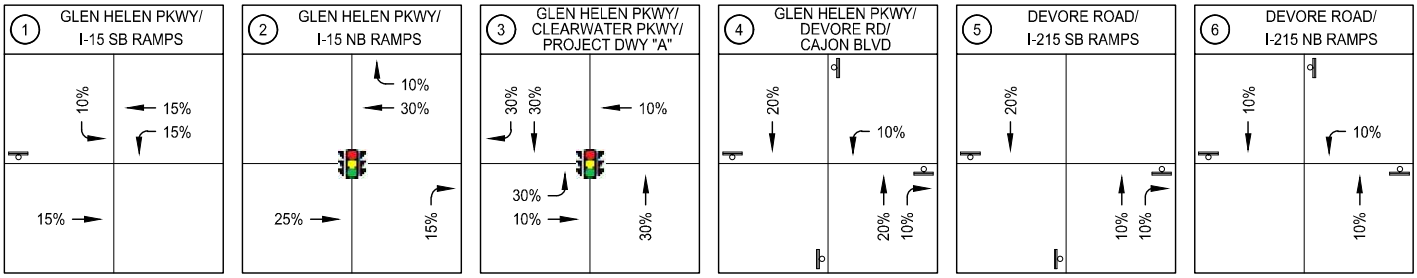
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	988	-	293	768	-	-
HCM Lane V/C Ratio	0.039	-	0.364	0.046	-	-
HCM Control Delay (s)	8.8	-	24.2	9.9	-	-
HCM Lane LOS	A	-	C	A	-	-
HCM 95th %tile Q(veh)	0.1	-	1.6	0.1	-	-

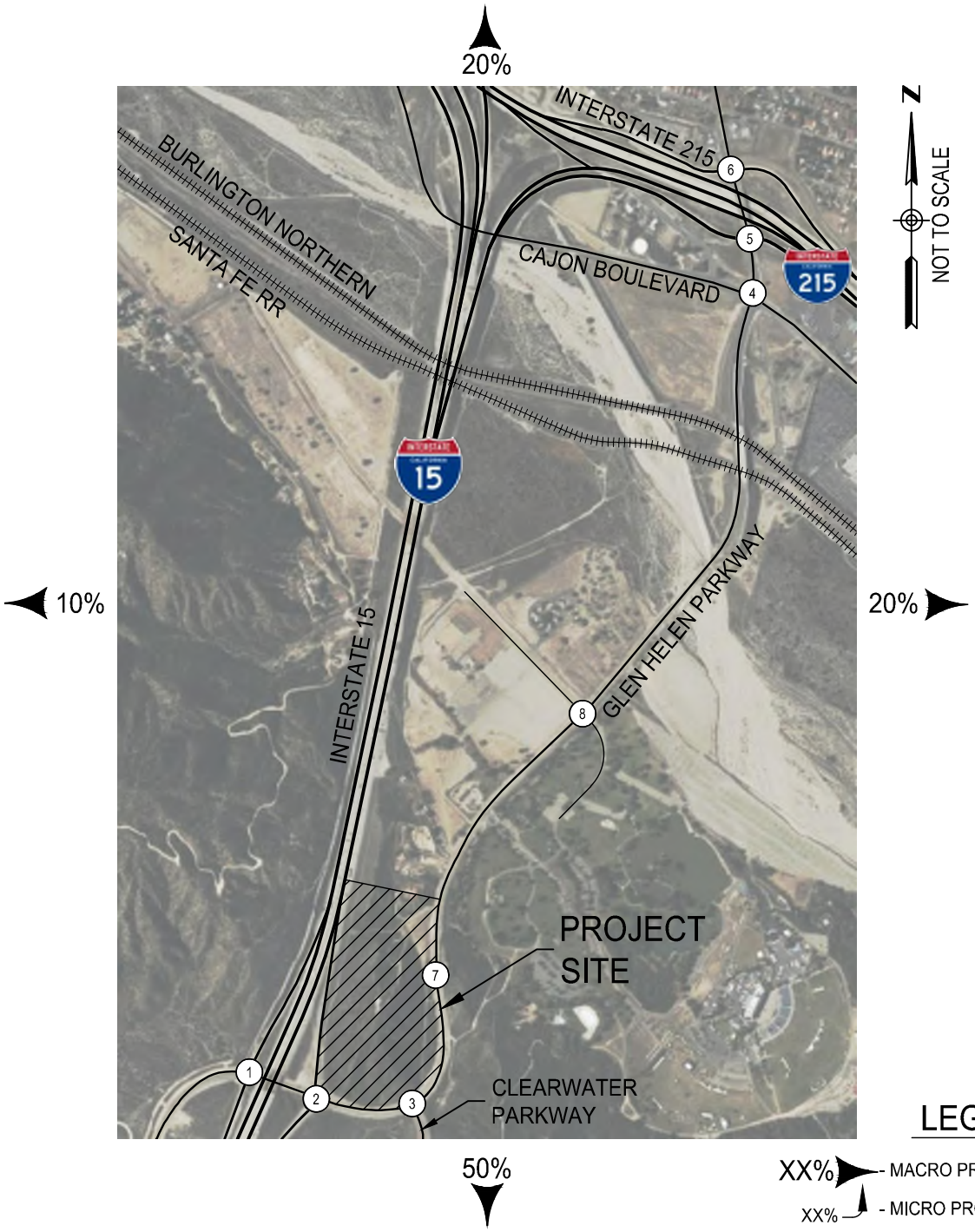
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	300	7	20	15	7	7	7	610	7	7	466	263
Future Volume (veh/h)	300	7	20	15	7	7	7	610	7	7	466	263
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1786	1786	1786	1786	1786	1786	1786	1786	1786	1786	1786	1786
Adj Flow Rate, veh/h	323	8	22	16	8	8	8	656	8	8	501	283
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	403	10	27	49	25	25	14	1043	465	14	643	362
Arrive On Green	0.26	0.26	0.26	0.06	0.06	0.06	0.01	0.31	0.31	0.01	0.31	0.31
Sat Flow, veh/h	1546	38	105	835	417	417	1701	3393	1514	1701	2093	1178
Grp Volume(v), veh/h	353	0	0	32	0	0	8	656	8	8	406	378
Grp Sat Flow(s),veh/h/ln	1690	0	0	1669	0	0	1701	1697	1514	1701	1697	1574
Q Serve(g_s), s	8.6	0.0	0.0	0.8	0.0	0.0	0.2	7.3	0.2	0.2	9.6	9.6
Cycle Q Clear(g_c), s	8.6	0.0	0.0	0.8	0.0	0.0	0.2	7.3	0.2	0.2	9.6	9.6
Prop In Lane	0.92		0.06	0.50		0.25	1.00		1.00	1.00		0.75
Lane Grp Cap(c), veh/h	441	0	0	98	0	0	14	1043	465	14	521	484
V/C Ratio(X)	0.80	0.00	0.00	0.33	0.00	0.00	0.56	0.63	0.02	0.56	0.78	0.78
Avail Cap(c_a), veh/h	616	0	0	608	0	0	232	1237	552	232	618	574
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.2	0.0	0.0	19.8	0.0	0.0	21.7	13.1	10.6	21.7	13.8	13.9
Incr Delay (d2), s/veh	5.1	0.0	0.0	1.9	0.0	0.0	29.4	0.8	0.0	29.4	5.3	5.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	0.0	0.0	0.3	0.0	0.0	0.2	2.2	0.0	0.2	3.5	3.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.3	0.0	0.0	21.7	0.0	0.0	51.1	13.8	10.6	51.1	19.2	19.7
LnGrp LOS	C	A	A	C	A	A	D	B	B	D	B	B
Approach Vol, veh/h		353			32			672			792	
Approach Delay, s/veh		20.3			21.7			14.2			19.7	
Approach LOS		C			C			B			B	

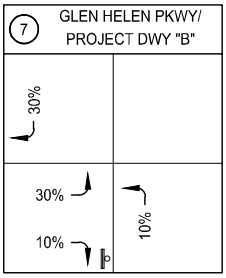
Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.4	17.5		15.5	4.4	17.5		6.6
Change Period (Y+Rc), s	4.0	4.0		4.0	4.0	4.0		4.0
Max Green Setting (Gmax), s	6.0	16.0		16.0	6.0	16.0		16.0
Max Q Clear Time (g_c+I1), s	2.2	9.3		10.6	2.2	11.6		2.8
Green Ext Time (p_c), s	0.0	2.3		1.0	0.0	1.9		0.1

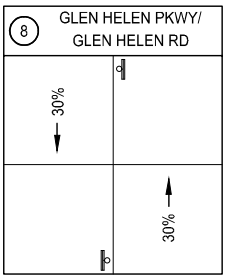
Intersection Summary	
HCM 6th Ctrl Delay	17.9
HCM 6th LOS	B

Appendix D: Project Trip Distribution and Assignment









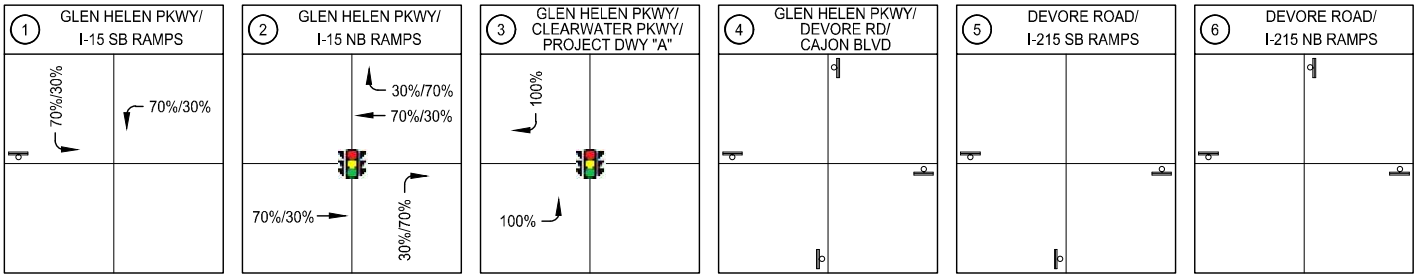
LEGEND

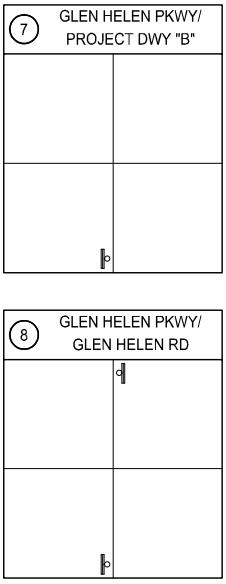
- XX% - MACRO PROJECT TRIP DISTRIBUTION
- XX% - MICRO PROJECT TRIP PERCENTAGE
- # - STUDY INTERSECTIONS
- STOP CONTROLLED INTERSECTION
- SIGNAL CONTROLLED INTERSECTION

DAVID EVANS AND ASSOCIATES INC.

FIGURE D1: PRIMARY PROJECT TRIP DISTRIBUTION
COMMERCIAL DEVELOPMENT IN GLEN HELEN
SAN BERNARDINO COUNTY, CALIFORNIA

Drawing Name: P:\UUCRG2151T00030\0400CAD\TT\EXHIBITS\Traffic Study\Figure D1.dwg
Last Opened: Apr 06, 2023 - 5:41pm by: heay





N
NOT TO SCALE

LEGEND

XX% / XX% - SPECIFIC DIVERTED LINK PROJECT AM/PM PEAK TRIP DISTRIBUTION

(#) - STUDY INTERSECTIONS

- STOP CONTROLLED INTERSECTION

- SIGNAL CONTROLLED INTERSECTION

DAVID EVANS AND ASSOCIATES INC.

FIGURE D2: DIVERTED-LINK PROJECT TRIP DISTRIBUTION
COMMERCIAL DEVELOPMENT IN GLEN HELEN
SAN BERNARDINO COUNTY, CALIFORNIA

Drawing Name: P:\UUCRG215T00003\0400CAD\TT\EXHIBITS\Traffic Study\Figure D2.dwg
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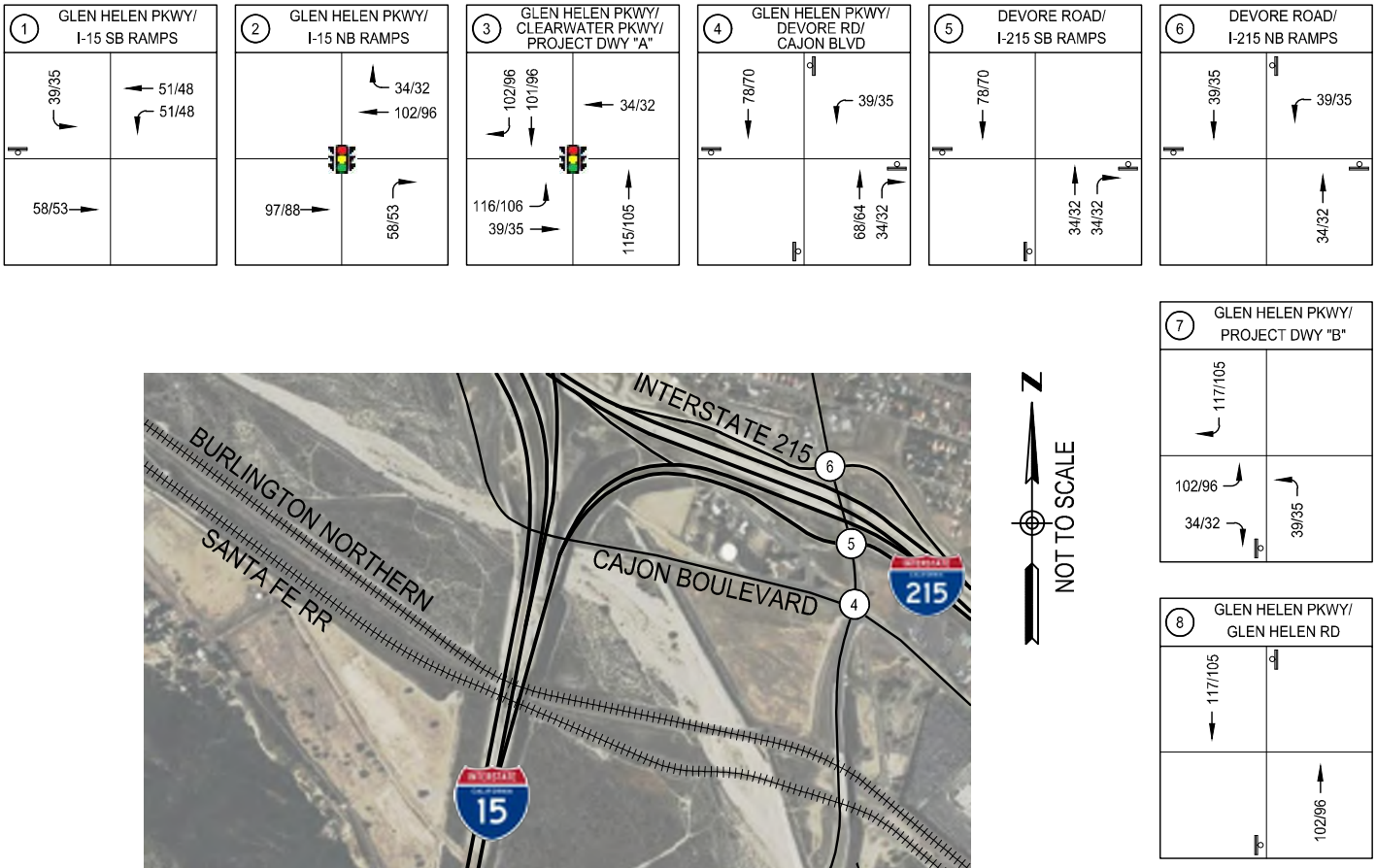

BALANCED PRIMARY PROJECT TRIPS

AM PEAK HOUR TRIPS - 381 IN / 334 OUT
PM PEAK HOUR TRIPS - 349 IN / 320 OUT

LEGEND

XX/XX - AM/PM PRIMARY PROJECT TRIPS
(#) - STUDY INTERSECTIONS
- STOP CONTROLLED INTERSECTION
- SIGNAL CONTROLLED INTERSECTION

DAVID EVANS AND ASSOCIATES INC.

FIGURE D3: BALANCED PRIMARY PROJECT TRIPS
COMMERCIAL DEVELOPMENT IN GLEN HELEN
SAN BERNARDINO COUNTY, CALIFORNIA

Drawing Name: P:\UUCRG215T00030\0400CAD\TT\EXHIBITS\Traffic Study\Figure D3.dwg
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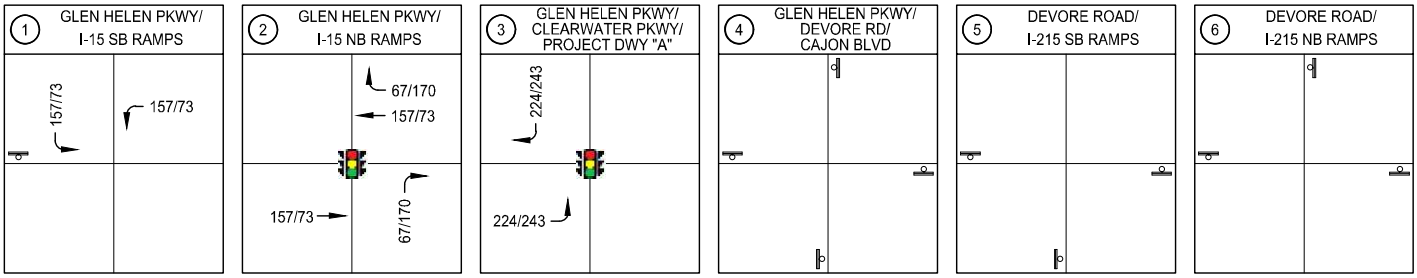
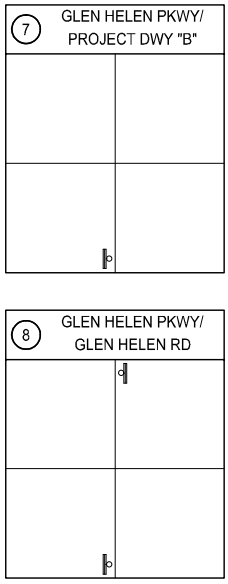




DIVERTED-LINK PROJECT TRIPS

AM PEAK HOUR TRIPS - 224 IN / 224 OUT
PM PEAK HOUR TRIPS - 243 IN / 243 OUT

Note: the assignment of diverted link trips is balanced and adjusted so the trips entering the project site equal the trips exiting the site. Because of these adjustments, the diverted link trips in this figure do not precisely match the diverted link trips in Table 5-1 (Estimated Project Trip Generation) and, in fact, are slightly higher.

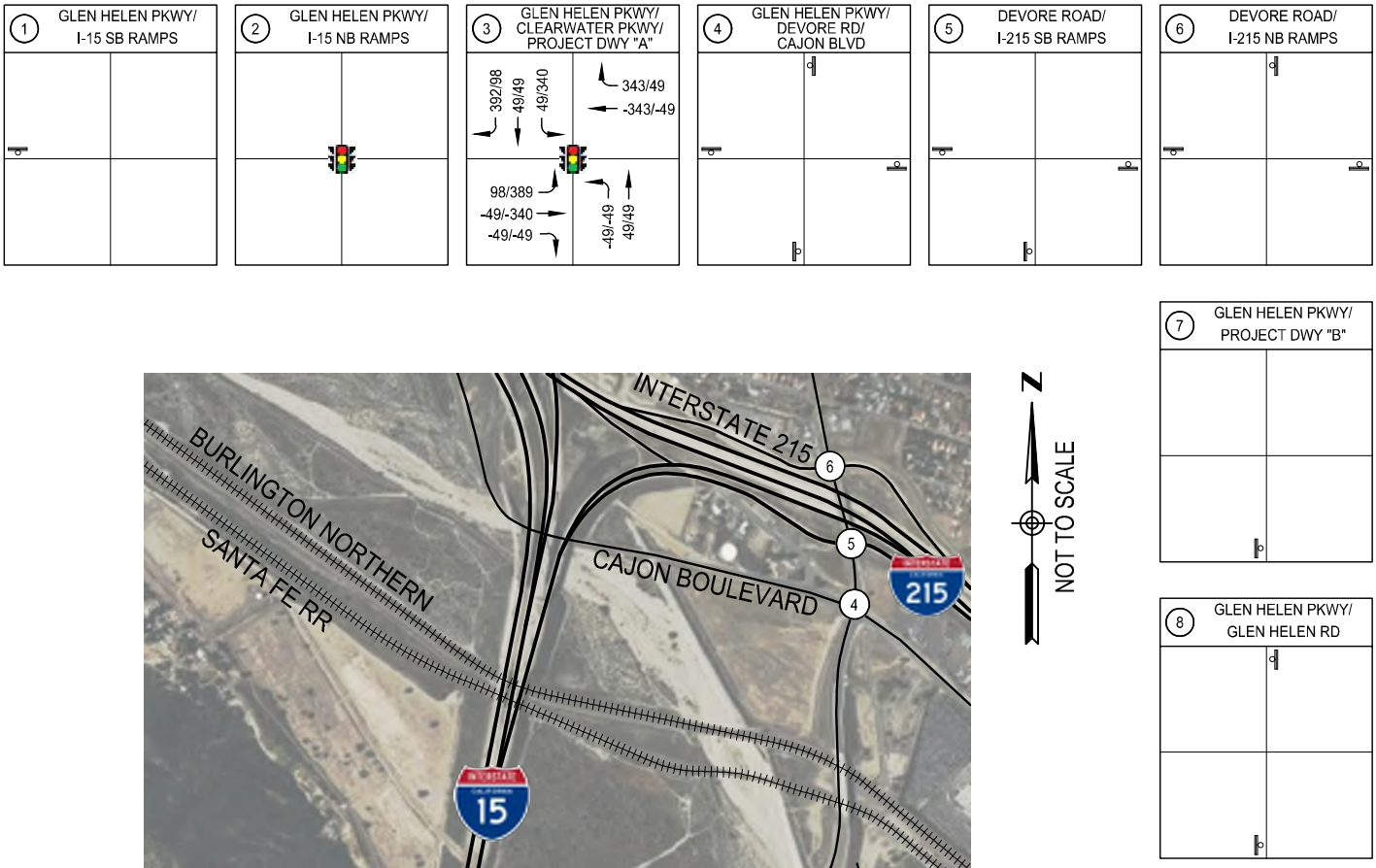
LEGEND

XX/XX - AM/PM DIVERTED-LINK PROJECT TRIPS
(#) - STUDY INTERSECTIONS
- STOP CONTROLLED INTERSECTION
- SIGNAL CONTROLLED INTERSECTION

DAVID EVANS AND ASSOCIATES INC.

FIGURE D4: BALANCED DIVERTED-LINK PROJECT TRIPS
COMMERCIAL DEVELOPMENT IN GLEN HELEN
SAN BERNARDINO COUNTY, CALIFORNIA

Drawing Name: P:\UU\CRG215T00030\0400CAD\TT\EXHIBITS\Traffic Study\Figure D4.dwg
Last Opened: Apr 06, 2023 - 5:41pm by: heay



PASS-BY PROJECT TRIPS

AM PEAK HOUR TRIPS - 490 IN / 490 OUT
PM PEAK HOUR TRIPS - 487 IN / 487 OUT

Note: the assignment of pass-by trips is balanced and adjusted so the trips entering the project site equal the trips exiting the site. Because of these adjustments, the pass-by trips in this figure do not precisely match the pass-by trips in Table 5-1 (Estimated Project Trip Generation) and, in fact, are slightly higher.

LEGEND

XX/XX - AM/PM PASS-BY PROJECT TRIPS

(#) - STUDY INTERSECTIONS

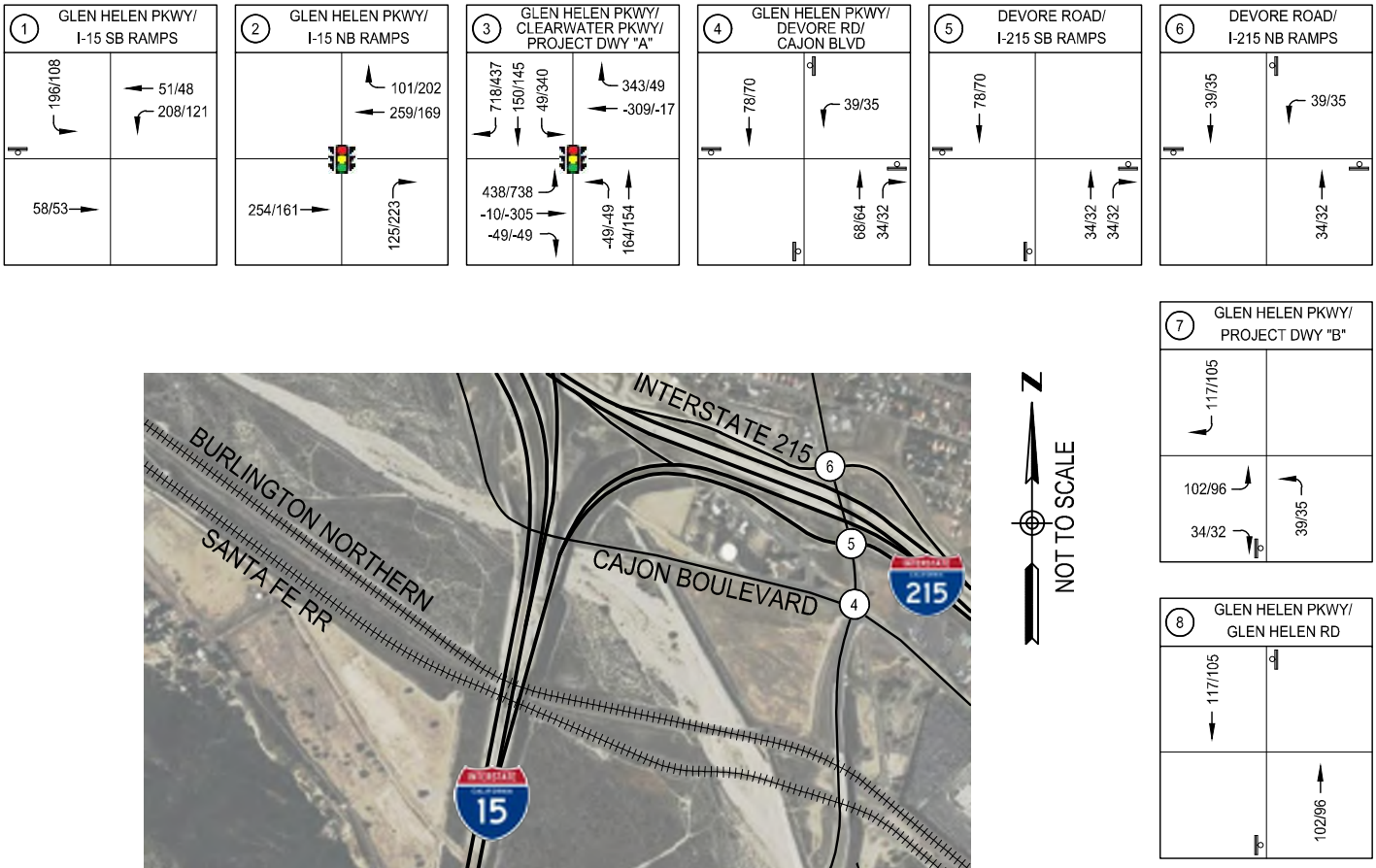
- STOP CONTROLLED INTERSECTION

- SIGNAL CONTROLLED INTERSECTION

DAVID EVANS AND ASSOCIATES INC.

FIGURE D5: PASS-BY PROJECT TRIPS
COMMERCIAL DEVELOPMENT IN GLEN HELEN
SAN BERNARDINO COUNTY, CALIFORNIA

Drawing Name: P:\UU\CRG215T00003\0400CAD\TT\EXHIBITS\Traffic Study\Figure D5.dwg
Last Opened: Apr 06, 2023 - 5:41pm by: heay



TOTAL PROJECT TRIPS

AM PEAK HOUR TRIPS - 1,101 IN / 1,053 OUT
PM PEAK HOUR TRIPS - 1,081 IN / 1,050 OUT

Note: the assignment of primary, diverted link, and pass-by trips is balanced between adjacent intersections and diverted link, and pass-by trip are adjusted so that trips entering the project site equal the trips exiting the site. Because of the balancing steps and adjustments the total project trips in this figure do not match the total project volumes in Table 5-1 (Estimated Project Trip Generation) and, in fact, are slightly higher.

LEGEND

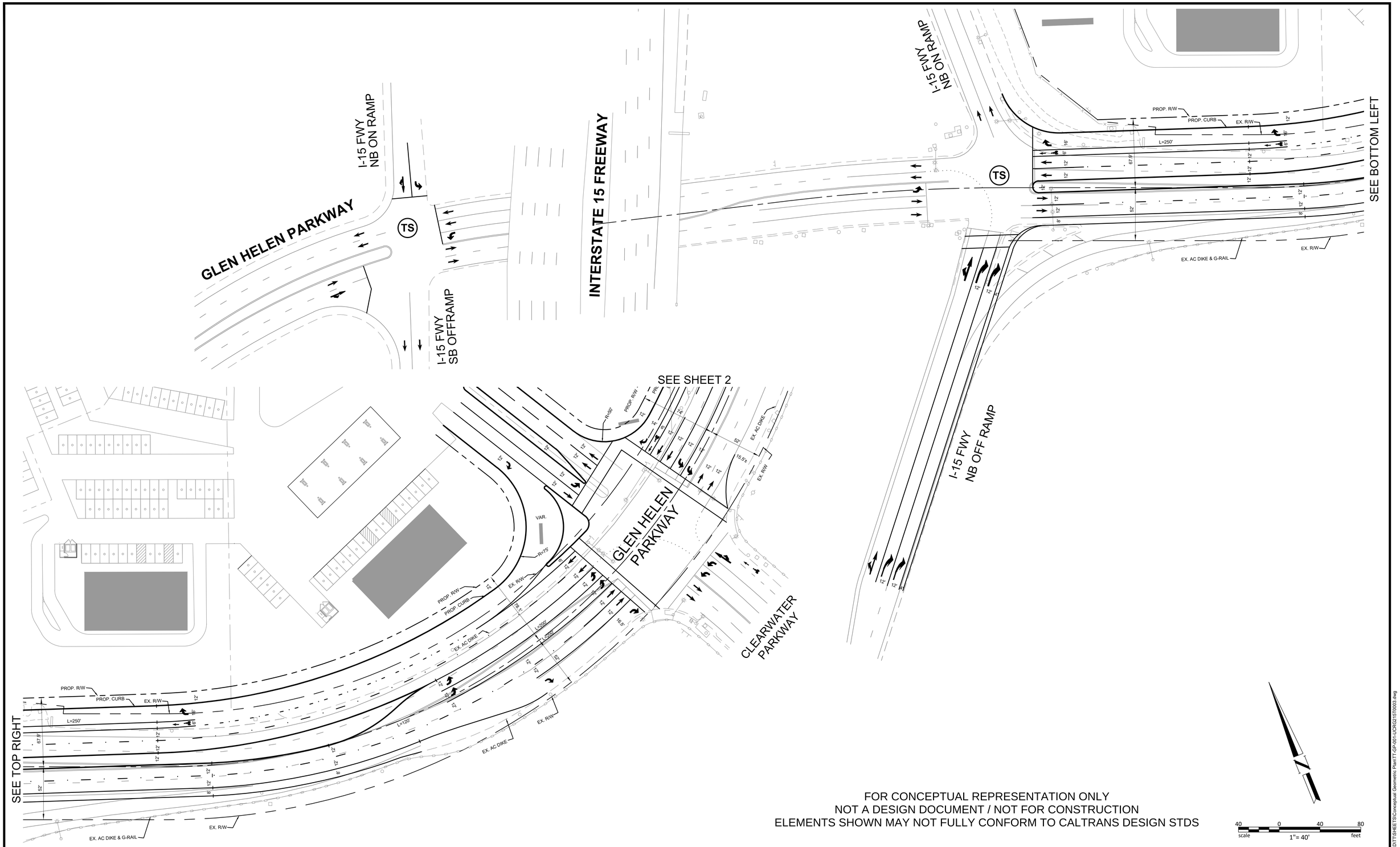
XX/XX - AM/PM TOTAL PROJECT TRIPS
(#) - STUDY INTERSECTIONS
- STOP CONTROLLED INTERSECTION
- SIGNAL CONTROLLED INTERSECTION

DAVID EVANS AND ASSOCIATES INC.

FIGURE D6: TOTAL PROJECT TRIPS
COMMERCIAL DEVELOPMENT IN GLEN HELEN
SAN BERNARDINO COUNTY, CALIFORNIA

Drawing Name: P:\UU\CRG215T00030\0400CAD\TT\EXHIBITS\Traffic Study\Figure D6.dwg
Last Opened: Apr 06, 2023 - 5:41pm by: heay

Appendix E: Glen Helen Parkway Conceptual Geometric Plans and Truck Turning Templates



FOR CONCEPTUAL REPRESENTATION ONLY
NOT A DESIGN DOCUMENT / NOT FOR CONSTRUCTION
ELEMENTS SHOWN MAY NOT FULLY CONFORM TO CALTRANS DESIGN STDS

40 0 40 80
scale 1"= 40' feet

811 Know what's below. Call 811 before you dig

NO.	DESCRIPTION	DATE	BY
	REVISONS		

DAVID EVANS AND ASSOCIATES INC.
18484 Outer Highway 18 North Suite 225
Apple Valley California 92307
Phone: 760.524.9100

PREPARED UNDER THE SUPERVISION OF:

ROBERT A. KILPATRICK R.C.E. 42386 DATE:

SAN BERNARDINO COUNTY

GLEN HELEN PARKWAY AND INTERSTATE 15 FREEWAY

DRAWN BY: JFA
DESIGNED BY: RAK
CHECKED BY: RAK

CONCEPTUAL GEOMETRIC PLAN

JOB NO. UCRG215T0003
DATE: 11-01-203
SHT NO.: 1 OF 2

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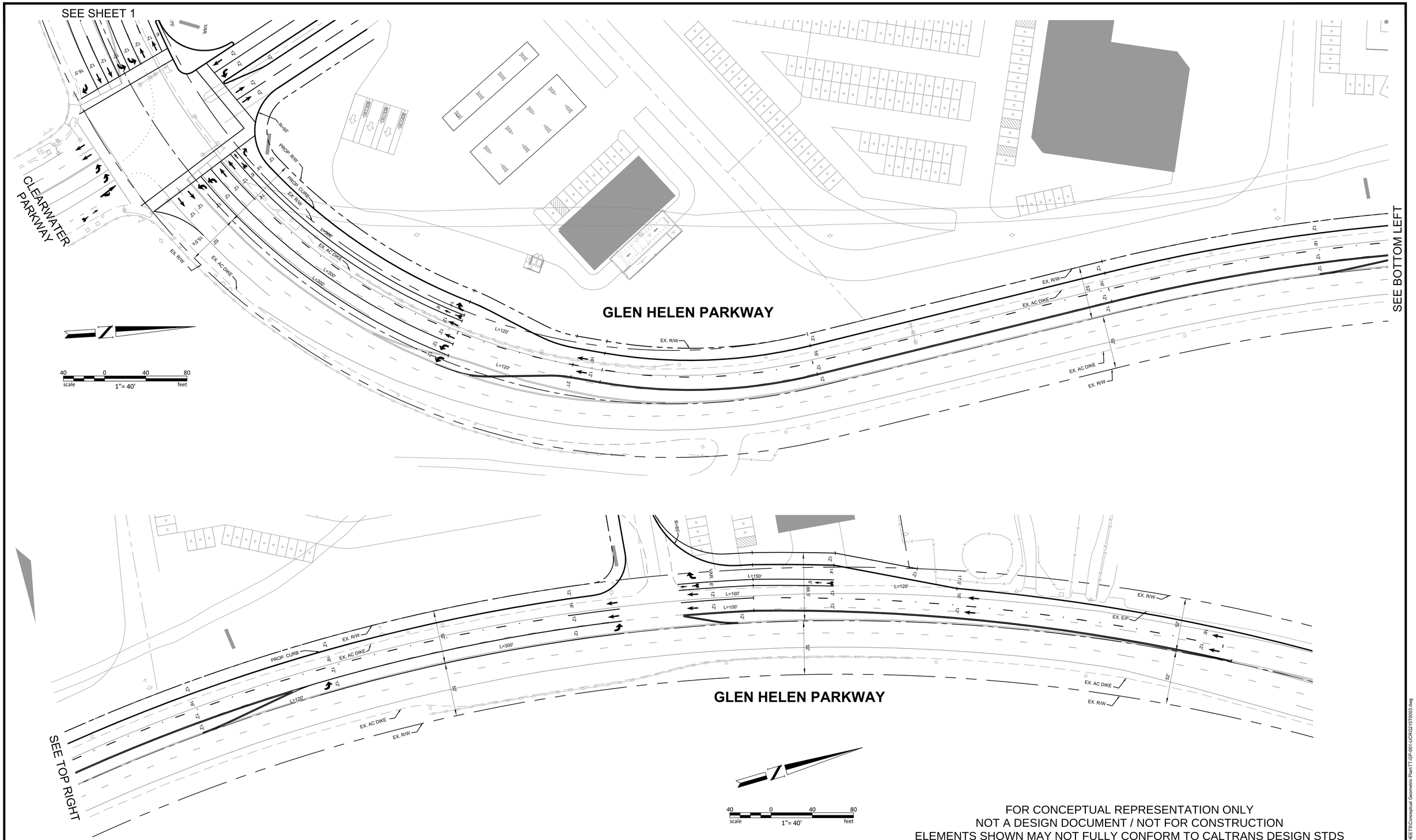

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ELEMENTS SHOWN MAY NOT FULLY CONFORM TO CALTRANS DESIGN STDS

811 Know what's below. Call 811 before you dig

NO.	DESCRIPTION	DATE	BY

REVISONS

DAVID EVANS AND ASSOCIATES INC.
18484 Outer Highway 18 North Suite 225
Apple Valley California 92307
Phone: 760.524.9100

PREPARED UNDER THE SUPERVISION OF:

ROBERT A. KILPATRICK R.C.E. 42386 DATE:

SAN BERNARDINO COUNTY

GLEN HELEN PARKWAY AND INTERSTATE 15 FREEWAY

DRAWN BY: JFA
DESIGNED BY: RAK
CHECKED BY: RAK

CONCEPTUAL GEOMETRIC PLAN

JOB NO. UCRG215T0003
DATE: 11-01-203
SHT NO.: 2 OF 2

Drawing Name: P:\UCRG215T0003\0200\ADMIN\SHEETS\Conceptual Geometric Plan\TT-GP-001-UCRG215T0003.dwg
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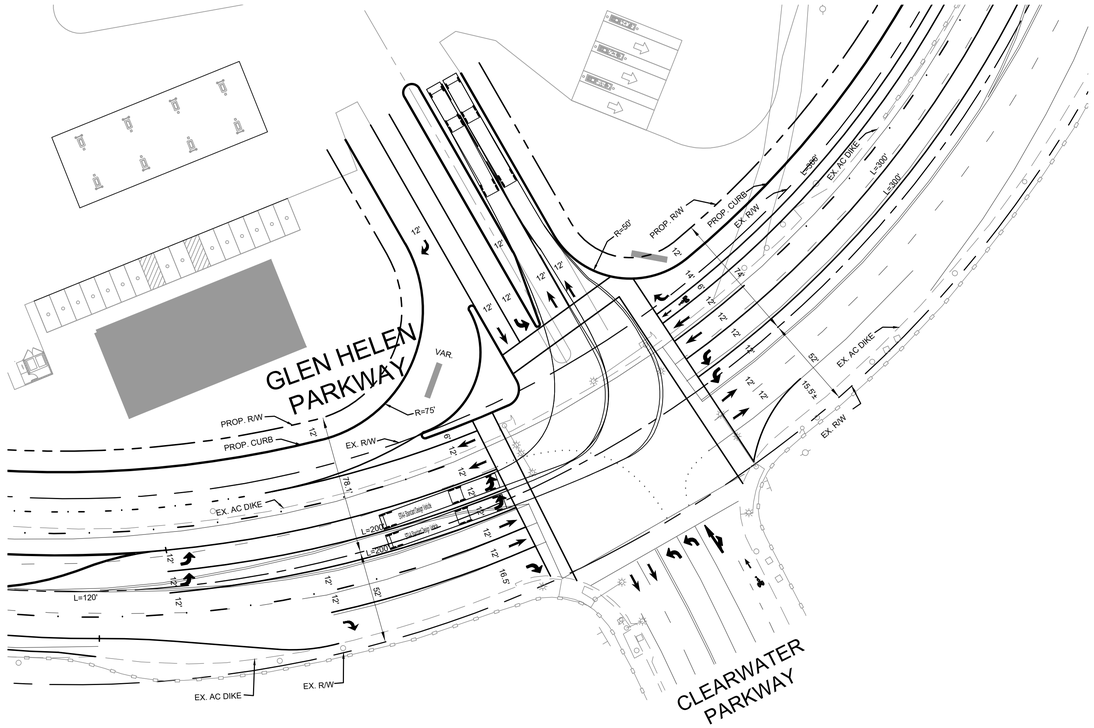
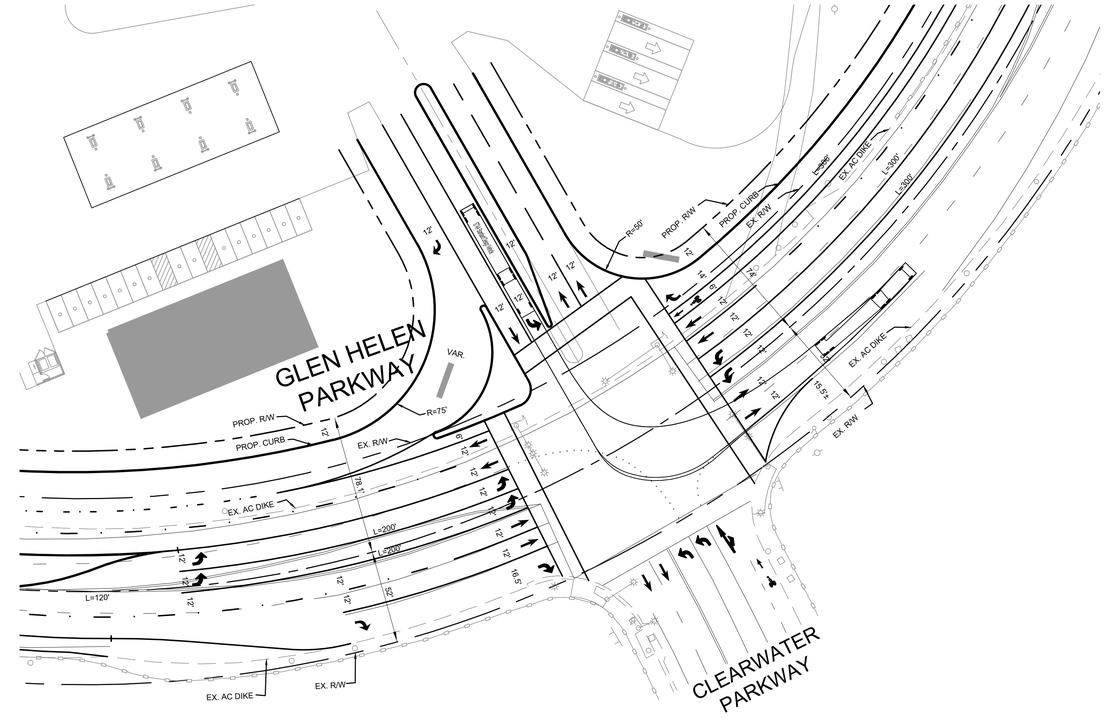
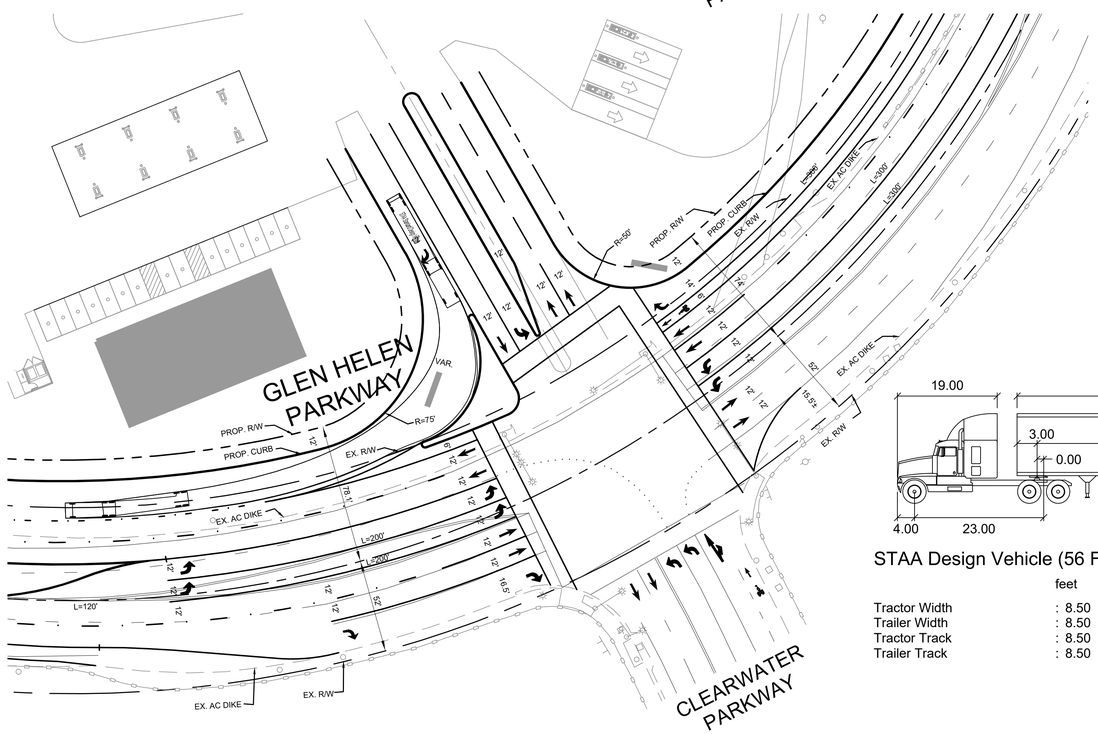
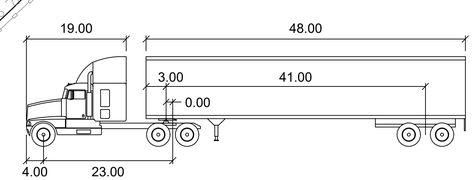




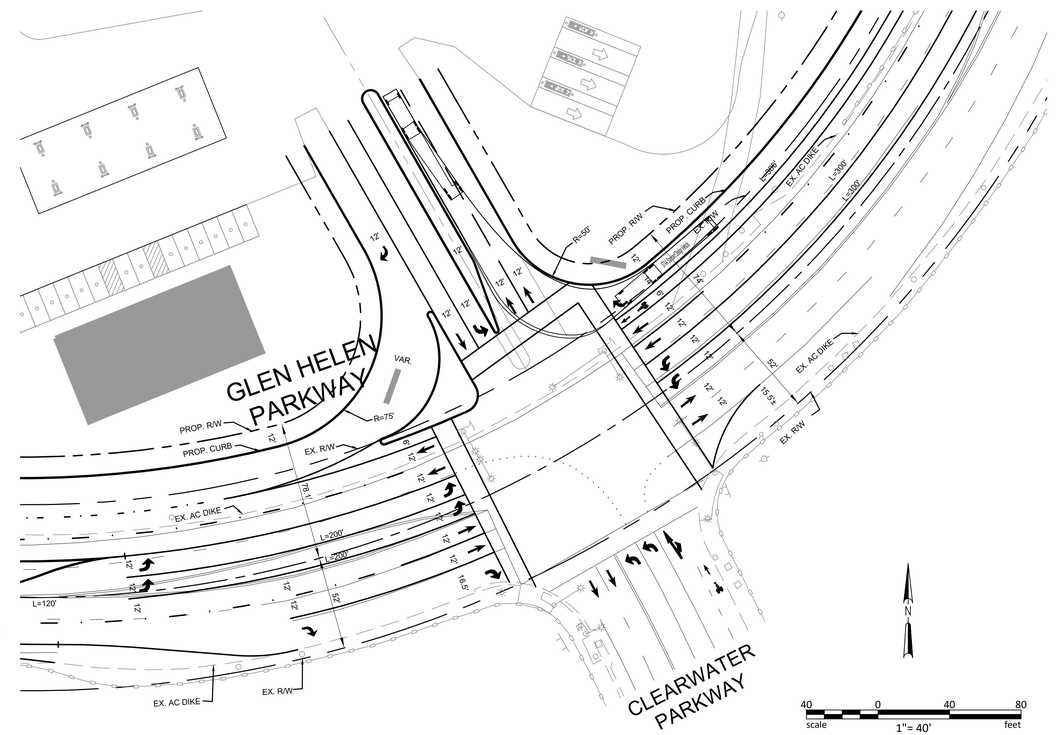




STAA Design Vehicle (56 FT RADIUS)

feet

Tractor Width	: 8.50	Lock to Lock Time	: 6.0
Trailer Width	: 8.50	Steering Angle	: 26.1
Tractor Track	: 8.50	Articulating Angle	: 70.0
Trailer Track	: 8.50		



N

40 0 40 80
scale 1"= 40' feet

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REVISONS

DAVID EVANS AND ASSOCIATES INC.

18484 Outer Highway 18 North Suite 225
Apple Valley California 92307
Phone: 760.524.9100

PREPARED UNDER THE SUPERVISION OF:

ROBERT A. KILPATRICK R.C.E. 42386 DATE:

SAN BERNARDINO COUNTY

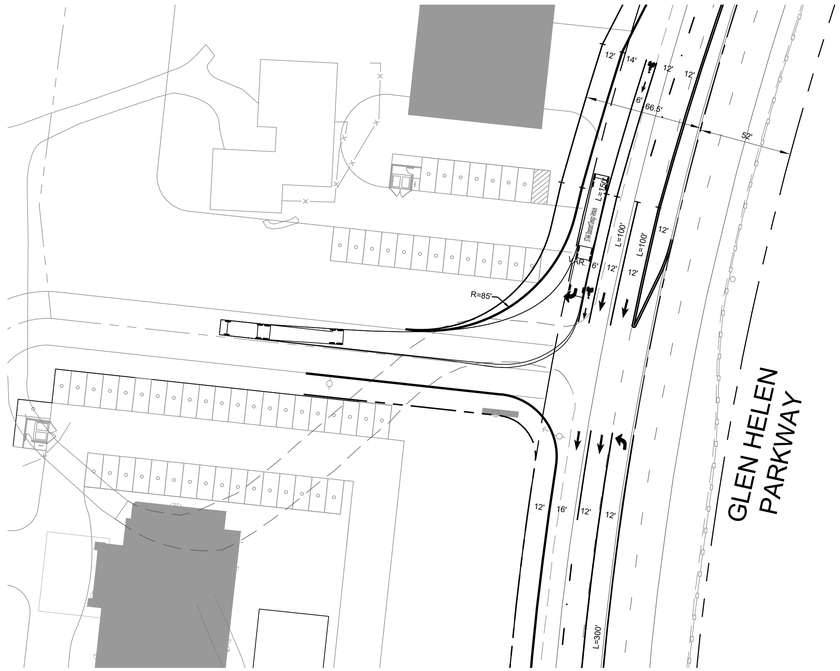
GLEN HELEN PARKWAY AND INTERSTATE 15 FREEWAY

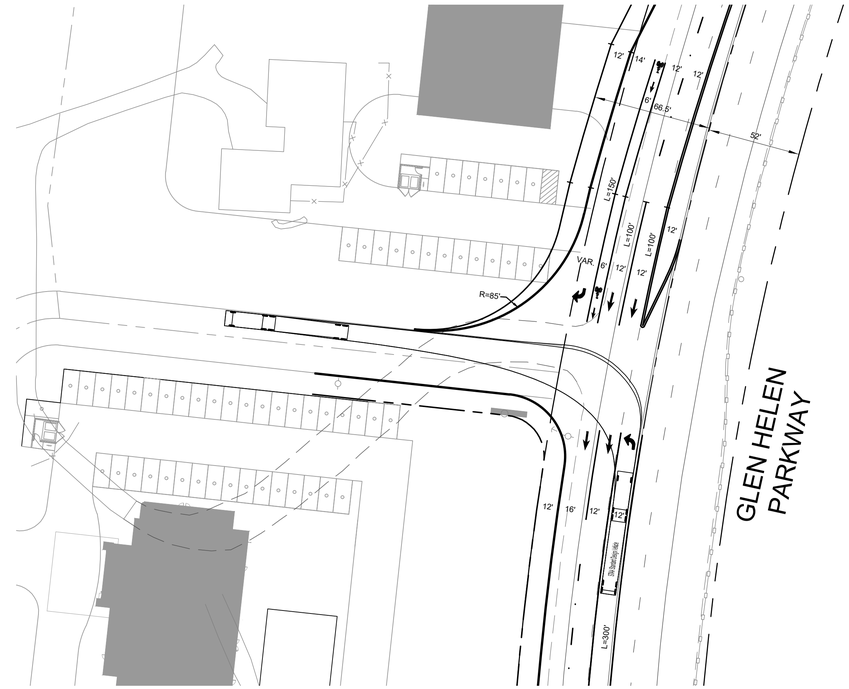
TRUCK TURNING TEMPLATE

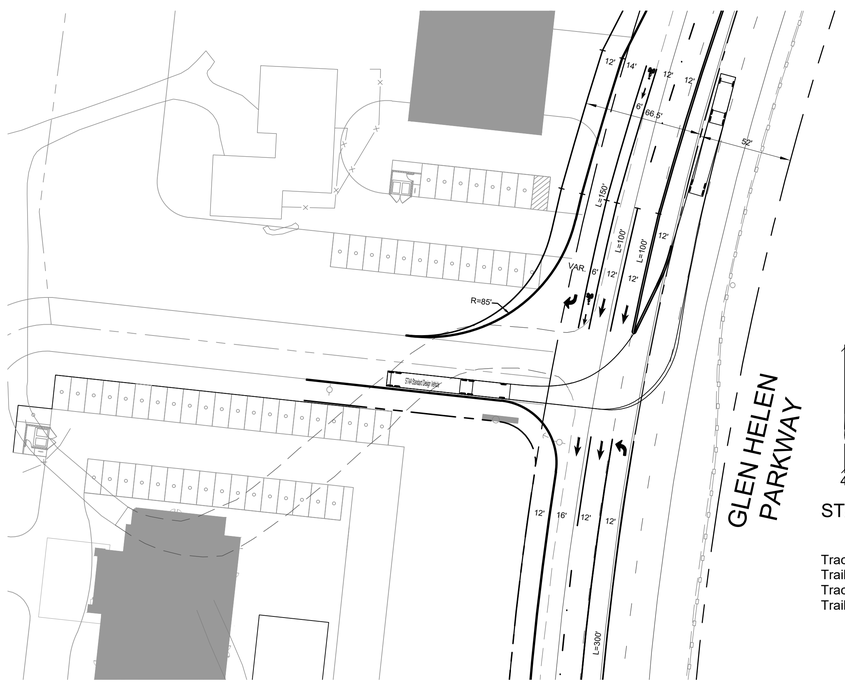
DRAWN BY: JFA
DESIGNED BY: RAK
CHECKED BY: RAK

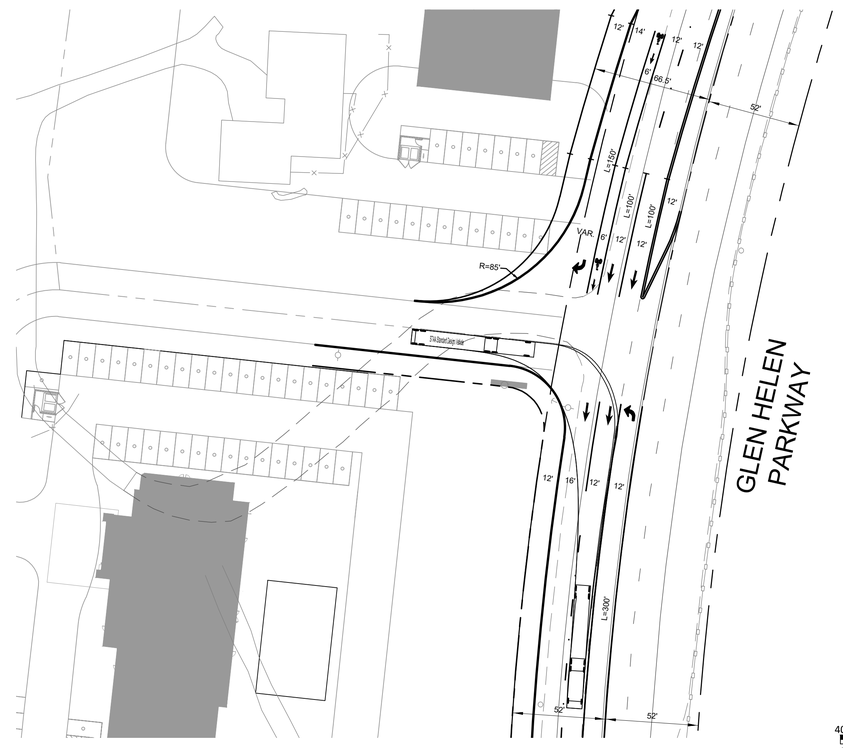
JOB NO. UCRG215T0003
DATE: 11-01-203
SHT NO.: 1 OF 2

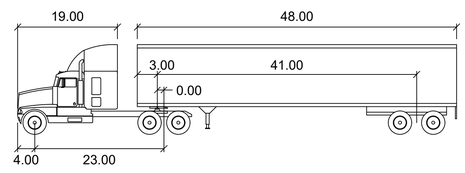
Drawing Name: P:\UCRG215T0003\0000\CADD\TT\SHEETS\Conceptual Geometric Plan\TT-TRUCK TURN-001-UCRG215T0003.dwg
Last Opened: Nov 01, 2023 - 1:21pm By: JFA











STAA Design Vehicle (56 FT RADIUS)

	feet		
Tractor Width	: 8.50	Lock to Lock Time	: 6.0
Trailer Width	: 8.50	Steering Angle	: 26.1
Tractor Track	: 8.50	Articulating Angle	: 70.0
Trailer Track	: 8.50		

N

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scale 1"= 40' feet

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PREPARED UNDER THE SUPERVISION OF:

ROBERT A. KILPATRICK R.C.E. 42386 DATE:

SAN BERNARDINO COUNTY

GLEN HELEN PARKWAY AND INTERSTATE 15 FREEWAY

TRUCK TURNING TEMPLATE

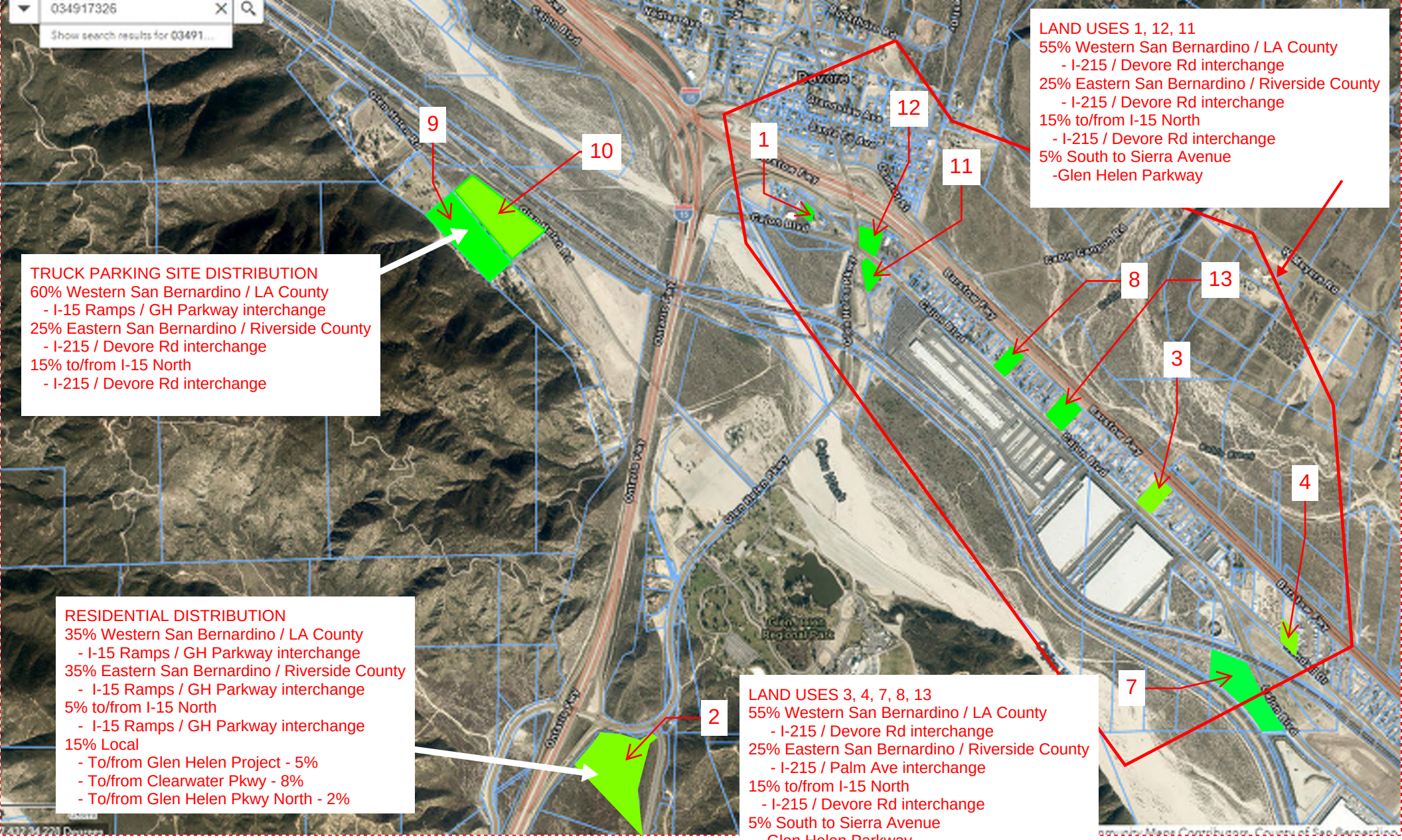
DRAWN BY: JFA
DESIGNED BY: RAK
CHECKED BY: RAK
JOB NO. UCRG215T0003
DATE: 11-01-203
SHT NO.: 2 OF 2

Drawing Name: P:\UCRG215T0003\DEC\DJT\SHEETS\Conceptual Geometric Plan\TT-TRUCK TURN-001-UCRG215T0003.dwg
Last Opened: Nov 01, 2023 - 1:20pm By: jfa

Appendix F: Cumulative Development Project Descriptions and Estimated Trip Generation

LIST OF CUMULATIVE DEVELOPMENT PROJECTS

County Project Numbver	Assessors Parcel Numbers	Project Description	Project Address	Application Status	Map Index	Trip Generation
PROJ-2019-00015	34917326	MINOR USE PERMIT - PROPOSED RESTAURANT - TONY'S DINER (ASSUME 2,500 SF OF HIGH TURNOVER SIT-DOWN RESTAURANT)	18355 CAJON CT, DEVORE, CA 92407	IN REVIEW	1	SEE TABLE G
PROJ-2021-00148	0239-031-52	175 SINGLE FAMILY DWELLING UNITS	See map in workheet #2	APPROVED	2	SEE TABLE H
PROJ-2020-00229	034814219, 034814218	A MINOR USE PERMIT REQUEST FOR A PALLET MANUFACTURING YARD LOCATED AT 19042 KENDALL AVENUE IN THE GLENN HELEN SPECIFIC PLAN, CORRIDOR INDUSTRIAL (GHPS-CI) AND CITY OF SAN BERNARDINO SPHERE OF INFLUENCE.	19042 CAJON BLVD, DEVORE, CA 92407	IN REVIEW	3	SEE TABLE I
PROJ-2020-00232	26111108	CONCURRENT FILING - MINOR USE PERMIT AND LOT MERGER - PROPOSED PALLET MANUFACTURING OPERATION ON A 1.09 ACRE SITE	19346 KENDALL DR, SAN BERNARDINO, CA 92407	IN REVIEW	4	SEE TABLE J
PROJ-2021-00001	026116116, 026116115	CONDITIONAL USE PERMIT PROPOSED TRUCK TERMINAL	19672 KENDALL DR, SAN BERNARDINO, CA 92407	APPROVED	5	SEE TABLE K
PROJ-2021-00005	034814101, 034814102, 034814103	MINOR USE PERMIT TO ESTABLISH A TRUCK TERMINAL WITH OFFICE AND 2,400 SQUARE FOOT ANCILLARY TRUCK REPAIRS (NOT OPEN TO THE GENERAL PUBLIC), AND TO DEMOLISH THREE (3) EXISTING BUILDINGS; LOCATED AT 18828, 18848 and 18850 CAJON BOULEVARD; WITHIN THE GLEN HELEN SPECIFIC PLAN, IN THE CORRIDOR INDUSTRIAL (GH-SP/CI) ZONING DISTRICT; WITHIN THE CITY OF SAN BERNARDINO SPHERE OF INFLUENCE AREA; 5TH SUPERVISORIAL DISTRICT; PROJECT NO.: PROJ-2021-00005; APN: 0348-141-01, -02 AND -03.	18828 CAJON BLVD, DEVORE, CA 92407	DECISION PENDING	13	SEE TABLE L
PROJ-2021-00066	026202113, 026202109	Route 66 Truck Parking & Cargo Terminal - A Conditional Use Permit to establish a truck parking and cargo terminal, and construct a 28,680-square foot shipping terminal facility in two phases.	19472 CAJON BLVD, SAN BERNARDINO, CA 92407	IN REVIEW	6	SEE TABLE F
PROJ-2022-00019	26202114	A CONDITIONAL USE PERMIT FOR A PROPOSED TRUCK TRAILER STORAGE YARD WITH 211 TRUCK PARKING SPACES AND A 1,718 SQUARE-FOOT OFFICE BUILDING ON A 10 ACRE PARCEL; WITHIN THE GLEN HELEN SPECIFIC PLAN, IN THE CORRIDOR INDUSTRIAL (GH-SP/CI) ZONING DISTRICT; WITHIN THE CITY OF SAN BERNARDINO SPHERE OF INFLUENCE AREA; 5TH SUPERVISORIAL DISTRICT; APN: 0262-021-14; PROJECT NO.: PROJ-2022-00019	19407 CAJON BLVD, SAN BERNARDINO, CA 92407	IN REVIEW	7	SEE TABLE E
PROJ-2022-00024	023931102, 023931103	A CONDITIONAL USE PERMIT FOR AN APICULTURE FACILITY COMPRISED OF TWO 15,000 SQ. FT. SINGLE STORY CONCRETE TILT-UP BUILDINGS FOR HONEY AND BEE PRODUCTION STORAGE LOCATED ON 10-ACRES WITHIN THE RURAL LIVING DESIGNATION AND LAND USE ZONING DISTRICT; APN: 0239-311-01, -02, & -03; 3RD SUPERVISORIAL DISTRICT; PROJECT NUMBER: PROJ-2022-00024.	3112 LYTLE CREEK RD, FONTANA, CA 92335	INCLUDE		SEE TABLE M
PTUP-2020-00004	34813231	MAJOR TEMPORARY USE PERMIT - INTERIM TRUCK DISPATCHING/PARKING ON A 1.67 ACRE SITE - SEE PROJ-2020-00012	18720 CAJON BLVD, DEVORE, CA 92407	APPROVED	8	SEE TABLE D
PTUP-2022-00046	APN 0349-201-24	FREEDOM ACRES (12.2 AC SITE) TRUCK PARKING ON GLEN HELEN ROAD. PARKING INCLUDES 4 PASSENGER CAR SPACES AND 625 TRAILER SPACES. PEAK HOUR TRIP GENERATION MAY BE 285 ACCORDING TO COUNTY, BUT STATED A TG RATE NEEDS TO BE ESTABLISHED.		TEMPORARY USE PERMIT APPROVED	9	SEE TABLE A
PTUP-2022-00017	APN 0349-174-01 (034919120 ?)	TRUCK PARKING ON GLEN HELEN ROAD. PARKING INCLUDES 2 PASSENGER CAR SPACES AND 520 TRAILER SPACES ON 14.45 ACRE SITE. TG RATES NEEDS TO BE ESTABLISHED.			10	SEE TABLE A
PROJ-2022-00213	0349-182-11	GAS STATION WITH 6 FUELING POSITION, 2,000 SF OF CONV. STORE, AND 1,000 SF OF QUICK SERVE REST.	LOCATED IN THE SEC OF GLEN HELEN PKWY AND CAJON BLVD	APPROVED	11	SEE TABLE B
PROJ-2021-00091	0349-169-09	GAS STATION WITH 8 FUELING POSITION, 3,800 SF OF CONV. STORE, AND 2,000 SF OF QUICK SERVE REST.	LOCATED IN THE NEC OF GLEN HELEN PKWY AND CAJON BLVD	APPROVED	12	SEE TABLE C



GLEN HELEN COMMERCIAL DEVELOPMENT
LOCATION OF CUMULATIVE PROJECTS
PAGE 1/2

GLEN HELEN COMMERCIAL DEVELOPMENT
LOCATION OF CUMULATIVE PROJECTS
PAGE 2/2

Table A: Trip Generation Estimates for PTUP-2022-00046 and PTUP-2022-00017

Cumulative Project	No. of Acres	AM Peak Hour				PM Peak Hour			
		In	Out	Total		In	Out	Total	Daily
	Rates	4.8	8.8	13.6		4.8	5.2	10	202.8
Freedom Acres	12.2	59	107	166		59	63	122	2474
Adjacent Site	14.45	69	127	197		69	75	145	2930
	Total	**128**	**235**	**362**		**128**	**139**	**267**	**5405**

[a] Truck / Trailer Parking Facility Trip Generation Rates (per acre)
Source: Carson Trailer Storage and Truck Yard Study, 2014. Kunzman Associates. Highest rates from four surveys of truck parking facilities in Long Beach and Compton, CA

Table B: Trip Generation Estimate for PROJ-2022-00213 (Gas Station with Conv. Market + Quick Serve Restaurant)

ITE Land Use Category 945

Cumulative Project PROJ-2022-00213	Fueling Positions	AM Peak Hour				PM Peak Hour			
		In	Out	Total		In	Out	Total	Daily
	Rates	8.0	8.0	16.1		9.2	9.2	18.4	265.12
Gas Station with Conv.Market	6.00	48	48	96		55	55	111	1591
Pass-by Trips	60%	29	29	58	56%	31	31	62	-
	Net Trips	**19**	**19**	**39**		**24**	**24**	**49**	**1591**

ITE Land Use Category 934

Cumulative Project PROJ-2022-00213	KSF	AM Peak Hour				PM Peak Hour			
		In	Out	Total		In	Out	Total	Daily
	Rates	22.8	21.9	44.6		17.2	15.9	33.0	467.48
Quick Serve Restaurant	1.00	137	131	268		103	95	198	467
Pass-by Trips	50%	68	66	134	55%	57	52	109	-
	Net Trips	**68**	**66**	**134**		**46**	**43**	**89**	**467**

Total Trips (LUC 945 + 934)

Cumulative Project PROJ-2022-00213		AM Peak Hour				PM Peak Hour			
		In	Out	Total		In	Out	Total	Daily
Total Project Trips		185	179	364		158	150	309	2058
Total Pass-by Trips		97	94	192		88	83	171	
Total Net Trips		**88**	**85**	**172**		**71**	**67**	**138**	**2058**

Table C: Trip Generation Estimate for PROJ-2021-00091 (Gas Station with Conv. Market + Quick Serve Restaurant)

ITE Land Use Category 945

Cumulative Project PROJ-2022-00213	Fueling	AM Peak Hour				PM Peak Hour			
		In	Out	Total		In	Out	Total	Daily
	Rates	8.0	8.0	16.1		9.2	9.2	18.4	265.12
Gas Station with Conv.Market	8.00	64	64	128		74	74	147	2121
Pass-by Trips	60%	39	39	77	56%	44	44	88	-
	Net Trips	**26**	**26**	**51**		**29**	**29**	**59**	**2121**

ITE Land Use Category 934

Cumulative Project PROJ-2022-00213	KSF	AM Peak Hour				PM Peak Hour			
		In	Out	Total		In	Out	Total	Daily
	Rates	22.8	21.9	44.6		17.2	15.9	33.0	467.48
Quick Serve Restaurant	2.00	46	44	89		34	32	66	935
Pass-by Trips	50%	23	22	45	55%	19	17	36	-
	Net Trips	**23**	**22**	**45**		**15**	**14**	**30**	**935**

Total Trips (LUC 945 + 934)

Cumulative Project PROJ-2022-00213		AM Peak Hour				PM Peak Hour			Daily
		In	Out	Total		In	Out	Total	
Total Project Trips		110	108	218		108	105	213	3056
Total Pass-by Trips		61	60	122		63	62	125	
Total Net Trips		**48**	**48**	**96**		**45**	**44**	**89**	**3056**

Table I: Trip Generation Estimates for PROJ-2020-00229

Use	Gross Floor Area (KSF)	Daily	AM Peak Hour of Adjacent Street Traffic			PM Peak Hour of Adjacent Street Traffic		
			In	Out	Total	In	Out	Total
Pallet Manufacturing Site (ITE LU Code 110)	21.8	*(Trips Per 1,000 Square Feet of Gross Floor Area)*						
		4.87	0.65	0.09	0.74	0.09	0.56	0.65
		Total Vehicle Trip Generation						
		106	14	2	16	2	12	14

Table D: Trip Generation Estimates for PTUP-2020-00004

Truck Dispatch and Parking Facility

Cumulative Project PTUP-2020-00004	No. of Acres	AM Peak Hour				PM Peak Hour			
		In	Out	Total		In	Out	Total	Daily
	Rates	4.8	8.8	13.6		4.8	5.2	10	202.8
Truck Dispatch / Parking Facility	1.67	8	15	23		8	9	17	339

Source of trip rates: Carson Trailer Storage and Truck Yard Study, 2014. Kunzman Associates. Highest rates from four surveys of truck parking facilities in Long Beach and Compton, CA

Table E: Trip Generation Estimates for PROJ-2022-00019

Truck Dispatch and Parking Facility

Cumulative Project PTUP-2020-00004	No. of Acres / SF	AM Peak Hour				PM Peak Hour			Daily
		In	Out	Total		In	Out	Total	
	Rates	4.8	8.8	13.6		4.8	5.2	10	202.8
Truck Dispatch / Parking Facility	10	48	88	136		48	52	100	2028
Site Office (ITE Land Use Code 712)	Rates	1.4	0.3	1.7		0.7	1.4	2.2	14.4
	1,781	2	1	3		1	3	4	26
Site Total		**50**	**89**	**139**		**49**	**55**	**104**	**2054**

Notes:
Source of trip rates for truck parking facility: Carson Trailer Storage and Truck Yard Study, 2014. Kunzman Associates. Highest rates from four surveys of truck parking facilities in Long Beach and Compton, CA
Source of trip rates for office component: ITE Trip Generation, 11th Edition, Land Use Code 712.

Table F: Trip Generation Estimates for PROJ-2021-00066

Land Use	Quantity Units[1]	AM Peak Hour			PM Peak Hour			Daily
		In	Out	Total	In	Out	Total	
Trip Generation Summary (Actual Vehicles):								
Truck Terminal	28.680 TSF							
Passenger Cars:		12	14	26	13	12	25	248
2-Axle Trucks:		2	2	3	2	2	3	34
3-Axle Trucks:		4	4	8	4	4	7	76
4+-Axle Trucks:		9	10	19	9	9	18	182
Truck Trips:		15	16	31	15	15	30	292
Total Trips (Actual Vehicles)[2]		**27**	**30**	**57**	**28**	**27**	**55**	**540**

Table M: Trip Generation Estimates for PROJ-2022-00024

Estimated Trip Generation of PROJ-2022-00024 Bee Keeping Facility

Cumulative Project	No. of Acres	AM Peak Hour				PM Peak Hour			
		In	Out	Total		In	Out	Total	Daily
	Rates	Assumes 10% of Daily (80/20 Split)				Assumes 12% of Daily (20/80 Split)			
Agricultural Facility	18	6	2	8		2	7	9	76

Source: Daily trip generation is from the Intitial Study / MND for the proposed project (December 2022)

Table G: Trip Generation Estimates for PROJ-2019-00015

Use	Gross Floor Area (KSF)	Daily	AM Peak Hour of Adjacent Street Traffic			PM Peak Hour of Adjacent Street Traffic		
			In	Out	Total	In	Out	Total
High Turnover Sit-Down Restaurant (ITE LU Category 932)	2.5	*(Trips Per 1,000 Square Feet of Gross Floor Area)*						
		107.20	5.26	4.31	9.57	5.52	3.53	9.05
		Total Vehicle Trip Generation						
		268	14	11	25	14	9	23

Table H: Trip Generation Estimates for PROJ-2021-00148

Use	Number of Dwellinig Units	Daily	AM Peak Hour of Adjacent Street Traffic			PM Peak Hour of Adjacent Street Traffic		
			In	Out	Total	In	Out	Total
Single Family Residential (ITE LU Code 210)	175.0	*(Trips Per 1,000 Square Feet of Gross Floor Area)*						
		9.43	0.18	0.52	0.70	0.59	0.35	0.94
		Total Vehicle Trip Generation						
		1,651	32	91	123	104	61	165

Table K: Trip Generation Estimates for PROJ-2021-00001

Use	Gross Floor Area (KSF)	Daily	AM Peak Hour of Adjacent Street Traffic			PM Peak Hour of Adjacent Street Traffic		
			In	Out	Total	In	Out	Total
Truck Terminal (ITE LU Code 30)	21.9	*(Trips Per 1,000 Square Feet of Gross Floor Area)*						
		N/A	0.93	1.04	1.97	0.97	0.90	1.87
		Total Vehicle Trip Generation						
		N/A	21	23	44	22	20	42

Building size based on a 2 acre site with a 0.25 FAR.

Table L: Trip Generation Estimates for PROJ-2021-00005

Use	Gross Floor Area (KSF)	Daily	AM Peak Hour of Adjacent Street Traffic			PM Peak Hour of Adjacent Street Traffic		
			In	Out	Total	In	Out	Total
Truck Terminal (ITE LU Code 30)	29.2	*(Trips Per 1,000 Square Feet of Gross Floor Area)*						
		N/A	0.93	1.04	1.97	0.97	0.90	1.87
		Total Vehicle Trip Generation						
		N/A	28	30	58	29	27	56

Building size based on a 2.68 acre site with a 0.25 FAR.

Table J: Trip Generation Estimates for PROJ-2020-00232

Use	Gross Floor Area (KSF)	Daily	AM Peak Hour of Adjacent Street Traffic			PM Peak Hour of Adjacent Street Traffic		
			In	Out	Total	In	Out	Total
Pallet Manufacturing Site (ITE LU Code 110)	11.9	*(Trips Per 1,000 Square Feet of Gross Floor Area)*						
		4.87	0.65	0.09	0.74	0.08	0.48	0.56
		Total Vehicle Trip Generation						
		58	8	1	9	1	6	7

Gross floor area based on a 0.25 FAR of the 1.09 acre site

Appendix C:
Habitat Assessment

October 27, 2023

215 TABLE TOP, LLC
Attention: Jim Mauge
P.O. Box 9716
Redlands, California 92375

SUBJECT: Habitat Assessment for the 215 Table Top, LLC Project Located in San Bernardino County, California

Introduction

This report contains the findings of ELMT Consulting's (ELMT) habitat assessment for the 215 Table Top, LLC Project located in the County of San Bernardino, California. The initial habitat assessment was conducted by biologists Thomas J. McGill, Ph.D. and Travis J. McGill on March 28 and April 16, 2019 to document baseline conditions and assess the potential for special-status[1] plant and wildlife species to occur within the project site that could pose a constraint to implementation of the proposed project. A follow up survey was conducted on March 8, 2023 to verify existing site conditions previously noted in 2019. This report also includes the results of a special-status plant survey and California gnatcatcher (*Polioptila californica californica*) focused survey.

Special attention was given to the suitability of the project site to support special-status plant and wildlife species identified by the California Department of Fish and Wildlife's (CDFW) California Natural Diversity Database (CNDDB), and other electronic databases as potentially occurring in the general vicinity of the project site.

The site was also evaluated for its potential to support natural drainage features, ponded areas, and/or water bodies that have the potential to fall under the regulatory authority of the of the United States Army Corps of Engineers (Corps), Regional Water Quality Control Board (Regional Board), or California Department of Fish and Wildlife (CDFW) pursuant to Sections 401 and 404 of the Federal Clean Water Act (CWA), the California Porter-Cologne Water Quality Control Act, and Section 1600 *et seq.* of the Fish and Game Code.

Project Location

The project site is generally located north of State Route 210, south of Interstate 215, and east of Interstate 15 within unincorporated San Bernardino County. The project site is depicted on the Devore quadrangle of the United States Geological Survey's (USGS) 7.5-minute topographic map within Section 4 of Township 1 North, Range 5 West. Specifically, the project site is bordered by Interstate 15 to the west, Glen Helen

1 As used in this report, "special-status" refers to plant and wildlife species that are federally and State listed, proposed, or candidates; plant species that have been designated with a California Native Plant Society Rare Plant Rank; wildlife species that are designated by the CDFW as fully protected, species of special concern, or watch list species; and specially protected natural vegetation communities as designated by the CDFW.

Parkway to the south and east, and residential developments to the north, approximately 1 mile south of the Interstate 15/Interstate 215 Interchange. Refer to Exhibits 1-3 in Attachment A.

Project Description

The Project site is anticipated to be developed in one phase and would include approximately 72,000 square feet designated for hotel uses; 35,000 square feet designated for a fitness facility; a 45,500 square foot building which includes 25,000-square feet designated for a market, a 15,000 square foot pharmacy, and 5,500 square feet of commercial shops; 5,300 square feet designated for convenience store and a gas station with 12 fueling islands and related drive-thru carwash; 5,300 square feet designated for a convenience store with gas station and 10 fueling islands; and five 3,500 square foot buildings designated for drive-thru restaurants and an approximate 5,300 square foot drive-thru restaurant; two restaurants (5,300 square feet and 6,500 square feet); and 5,200 square feet designated for a Fire/Sheriff Station.

Methodology

A literature review and records search were conducted to determine which special-status biological resources have the potential to occur on or within the general vicinity of the project site. In addition to the literature review, a general habitat assessment or field investigation of the project site was conducted to document existing conditions and assess the potential for special-status biological resources to occur within the project site.

Literature Review

Prior to conducting the field investigation, a literature review and records search was conducted for special-status biological resources potentially occurring on or within the vicinity of the project site. Previously recorded occurrences of special-status plant and wildlife species and their proximity to the project site were determined through a query of the CDFW's QuickView Tool in the Biogeographic Information and Observation System (BIOS), CNDDB Rarefind 5, the California Native Plant Society's (CNPS) Electronic Inventory of Rare and Endangered Vascular Plants of California, Calflora Database, compendia of special-status species published by CDFW, and the United States Fish and Wildlife Service (USFWS) species listings.

All available literature detailing the biological resources previously observed on or within the vicinity of the project site were reviewed to understand existing site conditions and note the extent of any disturbances that have occurred within the project site that would otherwise limit the distribution of special-status biological resources. Standard field guides and texts were reviewed for specific habitat requirements of special-status and non-special-status biological resources, as well as the following resources:

- Google Earth Pro historic aerial imagery (1994-2022);
- United States Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS), Soil Survey[2];
- USFWS Critical Habitat designations for Threatened and Endangered Species; and

2 A soil series is defined as a group of soils with similar profiles developed from similar parent materials under comparable climatic and vegetation conditions. These profiles include major horizons with similar thickness, arrangement, and other important characteristics, which may promote favorable conditions for certain biological resources.

- USFWS Endangered Species Profiles.

The literature review provided a baseline from which to inventory the biological resources potentially occurring within the project site. The CNDDB database was used, in conjunction with ArcGIS software, to locate the nearest recorded occurrences of special-status species and determine the distance from the project site.

Field Investigation

Following the literature review, biologists Thomas J. McGill, Ph.D., and Travis J. McGill inventoried and evaluated the condition of the habitat within the project site on March 28, and April 16 2019. A follow up survey was conducted on March 8, 2023 to verify existing site conditions previously noted in 2019. Plant communities and land cover types identified on aerial photographs during the literature review were verified by walking meandering transects throughout the project site. In addition, aerial photography was reviewed prior to the site investigation to locate potential natural corridors and linkages that may support the movement of wildlife through the area. These areas identified on aerial photography were then walked during the field investigation.

All plant and wildlife species observed, as well as dominant plant species within each plant community, were recorded. Plant species observed during the field investigation were identified by visual characteristics and morphology in the field. Unusual and less familiar plant species were photographed during the field investigation and identified in the laboratory using taxonomical guides. Wildlife detections were made through observation of scat, trails, tracks, burrows, nests, and/or visual and aural observation. In addition, site characteristics such as soil condition, topography, hydrology, anthropogenic disturbances, indicator species, condition of on-site plant communities and land cover types, and presence of potential jurisdictional drainage and/or wetland features were noted.

Soil Series Assessment

On-site and adjoining soils were researched prior to the field investigation using the USDA NRCS Soil Survey for San Bernardino County, California. In addition, a review of the local geological conditions and historical aerial photographs was conducted to assess the ecological changes that the project site have undergone.

Plant Communities

Plant communities were mapped using 7.5-minute USGS topographic base maps and aerial photography. The plant communities were classified in accordance with Sawyer, Keeler-Wolf and Evens (2009), delineated on an aerial photograph, and then digitized into GIS Arcview. The Arcview application was used to compute the area of each plant community and/or land cover type in acres.

Plants

Common plant species observed during the field investigation were identified by visual characteristics and morphology in the field and recorded in a field notebook. Unusual and less familiar plants were photographed in the field and identified in the laboratory using taxonomic guides. Taxonomic nomenclature used in this study follows the 2012 Jepson Manual (Hickman 2012). In this report, scientific names are provided immediately following common names of plant species (first reference only).

Wildlife

Wildlife species detected during the field investigation by sight, calls, tracks, scat, or other sign were recorded during surveys in a field notebook. Field guides used to assist with identification of wildlife species during the survey included The Sibley Field Guide to the Birds of Western North America (Sibley 2003), A Field Guide to Western Reptiles and Amphibians (Stebbins 2003), and A Field Guide to Mammals of North America (Reid 2006). Although common names of wildlife species are well standardized, scientific names are provided immediately following common names in this report (first reference only).

Jurisdictional Drainages and Wetlands

Aerial photography was reviewed prior to conducting a field investigation in order to locate and inspect any potential natural drainage features, ponded areas, or water bodies that may fall under the jurisdiction of the United States Army Corps of Engineers (Corps), Regional Water Quality Control Board (Regional Board), or CDFW. In general, surface drainage features indicated as blue-line streams on USGS maps that are observed or expected to exhibit evidence of flow are considered potential riparian/riverine habitat and are also subject to state and federal regulatory jurisdiction. In addition, ELMT reviewed jurisdictional waters information through examining historical aerial photographs to gain an understanding of the impact of land-use on natural drainage patterns in the area. The USFWS National Wetland Inventory (NWI) and Environmental Protection Agency (EPA) Water Program "My Waters" data layers were also reviewed to determine whether any hydrologic features and wetland areas have been documented on or within the vicinity of the project site.

Topography and Soils

On-site elevation ranges from approximately 2,015 to 2,256 ft above mean sea level and has a central hill that slopes to the outer boundaries of the site. Based on the NRCS USDA Web Soil Survey, the project site is underlain by the following soil units: Soboba-Hanford families association (2 to 15 percent slopes) and Trigo-Lithic Xerorthents, warm complex (50 to 75 percent slopes). Refer to Exhibit 4, *Soils*, in Attachment A.

The project site primarily consists undeveloped land with the exception of dirt access roads, and a single residential development. The project site is bordered by existing roads to the west, south and east which separate the project site from open areas to the north, south and east. Additionally, the project site is bordered by residential developments and disturbed areas to the north.

Vegetation Communities and Land Cover Types

The project site is relatively undisturbed and supports natural plant communities. Two (2) plant communities were observed on-site: Riversidean sage scrub, and mulefat scrub (refer to Exhibit 5, *Vegetation*, in Attachment A). In addition, two (2) land cover types that would be classified as disturbed and developed were also observed onsite. These plant communities and land cover types are described in further detail below.

Riversidean Sage Scrub – Chaparral (Erogonum fasciculatum – Artemisia californica Alliance/ Arctostaphylos glandulosa – Adenostoma fasciculatum – Ceanothsu leucodermis Alliance)

The majority of the project site supports a Riversidean sage scrub (RSS) plant community that is dense (approximately 75-90% vegetation coverage) and mature, and is transitioning into a chaparral plant community. The RSS plant community is found throughout the project site on the steep hillsides. This plant community is primarily dominated by California buckwheat (*Eriogonum fasciculatum*) black sage (*Salvia mellifera*), California sagebrush (*Artemisia californica*), white sage (*Salvia apiana*), and deerweed (*Acmispon glaber*). Other common plant species observed include basketbush (*Rhus aromatica*), pine goldenbush (*Ericameria pinifolia*), prickly pear (*Opuntia sp.*), red brome (*Bromus marditensis*), ripgut brome (*Bromus diandrus*), sapphire woollystar (*Eriastrum sapphirinum*), saw tooth goldenbush (*Hazardia squarrosa*), and short podded mustard (*Hirschfeldia incana*). Chaparral plant species found onsite primarily consisted of dense, woody plant species including chamise (*Adenostoma fasciculatum*), chaparral whitethorn (*Ceanothus leucodermis*), spiny red berry (*Rhamnus crocea*), and bush monkeyflower (*Diplacus aurantiacus*), Southern California black walnut (*Juglans californica*), manzanita (*Arctostaphylos glauca*), toyon (*heteromeles arbutifolia*), and mountain mahogany, (*Cercocarpus sp.*).

Mulefat Scrub (Baccharis salicifolia Alliance)

The mulefat scrub plant community is found on the southeast corner of the project site in a topographic low spot between the hillside to the west and Glen Helen Parkway to the east. This plant community is dominated by mulefat (*Baccharis salicifolia*) with a mixed understory of sage scrub plant species. Common plant species found in the understory include California buckwheat, black sage, California sagebrush, deerweed (*Acmispon glaber*), red brome, ripgut brome, and short podded mustard.

Disturbed

Disturbed areas refer to unpaved or dirt areas that are routinely exposed to anthropogenic disturbances and typically do not comprise a plant community. Surface soils within these areas are generally devoid of vegetation or support non-native and ruderal/weedy plant species, and have been heavily disturbed/compacted from anthropogenic disturbances (i.e., weed abatement activities, activities associated with surrounding infrastructure). Disturbed areas on-site generally encompass an unimproved dirt access road, and land immediately adjacent to the rural residential property on the northern boundary of the project site.

Developed

Developed areas within the project site generally consist of paved, impervious surfaces. Developed areas within the boundaries of the project site include a paved road and an existing residential development on the northern boundary of the project site.

Wildlife

Plant communities provide foraging habitat, nesting/denning sites, and shelter from adverse weather or predation. This section provides a discussion of those common wildlife species that were observed or are expected to occur within the project site. The discussion is to be used a general reference and is limited by the season, time of day, and weather conditions in which the field investigation was conducted. Wildlife

detections were based on calls, songs, scat, tracks, burrows, and direct observation.

Fish

No fish or hydrogeomorphic features (e.g., perennial creeks, ponds, lakes, reservoirs) that would provide suitable habitat for fish were observed on or within the vicinity of the project site. Therefore, no fish are expected to occur and are presumed absent from the project site.

Amphibians

No amphibians or hydrogeomorphic features (e.g., perennial creeks, ponds, lakes, reservoirs) that would provide suitable habitat for amphibians were observed on or within the vicinity of the project site. Therefore, no amphibians are expected to occur and are presumed absent from the project site.

Reptiles

Western side-blotched lizard (*Uta stansburiana elegans*), and coastal whiptail (*Aspidoscelis tigris steinegeri*) were the only reptiles observed onsite. Common reptilian species that have the potential to occur on the project site include, alligator lizard (*Elgaria multicarinata*), gopher snake (*Pituophis catenifer*), and southern Pacific rattlesnake (*Crotalus oreganus helleri*).

Birds

Bird species detected onsite during the field surveys include American crow (*Corvus brachyrhynchos*), Anna's hummingbird (*Calypte anna*), Bewick's wren (*Thryomanes bewickii*), California towhee (*Melozone crissalis*), lesser goldfinch (*Spinus psaltria*), Southern California rufous-crowned sparrow (*Aimophila ruficeps canescens*), spotted towhee (*Pipilo maculatus*), California thrasher (*Toxostoma redivivum*), house finch (*Haemorphous mexicanus*), and orange-crowned warbler (*Vermivora celata*).

Mammals

During the field investigation the only observed mammal was a cottontail (*Sylvilagus audubonii*). Common mammalian species that have the potential to occur within the project site include coyote (*Canis latrans*), California ground squirrel (*Otospermophilus beecheyi*), and raccoon (*Procyon lotor*). No bat species are expected to occur due to a lack of suitable roosting habitat (i.e., trees, crevices) on and surrounding the project site.

Nesting Birds

No active nests or birds displaying nesting behavior were observed during the field investigation. The project site and surrounding area provides suitable foraging and nesting habitat for year-round and seasonal avian residents, as well as migrating songbirds that could occur in the area.

Migratory Corridors and Linkages

Habitat linkages provide connections between larger habitat areas that are separated by development. Wildlife corridors are similar to linkages but provide specific opportunities for animals to disperse or migrate between areas. A corridor can be defined as a linear landscape feature of sufficient width to allow

animal movement between two comparatively undisturbed habitat fragments. Adequate cover is essential for a corridor to function as a wildlife movement area. It is possible for a habitat corridor to be adequate for one species yet still inadequate for others. Wildlife corridors are features that allow for the dispersal, seasonal migration, breeding, and foraging of a variety of wildlife species. Additionally, open space can provide a buffer against both human disturbance and natural fluctuations in resources.

According to the San Bernardino County General Plan Open Space Element, the project site has not been identified as occurring within any major open space areas. The project site is located between two wildlife corridors; the Lytle Creek wildlife corridor to the south, and the Cajon Creek wildlife corridor to the north. Additionally, the project site is located immediately west of the Cajon Creek Policy Area.

The project site is an island of habitat located between Interstate 15, Glen Helen Parkway, and developments to the north, which has restricted, if not eliminated, wildlife movement opportunities across the site. Interstate 15 bordering the western boundary of the project site has eliminated wildlife movement opportunities out of the San Gabriel Mountains to the west. Further, large mammals (i.e., bobcats, mountain lions) typically do not cross large freeways, and are not expected to use the site. As a result, implementation of the proposed project will not disrupt or have any adverse effects on any migratory corridors or linkages in the surrounding area.

Jurisdictional Areas

There are three key agencies that regulate activities within inland streams, wetlands, and riparian areas in California. The Corps Regulatory Branch regulates discharge of dredge or fill materials into "waters of the United States" pursuant to Section 404 of the Clean Water Act (CWA) and Section 10 of the Rivers and Harbors Act. Of the State agencies, the CDFW regulates alterations to streambed and bank under Fish and Wildlife Code Sections 1600 et seq., and the Regional Board regulates discharges into surface waters pursuant to Section 401 of the CWA and the California Porter-Cologne Water Quality Control Act.

According to the NWI data, no aquatic resources have been mapped on or immediately adjacent to the project site. Several freshwater ponds have been mapped south of the project site, south of Glen Helen Parkway in the area labeled as Sycamore Flats, and freshwater ponds have been mapped in association with the lakes at Glen Helen Regional Park. A riverine feature is also mapped southwest of the project site, extending out of Sycamore Canyon, west of Interstate 15.

A jurisdictional delineation was prepared under separate cover. A summary of the findings is provided below.

Swale

The swale on the southeast portion of the project site that parallels Glen Helen Parkway, was created when Glen Helen Parkway was improved in the late 1990's. The original alignment of Glen Helen Parkway extended along the eastern slope of the onsite hill. When Glen Helen Parkway was improved, it pushed the limits of the road to the east, creating a small area between the old road and new road. This area between the two roads is where the swale lies (topographic low spot). The swale only conveys flows from Glen Helen Parkway during storm events, acting as a roadside ditch. Around 2009 when Clearwater Parkway was created south of the project site, culverts were installed connecting the swale to the area located on the

southwest corner of Clearwater Parkway and Glen Helen Parkway. This swale only receives flows from direct precipitation and flows off of Glen Helen Parkway, and is primarily vegetated with upland species; however, a small area at the southern limits of the swale supports a mulefat scrub plant community.

The mulefat scrub plant community is dominated by mulefat (*Baccharis salicifolia*) with a mixed understory of sage scrub plant species. Common plant species found in the understory include California buckwheat, black sage, California sagebrush, deerweed (*Acmispon glaber*), red brome, ripgut brome, and short podded mustard.

Hillside

The project site predominantly features a steep hill that naturally channels water down its slopes through onsite topography. Given the steepness of the slopes, the zones facilitating water flow during storm events exhibit increased erosion and support upland vegetation. Consequently, these areas, since they are erosional, will not be considered jurisdictional.

Findings

- Corps: The swale on the southeast portion of the project site was constructed wholly in the uplands and is not relatively permanent, standing, or a continuously flowing body of water and, therefore, will not qualify as waters of the United States under the regulatory authority of the Corps (*Sackett v. EPA* (2022) 143 S. Ct. 1322, 1336).
- Regional Board: Since the swale on the southeast portion of the project site was artificially created in the uplands when Glen Helen Parkway was improved in the late 1990s and did not replace a blueline stream or other natural drainage course it is not expected to fall under the regulatory authority of the Regional Board.
- CDFW: Since the swale on the southeast portion of the project site was artificially created in the uplands when Glen Helen Parkway was improved in the late 1990s, did not replace a blueline stream or other natural drainage course, and is not dominated by riparian habitat that provides habitat for special-status species, it is not expected to fall under the regulatory authority of CDFW.

Special-Status Biological Resources

The CNDDB Rarefind 5 and the CNPS Electronic Inventory of Rare and Endangered Vascular Plants of California were queried for reported locations of special-status plant and wildlife species as well as special-status natural plant communities in the Devore USGS Topographic Map 7.5-minute quadrangle. The habitat assessment evaluated the conditions of the habitat(s) within the boundaries of the project site to determine if the existing plant communities, at the time of the survey, have the potential to provide suitable habitat(s) for special-status plant and wildlife species.

The literature search identified nineteen (19) special-status plant species, thirty-seven (37) special-status wildlife species, and three (3) special-status plant community as having potential to occur within the Devore USGS 7.5-minute quadrangle. Special-status plant and wildlife species were evaluated for their potential to occur within the project site based on habitat requirements, availability and quality of suitable habitat, and known distributions. Species determined to have the potential to occur within the general vicinity of the project site are presented in Attachment D*: Potentially Occurring Special-Status Biological Resources*.

Special-Status Plants

According to the CNDDB and CNPS, nineteen (19) special-status plant species have been recorded in the Devore quadrangle (refer to Attachment D). Southern California black walnut (*Juglans californica*) was the only special-status plant species observed onsite during the habitat assessment and 2019 special-status plant survey. Southern California black walnut is not federally or state listed, it is only listed by the CNPS as 4.2 Rare Plant Rank Species, which is a plant species limited in distribution and moderately threated in California. Based on habitat requirements for specific special-status plant species and the availability and quality of habitats needed by each species, it was determined that the project site has a moderate potential to provide suitable habitat for singlerwhorl burrowbush (*Ambrosia monogyra*), Plummer's mariposa lily (*calochortus plummerae*), Parry's spineflower (*Chorizanthe parryi var. parryi*), white-bracted spineflower (*Chroizanthe xanti var. leucotheca*), mesa horkela (*Horkelia cuneuta var. puberula*) and San Gabriel oak (*Quercus durata var. gabrielensis*); and a low potential to provide suitable habitat for San Gabriel ragwort (*Senecio astephanus*). All other special-status plant species known to occur in the area are presumed to be absent from the project site.

Special-Status Plant Survey

Special-status plant surveys were conducted during the 2019 and 2021 blooming season to coincide with known flowering periods of special-status plant species determine to have the potential to occur on the project site in accordance with the CDFW *Guidelines for Assessing the Effects of Proposed Developments on Rare and Endangered Plants and Plant Communities* (CDFW 2009) as well as the USFWS *Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants* (USFWS 1996). One (1) special-status plant species was observed on-site during the special-status plant species focused survey, Southern California black walnut. No other special-status plant species were observed. Due to the lack of observation of any other special-status plant species during the focused surveys conducted in 2019 and 2021, all other special-status plant species are presumed to be absent from the project site.

Southern California black walnut is neither federally nor state listed as threatened or endangered. It is designated as a CNPS Rare Plant Rank 4.2 (a watch list of plants of limited distribution, that is moderately threatened in California). In an effort to increase coverage for unlisted but regionally sensitive plants under the California Environmental Quality Act (CEQA), the California Native Plant Society began publishing sensitivity rankings for special-status plant species. CNPS Rare Plant Rank 4 plant species are a watch list species of limited distribution. The presences of this species onsite, therefore, does not rise to the level of a species of concern under CEQA. As such, the presence of southern California black walnut is not expected to contribute to the long-term conservation of the value for the species, and impacts would be less than significant; no mitigation is required.

Special-Status Wildlife

According to the CNDDB, thirty-seven (37) special-status wildlife species have been reported in the Devore quadrangle (refer to Attachment D). Southern California rufous-crowned sparrow (*Aimophila ruficeps canescens*) and coastal whiptail (*Aspidoscelis tigris stejnegeri*) were the only special-status species observed onsite during the habitat assessment. Both of these species are not federally, or state listed as endangered or threatened, they are listed on the CDFW Watch List and as a Species of Special Concern, respectively. Based on habitat requirements for specific species and the availability and quality of onsite

habitats, it was determined that the proposed project site has a high potential to support Bell's sparrow (*Artemisiospiza belli belli*), and loggerhead shrike (*Lanius ludovicianus*); a moderate potential to support Cooper's hawk (*Accipiter cooperii*), San Diego desert woodrat (*Neotoma lepida intermedia*), and coastal California gnatcatcher; and a low potential to support Costa's hummingbird (*Calypte costae*), coast horned lizard (*Phrynosoma blainvillii*). All remaining special-status wildlife species are presumed to be absent since the project site; refer to Attachment D, for explanations of determinations for those species not expected to occur onsite.

California Gnatcatcher Breeding Season Presence/Absence Survey

A California gnatcatcher breeding season presence/absence survey was conducted during the 2019 breeding season in accordance with the guidance from the USFWS California gnatcatcher survey protocol to cover breeding periods (USFWS 1997). The surveys were completed by USFWS permitted biologist Karly Moore (USFWS 10a1A permit #TE-02484-2) between April 2 and May 7, 2019. No California gnatcatcher were detected during the six (6) breeding season protocol surveys.

The project site is mapped within the northeasterly extent of the range for this species, and while the California gnatcatcher has historical range nearby the site, it is unlikely to be present due to the maturity and density of the habitat. The plant communities onsite are dense/mature and are not ideal for California gnatcatcher. Due to the marginal suitability of the habitat onsite and the proximity of the site to Interstate 15, this site is not recommended for conservation for the California gnatcatcher, and are presumed absent from the project site.

Special-Status Plant Communities

According to the CNDDB, three (3) special-status plant communities have been reported in the Devore USGS Topographic Map 7.5-minute quadrangle: Riversidean Alluvial Fan Sage Scrub, Southern Riparian Forest, and Southern Sycamore Alder Riparian Woodland. Based on the results of the field investigation, no special-status plant communities were observed onsite.

Critical Habitat

Under the federal Endangered Species Act, "Critical Habitat" is designated at the time of listing of a species or within one year of listing. Critical Habitat refers to specific areas within the geographical range of a species at the time it is listed that include the physical or biological features that are essential to the survival and eventual recovery of that species. Maintenance of these physical and biological features requires special management considerations or protection, regardless of whether individuals or the species are present or not. All federal agencies are required to consult with the United States Fish and Wildlife Service (USFWS) regarding activities they authorize, fund, or permit which may affect a federally listed species or its designated Critical Habitat. The purpose of the consultation is to ensure that projects will not jeopardize the continued existence of the listed species or adversely modify or destroy its designated Critical Habitat. The designation of Critical Habitat does not affect private landowners, unless a project they are proposing is on federal lands, uses federal funds, or requires federal authorization or permits (e.g., funding from the Federal Highways Administration or a CWA Permit from the Corps). If a there is a federal nexus, then the federal agency that is responsible for providing the funding or permit would consult with the USFWS.

The project site is not located with federally designated Critical Habitat. Refer to Exhibit 6, *Critical Habitat* in Attachment A. The nearest designated Critical Habitat is located south of the project site, south of Glen Helen Pkwy (<0.02 miles) for San Bernardino kangaroo rat. Additionally, mapped Critical Habitat for arroyo toad (*Anaxyrus californicus*) is located approximately 1 mile northwest of the project site. Therefore, loss or adverse modification of Critical Habitat from site development will not occur and consultation with the USFWS for impacts to Critical Habitat will not be required for implementation of the proposed project.

Conclusion

Based on the literature review and field survey, and existing site conditions discussed in this report, implementation of the project will have no significant impacts on federally or State listed species known to occur in the general vicinity of the project site. Additionally, the development of the project will not impact designated Critical Habitats, regional wildlife movement corridors/linkages, or jurisdictional drainage features. With completion of the recommendations provided below, no impacts to year-round, seasonal, or special-status avian residents or special-status species will occur from implementation of the proposed project.

Recommendations

Pre-Construction Nesting Bird Clearance Survey

Nesting birds are protected pursuant to the Migratory Bird Treaty Act (MBTA) and California Fish and Game Code (Sections 3503, 3503.5, 3511, and 3513 prohibit the take, possession, or destruction of birds, their nests or eggs). In order to protect migratory bird species, a nesting bird clearance survey should be conducted prior to any ground disturbance or vegetation removal activities that may disrupt the birds during the nesting season.

In order to ensure impacts to the southern California rufous-crowned sparrow Bell's sage sparrow, loggerhead shrike, Cooper's hawk, and Costa's hummingbird do not occur from implementation of the proposed project, a pre-construction nesting bird clearance survey should be conducted prior to ground disturbance. With implementation of mitigation through the pre-construction clearance survey, impacts to the aforementioned avian species will be less than significant.

If construction occurs between February 1st and August 31st, a pre-construction clearance survey for nesting birds should be conducted within three (3) days of the start of any vegetation removal or ground disturbing activities to ensure that no nesting birds will be disturbed during construction.

Pre-Construction Special-Status Species Clearance Survey

To ensure impacts to San Diego desert woodrat, Coastal whiptail, and Coast horned lizard are less than significant from site development, pre-construction clearance surveys shall be conducted. The project biologist will use their discretion in ensuring impacts to any special-status wildlife observed during pre-construction clearance surveys are avoided (e.g., avoidance buffers, relocation from harm's way, etc.).

Please do not hesitate to contact Tom McGill at (951) 285-6014 or tmcgill@elmtconsulting.com or Travis McGill at (909) 816-1646 or travismcgill@elmtconsulting.com should you have any questions this report.

Sincerely,

Thomas J. McGill, Ph.D.
Managing Director

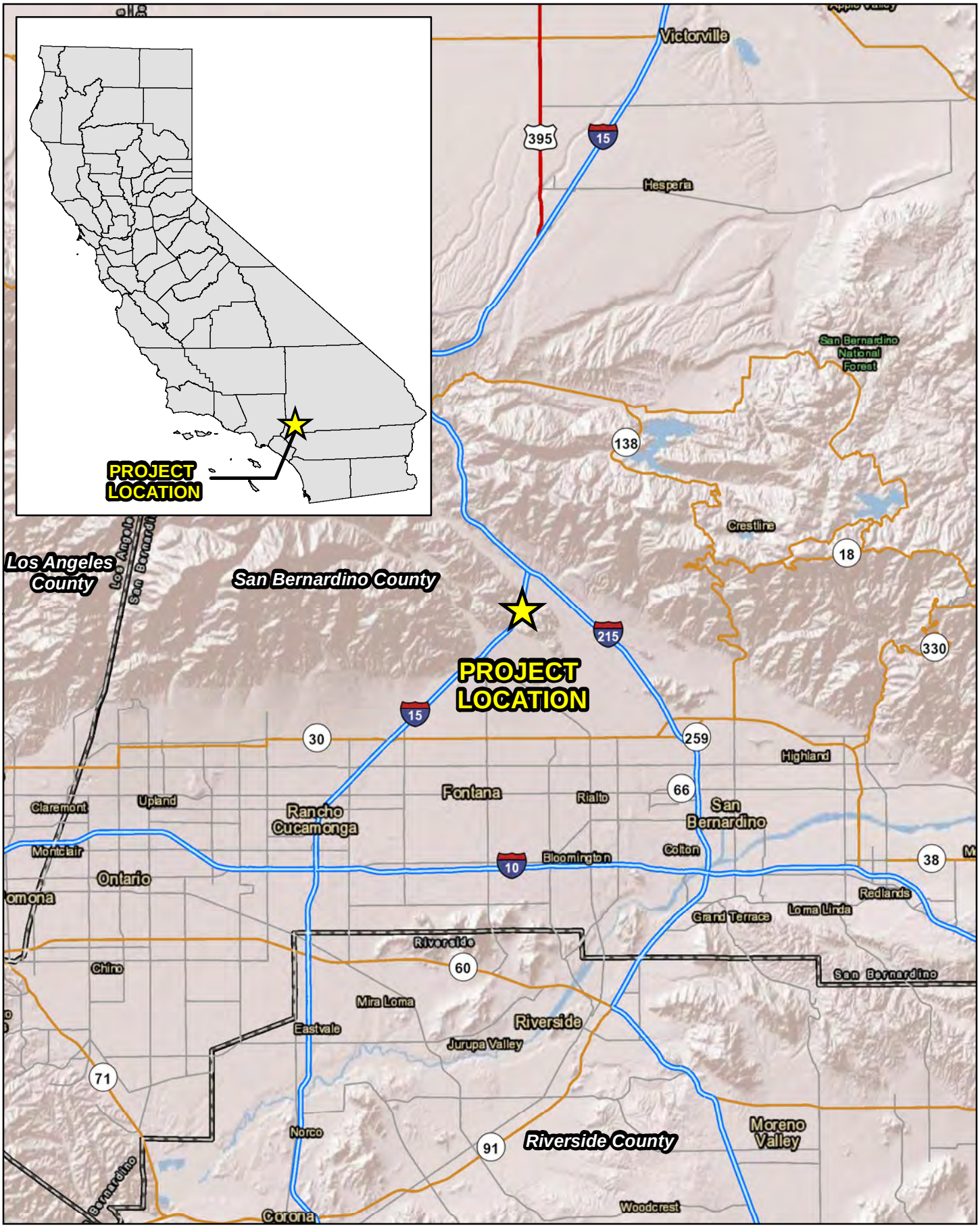
Travis J. McGill
Director

Attachments:

A. *Project Exhibits*
B. *Conceptual Site Plans*
C. *Site Photographs*
D. *Potentially Occurring Special-Status Biological Resources*
E. *Regulations*

Attachment A

Project Exhibits



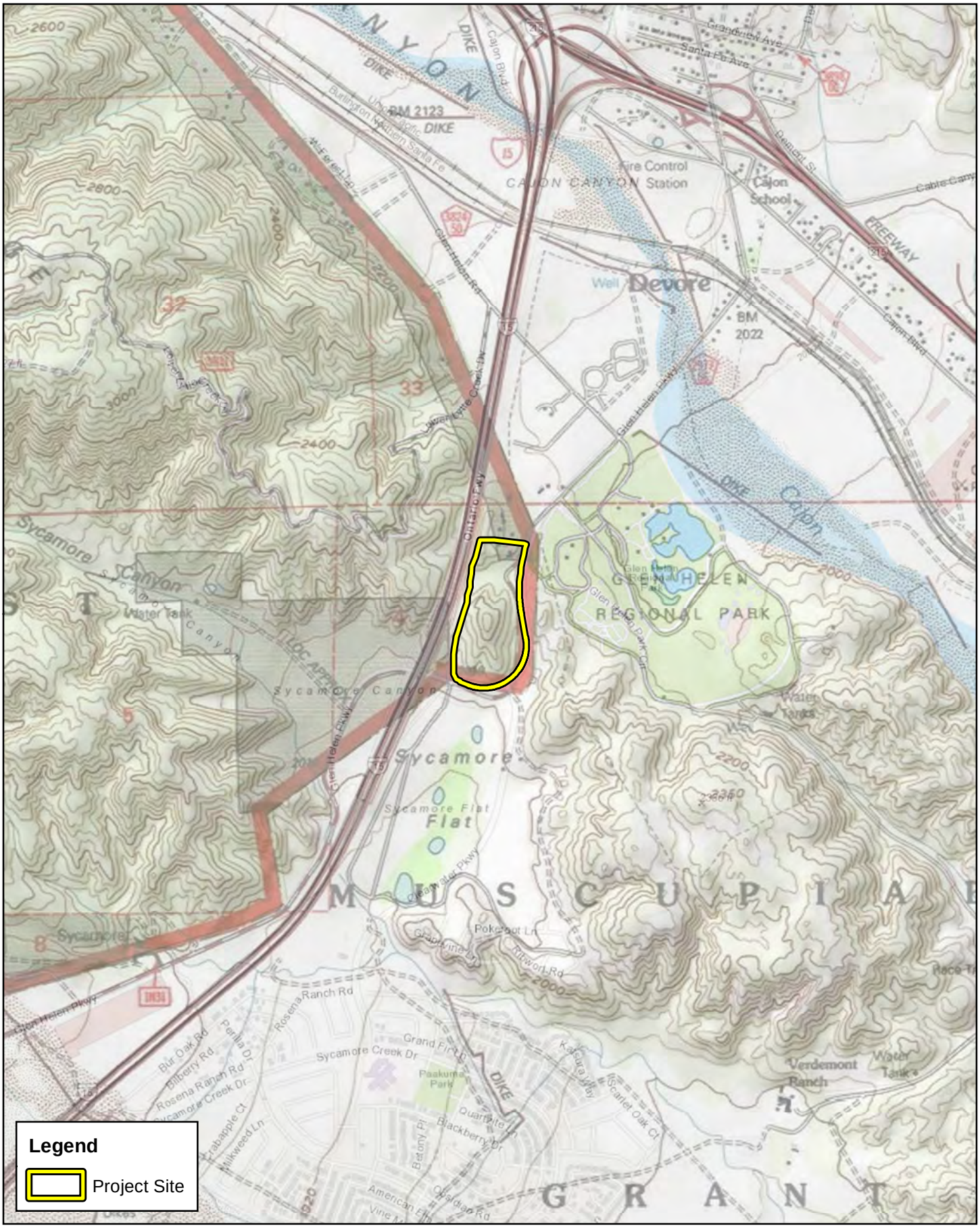
0 2.5 5 10 Miles

Source: Federal Highway Administration, US Department of Transportation

215 TABLE TOP PROJECT
HABITAT ASSESSMENT

Regional Vicinity

Exhibit 1

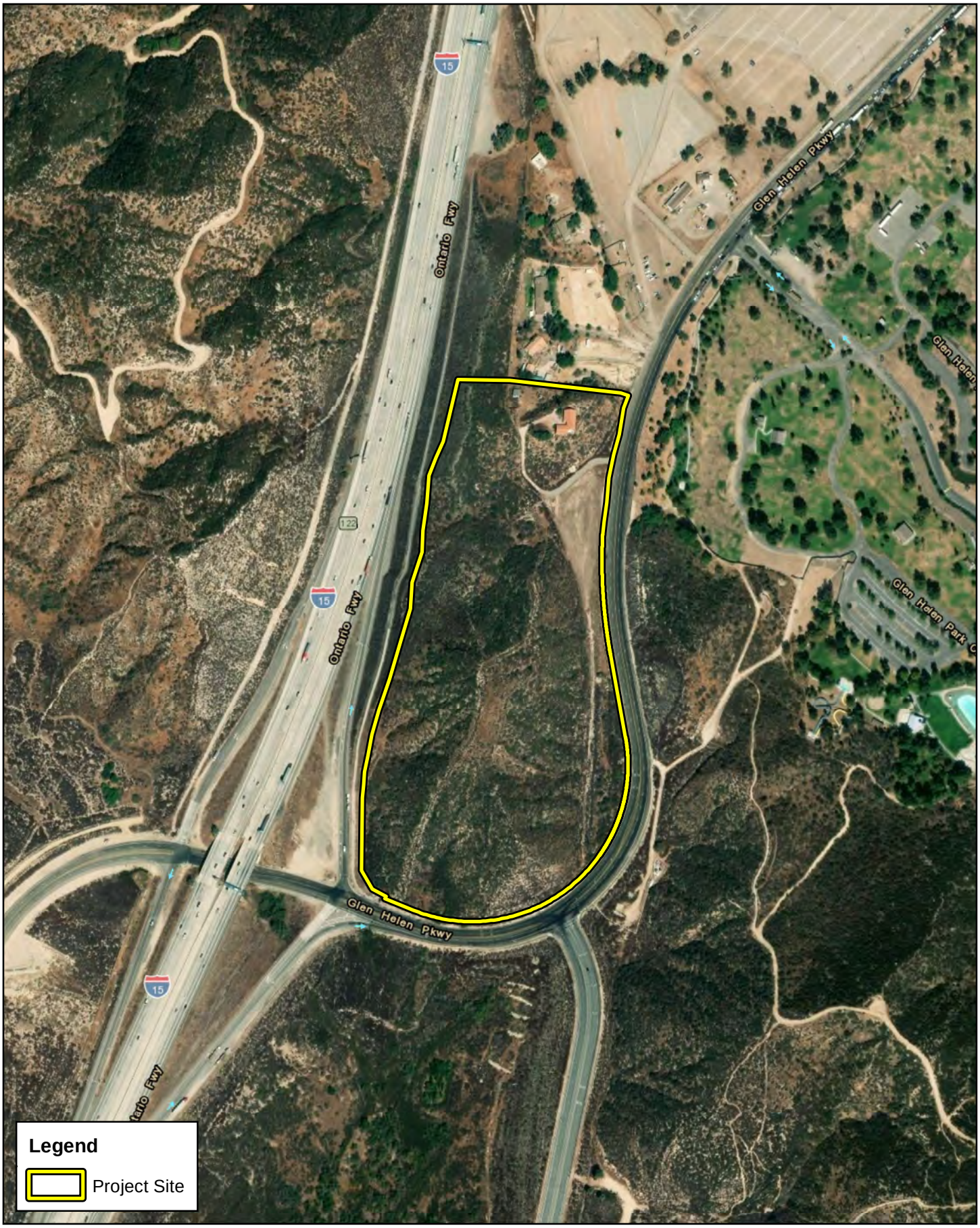


Source: USA Topographic Map, San Bernardino County

215 TABLE TOP PROJECT
HABITAT ASSESSMENT

Site Vicinity

Exhibit 2



ELMT CONSULTING

0 250 500 1,000 Feet

Source: ESRI Aerial Imagery, San Bermardino County

215 TABLE TOP PROJECT
HABITAT ASSESSMENT

Project Site

Exhibit 3

ELMT CONSULTING

0 250 500 1,000 Feet

Source: ESRI Aerial Imagery, Soil Survey Geographic Database, San Bermardino County

215 TABLE TOP PROJECT
HABITAT ASSESSMENT

Soils

Exhibit 4

215 TABLE TOP PROJECT
HABITAT ASSESSMENT

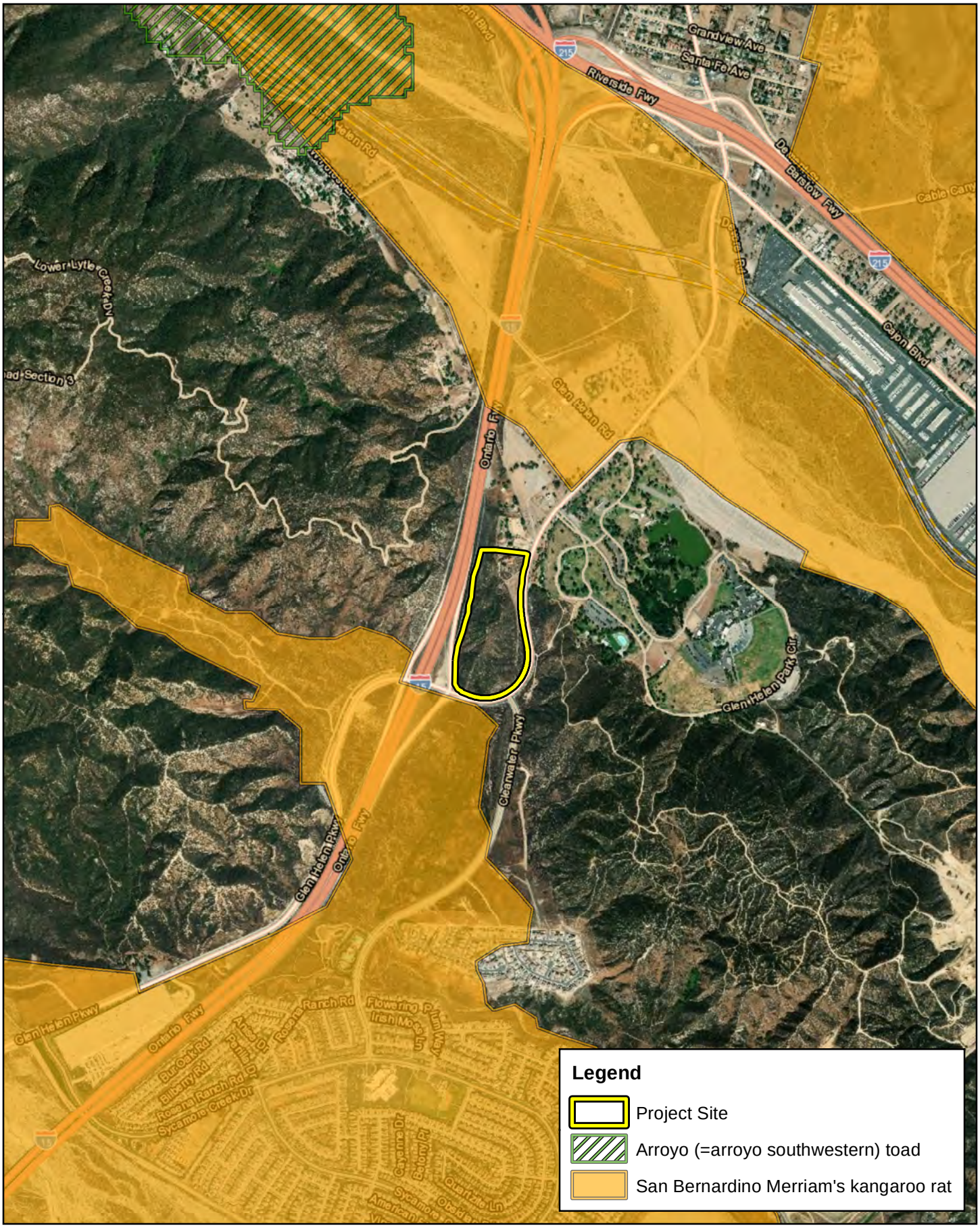
ELMT CONSULTING

0 125 250 500 Feet

Source: ESRI Aerial Imagery, San Bermardino County

Vegetation Communities and Land Cover Types

Exhibit 5



215 TABLE TOP PROJECT
HABITAT ASSESSMENT

Critical Habitat

ELMT CONSULTING

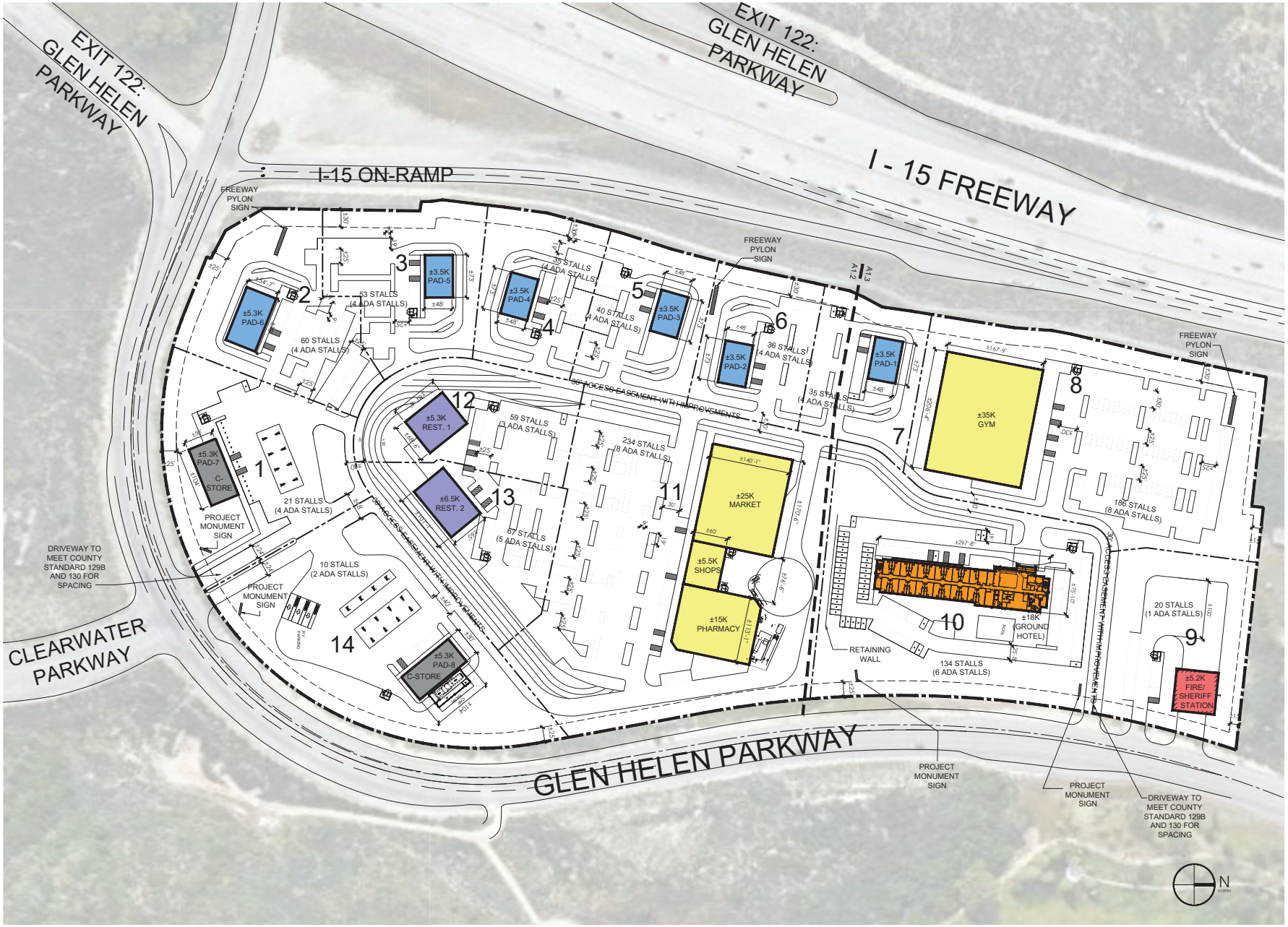
0 500 1,000 2,000 Feet

Source: ESRI Aerial Imagery, USFWS Critical Habitat, San Bermardino County

Exhibit 6

Attachment B

Conceptual Site Plans



SUMMARY

SITE AREA: 1,411,779 SF (32.41 AC)

GROSS AREA (W/ FIRE STATION): +/- 202,900 SF

NET AREA (W/O FIRE STATION): +/- 197,700 SF

BUILDING F.A.R.: 14%

PARCEL 1
AREA: +/- 95,328 SF OR +/- 2.2 AC
BLDG AREA: +/- 5,300 SF
PARKING PROVIDED: 21 STALLS
PARKING RATIO: 3.9/1000

PARCEL 2
AREA: +/- 76,421 SF OR +/- 1.8 AC
BLDG AREA: +/- 5,300 SF
PARKING PROVIDED: 60 STALLS
PARKING RATIO: 11.3/1000

PARCEL 3
AREA: +/- 65,125 SF OR +/- 1.5 AC
BLDG AREA: +/- 3,500 SF
PARKING PROVIDED: 53 STALLS
PARKING RATIO: 15.1/1000

PARCEL 4
AREA: +/- 52,211 SF OR +/- 1.2 AC
BLDG AREA: +/- 3,500 SF
PARKING PROVIDED: 35 STALLS
PARKING RATIO: 10/1000

PARCEL 5
AREA: +/- 51,857 SF OR +/- 1.2 AC
BLDG AREA: +/- 3,500 SF
PARKING PROVIDED: 40 STALLS
PARKING RATIO: 11.4/1000

PARCEL 6
AREA: +/- 48,800 SF OR +/- 1.1 AC
BLDG AREA: +/- 3,500 SF
PARKING PROVIDED: 36 STALLS
PARKING RATIO: 10.3/1000

PARCEL 7
AREA: +/- 47,838 SF OR +/- 1.1 AC
BLDG AREA: +/- 3,500 SF
PARKING PROVIDED: 35 STALLS
PARKING RATIO: 10/1000

PARCEL 8
AREA: +/- 190,151 SF OR +/- 4.4 AC
BLDG AREA: +/- 35,000 SF
PARKING PROVIDED: 186 STALLS
PARKING RATIO: 5.31/1000

PARCEL 9
AREA: +/- 69,353 SF OR +/- 1.6 AC
BLDG AREA: +/- 5,200 SF
PARKING PROVIDED: 20 STALLS
PARKING RATIO: 3.86/1000

PARCEL 10
AREA: +/- 168,877 SF OR +/- 3.9 AC
BLDG AREA: +/- 72,000 SF
PARKING PROVIDED: 134 STALLS
PARKING RATIO: 1.86/1000

PARCEL 11
AREA: +/- 261,792 SF OR +/- 6.0 AC
BLDG AREA: +/- 45,500 SF
PARKING PROVIDED: 234 STALLS
PARKING RATIO: 5.14/1000

PARCEL 12
AREA: +/- 64,135 SF OR +/- 1.5 AC
BLDG AREA: +/- 5,300 SF
PARKING PROVIDED: 59 STALLS
PARKING RATIO: 11.13/1000

PARCEL 13
AREA: +/- 66,352 SF OR +/- 1.5 AC
BLDG AREA: +/- 6,500 SF
PARKING PROVIDED: 67 STALLS
PARKING RATIO: 10.3/1000

PARCEL 14
AREA: +/- 138,704 SF OR +/- 3.2 AC
BLDG AREA: +/- 5,300 SF
PARKING PROVIDED: 10 STALLS
PARKING RATIO: 1.9/1000

TOTAL PARKING: 990 SPACES
(61 ADA)
40 EV SPACES
04 RV SPACES

TOTAL PARKING RATIO: 4.87 SPACES PER 1,000 SF

NEC GLEN HELEN & I-15

PROPOSED SITE PLAN

A1.1

SAN BERNARDINO COUNTY, CA

DLR # 75–22756-00 DATE: NOVEMBER 03, 2023

SCALE: 1" = 750' - 0"

UCR Group Property Development

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DLRGROUP
ARCHITECTURE ENGINEERING PLANNING INTERIORS

Attachment C

Site Photographs

Photograph 1: Looking at the disturbed area on the northeast portion of the project site.

Photograph 2: View of the existing residential development on the northern boundary of the site.

Photograph 3: View of a structure on the northern boundary of the site and the disturbed area associated with the residential development.

Photograph 4: from the northern boundary of the project site looking south across the site at the steep hill on the southern portion of the site.

Photograph 5: Looking north at the northwest corner of the site.

Photograph 6: From the northwest corner of the site looking south along the western boundary.

Photograph 7: From the middle of the western boundary of the site looking north along the western boundary.

Photograph 8: Looking at the southwest corner of the project site.

Photograph 9: Looking north along the eastern boundary of the site from the southeast corner.

Photograph 10: From the middle of the eastern boundary of the site looking south at the southeast corner of the site.

Photograph 11: Looking north across the project site from the steep hill on the southern portion of the site.

Photograph 12: Looking south at the southern portion of the site from the middle of the steep hill on the southern portion of the site.

Photograph 13: From the southeast corner of the project site looking at the mulefat scrub plant community.

Photograph 14: View of the mulefat scrub plant community on the southeast corner of the project site.

Photograph 15: Looking at the culver that conveys storm water under Glen Helen Parkway.

Photograph 16: Looking south at the topographic low spot on the southeast corner of the site.

Attachment D

Potentially Occurring Special-Status Biological Resources

Table D-1: Potentially Occurring Special-Status Biological Resources

Scientific Name Common Name	**Status**	**Habitat**	**Observed On-site**	**Potential to Occur**
SPECIAL-STATUS WILDLIFE SPECIES				
Accipiter cooperii Cooper's hawk	Fed: None CA: WL	Generally found in forested areas up to 3,000 feet in elevation, especially near edges and rivers. Prefers hardwood stands and mature forests, but can be found in urban and suburban areas where there are tall trees for nesting. Common in open areas during nesting season.	No	**Moderate.** There is suitable foraging habitat throughout the site, but no suitable nesting opportunities onsite. This species is adapted to urban environments and occurs commonly.
Aimophila ruficeps canescens southern California rufous-crowned sparrow	Fed: None CA: WL	Typically found between 3,000 and 6,000 feet in elevation. Breed in sparsely vegetated shrublands on hillsides and canyons. Prefers coastal sage scrub dominated by California sagebrush (*Artemisia californica*), but can also be found breeding in coastal bluff scrub, low-growing serpentine chaparral, and along the edges of tall chaparral habitats.	Yes	**Present.** Observed onsite during the 2019 CAGN focused survey. The project site provides suitable foraging and nesting habitat.
Anniella stebbinsi southern California legless lizard	Fed: None CA: SSC	Occurs primarily in areas with sandy or loose loamy soils under sparse vegetation of beaches, chaparral, or pine-oak woodland; or near sycamores, oaks, or cottonwoods that grow on stream terraces. Often found under or in the close vicinity of logs, rocks, old boards, and the compacted debris of woodrat nests.	No	**Presumed absent.** No suitable habitat is present on-site.
Aquila chrysaetos golden eagle	Fed: None CA: FP; WL	Occupies nearly all terrestrial habitats of the western states except densely forested areas. Favors secluded cliffs with overhanging ledges and large trees for nesting and cover. Hilly or mountainous country where takeoff and soaring are supported by updrafts is generally preferred to flat habitats. Deeply cut canyons rising to open mountain slopes and crags are ideal habitat.	No	**Presumed absent.** No suitable habitat is present on-site.
Ardea alba great egret	Fed: None CA: None	Yearlong resident throughout California, except for the high mountains and deserts. Feeds and rests in fresh, and saline emergent wetlands, along the margins of estuaries, lakes, and slow-moving streams, on mudflats and salt ponds, and in irrigated croplands and pastures.	No	**Presumed absent.** No suitable habitat is present on-site.
Arizona elegans occidentalis California glossy snake	Fed: None CA: SSC	Occurs in a wide variety of habitat types including open desert, grasslands, shrublands, chaparral, and woodlands. Prefers areas where the soil is loose and sandy which allows for burrowing.	No	**Presumed absent.** No suitable habitat is present on-site.

Scientific Name Common Name	**Status**	**Habitat**	**Observed On-site**	**Potential to Occur**
Artemisiospiza belli belli Bell's sage sparrow	Fed: None CA: WL	Occurs in chaparral dominated by fairly dense stands of chamise. Also found in coastal sage scrub in south of range.	No	**High**. There is suitable foraging and nesting habitat throughout the site.
Aspidoscelis tigris stejnegeri coastal whiptail	Fed: None CA: SSC	Found in a variety of ecosystems, primarily hot and dry open areas with sparse foliage such as chaparral, woodland, and riparian areas.	Yes	**Present.** This species was observed onsite.
Athene cunicularia burrowing owl	Fed: None CA: SSC	Primarily a grassland species, but it persists and even thrives in some landscapes highly altered by human activity. Occurs in open, annual or perennial grasslands, deserts, and scrublands characterized by low-growing vegetation. The overriding characteristics of suitable habitat appear to be burrows for roosting and nesting and relatively short vegetation with only sparse shrubs and taller vegetation.	No	**Presumed absent.** No suitable habitat is present on-site.
Batrachoseps gabrieli San Gabriel slender salamander	Fed: None CA: None	Known from select localities in the San Gabriel Mountains and the Mt. Baldy area of Los Angeles County and the western end of the San Bernardino Mountains in San Bernardino Co., with an elevation range of 1,200- 5,085 feet. Occurs on talus slopes surrounded by a variety of conifer and montane hardwood species, including bigcone spruce, pine, white fir, incense cedar, canyon live oak, black oak, and California laurel.	No	**Presumed absent.** No suitable habitat is present on-site.
Bombus crotchii Crotch bumble bee	Fed: None CA: None	Exclusive to coastal California east towards the Sierra-Cascade Crest; less common in western Nevada.	No	**Presumed absent.** No suitable habitat is present on-site.
Calypte costae Costa's hummingbird	Fed: None CA: None	Desert and semi-desert, arid brushy foothills and chaparral. A desert hummingbird that breeds in the Sonoran and Mojave Deserts. Departs desert heat moving into chaparral, scrub, and woodland habitats.	No	**Low.** The project site provides marginal suitable habitat.
Chaetodipus fallax fallax northwestern San Diego pocket mouse	Fed: None CA: SSC	Occurs in desert and coastal habitats in southern California, Mexico, and northern Baja California, from sea level to at least 1,400 meters above msl. Found in a variety of temperate habitats ranging from chaparral and grasslands to scrub forests and deserts. Requires low growing vegetation or rocky outcroppings, as well as sandy soils for burrowing.	No	**Presumed absent.** No suitable habitat is present on-site.
Chaetodipus fallax pallidus pallid San Diego pocket mouse	Fed: None CA: SSC	Occurs in sandy herbaceous areas, usually in association with rocks or coarse gravel in desert wash, desert scrub, desert succulent scrub, and pinyon-juniper communities.	No	**Presumed absent.** No suitable habitat is present on-site.

Scientific Name Common Name	**Status**		**Habitat**	**Observed On-site**	**Potential to Occur**
Circus hudsonius northern harrier	Fed: CA:	None SSC	Frequents meadows, grasslands, open rangelands, desert sinks, fresh and saltwater emergent wetlands; seldom found in wooded areas. Mostly found in flat, or hummocky, open areas of tall, dense grasses moist or dry shrubs, and edges for nesting, cover, and feeding.	No	**Presumed absent.** No suitable habitat is present on-site.
Dipodomys merriami parvus San Bernardino kangaroo rat	Fed: CA:	**END** SSC	Primarily found in Riversidian alluvial fan sage scrub and sandy loam soils, alluvial fans and flood plains, and along washes with nearby sage scrub. May occur at lower densities in Riversidian upland sage scrub, chaparral and grassland in uplands and tributaries in proximity to Riversidian alluvial fan sage scrub habitats. Tend to avoid rocky substrates and prefer sandy loam substrates for digging of shallow burrows.	No	**Presumed absent.** No suitable habitat is present on-site.
Dipodomys simulans Dulzura kangaroo rat	Fed: CA:	None None	Relatively common in chaparral, coastal sage scrub, Riversidean alluvial fan sage scrub, and peninsular juniper woodland habitats.	No	**Presumed absent.** No suitable habitat is present on-site.
Elanus leucurus white-tailed kite	Fed: CA:	None FP	Occurs in low elevation, open grasslands, savannah-like habitats, agricultural areas, wetlands, and oak woodlands. Uses trees with dense canopies for cover. Important prey item is the California vole.	No	**Presumed absent.** No suitable habitat is present on-site.
Eremophila alpestris actia California horned lark	Fed: CA:	None WL	Generally found in shortgrass prairies, grasslands, disturbed fields, or similar habitat types. Flocks in groups.	No	**Presumed absent.** No suitable habitat is present on-site.
Falco mexicanus prairie falcon	Fed: CA:	None WL	In the winter, they prefer open desert habitat and grassland habitat. Breed in open, arid grassland with cliffs and bluffs for nesting.	No	**Presumed absent.** No suitable habitat is present on-site.
Icteria virens yellow-breasted chat	Fed: CA:	None SSC	Primarily found in tall, dense, relatively wide riparian woodlands and thickets of willows, vine tangles, and dense brush with well-developed understories. Nesting areas are associated with streams, swampy ground, and the borders of small ponds. Breeding habitat must be dense to provide shade and concealment. It winters south the Central America.	No	**Presumed absent.** No suitable habitat is present on-site.
Lanius ludovicianus loggerhead shrike	Fed: CA:	None SSC	Often found in broken woodlands, shrublands, and other habitats. Prefers open country with scattered perches for hunting and fairly dense brush for nesting.	No	**High.** On-site habitats provide suitable nesting and foraging opportunities.
Lepus californicus bennettii San Diego black-tailed jackrabbit	Fed: CA:	None SSC	Occurs in diverse habitats, but primarily is found in arid regions supporting shortgrass habitats. Openness of open scrub habitat is preferred over dense chaparral.	No	**Presumed absent.** No suitable habitat is present on-site.

Scientific Name Common Name	**Status**	**Habitat**	**Observed On-site**	**Potential to Occur**
Microtus californicus mohavensis Mohave river vole	Fed: None CA: SSC	Found in moist habitats including meadows, freshwater marshes and irrigated pastures in the vicinity of the Mojave River. Suitable habitat it associated with ponds and irrigation canals along with the Mojave River proper. Alfalfa fields may also provide habitat.	No	**Presumed absent.** No suitable habitat is present on-site.
Neotoma lepida intermedia San Diego desert woodrat	Fed: None CA: SSC	Occurs in coastal scrub communities between San Luis Obispo and San Diego Counties. Prefers moderate to dense canopies, and especially rocky outcrops.	No	**Moderate.** The project site provides marginal suitable habitat on-site.
Nyctinomops femorosaccus pocketed free-tailed bat	Fed: None CA: SSC	Often found in pinyon-juniper woodlands, desert scrub, desert succulent shrub, desert riparian, desert wash, alkali desert scrub, Joshua tree, and palm oasis.	No	**Presumed absent.** No suitable habitat is present on-site.
Pandion haliaetus osprey	Fed: None CA: WL	Remain close to still or slow-moving bodies of water including oceans, rivers, lakes, mangroves, coastal wetlands, lagoons, reefs, estuaries and marshes. Generally nest in high places, such as trees, power poles, or cliffs.	No	**Presumed absent.** No suitable habitat is present on-site.
Perognathus longimembris brevinasus Los Angeles pocket mouse	Fed: None CA: SSC	Occurs in lower elevation grasslands and coastal sage scrub communities in and around the Los Angeles Basin. Prefers open ground with fine sandy soils. May not dig extensive burrows, but instead will seek refuge under weeds and dead leaves instead.	No	**Presumed absent.** No suitable habitat is present on-site.
Perognathus longimembris pacificus Pacific pocket mouse	Fed: **END** CA: SSC	Occurs on loose sandy soils that support sparse coastal sage scrub, grassland, and ruderal habitats.	No	**Presumed absent.** No suitable habitat is present on-site.
Phrynosoma blainvillii coast horned lizard	Fed: None CA: SSC	Occurs in a wide variety of vegetation types including coastal sage scrub, annual grassland, chaparral, oak woodland, riparian woodland and coniferous forest. In inland areas, this species is restricted to areas with pockets of open microhabitat, created by disturbance (i.e. fire, floods, roads, grazing, fire breaks). The key elements of such habitats are loose, fine soils with a high sand fraction; an abundance of native ants or other insects; and open areas with limited overstory for basking and low, but relatively dense shrubs for refuge.	No	**Low**. There is marginal habitat throughout the site.
Polioptila californica californica coastal California gnatcatcher	Fed: **THR** CA: SSC	Obligate resident of sage scrub habitats that are dominated by California sagebrush (*Artemisia californica*). This species generally occurs below 750 feet elevation in coastal regions and below 1,500 feet inland. Ranges from the Ventura County, south to San Diego County and northern Baja California and it is less common in sage scrub with a high percentage of tall shrubs. Prefers habitat with more low-growing vegetation.	No	**Moderate.** The project site provides marginal suitable habitat on-site. CAGN was not observed on-site during the 2019 focused survey.

Scientific Name Common Name	**Status**	**Habitat**	**Observed On-site**	**Potential to Occur**
Rana muscosa southern mountain yellow-legged frog	Fed: **END** CA: **END**; SSC	Occurs in lower elevation habitats characterized by rocky streambeds and wet meadows, while higher elevation habitats include lakes, ponds, and streams. Occupy streams in narrow, rock-walled canyons. Often found along rock walls or vegetated banks and always within a few feet of the water.	No	**Presumed absent.** No suitable habitat is present on-site.
Rhinichthys osculus* ssp. *3 Santa Ana speckled dace	Fed: None CA: SSC	Requires permanent flowing streams within summer water temperatures of 17 – 20 degrees Celsius. Inhabits shallow cobble and gravel riffles and small streams that flow through steep, rocky canyons with chaparral covered walls.	No	**Presumed absent.** No suitable habitat is present on-site.
Salvadora hexalepis virgultea coast patch-nosed snake	Fed: None CA: SSC	Found in brushy or shrubby vegetation along the coast and requires small mammal burrows for refuge and overwintering.	No	**Presumed absent.** No suitable habitat is present on-site.
Setophaga petechial yellow warbler	Fed: None CA: SSC	Nests over all of California except the Central Valley, the Mojave Desert region, and high altitudes and the eastern side of the Sierra Nevada. Winters along the Colorado River and in parts of Imperial and Riverside Counties. Nests in riparian areas dominated by willows, cottonwoods, sycamores, or alders or in mature chaparral. May also use oaks, conifers, and urban areas near stream courses.	No	**Presumed absent.** No suitable habitat is present on-site.
Taxidea taxus American badger	Fed: None CA: SSC	Primarily occupy grasslands, parklands, farms, tallgrass and shortgrass prairies, meadows, shrub-steppe communities and other treeless areas with sandy loam soils where it can dig more easily for its prey. Occasionally found in open chaparral (with less than 50% plant cover) and riparian zones.	No	**Presumed absent.** No suitable habitat is present on-site.
Vireo bellii pusillus least Bell's vireo	Fed: **END** CA: **END**	Primarily occupy Riverine riparian habitat that typically feature dense cover within 1-2 meters of the ground and a dense, stratified canopy. Typically it is associated with southern willow scrub, cottonwood-willow forest, mule fat scrub, sycamore alluvial woodlands, coast live oak riparian forest, arroyo willow riparian forest, or mesquite in desert localities. It uses habitat which is limited to the immediate vicinity of water courses, 2,000 feet elevation in the interior.	No	**Presumed absent.** No suitable habitat is present on-site.

SPECIAL-STATUS PLANT SPECIES				
Ambrosia monogyra singlewhorl burrobush	Fed: None CA: None CNPS: 2B.2	Found in sandy soils within chaparral and Sonoran desert scrub habitat. Found at elevations ranging from 33 to 1,640 feet. Blooming period is from August to November.	No	**Moderate.** The project site provides suitable habitat for this species. Was not observed onsite during the 2019 focused survey.
Calochortus plummerae Plummer's mariposa-lily	Fed: None CA: None CNPS: 4.2	Prefers openings in chaparral, foothill woodland, coastal sage scrub, valley foothill grasslands, cismontane woodland, lower montane coniferous forest and yellow pine forest. Often found on dry, rocky slopes and soils and brushy areas. Can be very common after a fire. Found at elevations ranging from 459 to 6,299 feet. Blooming period is from May to July.	No	**Moderate.** The project site provides suitable habitat for this species. Was not observed onsite during the 2019 focused survey.
Chorizanthe parryi* var. *parryi Parry's spineflower	Fed: None CA: None CNPS: 1B.1	Occurs on sandy and/or rocky soils in chaparral, coastal sage scrub, and sandy openings within alluvial washes and margins. Found at elevations ranging from 951 to 3,773 feet. Blooming period is from April to June.	No	**Moderate.** The project site provides suitable habitat for this species. Was not observed onsite during the 2019 focused survey.
Chorizanthe xanti var. leucotheca white-bracted spineflower	Fed: None CA: None CNPS: 1B.2	Found in sandy or gravelly soils within coastal scrub (alluvial fans), Mojavean desert scrub, pinyon and juniper woodland habitats. Found at elevations ranging from 984 to 3,937 feet. Blooming period is from April to June.	No	**Moderate.** The project site provides suitable habitat for this species. Was not observed onsite during the 2019 focused survey.
Cryptantha incana Tulare cryptantha	Fed: None CA: None CNPS: 1B.3	Occurs in lower montane coniferous forest (gravelly or rocky). Found at elevations ranging from 4,692 to 7,054 feet above msl. Blooming period is from June to August.	No	**Presumed absent.** No suitable habitat is present on-site.
Dodecahema leptoceras slender-horned spineflower	Fed: **END** CA: **END** CNPS: 1B.1	Chaparral, coastal scrub (alluvial fan sage scrub). Flood deposited terraces and washes. Found at elevations ranging from 1,181 to 2,690 feet. Blooming period is from April to June.	No	**Presumed absent.** No suitable habitat is present on-site.
Eriastrum densifolium* ssp. *sanctorum Santa Ana River woollystar	Fed: **END** CA: **END** CNPS: 1B.1	Found in sandy soil in association with mature alluvial scrub. Ideal habitat appears to be a terrace or bench that receives overbank deposits every 50 to 100 years. Cryptogamic crusts are frequently present in occupied areas. Found at elevations ranging from 299 to 2,001 feet. Blooming period is from April to September.	No	**Presumed absent.** No suitable habitat is present on-site.
Galium jepsonii Jepson's bedstraw	Fed: None CA: None CNPS: 4.3	Found in granitic, rocky or gravelly soils within lower montane coniferous forest and upper montane coniferous forest habitats. Found at elevations ranging from 5,052 to 8,202 feet above msl. Blooming period is from July to August.	No	**Presumed absent.** No suitable habitat is present on-site.
Galium johnstonii Johnston's bedstraw	Fed: None CA: None CNPS: 4.3	Found in granitic, rocky or gravelly soils within lower montane coniferous forest and upper montane coniferous forest habitats. Found at elevations ranging from 5,052 to 8,202 feet. Blooming period is from July to August.	No	**Presumed absent.** No suitable habitat is present on-site.

Horkelia cuneata var. puberula Mesa horkelia	Fed: None CA: None CNPS: 1B.1	Occurs on sandy or gravelly soils in chaparral, woodlands, and coastal scrub plant communities. Found at elevations ranging from 230 to 2,657 feet. Blooming period is from February to September.	No	**Moderate.** The project site provides suitable habitat for this species. Was not observed onsite during the 2019 focused survey.
Juglans californica southern California black walnut	Fed: None CA: None CNPS: 4.2	Found in chaparral, cismontane woodland, coastal scrub, and riparian woodland habitats. Found at elevations ranging from 164 to 2,953 feet. Blooming period is from March to August.	Yes	**Present.** This species was observed on-site.
Lilium humboldtii* ssp. *ocellatum ocellated humboldt lily	Fed: None CA: None CNPS: 4.2	Found in openings within chaparral, cismontane woodland, coastal scrub, lower montane coniferous forest, and riparian woodland habitats. Found at elevations ranging from 98 to 5,906 feet in elevation. Blooming period is from March to August.	No	**Presumed absent.** No suitable habitat is present on-site.
Lilium parryi lemon lily	Fed: None CA: None CNPS: 1B.2	Prefers lower montane coniferous forest, riparian forests, upper montane coniferous forests, meadows and seeps. Found at elevations ranging from 4,003 to 9,006 feet. Blooming period is from July to August.	No	**Presumed absent.** No suitable habitat is present on-site.
Lycium parishii Parish's desert-thorn	Fed: None CA: None CNPS: 2B.3	Habitats include coastal scrub and Sonoran desert scrub. Found at elevations ranging from 443 to 3,281 feet. Blooming period is from March to April.	No	**Presumed absent.** No suitable habitat is present on-site.
Malacothamnus parishii Parish's bush-mallow	Fed: None CA: None CNPS: 1A	Species is presumed extinct. Habitats include coastal scrub and chaparral. Found at elevations ranging from 1,000 to 1,495 feet. Blooming period is from June to July.	No	**Presumed absent.** No suitable habitat is present on-site.
Monardella saxicola rock monardella	Fed: None CA: None CNPS: 4.2	Found in rocky, usually serpentinite, soils within closed-cone coniferous forest, chaparral, and lower montane coniferous forest habitats. Found at elevations ranging from 1,640 to 5,906 feet. Blooming period is from June to September.	No	**Presumed absent.** No suitable habitat is present on-site.
Opuntia basilaris var. brachyclada short-joint beavertail	Fed: None CA: None CNPS: 1B.1	Habitats include chaparral, Joshua tree woodland, Mojavean desert scrub, pinyon and juniper woodlands. Found at elevations ranging from 1,394 to 5,906 feet. Blooming period is from April to August.	No	**Presumed absent.** No suitable habitat is present on-site.
Senecio astephanus San Gabriel ragwort	Fed: None CA: None CNPS: 4.3	Grows in chaparral, cismontane woodland, and coastal scrub habitat. Found at elevations ranging from 49 to 2,625 feet. Blooming period is from January to April.	No	**Low.** No suitable habitat is present on-site. Was not observed onsite during the 2019 focused survey.
Streptanthus bernardinus Laguna Mountains jewelflower	Fed: None CA: None CNPS: 4.3	Grows in chaparral and lower montane coniferous forest on clay or decomposed granite soils. It is sometimes found in disturbed areas such as streamsides or roadcuts. From 4,724 to 8,202 feet in elevation. Blooming period is from May to August.	No	**Presumed absent.** No suitable habitat is present on-site.

SPECIAL-STATUS PLANT COMMUNITIES				
Riversidean Alluvial Fan Sage Scrub	CDFW Sensitive Habitat	Occur within broad washes of sandy alluvial drainages that carry rainfall runoff sporadically in winter and spring, but remain relatively dry through the remainder of the year. Is restricted to drainages and floodplains with very sandy substrates that have a dearth of decomposed plant material. These areas do not develop into riparian woodland or scrub due to the limited water resources and scouring by occasional floods.	No	**Absent**. This plant community was not observed on-site.
Southern Riparian Forest	CDFW Sensitive Habitat	Dense riparian forests found along streams and rivers. Characteristic plant species include western sycamore, cottonwood, and many other wetland plants.	No	**Absent**. This plant community was not observed on-site.
Southern Sycamore Alder Riparian Woodland	CDFW Sensitive Habitat	Occurs below 2,000 meters in elevation, sycamore and alder often occur along seasonally-flooded banks; cottonwoods and willows are also often present. Poison oak, mugwort, elderberry and wild raspberry may be present in understory.	No	**Absent**. This plant community was not observed on-site.

U.S. Fish and Wildlife Service (USFWS) - Federal
END- Federal Endangered
THR- Federal Threatened

California Department of Fish and Wildlife (CDFW) - California
END- California Endangered
THR- California Threatened
FP- California Fully Protected
SSC- California Species of Concern
WL- Watch List

California Native Plant Society (CNPS)
California Rare Plant Rank
1A Plants Presumed Extirpated in California and Either Rare or Extinct Elsewhere
1B Plants Rare, Threatened, or Endangered in California and Elsewhere
2B Plants Rare, Threatened, or Endangered in California, but More Common Elsewhere
4 Plants of Limited Distribution – A Watch List

Threat Ranks
0.1- Seriously threatened in California
0.2- Moderately threatened in California
0.3- Not very threatened in California

Attachment E

Regulations

Special status species are native species that have been afforded special legal or management protection because of concern for their continued existence. There are several categories of protection at both federal and state levels, depending on the magnitude of threat to continued existence and existing knowledge of population levels.

Federal Regulations

Endangered Species Act of 1973

As defined within the Federal Endangered Species Act (FESA) of 1973, an endangered species is any animal or plant listed by regulation as being in danger of extinction throughout all or a significant portion of its geographical range. A threatened species is any animal or plant that is likely to become endangered within the foreseeable future throughout all or a significant portion of its geographical range. Without a special permit, federal law prohibits the "take" of any individuals or habitat of federally listed species. Under Section 9 of the FESA, take is defined as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct." The term "harm" has been clarified to include "any act which actually kills or injures fish or wildlife, and emphasizes that such acts may include significant habitat modification or degradation that significantly impairs essential behavioral patterns of fish or wildlife." The presence of any federally threatened or endangered species within a project area generally imposes severe constraints on development, particularly if development would result in "take" of the species or its habitat. Under the regulations of the FESA, the United States Fish and Wildlife Service (USFWS) may authorize "take" when it is incidental to, but not the purpose of, an otherwise lawful act.

Critical Habitat is designated for the survival and recovery of species listed as threatened or endangered under the ESA. Critical Habitat includes those areas occupied by the species, in which are found physical and biological features that are essential to the conservation of an FESA listed species and which may require special management considerations or protection. Critical Habitat may also include unoccupied habitat if it is determined that the unoccupied habitat is essential for the conservation of the species.

Whenever federal agencies authorize, fund, or carry out actions that may adversely modify or destroy Critical Habitat, they must consult with USFWS under Section 7 of the ESA. The designation of Critical Habitat does not affect private landowners, unless a project they are proposing uses federal funds, or requires federal authorization or permits (e.g., funding from the Federal Highway Administration or a permit from the U.S. Army Corps of Engineers (Corps)).

If the USFWS determines that Critical Habitat will be adversely modified or destroyed from a proposed action, the USFWS will develop reasonable and prudent alternatives in cooperation with the federal institution to ensure the purpose of the proposed action can be achieved without loss of Critical Habitat. If the action is not likely to adversely modify or destroy Critical Habitat, USFWS will include a statement in its biological opinion concerning any incidental take that may be authorized and specify terms and conditions to ensure the agency is in compliance with the opinion.

Migratory Bird Treaty Act

Pursuant to the Migratory Bird Treaty Act (MBTA) (16 U.S. Government Code [USC] 703) of 1918, as amended in 1972, federal law prohibits the taking of migratory birds or their nests or eggs (16 USC 703; 50 CFR 10, 21). The statute states:

> *Unless and except as permitted by regulations made as hereinafter provided in this subchapter, it shall be unlawful at any time, by any means or in any manner, to pursue, hunt, take, capture, kill, attempt to take, capture, or kill...any migratory bird, any part, nest, or egg of any such bird...included in the terms of the [Migratory Bird] conventions…*

The MBTA covers the taking of any nests or eggs of migratory birds, except as allowed by permit pursuant to 50 CFR, Part 21. Disturbances causing nest abandonment and/or loss of reproductive effort (i.e., killing or abandonment of eggs or young) may also be considered "take." This regulation seeks to protect migratory birds and active nests.

In 1972, the MBTA was amended to include protection for migratory birds of prey (e.g., raptors). Six families of raptors occurring in North America were included in the amendment: Accipitridae (kites, hawks, and eagles); Cathartidae (New World vultures); Falconidae (falcons and caracaras); Pandionidae (ospreys); Strigidae (typical owls); and Tytonidae (barn owls). The provisions of the 1972 amendment to the MBTA protects all species and subspecies of the families listed above. The MBTA protects over 800 species including geese, ducks, shorebirds, raptors, songbirds and many relatively common species.

State Regulations

California Environmental Quality Act (CEQA)

The California Environmental Quality Act (CEQA) provides for the protection of the environment within the State of California by establishing State policy to prevent significant, avoidable damage to the environment through the use of alternatives or mitigation measures for projects. It applies to actions directly undertaken, financed, or permitted by State lead agencies. If a project is determined to be subject to CEQA, the lead agency will be required to conduct an Initial Study (IS); if the IS determines that the project may have significant impacts on the environment, the lead agency will subsequently be required to write an Environmental Impact Report (EIR). A finding of non-significant effects will require either a Negative Declaration or a Mitigated Negative Declaration instead of an EIR. Section 15380 of the CEQA Guidelines independently defines "endangered" and "rare" species separately from the definitions of the California Endangered Species Act (CESA). Under CEQA, "endangered" species of plants or animals are defined as those whose survival and reproduction in the wild are in immediate jeopardy, while "rare" species are defined as those who are in such low numbers that they could become endangered if their environment worsens.

California Endangered Species Act (CESA)

In addition to federal laws, the state of California implements the CESA which is enforced by CDFW. The CESA program maintains a separate listing of species beyond the FESA, although the provisions of each act are similar.

State-listed threatened and endangered species are protected under provisions of the CESA. Activities that may result in "take" of individuals (defined in CESA as; "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill") are regulated by CDFW. Habitat degradation or modification is not included in the definition of "take" under CESA. Nonetheless, CDFW has interpreted "take" to include the destruction of nesting, denning, or foraging habitat necessary to maintain a viable breeding population of protected species.

The State of California considers an endangered species as one whose prospects of survival and reproduction are in immediate jeopardy. A threatened species is considered as one present in such small numbers throughout its range that it is likely to become an endangered species in the near future in the absence of special protection or management. A rare species is one that is considered present in such small numbers throughout its range that it may become endangered if its present environment worsens. State threatened and endangered species are fully protected against take, as defined above.

CDFW has also produced a species of special concern list to serve as a species watch list. Species on this list are either of limited distribution or their habitats have been reduced substantially, such that a threat to their populations may be imminent. Species of special concern may receive special attention during environmental review, but they do not have formal statutory protection. At the federal level, USFWS also uses the label species of concern, as an informal term that refers to species which might be in need of concentrated conservation actions. As the Species of Concern designated by USFWS do not receive formal legal protection, the use of the term does not necessarily ensure that the species will be proposed for listing as a threatened or endangered species.

Fish and Game Code

Fish and Game Code Sections 3503, 3503.5, 3511, and 3513 are applicable to natural resource management. For example, Section 3503 of the Code makes it unlawful to destroy any birds' nest or any birds' eggs that are protected under the MBTA. Further, any birds in the orders Falconiformes or Strigiformes (Birds of Prey, such as hawks, eagles, and owls) are protected under Section 3503.5 of the Fish and Game Code which makes it unlawful to take, possess, or destroy their nest or eggs. A consultation with CDFW may be required prior to the removal of any bird of prey nest that may occur on a project site. Section 3511 of the Fish and Game Code lists fully protected bird species, where the CDFW is unable to authorize the issuance of permits or licenses to take these species. Pertinent species that are State fully protected by the State include golden eagle (*Aquila chrysaetos*) and white-tailed kite (*Elanus leucurus*). Section 3513 of the Fish and Game Code makes it unlawful to take or possess any migratory nongame bird as designated in the MBTA or any part of such migratory nongame bird except as provided by rules and regulations adopted by the Secretary of the Interior under provisions of the MBTA.

Native Plant Protection Act

Sections 1900–1913 of the Fish and Game Code were developed to preserve, protect, and enhance Rare and Endangered plants in the state of California. The act requires all state agencies to use their authority to carry out programs to conserve Endangered and Rare native plants. Provisions of the Native Plant Protection Act prohibit the taking of listed plants from the wild and require notification of the CDFW at

least ten days in advance of any change in land use which would adversely impact listed plants. This allows the CDFW to salvage listed plant species that would otherwise be destroyed.

California Native Plant Society Rare and Endangered Plant Species

Vascular plants listed as rare or endangered by the CNPS, but which have no designated status under FESA or CESA are defined as follows:

California Rare Plant Rank

1A- Plants Presumed Extirpated in California and either Rare or Extinct Elsewhere

1B- Plants Rare, Threatened, or Endangered in California and Elsewhere

2A- Plants Presumed Extirpated in California, But More Common Elsewhere

2B- Plants Rare, Threatened, or Endangered in California, But More Common Elsewhere

3- Plants about Which More Information is Needed - A Review List

4- Plants of Limited Distribution - A Watch List

Threat Ranks

.1- Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat)

.2- Moderately threatened in California (20-80% occurrences threatened / moderate degree and immediacy of threat)

.3- Not very threatened in California (<20% of occurrences threatened / low degree and immediacy of threat or no current threats known).

There are three key agencies that regulate activities within inland streams, wetlands, and riparian areas in California. The Corps Regulatory Branch regulates activities pursuant to Section 404 of the Federal Clean Water Act (CWA) and Section 10 of the Rivers and Harbors Act. Of the State agencies, the CDFG regulates activities under the Fish and Game Code Section 1600-1616, and the Regional Board regulates activities pursuant to Section 401 of the CWA and the California Porter-Cologne Water Quality Control Act.

Federal Regulations

In accordance with the Revised Definition of "Waters of the United States" (March 20, 2023), "waters of the United Sates" are defined as follows:

> The ''waters of the United States'' are defined in paragraph (a) of this rule:
>
> (1) traditional navigable waters, the territorial seas, and interstate waters;
>
> (2) impoundments of ''waters of the United States'';
>
> (3) tributaries to traditional navigable waters, the territorial seas, interstate waters, or impoundments when the tributaries meet either the relatively permanent standard or the significant nexus standard (''jurisdictional tributaries'');
>
> (4) wetlands adjacent to traditional navigable waters; wetlands adjacent to and with a continuous surface connection to relatively permanent paragraph impoundments or to jurisdictional tributaries when the jurisdictional tributaries meet the relatively permanent standard; and wetlands adjacent to impoundments or jurisdictional tributaries when the wetlands meet the significant nexus standard (''jurisdictional adjacent wetlands''); and
>
> (5) intrastate lakes and ponds, streams, or wetlands not identified in (1) through (4) above that meet either the relatively permanent standard or the significant nexus standard.

The ''relatively permanent standard'' means relatively permanent, standing or continuously flowing waters connected to traditional navigable waters, and waters with a continuous surface connection to such relatively permanent waters or to traditional navigable waters. The ''significant nexus standard'' means waters that, either alone or in combination with similarly situated waters in the region, significantly affect the chemical, physical, or biological integrity of traditional navigable waters, the territorial seas, or interstate waters.

Section 401 of the Clean Water Act

Pursuant to Section 401 of the CWA, any applicant for a federal license or permit to conduct any activity which may result in any discharge to waters of the United States must provide certification from the State or Indian tribe in which the discharge originates. This certification provides for the protection of the physical, chemical, and biological integrity of waters, addresses impacts to water quality that may result from issuance of federal permits, and helps insure that federal actions will not violate water quality standards of the State or Indian tribe. In California, there are nine Regional Water Quality Control Boards (Regional Board) that issue or deny certification for discharges to waters of the United States and waters of the State, including wetlands, within their geographical jurisdiction. The State Water Resources Control

Board assumed this responsibility when a project has the potential to result in the discharge to waters within multiple Regional Boards.

State Regulations

Fish and Game Code

Fish and Game Code Sections 1600 et. seq. establishes a fee-based process to ensure that projects conducted in and around lakes, rivers, or streams do not adversely impact fish and wildlife resources, or, when adverse impacts cannot be avoided, ensures that adequate mitigation and/or compensation is provided.

Fish and Game Code Section 1602 requires any person, state, or local governmental agency or public utility to notify the CDFW before beginning any activity that will do one or more of the following:

(1) substantially obstruct or divert the natural flow of a river, stream, or lake;
(2) substantially change or use any material from the bed, channel, or bank of a river, stream, or lake; or
(3) deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into a river, stream, or lake.

Fish and Game Code Section 1602 applies to all perennial, intermittent, and ephemeral rivers, streams, and lakes in the State. CDFW's regulatory authority extends to include riparian habitat (including wetlands) supported by a river, stream, or lake regardless of the presence or absence of hydric soils and saturated soil conditions. Generally, the CDFW takes jurisdiction to the top of bank of the stream or to the outer limit of the adjacent riparian vegetation (outer drip line), whichever is greater. Notification is generally required for any project that will take place in or in the vicinity of a river, stream, lake, or their tributaries. This includes rivers or streams that flow at least periodically or permanently through a bed or channel with banks that support fish or other aquatic life and watercourses having a surface or subsurface flow that support or have supported riparian vegetation. A Section 1602 Streambed Alteration Agreement would be required if impacts to identified CDFW jurisdictional areas occur.

Porter Cologne Act

The California *Porter-Cologne Water Quality Control Act* gives the State very broad authority to regulate waters of the State, which are defined as any surface water or groundwater, including saline waters. The Porter-Cologne Act has become an important tool in the post SWANCC and Rapanos regulatory environment, with respect to the state's authority over isolated and insignificant waters. Generally, any person proposing to discharge waste into a water body that could affect its water quality must file a Report of Waste Discharge in the event that there is no Section 404/401 nexus. Although "waste" is partially defined as any waste substance associated with human habitation, the Regional Board also interprets this to include fill discharged into water bodies.

Appendix D:
Air Quality Assessment

Air Quality Assessment
The Oasis at Glen Helen Parkway
County of San Bernardino, California

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Appendix A: Air Quality Modeling Data

LIST OF ABBREVIATED TERMS

AQMP	air quality management plan
AB	Assembly Bill
ADT	average daily traffic
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CAAQS	California Ambient Air Quality Standards
CCAA	California Clean Air Act
CalEEMod	California Emissions Estimator Model
CEQA	California Environmental Quality Act
CO	carbon monoxide
cy	cubic yards
DPM	diesel particulate matter
FCAA	Federal Clean Air Act
H_2S	hydrogen sulfide
Pb	lead
LST	localized significance threshold
$\mu g/m^3$	micrograms per cubic meter
mg/m^3	milligrams per cubic meter
NAAQS	National Ambient Air Quality Standards
NO_2	nitrogen dioxide
NO_x	nitrogen oxide
O_3	ozone
PM_{10}	particulate matter less than 10 microns in diameter
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
ppm	parts per million
ROG	reactive organic gases
RTP/SCS	Regional Transportation Plan/Sustainable Communities Strategy
SB	Senate Bill
SRA	source receptor area
SCAB	South Coast Air Basin
SCAQMD	South Coast Air Quality Management District
SCAG	Southern California Association of Governments
sf	square foot
SO_{4-2}	sulfates
SO_2	sulfur dioxide
TAC	toxic air contaminant
U.S. EPA	U.S. Environmental Protection Agency
VOC	volatile organic compound

1 INTRODUCTION

This report documents the results of an Air Quality Assessment completed for The Oasis at Glen Helen Parkway ("Project" or "Proposed Project"). The purpose of this Air Quality Assessment is to evaluate the potential construction and operational emissions associated with the Project and determine the level of impact the Project would have on the environment. This comparative analysis has been undertaken to analyze whether the Proposed Project would result in any new or substantially more severe significant environmental impacts as compared to the conclusions discussed in the certified Final Program Environmental Impact Report (FEIR) for the Glen Helen Specific Plan (State Clearinghouse # 2000011093), approved July 25, 2005 (Previously Approved Project).

1.1 Project Location and Setting

The Project site is located in an unincorporated area of southwestern San Bernardino County; refer to Exhibit 1, Regional Location Map. The Project is approximately 33-acre site (Assessor's Parcel Numbers [APNs] 0239-031-04, 0239-031-32, 0239-031-37, 0239-031-50) and is located east of Interstate (I-) 15, west of Glen Helen Parkway and the Glen Helen Regional Park, north of I-15 Exit 122, and south of single-family residences and the Glen Helen Park Maintenance Yard; refer to Exhibit 2, Local Vicinity Map. The City of Rialto is located to the south and southwest and the City of San Bernardino is located to the northeast, east, and south.

The Project site is vacant and generally surrounded by vacant land and roadway infrastructure to the west, south, and east, single family homes to the far north, and the Glen Helen Regional Park to the east. Open space areas are located across I-15 to the west, and across Glen Helen Parkway to the south and east. Further south, a residential community is located along Clearwater Parkway (approximately one-half mile to the south). Refer to Table 1: Surrounding Land Use and Zoning District.

Table 1: Surrounding Land Use and Zoning District

Area	Existing Land Use	Land Use Zoning District
Project Site	Vacant	Destination Recreation (DR)
North	Single Family	Commercial/Destination Entertainment (C/DE) Destination Recreation (DR)
South	Glen Helen Parkway, Vacant	Open Space Passive Recreation (OS/P)
East	Glen Helen Parkway, Vacant, Glen Helen Regional Park	Open Space/Active Recreation (OS/A)
West	I-15	Existing Road/Railroad (E/RR)

Source: County of San Bernardino. 2020. *Glen Helen Specific Plan; Exhibit 2-2 – Land Use Plan*

1.2 Project Description

The Project proposes the development of approximately 207,900 square feet (SF) of commercial and retail uses on approximately 33 acres, to include but not necessarily be limited to, hotel uses, fitness facilities, market and pharmacies, commercial shops, gas stations and convenience stores, drive-through car wash, restaurants, and a Fire and Sheriff Station.

The Project entitlements include the approval of a Specific Plan Amendment (SPA) to the existing Glen Helen Specific Plan (GHSP), a Planned Development Permit (PDP), and a Tentative Parcel Map (TPM) to allow for the development of approximately 207,900 SF of commercial and retail center land uses on an approximately 33-acre site; refer to Exhibit 3, Conceptual Site Plan.

The PDP Project site (as represented by the Conceptual Site plan) is anticipated to be developed in one phase and would include approximately 72,000 square feet designated for hotel uses; 35,000 square feet designated for a fitness facility, a 45,500 square foot building which includes 25,000-square feet designated for a market; a 15,000 square foot pharmacy; 5,500 square feet of commercial shops; 5,300 square feet designated for convenience store and a gas station with 12 fueling islands and related drive-thru carwash; 5,300 square feet designated for a convenience store with gas station and 10 fueling islands; and five 3,500 square foot buildings designated for drive-thru restaurants and an approximate 5,300 square foot drive-thru restaurant; two restaurants (5,300 square feet and 6,500 square feet); and 5,200 square feet designated for a Fire/Sheriff Station.

Site Access and Circulation

Access to the Project site would be provided at the existing signalized intersection of Glen Helen Parkway and Clearwater Parkway at the southern portion of the Project site. There would be an unsignalized 30-foot-wide driveway located on the northeastern portion of the Project site. Additionally, the proposed Fire/Sheriff Station would have driveway access directly to Glen Helen Parkway to provide emergency vehicle access from the station to public roadways. The Project would construct 30-foot-wide driveways throughout the Project site to provide circulation to the individual developments.

Project Phasing and Construction

It is currently anticipated that construction would begin in 2024 with an anticipated opening year of 2028. The Project requires approximately 2.8 million cubic yards of grading. Project construction is anticipated to require approximately four years to complete.

EXHIBIT 1: Regional Location Map
The Oasis at Glen Helen Parkway

Not to scale

Kimley»Horn

Legend

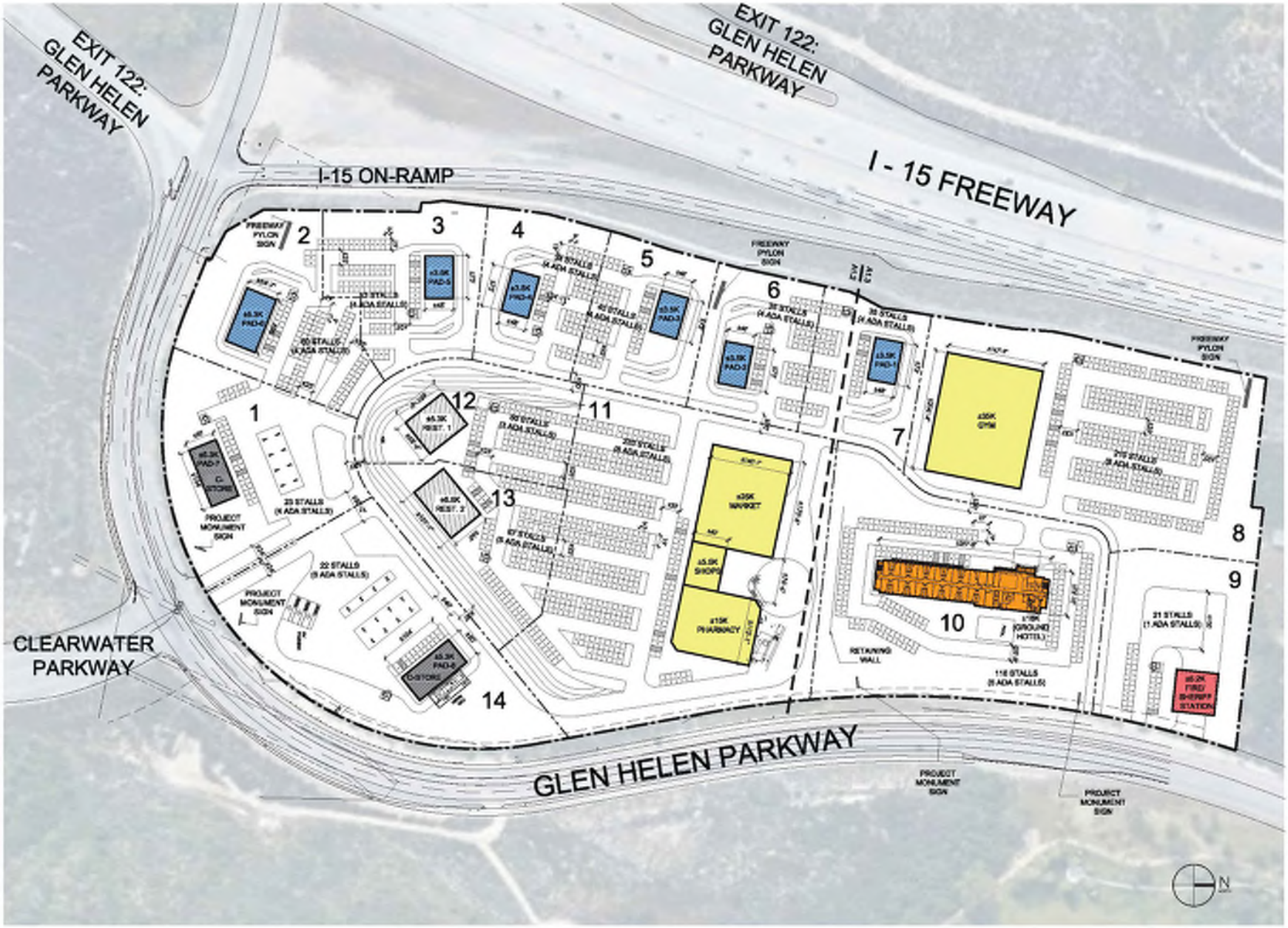
Project Site

Source: Nearmap, 2023.

EXHIBIT 2 : Local Vicinity Map
The Oasis at Glen Helen Parkway

Not to scale

Kimley»Horn



Source: UCR Group, DLR Group, December 2, 2022

SUMMARY

GROSS AREA: +/- 207,900 SF
NET AREA: +/- 202,700 SF

PARCEL 1
AREA: +/- 95,328 SF OR +/- 2.2 AC
BLDG AREA: +/- 5,300 SF
PARKING PROVIDED: 23 STALLS
PARKING RATIO: 4.3/1000

PARCEL 2
AREA: +/- 78,421 SF OR +/- 1.8 AC
BLDG AREA: +/- 5,300 SF
PARKING PROVIDED: 60 STALLS
PARKING RATIO: 11.3/1000

PARCEL 3
AREA: +/- 65,125 SF OR +/- 1.5 AC
BLDG AREA: +/- 3,500 SF
PARKING PROVIDED: 53 STALLS
PARKING RATIO: 15.1/1000

PARCEL 4
AREA: +/- 52,211 SF OR +/- 1.2 AC
BLDG AREA: +/- 3,500 SF
PARKING PROVIDED: 34 STALLS
PARKING RATIO: 9.7/1000

PARCEL 5
AREA: +/- 51,867 SF OR +/- 1.2 AC
BLDG AREA: +/- 3,500 SF
PARKING PROVIDED: 40 STALLS
PARKING RATIO: 11.4/1000

PARCEL 6
AREA: +/- 48,800 SF OR +/- 1.1 AC
BLDG AREA: +/- 3,500 SF
PARKING PROVIDED: 35 STALLS
PARKING RATIO: 10/1000

PARCEL 7
AREA: +/- 47,838 SF OR +/- 1.1 AC
BLDG AREA: +/- 3,500 SF
PARKING PROVIDED: 35 STALLS
PARKING RATIO: 10/1000

PARCEL 8
AREA: +/- 190,151 SF OR +/- 4.4 AC
BLDG AREA: +/- 35,000 SF
PARKING PROVIDED: 228 STALLS
PARKING RATIO: 6.65/1000

PARCEL 9
AREA: +/- 69,303 SF OR +/- 1.6 AC
BLDG AREA: +/- 5,200 SF
PARKING PROVIDED: 21 STALLS
PARKING RATIO: 4/1000

PARCEL 10
AREA: +/- 166,677 SF OR +/- 3.9 AC
BLDG AREA: +/- 18,000 SF
PARKING PROVIDED: 147 STALLS
PARKING RATIO: 8.2/1000

PARCEL 11
AREA: +/- 291,792 SF OR +/- 6.0 AC
BLDG AREA: +/- 45,500 SF
PARKING PROVIDED: 260 STALLS
PARKING RATIO: 5.7/1000

PARCEL 12
AREA: +/- 84,135 SF OR +/- 1.5 AC
BLDG AREA: +/- 5,300 SF
PARKING PROVIDED: 60 STALLS
PARKING RATIO: 11.3/1000

PARCEL 13
AREA: +/- 86,362 SF OR +/- 1.5 AC
BLDG AREA: +/- 6,500 SF
PARKING PROVIDED: 67 STALLS
PARKING RATIO: 10.3/1000

PARCEL 14
AREA: +/- 138,794 SF OR +/- 3.2 AC
BLDG AREA: +/- 5,300 SF
PARKING PROVIDED: 22 STALLS
PARKING RATIO: 4.15/1000

TOTAL PARKING: 1,083 SPACES
(64 ADA)
40 EV SPACES
54 RV SPACES

TOTAL PARKING RATIO: 5.20 SPACES PER 1,000 SF

EXHIBIT 3: Overall Site Plan
The Oasis at Glen Helen Parkway

Not to scale

Kimley»Horn

2 ENVIRONMENTAL SETTING

2.1 Climate and Meteorology

The California Air Resources Board (CARB) divides the State into 15 air basins that share similar meteorological and topographical features. The Project is located within the South Coast Air Basin (SCAB), which includes the non-desert portions of Los Angeles, Riverside, and San Bernardino counties, as well as all of Orange County. The SCAB is on a coastal plain with connecting broad valleys and low hills, bounded by the Pacific Ocean on the southwest and high mountains forming the remainder of the perimeter.[1] Air quality in this area is determined by natural factors such as topography, meteorology, and climate, in addition to the presence of existing air pollution sources and ambient conditions. These factors along with applicable regulations are discussed below.

The SCAB is part of a semi-permanent high-pressure zone in the eastern Pacific Ocean. As a result, the climate is mild and tempered by cool sea breezes. This usually mild weather pattern is occasionally interrupted by periods of extreme heat, winter storms, and Santa Ana winds. The annual average temperature throughout the 6,645-square-mile SCAB ranges from low 60 to high 80 degrees Fahrenheit with little variance. With more oceanic influence, coastal areas show less variability in annual minimum and maximum temperatures than inland areas.

Contrasting the steady pattern of temperature, rainfall is seasonally and annually highly variable. Almost all annual rainfall occurs between the months of November and April. Summer rainfall is reduced to widely scattered thundershowers near the coast, with slightly heavier activity in the east and over the mountains.

Although the SCAB has a semiarid climate, the air closer to the Earth's surface is typically moist because of the presence of a shallow marine layer. Except for occasional periods when dry, continental air is brought into the SCAB by offshore winds, the "ocean effect" is dominant. Periods of heavy fog are frequent and low clouds known as high fog are characteristic climatic features, especially along the coast. Annual average humidity is 70 percent at the coast and 57 percent in the eastern portions of the SCAB.

Wind patterns across the SCAB are characterized by westerly or southwesterly on-shore winds during the day and easterly or northeasterly breezes at night. Wind speed is typically higher during the dry summer months than during the rainy winter. Between periods of wind, air stagnation may occur in both the morning and evening hours. Air stagnation is one of the critical determinants of air quality conditions on any given day. During winter and fall, surface high-pressure systems over the SCAB, combined with other meteorological conditions, result in very strong, downslope Santa Ana winds. These winds normally continue for a few days before predominant meteorological conditions are reestablished.

The mountain ranges to the east affect the diffusion of pollutants by inhibiting the eastward transport of pollutants. Air quality in the SCAB generally ranges from fair to poor and is similar to air quality in most of coastal southern California. The entire region experiences heavy concentrations of air pollutants during prolonged periods of stable atmospheric conditions.

In addition to the characteristic wind patterns that affect the rate and orientation of horizontal pollutant transport, two distinct types of temperature inversions control the vertical depth through which air pollutants are mixed. These inversions are the marine inversion and the radiation inversion. The height of

[1] South Coast Air Quality Management District, *CEQA Air Quality Handbook*, 1993.

the base of the inversion at any given time is called the "mixing height." The combination of winds and inversions is a critical determinant leading to highly degraded air quality for the SCAB in the summer and generally good air quality in the winter.

2.2 Air Pollutants of Concern

The air pollutants emitted into the ambient air by stationary and mobile sources are regulated by State and federal laws. These regulated air pollutants are known as "criteria air pollutants" and are categorized into primary and secondary pollutants.

Primary air pollutants are emitted directly from sources. Carbon monoxide (CO), reactive organic gases (ROG), nitrogen oxide (NO_X), sulfur dioxide (SO_2), coarse particulate matter (PM_{10}), fine particulate matter ($PM_{2.5}$), and lead are primary air pollutants. Of these, CO, NO_X, SO_2, PM_{10}, and $PM_{2.5}$ are primary criteria pollutants. ROG and NO_X are criteria pollutant precursors and form secondary criteria pollutants through chemical and photochemical reactions in the atmosphere. For example, the criteria pollutant ozone (O_3) is formed by a chemical reaction between ROG and NO_X in the presence of sunlight. O_3 and nitrogen dioxide (NO_2) are the principal secondary pollutants. Sources and health effects commonly associated with criteria pollutants are summarized in Table 2: Air Contaminants and Associated Public Health Concerns.

Table 2: Air Contaminants and Associated Public Health Concerns

Pollutant	Major Man-Made Sources	Human Health Effects
Particulate Matter (PM_{10} and $PM_{2.5}$)	Power plants, steel mills, chemical plants, unpaved roads and parking lots, wood-burning stoves and fireplaces, automobiles, and others.	Increased respiratory symptoms, such as irritation of the airways, coughing, or difficulty breathing; asthma; chronic bronchitis; irregular heartbeat; nonfatal heart attacks; and premature death in people with heart or lung disease. Impairs visibility.
Ozone (O_3)	Formed by a chemical reaction between reactive organic gases/volatile organic compounds (ROG or VOC)[1] and nitrogen oxides (NO_X) in the presence of sunlight. Motor vehicle exhaust industrial emissions, gasoline storage and transport, solvents, paints and landfills.	Irritates and causes inflammation of the mucous membranes and lung airways; causes wheezing, coughing, and pain when inhaling deeply; decreases lung capacity; aggravates lung and heart problems. Damages plants; reduces crop yield.
Sulfur Dioxide (SO_2)	A colorless gas formed when fuel containing sulfur is burned and when gasoline is extracted from oil. Examples are petroleum refineries, cement manufacturing, metal processing facilities, locomotives, and ships.	Respiratory irritant. Aggravates lung and heart problems. In the presence of moisture and oxygen, sulfur dioxide converts to sulfuric acid which can damage marble, iron and steel. Damages crops and natural vegetation. Impairs visibility. Precursor to acid rain.
Carbon Monoxide (CO)	An odorless, colorless gas formed when carbon in fuel is not burned completely; a component of motor vehicle exhaust.	Reduces the ability of blood to deliver oxygen to vital tissues, affecting the cardiovascular and nervous system. Impairs vision, causes dizziness, and can lead to unconsciousness or death.
Nitrogen Dioxide (NO_2)	A reddish-brown gas formed during fuel combustion for motor vehicles and industrial sources. Sources include motor vehicles, electric utilities, and other sources that burn fuel.	Respiratory irritant; aggravates lung and heart problems. Precursor to O_3. Contributes to global warming and nutrient overloading which deteriorates water quality. Causes brown discoloration of the atmosphere.
Lead (Pb)	Lead is a metal found naturally in the environment as well as in manufactured	Exposure to lead occurs mainly through inhalation of air and ingestion of lead in food,

Table 2: Air Contaminants and Associated Public Health Concerns		
Pollutant	**Major Man-Made Sources**	**Human Health Effects**
	products. The major sources of lead emissions have historically been motor vehicles (such as cars and trucks) and industrial sources. Due to the phase out of leaded gasoline, metals processing is the major source of lead emissions to the air today. The highest levels of lead in air are generally found near lead smelters. Other stationary sources are waste incinerators, utilities, and lead-acid battery manufacturers.	water, soil, or dust. It accumulates in the blood, bones, and soft tissues and can adversely affect the kidneys, liver, nervous system, and other organs. Excessive exposure to lead may cause neurological impairments such as seizures, mental retardation, and behavioral disorders. Even at low doses, lead exposure is associated with damage to the nervous systems of fetuses and young children, resulting in learning deficits and lowered IQ.
[1] Volatile Organic Compounds (VOCs or Reactive Organic Gases [ROG]) are hydrocarbons/organic gases that are formed solely of hydrogen and carbon. There are several subsets of organic gases including ROGs and VOCs. Both ROGs and VOCs are emitted from the incomplete combustion of hydrocarbons or other carbon-based fuels. The major sources of hydrocarbons are combustion engine exhaust, oil refineries, and oil-fueled power plants; other common sources are petroleum fuels, solvents, dry cleaning solutions, and paint (via evaporation).		
Source: California Air Pollution Control Officers Association (CAPCOA), Health Effects, http://www.capcoa.org/health-effects/, Accessed December 30, 2022.		

Toxic Air Contaminants

Toxic air contaminants (TACs) are airborne substances that can cause short-term (acute) or long-term (i.e., chronic, carcinogenic or cancer causing) adverse human health effects (i.e., injury or illness). TACs include both organic and inorganic chemical substances. They may be emitted from a variety of common sources including gasoline stations, automobiles, dry cleaners, industrial operations, and painting operations. The current California list of TACs includes more than 200 compounds, including particulate emissions from diesel-fueled engines.

CARB identified diesel particulate matter (DPM) as a TAC. DPM differs from other TACs in that it is not a single substance but rather a complex mixture of hundreds of substances. Diesel exhaust is a complex mixture of particles and gases produced when an engine burns diesel fuel. DPM is a concern because it causes lung cancer; many compounds found in diesel exhaust are carcinogenic. DPM includes the particle-phase constituents in diesel exhaust. The chemical composition and particle sizes of DPM vary between different engine types (heavy-duty, light-duty), engine operating conditions (idle, accelerate, decelerate), fuel formulations (high/low sulfur fuel), and the year of the engine. Some short-term (acute) effects of diesel exhaust include eye, nose, throat, and lung irritation, and diesel exhaust can cause coughs, headaches, light-headedness, and nausea. DPM poses the greatest health risk among the TACs. Almost all diesel exhaust particle mass is 10 microns or less in diameter. Due to their extremely small size, these particles can be inhaled and eventually trapped in the bronchial and alveolar regions of the lung.

Ambient Air Quality

CARB monitors ambient air quality at approximately 250 air monitoring stations across the State. These stations usually measure pollutant concentrations ten feet above ground level; therefore, air quality is often referred to in terms of ground-level concentrations. Existing ambient air quality levels, historical trends, and projections near the Project are documented by measurements made by the South Coast Air Quality Management District (SCAQMD), the air pollution regulatory agency in the SCAB that maintains air quality monitoring stations which process ambient air quality measurements.

Pollutants of concern in the SCAB include O_3, PM_{10}, and $PM_{2.5}$. The closest air monitoring station to the Project that monitors ambient concentrations of these pollutants is the Crestline Monitoring Station (located approximately 8.2 miles to the northeast).[2] Local air quality data from 2019 to 2021 are provided in Table 3: Ambient Air Quality Data, which lists the monitored maximum concentrations and number of exceedances of state or federal air quality standards for each year.

Table 3: Ambient Air Quality Data

Criteria Pollutant	2019	2020	2021
Ozone (O_3) [1]			
1-hour Maximum Concentration (ppm)	0.129	0.159	0.148
8-hour Maximum Concentration (ppm)	0.112	0.127	0.112
Number of Days Standard Exceeded			
CAAQS 1-hour (>0.070 ppm)	53	69	65
NAAQS 8-hour (>0.070 ppm)	99	118	110
Carbon Monoxide (CO) [1]			
1-hour Maximum Concentration (ppm)	1.29	1.907	1.966
Number of Days Standard Exceeded			
NAAQS 1-hour (>35 ppm)	0	0	0
CAAQS 1-hour (>20 ppm)	0	0	0
Nitrogen Dioxide (NO_2) [2]			
1-hour Maximum Concentration (ppm)	0.0761	0.0664	0.0672
Number of Days Standard Exceeded			
NAAQS 1-hour (>0.100 ppm)	0	0	0
CAAQS 1-hour (>0.18 ppm)	0	0	0
Particulate Matter Less Than 10 Microns (PM_{10}) [1]			
National 24-hour Maximum Concentration	38.6	51.8	33.4
State 24-hour Maximum Concentration	32.6	43.8	28.2
State Annual Average Concentration (CAAQS=20 µg/m^3)	15.9	19.2	16.4
Number of Days Standard Exceeded			
NAAQS 24-hour (>150 µg/m^3)	0	0	0
CAAQS 24-hour (>50 µg/m^3)	0	0	0
Particulate Matter Less Than 2.5 Microns ($PM_{2.5}$) [1]			
National 24-hour Maximum Concentration	*	*	*
State 24-hour Maximum Concentration	21.2	43.6	24.8
Number of Days Standard Exceeded			
NAAQS 24-hour (>35 µg/m^3)	*	*	*

Notes:
NAAQS = National Ambient Air Quality Standards; CAAQS = California Ambient Air Quality Standards; ppm = parts per million; µg/m^3 = micrograms per cubic meter; – = not measured;* = insufficient data
[1] Measurements taken at the Crestline Monitoring Station at 24171 Lake Dr, Crestline, CA 92325 (CARB# 36181)
[2] Measurements taken at the Fontana Monitoring Station at 14360 Arrow Highway, Fontana CA 92335 (CARB# 36197)

Source: All pollutant measurements are from the CARB Aerometric Data Analysis and Management system database (https://www.arb.ca.gov/adam) except for CO, which were retrieved from the CARB Air Quality and Meteorological Information System (https://www.arb.ca.gov/aqmis2/aqdselect.php).

2.3 Sensitive Receptors

Sensitive populations are more susceptible to the effects of air pollution than is the general population. Sensitive receptors that are in proximity to localized sources of toxics are of particular concern. Land uses considered sensitive receptors include residences, schools, playgrounds, childcare centers, long-term health care facilities, rehabilitation centers, convalescent centers, and retirement homes. Land uses

[2] California Air Resources Board, Air Monitoring Sites – Interactive Map. 2022, https://ww2.arb.ca.gov/applications/air-monitoring-sites-interactive-map, Accessed June 2023.

surrounding the Project site consist of Glen Helen Parkway to the south and east, I-15 to the west, and residential to the north. The nearest sensitive receptor is a single-family residence to the north and Glen Helen Regional Park to the east across Glen Helen Parkway.

3 REGULATORY SETTING

3.1 Federal

Federal Clean Air Act

Air quality is federally protected by the Federal Clean Air Act (FCAA) and its amendments. Under the FCAA, the United States Environmental Protection Agency (U.S. EPA) developed the primary and secondary National Ambient Air Quality Standards (NAAQS) for the criteria air pollutants including O_3, NO_2, CO, SO_2, PM_{10}, $PM_{2.5}$, and lead. Proposed projects in or near nonattainment areas could be subject to more stringent air-permitting requirements. The FCAA requires each state to prepare a State Implementation Plan (SIP) to demonstrate how it would attain the NAAQS within the federally imposed deadlines.

The U.S. EPA can withhold certain transportation funds from states that fail to comply with the planning requirements of the FCAA. If a state fails to correct these planning deficiencies within two years of Federal notification, the U.S. EPA is required to develop a Federal implementation plan for the identified nonattainment area or areas. The provisions of 40 Code of Federal Regulations Parts 51 and 93 apply in all nonattainment and maintenance areas for transportation-related criteria pollutants for which the area is designated nonattainment or has a maintenance plan. Applicable NAAQS are summarized in Table 4: State and Federal Ambient Air Quality Standards.

3.2 State of California

California Air Resources Board

CARB administers the air quality policy in California. The California Ambient Air Quality Standards (CAAQS) were established in 1969 pursuant to the Mulford-Carrell Act. These standards, included with the NAAQS in Table 4, are generally more stringent and apply to more pollutants than the NAAQS. In addition to the criteria pollutants, CAAQS have been established for visibility reducing particulates, hydrogen sulfide, and sulfates.

The California Clean Air Act (CCAA) requires that each local air district prepare and maintain an Air Quality Management Plan (AQMP) to achieve compliance with CAAQS. These AQMPs also serve as the basis for the preparation of the SIP for meeting federal clean air standards for the State of California. Like the U.S. EPA, CARB also designates areas within California as either attainment or nonattainment for each criteria pollutant based on whether the CAAQS have been achieved. Under the CCAA, areas are designated as nonattainment for a pollutant if air quality data shows that a State standard for the pollutant was violated at least once during the previous three calendar years. Exceedances that are affected by highly irregular or infrequent events such as wildfires, volcanoes, etc. are not considered violations of a State standard, and are not used as a basis for designating areas as nonattainment. The applicable State standards are summarized in Table 4.

Table 4: State and Federal Ambient Air Quality Standards

Pollutant	Averaging Time	State Standards[1]	National Standards[2]
Ozone (O_3) [2, 5, 7]	1 Hour	0.09 ppm (180 µg/m^3)	NA
	8 Hour	0.070 ppm (137 µg/m^3)	0.070 ppm (137 µg/m^3)
Carbon Monoxide (CO)	1 Hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)
	8 Hour	9.0 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)
Nitrogen Dioxide (NO_2)	1 Hour	0.18 ppm (339 µg/m^3)	0.100 ppm (188 µg/m^3)
	Annual Arithmetic Mean	0.030 ppm (57 µg/m^3)	0.053 ppm (100 µg/m^3)
Sulfur Dioxide (SO_2) [8]	1 Hour	0.25 ppm (655 µg/m^3)	0.075 ppm (196 µg/m^3)
	24 Hour	0.04 ppm (105 µg/m^3)	0.14 ppm (365 µg/m^3)
	Annual Arithmetic Mean	NA	0.03 ppm (80 µg/m^3)
Particulate Matter (PM_{10}) [1, 3, 6]	24-Hour	50 µg/m^3	150 µg/m^3
	Annual Arithmetic Mean	20 µg/m^3	NA
Fine Particulate Matter ($PM_{2.5}$) [3, 4, 6, 9]	24-Hour	NA	35 µg/m^3
	Annual Arithmetic Mean	12 µg/m^3	12 µg/m^3
Sulfates (SO_{4-2})	24 Hour	25 µg/m^3	NA
Lead (Pb) [10, 11]	30-Day Average	1.5 µg/m^3	NA
	Calendar Quarter	NA	1.5 µg/m^3
	Rolling 3-Month Average	NA	0.15 µg/m^3
Hydrogen Sulfide (H_2S)	1 Hour	0.03 ppm (42 µg/m^3)	NA
Vinyl Chloride (C_2H_3Cl) [10]	24 Hour	0.01 ppm (26 µg/m^3)	NA

Notes:
ppm = parts per million; µg/m^3 = micrograms per cubic meter; mg/m^3 = milligrams per cubic meter; – = no information available.

1 California standards for O_3, carbon monoxide (except Lake Tahoe), sulfur dioxide (1-hour and 24-hour), nitrogen dioxide, suspended particulate matter - PM_{10}, and visibility reducing particles are values that are not to be exceeded. The standards for sulfates, Lake Tahoe carbon monoxide, lead, hydrogen sulfide, and vinyl chloride are not to be equaled or exceeded. If the standard is for a 1-hour, 8-hour or 24-hour average (i.e. all standards except for lead and the PM_{10} annual standard), then some measurements may be excluded. Measurements are excluded that CARB determines would occur less than once per year on the average. The Lake Tahoe carbon monoxide standard is 6.0 ppm, a level one-half the national standard and two-thirds the State standard.

2 National standards shown are the "primary standards" designed to protect public health. National standards other than for O_3, particulates and those based on annual averages are not to be exceeded more than once a year. The 1-hour O_3 standard is attained if, during the most recent three-year period, the average number of days per year with maximum hourly concentrations above the standard is equal to or less than one. The 8-hour O_3 standard is attained when the 3-year average of the 4th highest daily concentrations is 0.070 ppm or less. The 24-hour PM_{10} standard is attained when the 3-year average of the 99th percentile of monitored concentrations is less than 150 µg/m$_3$. The 24-hour $PM_{2.5}$ standard is attained when the 3-year average of 98th percentiles is less than 35 µg/m^3.

3 Except for the national particulate standards, annual standards are met if the annual average falls below the standard at every site. The national annual particulate standard for PM_{10} is met if the 3-year average falls below the standard at every site. The annual $PM_{2.5}$ standard is met if the 3-year average of annual averages spatially-averaged across officially designed clusters of sites falls below the standard.
NAAQS are set by the U.S. EPA at levels determined to be protective of public health with an adequate margin of safety.

4 On October 1, 2015, the national 8-hour O_3 primary and secondary standards were lowered from 0.075 to 0.070 ppm. An area will meet the standard if the fourth-highest maximum daily 8-hour O_3 concentration per year, averaged over three years, is equal to or less than 0.070 ppm. U.S. EPA will make recommendations on attainment designations by October 1, 2016, and issue final designations October 1, 2017. Nonattainment areas will have until 2020 to late 2037 to meet the health standard, with attainment dates varying based on the O_3 level in the area.

5 The national 1-hour O_3 standard was revoked by the U.S. EPA on June 15, 2005.

6 In June 2002, CARB established new annual standards for $PM_{2.5}$ and PM_{10}.

7 The 8-hour California O_3 standard was approved by the CARB on April 28, 2005, and became effective on May 17, 2006.

8 On June 2, 2010, the U.S. EPA established a new 1-hour SO_2 standard, effective August 23, 2010, which is based on the 3-year average of the annual 99th percentile of 1-hour daily maximum concentrations. The existing 0.030 ppm annual and 0.14 ppm 24-hour SO_2 NAAQS however must continue to be used until one year following U.S. EPA initial designations of the new 1-hour SO_2 NAAQS.

9 In December 2012, U.S. EPA strengthened the annual $PM_{2.5}$ NAAQS from 15.0 to 12.0 µg/m^3. In December 2014, the U.S. EPA issued final area designations for the 2012 primary annual $PM_{2.5}$ NAAQS. Areas designated “unclassifiable/attainment” must continue to take steps to prevent their air quality from deteriorating to unhealthy levels. The effective date of this standard is April 15, 2015.

10 CARB has identified lead and vinyl chloride as ‘toxic air contaminants’ with no threshold level of exposure below which there are no adverse health effects determined.

11 National lead standards, rolling 3-month average: final rule signed October 15, 2008. Final designations effective December 31, 2011.

Source: South Coast Air Quality Management District, *Air Quality Management Plan*, 2022; California Air Resources Board, *Ambient Air Quality Standards*, December 2022.

3.3 Regional

South Coast Air Quality Management District

The SCAQMD is the air pollution control agency for Orange County and the urban portions of Los Angeles, Riverside, and San Bernardino Counties. The agency's primary responsibility is ensuring that the CAAQS and NAAQS are attained and maintained in the SCAB. The SCAQMD is also responsible for adopting and enforcing rules and regulations concerning air pollutant sources, issuing permits for stationary sources of air pollutants, inspecting stationary sources of air pollutants, responding to citizen complaints, monitoring ambient air quality and meteorological conditions, awarding grants to reduce motor vehicle emissions, conducting public education campaigns, and many other activities. All projects are subject to SCAQMD rules and regulations in effect at the time of construction.

The SCAQMD is also the lead agency in charge of developing the AQMP, with input from the Southern California Association of Governments (SCAG) and CARB. The AQMP is a comprehensive plan that includes control strategies for stationary and area sources, as well as for on-road and off-road mobile sources. SCAG has the primary responsibility for providing future growth projections and the development and implementation of transportation control measures. CARB, in coordination with federal agencies, provides the control element for mobile sources.

The 2022 AQMP was adopted by the SCAQMD Governing Board on December 2, 2022. The purpose of the AQMP is to set forth a comprehensive and integrated program that would lead the SCAB into compliance with the federal 24-hour $PM_{2.5}$ air quality standard, and to provide an update to the SCAQMD's commitments towards meeting the federal 8-hour O_3 NAAQS. The AQMP incorporates the latest scientific and technological information and planning assumptions, including the *Regional Transportation Plan/Sustainable Communities Strategy* (RTP/SCS) and updated emission inventory methodologies for various source categories.

The SCAQMD has published the *CEQA Air Quality Handbook* (approved by the SCAQMD Governing Board in 1993 and augmented with guidance for Localized Significance Thresholds [LST] in 2008). The SCAQMD guidance helps local government agencies and consultants to develop environmental documents required by California Environmental Quality Act (CEQA) and provides identification of suggested thresholds of significance for criteria pollutants for both construction and operation (see discussion of thresholds below). With the help of the *CEQA Air Quality Handbook* and associated guidance, local land use planners and consultants are able to analyze and document how proposed and existing projects affect air quality in order to meet the requirements of the CEQA review process. The SCAQMD periodically provides supplemental guidance and updates to the handbook on their website.

SCAG is the regional planning agency for Los Angeles, Orange, Ventura, Riverside, San Bernardino, and Imperial Counties and serves as a forum for regional issues relating to transportation, the economy, community development, and the environment. Under federal law, SCAG is designated as a Metropolitan Planning Organization and under State law as a Regional Transportation Planning Agency and a Council of Governments.

The State and federal attainment status designations for the SCAB are summarized in Table 5: South Coast Air Basin Attainment Status. The SCAB is currently designated as a nonattainment area for O_3, PM_{10}, and $PM_{2.5}$ CAAQS, as well as O_3 and $PM_{2.5}$ NAAQS. The SCAB is designated as attainment or unclassified for the remaining CAAQS and NAAQS.

Table 5: South Coast Air Basin Attainment Status

Pollutant	State	Federal
Ozone (O_3) (1 Hour Standard)	Non-Attainment	Non-Attainment (Extreme)
Ozone (O_3) (8 Hour Standard)	Non-Attainment	Non-Attainment (Extreme)
Particulate Matter ($PM_{2.5}$) (24 Hour Standard)	–	Non-Attainment (Serious)
Particulate Matter ($PM_{2.5}$) (Annual Standard)	Non-Attainment	Non-Attainment (Serious)
Particulate Matter (PM_{10}) (24 Hour Standard)	Non-Attainment	Attainment (Maintenance)
Particulate Matter (PM_{10}) (Annual Standard)	Non-Attainment	–
Carbon Monoxide (CO) (1 Hour Standard)	Attainment	Attainment (Maintenance)
Carbon Monoxide (CO) (8 Hour Standard)	Attainment	Attainment (Maintenance)
Nitrogen Dioxide (NO_2) (1 Hour Standard)	Attainment	Unclassifiable/Attainment
Nitrogen Dioxide (NO_2) (Annual Standard)	Attainment	Attainment (Maintenance)
Sulfur Dioxide (SO_2) (1 Hour Standard)	Attainment	Unclassifiable/Attainment
Sulfur Dioxide (SO_2) (24 Hour Standard)	Attainment	–
Lead (Pb) (30 Day Standard)	Attainment	Unclassifiable/Attainment
Lead (Pb) (3 Month Standard)	Attainment	–
Sulfates (SO_{4-2}) (24 Hour Standard)	Attainment	–
Hydrogen Sulfide (H_2S) (1 Hour Standard)	Unclassified	–

Source: South Coast Air Quality Management District, *Air Quality Management Plan*, 2022; United States Environmental Protection Agency, *Nonattainment Areas for Criteria Pollutants (Green Book)*, 2022.

The following is a list of SCAQMD rules that are required of construction activities associated with the Project:

- **Rule 402 (Nuisance)** – This rule prohibits the discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property. This rule does not apply to odors emanating from agricultural operations necessary for the growing of crops or the raising of fowl or animals.

- **Rule 403 (Fugitive Dust)** – The purpose of this rule is to minimize the amount of particulate matter in the ambient air as a result of anthropogenic fugitive dust sources. This rule requires fugitive dust sources to implement best available control measures for all sources, and all forms of visible particulate matter are prohibited from crossing any property line. This rule is intended to reduce

PM_{10} emissions from any transportation, handling, construction, or storage activity that has the potential to generate fugitive dust. PM_{10} suppression techniques are summarized below.

a) Portions of a construction site to remain inactive longer than a period of three months will be seeded and watered until grass cover is grown or otherwise stabilized.

b) All on-site roads will be paved as soon as feasible or watered periodically or chemically stabilized.

c) All material transported off-site will be either sufficiently watered or securely covered to prevent excessive amounts of dust.

d) The area disturbed by clearing, grading, earthmoving, or excavation operations will be minimized at all times.

e) Where vehicles leave a construction site and enter adjacent public streets, the streets will be swept daily or washed down at the end of the work day to remove soil tracked onto the paved surface.

- **Rule 1113 (Architectural Coatings)** – This rule requires manufacturers, distributors, and end users of architectural and industrial maintenance coatings to reduce ROG emissions from the use of these coatings, primarily by placing limits on the ROG content of various coating categories.

3.4 Local

County of San Bernardino Development Code

The San Bernardino County Development Code implements the goals and policies of the General Plan by regulating land uses within the unincorporated areas of the County. The development Code contains the following standards for air quality that would apply to the Project:

§ 83.01.040 Air Quality.

(c) Diesel Exhaust Emissions Control Measures. The following emissions control measures shall apply to all discretionary land use projects approved by the County on or after January 15, 2009:

(1) On-Road Diesel Vehicles. On-road diesel vehicles are regulated by the State of California Air Resources Board.

(2) Off-Road Diesel Vehicle/Equipment Operations. All business establishments and contractors that use off-road diesel vehicle/equipment as part of their normal business operations shall adhere to the following measures during their operations in order to reduce diesel particulate matter emissions from diesel-fueled engines:

(A) Off-road vehicles/equipment shall not be left idling on site for periods in excess of five minutes. The idling limit does not apply to:

(I) Idling when queuing;

(II) Idling to verify that the vehicle is in safe operating condition;

(III) Idling for testing, servicing, repairing or diagnostic purposes;

(IV) Idling necessary to accomplish work for which the vehicle was designed (such as operating a crane);

(V) Idling required to bring the machine system to operating temperature; and

(VI) Idling necessary to ensure safe operation of the vehicle.

(B) Use reformulated ultra low-sulfur diesel fuel in equipment and use equipment certified by the U.S. Environmental Protection Agency (U.S. EPA) or that pre-dates U.S. EPA regulations.

(C) Maintain engines in good working order to reduce emissions.

(D) Signs shall be posted requiring vehicle drivers to turn off engines when parked.

(E) Any requirements or standards subsequently adopted by the South Coast Air Quality Management District, the Mojave Desert Air Quality Management District or the California Air Resources Board.

(F) Provide temporary traffic control during all phases of construction.

(G) On-site electrical power connections shall be provided for electric construction tools to eliminate the need for diesel-powered electric generators, where feasible.

(H) Maintain construction equipment engines in good working order to reduce emissions. The developer shall have each contractor certify that all construction equipment is properly serviced and maintained in good operating condition.

(I) Contractors shall use ultra low sulfur diesel fuel for stationary construction equipment as required by Air Quality Management District (AQMD) Rules 431.1 and 431.2 to reduce the release of undesirable emissions.

(J) Substitute electric and gasoline-powered equipment for diesel-powered equipment, where feasible.

4 SIGNIFICANCE CRITERIA AND METHODOLOGY

San Bernardino Countywide Plan (General Plan)

The County of San Bernardino addresses air quality in the Natural Resources Element of its General Plan. The Natural Resources Element contains goals and policies that work to promote health and wellness of residents in San Bernardino County through improvements in locally generated emissions. The following policies are applicable to the Proposed Project:

Policy NR-1.1 **Land Use.** We promote compact and transit-oriented development countywide and regulate the types and locations of development in unincorporated areas to minimize vehicle miles traveled and greenhouse gas emissions.

Policy NR-1.2 **Indoor air quality**. We promote the improvement of indoor air quality through the California Building and Energy Codes and through the provision of public health programs and services.

Policy NR-1.3 **Coordination on air pollution**. We collaborate with air quality management districts and other local agencies to monitor and reduce major pollutants affecting the county at the emission source.

Policy NR-1.6 **Fugitive dust emissions**. We coordinate with air quality management on requirement for dust control plans, revegetation, and soil compaction to prevent fugitive dust emissions.

Policy NR-1.8 **Construction and operations**. We invest in county facilities and fleet vehicles to improve energy efficiency and reduce emissions. We encourage county contractors and other builders and developers to use low-emission construction vehicles and equipment to improve air quality and reduce emissions.

4.1 Air Quality Thresholds

Based upon the criteria derived from State CEQA Guidelines Appendix G, a Project normally would have a significant effect on the environment and would require mitigation if it would meet any of the following criteria:

- Conflict with or obstruct implementation of the applicable air quality plan.
- Result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is in nonattainment under an applicable State or federal ambient air quality standard.
- Expose sensitive receptors to substantial pollutant concentrations.
- Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.

SCAQMD Thresholds

The significance criteria established by SCAQMD may be relied upon to make the above determinations. According to the SCAQMD, an air quality impact is considered significant if a project would violate any ambient air quality standard, contribute substantially to an existing or projected air quality violation, or expose sensitive receptors to substantial pollutant concentrations. The SCAQMD has established

thresholds of significance for air quality during construction and operational activities of land use development projects, as shown in Table 6: South Coast Air Quality Management District Emissions Thresholds.

Table 6: South Coast Air Quality Management District Emissions Thresholds

Criteria Air Pollutants and Precursors	Maximum Pounds Per Day	
	Construction-Related	Operational-Related
Reactive Organic Gases (ROG)	75	55
Carbon Monoxide (CO)	550	550
Nitrogen Oxides (NO_X)	100	55
Sulfur Oxides (SO_X)	150	150
Coarse Particulates (PM_{10})	150	150
Fine Particulates ($PM_{2.5}$)	55	55

Source: South Coast Air Quality Management District, *South Coast AQMD Air Quality Significance Thresholds*.

Localized Carbon Monoxide

In addition to the daily thresholds listed above, the Project would also be subject to the CAAQS and NAAQS. These are addressed through an analysis of localized CO impacts. The significance of localized impacts depends on whether ambient CO levels near the Project site are above the CAAQS and NAAQS for CO standards (the more stringent CAAQS are 20 ppm for 1-hour and 9 ppm for 8-hour). The SCAB has been designated as attainment under the 1-hour and 8-hour CAAQS and NAAQS.

Localized Significance Thresholds

In addition to the CO hotspot analysis, the SCAQMD developed LSTs for emissions of NO_2, CO, PM_{10}, and $PM_{2.5}$ generated at new development sites (off-site mobile source emissions are not included in the LST analysis). LSTs represent the maximum emissions that can be generated at a project without expecting to cause or substantially contribute to an exceedance of the most stringent CAAQS or NAAQS. LSTs are based on the ambient concentrations of that pollutant within the Project source receptor area (SRA), as demarcated by the SCAQMD, and the distance to the nearest sensitive receptor. LST analysis for construction is applicable for all projects that disturb 5 acres or less on a single day. The Project is located within SCAQMD SRA 32. Table 7: Localized Significance Thresholds for Construction/Operations, shows the LSTs for a 1-acre, 2-acre, and 5-acre project in SRA 32 with sensitive receptors located at approximately 25 meters. Table 7 shows that the LSTs increase as acreage increases. The nearest sensitive receptors are located approximately 80 feet (24 meters) north of the Project site.

Table 7: Localized Significance Thresholds for Construction/Operations

Project Size	Maximum Pounds Per Day			
	NO_X	CO	PM_{10}	$PM_{2.5}$
1 Acre	118/118	863/863	5/2	4/1
2 Acres	170/170	1,232/1,232	6/2	5/2
5 Acres	270/270	2,193/2,193	16/4	9/2

NO_X = Nitrogen Oxides; CO = Carbon Monoxide; PM_{10} = Particulate Matter 10 microns in diameter or less; $PM_{2.5}$ = Particulate Matter 2.5 microns in diameter or less

Note: Based on a sensitive receptor distance of 25 meters in SRA 32.

Source: South Coast Air Quality Management District, *Localized Significance Threshold Methodology,* July 2008.

It should be noted that LSTs are screening thresholds and are therefore conservative. The construction LST acreage is determined based the expected daily acreage disturbed. The operational LST acreage is based on the total area of the project site. Although the Project site is greater than five acres, the 5-acre operational LSTs are conservatively used to evaluate the Project.

4.2 Methodology

This air quality impact analysis considers the Project's construction and operational impacts. Where criteria air pollutant quantification was required, emissions were modeled using the California Emissions Estimator Model (CalEEMod) version 2022.1.1.13. CalEEMod is a Statewide land use emissions computer model designed to quantify potential criteria pollutant emissions associated with both construction and operations from a variety of land use projects. Air quality impacts were assessed according to methodologies recommended by CARB and the SCAQMD.

Construction

Project-related construction equipment, trucks, worker vehicles, and ground-disturbing activities would generate emissions of criteria air pollutants and precursors. Daily regional construction emissions are estimated by assuming construction occurs at the earliest feasible date (i.e., a conservative estimate of construction activities) and applying off-road, fugitive dust, and on-road emissions factors in CalEEMod.

Construction was modeled according to the following timeline:

- Site Preparation/Grading: January 1, 2024, to December 31, 2026
- Building Construction: January 1, 2027, to September 30, 2027
- Paving: June 1, 2027, to August 31, 2027
- Architectural Coating: August 1, 2027, to December 31, 2027

Operations

Project operations would result in emissions of area sources (consumer products, architectural coating, and landscape equipment), energy sources (natural gas usage), mobile sources (motor vehicles from Project generated vehicle trips), and off-road equipment. Project-generated increases in operational emissions would be predominantly associated with motor vehicle use. Emissions from each of these categories are discussed below.

- **Area Sources.** Area source emissions would be generated due to consumer products, on-site equipment, architectural coating, and landscaping. Consumer products are various solvents used in non-industrial applications, which emit VOCs during product use. These typically include cleaning supplies, kitchen aerosols, cosmetics, and toiletries.

- **Energy Sources.** Energy source emissions would be generated due to electricity and natural gas usage associated with the Project. Primary uses of electricity and natural gas by the Project would be for miscellaneous commercial/retail equipment, space heating and cooling, water heating, ventilation, lighting, appliances, and electronics. Energy source emissions were calculated in CalEEMod. No changes were made to the default energy usage consumption rates or emissions factors.

- **Mobile Sources.** Mobile sources are emissions from motor vehicles, including tailpipe and evaporative emissions. Depending upon the pollutant being discussed, the potential air quality impact may be of either regional or local concern. For example, ROG, NO_X, PM_{10}, and $PM_{2.5}$ are all pollutants of regional concern. NO_X and ROG react with sunlight to form O_3, known as photochemical smog. Additionally, wind currents readily transport PM_{10} and $PM_{2.5}$. However, CO tends to be a localized pollutant, dispersing rapidly at the source.

  Project-generated vehicle emissions are based on the trip generation within the General Plan Level of Service Conformance Analysis and Vehicle Miles Traveled (VMT) Screening Assessment prepared by David Evans and Associates (February 2023) and incorporated into CalEEMod as recommended by the SCAQMD. Project trip generation is based on the following Institute of Transportation Engineers (ITE) land use categories:

  - ITE Land Use 310: Hotel (935 average daily trips)
  - ITE Land Use 492: Fitness Center (1,242 average daily trips)
  - ITE Land Use 821: Shopping Plaza (2,594 average daily trips)
  - ITE Land Use 881: Pharmacy/Drugstore (1,463 average daily trips)
  - ITE Land Use 945: Convenience Store/Gas Station (12,244 average daily trips)
  - ITE Land Use 934: Fast-Food with Drive-Through Window (9,593 average daily trips)
  - ITE Land Use 932: High-Turnover (Sit-Down) Restaurant (1,023 average daily trips)

As discussed above, the SCAQMD provides significance thresholds for emissions associated with Proposed Project construction and operations. The Proposed Project's construction and operational emissions are compared to the daily criteria pollutant emissions significance thresholds in order to determine the significance of a Project's impact on regional air quality.

The localized effects from the Project's on-site emissions were evaluated in accordance with the SCAQMD's LST methodology, which uses on-site mass emissions rate look-up tables and Project-specific modeling. LSTs represent the maximum emissions from a project that are not expected to cause or contribute to an exceedance of the most stringent applicable NAAQS or CAAQS and are developed based on the ambient concentrations of that pollutant for each SRA and distance to the nearest sensitive receptor.

5 POTENTIAL IMPACTS AND MITIGATION

5.1 Air Quality Analysis

Threshold 5.1 Would the Project conflict with or obstruct implementation of the applicable air quality plan?

As part of its enforcement responsibilities, the U.S. EPA requires each state with nonattainment areas to prepare and submit a SIP that demonstrates the means to attain the NAAQS. The SIP must integrate federal, State, and local plan components and regulations to identify specific measures to reduce pollution in nonattainment areas, using a combination of performance standards and market-based programs. Similarly, under State law, the CCAA requires an air quality attainment plan to be prepared for areas designated as nonattainment regarding the CAAQS and NAAQS. Air quality attainment plans outline emissions limits and control measures to achieve and maintain these standards by the earliest practical date.

The Project is located within the SCAB, which is under the jurisdiction of the SCAQMD. The SCAQMD is required, pursuant to the FCAA, to reduce emissions of criteria pollutants for which the SCAB is in nonattainment. To reduce such emissions, the SCAQMD drafted the 2022 AQMP which establishes a program of rules and regulations directed at reducing air pollutant emissions and achieving CAAQS and NAAQS. The 2022 AQMP is a regional and multi-agency effort including the SCAQMD, the CARB, the SCAG, and the U.S. EPA. The plan's pollutant control strategies are based on the latest scientific and technical information and planning assumptions, including SCAG's Connect SoCal 2020-2045 RTP/SCS, updated emission inventory methodologies for various source categories, and SCAG's latest growth forecasts. SCAG's latest growth forecasts were defined in consultation with local governments and with reference to local general plans. The Project is subject to the SCAQMD's AQMP.

Criteria for determining consistency with the AQMP are defined by the following indicators:

- **Consistency Criterion No. 1**: The Project will not result in an increase in the frequency or severity of existing air quality violations, or cause or contribute to new violations, or delay the timely attainment of air quality standards or the interim emissions reductions specified in the AQMP.
- **Consistency Criterion No. 2**: The Project will not exceed the assumptions in the AQMP, or increments based on the years of the Project build-out phase.

According to the SCAQMD's *CEQA Air Quality Handbook*, the purpose of the consistency finding is to determine if a project is inconsistent with the assumptions and objectives of the regional air quality plans, and thus if it would interfere with the region's ability to comply with CAAQS and NAAQS.

The violations to which Consistency Criterion No. 1 refers are the CAAQS and NAAQS. As shown in Table 8, the Proposed Project would not exceed construction emission standards with the implementation of Mitigation Measure (**MM**) **AQ-1**. However, operational emissions would exceed the operational standards for ROG, NO_X, and CO despite the implementation of all feasible mitigation, as shown in Table 9. Mitigation measures from the FEIR, **4.6-1** through **4.6-11**, are included to reduce operation emissions to the greatest amount feasible. However, even with mitigation, operational emissions would remain above the SCAQMD thresholds. Therefore, the Project would potentially contribute to an existing air quality violation. Thus, the Project is not consistent with the first criterion.

Concerning Consistency Criterion No. 2, the AQMP contains air pollutant reduction strategies based on SCAG's latest growth forecasts, and SCAG's growth forecasts were defined in consultation with local governments and with reference to local general plans. The Proposed Project would not require any changes to zoning or land use and would be consistent with the land uses planned for the site. Additionally, the Project would not result in a direct increase in population as it would not accommodate any new residents. As such, the Project would not result in substantial unplanned growth or unaccounted job growth projections used by the SCAQMD to develop the AQMP. Thus, the Proposed Project is consistent with the 2022 AQMP and the second criterion.

The FEIR concluded that land uses in the GHSP were less intensive than those in the 1989 San Bernardino County General Plan. Because emissions from the General Pan were included in the AQMP and the GHSP would result in fewer emissions than the Previously Approved Project. As such, the FEIR determined that the Previously Approved Project was consistent with the AQMP and would result in less than significant impacts.

As noted above (and discussed further in Threshold 5.2, below), the Proposed Project would result in air pollutant emissions that exceed SCAQMD's operational emission thresholds. Although mitigation would reduce emissions by the greatest feasible amount, Project emissions levels would remain significant and would contribute to the nonattainment designations in the SCAB. Therefore, the Project would be inconsistent with the AQMP, resulting in a significant and unavoidable impact despite the implementation of mitigation.

Mitigation Measures: Mitigation measures **4.6-1 through 4.6-11 from the FEIR and MM AQ-1** through **MM AQ-6** (refer to Impact Threshold 5.2, below).

Level of Significance: Significant and unavoidable impact. No additional feasible mitigation measures are available that can reduce this impact to less than significant. Although the FEIR for the Previously Approved Project concluded that the Previously Approved Project would not result in significant impacts, the Proposed Project would exceed SCAQMD operational thresholds for ROG, NO_X, and CO. As a result, impacts from the Proposed Project would be greater than those of the Previously Approved Project.

Threshold 5.2 Would the Project result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is non-attainment under an applicable state or federal ambient air quality standard?

Construction Emissions

Project construction activities would generate short-term emissions of criteria air pollutants. The criteria pollutants of primary concern within the Project area are O_3-precursor pollutants (i.e., ROG and NO_X) and PM_{10} and $PM_{2.5}$. Construction-related emissions are short term and of temporary duration, lasting only as long as construction activities occur, but would be considered a significant air quality impact if the volume of pollutants generated exceeds the SCAQMD's thresholds of significance.

Construction results in the temporary generation of emissions resulting from site grading, road paving, motor vehicle exhaust associated with construction equipment and worker trips, and the movement of construction equipment, especially on unpaved surfaces. Emissions of airborne particulate matter are largely dependent on the amount of ground disturbance associated with site preparation activities as well

as weather conditions and the appropriate application of water. Fugitive dust emissions may have a substantial, temporary impact on local air quality. In addition, fugitive dust may be a nuisance to those living and working in the Project vicinity. Uncontrolled dust from construction can become a nuisance and potential health hazard to those living and working nearby.

The Project's grading phase is anticipated to occur over a three-year period while the construction phase, including building construction, paving, and architectural coating, is estimated to last approximately 12 months. The Project's construction emissions were calculated using the CalEEMod computer program, which is designed to model emissions for land use development projects, based on typical construction requirements. See Appendix A: Air Quality Modeling Data for more information regarding the construction assumptions used in this analysis. Predicted maximum daily construction-generated emissions for the Project are summarized in in Table 8: Construction-Related Emissions.

Table 8: Construction-Related Emissions

Construction Year	Maximum Pounds Per Day[1]					
	ROG	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
Unmitigated Emissions						
2024	10.80	**129.00**	108.00	0.34	20.6	9.21
2025	9.82	**114.00**	103.00	0.34	19.8	8.61
2026	9.19	**106.00**	100.00	0.34	19.5	8.29
2027	22.10	21.00	63.30	0.09	4.17	1.94
SCAQMD Threshold	*75*	*100*	*550*	*150*	*150*	*55*
Exceed SCAQMD Threshold?	**No**	**Yes**	**No**	**No**	**No**	**No**
Mitigated Emissions[2]						
2024	10.80	*42.10*	108.00	0.34	*16.7*	*5.61*
2025	9.82	*40.80*	103.00	0.34	*16.5*	*5.61*
2026	9.19	*39.60*	100.00	0.34	*16.5*	*5.61*
2027	22.10	*21.00*	63.30	0.09	*4.17*	*1.94*
SCAQMD Threshold	*75*	*100*	*550*	*150*	*150*	*55*
Exceed SCAQMD Threshold?	**No**	**No**	**No**	**No**	**No**	**No**

ROG = Reactive Organic Gases; NO_X = Nitrogen Oxides; CO = Carbon Monoxide; SO_2 = Sulfur Dioxide; PM_{10} = Particulate Matter 10 microns in diameter or less; $PM_{2.5}$ = Particulate Matter 2.5 microns in diameter or less

1. SCAQMD Rule 403 Fugitive Dust applied. The Rule 403 reduction/credits include the following: properly maintain mobile and other construction equipment; replace ground cover in disturbed areas quickly; water exposed surfaces three times daily; water all haul roads twice daily; and limit speeds on unpaved roads to 15 miles per hour.
2. Mitigation includes the incorporation of 2020 Glen Helen SP EIR Addendum Mitigation Measures **7-1 through 7-10** and **MM AQ-1**. **MM AQ-1** requires off-road equipment 50 horsepower or greater to meet CARB Tier 4 Final standards during construction activities.

Source: CalEEMod version 2022.1.1.13 Refer to Appendix A for model outputs.

Fugitive dust emissions may have a substantial, temporary impact on local air quality. In addition, fugitive dust may be a nuisance to those living and working in the Project vicinity. Uncontrolled dust from construction can become a nuisance and potential health hazard to those living and working nearby. SCAQMD Rules 402 and 403 (prohibition of nuisances, watering of inactive and perimeter areas, track out requirements, etc.), are applicable to the Project and were applied in CalEEMod to minimize fugitive dust emissions. Plans, programs, and policies (PPP) 1 requires the implementation of Rule 402 and 403 dust control techniques to minimize PM_{10} and $PM_{2.5}$ concentrations.

The 2020 Glen Helen Specific Plan EIR Addendum included mitigation measures to reduce construction emissions. **MM 7-1** requires contractors to water active grading areas a minimum of three times per day.

MM 7-2 requires construction equipment to be properly tuned and maintained while **MM 7-3** requires construction to be operated to minimize exhaust emissions. **MM 7-4** requires contractors to use line power instead of diesel or gas-powered generators whenever line power is reasonably available. **MM 7-5** limits construction equipment operators to no more than five minutes of idling when within 100 feet of homes or schools while driver is resting. **MM 7-6** limits grading activities to 10 acres per day or less when grading within 1,000 feet of residential receptors. **MM 7-7** requires the contractor to reduce the emission of pollutants generated by heavy-duty diesel-powered equipment throughout the construction period. **MM 7-8** requires stationary equipment to be located at least 100 feet from homes or schools, when possible. **MM 7-10** requires the contractor to schedule deliveries during off-peak traffic periods.

Using the latest version of CalEEMod, the unmitigated maximum daily emissions associated with the Proposed Project would only exceed the NO_X construction emission standard. With the implementation of **MM AQ-1**, which requires all off-road equipment 50 horsepower or greater to meet CARB Tier 4 Final standards, NO_X emissions would be reduced below the SCAQMD construction standards. Therefore, the Proposed Project would generate less construction impacts than the Previously Approved Project.

Operational Emissions

Project operational emissions are those attributed to vehicle trips (mobile emissions), the use of natural gas and electricity (energy source emissions), and consumer products, architectural coatings, and landscape maintenance equipment (area source emissions). CalEEMod was used to calculate emissions based on the proposed land uses for the plan area and the number of trips generated.

The FEIR determined that operational emissions from the Previously Approved Project would exceed SCAQMD operational thresholds for ROG, NO_X, CO, and PM_{10}. Although the FEIR included air quality mitigation measures (refer to Mitigation Measures from FEIR **4.6-1** through **4.6-11**) operational emissions remained above SCAQMD thresholds.

Table 9: Operational Emissions illustrates the long-term operational emissions from the Proposed Project. As shown in Table 9, unmitigated emissions would exceed SCAQMD's operational significance thresholds for ROG, NO_X, CO, and PM_{10}. Impacts from operational emissions would be potentially significant.

Table 9: Operational Emissions

Source	Maximum Pounds Per Day					
	ROG	**NO_X**	**CO**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Unmitigated Emissions						
Area Source Emissions	9.41	0.11	13.5	<0.01	0.02	0.02
Energy Emissions	0.17	3.11	2.61	0.02	0.24	0.24
Mobile Emissions	**117**	**153.78**	**1,477**	4.13	**151**	28.9
Total Emissions	**126.58**	**157**	**1,493.11**	**4.15**	**151.26**	**29.16**
SCAQMD Threshold	*55*	*55*	*550*	*150*	*150*	*55*
Exceeds Threshold?	**Yes**	**Yes**	**Yes**	**No**	**Yes**	**No**

Table 9: Operational Emissions						
Source	**Maximum Pounds Per Day**					
	ROG	**NO_X**	**CO**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Mitigated Emissions [1]						
Area Source Emissions	8.56	0.11	13.5	<0.01	0.02	0.02
Energy Emissions	0.16	3.00	2.52	0.02	0.23	0.23
Mobile Emissions	**113**	**148**	**1,423**	3.98	146	27.8
Total Emissions	**121.72**	**151.11**	**1,439.02**	4.00	146.25	28.05
SCAQMD Threshold	55	55	550	150	150	55
Exceeds Threshold?	**Yes**	**Yes**	**Yes**	No	No	No
ROG = Reactive Organic Gases; NO_X = Nitrogen Oxides; CO = Carbon Monoxide; SO_2 = Sulfur Dioxide; PM_{10} = Particulate Matter 10 microns in diameter or less; $PM_{2.5}$ = Particulate Matter 2.5 microns in diameter or less						
1. Mitigation includes the incorporation of mitigation measures 4.6-1 through 4.6-11 from the FEIR						
Source: CalEEMod version 2022.1.1.13 Refer to Appendix A for model outputs.						

Mitigation measures from FEIR **4.6-1** through **4.6-11** are required to reduce operational emissions to the maximum extent feasible. However, as shown in Table 9, a majority of the operational emissions are from mobile sources. Motor vehicle emissions are regulated by State and Federal standards and the Proposed Project has no control over these standards. Therefore, even with mitigation, operational emissions from the Proposed Project would exceed the SCAQMD thresholds for ROG, NO_X, and CO. However, with mitigation the Proposed Project would generate less construction impacts than the Previously Approved Project.

Cumulative Construction Impacts

The SCAB is designated nonattainment for O_3, PM_{10}, and $PM_{2.5}$ for the CAAQS and nonattainment for O_3 and $PM_{2.5}$ for the NAAQS. Appendix D of the SCAQMD *White Paper on Potential Control Strategies to Address Cumulative Impacts from Air Pollution* (2003) notes that projects that result in emissions that do not exceed the project specific SCAQMD regional thresholds of significance should result in a less than significant impact on a cumulative basis unless there is other pertinent information to the contrary. The mass-based regional significance thresholds published by the SCAQMD are designed to ensure compliance with both NAAQS and CAAQS and are based on an inventory of projected emissions in the SCAB. Therefore, if a project is estimated to result in emissions that do not exceed the thresholds, the project's contribution to the cumulative air quality impact in the SCAB would not be cumulatively considerable. As shown in Table 8 above, Proposed Project construction-related emissions with the incorporation of construction mitigation measures **7-1** through **7-10** from the 2020 Addendum EIR and **MM AQ-1** would not exceed the SCAQMD significance thresholds for criteria pollutants. Therefore, the Proposed Project would not generate a cumulatively considerable contribution to air pollutant emissions during construction.

The SCAQMD has developed strategies to reduce criteria pollutant emissions outlined in the AQMP pursuant to the FCAA mandates. The analysis assumed fugitive dust controls would be utilized during construction, including frequent water applications. SCAQMD rules, mandates, and compliance with adopted AQMP emissions control measures would also be imposed on construction projects throughout the SCAB, which would include related projects. Compliance with SCAQMD rules and regulations would further reduce Project construction-related emissions. Therefore, Project-related construction emissions, combined with those from other projects in the area, would not substantially deteriorate local air quality.

The Proposed Project's construction-related emissions would not result in a cumulatively considerable contribution to significant cumulative air quality.

Cumulative Operational Impacts

The SCAQMD has not established separate significance thresholds for cumulative operational emissions. The nature of air emissions is largely a cumulative impact. As a result, no single project is sufficient in size to, by itself, result in nonattainment of ambient air quality standards. Instead, individual project emissions contribute to existing cumulatively significant adverse air quality impacts. The SCAQMD developed the operational thresholds of significance based on the level above which individual project emissions would result in a cumulatively considerable contribution to the SCAB's existing air quality conditions. Therefore, a project that exceeds the SCAQMD operational thresholds would also be a cumulatively considerable contribution to a significant cumulative impact.

As shown in Table 9 above, the Project operational emissions (primarily mobile source emissions) would exceed the SCAQMD threshold for ROG, NO_X, and CO despite the implementation of mitigation. As a result, operational emissions associated with the Project would result in a cumulatively considerable contribution to significant cumulative air quality impacts. Emissions of motor vehicles are controlled by State and Federal standards and the Project has no control over these standards. The application of mandatory plans, programs, and policies along with the implementation of operational mitigation measures from the FEIR, **4.6-1** through **4.6-11** would reduce some emissions, but the majority of the mobile source emissions are beyond the Project's control. Therefore, the project would contribute to a significant cumulative operational impact, consistent with the Previously Approved Project.

Plans, Programs, and Policies

Existing requirements based on local, state, or federal regulations or laws are frequently required independently of CEQA review. Typical requirements include compliance with the provisions of the Building Code, CalGreen Code, local municipal code, SCAQMD Rules, etc. Because Plans, Programs, and Policies (PPP) are neither Project specific nor a result of development of the Project, they are not considered to be project design features or Mitigation Measures.

PPP-1 Prior to the issuance of grading permits, the County Engineer shall confirm that the Grading Plan, Building Plans and Specifications require all construction contractors to comply with South Coast Air Quality Management District's (SCAQMD's) Rules 402 and 403 to minimize construction emissions of dust and particulates. The measures include, but are not limited to, the following:

- Portions of a construction site to remain inactive longer than a period of three months will be seeded and watered until grass cover is grown or otherwise stabilized.
- All on-site roads will be paved as soon as feasible or watered periodically or chemically stabilized.
- All material transported off site will be either sufficiently watered or securely covered to prevent excessive amounts of dust.

- The area disturbed by clearing, grading, earthmoving, or excavation operations will be minimized at all times.
- Where vehicles leave a construction site and enter adjacent public streets, the streets will be swept daily or washed down at the end of the work day to remove soil tracked onto the paved surface.

PPP-2 Pursuant to SCAQMD Rule 1113, the Project applicant shall require by contract specifications that the interior and exterior architectural coatings (paint and primer including parking lot paint) products used would have a volatile organic compound rating of 50 grams per liter or less.

PPP-3 Require diesel powered construction equipment to turn off when not in use per Title 13 of the California Code of Regulations, Section 2449.

PPP-4 The Project shall be designed in accordance with the applicable Title 24 Energy Efficiency Standards for Residential and Nonresidential Buildings (California Code of Regulations [CCR], Title 24, Part 6). These standards are updated, nominally every three years, to incorporate improved energy efficiency technologies and methods. The Building Official, or designee shall ensure compliance prior to the issuance of each building permit. The Title 24 Energy Efficiency Standards (Section 110.10) require buildings to be designed to have 15 percent of the roof area "solar ready" that will structurally accommodate later installation of rooftop solar panels. If future building operators pursue providing rooftop solar panels, they will submit plans for solar panels prior to occupancy.

PPP-5 The Project shall be designed in accordance with the applicable California Green Building Standards (CALGreen) Code (24 CCR, Part 11). The Building Official, or designee shall ensure compliance prior to the issuance of each building permit. These requirements include, but are not limited to:

- Design buildings to be water-efficient. Install water-efficient fixtures in accordance with Section 4.303 (residential) and Section 5.303 (nonresidential) of the California Green Building Standards Code Part 11.
- Recycle and/or salvage for reuse a minimum of 65 percent of the nonhazardous construction and demolition waste in accordance with Section 4.408.1 (residential) and Section 5.408.1 (nonresidential) of the California Green Building Standards Code Part 11.
- Provide storage areas for recyclables and green waste and adequate recycling containers located in readily accessible areas in accordance with Section 4.410 (residential) and Section 5.410 (nonresidential) of the California Green Building Standards Code Part 11.
- To facilitate future installation of electric vehicle supply equipment (EVSE), nonresidential construction shall comply with Section 5.106.5.3 (nonresidential electric vehicle charging) of the California Green Building Standards Code Part 11.

2005 Glen Helen Specific Plan EIR Mitigation Measures: The FEIR includes measures to reduce potential impacts associated with the implementation of Glen Helen Specific Plan. The following measures from the FEIR are applicable to the Proposed Project:

4.6-1 Provide adequate ingress and egress at all entrances to public facilities to minimize vehicle idling at curbside.

- Submit building plans to Building and Safety for approval.
- Submit copy of approval by Building and Safety to Planning Division.
- Submit copy of approved plans to Planning Division for review and approval.

4.6-2 Provide dedicated turn lanes as appropriate and provide roadway improvements at heavily congested roadways.

- County Traffic Planning Section to identify heavily congested intersections and notify Building and Safety.
- Submit building plans to Building and Safety for approval.
- Submit copy of approval by Building and Safety to Planning Division.
- Submit copy of approved plans to Planning Division for review and approval.

4.6-3 Install energy efficient lighting.

- Submit building plans with Title 24 certification from a certified lighting/electrical engineer to Building and Safety for approval.
- Submit copy of approval by Building and Safety to Planning Division.
- Submit copy of approved plans to Planning Division for review and approval.

4.6- 4 Landscape with native or drought-resistant species to reduce water consumption and to provide passive solar benefits.

- Submit landscaping and irrigation plans to Building and Safety for approval.
- Submit copy of approval by Building and Safety to Planning Division.
- Submit copy of approved plans to Planning Division for review and approval.

4.6-5 Employers should provide local shuttle and transit shelters, and ride matching services.

- Submit plans to County Transportation Authority to determine need and/or location for transit shelters, bus stops, etc.
- Submit commercial and industrial site building plans to Building and Safety for approval.
- Submit copy of approval by Building and Safety to Planning Division.
- Submit copy of approved plans to Planning Division for review and approval.

4.6-6 Employers should provide bicycle lanes, storage areas, and amenities, and ensure efficient parking management.

- Submit plans to County Transportation Authority to determine need and/or location for bicycle improvements.
- Submit commercial and industrial site/building plans to Building and Safety for approval.
- Submit copy of approval by Building and Safety to Planning Division.
- Submit copy of approved plans to Planning Division for review and approval.

4.6-7 Employers should provide variable work hours and telecommuting to employees to comply with the AQMP Advanced Transportation Technology ATT-01 and ATT-02 measures.

- Developers of commercial and industrial uses shall submit appropriate technology plans based on discussion or correspondence with SCAQMD personnel.
- Developers shall submit plans to County Planning to determine need and/or location for any technology improvements or systems for review and approval.
- Submit copy of approval from County Planning for commercial and industrial site building plans to Building and Safety for approval.

4.6-8 Employers should develop a trip reduction plan to comply with SCAQMD Rule 2202.

- Developers of commercial and industrial uses shall submit a Trip Reduction Plan (TRP) to SCAQMD for review and approval.
- Submit TRP approved by SCAQMD to County Planning for review and approval.
- Submit TRP approved by SCAQMD and County Planning along with building plans to Building and Safety for approval.

4.6-9 Employers should provide ride matching, guaranteed ride home, or carpool or vanpool to employees as a part of the TDM program and to comply with the AQMP Transportation Improvements TCM-01 measure.

- Developers of commercial and industrial uses shall submit a Travel Demand Management (TDM) to SCAQMD for review and approval.
- Submit TDM approved by SCAQMD to County Planning for review and approval.
- Submit TDM approved by SCAQMD and County Planning along with building plans to Building and Safety for approval.

4.6-10 Synchronize traffic signals. The areas where this measure would be applicable are roadway intersections within the specific plan area.

- County Traffic Planning Section to identify heavily congested intersections and notify Building and Safety.

- Submit building plans to Building and Safety for approval demonstrating that signals can be synchronized in the future.
- Developers to submit copy of approval by Building and Safety to Planning Division.
- Submit copy of approved plans to Planning Division for review and approval.
- County to synchronize traffic signals as funding is available.

4.6-11 Encourage the use of alternative fuel or low emission vehicles to comply with the AQMP On-Road Mobile M2 measure, and Off-Road Mobile Sources M9 and M 10 measures.

- Developers of commercial and industrial uses shall submit an Alternative Fuel or Low Emission Vehicle Plan (AFLEVP) to SCAQMD for review and approval.
- Submit AFLEVP approved by SCAQMD to County Planning for review and approval.
- Submit AFLEVP approved by SCAQMD and County Planning along with building plans to Building and Safety for approval.

2020 Glen Helen Specific Plan EIR Addendum Mitigation Measures: The Addendum EIR includes measures to reduce potential impacts associated with the implementation of Glen Helen Specific Plan. The following measures from the Addendum EIR are applicable to the Proposed Project:

7-1 The Applicant shall water all active grading areas a minimum of three times per day (as opposed to two).

7-2 All construction equipment shall be properly tuned and maintained in accordance with manufacturer's specifications.

7-3 The Applicant shall maintain and operate construction equipment so as to minimize exhaust emissions. During construction, trucks and vehicles in loading and unloading queues shall turn their engines off when not in use to reduce vehicle emissions. Construction emissions shall be phased and scheduled to avoid emissions peaks to the extent feasible and discontinued during second-stage smog alerts.

7-4 The Applicant shall use line power instead of diesel- or gas-powered generators at all construction sites whereever line power is reasonably available.

7-5 Unless required for safety reasons, during construction, equipment operators shall limit the idling of all mobile and stationary construction equipment to no more than five minutes. The use of diesel auxiliary power systems and main engines shall also be limited to no more than five minutes when within 100 feet of homes or schools while driver is resting.

7-6 Active grading activities shall be limited to 10 acres per day or less when grading within 1,000 feet of residential receptors.

7-7 The Applicant shall implement measures to reduce the emissions of pollutants generated by heavy-duty diesel-powered equipment operating at the project site throughout the

project construction. The Applicant shall include in construction contracts the control measures required and recommended by the SCAQMD at the time of development. These measures include the following:

(1) Use Tier II (2001 or later) heavy-duty diesel-powered equipment at the project site;
(2) Apply NOX control technologies, such as fuel injection timing retard for diesel engines and air-to-air cooling, and diesel oxidation catalysts as feasible; feasibility shall be determined by using the cost- effectiveness formula developed by the Carl Moyer Program; and
(3) General contractors shall maintain and operate construction equipment so as to minimize exhaust emissions and keep all construction equipment in proper tune in accordance with manufacturer's specifications.

7-8 If stationary equipment, such as generators for ventilation fans, must be operated continuously, locate such equipment at least 100 feet from homes or schools, where possible.

~~7-9~~ ~~Applicant shall ensure that the construction contractors utilize architectural coatings that contain a VOC rating of 75 grams/liter of VOC or less.~~ South Coast AQMD Rule 1113 requires architectural coatings to be 50 grams/liter of VOC or less. Refer to PPP-2 above.

7-10 The Applicant shall, to the extent feasible, promote, support, and encourage the scheduling of deliveries during off-peak traffic periods to encourage the reduction of trips during the most congested periods.

7-12 During site plan review, due consideration shall be given to the provision of safe and convenient pedestrian and bicycle access to transit stops and to public transportation facilities.

7-16 Future purchasers of real property located within 500 feet of the I-15 Freeway right-of-way and within 500 feet of the main truck route and active mining areas at the Cemex USA quarry and the Vulcan Materials Company plant shall, in accordance with the disclosure requirements of the California Department of Real Estate, receive notification that residential occupants and other sensitive receptors may be exposed to excess cancer risks as a result of long-term exposure to toxic air contaminants, including diesel particulate matter, associated with diesel-powered vehicles traveling along and operating within those areas.

7-17 ~~All dwelling units within 500 feet of the I-15 Freeway right-of-way and within 500 feet of the Cemex USA quarry's and Vulcan Materials Company plant's main truck route and active mining areas shall incorporate an air filtration system designed to have a minimum efficiency reporting value (MERV) of 12 or better as indicated by the American Society of Heating Refrigerating and Air Conditioning Engineers (ASHRAE) Standard 52.2.~~ The Project does not include residential uses, therefore this mitigation measure does not apply.

7-18 ~~Excluding pedestrian and bicycle trails, sensitive public recreational uses, such as active outdoor playground, shall be prohibited within 500 feet of the I-15 Freeway right-of-way and within 500 feet of the main truck route and active mining areas at the Cemex USA~~

~~and Vulcan Materials Company quarries.~~ The Project does not include sensitive public recreational uses, therefore this mitigation measure does not apply.

Additional Mitigation Measures:

MM AQ-1 Prior to issuance of grading permits, the applicant shall prepare and submit documentation to the County of San Bernardino that demonstrate the following:

- All off-road diesel-powered construction equipment greater than 50 horsepower meets California Air Resources Board Tier 4 Final off-road emissions standards. Requirements for Tier 4 Final equipment shall be included in applicable bid documents and successful contractor(s) must demonstrate the ability to supply such equipment. A copy of each unit's Best Available Control Technology (BACT) documentation (certified tier specification or model year specification), and CARB or SCAQMD operating permit (if applicable) shall be provided to the County at the time of mobilization of each applicable unit of equipment.
- All construction equipment and delivery vehicles shall be turned off when not in use, or limit on-site idling for no more than 5 minutes in any 1 hour.

Level of Significance: Significant and unavoidable impact. Construction emissions have been reduced to less than significant with the incorporation of 2020 Addendum EIR mitigation measures **7-1** through **7-8 and 7-10** as well as **MM AQ-1**. However, operational impacts from mobile sources remain significant even after the incorporation of mitigation measures from FEIR, **4.6-1** through **4.6-4** and **4.6-6** through **4.6-11** in addition to mitigation measure **7-12** from the 2020 Addendum EIR. The FEIR for the Previously Approved Project also determined that impacts from operations would be significant and unavoidable. No additional feasible mitigation measures are available that can reduce mobile emission impacts to less than significant. Therefore, the Proposed Project would not result in new or more severe impacts than previously analyzed in the FEIR.

Threshold 5.3 Would the Project expose sensitive receptors to substantial pollutant concentrations?

The FEIR for the Previously Approved Project, adopted in 2005, was not required to analyze impacts to sensitive receptors. However, since the Project has changed this impact will be analyzed for new significant environmental impacts.

Localized Construction Significance Analysis

The nearest sensitive receptor is a single-family home, approximately 80 feet (24 meters) to the north of the Project site. To identify impacts to sensitive receptors, the SCAQMD recommends addressing construction LSTs. LSTs were developed in response to SCAQMD Governing Boards' Environmental Justice Enhancement Initiative (I-4). The SCAQMD provided the *Final Localized Significance Threshold Methodology* (dated June 2003 [revised 2008]) for guidance. The LST methodology assists lead agencies in analyzing localized impacts associated with Project-specific emissions.

Since CalEEMod calculates construction emissions based on the number of equipment hours and the maximum daily soil disturbance activity possible for each piece of equipment, Table 10: Equipment-Specific Grading Rates, is used to determine the maximum daily disturbed acreage for comparison to LSTs.

The appropriate SRA for the localized significance thresholds is the Northwest San Bernardino Valley (SRA 32) since this area includes the Project. LSTs apply to CO, NO_2, PM_{10}, and $PM_{2.5}$. The SCAQMD produced look-up tables for projects that disturb areas less than or equal to 5 acres in size. Project construction is anticipated to disturb a maximum of 13.5 acres in a single day. As the LST guidance provides thresholds for projects disturbing 1-, 2-, and 5-acres in size and the thresholds increase with size of the site, the LSTs for a 5-acre threshold was conservatively utilized for this analysis.

Table 10: Equipment-Specific Grading Rates

Construction Phase	Equipment Type	Equipment Quantity	Acres Graded per 8-Hour Day	Operating Hours per Day	Acres Graded per Day
Grading	Tractors	10	0.5	8	5
	Graders	3	0.5	8	1.5
	Dozers	2	0.5	8	1
	Scrapers	6	1	8	6
				Maximum Acres Graded per Day	**13.5** [1]

1. Grading limited to 10 acres per day when grading within 1,000 feet of residential receptors (refer to 2020 Addendum EIR mitigation measure 7-6),

Source: CalEEMod version 2022.1.1.13. Refer to Appendix A for model outputs.

The SCAQMD's methodology states that "off-site mobile emissions from the Project should not be included in the emissions compared to LSTs." Therefore, only "on-site" emissions included in the CalEEMod outputs were considered. The nearest sensitive receptor is a single-family home located approximately 80 feet (24 meters) to the north of the Project. LST thresholds are provided for distances to sensitive receptors of 25, 50, 100, 200, and 500 meters. Therefore, LSTs for receptors located at 40 meters were interpolated and utilized in this analysis. Table 11: Localized Significance of Construction Emissions, presents the results of localized emissions during construction. Table 11 shows that Project emissions of these pollutants on the peak day of construction would not exceed SCAQMD thresholds at the nearest sensitive receptor. Therefore, the Project would result in a less than significant impact concerning LSTs during construction.

Table 11: Localized Significance of Construction Emissions

Construction Activity	Maximum Pounds Per Day			
	NO_X	CO	PM_{10}	$PM_{2.5}$
Unmitigated Emissions				
Site Preparation/Grading	83.9	82.1	12.35	6.38
Building Construction, Paving, and Architectural Coating [1]	36.02	60.3	1.35	1.24
SCAQMD Localized Screening Threshold (adjusted for 5 acres at 25 meters)	*270*	*2,193*	*16*	*9*
Exceed SCAQMD Threshold?	No	No	No	No

NO_X = Nitrogen Oxides; CO = Carbon Monoxide; PM_{10} = Particulate Matter 10 microns in diameter or less; $PM_{2.5}$ = Particulate Matter 2.5 microns in diameter or less

1. Building Construction, Paving, Architectural Coating activities can occur on the same day, therefore these emissions are added together to show a daily maximum.

Source: CalEEMod version 2022.1.1.13 Refer to Appendix A for model outputs.

Wind Influence on Construction Related Particulate Matter

Wind patterns in the area are characterized by westerly and southwesterly onshore winds during the day and easterly or northeasterly breezes at night. The Project site is located between two meteorological stations located at Fontana and Upland. The Fontana station is located closer to the Project site while the Upland station is located in the same SRA, indicating that that conditions at the Project site and the Upland station are similar. Because the Project is located between these two stations a wind rose for both monitoring stations are provided in Exhibit 4, Wind Rose. As shown in these wind roses, the majority of the wind would blow from the southwest to the northeast. Winds blowing from the southwest in Fontana would range in speeds of 0.89 to 19.69 miles per hour (0.40 to 8.80 m/s) while the winds blowing from the southwest in Upland would range in speeds of 0.89 to 12.75 miles per hour (0.40 to 5.70 m/s). After comparing both wind roses, the maximum wind speed would be 24.83 miles per hour (11.10 m/s) blowing from the northeast to the southwest. The National Weather Service identifies these wind levels as "very low" to "low" and describes them as "breezy" or "windy".[3]

Based on this analysis, the majority of the time that there is a wind blowing, it would blow from the construction site toward the nearest sensitive receptors. Therefore, **MM AQ-2** is included to prevent fugitive dust generation from impacting sensitive receptors. **MM AQ-2** requires the Project Applicant to have a Dust Control Management Plan approved prior to the approval of the grading plan.

Localized Operational Significance Analysis

Interpolated LSTs for receptors located at 80 feet (24 meters) for SRA 32 were used in this analysis. The Project site is approximately 33 acres, the 5-acre threshold was conservatively used for evaluation of operational emissions. As noted above, the LSTs increase as site acreage increases. Therefore, the 5-acre LSTs are conservative for evaluation of a 33-acre site. The LST analysis only includes on-site sources. However, the CalEEMod model outputs do not separate on- and off-site emissions for mobile sources. For a worst-case scenario assessment, the emissions shown in Table 12: Localized Significance of Operational Emissions assumes that five percent of the total mobile emissions would occur on site. Based on the 29,094 daily trips assumed in the traffic impact study, this analysis conservatively assumes each vehicle accessing the Proposed Project would drive a total of 2 miles while on site.

Table 12: Localized Significance of Operational Emissions

Activity	Maximum Pounds Per Day			
	NO_X	CO	PM_{10}	$PM_{2.5}$
On-Site Emissions[1]	10.52	89.96	7.81	1.56
SCAQMD Localized Screening Threshold (adjusted for 5-acre at 25 meters)	*270*	*2,193*	*4*	*2*
Exceed SCAQMD Threshold?	**No**	**No**	**No**	**No**

NO_X = Nitrogen Oxides; CO = Carbon Monoxide; PM_{10} = Particulate Matter 10 microns in diameter or less; $PM_{2.5}$ = Particulate Matter 2.5 microns in diameter or less

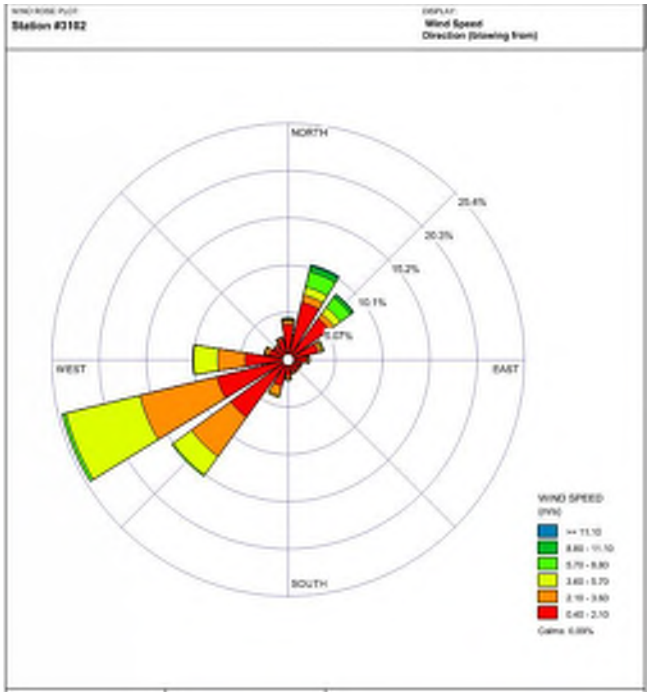
1. Includes all on-site area source and energy emissions and 5 percent of total mobile emissions.

Source: CalEEMod version 2022.1.1.13. Refer to Appendix A for model outputs.

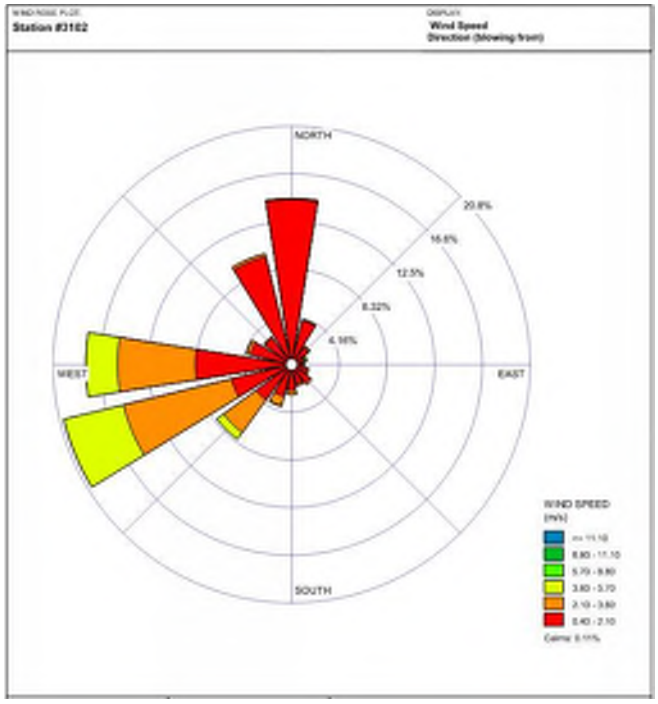
[3] National Weather Service, *Wind Threat Description*, 2023. https://www.weather.gov/mlb/seasonal_wind_threat. Accessed July 2023

Exhibit 4: Wind Rose

Fontana



Upland



Daily on-site operational emissions are compared to the LST thresholds in Table 12. Table 12 shows that the maximum daily emissions of these pollutants during Project operations would not result in significant concentrations of pollutants at nearby sensitive receptors. Therefore, the Project would result in a less than significant impact concerning LSTs during operational activities.

Criteria Pollutant Health Impacts

On December 24, 2018, the California Supreme Court issued an opinion identifying the need to provide sufficient information connecting a project's air emissions to health impacts or explain why such information could not be ascertained (*Sierra Club v. County of Fresno* [Friant Ranch, L.P.] [2018] Cal.5th, Case No. S219783). The SCAQMD has set its CEQA significance thresholds based on the FCAA, which defines a major stationary source (in extreme O_3 nonattainment areas such as the SCAB) as emitting 10 tons per year. The thresholds correlate with the trigger levels for the federal New Source Review (NSR) Program and SCAQMD Rule 1303 for new or modified sources. The NSR Program[4] was created by the FCAA to ensure that stationary sources of air pollution are constructed or modified in a manner that is consistent with attainment of health-based NAAQS. The NAAQS establish the levels of air quality necessary, with an adequate margin of safety, to protect the public health. Therefore, projects that do not exceed the SCAQMD's LSTs and mass emissions thresholds would not violate any air quality standards or contribute substantially to an existing or projected air quality violation and no criteria pollutant health impacts would occur.

NO_X and ROG are precursor emissions that form O_3 in the atmosphere in the presence of sunlight where the pollutants undergo complex chemical reactions. It takes time and the influence of meteorological conditions for these reactions to occur, so ozone may be formed at a distance downwind from the sources. Breathing ground-level O_3 can result health effects that include reduced lung function, inflammation of airways, throat irritation, pain, burning, or discomfort in the chest when taking a deep breath, chest tightness, wheezing, or shortness of breath. In addition to these effects, evidence from observational studies strongly indicates that higher daily O_3 concentrations are associated with increased asthma attacks, increased hospital admissions, increased daily mortality, and other markers of morbidity. The consistency and coherence of the evidence for effects upon asthmatics suggests that O_3 can make asthma symptoms worse and can increase sensitivity to asthma triggers.

According the SCAQMD's 2022 AQMP, O_3, NO_X, and ROG have been decreasing in the SCAB since 1975 and are projected to continue to decrease in the future. Although vehicle miles traveled in the SCAB continue to increase, NO_X and ROG levels are decreasing because of the mandated controls on motor vehicles and the replacement of older polluting vehicles with lower-emitting vehicles. NO_X emissions from electric utilities have also decreased due to the use of cleaner fuels and renewable energy. The 2022 AQMP demonstrates how the SCAQMD's control strategy to meet the 8-hour O_3 standard in 2037. In addition, since NO_X emissions also lead to the formation of $PM_{2.5}$, the NO_X reductions needed to meet the O_3 standards will likewise lead to improvement of $PM_{2.5}$ levels and attainment of $PM_{2.5}$ standards.

The SCAQMD's air quality modeling demonstrates that NO_X reductions prove to be much more effective in reducing O_3 levels and will also lead to significant improvement in $PM_{2.5}$ concentrations. NO_X-emitting stationary sources regulated by the SCAQMD include Regional Clean Air Incentives Market (RECLAIM) facilities (e.g., refineries, power plants, etc.), natural gas combustion equipment (e.g., boilers, heaters,

[4] Code of Federal Regulation (CFR) [i.e., PSD (40 CFR 52.21, 40 CFR 51.166, 40 CFR 51.165 (b)), Non-attainment NSR (40 CFR 52.24, 40 CFR 51.165, 40 CFR part 51, Appendix S)

engines, burners, flares) and other combustion sources that burn wood or propane. The 2016 AQMP identifies robust NO_X reductions from new regulations on RECLAIM facilities, non-refinery flares, commercial cooking, and residential and commercial appliances. Such combustion sources are already heavily regulated with the lowest NO_X emissions levels achievable but there are opportunities to require and accelerate replacement with cleaner zero-emission alternatives, such as residential and commercial furnaces, pool heaters, and backup power equipment. The AQMD plans to achieve such replacements through a combination of regulations and incentives. Technology-forcing regulations can drive development and commercialization of clean technologies, with future year requirements for new or existing equipment. Incentives can then accelerate deployment and enhance public acceptability of new technologies.

As previously discussed, localized effects of on-site Project emissions on nearby receptors for the Project would be less than significant (refer to Table 11 and Table 12). The LSTs represent the maximum emissions from a project that are not expected to cause or contribute to an exceedance of the most stringent applicable state or federal ambient air quality standard. The LSTs were developed by the SCAQMD based on the ambient concentrations of that pollutant for each SRA and distance to the nearest sensitive receptor. The ambient air quality standards establish the levels of air quality necessary, with an adequate margin of safety, to protect public health, including protecting the health of sensitive populations. However, as discussed above, neither the SCAQMD nor any other air district currently have methodologies that would provide Lead Agencies and CEQA practitioners with a consistent, reliable, and meaningful analysis to correlate specific health impacts that may result from a proposed project's mass emissions. Information on health impacts related to exposure to O_3 and PM emissions published by the U.S. EPA and CARB have been summarized above and discussed in the Regulatory Setting section. Health studies are used by these agencies to set the NAAQS and CAAQS.

The NAAQS and CAAQS were developed to protect the most susceptible population groups from adverse health effects and were established in terms of parts per million or micrograms per cubic meter for the applicable emissions. As stated earlier, the mass emission thresholds were established primarily in conjunction with federal permitting "major source" thresholds. If emissions were below these "de minimis" emission rates, then the Proposed Project is presumed to conform with the NAAQS.[5] While based on the status of an air basin level of attainment of the health-based NAAQS, emissions in excess of the mass emission thresholds from one project does not mean the air basin would experience measurably higher ground level concentrations, or more frequent occurrences of ground level concentrations in exceedance of standards, or delay timely attainment of a particular NAAQS.

Ozone concentrations are dependent upon a variety of complex factors, including the presence of sunlight and precursor pollutants, natural topography, nearby structures that cause building downwash, atmospheric stability, and wind patterns. Because of the complexities of predicting ground-level O_3 concentrations in relation to the NAAQS and CAAQS, none of the health-related information can be directly correlated to the pounds/day or tons/year of emissions estimated from a single, proposed project. It should also be noted that this analysis identifies health concerns related to PM, CO, O_3, and NO_2. Table 2 includes a list of criteria pollutants and summarizes common sources and effects. Thus, this analysis is reasonable and intended to foster informed decision making.

[5] U.S. Environmental Protection Agency, Frequent Questions about General Conformity. Available: https://www.epa.gov/general-conformity/frequent-questions-about-general-conformity. Accessed July 2019.

Diesel Particulate Matter

Exhaust from diesel engines contains a mixture of gases and solid particles. These solid particles are known as diesel particulate matter (DPM). DPM contains hundreds of different chemicals, many of which are harmful to human health. During the grading phase of construction, diesel trucks hauling soil and other material will make 176 trips to and from the site, for a total of 352 trips during each workday. Trips from the Project site, travel along Glen Helen Parkway to the I-15 interchange and merge onto I-15. Based on CalEEMod estimates, diesel trucks transporting soil and materials to the site would generate approximately 0.45 pounds per day of PM_{10} exhaust (total daily exhaust equals 4.76 pounds of PM_{10}, minus 4.31 pounds of PM_{10} generated by on-site construction equipment, leaves 0.45 pounds of PM_{10} generated off-site) which is conservatively assumed to be entirely DPM emissions. Based on CalEnviroScreen 4.0 results, the Project is located in an area that falls within the 8th percentile for California in DPM emissions, meaning the Project is within the lowest range reported 0-10. As such, the project's emissions would represent a low incremental contribution to the background DPM concentrations.

The amount to which the receptors are exposed (a function of concentration and duration of exposure) is the primary factor used to determine health risk (i.e., potential exposure to toxic air contaminant emission levels that exceed applicable standards). Health-related risks associated with diesel-exhaust emissions are primarily linked to long-term exposure and the associated risk of contracting cancer. The use of diesel-powered construction equipment would be episodic and would occur throughout the Project site.

Section 2485 and Section 2449 of Title 13 of the California Code of Regulations limits diesel-fueled motor vehicle idling to no more than five minutes. Section 2449 limits idling for off-road diesel-fueled fleets. Section 2485 limits idling for diesel-fueled commercial motor vehicles with gross vehicle weight ratings of greater than 10,000 pounds that are or must be licensed to operate on publicly maintained highways and streets within California. Project construction is subject to and would comply with California regulations limiting the idling of heavy-duty construction equipment to no more than five minutes which would further reduce nearby sensitive receptors' exposure to temporary and variable DPM emissions.

The duration of exposure would be short, and exhaust from construction equipment dissipates rapidly. Current models and methodologies for conducting health risk assessments are associated with longer-term exposure periods of 9, 30, and 70 years, which do not correlate well with the temporary and highly variable nature of construction activities.

As noted above, construction activities would limit idling to no more than five minutes, which would further reduce nearby sensitive receptors' exposure to temporary and variable DPM emissions. Furthermore, even during the most intense period of construction, emissions of DPM would be generated from different locations on the Project site rather than in a single location because different types of construction activities (e.g., site preparation and building construction) would not occur at the same place at the same time.

Furthermore, SCAQMD's Multiple Air Toxics Exposure Study (MATES V) (August 2021) shows that carcinogenic risk from air toxics in the South Coast Air Basin, based on the average concentrations at the 10 monitoring sites, is approximately 40 percent lower than the monitored average in MATES IV (2015)

and 84 percent lower than the average in MATES II (2000).[6] The results of SCAQMD's ongoing research in air toxics shows that risk levels are decreasing despite development and vehicle traffic growth. This trend is expected to continue with the implementation of the various statewide policies focused on reducing mobile source emissions. Therefore, the temporary addition of 0.45 pounds per day of DPM during the construction grading phase would result in a less than significant impact.

Carbon Monoxide Hotspots

An analysis of CO "hot spots" is needed to determine whether the change in the level of service of an intersection resulting from the Project would have the potential to result in exceedances of the CAAQS or NAAQS. It has long been recognized that CO exceedances are caused by vehicular emissions, primarily when vehicles are idling at intersections. Vehicle emissions standards have become increasingly stringent in the last 20 years. Currently, the CO standard in California is a maximum of 3.4 grams per mile for passenger cars (requirements for certain vehicles are more stringent). With the turnover of older vehicles, introduction of cleaner fuels, and implementation of control technology on industrial facilities, CO concentrations have steadily declined. Accordingly, with the steadily decreasing CO emissions from vehicles, even very busy intersections do not result in exceedances of the CO standard.

The SCAB was re-designated as attainment in 2007 and is no longer addressed in the SCAQMD's AQMP. The 2003 AQMP is the most recent version that addresses CO concentrations. As part of the SCAQMD *CO Hotspot Analysis*, the Wilshire Boulevard and Veteran Avenue intersection, one of the most congested intersections in southern California with an average daily traffic (ADT) volume of approximately 100,000 vehicles per day, was modeled for CO concentrations. This modeling effort identified a CO concentration high of 4.6 ppm, which is well below the 35-ppm Federal standard. The Project considered herein would not produce the volume of traffic required to generate a CO hot spot in the context of SCAQMD's *CO Hotspot Analysis*. As the CO hotspots were not experienced at the Wilshire Boulevard and Veteran Avenue intersection even as it accommodates 100,000 vehicles daily, it can be reasonably inferred that CO hotspots would not be experienced at any vicinity intersections resulting from 29,094 additional vehicle trips attributable to the Project. Therefore, impacts would be less than significant.

Additional Mitigation Measures:

MM AQ-2 The Project applicant shall submit a Dust Control Management Plan limiting the generation of fugitive dust to the County of San Bernardino. The Dust Control Management Plan shall be approved prior to the approval of the grading permit. The Dust Control Management Plan shall include, but not limited to, the following:

- Prior to Grading Permit issuance, a sign, legible at 50 feet shall be posted at the Project construction site. The sign(s) shall be reviewed and approved by the Building Official and City Planning Department, prior to posting and shall indicate the dates and duration of construction activities, as well as provide a contact name and a telephone number where residents can inquire about the construction process and register complaints.

[6] South Coast Air Quality Management District (August 2021). *MATES V Final Report, page ES-16*. Available at http://www.aqmd.gov/docs/default-source/planning/mates-v/mates-v-final-report-9-24-21.pdf?sfvrsn=6. Accessed November 2023.

- During construction, the contractor will designate a member of the construction staff as a Dust Control Coordinator. The Dust Control Coordinator will be present during all earthmoving activities and respond to local complaints about fugitive dust. When a complaint is received, the Dust Control Coordinator shall notify the City within 24-hours of the complaint, determine the cause, and implement reasonable measures to resolve the complaint as deemed acceptable by the Public Works Department.

- Soil stockpiles maintained as part of the Project will be stabilized to reduce fugitive dust. Soil stockpiles may be stabilized by wetting to form a crust or other treatment – such as covering, use of soil binders, chemical soil stabilizers, geotextiles, mulching, or hydroseeding.

- Any Project-related person operating a vehicle on a public roadway with a load of dirt, sand, gravel, or other loose material – which may be susceptible to generating dust – will cover the load or maintain two feet or more of freeboard during transportation.

- All grading and excavation activities shall cease during periods of sustained wind events. These events are defined as winds exceeding 20 mph for more than 3 minutes in any 60-minute period. A sustained wind event will be measured by monitoring the nearest National Weather Service monitoring station or by using a kestrel wind meter or similar device. In the event that operations are shut down during high winds, watering of the area will continue to minimize fugitive dust. Construction activities will resume when wind speeds fall below the 20 mph 3-minute aggregate period in any 60-minute period.

- A speed limit of 15 mph for construction vehicles will be implemented on all unpaved roads. The contractor will post speed limit signs and discuss speed limits during tailboard meetings.

Level of Significance: Less than significant impact with mitigation incorporated. Although modeling shows that localized impacts will be less than significant, **MM AQ-2** has been added to ensure that sensitive receptors located near the site will not be affected by construction related particulate matter displaced by the wind.

Threshold 5.4 Would the Project result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?

The FEIR for the Previously Approved Project, adopted in 2005, was not required to analyze impacts from other emissions, such as odors. However, since the Project has changed this impact will be analyzed for new significant environmental impacts.

Construction

Odors that could be generated by construction activities are required to follow SCAQMD Rule 402 to prevent odor nuisances on sensitive land uses. SCAQMD Rule 402, Nuisance, states:

> *A person shall not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to*

> *any considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property.*

Construction equipment emissions, such as diesel exhaust, and volatile organic compounds from architectural coatings and paving activities, may generate odors. However, these odors would be temporary, are not expected to affect a substantial number of people and would disperse rapidly. Therefore, Project construction activities would not result in objectionable odors that would adversely affect a substantial number of people and impacts would be less than significant.

Operations

The SCAQMD *CEQA Air Quality Handbook* identifies certain land uses as sources of odors. These land uses include agriculture (farming and livestock), wastewater treatment plants, food processing plants, chemical plants, composting facilities, refineries, landfills, dairies, and fiberglass molding. The Project would not include any of the land uses that have been identified by the SCAQMD as odor sources. Therefore, Project operations would not result in odors that would adversely affect people.

Mitigation Measures: No mitigation is required.

Level of Significance: Less than significant impact.

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Appendix A

Air Quality Modeling Data

Glen Helen Oasis Detailed Report

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5.2.1. Unmitigated

5.2.2. Mitigated

5.3. Construction Vehicles

5.3.1. Unmitigated

5.3.2. Mitigated

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

5.5. Architectural Coatings

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

5.6.2. Construction Earthmoving Control Strategies

5.7. Construction Paving

5.8. Construction Electricity Consumption and Emissions Factors

5.9. Operational Mobile Sources

5.9.1. Unmitigated

5.9.2. Mitigated

5.10. Operational Area Sources

5.10.1. Hearths

5.10.1.1. Unmitigated

5.10.1.2. Mitigated

5.10.2. Architectural Coatings

5.10.3. Landscape Equipment

5.10.4. Landscape Equipment - Mitigated

5.11. Operational Energy Consumption

5.11.1. Unmitigated

5.11.2. Mitigated

5.12. Operational Water and Wastewater Consumption

5.12.1. Unmitigated

5.12.2. Mitigated

5.13. Operational Waste Generation

5.13.1. Unmitigated

5.13.2. Mitigated

5.14. Operational Refrigeration and Air Conditioning Equipment

5.14.1. Unmitigated

5.14.2. Mitigated

5.15. Operational Off-Road Equipment

5.15.1. Unmitigated

5.15.2. Mitigated

5.16. Stationary Sources

5.16.1. Emergency Generators and Fire Pumps

5.16.2. Process Boilers

5.17. User Defined

5.18. Vegetation

5.18.1. Land Use Change

5.18.1.1. Unmitigated

5.18.1.2. Mitigated

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

5.18.1.2. Mitigated

5.18.2. Sequestration

5.18.2.1. Unmitigated

5.18.2.2. Mitigated

6. Climate Risk Detailed Report

6.1. Climate Risk Summary

6.2. Initial Climate Risk Scores

6.3. Adjusted Climate Risk Scores

6.4. Climate Risk Reduction Measures

7. Health and Equity Details

7.1. CalEnviroScreen 4.0 Scores

7.2. Healthy Places Index Scores

7.3. Overall Health & Equity Scores

7.4. Health & Equity Measures

7.5. Evaluation Scorecard

7.6. Health & Equity Custom Measures

8. User Changes to Default Data

1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	Glen Helen Oasis
Construction Start Date	1/1/2024
Operational Year	2028
Lead Agency	—
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	2.80
Precipitation (days)	6.80
Location	Glen Helen Pkwy, California, USA
County	San Bernardino-South Coast
City	Unincorporated
Air District	South Coast AQMD
Air Basin	South Coast
TAZ	5317
EDFZ	10
Electric Utility	Southern California Edison
Gas Utility	Southern California Gas
App Version	2022.1.1.13

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description

Hotel	130	Room	4.33	188,760	0.00	—	—	—
Health Club	40.0	1000sqft	0.92	40,000	0.00	—	—	—
Strip Mall	31.0	1000sqft	0.71	30,500	0.00	—	—	—
Pharmacy/Drugstore with Drive Thru	15.0	1000sqft	0.34	15,000	0.00	—	—	—
Gasoline/Service Station	22.0	Pump	0.07	3,106	0.00	—	—	—
Fast Food Restaurant with Drive Thru	23.0	1000sqft	0.53	22,800	0.00	—	—	—
High Turnover (Sit Down Restaurant)	11.0	1000sqft	0.25	10,600	0.00	—	—	—
Parking Lot	1,205	1000sqft	27.7	0.00	0.00	—	—	—

1.3. User-Selected Emission Reduction Measures by Emissions Sector

Sector	#	Measure Title
Construction	C-5	Use Advanced Engine Tiers
Transportation	T-5	Implement Commute Trip Reduction Program (Voluntary)
Transportation	T-14*	Provide Electric Vehicle Charging Infrastructure
Energy	E-1	Buildings Exceed 2019 Title 24 Building Envelope Energy Efficiency Standards
Energy	E-2	Require Energy Efficient Appliances
Energy	E-7*	Require Higher Efficacy Public Street and Area Lighting
Water	W-4	Require Low-Flow Water Fixtures
Waste	S-1/S-2	Implement Waste Reduction Plan
Area Sources	AS-1	Use Low-VOC Cleaning Supplies
Area Sources	LL-1	Replace Gas Powered Landscape Equipment with Zero-Emission Landscape Equipment
Area Sources	AS-2	Use Low-VOC Paints

* Qualitative or supporting measure. Emission reductions not included in the mitigated emissions results.

2. Emissions Summary

2.1. Construction Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	15.4	22.1	127	108	0.34	4.76	15.9	20.6	4.27	4.95	9.21	—	44,294	44,294	3.49	4.10	54.5	45,658
Mit.	5.37	19.8	40.8	126	0.34	0.82	15.9	16.7	0.67	4.95	5.61	—	44,294	44,294	3.49	4.10	54.5	45,658
% Reduced	65%	10%	68%	-16%	—	83%	—	19%	84%	—	39%	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	15.4	16.8	129	107	0.34	4.76	15.9	20.6	4.27	4.95	9.21	—	44,234	44,234	3.49	4.10	1.42	45,544
Mit.	5.33	16.8	42.1	125	0.34	0.82	15.9	16.7	0.67	4.95	5.61	—	44,234	44,234	3.49	4.10	1.42	45,544
% Reduced	65%	—	67%	-16%	—	83%	—	19%	84%	—	39%	—	—	—	—	—	—	—
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	13.2	9.26	111	92.4	0.29	4.09	13.6	17.7	3.67	4.25	7.91	—	38,023	38,023	3.00	3.52	20.1	39,169
Mit.	4.59	6.10	36.5	107	0.29	0.70	13.6	14.3	0.57	4.25	4.82	—	38,023	38,023	3.00	3.52	20.1	39,169
% Reduced	65%	34%	67%	-16%	—	83%	—	19%	84%	—	39%	—	—	—	—	—	—	—
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	2.42	1.69	20.2	16.9	0.05	0.75	2.48	3.23	0.67	0.78	1.44	—	6,295	6,295	0.50	0.58	3.34	6,485
Mit.	0.84	1.11	6.65	19.6	0.05	0.13	2.48	2.61	0.10	0.78	0.88	—	6,295	6,295	0.50	0.58	3.34	6,485

% Reduced	65%	34%	67%	-16%	—	83%	—	19%	84%	—	39%	—	—	—	—	—	—	—
Exceeds (Daily Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Threshold	—	75.0	100	550	150	—	—	150	—	—	55.0	—	—	—	—	—	—	3,000
Unmit.	—	No	Yes	No	No	—	—	No	—	—	No	—	—	—	—	—	—	Yes
Mit.	—	No	No	No	No	—	—	No	—	—	No	—	—	—	—	—	—	Yes
Exceeds (Average Daily)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Threshold	—	75.0	100	550	150	—	—	150	—	—	55.0	—	—	—	—	—	—	3,000
Unmit.	—	No	Yes	No	No	—	—	No	—	—	No	—	—	—	—	—	—	Yes
Mit.	—	No	No	No	No	—	—	No	—	—	No	—	—	—	—	—	—	Yes

2.2. Construction Emissions by Year, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	15.4	10.8	127	108	0.34	4.76	15.9	20.6	4.27	4.95	9.21	—	44,294	44,294	3.49	4.10	54.5	45,658
2025	14.1	9.82	113	103	0.34	3.96	15.9	19.8	3.67	4.95	8.61	—	43,845	43,845	3.32	4.09	53.8	45,201
2026	13.4	9.19	105	100	0.34	3.61	15.9	19.5	3.34	4.95	8.29	—	43,391	43,391	3.16	3.94	50.5	44,695
2027	5.74	22.1	38.2	63.3	0.09	1.37	2.80	4.17	1.26	0.67	1.94	—	12,312	12,312	0.47	0.38	11.3	12,448
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	15.4	10.8	129	107	0.34	4.76	15.9	20.6	4.27	4.95	9.21	—	44,234	44,234	3.49	4.10	1.42	45,544

2025	14.1	9.78	114	102	0.34	3.96	15.9	19.8	3.67	4.95	8.61	—	43,786	43,786	3.33	4.10	1.39	45,093
2026	13.3	9.15	106	99.3	0.34	3.61	15.9	19.5	3.34	4.95	8.29	—	43,335	43,335	3.13	3.94	1.31	44,589
2027	3.15	16.8	21.0	33.1	0.06	0.70	2.08	2.77	0.64	0.51	1.15	—	7,870	7,870	0.32	0.33	0.23	7,975
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	13.2	9.26	111	92.4	0.29	4.09	13.6	17.7	3.67	4.25	7.91	—	38,023	38,023	3.00	3.52	20.1	39,169
2025	12.1	8.39	98.1	87.3	0.29	3.39	13.6	17.0	3.14	4.24	7.38	—	37,536	37,536	2.85	3.52	20.0	38,674
2026	11.4	7.86	91.0	85.2	0.29	3.09	13.6	16.7	2.86	4.24	7.10	—	37,148	37,148	2.69	3.38	18.7	38,241
2027	2.22	6.93	14.8	23.5	0.04	0.50	1.27	1.78	0.46	0.31	0.77	—	5,087	5,087	0.20	0.19	2.31	5,150
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	2.42	1.69	20.2	16.9	0.05	0.75	2.48	3.23	0.67	0.78	1.44	—	6,295	6,295	0.50	0.58	3.34	6,485
2025	2.20	1.53	17.9	15.9	0.05	0.62	2.48	3.10	0.57	0.77	1.35	—	6,214	6,214	0.47	0.58	3.31	6,403
2026	2.09	1.43	16.6	15.6	0.05	0.56	2.48	3.04	0.52	0.77	1.30	—	6,150	6,150	0.44	0.56	3.09	6,331
2027	0.41	1.26	2.70	4.29	0.01	0.09	0.23	0.32	0.08	0.06	0.14	—	842	842	0.03	0.03	0.38	853

2.3. Construction Emissions by Year, Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	5.37	2.63	40.8	126	0.34	0.82	15.9	16.7	0.67	4.95	5.61	—	44,294	44,294	3.49	4.10	54.5	45,658
2025	5.16	2.60	39.5	125	0.34	0.67	15.9	16.5	0.67	4.95	5.61	—	43,845	43,845	3.32	4.09	53.8	45,201
2026	4.98	2.43	38.5	124	0.34	0.67	15.9	16.5	0.67	4.95	5.61	—	43,391	43,391	3.16	3.94	50.5	44,695
2027	2.86	19.8	15.6	68.6	0.09	0.35	2.80	3.15	0.34	0.67	1.01	—	12,312	12,312	0.47	0.38	11.3	12,448
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	5.33	2.59	42.1	125	0.34	0.82	15.9	16.7	0.67	4.95	5.61	—	44,234	44,234	3.49	4.10	1.42	45,544

2025	5.12	2.56	40.8	124	0.34	0.67	15.9	16.5	0.67	4.95	5.61	—	43,786	43,786	3.33	4.10	1.39	45,093
2026	4.94	2.39	39.6	123	0.34	0.67	15.9	16.5	0.67	4.95	5.61	—	43,335	43,335	3.13	3.94	1.31	44,589
2027	1.70	16.8	8.33	37.1	0.06	0.22	2.08	2.30	0.21	0.51	0.72	—	7,870	7,870	0.32	0.33	0.23	7,975
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	4.59	2.24	36.5	107	0.29	0.70	13.6	14.3	0.57	4.25	4.82	—	38,023	38,023	3.00	3.52	20.1	39,169
2025	4.40	2.20	35.3	106	0.29	0.57	13.6	14.1	0.57	4.24	4.81	—	37,536	37,536	2.85	3.52	20.0	38,674
2026	4.25	2.06	34.2	106	0.29	0.57	13.6	14.1	0.57	4.24	4.81	—	37,148	37,148	2.69	3.38	18.7	38,241
2027	1.19	6.10	6.23	25.9	0.04	0.15	1.27	1.43	0.14	0.31	0.45	—	5,087	5,087	0.20	0.19	2.31	5,150
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	0.84	0.41	6.65	19.6	0.05	0.13	2.48	2.61	0.10	0.78	0.88	—	6,295	6,295	0.50	0.58	3.34	6,485
2025	0.80	0.40	6.43	19.4	0.05	0.10	2.48	2.58	0.10	0.77	0.88	—	6,214	6,214	0.47	0.58	3.31	6,403
2026	0.78	0.38	6.23	19.3	0.05	0.10	2.48	2.58	0.10	0.77	0.88	—	6,150	6,150	0.44	0.56	3.09	6,331
2027	0.22	1.11	1.14	4.72	0.01	0.03	0.23	0.26	0.03	0.06	0.08	—	842	842	0.03	0.03	0.38	853

2.4. Operations Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	137	127	146	1,494	4.15	2.83	149	151	2.67	26.4	29.1	460	433,630	434,090	62.5	17.8	1,549	442,498
Mit.	132	121	141	1,439	4.00	2.73	143	146	2.58	25.5	28.0	118	417,071	417,189	27.6	17.1	1,505	424,481
% Reduced	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	74%	4%	4%	56%	4%	3%	4%
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	128	118	157	1,202	3.88	2.81	149	151	2.65	26.4	29.1	460	406,927	407,387	62.8	18.3	379	414,797

Mit.	123	113	151	1,158	3.74	2.71	143	146	2.55	25.5	28.0	118	391,349	391,467	27.9	17.6	378	397,797
% Reduced	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	74%	4%	4%	56%	4%	< 0.5%	4%
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	128	118	160	1,260	3.93	2.82	149	151	2.67	26.4	29.1	460	411,105	411,565	62.8	18.5	867	419,507
Mit.	124	113	154	1,214	3.78	2.72	143	146	2.57	25.5	28.0	118	395,375	395,493	27.9	17.8	848	402,335
% Reduced	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	74%	4%	4%	56%	4%	2%	4%
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	23.4	21.6	29.2	230	0.72	0.52	27.1	27.6	0.49	4.83	5.31	76.2	68,063	68,139	10.4	3.06	143	69,454
Mit.	22.6	20.7	28.1	222	0.69	0.50	26.1	26.6	0.47	4.65	5.12	19.5	65,459	65,478	4.62	2.94	140	66,611
% Reduced	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	74%	4%	4%	56%	4%	2%	4%
Exceeds (Daily Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Threshold	—	55.0	55.0	550	150	—	—	150	—	—	55.0	—	—	—	—	—	—	3,000
Unmit.	—	Yes	Yes	Yes	No	—	—	Yes	—	—	No	—	—	—	—	—	—	Yes
Mit.	—	Yes	Yes	Yes	No	—	—	No	—	—	No	—	—	—	—	—	—	Yes
Exceeds (Average Daily)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Threshold	—	55.0	55.0	550	150	—	—	150	—	—	55.0	—	—	—	—	—	—	3,000
Unmit.	—	Yes	Yes	Yes	No	—	—	Yes	—	—	No	—	—	—	—	—	—	Yes
Mit.	—	Yes	Yes	Yes	No	—	—	No	—	—	No	—	—	—	—	—	—	Yes

2.5. Operations Emissions by Sector, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Sector	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	134	117	143	1,477	4.13	2.57	149	151	2.41	26.4	28.9	—	423,960	423,960	15.5	17.6	1,201	430,795
Area	2.41	9.41	0.11	13.5	< 0.005	0.02	—	0.02	0.02	—	0.02	—	55.6	55.6	< 0.005	< 0.005	—	55.8
Energy	0.34	0.17	3.11	2.61	0.02	0.24	—	0.24	0.24	—	0.24	—	9,487	9,487	0.88	0.07	—	9,531
Water	—	—	—	—	—	—	—	—	—	—	—	37.6	127	164	3.87	0.09	—	289
Waste	—	—	—	—	—	—	—	—	—	—	—	423	0.00	423	42.3	0.00	—	1,479
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	348	348
Total	137	127	146	1,494	4.15	2.83	149	151	2.67	26.4	29.1	460	433,630	434,090	62.5	17.8	1,549	442,498
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	127	110	154	1,199	3.87	2.58	149	151	2.42	26.4	28.9	—	397,313	397,313	15.8	18.2	31.1	403,149
Area	—	7.19	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Energy	0.34	0.17	3.11	2.61	0.02	0.24	—	0.24	0.24	—	0.24	—	9,487	9,487	0.88	0.07	—	9,531
Water	—	—	—	—	—	—	—	—	—	—	—	37.6	127	164	3.87	0.09	—	289
Waste	—	—	—	—	—	—	—	—	—	—	—	423	0.00	423	42.3	0.00	—	1,479
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	348	348
Total	128	118	157	1,202	3.88	2.81	149	151	2.65	26.4	29.1	460	406,927	407,387	62.8	18.3	379	414,797
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	126	109	157	1,248	3.91	2.57	149	151	2.42	26.4	28.9	—	401,453	401,453	15.8	18.3	519	407,821
Area	1.65	8.71	0.08	9.26	< 0.005	0.01	—	0.01	0.02	—	0.02	—	38.1	38.1	< 0.005	< 0.005	—	38.2
Energy	0.34	0.17	3.11	2.61	0.02	0.24	—	0.24	0.24	—	0.24	—	9,487	9,487	0.88	0.07	—	9,531
Water	—	—	—	—	—	—	—	—	—	—	—	37.6	127	164	3.87	0.09	—	289

Waste	—	—	—	—	—	—	—	—	—	—	—	423	0.00	423	42.3	0.00	—	1,479
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	348	348
Total	128	118	160	1,260	3.93	2.82	149	151	2.67	26.4	29.1	460	411,105	411,565	62.8	18.5	867	419,507
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	23.1	20.0	28.6	228	0.71	0.47	27.1	27.6	0.44	4.83	5.27	—	66,465	66,465	2.62	3.03	85.9	67,519
Area	0.30	1.59	0.01	1.69	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	6.30	6.30	< 0.005	< 0.005	—	6.33
Energy	0.06	0.03	0.57	0.48	< 0.005	0.04	—	0.04	0.04	—	0.04	—	1,571	1,571	0.15	0.01	—	1,578
Water	—	—	—	—	—	—	—	—	—	—	—	6.23	21.0	27.2	0.64	0.02	—	47.8
Waste	—	—	—	—	—	—	—	—	—	—	—	70.0	0.00	70.0	7.00	0.00	—	245
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	57.6	57.6
Total	23.4	21.6	29.2	230	0.72	0.52	27.1	27.6	0.49	4.83	5.31	76.2	68,063	68,139	10.4	3.06	143	69,454

2.6. Operations Emissions by Sector, Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Sector	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	129	113	138	1,423	3.98	2.48	143	146	2.33	25.5	27.8	—	408,351	408,351	14.9	17.0	1,157	414,934
Area	2.41	8.56	0.11	13.5	< 0.005	0.02	—	0.02	0.02	—	0.02	—	55.6	55.6	< 0.005	< 0.005	—	55.8
Energy	0.33	0.16	3.00	2.52	0.02	0.23	—	0.23	0.23	—	0.23	—	8,552	8,552	0.79	0.06	—	8,591
Water	—	—	—	—	—	—	—	—	—	—	—	33.3	112	146	3.43	0.08	—	256
Waste	—	—	—	—	—	—	—	—	—	—	—	84.6	0.00	84.6	8.45	0.00	—	296
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	348	348
Total	132	121	141	1,439	4.00	2.73	143	146	2.58	25.5	28.0	118	417,071	417,189	27.6	17.1	1,505	424,481
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	122	106	148	1,155	3.72	2.48	143	146	2.33	25.5	27.8	—	382,685	382,685	15.2	17.5	30.0	388,306

Area	—	6.34	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Energy	0.33	0.16	3.00	2.52	0.02	0.23	—	0.23	0.23	—	0.23	—	8,552	8,552	0.79	0.06	—	8,591
Water	—	—	—	—	—	—	—	—	—	—	—	33.3	112	146	3.43	0.08	—	256
Waste	—	—	—	—	—	—	—	—	—	—	—	84.6	0.00	84.6	8.45	0.00	—	296
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	348	348
Total	123	113	151	1,158	3.74	2.71	143	146	2.55	25.5	28.0	118	391,349	391,467	27.9	17.6	378	397,797
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	122	105	151	1,202	3.76	2.48	143	146	2.33	25.5	27.8	—	386,672	386,672	15.2	17.6	500	392,806
Area	1.65	7.86	0.08	9.26	< 0.005	0.01	—	0.01	0.02	—	0.02	—	38.1	38.1	< 0.005	< 0.005	—	38.2
Energy	0.33	0.16	3.00	2.52	0.02	0.23	—	0.23	0.23	—	0.23	—	8,552	8,552	0.79	0.06	—	8,591
Water	—	—	—	—	—	—	—	—	—	—	—	33.3	112	146	3.43	0.08	—	256
Waste	—	—	—	—	—	—	—	—	—	—	—	84.6	0.00	84.6	8.45	0.00	—	296
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	348	348
Total	124	113	154	1,214	3.78	2.72	143	146	2.57	25.5	28.0	118	395,375	395,493	27.9	17.8	848	402,335
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	22.2	19.2	27.6	219	0.69	0.45	26.1	26.6	0.42	4.65	5.07	—	64,018	64,018	2.52	2.92	82.7	65,033
Area	0.30	1.43	0.01	1.69	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	6.30	6.30	< 0.005	< 0.005	—	6.33
Energy	0.06	0.03	0.55	0.46	< 0.005	0.04	—	0.04	0.04	—	0.04	—	1,416	1,416	0.13	0.01	—	1,422
Water	—	—	—	—	—	—	—	—	—	—	—	5.52	18.6	24.1	0.57	0.01	—	42.4
Waste	—	—	—	—	—	—	—	—	—	—	—	14.0	0.00	14.0	1.40	0.00	—	49.0
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	57.6	57.6
Total	22.6	20.7	28.1	222	0.69	0.50	26.1	26.6	0.47	4.65	5.12	19.5	65,459	65,478	4.62	2.94	140	66,611

3. Construction Emissions Details

3.1. Grading (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	11.9	9.99	97.2	86.9	0.18	4.31	—	4.31	3.96	—	3.96	—	19,128	19,128	0.78	0.16	—	19,194
Dust From Material Movement	—	—	—	—	—	—	8.69	8.69	—	3.02	3.02	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	11.9	9.99	97.2	86.9	0.18	4.31	—	4.31	3.96	—	3.96	—	19,128	19,128	0.78	0.16	—	19,194
Dust From Material Movement	—	—	—	—	—	—	8.69	8.69	—	3.02	3.02	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	10.2	8.58	83.5	74.7	0.15	3.70	—	3.70	3.40	—	3.40	—	16,441	16,441	0.67	0.13	—	16,497
Dust From Material Movement	—	—	—	—	—	—	7.47	7.47	—	2.59	2.59	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.86	1.57	15.2	13.6	0.03	0.68	—	0.68	0.62	—	0.62	—	2,722	2,722	0.11	0.02	—	2,731
Dust From Material Movement	—	—	—	—	—	—	1.36	1.36	—	0.47	0.47	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.33	0.30	0.28	4.86	0.00	0.00	0.75	0.75	0.00	0.18	0.18	—	828	828	0.03	0.03	3.31	840
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	3.22	0.51	29.9	16.7	0.16	0.46	6.41	6.87	0.30	1.75	2.06	—	24,338	24,338	2.68	3.92	51.2	25,624
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.31	0.28	0.33	3.68	0.00	0.00	0.75	0.75	0.00	0.18	0.18	—	759	759	0.04	0.03	0.09	768
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	3.19	0.49	31.2	16.8	0.16	0.46	6.41	6.87	0.30	1.75	2.06	—	24,346	24,346	2.68	3.92	1.33	25,582
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.27	0.24	0.28	3.32	0.00	0.00	0.64	0.64	0.00	0.15	0.15	—	661	661	0.03	0.02	1.23	671
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	2.76	0.43	27.1	14.4	0.14	0.39	5.49	5.88	0.26	1.50	1.77	—	20,921	20,921	2.31	3.37	18.9	22,001
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.04	0.05	0.61	0.00	0.00	0.12	0.12	0.00	0.03	0.03	—	109	109	0.01	< 0.005	0.20	111
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.50	0.08	4.94	2.63	0.03	0.07	1.00	1.07	0.05	0.27	0.32	—	3,464	3,464	0.38	0.56	3.13	3,643

3.2. Grading (2024) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.82	1.82	10.6	104	0.18	0.36	—	0.36	0.36	—	0.36	—	19,128	19,128	0.78	0.16	—	19,194
Dust From Material Movement	—	—	—	—	—	—	8.69	8.69	—	3.02	3.02	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.82	1.82	10.6	104	0.18	0.36	—	0.36	0.36	—	0.36	—	19,128	19,128	0.78	0.16	—	19,194
Dust From Material Movement	—	—	—	—	—	—	8.69	8.69	—	3.02	3.02	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.57	1.57	9.09	89.6	0.15	0.31	—	0.31	0.31	—	0.31	—	16,441	16,441	0.67	0.13	—	16,497
Dust From Material Movement	—	—	—	—	—	—	7.47	7.47	—	2.59	2.59	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.29	0.29	1.66	16.4	0.03	0.06	—	0.06	0.06	—	0.06	—	2,722	2,722	0.11	0.02	—	2,731
Dust From Material Movement	—	—	—	—	—	—	1.36	1.36	—	0.47	0.47	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.33	0.30	0.28	4.86	0.00	0.00	0.75	0.75	0.00	0.18	0.18	—	828	828	0.03	0.03	3.31	840
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	3.22	0.51	29.9	16.7	0.16	0.46	6.41	6.87	0.30	1.75	2.06	—	24,338	24,338	2.68	3.92	51.2	25,624
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.31	0.28	0.33	3.68	0.00	0.00	0.75	0.75	0.00	0.18	0.18	—	759	759	0.04	0.03	0.09	768
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	3.19	0.49	31.2	16.8	0.16	0.46	6.41	6.87	0.30	1.75	2.06	—	24,346	24,346	2.68	3.92	1.33	25,582
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.27	0.24	0.28	3.32	0.00	0.00	0.64	0.64	0.00	0.15	0.15	—	661	661	0.03	0.02	1.23	671
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	2.76	0.43	27.1	14.4	0.14	0.39	5.49	5.88	0.26	1.50	1.77	—	20,921	20,921	2.31	3.37	18.9	22,001
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.04	0.05	0.61	0.00	0.00	0.12	0.12	0.00	0.03	0.03	—	109	109	0.01	< 0.005	0.20	111
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Hauling	0.50	0.08	4.94	2.63	0.03	0.07	1.00	1.07	0.05	0.27	0.32	—	3,464	3,464	0.38	0.56	3.13	3,643

3.3. Grading (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	10.8	9.04	83.9	82.1	0.18	3.66	—	3.66	3.36	—	3.36	—	19,130	19,130	0.78	0.16	—	19,196
Dust From Material Movement	—	—	—	—	—	—	8.69	8.69	—	3.02	3.02	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	10.8	9.04	83.9	82.1	0.18	3.66	—	3.66	3.36	—	3.36	—	19,130	19,130	0.78	0.16	—	19,196
Dust From Material Movement	—	—	—	—	—	—	8.69	8.69	—	3.02	3.02	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	9.22	7.75	72.0	70.4	0.15	3.13	—	3.13	2.88	—	2.88	—	16,397	16,397	0.67	0.13	—	16,454

Dust From Material Movement	—	—	—	—	—	—	7.45	7.45	—	2.59	2.59	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.68	1.41	13.1	12.8	0.03	0.57	—	0.57	0.53	—	0.53	—	2,715	2,715	0.11	0.02	—	2,724
Dust From Material Movement	—	—	—	—	—	—	1.36	1.36	—	0.47	0.47	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.29	0.26	0.25	4.48	0.00	0.00	0.75	0.75	0.00	0.18	0.18	—	810	810	0.03	0.03	3.00	823
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	3.05	0.51	28.6	16.1	0.16	0.30	6.41	6.71	0.30	1.75	2.06	—	23,904	23,904	2.52	3.91	50.8	25,183
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.28	0.25	0.28	3.38	0.00	0.00	0.75	0.75	0.00	0.18	0.18	—	743	743	0.03	0.03	0.08	752
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	3.03	0.49	29.9	16.2	0.16	0.30	6.41	6.71	0.30	1.75	2.06	—	23,913	23,913	2.52	3.92	1.32	25,145
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.23	0.21	0.26	3.05	0.00	0.00	0.64	0.64	0.00	0.15	0.15	—	646	646	0.03	0.02	1.11	655
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	2.61	0.43	25.9	13.8	0.14	0.26	5.48	5.74	0.26	1.50	1.76	—	20,492	20,492	2.16	3.36	18.9	21,566

Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04	0.04	0.05	0.56	0.00	0.00	0.12	0.12	0.00	0.03	0.03	—	107	107	< 0.005	< 0.005	0.18	108
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.48	0.08	4.73	2.52	0.03	0.05	1.00	1.05	0.05	0.27	0.32	—	3,393	3,393	0.36	0.56	3.12	3,570

3.4. Grading (2025) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.82	1.82	10.6	104	0.18	0.36	—	0.36	0.36	—	0.36	—	19,130	19,130	0.78	0.16	—	19,196
Dust From Material Movement	—	—	—	—	—	—	8.69	8.69	—	3.02	3.02	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.82	1.82	10.6	104	0.18	0.36	—	0.36	0.36	—	0.36	—	19,130	19,130	0.78	0.16	—	19,196
Dust From Material Movement	—	—	—	—	—	—	8.69	8.69	—	3.02	3.02	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	1.56	1.56	9.07	89.4	0.15	0.31	—	0.31	0.31	—	0.31	—	16,397	16,397	0.67	0.13	—	16,454
Dust From Material Movement	—	—	—	—	—	—	7.45	7.45	—	2.59	2.59	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.29	0.29	1.65	16.3	0.03	0.06	—	0.06	0.06	—	0.06	—	2,715	2,715	0.11	0.02	—	2,724
Dust From Material Movement	—	—	—	—	—	—	1.36	1.36	—	0.47	0.47	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.29	0.26	0.25	4.48	0.00	0.00	0.75	0.75	0.00	0.18	0.18	—	810	810	0.03	0.03	3.00	823
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	3.05	0.51	28.6	16.1	0.16	0.30	6.41	6.71	0.30	1.75	2.06	—	23,904	23,904	2.52	3.91	50.8	25,183
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.28	0.25	0.28	3.38	0.00	0.00	0.75	0.75	0.00	0.18	0.18	—	743	743	0.03	0.03	0.08	752
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	3.03	0.49	29.9	16.2	0.16	0.30	6.41	6.71	0.30	1.75	2.06	—	23,913	23,913	2.52	3.92	1.32	25,145
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.23	0.21	0.26	3.05	0.00	0.00	0.64	0.64	0.00	0.15	0.15	—	646	646	0.03	0.02	1.11	655

Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	2.61	0.43	25.9	13.8	0.14	0.26	5.48	5.74	0.26	1.50	1.76	—	20,492	20,492	2.16	3.36	18.9	21,566
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04	0.04	0.05	0.56	0.00	0.00	0.12	0.12	0.00	0.03	0.03	—	107	107	< 0.005	< 0.005	0.18	108
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.48	0.08	4.73	2.52	0.03	0.05	1.00	1.05	0.05	0.27	0.32	—	3,393	3,393	0.36	0.56	3.12	3,570

3.5. Grading (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	10.2	8.59	76.9	80.3	0.18	3.30	—	3.30	3.04	—	3.04	—	19,129	19,129	0.78	0.16	—	19,194
Dust From Material Movement	—	—	—	—	—	—	8.69	8.69	—	3.02	3.02	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	10.2	8.59	76.9	80.3	0.18	3.30	—	3.30	3.04	—	3.04	—	19,129	19,129	0.78	0.16	—	19,194
Dust From Material Movement	—	—	—	—	—	—	8.69	8.69	—	3.02	3.02	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	8.76	7.36	65.9	68.8	0.15	2.83	—	2.83	2.60	—	2.60	—	16,396	16,396	0.67	0.13	—	16,452
Dust From Material Movement	—	—	—	—	—	—	7.45	7.45	—	2.59	2.59	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.60	1.34	12.0	12.6	0.03	0.52	—	0.52	0.48	—	0.48	—	2,715	2,715	0.11	0.02	—	2,724
Dust From Material Movement	—	—	—	—	—	—	1.36	1.36	—	0.47	0.47	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.28	0.25	0.23	4.14	0.00	0.00	0.75	0.75	0.00	0.18	0.18	—	794	794	0.03	0.03	2.72	805
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	2.88	0.36	27.7	15.8	0.16	0.30	6.41	6.71	0.30	1.75	2.06	—	23,469	23,469	2.35	3.76	47.7	24,695
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.26	0.23	0.25	3.13	0.00	0.00	0.75	0.75	0.00	0.18	0.18	—	728	728	0.01	0.03	0.07	737
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Hauling	2.86	0.34	28.8	15.9	0.16	0.30	6.41	6.71	0.30	1.75	2.06	—	23,478	23,478	2.35	3.76	1.24	24,658
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.22	0.20	0.24	2.82	0.00	0.00	0.64	0.64	0.00	0.15	0.15	—	633	633	0.01	0.02	1.01	641
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	2.46	0.30	24.8	13.6	0.14	0.26	5.48	5.74	0.26	1.50	1.76	—	20,120	20,120	2.01	3.22	17.7	21,147
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04	0.04	0.04	0.51	0.00	0.00	0.12	0.12	0.00	0.03	0.03	—	105	105	< 0.005	< 0.005	0.17	106
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.45	0.05	4.54	2.47	0.03	0.05	1.00	1.05	0.05	0.27	0.32	—	3,331	3,331	0.33	0.53	2.92	3,501

3.6. Grading (2026) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.82	1.82	10.6	104	0.18	0.36	—	0.36	0.36	—	0.36	—	19,129	19,129	0.78	0.16	—	19,194
Dust From Material Movement	—	—	—	—	—	—	8.69	8.69	—	3.02	3.02	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.82	1.82	10.6	104	0.18	0.36	—	0.36	0.36	—	0.36	—	19,129	19,129	0.78	0.16	—	19,194

Dust From Material Movement	—	—	—	—	—	—	8.69	8.69	—	3.02	3.02	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.56	1.56	9.07	89.4	0.15	0.31	—	0.31	0.31	—	0.31	—	16,396	16,396	0.67	0.13	—	16,452
Dust From Material Movement	—	—	—	—	—	—	7.45	7.45	—	2.59	2.59	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.29	0.29	1.65	16.3	0.03	0.06	—	0.06	0.06	—	0.06	—	2,715	2,715	0.11	0.02	—	2,724
Dust From Material Movement	—	—	—	—	—	—	1.36	1.36	—	0.47	0.47	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.28	0.25	0.23	4.14	0.00	0.00	0.75	0.75	0.00	0.18	0.18	—	794	794	0.03	0.03	2.72	805
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	2.88	0.36	27.7	15.8	0.16	0.30	6.41	6.71	0.30	1.75	2.06	—	23,469	23,469	2.35	3.76	47.7	24,695
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Worker	0.26	0.23	0.25	3.13	0.00	0.00	0.75	0.75	0.00	0.18	0.18	—	728	728	0.01	0.03	0.07	737
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	2.86	0.34	28.8	15.9	0.16	0.30	6.41	6.71	0.30	1.75	2.06	—	23,478	23,478	2.35	3.76	1.24	24,658
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.22	0.20	0.24	2.82	0.00	0.00	0.64	0.64	0.00	0.15	0.15	—	633	633	0.01	0.02	1.01	641
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	2.46	0.30	24.8	13.6	0.14	0.26	5.48	5.74	0.26	1.50	1.76	—	20,120	20,120	2.01	3.22	17.7	21,147
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04	0.04	0.04	0.51	0.00	0.00	0.12	0.12	0.00	0.03	0.03	—	105	105	< 0.005	< 0.005	0.17	106
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.45	0.05	4.54	2.47	0.03	0.05	1.00	1.05	0.05	0.27	0.32	—	3,331	3,331	0.33	0.53	2.92	3,501

3.7. Building Construction (2027) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.46	2.06	18.8	25.9	0.05	0.67	—	0.67	0.62	—	0.62	—	4,794	4,794	0.19	0.04	—	4,811
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.46	2.06	18.8	25.9	0.05	0.67	—	0.67	0.62	—	0.62	—	4,794	4,794	0.19	0.04	—	4,811

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.32	1.10	10.0	13.8	0.02	0.36	—	0.36	0.33	—	0.33	—	2,561	2,561	0.10	0.02	—	2,570
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.24	0.20	1.83	2.52	< 0.005	0.07	—	0.07	0.06	—	0.06	—	424	424	0.02	< 0.005	—	426
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.58	0.52	0.44	8.42	0.00	0.00	1.64	1.64	0.00	0.39	0.39	—	1,700	1,700	0.02	0.06	5.34	1,723
Vendor	0.14	0.03	1.60	0.87	0.01	0.02	0.44	0.46	0.02	0.12	0.14	—	1,516	1,516	0.11	0.23	3.64	1,590
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.55	0.48	0.50	6.35	0.00	0.00	1.64	1.64	0.00	0.39	0.39	—	1,559	1,559	0.02	0.06	0.14	1,577
Vendor	0.14	0.03	1.67	0.88	0.01	0.02	0.44	0.46	0.02	0.12	0.14	—	1,517	1,517	0.11	0.23	0.09	1,587
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.29	0.26	0.29	3.55	0.00	0.00	0.87	0.87	0.00	0.20	0.20	—	845	845	0.01	0.03	1.23	856
Vendor	0.07	0.02	0.89	0.47	0.01	0.01	0.23	0.24	0.01	0.06	0.08	—	810	810	0.06	0.12	0.84	849
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Worker	0.05	0.05	0.05	0.65	0.00	0.00	0.16	0.16	0.00	0.04	0.04	—	140	140	< 0.005	0.01	0.20	142
Vendor	0.01	< 0.005	0.16	0.09	< 0.005	< 0.005	0.04	0.04	< 0.005	0.01	0.01	—	134	134	0.01	0.02	0.14	140
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.8. Building Construction (2027) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.02	0.91	6.16	29.9	0.05	0.20	—	0.20	0.19	—	0.19	—	4,794	4,794	0.19	0.04	—	4,811
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.02	0.91	6.16	29.9	0.05	0.20	—	0.20	0.19	—	0.19	—	4,794	4,794	0.19	0.04	—	4,811
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.54	0.49	3.29	16.0	0.02	0.11	—	0.11	0.10	—	0.10	—	2,561	2,561	0.10	0.02	—	2,570
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.10	0.09	0.60	2.92	< 0.005	0.02	—	0.02	0.02	—	0.02	—	424	424	0.02	< 0.005	—	426

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.58	0.52	0.44	8.42	0.00	0.00	1.64	1.64	0.00	0.39	0.39	—	1,700	1,700	0.02	0.06	5.34	1,723
Vendor	0.14	0.03	1.60	0.87	0.01	0.02	0.44	0.46	0.02	0.12	0.14	—	1,516	1,516	0.11	0.23	3.64	1,590
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.55	0.48	0.50	6.35	0.00	0.00	1.64	1.64	0.00	0.39	0.39	—	1,559	1,559	0.02	0.06	0.14	1,577
Vendor	0.14	0.03	1.67	0.88	0.01	0.02	0.44	0.46	0.02	0.12	0.14	—	1,517	1,517	0.11	0.23	0.09	1,587
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.29	0.26	0.29	3.55	0.00	0.00	0.87	0.87	0.00	0.20	0.20	—	845	845	0.01	0.03	1.23	856
Vendor	0.07	0.02	0.89	0.47	0.01	0.01	0.23	0.24	0.01	0.06	0.08	—	810	810	0.06	0.12	0.84	849
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.05	0.05	0.65	0.00	0.00	0.16	0.16	0.00	0.04	0.04	—	140	140	< 0.005	0.01	0.20	142
Vendor	0.01	< 0.005	0.16	0.09	< 0.005	< 0.005	0.04	0.04	< 0.005	0.01	0.01	—	134	134	0.01	0.02	0.14	140
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.9. Paving (2027) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.76	1.47	13.9	19.9	0.03	0.60	—	0.60	0.55	—	0.55	—	3,022	3,022	0.12	0.02	—	3,033
Paving	—	1.10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.32	0.27	2.51	3.60	0.01	0.11	—	0.11	0.10	—	0.10	—	546	546	0.02	< 0.005	—	548
Paving	—	0.20	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.06	0.05	0.46	0.66	< 0.005	0.02	—	0.02	0.02	—	0.02	—	90.5	90.5	< 0.005	< 0.005	—	90.8
Paving	—	0.04	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.14	0.12	0.10	2.01	0.00	0.00	0.39	0.39	0.00	0.09	0.09	—	406	406	< 0.005	0.01	1.28	411
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.02	0.29	0.00	0.00	0.07	0.07	0.00	0.02	0.02	—	68.2	68.2	< 0.005	< 0.005	0.10	69.1
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.05	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	11.3	11.3	< 0.005	< 0.005	0.02	11.4
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.10. Paving (2027) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.32	0.32	3.87	21.2	0.03	0.06	—	0.06	0.06	—	0.06	—	3,022	3,022	0.12	0.02	—	3,033
Paving	—	1.10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.06	0.06	0.70	3.83	0.01	0.01	—	0.01	0.01	—	0.01	—	546	546	0.02	< 0.005	—	548
Paving	—	0.20	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.13	0.70	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	90.5	90.5	< 0.005	< 0.005	—	90.8
Paving	—	0.04	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.14	0.12	0.10	2.01	0.00	0.00	0.39	0.39	0.00	0.09	0.09	—	406	406	< 0.005	0.01	1.28	411
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.02	0.29	0.00	0.00	0.07	0.07	0.00	0.02	0.02	—	68.2	68.2	< 0.005	< 0.005	0.10	69.1
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.05	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	11.3	11.3	< 0.005	< 0.005	0.02	11.4
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.11. Architectural Coating (2027) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.55	0.45	3.32	4.50	0.01	0.08	—	0.08	0.07	—	0.07	—	534	534	0.02	< 0.005	—	536
Architectural Coatings	—	16.3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.55	0.45	3.32	4.50	0.01	0.08	—	0.08	0.07	—	0.07	—	534	534	0.02	< 0.005	—	536
Architectural Coatings	—	16.3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.17	0.14	1.00	1.36	< 0.005	0.02	—	0.02	0.02	—	0.02	—	161	161	0.01	< 0.005	—	161
Architectural Coatings	—	4.90	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.03	0.02	0.18	0.25	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	26.6	26.6	< 0.005	< 0.005	—	26.7
Architectural Coatings	—	0.89	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.12	0.10	0.09	1.68	0.00	0.00	0.33	0.33	0.00	0.08	0.08	—	340	340	< 0.005	0.01	1.07	345
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.11	0.10	0.10	1.27	0.00	0.00	0.33	0.33	0.00	0.08	0.08	—	312	312	< 0.005	0.01	0.03	315
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.03	0.03	0.40	0.00	0.00	0.10	0.10	0.00	0.02	0.02	—	95.3	95.3	< 0.005	< 0.005	0.14	96.5
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.07	0.00	0.00	0.02	0.02	0.00	< 0.005	< 0.005	—	15.8	15.8	< 0.005	< 0.005	0.02	16.0
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.12. Architectural Coating (2027) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.55	0.45	3.32	4.50	0.01	0.08	—	0.08	0.07	—	0.07	—	534	534	0.02	< 0.005	—	536
Architectural Coatings	—	16.3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.55	0.45	3.32	4.50	0.01	0.08	—	0.08	0.07	—	0.07	—	534	534	0.02	< 0.005	—	536
Architectural Coatings	—	16.3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.17	0.14	1.00	1.36	< 0.005	0.02	—	0.02	0.02	—	0.02	—	161	161	0.01	< 0.005	—	161
Architectural Coatings	—	4.90	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.03	0.02	0.18	0.25	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	26.6	26.6	< 0.005	< 0.005	—	26.7
Architectural Coatings	—	0.89	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.12	0.10	0.09	1.68	0.00	0.00	0.33	0.33	0.00	0.08	0.08	—	340	340	< 0.005	0.01	1.07	345
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.11	0.10	0.10	1.27	0.00	0.00	0.33	0.33	0.00	0.08	0.08	—	312	312	< 0.005	0.01	0.03	315
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.03	0.03	0.40	0.00	0.00	0.10	0.10	0.00	0.02	0.02	—	95.3	95.3	< 0.005	< 0.005	0.14	96.5
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.07	0.00	0.00	0.02	0.02	0.00	< 0.005	< 0.005	—	15.8	15.8	< 0.005	< 0.005	0.02	16.0
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

4. Operations Emissions Details

4.1. Mobile Emissions by Land Use

4.1.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	134	117	143	1,477	4.13	2.57	149	151	2.41	26.4	28.9	—	423,960	423,960	15.5	17.6	1,201	430,795
Health Club	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Strip Mall	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Pharmacy/Drugstore with Drive Thru	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Gasoline/Service Station	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Fast Food Restaurant with Drive Thru	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
High Turnover (Sit Down Restaurant)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Parking Lot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Total	134	117	143	1,477	4.13	2.57	149	151	2.41	26.4	28.9	—	423,960	423,960	15.5	17.6	1,201	430,795
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	127	110	154	1,199	3.87	2.58	149	151	2.42	26.4	28.9	—	397,313	397,313	15.8	18.2	31.1	403,149
Health Club	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Strip Mall	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Pharmacy/Drugstore with Drive Thru	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Gasoline/Service Station	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Fast Food Restaurant with Drive Thru	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
High Turnover (Sit Down Restaurant)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Parking Lot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	127	110	154	1,199	3.87	2.58	149	151	2.42	26.4	28.9	—	397,313	397,313	15.8	18.2	31.1	403,149
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	23.1	20.0	28.6	228	0.71	0.47	27.1	27.6	0.44	4.83	5.27	—	66,465	66,465	2.62	3.03	85.9	67,519
Health Club	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Strip Mall	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Pharmacy/Drugstore	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Gasoline/Service Station	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Fast Food Restaurant with Drive Thru	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
High Turnover (Sit Down Restaurant)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Parking Lot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	23.1	20.0	28.6	228	0.71	0.47	27.1	27.6	0.44	4.83	5.27	—	66,465	66,465	2.62	3.03	85.9	67,519

4.1.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	129	113	138	1,423	3.98	2.48	143	146	2.33	25.5	27.8	—	408,351	408,351	14.9	17.0	1,157	414,934
Health Club	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Strip Mall	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Pharmacy/Drugstore with Drive Thru	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Gasoline Station	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Fast Food Restaurant with Drive Thru	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
High Turnover (Sit Down Restaurant)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Parking Lot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	129	113	138	1,423	3.98	2.48	143	146	2.33	25.5	27.8	—	408,351	408,351	14.9	17.0	1,157	414,934
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	122	106	148	1,155	3.72	2.48	143	146	2.33	25.5	27.8	—	382,685	382,685	15.2	17.5	30.0	388,306
Health Club	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Strip Mall	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Pharmacy/Drugstore with Drive Thru	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Gasoline/Service Station	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Fast Food Restaurant with Drive Thru	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

High Turnover (Sit Down Restaurant)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Parking Lot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	122	106	148	1,155	3.72	2.48	143	146	2.33	25.5	27.8	—	382,685	382,685	15.2	17.5	30.0	388,306
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	22.2	19.2	27.6	219	0.69	0.45	26.1	26.6	0.42	4.65	5.07	—	64,018	64,018	2.52	2.92	82.7	65,033
Health Club	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Strip Mall	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Pharmacy/Drugstore with Drive Thru	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Gasoline/Service Station	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Fast Food Restaurant with Drive Thru	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
High Turnover (Sit Down Restaurant)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Parking Lot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	22.2	19.2	27.6	219	0.69	0.45	26.1	26.6	0.42	4.65	5.07	—	64,018	64,018	2.52	2.92	82.7	65,033

4.2. Energy

4.2.1. Electricity Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	—	2,857	2,857	0.27	0.03	—	2,874
Health Club	—	—	—	—	—	—	—	—	—	—	—	—	362	362	0.03	< 0.005	—	364
Strip Mall	—	—	—	—	—	—	—	—	—	—	—	—	281	281	0.03	< 0.005	—	283
Pharmacy/Drugstore with Drive Thru	—	—	—	—	—	—	—	—	—	—	—	—	138	138	0.01	< 0.005	—	139
Gasoline/Service Station	—	—	—	—	—	—	—	—	—	—	—	—	28.1	28.1	< 0.005	< 0.005	—	28.3
Fast Food Restaurant with Drive Thru	—	—	—	—	—	—	—	—	—	—	—	—	758	758	0.07	0.01	—	763
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	—	353	353	0.03	< 0.005	—	355
Parking Lot	—	—	—	—	—	—	—	—	—	—	—	—	1,001	1,001	0.10	0.01	—	1,007
Total	—	—	—	—	—	—	—	—	—	—	—	—	5,779	5,779	0.55	0.07	—	5,812
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Hotel	—	—	—	—	—	—	—	—	—	—	—	—	2,857	2,857	0.27	0.03	—	2,874
Health Club	—	—	—	—	—	—	—	—	—	—	—	—	362	362	0.03	< 0.005	—	364
Strip Mall	—	—	—	—	—	—	—	—	—	—	—	—	281	281	0.03	< 0.005	—	283
Pharmacy/Drugstore with Drive Thru	—	—	—	—	—	—	—	—	—	—	—	—	138	138	0.01	< 0.005	—	139
Gasoline/Service Station	—	—	—	—	—	—	—	—	—	—	—	—	28.1	28.1	< 0.005	< 0.005	—	28.3
Fast Food Restaurant with Drive Thru	—	—	—	—	—	—	—	—	—	—	—	—	758	758	0.07	0.01	—	763
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	—	353	353	0.03	< 0.005	—	355
Parking Lot	—	—	—	—	—	—	—	—	—	—	—	—	1,001	1,001	0.10	0.01	—	1,007
Total	—	—	—	—	—	—	—	—	—	—	—	—	5,779	5,779	0.55	0.07	—	5,812
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	—	473	473	0.05	0.01	—	476
Health Club	—	—	—	—	—	—	—	—	—	—	—	—	59.9	59.9	0.01	< 0.005	—	60.3
Strip Mall	—	—	—	—	—	—	—	—	—	—	—	—	46.6	46.6	< 0.005	< 0.005	—	46.9
Pharmacy/Drugstore with Drive Thru	—	—	—	—	—	—	—	—	—	—	—	—	22.9	22.9	< 0.005	< 0.005	—	23.0

Gasoline /Service	—	—	—	—	—	—	—	—	—	—	—	—	4.65	4.65	< 0.005	< 0.005	—	4.68
Fast Food Restaurant with Drive Thru	—	—	—	—	—	—	—	—	—	—	—	—	126	126	0.01	< 0.005	—	126
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	—	58.4	58.4	0.01	< 0.005	—	58.7
Parking Lot	—	—	—	—	—	—	—	—	—	—	—	—	166	166	0.02	< 0.005	—	167
Total	—	—	—	—	—	—	—	—	—	—	—	—	957	957	0.09	0.01	—	962

4.2.2. Electricity Emissions By Land Use - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	—	2,388	2,388	0.23	0.03	—	2,402
Health Club	—	—	—	—	—	—	—	—	—	—	—	—	308	308	0.03	< 0.005	—	310
Strip Mall	—	—	—	—	—	—	—	—	—	—	—	—	243	243	0.02	< 0.005	—	244
Pharmacy/Drugstore with Drive Thru	—	—	—	—	—	—	—	—	—	—	—	—	119	119	0.01	< 0.005	—	120
Gasoline /Service Station	—	—	—	—	—	—	—	—	—	—	—	—	23.9	23.9	< 0.005	< 0.005	—	24.1

Fast Food Restaurant with Drive Thru	—	—	—	—	—	—	—	—	—	—	—	—	608	608	0.06	0.01	—	612
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	—	283	283	0.03	< 0.005	—	284
Parking Lot	—	—	—	—	—	—	—	—	—	—	—	—	1,001	1,001	0.10	0.01	—	1,007
Total	—	—	—	—	—	—	—	—	—	—	—	—	4,974	4,974	0.47	0.06	—	5,003
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	—	2,388	2,388	0.23	0.03	—	2,402
Health Club	—	—	—	—	—	—	—	—	—	—	—	—	308	308	0.03	< 0.005	—	310
Strip Mall	—	—	—	—	—	—	—	—	—	—	—	—	243	243	0.02	< 0.005	—	244
Pharmacy/Drugstore with Drive Thru	—	—	—	—	—	—	—	—	—	—	—	—	119	119	0.01	< 0.005	—	120
Gasoline/Service Station	—	—	—	—	—	—	—	—	—	—	—	—	23.9	23.9	< 0.005	< 0.005	—	24.1
Fast Food Restaurant with Drive Thru	—	—	—	—	—	—	—	—	—	—	—	—	608	608	0.06	0.01	—	612
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	—	283	283	0.03	< 0.005	—	284

Parking Lot	—	—	—	—	—	—	—	—	—	—	—	—	1,001	1,001	0.10	0.01	—	1,007
Total	—	—	—	—	—	—	—	—	—	—	—	—	4,974	4,974	0.47	0.06	—	5,003
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	—	395	395	0.04	< 0.005	—	398
Health Club	—	—	—	—	—	—	—	—	—	—	—	—	51.0	51.0	< 0.005	< 0.005	—	51.3
Strip Mall	—	—	—	—	—	—	—	—	—	—	—	—	40.2	40.2	< 0.005	< 0.005	—	40.4
Pharmacy/Drugstore with Drive Thru	—	—	—	—	—	—	—	—	—	—	—	—	19.8	19.8	< 0.005	< 0.005	—	19.9
Gasoline /Service Station	—	—	—	—	—	—	—	—	—	—	—	—	3.96	3.96	< 0.005	< 0.005	—	3.98
Fast Food Restaurant with Drive Thru	—	—	—	—	—	—	—	—	—	—	—	—	101	101	0.01	< 0.005	—	101
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	—	46.8	46.8	< 0.005	< 0.005	—	47.1
Parking Lot	—	—	—	—	—	—	—	—	—	—	—	—	166	166	0.02	< 0.005	—	167
Total	—	—	—	—	—	—	—	—	—	—	—	—	824	824	0.08	0.01	—	828

4.2.3. Natural Gas Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	0.17	0.08	1.51	1.27	0.01	0.12	—	0.12	0.12	—	0.12	—	1,807	1,807	0.16	< 0.005	—	1,812
Health Club	0.05	0.03	0.46	0.39	< 0.005	0.04	—	0.04	0.04	—	0.04	—	550	550	0.05	< 0.005	—	551
Strip Mall	0.01	< 0.005	0.05	0.04	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	57.6	57.6	0.01	< 0.005	—	57.8
Pharmacy/Drugstore with Drive Thru	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	28.3	28.3	< 0.005	< 0.005	—	28.4
Gasoline/Service Station	< 0.005	< 0.005	0.04	0.03	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	42.7	42.7	< 0.005	< 0.005	—	42.8
Fast Food Restaurant with Drive Thru	0.08	0.04	0.70	0.59	< 0.005	0.05	—	0.05	0.05	—	0.05	—	835	835	0.07	< 0.005	—	837
High Turnover (Sit Down Restaurant)	0.04	0.02	0.33	0.27	< 0.005	0.02	—	0.02	0.02	—	0.02	—	388	388	0.03	< 0.005	—	389
Parking Lot	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.34	0.17	3.11	2.61	0.02	0.24	—	0.24	0.24	—	0.24	—	3,709	3,709	0.33	0.01	—	3,719
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	0.17	0.08	1.51	1.27	0.01	0.12	—	0.12	0.12	—	0.12	—	1,807	1,807	0.16	< 0.005	—	1,812
Health Club	0.05	0.03	0.46	0.39	< 0.005	0.04	—	0.04	0.04	—	0.04	—	550	550	0.05	< 0.005	—	551
Strip Mall	0.01	< 0.005	0.05	0.04	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	57.6	57.6	0.01	< 0.005	—	57.8

Pharmacy/Drugst	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	28.3	28.3	< 0.005	< 0.005	—	28.4
Gasoline /Service Station	< 0.005	< 0.005	0.04	0.03	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	42.7	42.7	< 0.005	< 0.005	—	42.8
Fast Food Restaurant with Drive Thru	0.08	0.04	0.70	0.59	< 0.005	0.05	—	0.05	0.05	—	0.05	—	835	835	0.07	< 0.005	—	837
High Turnover (Sit Down Restaurant)	0.04	0.02	0.33	0.27	< 0.005	0.02	—	0.02	0.02	—	0.02	—	388	388	0.03	< 0.005	—	389
Parking Lot	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.34	0.17	3.11	2.61	0.02	0.24	—	0.24	0.24	—	0.24	—	3,709	3,709	0.33	0.01	—	3,719
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	0.03	0.02	0.28	0.23	< 0.005	0.02	—	0.02	0.02	—	0.02	—	299	299	0.03	< 0.005	—	300
Health Club	0.01	< 0.005	0.08	0.07	< 0.005	0.01	—	0.01	0.01	—	0.01	—	91.0	91.0	0.01	< 0.005	—	91.3
Strip Mall	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	9.54	9.54	< 0.005	< 0.005	—	9.57
Pharmacy/Drugstore with Drive Thru	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	4.69	4.69	< 0.005	< 0.005	—	4.71
Gasoline /Service Station	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	7.07	7.07	< 0.005	< 0.005	—	7.09
Fast Food Restaurant with Drive Thru	0.01	0.01	0.13	0.11	< 0.005	0.01	—	0.01	0.01	—	0.01	—	138	138	0.01	< 0.005	—	139

High Turnover (Sit Down Restaurant)	0.01	< 0.005	0.06	0.05	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	64.3	64.3	0.01	< 0.005	—	64.4
Parking Lot	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.06	0.03	0.57	0.48	< 0.005	0.04	—	0.04	0.04	—	0.04	—	614	614	0.05	< 0.005	—	616

4.2.4. Natural Gas Emissions By Land Use - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	0.16	0.08	1.43	1.20	0.01	0.11	—	0.11	0.11	—	0.11	—	1,704	1,704	0.15	< 0.005	—	1,709
Health Club	0.05	0.02	0.45	0.38	< 0.005	0.03	—	0.03	0.03	—	0.03	—	533	533	0.05	< 0.005	—	535
Strip Mall	0.01	< 0.005	0.05	0.04	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	57.0	57.0	0.01	< 0.005	—	57.1
Pharmacy/Drugstore with Drive Thru	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	28.0	28.0	< 0.005	< 0.005	—	28.1
Gasoline /Service Station	< 0.005	< 0.005	0.03	0.03	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	41.4	41.4	< 0.005	< 0.005	—	41.5
Fast Food Restaurant with Drive Thru	0.08	0.04	0.69	0.58	< 0.005	0.05	—	0.05	0.05	—	0.05	—	829	829	0.07	< 0.005	—	831

High Turnover (Sit Down Restaurant)	0.04	0.02	0.32	0.27	< 0.005	0.02	—	0.02	0.02	—	0.02	—	385	385	0.03	< 0.005	—	386
Parking Lot	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.33	0.16	3.00	2.52	0.02	0.23	—	0.23	0.23	—	0.23	—	3,578	3,578	0.32	0.01	—	3,588
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	0.16	0.08	1.43	1.20	0.01	0.11	—	0.11	0.11	—	0.11	—	1,704	1,704	0.15	< 0.005	—	1,709
Health Club	0.05	0.02	0.45	0.38	< 0.005	0.03	—	0.03	0.03	—	0.03	—	533	533	0.05	< 0.005	—	535
Strip Mall	0.01	< 0.005	0.05	0.04	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	57.0	57.0	0.01	< 0.005	—	57.1
Pharmacy/Drugstore with Drive Thru	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	28.0	28.0	< 0.005	< 0.005	—	28.1
Gasoline/Service Station	< 0.005	< 0.005	0.03	0.03	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	41.4	41.4	< 0.005	< 0.005	—	41.5
Fast Food Restaurant with Drive Thru	0.08	0.04	0.69	0.58	< 0.005	0.05	—	0.05	0.05	—	0.05	—	829	829	0.07	< 0.005	—	831
High Turnover (Sit Down Restaurant)	0.04	0.02	0.32	0.27	< 0.005	0.02	—	0.02	0.02	—	0.02	—	385	385	0.03	< 0.005	—	386
Parking Lot	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.33	0.16	3.00	2.52	0.02	0.23	—	0.23	0.23	—	0.23	—	3,578	3,578	0.32	0.01	—	3,588
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Hotel	0.03	0.01	0.26	0.22	< 0.005	0.02	—	0.02	0.02	—	0.02	—	282	282	0.02	< 0.005	—	283
Health Club	0.01	< 0.005	0.08	0.07	< 0.005	0.01	—	0.01	0.01	—	0.01	—	88.3	88.3	0.01	< 0.005	—	88.5
Strip Mall	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	9.43	9.43	< 0.005	< 0.005	—	9.46
Pharmacy/Drugstore with Drive Thru	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	4.64	4.64	< 0.005	< 0.005	—	4.65
Gasoline/Service Station	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	6.86	6.86	< 0.005	< 0.005	—	6.88
Fast Food Restaurant with Drive Thru	0.01	0.01	0.13	0.11	< 0.005	0.01	—	0.01	0.01	—	0.01	—	137	137	0.01	< 0.005	—	138
High Turnover (Sit Down Restaurant)	0.01	< 0.005	0.06	0.05	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	63.8	63.8	0.01	< 0.005	—	64.0
Parking Lot	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.06	0.03	0.55	0.46	< 0.005	0.04	—	0.04	0.04	—	0.04	—	592	592	0.05	< 0.005	—	594

4.3. Area Emissions by Source

4.3.2. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Source	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Consumer	—	6.75	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	—	0.44	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	2.41	2.22	0.11	13.5	< 0.005	0.02	—	0.02	0.02	—	0.02	—	55.6	55.6	< 0.005	< 0.005	—	55.8
Total	2.41	9.41	0.11	13.5	< 0.005	0.02	—	0.02	0.02	—	0.02	—	55.6	55.6	< 0.005	< 0.005	—	55.8
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	—	6.75	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	—	0.44	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	7.19	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	—	1.23	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	—	0.08	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	0.30	0.28	0.01	1.69	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	6.30	6.30	< 0.005	< 0.005	—	6.33
Total	0.30	1.59	0.01	1.69	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	6.30	6.30	< 0.005	< 0.005	—	6.33

4.3.1. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Source	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	—	6.25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	—	0.09	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	2.41	2.22	0.11	13.5	< 0.005	0.02	—	0.02	0.02	—	0.02	—	55.6	55.6	< 0.005	< 0.005	—	55.8
Total	2.41	8.56	0.11	13.5	< 0.005	0.02	—	0.02	0.02	—	0.02	—	55.6	55.6	< 0.005	< 0.005	—	55.8
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	—	6.25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	—	0.09	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	6.34	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	—	1.14	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	—	0.02	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Landscape Equipme	0.30	0.28	0.01	1.69	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	6.30	6.30	< 0.005	< 0.005	—	6.33
Total	0.30	1.43	0.01	1.69	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	6.30	6.30	< 0.005	< 0.005	—	6.33

4.4. Water Emissions by Land Use

4.4.2. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	6.32	21.3	27.6	0.65	0.02	—	48.5
Health Club	—	—	—	—	—	—	—	—	—	—	—	4.53	15.3	19.8	0.47	0.01	—	34.8
Strip Mall	—	—	—	—	—	—	—	—	—	—	—	4.40	14.8	19.2	0.45	0.01	—	33.8
Pharmacy/Drugstore with Drive Thru	—	—	—	—	—	—	—	—	—	—	—	2.02	6.82	8.85	0.21	0.01	—	15.5
Gasoline/Service Station	—	—	—	—	—	—	—	—	—	—	—	0.56	1.89	2.45	0.06	< 0.005	—	4.30
Fast Food Restaurant with Drive Thru	—	—	—	—	—	—	—	—	—	—	—	13.4	45.1	58.5	1.38	0.03	—	103
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	6.40	21.6	28.0	0.66	0.02	—	49.1

Parking Lot	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	37.6	127	164	3.87	0.09	—	289
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	6.32	21.3	27.6	0.65	0.02	—	48.5
Health Club	—	—	—	—	—	—	—	—	—	—	—	4.53	15.3	19.8	0.47	0.01	—	34.8
Strip Mall	—	—	—	—	—	—	—	—	—	—	—	4.40	14.8	19.2	0.45	0.01	—	33.8
Pharmacy/Drugstore with Drive Thru	—	—	—	—	—	—	—	—	—	—	—	2.02	6.82	8.85	0.21	0.01	—	15.5
Gasoline/Service Station	—	—	—	—	—	—	—	—	—	—	—	0.56	1.89	2.45	0.06	< 0.005	—	4.30
Fast Food Restaurant with Drive Thru	—	—	—	—	—	—	—	—	—	—	—	13.4	45.1	58.5	1.38	0.03	—	103
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	6.40	21.6	28.0	0.66	0.02	—	49.1
Parking Lot	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	37.6	127	164	3.87	0.09	—	289
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	1.05	3.53	4.57	0.11	< 0.005	—	8.03
Health Club	—	—	—	—	—	—	—	—	—	—	—	0.75	2.53	3.28	0.08	< 0.005	—	5.76
Strip Mall	—	—	—	—	—	—	—	—	—	—	—	0.73	2.45	3.18	0.07	< 0.005	—	5.59

Pharmacy with Drive Thru	—	—	—	—	—	—	—	—	—	—	—	0.34	1.13	1.46	0.03	< 0.005	—	2.57
Gasoline /Service Station	—	—	—	—	—	—	—	—	—	—	—	0.09	0.31	0.41	0.01	< 0.005	—	0.71
Fast Food Restaurant with Drive Thru	—	—	—	—	—	—	—	—	—	—	—	2.21	7.46	9.68	0.23	0.01	—	17.0
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	1.06	3.57	4.63	0.11	< 0.005	—	8.13
Parking Lot	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	6.23	21.0	27.2	0.64	0.02	—	47.8

4.4.1. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	5.57	18.8	24.4	0.57	0.01	—	42.8
Health Club	—	—	—	—	—	—	—	—	—	—	—	4.00	13.5	17.5	0.41	0.01	—	30.7
Strip Mall	—	—	—	—	—	—	—	—	—	—	—	3.97	13.4	17.4	0.41	0.01	—	30.5

Pharmacy/Drugstore with Drive Thru	—	—	—	—	—	—	—	—	—	—	—	1.83	6.16	7.99	0.19	< 0.005	—	14.0
Gasoline /Service Station	—	—	—	—	—	—	—	—	—	—	—	0.51	1.70	2.21	0.05	< 0.005	—	3.88
Fast Food Restaurant with Drive Thru	—	—	—	—	—	—	—	—	—	—	—	11.8	39.8	51.6	1.22	0.03	—	90.7
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	5.65	19.0	24.7	0.58	0.01	—	43.4
Parking Lot	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	33.3	112	146	3.43	0.08	—	256
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	5.57	18.8	24.4	0.57	0.01	—	42.8
Health Club	—	—	—	—	—	—	—	—	—	—	—	4.00	13.5	17.5	0.41	0.01	—	30.7
Strip Mall	—	—	—	—	—	—	—	—	—	—	—	3.97	13.4	17.4	0.41	0.01	—	30.5
Pharmacy/Drugstore with Drive Thru	—	—	—	—	—	—	—	—	—	—	—	1.83	6.16	7.99	0.19	< 0.005	—	14.0
Gasoline /Service Station	—	—	—	—	—	—	—	—	—	—	—	0.51	1.70	2.21	0.05	< 0.005	—	3.88

Fast Food Restaurant with Drive Thru	—	—	—	—	—	—	—	—	—	—	—	11.8	39.8	51.6	1.22	0.03	—	90.7
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	5.65	19.0	24.7	0.58	0.01	—	43.4
Parking Lot	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	33.3	112	146	3.43	0.08	—	256
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	0.92	3.11	4.03	0.09	< 0.005	—	7.08
Health Club	—	—	—	—	—	—	—	—	—	—	—	0.66	2.23	2.90	0.07	< 0.005	—	5.09
Strip Mall	—	—	—	—	—	—	—	—	—	—	—	0.66	2.22	2.87	0.07	< 0.005	—	5.05
Pharmacy/Drugstore with Drive Thru	—	—	—	—	—	—	—	—	—	—	—	0.30	1.02	1.32	0.03	< 0.005	—	2.32
Gasoline/Service Station	—	—	—	—	—	—	—	—	—	—	—	0.08	0.28	0.37	0.01	< 0.005	—	0.64
Fast Food Restaurant with Drive Thru	—	—	—	—	—	—	—	—	—	—	—	1.96	6.59	8.55	0.20	< 0.005	—	15.0
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	0.94	3.15	4.09	0.10	< 0.005	—	7.18
Parking Lot	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00

Total	—	—	—	—	—	—	—	—	—	—	—	5.52	18.6	24.1	0.57	0.01	—	42.4

4.5. Waste Emissions by Land Use

4.5.2. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	38.4	0.00	38.4	3.83	0.00	—	134
Health Club	—	—	—	—	—	—	—	—	—	—	—	123	0.00	123	12.3	0.00	—	430
Strip Mall	—	—	—	—	—	—	—	—	—	—	—	17.5	0.00	17.5	1.75	0.00	—	61.4
Pharmacy/Drugstore with Drive Thru	—	—	—	—	—	—	—	—	—	—	—	24.3	0.00	24.3	2.43	0.00	—	85.0
Gasoline /Service Station	—	—	—	—	—	—	—	—	—	—	—	6.39	0.00	6.39	0.64	0.00	—	22.4
Fast Food Restaurant with Drive Thru	—	—	—	—	—	—	—	—	—	—	—	143	0.00	143	14.3	0.00	—	500
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	70.5	0.00	70.5	7.05	0.00	—	247
Parking Lot	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00

Total	—	—	—	—	—	—	—	—	—	—	—	423	0.00	423	42.3	0.00	—	1,479
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	38.4	0.00	38.4	3.83	0.00	—	134
Health Club	—	—	—	—	—	—	—	—	—	—	—	123	0.00	123	12.3	0.00	—	430
Strip Mall	—	—	—	—	—	—	—	—	—	—	—	17.5	0.00	17.5	1.75	0.00	—	61.4
Pharmacy/Drugstore with Drive Thru	—	—	—	—	—	—	—	—	—	—	—	24.3	0.00	24.3	2.43	0.00	—	85.0
Gasoline/Service Station	—	—	—	—	—	—	—	—	—	—	—	6.39	0.00	6.39	0.64	0.00	—	22.4
Fast Food Restaurant with Drive Thru	—	—	—	—	—	—	—	—	—	—	—	143	0.00	143	14.3	0.00	—	500
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	70.5	0.00	70.5	7.05	0.00	—	247
Parking Lot	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	423	0.00	423	42.3	0.00	—	1,479
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	6.35	0.00	6.35	0.63	0.00	—	22.2
Health Club	—	—	—	—	—	—	—	—	—	—	—	20.3	0.00	20.3	2.03	0.00	—	71.2
Strip Mall	—	—	—	—	—	—	—	—	—	—	—	2.90	0.00	2.90	0.29	0.00	—	10.2

Pharmacy/Drugstore	—	—	—	—	—	—	—	—	—	—	—	4.02	0.00	4.02	0.40	0.00	—	14.1
Gasoline/Service Station	—	—	—	—	—	—	—	—	—	—	—	1.06	0.00	1.06	0.11	0.00	—	3.70
Fast Food Restaurant with Drive Thru	—	—	—	—	—	—	—	—	—	—	—	23.6	0.00	23.6	2.36	0.00	—	82.7
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	11.7	0.00	11.7	1.17	0.00	—	40.9
Parking Lot	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	70.0	0.00	70.0	7.00	0.00	—	245

4.5.1. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	7.67	0.00	7.67	0.77	0.00	—	26.8
Health Club	—	—	—	—	—	—	—	—	—	—	—	24.6	0.00	24.6	2.46	0.00	—	86.0
Strip Mall	—	—	—	—	—	—	—	—	—	—	—	3.51	0.00	3.51	0.35	0.00	—	12.3
Pharmacy/Drugstore with Drive Thru	—	—	—	—	—	—	—	—	—	—	—	4.86	0.00	4.86	0.49	0.00	—	17.0

Gasoline Station	—	—	—	—	—	—	—	—	—	—	—	1.28	0.00	1.28	0.13	0.00	—	4.47
Fast Food Restaurant with Drive Thru	—	—	—	—	—	—	—	—	—	—	—	28.6	0.00	28.6	2.85	0.00	—	99.9
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	14.1	0.00	14.1	1.41	0.00	—	49.4
Parking Lot	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	84.6	0.00	84.6	8.45	0.00	—	296
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	7.67	0.00	7.67	0.77	0.00	—	26.8
Health Club	—	—	—	—	—	—	—	—	—	—	—	24.6	0.00	24.6	2.46	0.00	—	86.0
Strip Mall	—	—	—	—	—	—	—	—	—	—	—	3.51	0.00	3.51	0.35	0.00	—	12.3
Pharmacy/Drugstore with Drive Thru	—	—	—	—	—	—	—	—	—	—	—	4.86	0.00	4.86	0.49	0.00	—	17.0
Gasoline /Service Station	—	—	—	—	—	—	—	—	—	—	—	1.28	0.00	1.28	0.13	0.00	—	4.47
Fast Food Restaurant with Drive Thru	—	—	—	—	—	—	—	—	—	—	—	28.6	0.00	28.6	2.85	0.00	—	99.9

High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	14.1	0.00	14.1	1.41	0.00	—	49.4
Parking Lot	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	84.6	0.00	84.6	8.45	0.00	—	296
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	1.27	0.00	1.27	0.13	0.00	—	4.44
Health Club	—	—	—	—	—	—	—	—	—	—	—	4.07	0.00	4.07	0.41	0.00	—	14.2
Strip Mall	—	—	—	—	—	—	—	—	—	—	—	0.58	0.00	0.58	0.06	0.00	—	2.03
Pharmacy/Drugstore with Drive Thru	—	—	—	—	—	—	—	—	—	—	—	0.80	0.00	0.80	0.08	0.00	—	2.82
Gasoline/Service Station	—	—	—	—	—	—	—	—	—	—	—	0.21	0.00	0.21	0.02	0.00	—	0.74
Fast Food Restaurant with Drive Thru	—	—	—	—	—	—	—	—	—	—	—	4.73	0.00	4.73	0.47	0.00	—	16.5
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	2.34	0.00	2.34	0.23	0.00	—	8.17
Parking Lot	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	14.0	0.00	14.0	1.40	0.00	—	49.0

4.6. Refrigerant Emissions by Land Use

4.6.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	295	295
Health Club	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.19	0.19
Strip Mall	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.19	0.19
Pharmacy/Drugstore with Drive Thru	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.38	0.38
Fast Food Restaurant with Drive Thru	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	35.6	35.6
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	16.6	16.6
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	348	348
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	295	295
Health Club	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.19	0.19
Strip Mall	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.19	0.19

Pharmacy/Drugst	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.38	0.38
Fast Food Restaurant with Drive Thru	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	35.6	35.6
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	16.6	16.6
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	348	348
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	48.9	48.9
Health Club	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.03	0.03
Strip Mall	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.03	0.03
Pharmacy/Drugstore with Drive Thru	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.06	0.06
Fast Food Restaurant with Drive Thru	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5.90	5.90
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2.74	2.74
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	57.6	57.6

4.6.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	295	295
Health Club	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.19	0.19
Strip Mall	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.19	0.19
Pharmacy/Drugstore with Drive Thru	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.38	0.38
Fast Food Restaurant with Drive Thru	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	35.6	35.6
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	16.6	16.6
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	348	348
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	295	295
Health Club	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.19	0.19
Strip Mall	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.19	0.19
Pharmacy/Drugstore with Drive Thru	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.38	0.38

Fast Food Restaurant with Drive Thru	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	35.6	35.6
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	16.6	16.6
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	348	348
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hotel	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	48.9	48.9
Health Club	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.03	0.03
Strip Mall	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.03	0.03
Pharmacy/Drugstore with Drive Thru	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.06	0.06
Fast Food Restaurant with Drive Thru	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5.90	5.90
High Turnover (Sit Down Restaurant)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2.74	2.74
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	57.6	57.6

4.7. Offroad Emissions By Equipment Type

4.7.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipme Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.7.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.8. Stationary Emissions By Equipment Type

4.8.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.8.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.9. User Defined Emissions By Equipment Type

4.9.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.9.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10. Soil Carbon Accumulation By Vegetation Type

4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetation	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.2. Above and Belowground Carbon Accumulation by Land Use Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.4. Soil Carbon Accumulation By Vegetation Type - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetation	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.5. Above and Belowground Carbon Accumulation by Land Use Type - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.6. Avoided and Sequestered Emissions by Species - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

5. Activity Data

5.1. Construction Schedule

Phase Name	Phase Type	Start Date	End Date	Days Per Week	Work Days per Phase	Phase Description
Site Prep/Grading	Grading	1/1/2024	12/31/2026	6.00	940	—
Building Construction	Building Construction	1/1/2027	9/30/2027	5.00	195	—
Paving	Paving	6/1/2027	8/31/2027	5.00	66.0	—
Architectural Coating	Architectural Coating	8/1/2027	12/31/2027	5.00	110	—

5.2. Off-Road Equipment

5.2.1. Unmitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Site Prep/Grading	Excavators	Diesel	Average	2.00	8.00	36.0	0.38
Site Prep/Grading	Graders	Diesel	Average	3.00	8.00	148	0.41
Site Prep/Grading	Rubber Tired Dozers	Diesel	Average	2.00	8.00	367	0.40
Site Prep/Grading	Scrapers	Diesel	Average	6.00	8.00	423	0.48
Site Prep/Grading	Tractors/Loaders/Backhoes	Diesel	Average	8.00	8.00	84.0	0.37
Site Prep/Grading	Crawler Tractors	Diesel	Average	2.00	8.00	87.0	0.43
Building Construction	Cranes	Diesel	Average	2.00	7.00	367	0.29
Building Construction	Forklifts	Diesel	Average	6.00	8.00	82.0	0.20
Building Construction	Generator Sets	Diesel	Average	2.00	8.00	14.0	0.74
Building Construction	Tractors/Loaders/Backhoes	Diesel	Average	6.00	7.00	84.0	0.37
Building Construction	Welders	Diesel	Average	2.00	8.00	46.0	0.45
Paving	Pavers	Diesel	Average	4.00	8.00	81.0	0.42
Paving	Paving Equipment	Diesel	Average	4.00	8.00	89.0	0.36
Paving	Rollers	Diesel	Average	4.00	8.00	36.0	0.38
Architectural Coating	Air Compressors	Diesel	Average	4.00	6.00	37.0	0.48

5.2.2. Mitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Site Prep/Grading	Excavators	Diesel	Tier 4 Final	2.00	8.00	36.0	0.38
Site Prep/Grading	Graders	Diesel	Tier 4 Final	3.00	8.00	148	0.41
Site Prep/Grading	Rubber Tired Dozers	Diesel	Tier 4 Final	2.00	8.00	367	0.40

Site Prep/Grading	Scrapers	Diesel	Tier 4 Final	6.00	8.00	423	0.48
Site Prep/Grading	Tractors/Loaders/Backhoes	Diesel	Tier 4 Final	8.00	8.00	84.0	0.37
Site Prep/Grading	Crawler Tractors	Diesel	Tier 4 Final	2.00	8.00	87.0	0.43
Building Construction	Cranes	Diesel	Tier 4 Final	2.00	7.00	367	0.29
Building Construction	Forklifts	Diesel	Tier 4 Final	6.00	8.00	82.0	0.20
Building Construction	Generator Sets	Diesel	Average	2.00	8.00	14.0	0.74
Building Construction	Tractors/Loaders/Backhoes	Diesel	Tier 4 Final	6.00	7.00	84.0	0.37
Building Construction	Welders	Diesel	Average	2.00	8.00	46.0	0.45
Paving	Pavers	Diesel	Tier 4 Final	4.00	8.00	81.0	0.42
Paving	Paving Equipment	Diesel	Tier 4 Final	4.00	8.00	89.0	0.36
Paving	Rollers	Diesel	Tier 4 Final	4.00	8.00	36.0	0.38
Architectural Coating	Air Compressors	Diesel	Average	4.00	6.00	37.0	0.48

5.3. Construction Vehicles

5.3.1. Unmitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Site Prep/Grading	—	—	—	—
Site Prep/Grading	Worker	57.5	18.5	LDA,LDT1,LDT2
Site Prep/Grading	Vendor	—	10.2	HHDT,MHDT
Site Prep/Grading	Hauling	346	20.0	HHDT
Site Prep/Grading	Onsite truck	—	—	HHDT
Building Construction	—	—	—	—
Building Construction	Worker	126	18.5	LDA,LDT1,LDT2
Building Construction	Vendor	50.9	10.2	HHDT,MHDT
Building Construction	Hauling	0.00	20.0	HHDT

Building Construction	Onsite truck	—	—	HHDT
Paving	—	—	—	—
Paving	Worker	30.0	18.5	LDA,LDT1,LDT2
Paving	Vendor	—	10.2	HHDT,MHDT
Paving	Hauling	0.00	20.0	HHDT
Paving	Onsite truck	—	—	HHDT
Architectural Coating	—	—	—	—
Architectural Coating	Worker	25.1	18.5	LDA,LDT1,LDT2
Architectural Coating	Vendor	—	10.2	HHDT,MHDT
Architectural Coating	Hauling	0.00	20.0	HHDT
Architectural Coating	Onsite truck	—	—	HHDT

5.3.2. Mitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Site Prep/Grading	—	—	—	—
Site Prep/Grading	Worker	57.5	18.5	LDA,LDT1,LDT2
Site Prep/Grading	Vendor	—	10.2	HHDT,MHDT
Site Prep/Grading	Hauling	346	20.0	HHDT
Site Prep/Grading	Onsite truck	—	—	HHDT
Building Construction	—	—	—	—
Building Construction	Worker	126	18.5	LDA,LDT1,LDT2
Building Construction	Vendor	50.9	10.2	HHDT,MHDT
Building Construction	Hauling	0.00	20.0	HHDT
Building Construction	Onsite truck	—	—	HHDT
Paving	—	—	—	—
Paving	Worker	30.0	18.5	LDA,LDT1,LDT2
Paving	Vendor	—	10.2	HHDT,MHDT

Paving	Hauling	0.00	20.0	HHDT
Paving	Onsite truck	—	—	HHDT
Architectural Coating	—	—	—	—
Architectural Coating	Worker	25.1	18.5	LDA,LDT1,LDT2
Architectural Coating	Vendor	—	10.2	HHDT,MHDT
Architectural Coating	Hauling	0.00	20.0	HHDT
Architectural Coating	Onsite truck	—	—	HHDT

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

Control Strategies Applied	PM10 Reduction	PM2.5 Reduction
Water unpaved roads twice daily	55%	55%
Limit vehicle speeds on unpaved roads to 25 mph	44%	44%
Sweep paved roads once per month	9%	9%

5.5. Architectural Coatings

Phase Name	Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
Architectural Coating	0.00	0.00	469,961	156,654	72,300

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

Phase Name	Material Imported (Cubic Yards)	Material Exported (Cubic Yards)	Acres Graded (acres)	Material Demolished (sq. ft.)	Acres Paved (acres)
Site Prep/Grading	0.00	2,599,650	3,918	0.00	—
Paving	0.00	0.00	0.00	0.00	27.7

5.6.2. Construction Earthmoving Control Strategies

Control Strategies Applied	Frequency (per day)	PM10 Reduction	PM2.5 Reduction
Water Exposed Area	2	61%	61%

5.7. Construction Paving

Land Use	Area Paved (acres)	% Asphalt
Hotel	0.00	0%
Health Club	0.00	0%
Strip Mall	0.00	0%
Pharmacy/Drugstore with Drive Thru	0.00	0%
Gasoline/Service Station	0.00	0%
Fast Food Restaurant with Drive Thru	0.00	0%
High Turnover (Sit Down Restaurant)	0.00	0%
Parking Lot	27.7	100%

5.8. Construction Electricity Consumption and Emissions Factors

kWh per Year and Emission Factor (lb/MWh)

Year	kWh per Year	CO2	CH4	N2O
2024	0.00	349	0.03	< 0.005
2025	0.00	349	0.03	< 0.005
2026	0.00	346	0.03	< 0.005
2027	0.00	346	0.03	< 0.005

5.9. Operational Mobile Sources

5.9.1. Unmitigated

Land Use Type	Trips/Weekday	Trips/Saturday	Trips/Sunday	Trips/Year	VMT/Weekday	VMT/Saturday	VMT/Sunday	VMT/Year
Hotel	29,094	29,094	29,094	10,619,310	532,778	532,778	532,778	194,464,124
Health Club	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Strip Mall	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pharmacy/Drugstore with Drive Thru	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gasoline/Service Station	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fast Food Restaurant with Drive Thru	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
High Turnover (Sit Down Restaurant)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Parking Lot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

5.9.2. Mitigated

Land Use Type	Trips/Weekday	Trips/Saturday	Trips/Sunday	Trips/Year	VMT/Weekday	VMT/Saturday	VMT/Sunday	VMT/Year
Hotel	28,023	28,023	28,023	10,228,333	513,163	513,163	513,163	187,304,426
Health Club	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Strip Mall	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pharmacy/Drugstore with Drive Thru	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gasoline/Service Station	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fast Food Restaurant with Drive Thru	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
High Turnover (Sit Down Restaurant)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Parking Lot	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

5.10. Operational Area Sources

5.10.1. Hearths

5.10.1.1. Unmitigated

5.10.1.2. Mitigated

5.10.2. Architectural Coatings

Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
0	0.00	469,961	156,654	72,300

5.10.3. Landscape Equipment

Season	Unit	Value
Snow Days	day/yr	0.00
Summer Days	day/yr	250

5.10.4. Landscape Equipment - Mitigated

Season	Unit	Value
Snow Days	day/yr	0.00
Summer Days	day/yr	250

5.11. Operational Energy Consumption

5.11.1. Unmitigated

Electricity (kWh/yr) and CO2 and CH4 and N2O and Natural Gas (kBTU/yr)

Land Use	Electricity (kWh/yr)	CO2	CH4	N2O	Natural Gas (kBTU/yr)

Hotel	3,012,129	346	0.0330	0.0040	5,638,355
Health Club	381,509	346	0.0330	0.0040	1,715,445
Strip Mall	296,714	346	0.0330	0.0040	179,812
Pharmacy/Drugstore with Drive Thru	145,925	346	0.0330	0.0040	88,432
Gasoline/Service Station	29,624	346	0.0330	0.0040	133,204
Fast Food Restaurant with Drive Thru	799,520	346	0.0330	0.0040	2,605,376
High Turnover (Sit Down Restaurant)	371,707	346	0.0330	0.0040	1,211,271
Parking Lot	1,055,580	346	0.0330	0.0040	0.00

5.11.2. Mitigated

Electricity (kWh/yr) and CO2 and CH4 and N2O and Natural Gas (kBTU/yr)

Land Use	Electricity (kWh/yr)	CO2	CH4	N2O	Natural Gas (kBTU/yr)
Hotel	2,517,915	346	0.0330	0.0040	5,316,395
Health Club	324,789	346	0.0330	0.0040	1,664,085
Strip Mall	255,993	346	0.0330	0.0040	177,768
Pharmacy/Drugstore with Drive Thru	125,898	346	0.0330	0.0040	87,427
Gasoline/Service Station	25,220	346	0.0330	0.0040	129,216
Fast Food Restaurant with Drive Thru	641,007	346	0.0330	0.0040	2,586,421
High Turnover (Sit Down Restaurant)	298,012	346	0.0330	0.0040	1,202,459
Parking Lot	1,055,580	346	0.0330	0.0040	0.00

5.12. Operational Water and Wastewater Consumption

5.12.1. Unmitigated

Land Use	Indoor Water (gal/year)	Outdoor Water (gal/year)
Hotel	3,297,680	0.00
Health Club	2,365,726	0.00
Strip Mall	2,296,248	0.00
Pharmacy/Drugstore with Drive Thru	1,056,713	0.00
Gasoline/Service Station	292,202	0.00
Fast Food Restaurant with Drive Thru	6,981,275	0.00
High Turnover (Sit Down Restaurant)	3,338,871	0.00
Parking Lot	0.00	0.00

5.12.2. Mitigated

Land Use	Indoor Water (gal/year)	Outdoor Water (gal/year)
Hotel	2,908,224	0.00
Health Club	2,088,936	0.00
Strip Mall	2,073,512	0.00
Pharmacy/Drugstore with Drive Thru	954,212	0.00
Gasoline/Service Station	263,858	0.00
Fast Food Restaurant with Drive Thru	6,164,466	0.00
High Turnover (Sit Down Restaurant)	2,948,223	0.00
Parking Lot	0.00	0.00

5.13. Operational Waste Generation

5.13.1. Unmitigated

Land Use	Waste (ton/year)	Cogeneration (kWh/year)

Hotel	71.2	—
Health Club	228	—
Strip Mall	32.6	—
Pharmacy/Drugstore with Drive Thru	45.1	—
Gasoline/Service Station	11.9	—
Fast Food Restaurant with Drive Thru	265	—
High Turnover (Sit Down Restaurant)	131	—
Parking Lot	0.00	—

5.13.2. Mitigated

Land Use	Waste (ton/year)	Cogeneration (kWh/year)
Hotel	14.2	—
Health Club	45.6	—
Strip Mall	6.51	—
Pharmacy/Drugstore with Drive Thru	9.02	—
Gasoline/Service Station	2.37	—
Fast Food Restaurant with Drive Thru	53.0	—
High Turnover (Sit Down Restaurant)	26.2	—
Parking Lot	0.00	—

5.14. Operational Refrigeration and Air Conditioning Equipment

5.14.1. Unmitigated

Land Use Type	Equipment Type	Refrigerant	GWP	Quantity (kg)	Operations Leak Rate	Service Leak Rate	Times Serviced
Hotel	Household refrigerators and/or freezers	R-134a	1,430	0.00	0.60	0.00	1.00
Hotel	Other commercial A/C and heat pumps	R-410A	2,088	1.80	4.00	4.00	18.0

Hotel	Walk-in refrigerators and freezers	R-404A	3,922	< 0.005	7.50	7.50	20.0
Health Club	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0
Health Club	Stand-alone retail refrigerators and freezers	R-134a	1,430	0.04	1.00	0.00	1.00
Strip Mall	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0
Strip Mall	Stand-alone retail refrigerators and freezers	R-134a	1,430	0.04	1.00	0.00	1.00
Strip Mall	Walk-in refrigerators and freezers	R-404A	3,922	< 0.005	7.50	7.50	20.0
Pharmacy/Drugstore with Drive Thru	Household refrigerators and/or freezers	R-134a	1,430	0.45	0.60	0.00	1.00
Pharmacy/Drugstore with Drive Thru	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0
Fast Food Restaurant with Drive Thru	Household refrigerators and/or freezers	R-134a	1,430	0.00	0.60	0.00	1.00
Fast Food Restaurant with Drive Thru	Other commercial A/C and heat pumps	R-410A	2,088	1.80	4.00	4.00	18.0
Fast Food Restaurant with Drive Thru	Walk-in refrigerators and freezers	R-404A	3,922	< 0.005	7.50	7.50	20.0
High Turnover (Sit Down Restaurant)	Household refrigerators and/or freezers	R-134a	1,430	0.00	0.60	0.00	1.00
High Turnover (Sit Down Restaurant)	Other commercial A/C and heat pumps	R-410A	2,088	1.80	4.00	4.00	18.0
High Turnover (Sit Down Restaurant)	Walk-in refrigerators and freezers	R-404A	3,922	< 0.005	7.50	7.50	20.0

5.14.2. Mitigated

Land Use Type	Equipment Type	Refrigerant	GWP	Quantity (kg)	Operations Leak Rate	Service Leak Rate	Times Serviced

Hotel	Household refrigerators and/or freezers	R-134a	1,430	0.00	0.60	0.00	1.00
Hotel	Other commercial A/C and heat pumps	R-410A	2,088	1.80	4.00	4.00	18.0
Hotel	Walk-in refrigerators and freezers	R-404A	3,922	< 0.005	7.50	7.50	20.0
Health Club	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0
Health Club	Stand-alone retail refrigerators and freezers	R-134a	1,430	0.04	1.00	0.00	1.00
Strip Mall	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0
Strip Mall	Stand-alone retail refrigerators and freezers	R-134a	1,430	0.04	1.00	0.00	1.00
Strip Mall	Walk-in refrigerators and freezers	R-404A	3,922	< 0.005	7.50	7.50	20.0
Pharmacy/Drugstore with Drive Thru	Household refrigerators and/or freezers	R-134a	1,430	0.45	0.60	0.00	1.00
Pharmacy/Drugstore with Drive Thru	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0
Fast Food Restaurant with Drive Thru	Household refrigerators and/or freezers	R-134a	1,430	0.00	0.60	0.00	1.00
Fast Food Restaurant with Drive Thru	Other commercial A/C and heat pumps	R-410A	2,088	1.80	4.00	4.00	18.0
Fast Food Restaurant with Drive Thru	Walk-in refrigerators and freezers	R-404A	3,922	< 0.005	7.50	7.50	20.0
High Turnover (Sit Down Restaurant)	Household refrigerators and/or freezers	R-134a	1,430	0.00	0.60	0.00	1.00
High Turnover (Sit Down Restaurant)	Other commercial A/C and heat pumps	R-410A	2,088	1.80	4.00	4.00	18.0
High Turnover (Sit Down Restaurant)	Walk-in refrigerators and freezers	R-404A	3,922	< 0.005	7.50	7.50	20.0

5.15. Operational Off-Road Equipment

5.15.1. Unmitigated

Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor

5.15.2. Mitigated

Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor

5.16. Stationary Sources

5.16.1. Emergency Generators and Fire Pumps

Equipment Type	Fuel Type	Number per Day	Hours per Day	Hours per Year	Horsepower	Load Factor

5.16.2. Process Boilers

Equipment Type	Fuel Type	Number	Boiler Rating (MMBtu/hr)	Daily Heat Input (MMBtu/day)	Annual Heat Input (MMBtu/yr)

5.17. User Defined

Equipment Type	Fuel Type
—	—

5.18. Vegetation

5.18.1. Land Use Change

5.18.1.1. Unmitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1.2. Mitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.1.2. Mitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.2. Sequestration

5.18.2.1. Unmitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)

5.18.2.2. Mitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)

6. Climate Risk Detailed Report

6.1. Climate Risk Summary

Cal-Adapt midcentury 2040–2059 average projections for four hazards are reported below for your project location. These are under Representation Concentration Pathway (RCP) 8.5 which assumes GHG emissions will continue to rise strongly through 2050 and then plateau around 2100.

Climate Hazard	Result for Project Location	Unit
Temperature and Extreme Heat	27.9	annual days of extreme heat

Extreme Precipitation	12.0	annual days with precipitation above 20 mm
Sea Level Rise	0.00	meters of inundation depth
Wildfire	21.2	annual hectares burned

Temperature and Extreme Heat data are for grid cell in which your project are located. The projection is based on the 98th historical percentile of daily maximum/minimum temperatures from observed historical data (32 climate model ensemble from Cal-Adapt, 2040–2059 average under RCP 8.5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Extreme Precipitation data are for the grid cell in which your project are located. The threshold of 20 mm is equivalent to about ¾ an inch of rain, which would be light to moderate rainfall if received over a full day or heavy rain if received over a period of 2 to 4 hours. Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Sea Level Rise data are for the grid cell in which your project are located. The projections are from Radke et al. (2017), as reported in Cal-Adapt (2040–2059 average under RCP 8.5), and consider different increments of sea level rise coupled with extreme storm events. Users may select from four model simulations to view the range in potential inundation depth for the grid cell. The four simulations make different assumptions about expected rainfall and temperature are: Warmer/drier (HadGEM2-ES), Cooler/wetter (CNRM-CM5), Average conditions (CanESM2), Range of different rainfall and temperature possibilities (MIROC5). Each grid cell is 50 meters (m) by 50 m, or about 164 feet (ft) by 164 ft.
Wildfire data are for the grid cell in which your project are located. The projections are from UC Davis, as reported in Cal-Adapt (2040–2059 average under RCP 8.5), and consider historical data of climate, vegetation, population density, and large (> 400 ha) fire history. Users may select from four model simulations to view the range in potential wildfire probabilities for the grid cell. The four simulations make different assumptions about expected rainfall and temperature are: Warmer/drier (HadGEM2-ES), Cooler/wetter (CNRM-CM5), Average conditions (CanESM2), Range of different rainfall and temperature possibilities (MIROC5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.

6.2. Initial Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	3	0	0	N/A
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	1	0	0	N/A
Wildfire	1	0	0	N/A
Flooding	N/A	N/A	N/A	N/A
Drought	N/A	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	0	0	0	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores do not include implementation of climate risk reduction measures.

6.3. Adjusted Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	3	1	1	3
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	1	1	1	2
Wildfire	1	1	1	2
Flooding	N/A	N/A	N/A	N/A
Drought	N/A	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	1	1	1	2

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores include implementation of climate risk reduction measures.

6.4. Climate Risk Reduction Measures

7. Health and Equity Details

7.1. CalEnviroScreen 4.0 Scores

The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Exposure Indicators	—
AQ-Ozone	99.1
AQ-PM	60.9
AQ-DPM	67.4
Drinking Water	96.3
Lead Risk Housing	8.87
Pesticides	0.00

Toxic Releases	58.6
Traffic	72.8
Effect Indicators	—
CleanUp Sites	94.1
Groundwater	68.6
Haz Waste Facilities/Generators	63.6
Impaired Water Bodies	0.00
Solid Waste	75.7
Sensitive Population	—
Asthma	56.5
Cardio-vascular	74.7
Low Birth Weights	44.5
Socioeconomic Factor Indicators	—
Education	61.1
Housing	0.94
Linguistic	36.0
Poverty	19.4
Unemployment	83.2

7.2. Healthy Places Index Scores

The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Economic	—
Above Poverty	84.02412421
Employed	1.591171564
Median HI	79.9563711
Education	—

Bachelor's or higher	28.85923264
High school enrollment	17.31040678
Preschool enrollment	36.78942641
Transportation	—
Auto Access	72.44963429
Active commuting	7.917361735
Social	—
2-parent households	44.74528423
Voting	49.54446298
Neighborhood	—
Alcohol availability	75.52932119
Park access	7.04478378
Retail density	9.457205184
Supermarket access	35.77569614
Tree canopy	15.46259464
Housing	—
Homeownership	91.76183755
Housing habitability	92.04414218
Low-inc homeowner severe housing cost burden	90.09367381
Low-inc renter severe housing cost burden	81.05992557
Uncrowded housing	69.47260362
Health Outcomes	—
Insured adults	52.11086873
Arthritis	41.4
Asthma ER Admissions	28.5
High Blood Pressure	35.9
Cancer (excluding skin)	49.7

Asthma	32.2
Coronary Heart Disease	57.7
Chronic Obstructive Pulmonary Disease	56.7
Diagnosed Diabetes	36.9
Life Expectancy at Birth	29.0
Cognitively Disabled	60.3
Physically Disabled	57.4
Heart Attack ER Admissions	27.5
Mental Health Not Good	47.3
Chronic Kidney Disease	45.1
Obesity	33.5
Pedestrian Injuries	91.8
Physical Health Not Good	49.9
Stroke	39.4
Health Risk Behaviors	—
Binge Drinking	26.9
Current Smoker	51.2
No Leisure Time for Physical Activity	54.9
Climate Change Exposures	—
Wildfire Risk	45.4
SLR Inundation Area	0.0
Children	40.5
Elderly	74.7
English Speaking	78.9
Foreign-born	23.9
Outdoor Workers	16.6
Climate Change Adaptive Capacity	—

Impervious Surface Cover	79.3
Traffic Density	68.0
Traffic Access	23.0
Other Indices	—
Hardship	39.4
Other Decision Support	—
2016 Voting	59.4

7.3. Overall Health & Equity Scores

Metric	Result for Project Census Tract
CalEnviroScreen 4.0 Score for Project Location (a)	70.0
Healthy Places Index Score for Project Location (b)	36.0
Project Located in a Designated Disadvantaged Community (Senate Bill 535)	No
Project Located in a Low-Income Community (Assembly Bill 1550)	No
Project Located in a Community Air Protection Program Community (Assembly Bill 617)	No

a: The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.
b: The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

7.4. Health & Equity Measures

No Health & Equity Measures selected.

7.5. Evaluation Scorecard

Health & Equity Evaluation Scorecard not completed.

7.6. Health & Equity Custom Measures

No Health & Equity Custom Measures created.

8. User Changes to Default Data

Screen	Justification

Land Use	Site Plan and trip gen table
Construction: Construction Phases	construction schedule
Construction: Off-Road Equipment	Construction Schedule and equipment list
Construction: Architectural Coatings	SCAQMD RULE 1113
Operations: Vehicle Data	Trip Gen Table
Operations: Architectural Coatings	Rule 1113
Construction: Dust From Material Movement	Grading Plan

Appendix E:
Water Quality Management Plan

Preliminary
Water Quality Management Plan

For:

The Oasis at Glen Helen Parkway

APN NO.0239-031-04, 32 & 37, 0239-031-50
PROJECT NO. PROJ-2023-00012 PLANNED DEVELOPMENT), PROJ-0223-00100 (TRACT MAP) AND PROJ-2023-00096 (SPECIFIC PLAN AMENDMENT)
WQMP-2023-00100

Prepared for:
215 Table Top, LLC
P.O. box 9716
Redlands, CA 92375
(951) 453-0541

Prepared by:
Transtech Engineers, Inc.
413 Mackay Drive
San Bernardino, CA 92408
(909) 384-7464
JN 15193

Submittal Date: March 11, 2024
Revision Date:

Approval Date: _____

Project Owner's Certification

This Water Quality Management Plan (WQMP) has been prepared for 215 Table Top, LLC by Transtech Engineers, Inc. The WQMP is intended to comply with the requirements of the County of San Bernardino and the NPDES Areawide Stormwater Program requiring the preparation of a WQMP. The undersigned, while it owns the subject property, is responsible for the implementation of the provisions of this plan and will ensure that this plan is amended as appropriate to reflect up-to-date conditions on the site consistent with San Bernardino County's Municipal Storm Water Management Program and the intent of the NPDES Permit for San Bernardino County and the incorporated cities of San Bernardino County within the Santa Ana Region. Once the undersigned transfers its interest in the property, its successors in interest and the city/county shall be notified of the transfer. The new owner will be informed of its responsibility under this WQMP. A copy of the approved WQMP shall be available on the subject site in perpetuity.

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

.

Project Data			
Permit/Application Number(s):	WQMP-22023-00100 PROJ-2023-00012 PROJ-2023-00096 PROJ2023-00100	Grading Permit Number(s):	GRAD-2023-00154
Tract/Parcel Map Number(s):	Parcel Map No. 20748	Building Permit Number(s):	TBD
CUP, SUP, and/or APN (Specify Lot Numbers if Portions of Tract):			APN NO. 0239-031-04, 31, 32 & 0230-31-50

Owner's Signature			
Owner Name: Jim Mauge			
Title	Project Manager (Authorized Agent for Owner		
Company	Glen Helen Site, LLC		
Address	P.O. Box 9716 Redlands, CA 92375		
Email	jimmauge@gmail.com		
Telephone #	310-722-8692		
Signature	JMauge	Date	3-11-24

Preparer's Certification

Project Data			
Permit/Application Number(s):	PROJ-2023-00012 PROJ-2023-00096 PROJ02023-00100	Grading Permit Number(s):	GRAD-2023-00154
Tract/Parcel Map Number(s):	Parcel Map No. 20748	Building Permit Number(s):	TBD
CUP, SUP, and/or APN (Specify Lot Numbers if Portions of Tract): CUP			APN NO. 0250-101-76

"The selection, sizing and design of stormwater treatment and other stormwater quality and quantity control measures in this plan were prepared under my oversight and meet the requirements of Regional Water Quality Control Board Order No. R8-2010-0036."

Engineer: David Ragland		PE Stamp Below
Title	Project Engineer	
Company	Transtech Engineers, Inc.	
Address	413 Mackay Drive, San Bernardino, CA 92408	
Email	david.ragland@transtech.org	
Telephone #	(909) 384-7464	
Signature	*David B Ragland*	
Date	March 11, 2024	

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Appendix H Stormwater Treatment Device and Control Measure Access and Maintenance Agreement
Appendix I WQMP Site Plan
Appendix J Grading Plans
Appendix K Landscape Plans

Section 1 Discretionary Permit(s)

Form 1-1 Project Information					
Project Name	The Oasis at Glen Helen Parkway				
Project Owner Contact Name:	Jim Mauge				
Mailing Address:	P.O. Box 9716 Redlands, CA 92375	E-mail Address:	jimmauge@gmail.com	Telephone:	(310) 722-8692
Permit/Application Number(s):	PROJ-2023-00012 PROJ-2023-00096 PROJ-2023-00100	Tract/Parcel Map Number(s):	Parcel Map NO. 20748		
Additional Information/ Comments:	None				
Description of Project:	**Project Location:** The Project is located in an unincorporated area of southwestern San Bernardino County and within the City of Rialto Sphere of Influence (SOI). The Project is located east of Interstate (1-15), west of Glen Helen Parkway and the Glen Helen Regional Park, north of 1-15 Exit 122, and south of three existing single-family residences and the Glen Helen Park Maintenance Yard. **Project Description:** The Project proposes the development of approximately 202,900 square feet (SF) of commercial and retail uses on approximately 31.34 acres, consisting of a hotel, fitness facilities, a market and pharmacies, commercial shops, gasoline/service stations and convenience store, drive-through car wash, restaurants, and a joint Fire and Sheriff Station. Additionally, the Project Draft SEIR consists of a Specific Plan Amendment (SPA, Project#: PROJ-2023-00096) and a Planned Development Permit (PDP, Project#: PROJ- 2023-00012) to allow for development of approximately 202,900 SF of commercial and retail uses as described above. Additional permitted uses under the SPA and PDP include indoor/outdoor RV storage, car condos, warehouse retail, and residential. In addition to the SPA, the Project also includes a Tentative Parcel Map (PROJ-2023-00100/TPM Map No. 20748) to address a site-specific development area within the Destination Recreation (DR) zone. The total square footage proposed as part of the PDP, is less than the maximum square footage allowed under the Glen Helen Specific Plan (GHSP). The Project proposes a maximum floor area ratio (FAR) of 0.18, which is less than the maximum allowed FAR of 0.20 in the GHSP-DR zone. The proposed text amendment would support the original intent of the GHSP-DR zone, to provide low-intensity retail commercial uses that are sensitive to the physical and environmental constraints of the area.				

	The Oasis at Glen Helen Parkway is located at the Northeast corner of Interstate 15 and Glen Helen Parkway in the City of San Bernardino, CA. The project site encompasses 31.4 acres. The site consists of a large, mounded hill that rises from 2010 ft to 2055.6 ft. The peak of this hill is in the approximate center of the site. Therefore, the site drains to the North and South from said peak. In addition, there is an existing concrete swale along the westerly boundary of the site that contains all tributary runoff to said swale (approx. 7.47 acres). The easterly portion of tributary runoff (E1, E2, E3, E4, E5 and E9 =22.80 ac.) flow southerly to the existing grate inlet. In addition, Glen Helen parkway has a high point located approx. 2120 ft easterly from the intersection of Interstate 10 and Glen Helen Parkway. Lastly, the existing flows from the freeway on-ramp are quantified as existing flows. All southerly noted existing flows flow into an existing grate inlet located at just north of the existing Glen Helen Right of Way at the intersection of the freeway on-ramp and Glen Helen Parkway. The remaining northerly 3.55 acres flows northerly and did not contribute to the total storm runoff entering the existing grate inlet. Presently there is no storm runoff contained onsite. Bio-retention, manufactured filtering devices and underground infiltration systems will be utilized to treat the water quality volume. Runoff from roofs, parking areas and other impervious surfaces will be directed to landscaped areas that will contain the BMP treatment facilities. Due to the low infiltration rates, water quality volume will be infiltrated into the underlying soils and processed through filtering systems filterra tree filters and bio-retention with subdrains. Overflow runoff from greater intensity storms will be discharged into the adjacent streets, curbs, and gutters and underground storm drains. Ultimate project runoff discharge will be to an existing storm drain system located at the southwest corner of the property (Northeast corner of I-15 on ramp and Glen Helen Parkway.)
Provide summary of Conceptual WQMP conditions (if previously submitted and approved). Attach complete copy.	N/A

Section 2 Project Description

2.1 Project Information

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

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

Form 2.1-1 Description of Proposed Project

1 Development Category (Select all that apply):

☐ Significant re-development involving the addition or replacement of 5,000 ft^2 or more of impervious surface on an already developed site	☒ New development involving the creation of 10,000 ft^2 or more of impervious surface collectively over entire site	☐ Automotive repair shops with standard industrial classification (SIC) codes 5013, 5014, 5541, 7532- 7534, 7536-7539	☒ Restaurants (with SIC code 5812) where the land area of development is 5,000 ft^2 or more
☐ Hillside developments of 5,000 ft^2 or more which are located on areas with known erosive soil conditions or where the natural slope is 25 percent or more	☐ Developments of 2,500 ft^2 of impervious surface or more adjacent to (within 200 ft) or discharging directly into environmentally sensitive areas or waterbodies listed on the CWA Section 303(d) list of impaired waters.	☒ Parking lots of 5,000 ft^2 or more exposed to storm water	☒ Retail gasoline outlets that are either 5,000 ft^2 or more, or have a projected average daily traffic of 100 or more vehicles per day

☐ Non-Priority / Non-Category Project *May require source control LID BMPs and other LIP requirements. Please consult with local jurisdiction on specific requirements*.

2 Project Area (ft2):	31.34 ac 1,365,022 s.f.	**3** Number of Dwelling Units:	125 Room Hotel	**4** SIC Code:	5411, 7542, 5812, 5541, 5412, 7011, 5912, 9924, 5812

5 Is Project going to be phased? Yes ☐ No ☒ *If yes, ensure that the WQMP evaluates each phase as a distinct DA, requiring LID BMPs to address runoff at time of completion.*

6 Does Project include roads? Yes ☐ No ☒ *If yes, ensure that applicable requirements for transportation projects are addressed (see Appendix A of TGD for WQMP)*

2.2 Property Ownership/Management

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

Form 2.2-1 Property Ownership/Management

Describe property ownership/management responsible for long-term maintenance of WQMP stormwater facilities:

The property is currently owned by 215 Table Top, LLC. The owner (215 Table Top, LLC) is also the developer of the project. The owner will be resposible for funding and implementation of all required BMPs. Upon completion of construction, the owner will commence with the sales and leasing program for the developpment. It is anticipated that a parcel map will be prepared to create separate parcels to allow independent ownership of each developable lot and proposed land use. To assure long term maintenance of the water quality facilities, a Covenant and Agreement entilted "Covenant and Agreement Regarding Water Quality Management Plan and Stormwater Best Management Practices Transfer, Access and Maintenance" will be recorded. This document will be recorded and run with the property and will be subject to any future owners of the property. A property owners association is proposed. The BMPs will be maintained by the commercial owners association and can be enforedc by the County and through the CC&Rs.
There are no onsite public street improvements proposed for the project.

Owner Information
Jim Mauge
Glen Helen Site, LLC
P.O. Box 9716
Redlands, CA 92375

2.3 Potential Stormwater Pollutants

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

Form 2.3-1 Pollutants of Concern			
Pollutant	Please check: E=Expected, N=Not Expected		Additional Information and Comments
Pathogens (Bacterial / Virus)	E ☒	N ☐	The proliferation of bacteria and viruses is generally caused by the transport of animal or fecal waste within stormwater runoff from a project site This would include domestic animal waste and garbage. A potential for wild animal waste desposted on the project from animals living in the surrounding undeveloped areas and heavily vegetated drainage courses adjacent to the project site
Nutrients - Phosphorous	E ☒	N ☐	Primary source of nutrients and phosphorous are typically caused by excessive and careless use of fertilizers and eroded soils.
Nutrients - Nitrogen	E ☒	N ☐	Primary source of nutrients and nitrogen are typically caused by excessive and careless use of fertilizers and eroded soils.
Noxious Aquatic Plants	E ☒	N ☐	An expected pollutant with landscaping onsite.
Sediment	E ☒	N ☐	Sediments are generally caused by eroded soils, transport of sediment not properly contained and poorly maintained landscape and pavements.
Metals	E ☒	N ☐	Associated with car and truck use, tires and brake pads.
Oil and Grease	E ☒	N ☐	Primary sources of oil and grease are petroleum hydrocarbon products, motor products from leaking vehicles, esters, oils, fats, waxes, and high molecular-weight fatty acids that can disperse from improperly disposed garbage.
Trash/Debris	E ☒	N ☐	Trash and other debris including paper, plastic, foam, aluminum, leaves, cut grass and food wastes from poorly managed trash containers, parking lot and pedestrian area dumping, and outdoor food preparation areas located in the project recreation areas.
Pesticides / Herbicides	E ☒	N ☐	Pesticides and hebicides are commonly used for landscaping and pest control around multi family projects. Care should be taken to minimize their use as much as possible and apply according to the manufacture's specifications.
Organic Compounds	E ☒	N ☐	Sources of organic compounds include waste handling areas and vehicle and landscape maintanence areas. Care should be taken to ensure that when cleaning and rinsing dirt, grease and grime from vehicles and equipment, cleaning fluids and rinse water is not discharged into storm drains.
Other:	E ☐	N ☐	
Other:	E ☐	N ☐	

2.4 Water Quality Credits

A water quality credit program is applicable for certain types of development projects if it is not feasible to meet the requirements for on-site LID. Proponents for eligible projects, as described below, can apply for water quality credits that would reduce project obligations for selecting and sizing other treatment BMP or participating in other alternative compliance programs. Refer to Section 6.2 in the TGD for WQMP to determine if water quality credits are applicable for the project.

Form 2.4-1 Water Quality Credits			
1 Project Types that Qualify for Water Quality Credits: *Select all that apply*			
☐ Redevelopment projects that reduce the overall impervious footprint of the project site. [Credit = % impervious reduced]	Higher density development projects ☐ Vertical density [20%] ☐ 7 units/ acre [5%]	☐ Mixed use development, (combination of residential, commercial, industrial, office, institutional, or other land uses which incorporate design principles that demonstrate environmental benefits not realized through single use projects) [20%]	☐ Brownfield redevelopment (redevelop real property complicated by presence or potential of hazardous contaminants) [25%]
☐ Redevelopment projects in established historic district, historic preservation area, or similar significant core city center areas [10%]	☐ Transit-oriented developments (mixed use residential or commercial area designed to maximize access to public transportation) [20%]	☐ In-fill projects (conversion of empty lots & other underused spaces < 5 acres, substantially surrounded by urban land uses, into more beneficially used spaces, such as residential or commercial areas) [10%]	☐ Live-Work developments (variety of developments designed to support residential and vocational needs) [20%]
2 Total Credit % 10 *(Total all credit percentages up to a maximum allowable credit of 50 percent)*			
Description of Water Quality Credit Eligibility (if applicable)	N/A		

Section 3 Site and Watershed Description

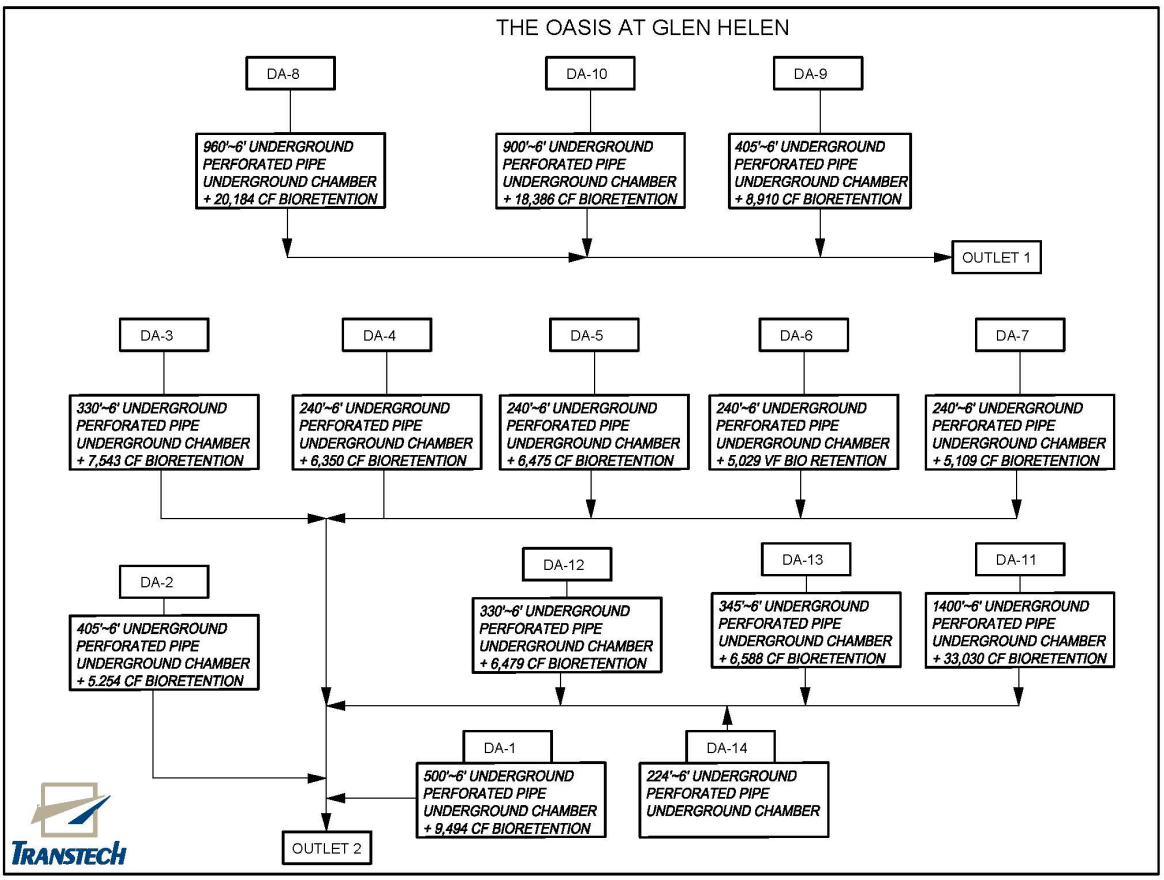
Describe the project site conditions that will facilitate the selection of BMP through an analysis of the physical conditions and limitations of the site and its receiving waters. Identify distinct drainage areas (DA) that collect flow from a portion of the site and describe how runoff from each DA (and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

Form 3-1 Site Location and Hydrologic Features

Site coordinates *take GPS measurement at approximate center of site*	Latitude 34°12'15.57"	Longitude 117°24'44.96"	Thomas Bros Map page 607

1 San Bernardino County climatic region: ☒ Valley ☐ Mountain

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



Conveyance	Briefly describe on-site drainage features to convey runoff that is not retained within a DMA
DA1 DMA C flows to DA1 DMA A	*Ex. Bioretention overflow to vegetated bioswale with 4' bottom width, 5:1 side slopes and bed slope of 0.01. Conveys runoff for 1000' through DMA 1 to existing catch basin on SE corner of property*
DMA1	The site drains to the North and South from said peak. In addition there is an existing concrete swale along the westerly boundary of the site that contains all tributary runoff to said seal (approx. 7.47 acres). Drainage through the site shall be directed to the existing grate inlet locateed at the Northeast corner of Interstate 15 and Glen Helen Parkway and to discharge along the westerly side of Glen Hlen Parkway near the northeasterly corner of the subject prperty.

Form 3-2 Existing Hydrologic Characteristics for Drainage Area 1

For Drainage Area 1's sub-watershed DMA, provide the following characteristics	DMA A	DMA B	DMA C	DMA D
1 DMA drainage area (ft^2)	936,540	428,630		
2 Existing site impervious area (ft^2)	0	4		
3 Antecedent moisture condition *For desert areas, use http://www.sbcounty.gov/dpw/floodcontrol/pdf/20100412_map.pdf*	AMC II	AMC II		
4 Hydrologic soil group *Refer to Watershed Mapping Tool – http://permitrack.sbcounty.gov/wap/*	A, D	A, D		
5 Longest flow path length (ft)	1398	1158		
6 Longest flow path slope (ft/ft)	.16	.16		
7 Current land cover type(s) Select *from Fig C-3 of Hydrology Manual*	**Grass, Orchard**	**Grass, Orchard**		
8 Pre-developed pervious area condition: *Based on the extent of wet season vegetated cover good >75%; Fair 50-75%; Poor <50% Attach photos of site to support rating*	Fair	Fair		

Form 3-3 Watershed Description for Drainage Area	
Receiving waters *Refer to Watershed Mapping Tool -* *http://permitrack.sbcounty.gov/wap/* *See 'Drainage Facilities" link at this website*	Surface flow and storm drain flow to: Lytle Creek Santa Ana River Reach 4 Santa Ana River Reach 2, 3 and 4 Prado Basin Lower Santa Ana River Pacific Ocean
Applicable TMDLs *Refer to Local Implementation Plan*	Lytle Creek: Pathogens Santa Ana River Reach 4: Pathogens Santa Ana River Reach 3: Pathogens, Copper, Lead Prado Dam: None Santa Ana River Reach 2: None Lower Santa Ana River: None *Pacific Ocean: None*
303(d) listed impairments *Refer to Local Implementation Plan and Watershed Mapping Tool –* *http://permitrack.sbcounty.gov/wap/ and State Water Resources Control Board website –* *http://www.waterboards.ca.gov/santaana/water_issues/programs/tmdl/index.shtml*	Santa Ana River Reach 4: E. Coli and Enterococcus, indicator bacteria Santa Ana River Reach 3: E Coli and Enterococcus, Metals Screen - Copper, Metals Screen – Lead, indicator bacteria Prado Dam - PH *Santa Ana River Reach 2:* None
Environmentally Sensitive Areas (ESA) *Refer to Watershed Mapping Tool –* *http://permitrack.sbcounty.gov/wap/*	The County mapping tool does not indicate any environmentally sensitive areas on the subject site. Lytle Creek and the Santa Ana River are considered environmentally sensitive.
Unlined Downstream Water Bodies *Refer to Watershed Mapping Tool –* *http://permitrack.sbcounty.gov/wap/*	Portions of the Santa Ana River are unlined and a NON EHM receiving water.
Hydrologic Conditions of Concern	☒ Yes *Complete Hydrologic Conditions of Concern (HCOC) Assessment. Include Forms 4.2-2 through Form 4.2-5 and Hydromodification BMP Form 4.3-10 in submittal* ☐ No
Watershed–based BMP included in a RWQCB approved WAP	☐ Yes *Attach verification of regional BMP evaluation criteria in WAP* • *More Effective than On-site LID* • *Remaining Capacity for Project DCV* • *Upstream of any Water of the US* • *Operational at Project Completion* • *Long-Term Maintenance Plan* ☒ No

Section 4 Best Management Practices (BMP)

4.1 Source Control BMP

4.1.1 Pollution Prevention

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

Form 4.1-1 Non-Structural Source Control BMPs

Identifier	Name	Check One		Describe BMP Implementation OR, if not applicable, state reason
		Included	Not Applicable	
N1	Education of Property Owners, Tenants and Occupants on Stormwater BMPs	☒	☐	The project owner will provide educational materials to property owners within the project. The materials will discuss water quality management issues relating to the project and property owner's individual and corporate responsibilities. The materials will contain appropriate information from private and government resources. These materials will include information on general good housekeeping practices that contribute to protection of Storm water quality, and BMPs that eliminate or reduce pollution. An awareness program will be established by the owner/operator to inform all employees of the impacts of dumping oil, antifreeze, paints, solvents, or other potentially harmful chemicals into storm drain; the impacts of littering and improper water disposal The owner will note the availability of stormwater information and educational materials available on the San Bernardino County Website http://www.sbcountystormwater.org/
N2	Activity Restrictions	☒	☐	Future lot owners/Tenants/Lessees/Employees shall not be allowed to discharge chemicals, chemical residues, wastewater or other prohibited discharges listed in the County Ordinances, to anywhere or any surface on the site. The property owner will provide restrictions to all employees, contractors, etc. on dumping and discharges conducted on the property that would contribute to stormwater pollution. Each employee must be trained and aware of activity restrictions. The use of pesticides will only be applied by a licensed applicator.

Form 4.1-1 Non-Structural Source Control BMPs				
N3	Landscape Management BMPs	☒	☐	Onsite landscaping will be maintained by the property owner. The owner will contract with a landscaping installation/maintenance company for the physical maintenance of the landscaping and the BMPs. Landscape crews shall inspect the irrigation system and shall report all drainage problems to the owner. All routine landscaping maintenance shall be done in conformance with County Ordinances.
N4	BMP Maintenance	☒	☐	The owner, through their landscape maintenance contractors will be responsible for inspection and maintenance activities in landscaped areas and inspect non-structural and structural BMPs. BMP maintenance, implementation schedules, and responsible parties are inlcuded with each specific BMP narrative and are listed in Form 5-1 of this document
N5	Title 22 CCR Compliance (How development will comply)	☒	☐	The owner shall comply with the applicable hazardous waste management section(s) of Title 22 for the proposed development. See Hazardous Generator Requirements Summary in Appendix E
N6	Local Water Quality Ordinances	☒	☐	The Project must comply with any applicable local water quality ordinances. The local Jurisdiction, County of San Bernardino under local water quality ordinances, has authority to ensure clean stormwater discharges from the site. The owner shall comply with any applicable local water quality ordinances from the local jurisdiction to ensure clean stormwater discharges. Compliance shall occur though the implementation of the WQMP.
N7	Spill Contingency Plan	☒	☐	Future operators will be provided with information within the agreement regarding spill responses and prevention procedures in case of an accidental spill or leak occurring on the project site. Any liquid chemicals storage on-site shall comply with hazmat regulations and any required spill contingency plans. See Appendix G Spill Prevention and Cleanup. An oil spill kit contains white absorbents and is designed to clean up hydrocarbons such as oil and gasoline. The absorbents found in this kit are hydrophobic. That means they repel and float on water for more effective cleanup contact with the hydrocarbons.
N8	Underground Storage Tank Compliance	☒	☐	The owner shall comply with State regulations dealing with underground storage tanks, enforced by County Environmental Health Services on behalf of the state.
N9	Hazardous Materials Disclosure Compliance	☒	☐	The owner shall comply with local ordinances and local fire protection agencies for the management of hazardous materials.
N10	Uniform Fire Code Implementation	☒	☐	The project is subject to the Uniform Fire Code and the California Health and Safety Code and will be designed in accordance with the Codes. This project is a commercial project including a retail gasoline outlet and is anticipated to be handling hazardous material subject to Articles 79 and 80 of the Uniform Fire Code and Chapter 6.7 of the Califorina Health and Safety Code. See also N5 above.

Form 4.1-1 Non-Structural Source Control BMPs

Identifier	Name	Check One		Describe BMP Implementation OR, if not applicable, state reason
		Included	Not Applicable	
N11	Litter/Debris Control Program	☒	☐	The owner of the project will implement a trash management progam that will be enforced by the owners/managers of the respective businesses. A program shall be implemented to pick up litter and sweep and clean the trash enclosure on a daily basis. Litter and debris will be picked up by the maintenance/landscape contractor on at least a weekly basis. Onsite manager/employees are to be instructed to be visually aware of improperly disposed or dumping of litter and debris and be cleaned up. Trash enclosures are designed to divert all flows around the enclosure. All dumpsters will have lids installed and will be inspected to ensure that the dumpsters remain covered and leak-proof. The owner shall contract with a refuse company to have the dumpsters emptied on a weekly basis, at a minimum.
N12	Employee Training	☒	☐	Employee training will be provided within 3 months of hire and annually threafter. Owner/property manager shall utilize the attached County brochures for employee training on stormwater best management practices. The following should be implemented as part of employee training. • Discuss good housekeeping practices in training programs and meetings. • Publicize pollution prevention concepts through posters or signs. • Post bulletin boards with updated good housekeeping procedures, tips and reminders
N13	Housekeeping of Loading Docks	☐	☒	The project does not include loading docks.
N14	Catch Basin Inspection Program	☒	☐	The on-site dead-end sumps for gas stations shall be inspected weekly. Catch basins, spillways and parkway culverts and storm drainage appurtenances associated with structural and filtration BMPs and the underground storm drain detention chamber system shall be inspected monthly during the rainy season (October-May) and before and after each storm to ensure proper operation. The owner shall contract with a qualified landscape contractor to inspect and clean out accumulation of trash, litter and sediment and check for evidence of illegal dumping of waste materials into on-site drains. The owner(s) are required to have at least 80 percent of the drainage facilities inspected, cleaned and maintained on an annual basis with 100 percent of the facilities included in a two-year period.
N15	Vacuum Sweeping of Private Streets and Parking Lots	☒	☐	Parking lots and drive aisles shall be vacuum swept monthly to prevent sediment, garden waste, and trash, or other pollutants from entering on-site drains and storm drain swales and channels. Sweeping will be

				performed by a landscape contractor or other contractor provided by the owner.
N16	Other Non-structural Measures for Public Agency Projects	☐	☒	No public agency projects associated; this is a private project.
N17	Comply with all other applicable NPDES permits	☒	☐	NPDES General Construction Activities Permit will be complied with by filing a notice of intent and SWPPP with the state and obtaining a WDID Discharge Permit Number prior to commencement of construction activities covered under the permit. Post construction BMP requirements of the SWPPP will be satisfied by implementation of this WQMP.

Form 4.1-2 Structural Source Control BMPs

Identifier	Name	Check One		Describe BMP Implementation OR, if not applicable, state reason
		Included	Not Applicable	
S1	Provide storm drain system stenciling and signage (CASQA New Development BMP Handbook SD-13)	☐	☒	"NO DUMPING - Drains to River" stencils will be applied at all catch basin locations. Legibility of stencils will be maintained on a yearly basis. The catch basins proposed are the dead end sumps for the fueling areas and do not require this signage.
S2	Design and construct outdoor material storage areas to reduce pollution introduction (CASQA New Development BMP Handbook SD-34)	☐	☒	There is not any outdoor material storage proposed for the project.
S3	Design and construct trash and waste storage areas to reduce pollution introduction (CASQA New Development BMP Handbook SD-32)	☒	☐	The trash enclosures located outside will be constructed per San Bernardino County Standards and all will be covered. Trash enclosures are designed such that storm water flows are diverted away from the refuse area and shall have a concrete slab to prohibit infiltration in refuse area. All dumpsters shall have working lids which shall be kept closed at all times.
S4	Use efficient irrigation systems & landscape design, water conservation, smart controllers, and source control (State-wide Model Landscape Ordinance; CASQA New Development BMP Handbook SD-12)	☒	☐	Landscaping and irrigation will be designed by a licensed landscape architect and will incorporate the State and Local requirements for landscaping. Implement landscape plans consistent with county water conservation resolutions, which shall include provision of weather-based controllers, rain shutoff devices, drip irrigation heads and recessed finish grade of all landscaped areas. Landscape and irrigation shall be consistent with the State Model Water Efficient Landscape Ordinance and the County landscape requirements. Plants installed will be arranged according to similar hydro

				zones and meet the required water budget for the site. Landscape areas used for water quality swales or infiltration areas shall have proper plants for saturated soils, drought tolerance and erosion control qualities.
S5	Finish grade of landscaped areas at a minimum of 1-2 inches below top of curb, sidewalk, or pavement	☒	☐	Landscaped areas will be depressed in order to increase retention of stormwater/irrigation water and promote infiltration. A note indicating finish grade of landscaped areas at a minimum of 1-2 inches below top of curb, sidewalk, or pavement to this effect is included on the grading and landscape plans. A copy of the landscape plans and grading plans are included in the Appendices K and L.
S6	Protect slopes and channels and provide energy dissipation (CASQA New Development BMP Handbook SD-10)	☒	☐	All slopes will be landscaped or provided with non-erosive covering for low water demand landscaping design. Rip-rap is proposed at the discharge points of the proposed vegetated swales or storm drain pipes into the proposed infiltration basins. Rip rap will be installed at each of the overflow spillways from the curbs and gutters into the infiltration basins. This will dissipate flows as they discharge into the proposed infiltration basins, to prevent erosion of the slopes of the basins.
S7	Covered dock areas (CASQA New Development BMP Handbook SD-31)	☐	☒	The project does not include docks.
S8	Covered maintenance bays with spill containment plans (CASQA New Development BMP Handbook SD-31)	☐	☒	The project does not included maintence facilities or bays.
S9	Vehicle wash areas with spill containment plans (CASQA New Development BMP Handbook SD-33)	☒	☐	Wash waters from this project's car wash facilities shall be directed to the sanitary sewer. Approved connection to the sewer will be provided. Independent washing of private vehicles by tenants, lessee's, etc. shall not be allowed.
S10	Covered outdoor processing areas (CASQA New Development BMP Handbook SD-36)	☐	☒	The project does not include outdoor processing.
S11	Equipment wash areas with spill containment plans (CASQA New Development BMP Handbook SD-33)	☐	☒	The project does not include equipment wash areas.
S12	Fues13ling areas (CASQA New Development BMP Handbook SD-30)	☒	☐	Fueling areas on the site shall be paved with PCC, have appropriate slope to prevent ponding, and must be separated from the rest of the site by a grade break that prevents run-on of storm water to the extent practicable and extend a minimum of 6.5 ft from the corner of each fuel dispenser. The canopy's minimum dimensions must be equal to or greater than the area within the grade break. The fueling pad shall be designed to flow to a dead-end sump.
S13	Hillside landscaping (CASQA New Development BMP Handbook SD-10)	☒	☐	A combination and/or of brow ditching, landscaping, channel vegetative lining, hydroseeding and mulching, jute netting, etc. shall be used on slopes to reduce erosion potential, runoff velocities and sediment transport from graded slopes.

S14	Wash water control for food preparation areas	☒	☐	Food preparation areas shall have either contained areas or sinks, each with sanitary sewer connections for disposal of wash waters containing kitchen and food wastes. Adequate signs shall be provided and appropriately placed stating the prohibition of discharging wash water to the storm drain system.
S15	Community car wash racks (CASQA New Development BMP Handbook SD-33)	☒	☐	Wash waters from this site shall be directed to the sanitary sewer. Approved connection to the sewer will be provided. Independent washing of private vehicles by tenants, lessee's, etc. shall not be allowed.

4.1.2 Preventative LID Site Design Practices

Site design practices associated with new LID requirements in the MS4 Permit should be considered in the earliest phases of a project. Preventative site design practices can result in smaller DCV for LID BMP and hydromodification control BMP by reducing runoff generation. Describe site design and drainage plan including:

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

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

Form 4.1-3 Preventative LID Site Design Practices Checklist
Site Design Practices *If yes, explain how preventative site design practice is addressed in project site plan. If no, other LID BMPs must be selected to meet targets*
Minimize impervious areas: Yes ☒ No ☐ Explanation: Impervious areas were minimized to the Maximum Extent Practicable (MEP). The project is designed for the storage of finished goods, truck trailer parking, and by design maximizes impervious areas. However, the project will utilize underground retention systems to collect runoff from impervious areas to maximize infiltration. In addition, the project will utilize additional onsite LID BMPs to collect runoff from impervious areas for treatment. The site has an impervious ratio of 85 percent.
Maximize natural infiltration capacity: Yes ☒ No ☐ Explanation: The proposed design has achieved a landscaped area of approximately 15 percent of the site area. The proposed development includes infiltration basins to utilize the site's natural infiltration capacity.

Preserve existing drainage patterns and time of concentration: Yes ☒ No ☐

Explanation: Existing project site flows are northeast to southwest for discharge into an existing storm drainage system. Flows of the proposed project will continue northeast to southwest. However, the time of concentration for the proposed project will be increased as 1) flows are routed around buildings and across parking lots increasing the length of travel and 2) onsite flows are directed to water quality infiltration basins that store runoff before discharge thus increasing the time of concentration. The existing drainage patterns are preserved however the time of concentration is not as it is increased. Post-development drainage patterns will mimic pre-development conditions. Stormwater will be retained in underground retention systems to assist in maintaining the time of concentration compared to existing condition. Furthermore, the detention system will retard developed condition stormwater discharge from a 100-year frequency storm to at or less that 90 percent of the existing condition 100-year storm event.

Disconnect impervious areas: Yes ☒ No ☐

Explanation: Roof drains and flows from other impervious surfaces such as sidewalks and parking areas will be discharged to landscaped areas prior to discharge to the infiltration basins as shown on the WQMP exhibit. Some roof drains will discharge next to sidewalks or parking lots and will not be possible to disconnect from the roof drain to the onsite area storm drains. Flows will be directed to vegetated swales and the infiltration basins. Multiple infiltration basins to disconnect impervious surfaces and retard peak flows are provided.[-

Protect existing vegetation and sensitive areas: Yes ☐ No ☒

Explanation: The site has been vacant for a number of years. Any existing vegetation will be grubbed (see Attachment A for recent site photos) and new landscaping will be provided as part of the project. The site is an infill project and is surrounded by public streets and highways on three of its four sides. The remaining side consits of residential and small commercial/industrial

Re-vegetate disturbed areas: Yes ☒ No ☐

Explanation: All areas not covered by buildings, sidewalks, parking and other impervious surfaces will be re-vegetated.

Minimize unnecessary compaction in stormwater retention/infiltration basin/trench areas: Yes ☒ No ☐

Explanation: Special care will be taken during construction of the infiltration basins so that the bottom of the basins will not be compacted. Special care will be taken during construction of the underground infiltration chambers so that the bottom of the chambers will not be compacted. This would include keeping heavy equipment away for the chamber infiltration areas and excavating the lower portion of the chamber trenches with a backhoe to minimize any compactive effort to the bottom of the trenches. Compaction of the material surrounding the chambers will be performed according to the manufacture's specifications. Grading of bioretention basins will be staked and minimumly sized equipment as necessary or backhoe's will be utilized to minimize basin compaction.

Utilize vegetated drainage swales in place of underground piping or imperviously lined swales: Yes ☒ No ☐

Explanation: A few vegetated drainage swales are used to convey flows from roofs, hardscape areas and parking lots to the water quality facilities. Where possible, roof drains and runoff from impervious surfaces will be directed to landscaped areas prior to entering an onsite storm drain through area drains.

Stake off areas that will be used for landscaping to minimize compaction during construction: Yes ☒ No ☐

Explanation: It will not be practical to stake off all the landscaped areas. However, prior to landscape installation, landscaped areas will be scarified, and soil amendments provided to assist in plan establishment and growth and minimize compaction. The chamber basins will be staked for construction. Small equipment or backhoes will be utilized to minimize compaction.

4.2 Project Performance Criteria

The purpose of this section of the Project WQMP is to establish targets for post-development hydrology based on performance criteria specified in the MS4 Permit. These targets include runoff volume for water quality control (referred to as LID design capture volume), and runoff volume, time of concentration, and peak runoff for protection of any downstream waterbody segments with a HCOC. If the project has more than one outlet for stormwater runoff, then complete additional versions of these forms for each DA / outlet.
Methods applied in the following forms include:

- For LID BMP Design Capture Volume (DCV), the San Bernardino County Stormwater Program requires use of the P_6 method (MS4 Permit Section XI.D.6a.ii) – Form 4.2-1
- For HCOC pre- and post-development hydrologic calculation, the San Bernardino County Stormwater Program requires the use of the Rational Method (San Bernardino County Hydrology Manual Section D). Forms 4.2-2 through Form 4.2-5 calculate hydrologic variables including runoff volume, time of concentration, and peak runoff from the project site pre- and post-development using the Hydrology Manual Rational Method approach. For projects greater than 640 acres (1.0 mi^2), the Rational Method and these forms should not be used. For such projects, the Unit Hydrograph Method (San Bernardino County Hydrology Manual Section E) shall be applied for hydrologic calculations for HCOC performance criteria.

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

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

1 Project area DA 1 (ft^2): 95,597	**2** Imperviousness after applying preventative site design practices (Imp%): 59	**3** Runoff Coefficient (Rc): _.4014 *$R_c = 0.858(Imp\%)^{\wedge 3}-0.78(Imp\%)^{\wedge 2}+0.774(Imp\%)+0.04$*
4 Determine 1-hour rainfall depth for a 2-year return period $P_{2yr\text{-}1hr}$ (in): .886 http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html		
5 Compute P_6, Mean 6-hr Precipitation (inches): 1.31 *P_6 = Item 4 *C_1, where C_1 is a function of site climatic region specified in Form 3-1 Item 1 (Valley = 1.4807; Mountain = 1.909; Desert = 1.2371)*		
6 Drawdown Rate *Use 48 hours as the default condition. Selection and use of the 24 hour drawdown time condition is subject to approval by the local jurisdiction. The necessary BMP footprint is a function of drawdown time. While shorter drawdown times reduce the performance criteria for LID BMP design capture volume, the depth of water that can be stored is also reduced.*		24-hrs ☐ 48-hrs ☒
7 Compute design capture volume, DCV (ft^3): 8,222 *DCV = 1/12 * [Item 1* Item 3 *Item 5 * C_2], where C_2 is a function of drawdown rate (24-hr = 1.582; 48-hr = 1.963)* *Compute separate DCV for each outlet from the project site per schematic drawn in Form 3-1 Item 2*		

Form 4.2-1 LID BMP Performance Criteria for Design Capture Volume (DA 2)

1 Project area DA 1 (ft^2): 77,367	**2** Imperviousness after applying preventative site design practices (Imp%): 50	**3** Runoff Coefficient (Rc): _..3393 *$R_c = 0.858(Imp\%)^{\wedge 3}-0.78(Imp\%)^{\wedge 2}+0.774(Imp\%)+0.04$*
4 Determine 1-hour rainfall depth for a 2-year return period $P_{2yr\text{-}1hr}$ (in): .886 http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html		
5 Compute P_6, Mean 6-hr Precipitation (inches): 1.31 *P_6 = Item 4 *C_1, where C_1 is a function of site climatic region specified in Form 3-1 Item 1 (Valley = 1.4807; Mountain = 1.909; Desert = 1.2371)*		
6 Drawdown Rate *Use 48 hours as the default condition. Selection and use of the 24 hour drawdown time condition is subject to approval by the local jurisdiction. The necessary BMP footprint is a function of drawdown time. While shorter drawdown times reduce the performance criteria for LID BMP design capture volume, the depth of water that can be stored is also reduced.*		24-hrs ☐ 48-hrs ☒
7 Compute design capture volume, DCV (ft^3): 5,624 *DCV = 1/12 * [Item 1* Item 3 *Item 5 * C_2], where C_2 is a function of drawdown rate (24-hr = 1.582; 48-hr = 1.963)* *Compute separate DCV for each outlet from the project site per schematic drawn in Form 3-1 Item 2*		

Form 4.2-1 LID BMP Performance Criteria for Design Capture Volume (DA 3)

1 Project area DA 1 (ft^2): 62,763	**2** Imperviousness after applying preventative site design practices (Imp%): 53	**3** Runoff Coefficient (Rc): _..3589 *$R_c = 0.858(Imp\%)^{\wedge 3}-0.78(Imp\%)^{\wedge 2}+0.774(Imp\%)+0.04$*
4 Determine 1-hour rainfall depth for a 2-year return period $P_{2yr\text{-}1hr}$ (in): .886 http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html		
5 Compute P_6, Mean 6-hr Precipitation (inches): 1.31 *P_6 = Item 4 *C_1, where C_1 is a function of site climatic region specified in Form 3-1 Item 1 (Valley = 1.4807; Mountain = 1.909; Desert = 1.2371)*		
6 Drawdown Rate *Use 48 hours as the default condition. Selection and use of the 24 hour drawdown time condition is subject to approval by the local jurisdiction. The necessary BMP footprint is a function of drawdown time. While shorter drawdown times reduce the performance criteria for LID BMP design capture volume, the depth of water that can be stored is also reduced.*		24-hrs ☐ 48-hrs ☒
7 Compute design capture volume, DCV (ft^3): 4,826 *DCV = 1/12 * [Item 1* Item 3 *Item 5 * C_2], where C_2 is a function of drawdown rate (24-hr = 1.582; 48-hr = 1.963)* *Compute separate DCV for each outlet from the project site per schematic drawn in Form 3-1 Item 2*		

Form 4.2-1 LID BMP Performance Criteria for Design Capture Volume (DA 4)

1 Project area DA 1 (ft^2): 44,507	**2** Imperviousness after applying preventative site design practices (Imp%): 51	**3** Runoff Coefficient (Rc): _..3457 *$R_c = 0.858(Imp\%)^{\wedge 3}-0.78(Imp\%)^{\wedge 2}+0.774(Imp\%)+0.04$*
4 Determine 1-hour rainfall depth for a 2-year return period $P_{2yr\text{-}1hr}$ (in): .886 http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html		
5 Compute P_6, Mean 6-hr Precipitation (inches): 1.31 *P_6 = Item 4 *C_1, where C_1 is a function of site climatic region specified in Form 3-1 Item 1 (Valley = 1.4807; Mountain = 1.909; Desert = 1.2371)*		
6 Drawdown Rate *Use 48 hours as the default condition. Selection and use of the 24 hour drawdown time condition is subject to approval by the local jurisdiction. The necessary BMP footprint is a function of drawdown time. While shorter drawdown times reduce the performance criteria for LID BMP design capture volume, the depth of water that can be stored is also reduced.*		24-hrs ☐ 48-hrs ☒
7 Compute design capture volume, DCV (ft^3): 3,297 *DCV = 1/12 * [Item 1* Item 3 *Item 5 * C_2], where C_2 is a function of drawdown rate (24-hr = 1.582; 48-hr = 1.963)* *Compute separate DCV for each outlet from the project site per schematic drawn in Form 3-1 Item 2*		

Form 4.2-1 LID BMP Performance Criteria for Design Capture Volume (DA 5)		
1 Project area DA 1 (ft^2): 46,773	2 Imperviousness after applying preventative site design practices (Imp%): 61	3 Runoff Coefficient (Rc): _..4167 *$R_c = 0.858(Imp\%)^{\wedge 3}-0.78(Imp\%)^{\wedge 2}+0.774(Imp\%)+0.04$*
4 Determine 1-hour rainfall depth for a 2-year return period $P_{2yr\text{-}1hr}$ (in): .886 http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html		
5 Compute P_6, Mean 6-hr Precipitation (inches): 1.31 *P_6 = Item 4 *C_1, where C_1 is a function of site climatic region specified in Form 3-1 Item 1 (Valley = 1.4807; Mountain = 1.909; Desert = 1.2371)*		
6 Drawdown Rate *Use 48 hours as the default condition. Selection and use of the 24 hour drawdown time condition is subject to approval by the local jurisdiction. The necessary BMP footprint is a function of drawdown time. While shorter drawdown times reduce the performance criteria for LID BMP design capture volume, the depth of water that can be stored is also reduced.*		24-hrs ☐ 48-hrs ☒
7 Compute design capture volume, DCV (ft^3): 4,176 *DCV = 1/12 * [Item 1* Item 3 *Item 5 * C_2], where C_2 is a function of drawdown rate (24-hr = 1.582; 48-hr = 1.963)* *Compute separate DCV for each outlet from the project site per schematic drawn in Form 3-1 Item 2*		

Form 4.2-1 LID BMP Performance Criteria for Design Capture Volume (DA 6)		
1 Project area DA 1 (ft^2): 45,100	2 Imperviousness after applying preventative site design practices (Imp%): 63	3 Runoff Coefficient (Rc): _.4326 *$R_c = 0.858(Imp\%)^{\wedge 3}-0.78(Imp\%)^{\wedge 2}+0.774(Imp\%)+0.04$*
4 Determine 1-hour rainfall depth for a 2-year return period $P_{2yr\text{-}1hr}$ (in): .886 http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html		
5 Compute P_6, Mean 6-hr Precipitation (inches): 1.31 *P_6 = Item 4 *C_1, where C_1 is a function of site climatic region specified in Form 3-1 Item 1 (Valley = 1.4807; Mountain = 1.909; Desert = 1.2371)*		
6 Drawdown Rate *Use 48 hours as the default condition. Selection and use of the 24 hour drawdown time condition is subject to approval by the local jurisdiction. The necessary BMP footprint is a function of drawdown time. While shorter drawdown times reduce the performance criteria for LID BMP design capture volume, the depth of water that can be stored is also reduced.*		24-hrs ☐ 48-hrs ☒
7 Compute design capture volume, DCV (ft^3): 4,181 *DCV = 1/12 * [Item 1* Item 3 *Item 5 * C_2], where C_2 is a function of drawdown rate (24-hr = 1.582; 48-hr = 1.963)* *Compute separate DCV for each outlet from the project site per schematic drawn in Form 3-1 Item 2*		

Form 4.2-1 LID BMP Performance Criteria for Design Capture Volume (DA 7)

1 Project area DA 1 (ft^2): 45,865	**2** Imperviousness after applying preventative site design practices (Imp%): 61	**3** Runoff Coefficient (Rc): _..4167 *$R_c = 0.858(Imp\%)^{\wedge 3}-0.78(Imp\%)^{\wedge 2}+0.774(Imp\%)+0.04$*
4 Determine 1-hour rainfall depth for a 2-year return period $P_{2yr\text{-}1hr}$ (in): .886 http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html		
5 Compute P_6, Mean 6-hr Precipitation (inches): 1.31 *P_6 = Item 4 *C_1, where C_1 is a function of site climatic region specified in Form 3-1 Item 1 (Valley = 1.4807; Mountain = 1.909; Desert = 1.2371)*		
6 Drawdown Rate *Use 48 hours as the default condition. Selection and use of the 24 hour drawdown time condition is subject to approval by the local jurisdiction. The necessary BMP footprint is a function of drawdown time. While shorter drawdown times reduce the performance criteria for LID BMP design capture volume, the depth of water that can be stored is also reduced.*		24-hrs ☐ 48-hrs ☒
7 Compute design capture volume, DCV (ft^3): 4,095 *DCV = 1/12 * [Item 1* Item 3 *Item 5 * C_2], where C_2 is a function of drawdown rate (24-hr = 1.582; 48-hr = 1.963)* *Compute separate DCV for each outlet from the project site per schematic drawn in Form 3-1 Item 2*		

Form 4.2-1 LID BMP Performance Criteria for Design Capture Volume (DA 8)

1 Project area DA 1 (ft^2): 180,531	**2** Imperviousness after applying preventative site design practices (Imp%): 66	**3** Runoff Coefficient (Rc): _..4577 *$R_c = 0.858(Imp\%)^{\wedge 3}-0.78(Imp\%)^{\wedge 2}+0.774(Imp\%)+0.04$*
4 Determine 1-hour rainfall depth for a 2-year return period $P_{2yr\text{-}1hr}$ (in): .886 http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html		
5 Compute P_6, Mean 6-hr Precipitation (inches): 1.31 *P_6 = Item 4 *C_1, where C_1 is a function of site climatic region specified in Form 3-1 Item 1 (Valley = 1.4807; Mountain = 1.909; Desert = 1.2371)*		
6 Drawdown Rate *Use 48 hours as the default condition. Selection and use of the 24 hour drawdown time condition is subject to approval by the local jurisdiction. The necessary BMP footprint is a function of drawdown time. While shorter drawdown times reduce the performance criteria for LID BMP design capture volume, the depth of water that can be stored is also reduced.*		24-hrs ☐ 48-hrs ☒
7 Compute design capture volume, DCV (ft^3): 17,709 *DCV = 1/12 * [Item 1* Item 3 *Item 5 * C_2], where C_2 is a function of drawdown rate (24-hr = 1.582; 48-hr = 1.963)* *Compute separate DCV for each outlet from the project site per schematic drawn in Form 3-1 Item 2*		

Form 4.2-1 LID BMP Performance Criteria for Design Capture Volume (DA 9)

1 Project area DA 1 (ft^2): 76,784	**2** Imperviousness after applying preventative site design practices (Imp%): 48	**3** Runoff Coefficient (Rc): _..3267 *$R_c = 0.858(Imp\%)^{\wedge 3}-0.78(Imp\%)^{\wedge 2}+0.774(Imp\%)+0.04$*
4 Determine 1-hour rainfall depth for a 2-year return period $P_{2yr\text{-}1hr}$ (in): .886 http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html		
5 Compute P_6, Mean 6-hr Precipitation (inches): 1.31 *P_6 = Item 4 *C_1, where C_1 is a function of site climatic region specified in Form 3-1 Item 1 (Valley = 1.4807; Mountain = 1.909; Desert = 1.2371)*		
6 Drawdown Rate *Use 48 hours as the default condition. Selection and use of the 24 hour drawdown time condition is subject to approval by the local jurisdiction. The necessary BMP footprint is a function of drawdown time. While shorter drawdown times reduce the performance criteria for LID BMP design capture volume, the depth of water that can be stored is also reduced.*		24-hrs ☐ 48-hrs ☒
7 Compute design capture volume, DCV (ft^3): 5,376 *DCV = 1/12 * [Item 1* Item 3 *Item 5 * C_2], where C_2 is a function of drawdown rate (24-hr = 1.582; 48-hr = 1.963)* *Compute separate DCV for each outlet from the project site per schematic drawn in Form 3-1 Item 2*		

Form 4.2-1 LID BMP Performance Criteria for Design Capture Volume (DA 10)

1 Project area DA 1 (ft^2): 171,562	**2** Imperviousness after applying preventative site design practices (Imp%): 68	**3** Runoff Coefficient (Rc): _..4754 *$R_c = 0.858(Imp\%)^{\wedge 3}-0.78(Imp\%)^{\wedge 2}+0.774(Imp\%)+0.04$*
4 Determine 1-hour rainfall depth for a 2-year return period $P_{2yr\text{-}1hr}$ (in): .886 http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html		
5 Compute P_6, Mean 6-hr Precipitation (inches): 1.31 *P_6 = Item 4 *C_1, where C_1 is a function of site climatic region specified in Form 3-1 Item 1 (Valley = 1.4807; Mountain = 1.909; Desert = 1.2371)*		
6 Drawdown Rate *Use 48 hours as the default condition. Selection and use of the 24 hour drawdown time condition is subject to approval by the local jurisdiction. The necessary BMP footprint is a function of drawdown time. While shorter drawdown times reduce the performance criteria for LID BMP design capture volume, the depth of water that can be stored is also reduced.*		24-hrs ☐ 48-hrs ☒
7 Compute design capture volume, DCV (ft^3): 17,479 *DCV = 1/12 * [Item 1* Item 3 *Item 5 * C_2], where C_2 is a function of drawdown rate (24-hr = 1.582; 48-hr = 1.963)* *Compute separate DCV for each outlet from the project site per schematic drawn in Form 3-1 Item 2*		

Form 4.2-1 LID BMP Performance Criteria for Design Capture Volume (DA 11)		
1 Project area DA 1 (ft^2): 249,184	2 Imperviousness after applying preventative site design practices (Imp%): 77	3 Runoff Coefficient (Rc): _..5652 *$R_c = 0.858(Imp\%)^{\wedge 3}-0.78(Imp\%)^{\wedge 2}+0.774(Imp\%)+0.04$*
4 Determine 1-hour rainfall depth for a 2-year return period $P_{2yr\text{-}1hr}$ (in): .886 http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html		
5 Compute P_6, Mean 6-hr Precipitation (inches): 1.31 *P_6 = Item 4 *C_1, where C_1 is a function of site climatic region specified in Form 3-1 Item 1 (Valley = 1.4807; Mountain = 1.909; Desert = 1.2371)*		
6 Drawdown Rate *Use 48 hours as the default condition. Selection and use of the 24 hour drawdown time condition is subject to approval by the local jurisdiction. The necessary BMP footprint is a function of drawdown time. While shorter drawdown times reduce the performance criteria for LID BMP design capture volume, the depth of water that can be stored is also reduced.*		24-hrs ☐ 48-hrs ☒
7 Compute design capture volume, DCV (ft^3): 30,182 *DCV = 1/12 * [Item 1* Item 3 *Item 5 * C_2], where C_2 is a function of drawdown rate (24-hr = 1.582; 48-hr = 1.963)* *Compute separate DCV for each outlet from the project site per schematic drawn in Form 3-1 Item 2*		

Form 4.2-1 LID BMP Performance Criteria for Design Capture Volume (DA 12)		
1 Project area DA 1 (ft^2): 64,268	2 Imperviousness after applying preventative site design practices (Imp%): 61	3 Runoff Coefficient (Rc): _..4167 *$R_c = 0.858(Imp\%)^{\wedge 3}-0.78(Imp\%)^{\wedge 2}+0.774(Imp\%)+0.04$*
4 Determine 1-hour rainfall depth for a 2-year return period $P_{2yr\text{-}1hr}$ (in): .886 http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html		
5 Compute P_6, Mean 6-hr Precipitation (inches): 1.31 *P_6 = Item 4 *C_1, where C_1 is a function of site climatic region specified in Form 3-1 Item 1 (Valley = 1.4807; Mountain = 1.909; Desert = 1.2371)*		
6 Drawdown Rate *Use 48 hours as the default condition. Selection and use of the 24 hour drawdown time condition is subject to approval by the local jurisdiction. The necessary BMP footprint is a function of drawdown time. While shorter drawdown times reduce the performance criteria for LID BMP design capture volume, the depth of water that can be stored is also reduced.*		24-hrs ☐ 48-hrs ☒
7 Compute design capture volume, DCV (ft^3): 5,732 *DCV = 1/12 * [Item 1* Item 3 *Item 5 * C_2], where C_2 is a function of drawdown rate (24-hr = 1.582; 48-hr = 1.963)* *Compute separate DCV for each outlet from the project site per schematic drawn in Form 3-1 Item 2*		

Form 4.2-1 LID BMP Performance Criteria for Design Capture Volume (DA 13)

1 Project area DA 1 (ft^2): 66,376	**2** Imperviousness after applying preventative site design practices (Imp%): 65	**3** Runoff Coefficient (Rc): _..4492 *$R_c = 0.858(Imp\%)^{\wedge 3}-0.78(Imp\%)^{\wedge 2}+0.774(Imp\%)+0.04$*
4 Determine 1-hour rainfall depth for a 2-year return period $P_{2yr\text{-}1hr}$ (in): .886 http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html		
5 Compute P_6, Mean 6-hr Precipitation (inches): 1.31 *P_6 = Item 4 *C_1, where C_1 is a function of site climatic region specified in Form 3-1 Item 1 (Valley = 1.4807; Mountain = 1.909; Desert = 1.2371)*		
6 Drawdown Rate *Use 48 hours as the default condition. Selection and use of the 24 hour drawdown time condition is subject to approval by the local jurisdiction. The necessary BMP footprint is a function of drawdown time. While shorter drawdown times reduce the performance criteria for LID BMP design capture volume, the depth of water that can be stored is also reduced.*		24-hrs ☐ 48-hrs ☒
7 Compute design capture volume, DCV (ft^3): 6,389 *DCV = 1/12 * [Item 1* Item 3 *Item 5 * C_2], where C_2 is a function of drawdown rate (24-hr = 1.582; 48-hr = 1.963)* *Compute separate DCV for each outlet from the project site per schematic drawn in Form 3-1 Item 2*		

Form 4.2-1 LID BMP Performance Criteria for Design Capture Volume (DA 14)

1 Project area DA 1 (ft^2): 138,3850	**2** Imperviousness after applying preventative site design practices (Imp%): 60	**3** Runoff Coefficient (Rc): _..4129 *$R_c = 0.858(Imp\%)^{\wedge 3}-0.78(Imp\%)^{\wedge 2}+0.774(Imp\%)+0.04$*
4 Determine 1-hour rainfall depth for a 2-year return period $P_{2yr\text{-}1hr}$ (in): .886 http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html		
5 Compute P_6, Mean 6-hr Precipitation (inches): 1.31 *P_6 = Item 4 *C_1, where C_1 is a function of site climatic region specified in Form 3-1 Item 1 (Valley = 1.4807; Mountain = 1.909; Desert = 1.2371)*		
6 Drawdown Rate *Use 48 hours as the default condition. Selection and use of the 24 hour drawdown time condition is subject to approval by the local jurisdiction. The necessary BMP footprint is a function of drawdown time. While shorter drawdown times reduce the performance criteria for LID BMP design capture volume, the depth of water that can be stored is also reduced.*		24-hrs ☐ 48-hrs ☒
7 Compute design capture volume, DCV (ft^3): 12,245 *DCV = 1/12 * [Item 1* Item 3 *Item 5 * C_2], where C_2 is a function of drawdown rate (24-hr = 1.582; 48-hr = 1.963)* *Compute separate DCV for each outlet from the project site per schematic drawn in Form 3-1 Item 2*		

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

Does project have the potential to cause or contribute to an HCOC in a downstream channel: Yes ☒ No ☐

Go to: *http://permitrack.sbcounty.gov/wap/*

If "Yes", then complete HCOC assessment of site hydrology for 2yr storm event using Forms 4.2-3 through 4.2-5 and insert results below

(Forms 4.2-3 through 4.2-5 may be replaced by computer software analysis based on the San Bernardino County Hydrology Manual)

If "No," then proceed to Section 4.3 Project Conformance Analysis

Condition	Runoff Volume (ft^3)	Time of Concentration (min)	Peak Runoff (cfs)
Pre-developed	**1** 121,515 *Form 4.2-3 Item 12*	**2** 19.26 *Form 4.2-4 Item 13*	**3** 25.9 *Form 4.2-5 Item 10*
Post-developed	**4** 269,707 *Form 4.2-3 Item 13*	**5** 10.24 *Form 4.2-4 Item 14*	**6** 41.2 *Form 4.2-5 Item 14*
Difference	**7** 148,192 *Item 4 – Item 1*	**8** 9.12 *Item 2 – Item 5*	**9** 15.3 *Item 6 – Item 3*
Difference (as % of pre-developed)	**10** 122% *Item 7 / Item 1*	**11** 47% *Item 8 / Item 2*	**12** 59% *Item 9 / Item 3*

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

Weighted Curve Number Determination for: Pre-developed DA	DMA A	DMA B	DMA C	DMA D	DMA E	DMA F	DMA G	DMA H
1a Land Cover type	Grass/ Orchard	Grass/ Orchard						
2a Hydrologic Soil Group (HSG)	A, D	A, D						
3a DMA Area, ft^2 *sum of areas of DMA should equal area of DA*	A=449,103 D=522,285 971,388	A=361,872 D=31,799 393,671						
4a Curve Number (CN) *use Items 1 and 2 to select the appropriate CN from Appendix C-2 of the TGD for WQMP*	A=43 D=82 CN=64	A=43 D=82 CN=46						
Weighted Curve Number Determination for: Post-developed DA								
1b Land Cover type	Commercial	Commercial						
2b Hydrologic Soil Group (HSG)	A, D	A						
3b DMA Area, ft^2 *sum of areas of DMA should equal area of DA*	A=522,319 D=414,221 936,540	A=428,630 428,630						
4b Curve Number (CN) *use Items 5 and 6 to select the appropriate CN from Appendix C-2 of the TGD for WQMP*	A=75 D=92 CN=83	A=75						

5 Pre-Developed area-weighted CN: 59	**7** Pre-developed soil storage capacity, S (in): 6.95 *S = (1000 / Item 5) - 10*	**9** Initial abstraction, I_a (in): 1.39 *I_a = 0.2 * Item 7*
6 Post-Developed area-weighted CN: 77	**8** Post-developed soil storage capacity, S (in): 2.99 *S = (1000 / Item 6) - 10*	**10** Initial abstraction, I_a (in): 060 *I_a = 0.2 * Item 8*

11 Precipitation for 2 yr, 24 hr storm (in): 4.70
Go to: http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html

12 Pre-developed Volume (ft^3): 121,515
*V_{pre} =(1 / 12) * (I01210*

13 Post-developed Volume (ft^3): 269,707
*V_{pre} =(1 / 12) * (Item sum of Item 3) * [(Item 11 – Item 10)^2 / ((Item 11 – Item 10 + Item 8)*

14 Volume Reduction needed to meet HCOC Requirement, (ft^3): 134,706
*V_{HCOC} = (Item 13 * 0.95) – Item 12*

Variables	Pre-developed DA1 *Use additional forms if there are more than 4 DMA*						
	DMA A	DMA B	DMA C	DMA D	DMA A	DMA B	DMA C
1 Length of flowpath (ft) *Use Form 3-2 Item 5 for pre-developed condition*	1,398	1,158					
2 Change in elevation (ft)	226	181					
3 Slope (ft/ft), *S_o = Item 2 / Item 1*	.16	.16					
4 Land cover	Grass/ Orchard	Grass/ Orchard			Commercial	Commercial	
5 Initial DMA Time of Concentration (min) *Appendix C-1 of the TGD for WQMP*	19.26	16.59			10.63	10.24	
6 Length of conveyance from DMA outlet to project site outlet (ft) *May be zero if DMA outlet is at project site outlet*							
7 Cross-sectional area of channel (ft^2)							
8 Wetted perimeter of channel (ft)							
9 Manning's roughness of channel (n)							
10 Channel flow velocity (ft/sec) *V_{fps} = (1.49 / Item 9) * (Item 7/Item 8)^0.67 * (Item 3)^0.5*							
11 Travel time to outlet (min) *T_t = Item 6 / (Item 10 * 60)*							
12 Total time of concentration (min) *T_c = Item 5 + Item 11*	19.26	16.59			10.63	10.24	

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

Compute peak runoff for pre- and post-developed conditions

Variables		Pre-developed DA to Project Outlet (*Use additional forms if more than 3 DMA)*			Post-developed DA to Project Outlet (*Use additional forms if more than 3 DMA)*		
		DMA A	DMA B	DMA C	DMA A	DMA B	DMA C
1 Rainfall Intensity for storm duration equal to time of concentration *I_{peak} = 10^(LOG Form 4.2-1 Item 4 - 0.6 LOG Form 4.2-4 Item 5 /60)*							
2 Drainage Area of each DMA (Acres) *For DMA with outlet at project site outlet, include upstream DMA (Using example schematic in Form 3-1, DMA A will include drainage from DMA C)*		31.34			31.34		
3 Ratio of pervious area to total area *For DMA with outlet at project site outlet, include upstream DMA (Using example schematic in Form 3-1, DMA A will include drainage from DMA C)*		.98			.63		
4 Pervious area infiltration rate (in/hr) *Use pervious area CN and antecedent moisture condition with Appendix C-3 of the TGD for WQMP*		.71			.42		
5 Maximum loss rate (in/hr) *F_m = Item 3 * Item 4* *Use area-weighted F_m from DMA with outlet at project site outlet, include upstream DMA (Using example schematic in Form 3-1, DMA A will include drainage from DMA C)*		.27			.21		
6 Peak Flow from DMA (cfs) *Q_p =Item 2 * 0.9 * (Item 1 - Item 5)*							
7 Time of concentration adjustment factor for other DMA to site discharge point *Form 4.2-4 Item 12 DMA / Other DMA upstream of site discharge point (If ratio is greater than 1.0, then use maximum value of 1.0)*	DMA A	*n/a*	1	1	*n/a*	1	1
	DMA B	1	*n/a*	1	1	*n/a*	1
	DMA C	1	1	*n/a*	1	1	*n/a*

8 Pre-developed Q_p at T_c for DMA A: *Q_p = Item 6_{DMAA} + [Item 6_{DMAB} * (Item 1_{DMAA} - Item 5_{DMAB})/(Item 1_{DMAB} - Item 5_{DMAB})* Item $7_{DMAA/2}$] + [Item 6_{DMAC} * (Item 1_{DMAA} - Item 5_{DMAC})/(Item 1_{DMAC} - Item 5_{DMAC})* Item $7_{DMAA/3}$]*	**9** Pre-developed Q_p at T_c for DMA B: *Q_p = Item 6_{DMAB} + [Item 6_{DMAA} * (Item 1_{DMAB} - Item 5_{DMAA})/(Item 1_{DMAA} - Item 5_{DMAA})* Item $7_{DMAB/1}$] + [Item 6_{DMAC} * (Item 1_{DMAB} - Item 5_{DMAC})/(Item 1_{DMAC} - Item 5_{DMAC})* Item $7_{DMAB/3}$]*	**10** Pre-developed Q_p at T_c for DMA C: *Q_p = Item 6_{DMAC} + [Item 6_{DMAA} * (Item 1_{DMAC} - Item 5_{DMAA})/(Item 1_{DMAA} - Item 5_{DMAA})* Item $7_{DMAC/1}$] + [Item 6_{DMAB} * (Item 1_{DMAC} - Item 5_{DMAB})/(Item 1_{DMAB} - Item 5_{DMAB})* Item $7_{DMAC/2}$]*
10 Peak runoff from pre-developed condition confluence analysis (cfs): 25.9 *Maximum of Item 8, 9, and 10 (including additional forms as needed)*		
11 Post-developed Q_p at T_c for DMA A: *Same as Item 8 for post-developed values*	**12** Post-developed Q_p at T_c for DMA B: *Same as Item 9 for post-developed values*	**13** Post-developed Q_p at T_c for DMA C: *Same as Item 10 for post-developed values*
14 Peak runoff from post-developed condition confluence analysis (cfs): 41.2 *Maximum of Item 11, 12, and 13 (including additional forms as needed)*		
15 Peak runoff reduction needed to meet HCOC Requirement (cfs): 13.24 *$Q_{p\text{-}HCOC}$ = (Item 14 * 0.95) – Item 10*		

4.3 Project Conformance Analysis

Complete the following forms for each project site DA to document that the proposed LID BMPs conform to the project DCV developed to meet performance criteria specified in the MS4 Permit (WQMP Template Section 4.2). For the LID DCV, the forms are ordered according to hierarchy of BMP selection as required by the MS4 Permit (see Section 5.3.1 in the TGD for WQMP). The forms compute the following for on-site LID BMP:

- Site Design and Hydrologic Source Controls (Form 4.3-2)
- Retention and Infiltration (Form 4.3-3)
- Harvested and Use (Form 4.3-4) or
- Biotreatment (Form 4.3-5).

At the end of each form, additional fields facilitate the determination of the extent of mitigation provided by the specific BMP category, allowing for use of the next category of BMP in the hierarchy, if necessary.
The first step in the analysis, using Section 5.3.2.1 of the TGD for WQMP, is to complete Forms 4.3-1 and 4.3-3) to determine if retention and infiltration BMPs are infeasible for the project. For each feasibility criterion in Form 4.3-1, if the answer is “Yes,” provide all study findings that includes relevant calculations, maps, data sources, etc. used to make the determination of infeasibility.
Next, complete Forms 4.3-2 and 4.3-4 to determine the feasibility of applicable HSC and harvest and use BMPs, and, if their implementation is feasible, the extent of mitigation of the DCV.
If no site constraints exist that would limit the type of BMP to be implemented in a DA, evaluate the use of combinations of LID BMPs, including all applicable HSC BMPs to maximize on-site retention of the DCV. If no combination of BMP can mitigate the entire DCV, implement the single BMP type, or combination of BMP types, that maximizes on-site retention of the DCV within the minimum effective area.
If the combination of LID HSC, retention and infiltration, and harvest and use BMPs are unable to mitigate the entire DCV, then biotreatment BMPs may be implemented by the project proponent. If biotreatment BMPs are used, then they must be sized to provide sufficient capacity for effective treatment of the remainder of the volume-based performance criteria that cannot be achieved with LID BMPs (TGD for WQMP Section 5.4.4.2). Under no circumstances shall any portion of the DCV be released from the site without effective mitigation and/or treatment.

Form 4.3-1 Infiltration BMP Feasibility (DA 1)

Feasibility Criterion – Complete evaluation for each DA on the Project Site

[1] Would infiltration BMP pose significant risk for groundwater related concerns? Yes ☐ No ☒
Refer to Section 5.3.2.1 of the TGD for WQMP

If Yes, Provide basis: (attach)

[2] Would installation of infiltration BMP significantly increase the risk of geotechnical hazards? Yes ☐ No ☒
(Yes, if the answer to any of the following questions is yes, as established by a geotechnical expert):

- The location is less than 50 feet away from slopes steeper than 15 percent
- The location is less than eight feet from building foundations or an alternative setback.
- A study certified by a geotechnical professional or an available watershed study determines that stormwater infiltration would result in significantly increased risks of geotechnical hazards.

If Yes, Provide basis: (attach)

[3] Would infiltration of runoff on a Project site violate downstream water rights? Yes ☐ No ☒

If Yes, Provide basis: (attach)

[4] Is proposed infiltration facility located on hydrologic soil group (HSG) D soils or does the site geotechnical investigation indicate presence of soil characteristics, which support categorization as D soils? Yes ☐ No ☒

If Yes, Provide basis: (attach)

[5] Is the design infiltration rate, after accounting for safety factor of 2.0, below proposed facility less than 0.3 in/hr (accounting for soil amendments)? Yes ☒ No ☐

If Yes, Provide basis: (attach) SEE BELOW

[6] Would on-site infiltration or reduction of runoff over pre-developed conditions be partially or fully inconsistent with watershed management strategies as defined in the WAP, or impair beneficial uses? Yes ☐ No ☒
See Section 3.5 of the TGD for WQMP and WAP

If Yes, Provide basis: (attach)

[7] Any answer from Item 1 through Item 3 is "Yes": Yes ☐ No ☒
If yes, infiltration of any volume is not feasible onsite. Proceed to Form 4.3-4, Harvest and Use BMP. If no, then proceed to Item 8 below.

[8] Any answer from Item 4 through Item 6 is "Yes": Yes ☒ No ☐
If yes, infiltration is permissible but is not required to be considered. Proceed to Form 4.3-2, Hydrologic Source Control BMP.
If no, then proceed to Item 9, below.

[9] All answers to Item 1 through Item 6 are "No": No
Infiltration of the full DCV is potentially feasible, LID infiltration BMP must be designed to infiltrate the full DCV to the MEP.
Proceed to Form 4.3-2, Hydrologic Source Control BMP.

The infiltration rate based upon the NRCS permeability at a depth of 20 to 50 feet is for soil type A is 92 micrometers per second. This equates to 1.09 inches per hour. Disccusion with the County indicates the ifiltration rate to be used without infiltration testing is to be 0.33 in/hr for soils type A and 0 in/hr for soil type D.

4.3.1 Site Design Hydrologic Source Control BMP

Section XI.E. of the Permit emphasizes the use of LID preventative measures; and the use of LID HSC BMPs reduces the portion of the DCV that must be addressed in downstream BMPs. Therefore, all applicable HSC shall be provided except where they are mutually exclusive with each other, or with other BMPs. Mutual exclusivity may result from overlapping BMP footprints such that either would be potentially feasible by itself, but both could not be implemented. Please note that while there are no numeric standards regarding the use of HSC, if a project cannot feasibly meet BMP sizing requirements or cannot fully address HCOCs, feasibility of all applicable HSC must be part of demonstrating that the BMP system has been designed to retain the maximum feasible portion of the DCV. Complete Form 4.3-2 to identify and calculate estimated retention volume from implementing site design HSC BMP. Refer to Section 5.4.1 in the TGD for more detailed guidance.

Form 4.3-2 Site Design Hydrologic Source Control BMPs (All DA's)			
1 Implementation of Impervious Area Dispersion BMP (i.e. routing runoff from impervious to pervious areas), excluding impervious areas planned for routing to on-lot infiltration BMP: Yes ☐ No ☒ *If yes, complete Items 2-5; If no, proceed to Item 6*	DA DMA BMP Type	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
2 Total impervious area draining to pervious area (ft^2)			
3 Ratio of pervious area receiving runoff to impervious area			
4 Retention volume achieved from impervious area dispersion (ft^3) *V = Item2 * Item 3 * (0.5/12), assuming retention of 0.5 inches of runoff*			
5 Sum of retention volume achieved from impervious area dispersion (ft^3): 0 $V_{retention}$ *=Sum of Item 4 for all BMPs*			
6 Implementation of Localized On-lot Infiltration BMPs (e.g. on-lot rain gardens): Yes ☐ No ☒ *If yes, complete Items 7-13 for aggregate of all on-lot infiltration BMP in each DA; If no, proceed to Item 14*	DA DMA BMP Type	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
7 Ponding surface area (ft^2)			
8 Ponding depth (ft)			
9 Surface area of amended soil/gravel (ft^2)			
10 Average depth of amended soil/gravel (ft)			
11 Average porosity of amended soil/gravel			
12 Retention volume achieved from on-lot infiltration (ft^3) $V_{retention}$ *= (Item 7 *Item 8) + (Item 9 * Item 10 * Item 11)*			
13 Runoff volume retention from on-lot infiltration (ft^3): 0 $V_{retention}$ *=Sum of Item 12 for all BMPs*			

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

14 Implementation of evapotranspiration BMP (green, brown, or blue roofs): Yes ☐ No ☒ *If yes, complete Items 15-20. If no, proceed to Item 21*	DA DMA BMP Type	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
15 Rooftop area planned for ET BMP (ft^2)			
16 Average wet season ET demand (in/day) *Use local values, typical ~ 0.1*			
17 Daily ET demand (ft^3/day) *Item 15 * (Item 16 / 12)*			
18 Drawdown time (hrs) *Copy Item 6 in Form 4.2-1*			
19 Retention Volume (ft^3) *$V_{retention}$ = Item 17 * (Item 18 / 24)*			
20 Runoff volume retention from evapotranspiration BMPs (ft^3): 0 *$V_{retention}$ =Sum of Item 19 for all BMPs*			
21 Implementation of Street Trees: Yes ☐ No ☒ *If yes, complete Items 22-25. If no, proceed to Item 26*	DA DMA BMP Type	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
22 Number of Street Trees			
23 Average canopy cover over impervious area (ft^2)			
24 Runoff volume retention from street trees (ft^3) *$V_{retention}$ = Item 22 * Item 23 * (0.05/12) assume runoff retention of 0.05 inches*			
25 Runoff volume retention from street tree BMPs (ft^3): 0 *$V_{retention}$ = Sum of Item 24 for all BMPs*			
26 Implementation of residential rain barrel/cisterns: Yes☐ No ☒ *If yes, complete Items 27-29; If no, proceed to Item 30*	DA DMA BMP Type	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
27 Number of rain barrels/cisterns			
28 Runoff volume retention from rain barrels/cisterns (ft^3) *$V_{retention}$ = Item 27 * 3*			
29 Runoff volume retention from residential rain barrels/Cisterns (ft3): *$V_{retention}$ =Sum of Item 28 for all BMPs*			
30 Total Retention Volume from Site Design Hydrologic Source Control BMPs: 0 *Sum of Items 5, 13, 20, 25 and 29*			

4.3.2 Infiltration BMPs

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

If site constraints limit the use of BMPs to a single type and implementation of retention and infiltration BMPs mitigate no more than 40% of the DCV, then they are considered infeasible, and the Project Proponent may evaluate the effectiveness of BMPs lower in the LID hierarchy of use (Section 5.5.1 of the TGD for WQMP) If implementation of infiltrations BMPs is feasible as determined using Form 4.3-1, then LID infiltration BMPs shall be implemented to the MEP (section 4.1 of the TGD for WQMP).

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

1 Remaining LID DCV not met by site design HSC BMP (ft^3): 8,222 *V_{unmet} = Form 4.2-1 Item 7 - Form 4.3-2 Item 30*				
BMP Type *Use columns to the right to compute runoff volume retention from proposed infiltration BMP (select BMP from Table 5-4 in TGD for WQMP) - Use additional forms for more BMPs*	DA 1 DMA A BMP Type Roadside Bioretention	DA 1 DMA B BMP Type Infiltration Basin	DA 1 DMA C BMP Type Infiltration Basin	DA 1 DMA D BMP Type DCV Storage Under Chambers
2 Infiltration rate of underlying soils (in/hr) *See Section 5.4.2 and Appendix D of the TGD for WQMP for minimum requirements for assessment methods*	.33	.33	.33	.33
3 Infiltration safety factor *See TGD Section 5.4.2 and Appendix D*	2.2	2.2	2.2	2.2
4 Design percolation rate (in/hr) *P_{design} = Item 2 / Item 3*	.15	.15	.15	.15
5 Ponded water drawdown time (hr) *Copy Item 6 in Form 4.2-1*	48	48	48	48
6 Maximum ponding depth (ft) *BMP specific, see Table 5-4 of the TGD for WQMP for BMP design details*	2.28	2.28	2.28	2.28
7 Ponding Depth (ft) *d_{BMP} = Minimum of (1/12*Item 4*Item 5) or Item 6*	.6	.6	.6	.6
8 Infiltrating surface area, SA_{BMP} (ft^2) *the lesser of the area needed for infiltration of full DCV or minimum space requirements from Table 5.7 of the TGD for WQMP*	750	1200	866	4400
9 Amended soil depth, d_{media} (ft) *Only included in certain BMP types, see Table 5-4 in the TGD for WQMP for reference to BMP design details*	-	2	2	-
10 Amended soil porosity	-	.33	.33	-
11 Gravel depth, d_{media} (ft) *Only included in certain BMP types, see Table 5-4 of the TGD for WQMP for BMP design details*	4	4	4	2
12 Gravel porosity	.4	.4	.4	.4
13 Duration of storm as basin is filling (hrs) *Typical ~ 3hrs*	3	3	3	3
14 Above Ground Retention Volume (ft^3) *$V_{retention}$ = Item 8 * [Item7 + (Item 9 * Item 10) + (Item 11 * Item 12) + (Item 13 * (Item 4 / 12))]*	1228	2757	1989	3520
15 Underground Retention Volume (ft^3) *Volume determined using manufacturer's specifications and calculations*				
16 Total Retention Volume from LID Infiltration BMPs: *9,494 (Sum of Items 14 and 15 for all infiltration BMP included in plan)*				
17 Fraction of DCV achieved with infiltration BMP: % 115% *Retention% = Item 16 / Form 4.2-1 Item 7*				
18 Is full LID DCV retained onsite with combination of hydrologic source control and LID retention/infiltration BMPs? Yes ☒ No ☐				

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

Form 4.3-3 Infiltration LID BMP - including underground BMPs (DA 2)

1 Remaining LID DCV not met by site design HSC BMP (ft^3): 5,624 *V_{unmet} = Form 4.2-1 Item 7 - Form 4.3-2 Item 30*				
BMP Type *Use columns to the right to compute runoff volume retention from proposed infiltration BMP (select BMP from Table 5-4 in TGD for WQMP) - Use additional forms for more BMPs*	DA 1 DMA A BMP Type Infiltration Basin	DA 1 DMA B BMP Type DCV Under Chambers	DA 1 DMA C BMP Type Infiltration Basin	DA 1 DMA D BMP Type Infiltration Basin
2 Infiltration rate of underlying soils (in/hr) *See Section 5.4.2 and Appendix D of the TGD for WQMP for minimum requirements for assessment methods*	.33	.33		
3 Infiltration safety factor *See TGD Section 5.4.2 and Appendix D*	2.2	2.2		
4 Design percolation rate (in/hr) *P_{design} = Item 2 / Item 3*	.15	.15		
5 Ponded water drawdown time (hr) *Copy Item 6 in Form 4.2-1*	48	45		
6 Maximum ponding depth (ft) *BMP specific, see Table 5-4 of the TGD for WQMP for BMP design details*	.6	.6		
7 Ponding Depth (ft) *d_{BMP} = Minimum of (1/12*Item 4*Item 5) or Item 6*	.6	.6		
8 Infiltrating surface area, SA_{BMP} (ft^2) *the lesser of the area needed for infiltration of full DCV or minimum space requirements from Table 5.7 of the TGD for WQMP*	1500	3510		
9 Amended soil depth, d_{media} (ft) *Only included in certain BMP types, see Table 5-4 in the TGD for WQMP for reference to BMP design details*	2	-		
10 Amended soil porosity	.33	-		
11 Gravel depth, d_{media} (ft) *Only included in certain BMP types, see Table 5-4 of the TGD for WQMP for BMP design details*	4	2		
12 Gravel porosity	.4	.4		
13 Duration of storm as basin is filling (hrs) *Typical ~ 3hrs*	3	3		
14 Above Ground Retention Volume (ft^3) *$V_{retention}$ = Item 8 * [Item7 + (Item 9 * Item 10) + (Item 11 * Item 12) + (Item 13 * (Item 4 / 12))]*	3446	2808		
15 Underground Retention Volume (ft^3) *Volume determined using manufacturer's specifications and calculations*				
16 Total Retention Volume from LID Infiltration BMPs: *6,254 (Sum of Items 14 and 15 for all infiltration BMP included in plan)*				

17	Fraction of DCV achieved with infiltration BMP: % 111% *Retention% = Item 16 / Form 4.2-1 Item 7*
18	Is full LID DCV retained onsite with combination of hydrologic source control and LID retention/infiltration BMPs? Yes ☒ No ☐ *If yes, demonstrate conformance using Form 4.3-10; If no, then reduce Item 3, Factor of Safety to 2.0 and increase Item 8, Infiltrating Surface Area, such that the portion of the site area used for retention and infiltration BMPs equals or exceeds the minimum effective area thresholds (Table 5-7 of the TGD for WQMP) for the applicable category of development and repeat all above calculations.*

Form 4.3-3 Infiltration LID BMP - including underground BMPs (DA 7)

1 Remaining LID DCV not met by site design HSC BMP (ft^3): 4,095 *V_{unmet} = Form 4.2-1 Item 7 - Form 4.3-2 Item 30*

BMP Type *Use columns to the right to compute runoff volume retention from proposed infiltration BMP (select BMP from Table 5-4 in TGD for WQMP) - Use additional forms for more BMPs*	DA 1 DMA A BMP Type Infiltration Basin	DA 1 DMA B BMP Type Infiltration Basin	DA 1 DMA C BMP Type Infiltration Basin	DA 1 DMA D BMP Type Infiltration Basin
2 Infiltration rate of underlying soils (in/hr) *See Section 5.4.2 and Appendix D of the TGD for WQMP for minimum requirements for assessment methods*	1.3	1.3		
3 Infiltration safety factor *See TGD Section 5.4.2 and Appendix D*	2.2	2.2		
4 Design percolation rate (in/hr) *P_{design} = Item 2 / Item 3*	.15	.15		
5 Ponded water drawdown time (hr) *Copy Item 6 in Form 4.2-1*	48	48		
6 Maximum ponding depth (ft) *BMP specific, see Table 5-4 of the TGD for WQMP for BMP design details*	.6	.6		
7 Ponding Depth (ft) *d_{BMP} = Minimum of (1/12*Item 4*Item 5) or Item 6*	.6	.6		
8 Infiltrating surface area, SA_{BMP} (ft^2) *the lesser of the area needed for infiltration of full DCV or minimum space requirements from Table 5.7 of the TGD for WQMP*	2404	1105		
9 Amended soil depth, d_{media} (ft) *Only included in certain BMP types, see Table 5-4 in the TGD for WQMP for reference to BMP design details*	2	2		
10 Amended soil porosity	.33	.33		
11 Gravel depth, d_{media} (ft) *Only included in certain BMP types, see Table 5-4 of the TGD for WQMP for BMP design details*	4	4		
12 Gravel porosity	.4	.4		
13 Duration of storm as basin is filling (hrs) *Typical ~ 3hrs*	3	3		
14 Above Ground Retention Volume (ft^3) *$V_{retention}$ = Item 8 * [Item7 + (Item 9 * Item 10) + (Item 11 * Item 12) + (Item 13 * (Item 4 / 12))]*	3937	2837		

15 Underground Retention Volume (ft^3) *Volume determined using manufacturer's specifications and calculations*	
16 Total Retention Volume from LID Infiltration BMPs: *6774 (Sum of Items 14 and 15 for all infiltration BMP included in plan)*	
17 Fraction of DCV achieved with infiltration BMP: % 138% *Retention% = Item 16 / Form 4.2-1 Item 7*	
18 Is full LID DCV retained onsite with combination of hydrologic source control and LID retention/infiltration BMPs? Yes ☒ No ☐ *If yes, demonstrate conformance using Form 4.3-10; If no, then reduce Item 3, Factor of Safety to 2.0 and increase Item 8, Infiltrating Surface Area, such that the portion of the site area used for retention and infiltration BMPs equals or exceeds the minimum effective area thresholds (Table 5-7 of the TGD for WQMP) for the applicable category of development and repeat all above calculations.*	

Form 4.3-3 Infiltration LID BMP - including underground BMPs (DA 8)

1 Remaining LID DCV not met by site design HSC BMP (ft^3): 17,709 *V_{unmet} = Form 4.2-1 Item 7 - Form 4.3-2 Item 30*

BMP Type *Use columns to the right to compute runoff volume retention from proposed infiltration BMP (select BMP from Table 5-4 in TGD for WQMP) - Use additional forms for more BMPs*	DA 1 DMA A BMP Type Infiltration Basin	DA 1 DMA B BMP Type Infiltration Basin	DA 1 DMA C BMP Type DCV Under Chambers	DA 1 DMA D BMP Type DCV Under Chambers
2 Infiltration rate of underlying soils (in/hr) *See Section 5.4.2 and Appendix D of the TGD for WQMP for minimum requirements for assessment methods*	.33	.33	.33	
3 Infiltration safety factor *See TGD Section 5.4.2 and Appendix D*	2.2	2.2	2.2	
4 Design percolation rate (in/hr) *P_{design} = Item 2 / Item 3*	.15	.15	.15	
5 Ponded water drawdown time (hr) *Copy Item 6 in Form 4.2-1*	48	48	48	
6 Maximum ponding depth (ft) *BMP specific, see Table 5-4 of the TGD for WQMP for BMP design details*	.6	.6	.6	
7 Ponding Depth (ft) *d_{BMP} = Minimum of (1/12*Item 4*Item 5) or Item 6*	.6	.6	.6	
8 Infiltrating surface area, SA_{BMP} (ft^2) *the lesser of the area needed for infiltration of full DCV or minimum space requirements from Table 5.7 of the TGD for WQMP*	3000	3000	8000	
9 Amended soil depth, d_{media} (ft) *Only included in certain BMP types, see Table 5-4 in the TGD for WQMP for reference to BMP design details*	2	2	-	
10 Amended soil porosity	.33	.33	-	
11 Gravel depth, d_{media} (ft) *Only included in certain BMP types, see Table 5-4 of the TGD for WQMP for BMP design details*	4	4	2	

12 Gravel porosity	.4	.4	.4	
13 Duration of storm as basin is filling (hrs) *Typical ~ 3hrs*	3	3	3	
14 Above Ground Retention Volume (ft^3) *$V_{retention}$ = Item 8 * [Item7 + (Item 9 * Item 10) + (Item 11 * Item 12) + (Item 13 * (Item 4 / 12))]*	6892	6892	6400	
15 Underground Retention Volume (ft^3) *Volume determined using manufacturer's specifications and calculations*				
16 Total Retention Volume from LID Infiltration BMPs: *20,184 (Sum of Items 14 and 15 for all infiltration BMP included in plan)*				
17 Fraction of DCV achieved with infiltration BMP: % 114% *Retention% = Item 16 / Form 4.2-1 Item 7*				
18 Is full LID DCV retained onsite with combination of hydrologic source control and LID retention/infiltration BMPs? Yes ☒ No ☐ *If yes, demonstrate conformance using Form 4.3-10; If no, then reduce Item 3, Factor of Safety to 2.0 and increase Item 8, Infiltrating Surface Area, such that the portion of the site area used for retention and infiltration BMPs equals or exceeds the minimum effective area thresholds (Table 5-7 of the TGD for WQMP) for the applicable category of development and repeat all above calculations.*				

Form 4.3-3 Infiltration LID BMP - including underground BMPs (DA 9)

1 Remaining LID DCV not met by site design HSC BMP (ft^3): 5,376 *V_{unmet} = Form 4.2-1 Item 7 - Form 4.3-2 Item 30*

BMP Type *Use columns to the right to compute runoff volume retention from proposed infiltration BMP (select BMP from Table 5-4 in TGD for WQMP) - Use additional forms for more BMPs*	DA 1 DMA A BMP Type Infiltration Basin	DA 1 DMA B BMP Type DCV Under Chamber Storage	DA 1 DMA C BMP Type Infiltration Basin	DA 1 DMA D BMP Type Infiltration Basin
2 Infiltration rate of underlying soils (in/hr) *See Section 5.4.2 and Appendix D of the TGD for WQMP for minimum requirements for assessment methods*	.33	.33		
3 Infiltration safety factor *See TGD Section 5.4.2 and Appendix D*	2.2	2.2		
4 Design percolation rate (in/hr) *P_{design} = Item 2 / Item 3*	.15	.15		
5 Ponded water drawdown time (hr) *Copy Item 6 in Form 4.2-1*	48	48		
6 Maximum ponding depth (ft) *BMP specific, see Table 5-4 of the TGD for WQMP for BMP design details*	.6	.6		
7 Ponding Depth (ft) *d_{BMP} = Minimum of (1/12*Item 4*Item 5) or Item 6*	.6	.6		
8 Infiltrating surface area, SA_{BMP} (ft^2) *the lesser of the area needed for infiltration of full DCV or minimum space requirements from Table 5.7 of the TGD for WQMP*	2700	3510		
9 Amended soil depth, d_{media} (ft) *Only included in certain BMP types, see Table 5-4 in the TGD for WQMP for reference to BMP design details*	2	-		
10 Amended soil porosity	.33	-		

11 Gravel depth, d_{media} (ft) *Only included in certain BMP types, see Table 5-4 of the TGD for WQMP for BMP design details*	4	2		
12 Gravel porosity	.4	.4		
13 Duration of storm as basin is filling (hrs) *Typical ~ 3hrs*	3	3		
14 Above Ground Retention Volume (ft^3) $V_{retention}$ *= Item 8 * [Item7 + (Item 9 * Item 10) + (Item 11 * Item 12) + (Item 13 * (Item 4 / 12))]*	6102	2808		
15 Underground Retention Volume (ft^3) *Volume determined using manufacturer's specifications and calculations*				
16 Total Retention Volume from LID Infiltration BMPs: *8,910 (Sum of Items 14 and 15 for all infiltration BMP included in plan)*				
17 Fraction of DCV achieved with infiltration BMP: % 165% *Retention% = Item 16 / Form 4.2-1 Item 7*				
18 Is full LID DCV retained onsite with combination of hydrologic source control and LID retention/infiltration BMPs? Yes ☒ No ☐ *If yes, demonstrate conformance using Form 4.3-10; If no, then reduce Item 3, Factor of Safety to 2.0 and increase Item 8, Infiltrating Surface Area, such that the portion of the site area used for retention and infiltration BMPs equals or exceeds the minimum effective area thresholds (Table 5-7 of the TGD for WQMP) for the applicable category of development and repeat all above calculations.*				

Form 4.3-3 Infiltration LID BMP - including underground BMPs (DA 10)

1 Remaining LID DCV not met by site design HSC BMP (ft^3): 17,479 V_{unmet} *= Form 4.2-1 Item 7 - Form 4.3-2 Item 30*

BMP Type *Use columns to the right to compute runoff volume retention from proposed infiltration BMP (select BMP from Table 5-4 in TGD for WQMP) - Use additional forms for more BMPs*	DA 1 DMA A BMP Type Infiltration Basin	DA 1 DMA B BMP Type DCV Under chamber Storage	DA 1 DMA C BMP Type Infiltration Basin	DA 1 DMA D BMP Type Infiltration Basin
2 Infiltration rate of underlying soils (in/hr) *See Section 5.4.2 and Appendix D of the TGD for WQMP for minimum requirements for assessment methods*	.33	.33	.33	
3 Infiltration safety factor *See TGD Section 5.4.2 and Appendix D*	2.2	2.2	2.2	
4 Design percolation rate (in/hr) P_{design} *= Item 2 / Item 3*	.15	.15	.15	
5 Ponded water drawdown time (hr) *Copy Item 6 in Form 4.2-1*	48	48	48	
6 Maximum ponding depth (ft) *BMP specific, see Table 5-4 of the TGD for WQMP for BMP design details*	.6	.6	.6	
7 Ponding Depth (ft) d_{BMP} *= Minimum of (1/12*Item 4*Item 5) or Item 6*	.6	.6	.6	
8 Infiltrating surface area, SA_{BMP} (ft^2) *the lesser of the area needed for infiltration of full DCV or minimum space requirements from Table 5.7 of the TGD for WQMP*	1000	7500	4391	

9 Amended soil depth, d_{media} (ft) *Only included in certain BMP types, see Table 5-4 in the TGD for WQMP for reference to BMP design details*	2	-	2	
10 Amended soil porosity	.33	-	.33	
11 Gravel depth, d_{media} (ft) *Only included in certain BMP types, see Table 5-4 of the TGD for WQMP for BMP design details*	4	2	4	
12 Gravel porosity	.4	.4	.4	
13 Duration of storm as basin is filling (hrs) *Typical ~ 3hrs*	3	3	3	
14 Above Ground Retention Volume (ft^3) *$V_{retention}$ = Item 8 * [Item7 + (Item 9 * Item 10) + (Item 11 * Item 12) + (Item 13 * (Item 4 / 12))]*	2297	6000	10089	
15 Underground Retention Volume (ft^3) *Volume determined using manufacturer's specifications and calculations*				
16 Total Retention Volume from LID Infiltration BMPs: *18,386 (Sum of Items 14 and 15 for all infiltration BMP included in plan)*				
17 Fraction of DCV achieved with infiltration BMP: % 105% *Retention% = Item 16 / Form 4.2-1 Item 7*				
18 Is full LID DCV retained onsite with combination of hydrologic source control and LID retention/infiltration BMPs? Yes ☒ No ☐ *If yes, demonstrate conformance using Form 4.3-10; If no, then reduce Item 3, Factor of Safety to 2.0 and increase Item 8, Infiltrating Surface Area, such that the portion of the site area used for retention and infiltration BMPs equals or exceeds the minimum effective area thresholds (Table 5-7 of the TGD for WQMP) for the applicable category of development and repeat all above calculations.*				

Form 4.3-3 Infiltration LID BMP - including underground BMPs (DA 11)

1 Remaining LID DCV not met by site design HSC BMP (ft^3): 30,182 *V_{unmet} = Form 4.2-1 Item 7 - Form 4.3-2 Item 30*				
BMP Type *Use columns to the right to compute runoff volume retention from proposed infiltration BMP (select BMP from Table 5-4 in TGD for WQMP) - Use additional forms for more BMPs*	DA 1 DMA A BMP Type Infiltration Basin	DA 1 DMA B BMP Type Infiltration Basin	DA 1 DMA C BMP Type Under Chamber Storage	DA 1 DMA D BMP Type Infiltration Basin
2 Infiltration rate of underlying soils (in/hr) *See Section 5.4.2 and Appendix D of the TGD for WQMP for minimum requirements for assessment methods*	.33	.33		
3 Infiltration safety factor *See TGD Section 5.4.2 and Appendix D*	2.2	2.2		
4 Design percolation rate (in/hr) *P_{design} = Item 2 / Item 3*	.15	.15		
5 Ponded water drawdown time (hr) *Copy Item 6 in Form 4.2-1*	48	48		
6 Maximum ponding depth (ft) *BMP specific, see Table 5-4 of the TGD for WQMP for BMP design details*	.6	.6		
7 Ponding Depth (ft) *d_{BMP} = Minimum of (1/12*Item 4*Item 5) or Item 6*	.6	.6		
8 Infiltrating surface area, SA_{BMP} (ft^2) *the lesser of the area needed for infiltration of full DCV or minimum space requirements from Table 5.7 of the TGD for WQMP*	5775	11550		
9 Amended soil depth, d_{media} (ft) *Only included in certain BMP types, see Table 5-4 in the TGD for WQMP for reference to BMP design details*	2	-		
10 Amended soil porosity	.33	-		
11 Gravel depth, d_{media} (ft) *Only included in certain BMP types, see Table 5-4 of the TGD for WQMP for BMP design details*	4	3		
12 Gravel porosity	.4	.4		
13 Duration of storm as basin is filling (hrs) *Typical ~ 3hrs*	3	3		
14 Above Ground Retention Volume (ft^3) *$V_{retention}$ = Item 8 * [Item7 + (Item 9 * Item 10) + (Item 11 * Item 12) + (Item 13 * (Item 4 / 12))]*	13268	13860		
15 Underground Retention Volume (ft^3) *Volume determined using manufacturer's specifications and calculations*				
16 Total Retention Volume from LID Infiltration BMPs: *27,128 (Sum of Items 14 and 15 for all infiltration BMP included in plan)*				
17 Fraction of DCV achieved with infiltration BMP: % 90% *Retention% = Item 16 / Form 4.2-1 Item 7*				
18 Is full LID DCV retained onsite with combination of hydrologic source control and LID retention/infiltration BMPs? Yes ☒ No ☐ *If yes, demonstrate conformance using Form 4.3-10; If no, then reduce Item 3, Factor of Safety to 2.0 and increase Item 8, Infiltrating Surface Area, such that the portion of the site area used for retention and infiltration BMPs equals or exceeds the minimum effective area thresholds (Table 5-7 of the TGD for WQMP) for the applicable category of development and repeat all above calculations.*				

Form 4.3-3 Infiltration LID BMP - including underground BMPs (DA 14)				
1 Remaining LID DCV not met by site design HSC BMP (ft^3): 12,245 *V_{unmet} = Form 4.2-1 Item 7 - Form 4.3-2 Item 30*				
BMP Type *Use columns to the right to compute runoff volume retention from proposed infiltration BMP (select BMP from Table 5-4 in TGD for WQMP) - Use additional forms for more BMPs*	DA 1 DMA A BMP Type Roadside Infiltration Basin	DA 1 DMA B BMP Type Infiltration Basin	DA 1 DMA C BMP Type Storage Under Chambers	DA 1 DMA D BMP Type Infiltration Basin
2 Infiltration rate of underlying soils (in/hr) *See Section 5.4.2 and Appendix D of the TGD for WQMP for minimum requirements for assessment methods*	.33	.33	.33	
3 Infiltration safety factor *See TGD Section 5.4.2 and Appendix D*	2.2	2.2	2.2	
4 Design percolation rate (in/hr) *P_{design} = Item 2 / Item 3*	.15	.15	0.15	
5 Ponded water drawdown time (hr) *Copy Item 6 in Form 4.2-1*	48	48	48	
6 Maximum ponding depth (ft) *BMP specific, see Table 5-4 of the TGD for WQMP for BMP design details*	.6	.6	.6	
7 Ponding Depth (ft) *d_{BMP} = Minimum of (1/12*Item 4*Item 5) or Item 6*	.6	.6	.6	
8 Infiltrating surface area, SA_{BMP} (ft^2) *the lesser of the area needed for infiltration of full DCV or minimum space requirements from Table 5.7 of the TGD for WQMP*	750	3000	7040	
9 Amended soil depth, d_{media} (ft) *Only included in certain BMP types, see Table 5-4 in the TGD for WQMP for reference to BMP design details*	-	2	-	
10 Amended soil porosity	-	.33	-	
11 Gravel depth, d_{media} (ft) *Only included in certain BMP types, see Table 5-4 of the TGD for WQMP for BMP design details*	4	4	2	
12 Gravel porosity	.4	.4	.4	
13 Duration of storm as basin is filling (hrs) *Typical ~ 3hrs*	3	3	3	
14 Above Ground Retention Volume (ft^3) *$V_{retention}$ = Item 8 * [Item7 + (Item 9 * Item 10) + (Item 11 * Item 12) + (Item 13 * (Item 4 / 12))]*	1228	6892	5632	
15 Underground Retention Volume (ft^3) *Volume determined using manufacturer's specifications and calculations*				
16 Total Retention Volume from LID Infiltration BMPs: *13,752 (Sum of Items 14 and 15 for all infiltration BMP included in plan)*				
17 Fraction of DCV achieved with infiltration BMP: % 112% *Retention% = Item 16 / Form 4.2-1 Item 7*				

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

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

4.3.3 Harvest and Use BMP

Harvest and use BMP may be considered if the full LID DCV cannot be met by maximizing infiltration BMPs. Use Form 4.3-4 to compute on-site retention of runoff from proposed harvest and use BMPs.
Volume retention estimates for harvest and use BMPs are sensitive to the on-site demand for captured stormwater. Since irrigation water demand is low in the wet season, when most rainfall events occur in San Bernardino County, the volume of water that can be used within a specified drawdown period is relatively low. The bottom portion of Form 4.3-4 facilitates the necessary computations to show infeasibility if a minimum incremental benefit of 40 percent of the LID DCV would not be achievable with MEP implementation of on-site harvest and use of stormwater (Section 5.5.4 of the TGD for WQMP).

Form 4.3-4 Harvest and Use BMPs (All DA's)

1 Remaining LID DCV not met by site design HSC or infiltration BMP (ft^3): 0
V_{unmet} = Form 4.2-1 Item 7 - Form 4.3-2 Item 30 – Form 4.3-3 Item 16

BMP Type(s) *Compute runoff volume retention from proposed harvest and use BMP (Select BMPs from Table 5-4 of the TGD for WQMP) - Use additional forms for more BMPs*	DA DMA BMP Type	DA DMA BMP Type	DA DMA BMP Type *(Use additional forms for more BMPs)*
2 Describe cistern or runoff detention facility			
3 Storage volume for proposed detention type (ft^3) *Volume of cistern*			
4 Landscaped area planned for use of harvested stormwater (ft^2)			
5 Average wet season daily irrigation demand (in/day) Use local values, typical ~ 0.1 in/day			
6 Daily water demand (ft^3/day) *Item 4 * (Item 5 / 12)*			
7 Drawdown time (hrs) *Copy Item 6 from Form 4.2-1*			
8 Retention Volume (ft^3) *$V_{retention}$ = Minimum of (Item 3) or (Item 6 * (Item 7 / 24))*			

9 Total Retention Volume (ft^3) from Harvest and Use BMP 0 *Sum of Item 8 for all harvest and use BMP included in plan*

10 Is the full DCV retained with a combination of LID HSC, retention and infiltration, and harvest & use BMPs? Yes ☐ No ☐

If yes, demonstrate conformance using Form 4.3-10. If no, then re-evaluate combinations of all LID BMP and optimize their implementation such that the maximum portion of the DCV is retained on-site (using a single BMP type or combination of BMP types). If the full DCV cannot be mitigated after this optimization process, proceed to Section 4.3.4.

4.3.4 Biotreatment BMP

Biotreatment BMPs may be considered if the full LID DCV cannot be met by maximizing retention and infiltration, and harvest and use BMPs. A key consideration when using biotreatment BMP is the effectiveness of the proposed BMP in addressing the pollutants of concern for the project (see Table 5-5 of the TGD for WQMP).
Use Form 4.3-5 to summarize the potential for volume based and/or flow based biotreatment options to biotreat the remaining unmet LID DCV w. Biotreatment computations are included as follows:

- Use Form 4.3-6 to compute biotreatment in small volume based biotreatment BMP (e.g. bioretention w/underdrains);
- Use Form 4.3-7 to compute biotreatment in large volume based biotreatment BMP (e.g. constructed wetlands);
- Use Form 4.3-8 to compute sizing criteria for flow-based biotreatment BMP (e.g. bioswales)

Form 4.3-5 Selection and Evaluation of Biotreatment BMP (All DA's)

1 Remaining LID DCV not met by site design HSC, infiltration, or harvest and use BMP for potential biotreatment (ft^3): 0 *Form 4.2-1 Item 7 - Form 4.3-2 Item 30 – Form 4.3-3 Item 16- Form 4.3-4 Item 9*	List pollutants of concern *Copy from Form 2.3-1.*	
2 Biotreatment BMP Selected *(Select biotreatment BMP(s) necessary to ensure all pollutants of concern are addressed through Unit Operations and Processes, described in Table 5-5 of the TGD for WQMP)*	Volume-based biotreatment *Use Forms 4.3-6 and 4.3-7 to compute treated volume*	Flow-based biotreatment *Use Form 4.3-8 to compute treated volume*
	☐ Bioretention with underdrain ☐ Planter box with underdrain ☐ Constructed wetlands ☐ Wet extended detention ☐ Dry extended detention	☐ Vegetated swale ☐ Vegetated filter strip ☐ Proprietary biotreatment
3 Volume biotreated in volume based biotreatment BMP (ft^3): *Form 4.3-6 Item 15 + Form 4.3-7 Item 13*	**4** Compute remaining LID DCV with implementation of volume based biotreatment BMP (ft^3): *Item 1 – Item 3*	**5** Remaining fraction of LID DCV for sizing flow based biotreatment BMP: % *Item 4 / Item 1*
6 Flow-based biotreatment BMP capacity provided (cfs): 0 *Use Figure 5-2 of the TGD for WQMP to determine flow capacity required to provide biotreatment of remaining percentage of unmet LID DCV (Item 5), for the project's precipitation zone (Form 3-1 Item 1)*		
7 Metrics for MEP determination: • Provided a WQMP with the portion of site area used for suite of LID BMP equal to minimum thresholds in Table 5-7 of the TGD for WQMP for the proposed category of development: ☐ *If maximized on-site retention BMPs is feasible for partial capture, then LID BMP implementation must be optimized to retain and infiltrate the maximum portion of the DCV possible within the prescribed minimum effective area. The remaining portion of the DCV shall then be mitigated using biotreatment BMP.*		

Form 4.3-6 Volume Based Biotreatment (DA 3) Bioretention and Planter Boxes with Underdrains

Biotreatment BMP Type *(Bioretention w/underdrain, planter box w/underdrain, other comparable BMP)*	DA 3 DMA A BMP Type Bio Retention w/ Underdrain	DA 3 DMA B BMP Type Storage Under chamber w/Underdrain	DA DMA BMP Type *(Use additional forms for more BMPs)*
1 Pollutants addressed with BMP *List all pollutant of concern that will be effectively reduced through specific Unit Operations and Processes described in Table 5-5 of the TGD for WQMP*	Pathogens, Metals, Sediment, Suspended solids, Organic Compounds, Pesticides, Herbicides, Oil & Grease	Pathogens, Metals, Sediment, Suspended solids, Organic Compounds, Pesticides, Herbicides, Oil & Grease	
2 Amended soil infiltration rate *Typical ~ 5.0*	5	5	
3 Amended soil infiltration safety factor *Typical ~ 2.0*	2	2	
4 Amended soil design percolation rate (in/hr) P_{design} *= Item 2 / Item 3*	2.5	2.5	
5 Ponded water drawdown time (hr) *Copy Item 6 from Form 4.2-1*	48	48	
6 Maximum ponding depth (ft) *see Table 5-6 of the TGD for WQMP for reference to BMP design details*	10	10	
7 Ponding Depth (ft) d_{BMP} *= Minimum of (1/12 * Item 4 * Item 5) or Item 6*	10	10	
8 Amended soil surface area (ft^2)	2060	2860	
9 Amended soil depth (ft) *see Table 5-6 of the TGD for WQMP for reference to BMP design details*	2	-	
10 Amended soil porosity, *n*	.33	-	
11 Gravel depth (ft) *see Table 5-6 of the TGD for WQMP for reference to BMP design details*	4	2	
12 Gravel porosity, *n*	.4	.4	
13 Duration of storm as basin is filling (hrs) *Typical ~ 3hrs*	3	3	
14 Biotreated Volume (ft^3) $V_{biotreated}$ *= Item 8 * [(Item 7/2) + (Item 9 * Item 10) +(Item 11 * Item 12) + (Item 13 * (Item 4 / 12))]*	4655	2888	
15 Total biotreated volume from bioretention and/or planter box with underdrains BMP: 7543 *Sum of Item 14 for all volume-based BMPs included in this form*			

Form 4.3-6 Volume Based Biotreatment (DA 4) Bioretention and Planter Boxes with Underdrains			
Biotreatment BMP Type *(Bioretention w/underdrain, planter box w/underdrain, other comparable BMP)*	DA 3 DMA BMP Type Bio Retention w/ Underdrain	DA 3 DMA BMP Type Storage Under chamber w/Underdrain	DA DMA BMP Type *(Use additional forms for more BMPs)*
1 Pollutants addressed with BMP *List all pollutant of concern that will be effectively reduced through specific Unit Operations and Processes described in Table 5-5 of the TGD for WQMP*	Pathogens, Metals, Sediment, Suspended solids, Organic Compounds, Pesticides, Herbicides, Oil & Grease		
2 Amended soil infiltration rate *Typical ~ 5.0*	5		
3 Amended soil infiltration safety factor *Typical ~ 2.0*	2		
4 Amended soil design percolation rate (in/hr) P_{design} *= Item 2 / Item 3*	2.5		
5 Ponded water drawdown time (hr) *Copy Item 6 from Form 4.2-1*	48		
6 Maximum ponding depth (ft) *see Table 5-6 of the TGD for WQMP for reference to BMP design details*	10		
7 Ponding Depth (ft) d_{BMP} *= Minimum of (1/12 * Item 4 * Item 5) or Item 6*	10		
8 Amended soil surface area (ft^2)	2810		
9 Amended soil depth (ft) *see Table 5-6 of the TGD for WQMP for reference to BMP design details*	2		
10 Amended soil porosity, *n*	.33		
11 Gravel depth (ft) *see Table 5-6 of the TGD for WQMP for reference to BMP design details*	4		
12 Gravel porosity, *n*	.4		
13 Duration of storm as basin is filling (hrs) *Typical ~ 3hrs*	3		
14 Biotreated Volume (ft^3) $V_{biotreated}$ *= Item 8 * [(Item 7/2) + (Item 9 * Item 10) +(Item 11 * Item 12) + (Item 13 * (Item 4 / 12))]*	6350		
15 Total biotreated volume from bioretention and/or planter box with underdrains BMP: 6350 *Sum of Item 14 for all volume-based BMPs included in this form*			

Form 4.3-6 Volume Based Biotreatment (DA 5) Bioretention and Planter Boxes with Underdrains			
Biotreatment BMP Type *(Bioretention w/underdrain, planter box w/underdrain, other comparable BMP)*	DA 3 DMA BMP Type Bio Retention w/ Underdrain	DA 3 DMA BMP Type Storage Under chamber w/Underdrain	DA DMA BMP Type *(Use additional forms for more BMPs)*
1 Pollutants addressed with BMP *List all pollutant of concern that will be effectively reduced through specific Unit Operations and Processes described in Table 5-5 of the TGD for WQMP*	Pathogens, Metals, Sediment, Suspended solids, Organic Compounds, Pesticides, Herbicides, Oil & Grease		
2 Amended soil infiltration rate *Typical ~ 5.0*	5		
3 Amended soil infiltration safety factor *Typical ~ 2.0*	2		
4 Amended soil design percolation rate (in/hr) P_{design} *= Item 2 / Item 3*	2.5		
5 Ponded water drawdown time (hr) *Copy Item 6 from Form 4.2-1*	10		
6 Maximum ponding depth (ft) *see Table 5-6 of the TGD for WQMP for reference to BMP design details*	10		
7 Ponding Depth (ft) d_{BMP} *= Minimum of (1/12 * Item 4 * Item 5) or Item 6*	0		
8 Amended soil surface area (ft^2)	2818		
9 Amended soil depth (ft) *see Table 5-6 of the TGD for WQMP for reference to BMP design details*	2		
10 Amended soil porosity, *n*	.33		
11 Gravel depth (ft) *see Table 5-6 of the TGD for WQMP for reference to BMP design details*	4		
12 Gravel porosity, *n*	.4		
13 Duration of storm as basin is filling (hrs) *Typical ~ 3hrs*	3		
14 Biotreated Volume (ft^3) $V_{biotreated}$ *= Item 8 * [(Item 7/2) + (Item 9 * Item 10) +(Item 11 * Item 12) + (Item 13 * (Item 4 / 12))]*	6475		
15 Total biotreated volume from bioretention and/or planter box with underdrains BMP: 6350 *Sum of Item 14 for all volume-based BMPs included in this form*			

Form 4.3-6 Volume Based Biotreatment (DA 6) Bioretention and Planter Boxes with Underdrains			
Biotreatment BMP Type *(Bioretention w/underdrain, planter box w/underdrain, other comparable BMP)*	DA 6 DMA A BMP Type Bio Retention w/ Underdrain	DA DMA BMP Type Storage Under chamber w/Underdrain	DA DMA BMP Type *(Use additional forms for more BMPs)*
1 Pollutants addressed with BMP *List all pollutant of concern that will be effectively reduced through specific Unit Operations and Processes described in Table 5-5 of the TGD for WQMP*	Pathogens, Metals, Sediment, Suspended solids, Organic Compounds, Pesticides, Herbicides, Oil & Grease		
2 Amended soil infiltration rate *Typical ~ 5.0*	5		
3 Amended soil infiltration safety factor *Typical ~ 2.0*	2		
4 Amended soil design percolation rate (in/hr) P_{design} *= Item 2 / Item 3*	2.5		
5 Ponded water drawdown time (hr) *Copy Item 6 from Form 4.2-1*	48		
6 Maximum ponding depth (ft) *see Table 5-6 of the TGD for WQMP for reference to BMP design details*	10		
7 Ponding Depth (ft) d_{BMP} *= Minimum of (1/12 * Item 4 * Item 5) or Item 6*	10		
8 Amended soil surface area (ft^2)	2189		
9 Amended soil depth (ft) *see Table 5-6 of the TGD for WQMP for reference to BMP design details*	2		
10 Amended soil porosity, *n*	-		
11 Gravel depth (ft) *see Table 5-6 of the TGD for WQMP for reference to BMP design details*	4		
12 Gravel porosity, *n*	.4		
13 Duration of storm as basin is filling (hrs) *Typical ~ 3hrs*	3		
14 Biotreated Volume (ft^3) $V_{biotreated}$ *= Item 8 * [(Item 7/2) + (Item 9 * Item 10) +(Item 11 * Item 12) + (Item 13 * (Item 4 / 12))]*	5029		
15 Total biotreated volume from bioretention and/or planter box with underdrains BMP: 5029 *Sum of Item 14 for all volume-based BMPs included in this form*			

Form 4.3-6 Volume Based Biotreatment (DA 11) Bioretention and Planter Boxes with Underdrains			
Biotreatment BMP Type *(Bioretention w/underdrain, planter box w/underdrain, other comparable BMP)*	DA 11 DMA C BMP Type Bio Retention w/ Underdrain in Parking Area	DA 11 DMA D BMP Type Bio Retention w/ Underdrain in Parking Area	DA 11 DMA E BMP Type Bio Retention w/ Underdrain in Parking Area
1 Pollutants addressed with BMP *List all pollutant of concern that will be effectively reduced through specific Unit Operations and Processes described in Table 5-5 of the TGD for WQMP*	Pathogens, Metals, Sediment, Suspended solids, Organic Compounds, Pesticides, Herbicides, Oil & Grease	Pathogens, Metals, Sediment, Suspended solids, Organic Compounds, Pesticides, Herbicides, Oil & Grease	Pathogens, Metals, Sediment, Suspended solids, Organic Compounds, Pesticides, Herbicides, Oil & Grease
2 Amended soil infiltration rate *Typical ~ 5.0*	5	5	5
3 Amended soil infiltration safety factor *Typical ~ 2.0*	2	2	2
4 Amended soil design percolation rate (in/hr) P_{design} *= Item 2 / Item 3*	2.5	2.5	2.5
5 Ponded water drawdown time (hr) *Copy Item 6 from Form 4.2-1*	48	48	48
6 Maximum ponding depth (ft) *see Table 5-6 of the TGD for WQMP for reference to BMP design details*	10	10	10
7 Ponding Depth (ft) d_{BMP} *= Minimum of (1/12 * Item 4 * Item 5) or Item 6*	10	10	10
8 Amended soil surface area (ft^2)	750	750	1500
9 Amended soil depth (ft) *see Table 5-6 of the TGD for WQMP for reference to BMP design details*	2	2	2
10 Amended soil porosity, *n*	-	-	.33
11 Gravel depth (ft) *see Table 5-6 of the TGD for WQMP for reference to BMP design details*	4	4	4
12 Gravel porosity, *n*	.4	.4	.4
13 Duration of storm as basin is filling (hrs) *Typical ~ 3hrs*	3	3	3
14 Biotreated Volume (ft^3) $V_{biotreated}$ *= Item 8 * [(Item 7/2) + (Item 9 * Item 10) +(Item 11 * Item 12) + (Item 13 * (Item 4 / 12))]*	1723	1723	3446
15 Total biotreated volume from bioretention and/or planter box with underdrains BMP: 6914 *Sum of Item 14 for all volume-based BMPs included in this form*			

Form 4.3-7 Volume Based Biotreatment (All DA's) – Constructed Wetlands and Extended Detention

Biotreatment BMP Type *Constructed wetlands, extended wet detention, extended dry detention, or other comparable proprietary BMP. If BMP includes multiple modules (e.g. forebay and main basin), provide separate estimates for storage and pollutants treated in each module.*	DA DMA BMP Type		DA DMA BMP Type *(Use additional forms for more BMPs)*	
	Forebay	Basin	Forebay	Basin
1 Pollutants addressed with BMP forebay and basin *List all pollutant of concern that will be effectively reduced through specific Unit Operations and Processes described in Table 5-5 of the TGD for WQMP*				
2 Bottom width (ft)				
3 Bottom length (ft)				
4 Bottom area (ft^2) A_{bottom} = *Item 2 * Item 3*				
5 Side slope (ft/ft)				
6 Depth of storage (ft)				
7 Water surface area (ft^2) $A_{surface}$ =*(Item 2 + (2 * Item 5 * Item 6)) * (Item 3 + (2 * Item 5 * Item 6))*				
8 Storage volume (ft^3) *For BMP with a forebay, ensure fraction of total storage is within ranges specified in BMP specific fact sheets, see Table 5-6 of the TGD for WQMP for reference to BMP design details* V =*Item 6 / 3 * [Item 4 + Item 7 + (Item 4 * Item 7)^0.5]*				
9 Drawdown Time (hrs) *Copy Item 6 from Form 2.1*				
10 Outflow rate (cfs) Q_{BMP} = *(Item* $8_{forebay}$ *+ Item* 8_{basin}*) / (Item 9 * 3600)*				
11 Duration of design storm event (hrs)				
12 Biotreated Volume (ft^3) $V_{biotreated}$ = *(Item* $8_{forebay}$ *+ Item* 8_{basin}*) +(Item 10 * Item 11 * 3600)*				
13 Total biotreated volume from constructed wetlands, extended dry detention, or extended wet detention : 0 *(Sum of Item 12 for all BMP included in plan)*				

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

4.3.5 Conformance Summary

Complete Form 4.3-9 to demonstrate how on-site LID DCV is met with proposed site design hydrologic source control, infiltration, harvest and use, and/or biotreatment BMP. The bottom line of the form is used to describe the basis for infeasibility determination for on-site LID BMP to achieve full LID DCV and provides methods for computing remaining volume to be addressed in an alternative compliance plan. If the project has more than one outlet, then complete additional versions of this form for each outlet.

Form 4.3-9 Conformance Summary and Alternative Compliance Volume Estimate (DA 1)

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

2 On-site retention with site design hydrologic source control LID BMP (ft^3): 0 *Copy Item 30 in Form 4.3-2*

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

4 On-site retention with LID harvest and use BMP (ft^3): 0 *Copy Item 9 in Form 4.3-4*

5 On-site biotreatment with volume based biotreatment BMP (ft^3): 0 *Copy Item 3 in Form 4.3-5*

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

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

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

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

- Combination of HSC, retention and infiltration, harvest and use, and biotreatment BMPs provide less than full LID DCV capture: ☐
  Checked yes for Form 4.3-5 Item 7, Item 6 is zero, and sum of Items 2, 3, 4, and 5 is less than Item 1. If so, apply water quality credits and calculate volume for alternative compliance, V_{alt} *= (Item 1 – Item 2 – Item 3 – Item 4 – Item 5) * (100 - Form 2.4-1 Item 2)%*
- An approved Watershed Action Plan (WAP) demonstrates that water quality and hydrologic impacts of urbanization are more effective when managed in at an off-site facility: ☐
  Attach appropriate WAP section, including technical documentation, showing effectiveness comparisons for the project site and regional watershed

4.3.6 Hydromodification Control BMP

Use Form 4.3-10 to compute the remaining runoff volume retention, after LID BMP are implemented, needed to address HCOC, and the increase in time of concentration and decrease in peak runoff necessary to meet targets for protection of waterbodies with a potential HCOC. Describe hydromodification control BMP that address HCOC, which may include off-site BMP and/or in-stream controls. Section 5.6 of the TGD for WQMP provides additional details on selection and evaluation of hydromodification control BMP.

Form 4.3-10 Hydromodification Control BMPs (DA 1)	
1 Volume reduction needed for HCOC performance criteria (ft^3): 134,707 *(Form 4.2-2 Item 4 * 0.95) – Form 4.2-2 Item 1*	**2** On-site retention with site design hydrologic source control, infiltration, and harvest and use LID BMP (ft^3): 158,260 *Sum of Form 4.3-9 Items 2, 3, and 4* *Evaluate option to increase implementation of on-site retention in Forms 4.3-2, 4.3-3, and 4.3-4 in excess of LID DCV toward achieving HCOC volume reduction*
3 Remaining volume for HCOC volume capture (ft^3): 0 *Item 1 – Item 2*	**4** Volume capture provided by incorporating additional on-site or off-site retention BMPs (ft^3): N/A *Existing downstream BMP may be used to demonstrate additional volume capture (if so, attach to this WQMP a hydrologic analysis showing how the additional volume would be retained during a 2-yr storm event for the regional watershed)*
5 If Item 4 is less than Item 3, incorporate in-stream controls on downstream waterbody segment to prevent impacts due to hydromodification ☐ *Attach in-stream control BMP selection and evaluation to this WQMP*	
6 Is Form 4.2-2 Item 11 less than or equal to 5%: Yes ☐ No ☒ *If yes, HCOC performance criteria is achieved. If no, select one or more mitigation options below:* • Demonstrate increase in time of concentration achieved by proposed LID site design, LID BMP, and additional on-site or off-site retention BMP ☒ *BMP upstream of a waterbody segment with a potential HCOC may be used to demonstrate increased time of concentration through hydrograph attenuation (if so, show that the hydraulic residence time provided in BMP for a 2-year storm event is equal or greater than the addition time of concentration requirement in Form 4.2-4 Item 15)* • Increase time of concentration by preserving pre-developed flow path and/or increase travel time by reducing slope and increasing cross-sectional area and roughness for proposed on-site conveyance facilities ☐ • Incorporate appropriate in-stream controls for downstream waterbody segment to prevent impacts due to hydromodification, in a plan approved and signed by a licensed engineer in the State of California ☐	
7 Form 4.2-2 Item 12 less than or equal to 5%: Yes ☐ No ☒ *If yes, HCOC performance criteria is achieved. If no, select one or more mitigation options below:* • Demonstrate reduction in peak runoff achieved by proposed LID site design, LID BMPs, and additional on-site or off-site retention BMPs ☒ *BMPs upstream of a waterbody segment with a potential HCOC may be used to demonstrate additional peak runoff reduction through hydrograph attenuation (if so, attach to this WQMP, a hydrograph analysis showing how the peak runoff would be reduced during a 2-yr storm event)* • Incorporate appropriate in-stream controls for downstream waterbody segment to prevent impacts due to hydromodification, in a plan approved and signed by a licensed engineer in the State of California ☐	

To meet HCOC requirements, a mitigation volume must be achieved by using LID and/or hydromodification mitigation BMPs. The HCOC mitigation volume is approximately 134,710 cu-ft. The total volume being retained by the infiltration basins prior to release is 158,260 cu-ft which is greater than the HCOC mitigation volume needed. As a result, the mitigation volume has been contained by the proposed BMPs. Since the mitigation volume has been met, it is physically impossible for the project to avoid increasing the time of concentration and reducing peak runoff by more than five percent of pre-development conditions (see Section 5.6.1 of the Technical Guidance Document for more information). The increase in volume of storm flows due to the proposed development is mitigated by the proposed infiltration BMPs.

4.4 Alternative Compliance Plan (if applicable)

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

- On-site structural treatment control BMP - All treatment control BMP should be located as close to possible to the pollutant sources and should not be located within receiving waters;
- Off-site structural treatment control BMP - Pollutant removal should occur prior to discharge of runoff to receiving waters;
- Urban runoff fund or In-lieu program, if available

Depending upon the proposed alternative compliance plan, approval by the executive officer may or may not be required (see Section 6 of the TGD for WQMP).

Section 5 Inspection and Maintenance Responsibility for Post Construction BMP

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

Form 5-1 BMP Inspection and Maintenance (use additional forms as necessary)			
BMP	Reponsible Party(s)	Inspection/ Maintenance Activities Required	Minimum Frequency of Activities
Education of Property Owners	Property Owner	Property owners/tenants shall receive an educational packet with information on "good housekeeping", BMP maintenance and listing those activities that are allowed and those that are not. See sample packet in Appendix E	Upon sale, rental ore leasing of property and once per year thereafter
Activity Restrictions	Property Owner	Property owners. Tenants shall receive a packet listing those activities that are allowed and those that are not. Enforcement of the restricted activities will be through the owner's association and the CC&Rs.	Upon sale, rental ore leasing of property and once per year thereafter
Drive aisle and Parking Lots (SC-43)	Property Owner	Parking lots shall be swept using a vacuum assisted sweeper monthly to prevent sediment, garden waste, and trash, or other pollutants from entering onsite drains and public storm channels. Sweeping will be done by a landscape contractor or other contractor provided by the owner.	Vacuum sweeping will begin with the completion of paving of the drive aisles and parking areas. Swept Monthly thereafter.
Bio-Infiltration Basins	Property Owner	Inspect and maintain to ensure that water infiltrates into the subsurface completely within 48 hours or less and that vegetation is carefully managed to prevent creating mosquito and other vector habitats. Identify potential problems such as erosion of the basin side slopes and invert, standing water, trash and debris and sediment accumulation.	Schedule semiannual inspections for beginning and end of the wet season
		Remove accumulated trash and debris in the basin.	Weekly
		Inspect for standing water. If erosion is occurring within the basin, repair or replace rip rap, revegetate immediately and	Annually and after all storm events

		stabilize with an erosion control mulch or mat until vegetation cover is established.	
		Trim vegetation as need to prevent establishment of woody vegetation and for aesthetic and vector reasons.	As-needed
Underground infiltration chambers and drainage pipes	Property Owner	Pre-Treatment Device Inspection: Inspection of all pretreatment devices in the treatment train, i.e. the catch basins and inserts should be inspected as outlined above. Storm Drainpipes Manholes and Diversion Structures: Maintenance or further investigation may be required if any of the following conditions exist. • Evidence of an unusual amount of silt and soil build-up on the surface. • Clogged outlet drain pipe. • System does not drain to the elevation of the lowest pipe in dry conditions. • Evidence of potholes or sink holes The diversion pipes and manhole with the flow restriction orifice should be inspected for clogging and sediment accumulation in the manhole and pipes leading to the chambers. The diversion directs first flush flows into the containment structures. The majority of the sediment will tend to accumulate in the manhole and chambers due to the extended time which allows the particles to settle out. Higher flows will continue through the flow restriction orifice. Inspection can be done through accessing the diversion manholes and visually inspection the inflow pipe. The containment chambers can be accessed via the manhole on each chamber. When the depth of sediment accumulates over 4-inches, cleanout is recommended. If accumulated silt is interfering with the operation of the detention system (i.e. blocking outlet pipes or deposits significantly reduce the storage capacity of the system) it should be removed. A vacuum truck or other similar devices can be used to remove sediment from the treatment train. A jetvac truck utilizing a high-pressure nozzle with rear facing jets may be required to force debris into a location for the vacuum hose to remove the sediment and debris from the containment	Inspections are required at a minimum annually. The first year of operation will require more frequent inspections. Inspections will need to be performed more often in winter months and depending on site conditions leading to rapid sediment accumulations, or in washdown areas. An inspection record and log will be kept for each inspection.

		chambers. Multiple passes may be required to fully cleanout the containment chambers.	
On-site private and common area Catch Basin Inspection Drain Insert (MP-52)	Property Owner	The on-site catch basins shall be inspected monthly during the rainy season (October-May) and before and after each storm to ensure proper operation. The owner shall contract with a qualified landscape contractor to inspect and clean out accumulation of trash, litter and sediment and check for evidence of illegal dumping of waste materials into on-site drains. Catch basins will be inspected visually for sediment build up or trash and cleaned of trash when seen and cleaned for sediment when sediment levels reach 2” or more. Remove grates and inspect and clean skimmer trays and remove and replace hydrocarbon booms and drain inserts on catch basins that have these features.	Upon completion of installation, monthly during the rainy season (October – May) and before and after each storm.
Protect Slopes and Channels and Provide Energy Dissipation	Property Owner	Implementation of Slopes and Channel Protection and Energy Dissipation devices is the responsibility of the Owner, beginning at the completion of grading. Damage to slopes and energy dissipaters from storms or construction activity damage shall be repaired and soon as possible, particularly during the rainy season. Comply with the SWPPP during construction.	Quarterly
(S1) Provide Storm Drain System Stenciling and Signage (SD-13) Storm Drain Signage	Property Owner	The painted message or disk shall be inspected annually & repainted/replaced as necessary.	Shall be inspected annually and repainted as necessary.
On-site private Parkway Culverts	Property Owner	The on-site parkway culverts shall be inspected monthly during the rainy season (October-May) and before and after each storm to ensure proper operation. The owner shall contract with a qualified landscape contractor to inspect and clean out accumulation of trash, litter and sediment and check for evidence of illegal dumping of waste materials into on-site drains. Parkway culverts will be inspected visually for sediment build up or trash and cleaned of trash when seen and cleaned for sediment when sediment levels may impede flow.	Upon completion of installation, monthly during the rainy season (October – May) and before and after each storm.
Landscape Maintenance	Property Owner	Landscapes shall be maintained to ensure water efficiency and healthy appearance. A regular maintenance schedule shall include, but not be limited to, checking, adjusting, and repairing the irrigation equipment; resetting the automatic controller; aerating and dethatching turf areas; replenishing mulch; fertilizing; pruning, weeding,	Inspection and maintenance will begin upon completion of the installation of the landscaping as it

		removing litter and replacement of plants as required. Verify fertilizer and pesticide usage requirements consistent with the instructions contained on product labels and with the regulations administered by the State Department of Pesticide Regulation Comply with product labels as new products are purchased and update new regulations by the State Department of Pesticide Regulation (http://www.cdpr.ca.gov/) Verify landscaping is 1-2" below the adjacent finished surface grade to allow for ponding. Remove excessive soil and/or vegetation to restore 1" minimum depth of landscaping area below adjacent grade. Replant landscaping areas disturbed during soil removal.	is installed. Upon completion of all installation, inspected during each weekly landscape service
Litter and Debris Control Program (SD-32) Trash Storage Areas	Property Owner	A program shall be implemented to pick up litter, pet and potential wild animal fecal matter and sweep and clean the trash enclosure on a daily basis. Litter and debris will be picked up by the maintenance/landscape contractor on at least a weekly basis. Onsite manager/employees are to be instructed to be visually aware of improperly disposed or dumping of litter and debris. All dumpsters will have lids installed and will be inspected weekly to ensure that the dumpsters remain covered and leak-proof. The owner shall contract with a refuse company to have the dumpsters emptied on a weekly basis, at a minimum.	Trash enclosure will be kept clean from litter and be swept on a daily basis. Lids to be inspected weekly. Trash to be removed by refuse company weekly. Provide weekly inspection of the site for litter and debris removal.
Efficient Irrigation (SD-12)	Property Owner	The owner will replace or repair any damaged or broken components of the irrigation system. Check and re-calibrate as necessary moisture sensors, rain shut off valves and segment timing to minimize runoff of excess irrigation.	Upon issuance of first Certificate of Occupancy and weekly thereafter
Vegetated Swale (TC-30)	Property Owner	• Inspect and correct erosion problems, damage to vegetation, and sediment and debris accumulation (address when > 3 inches at any spot or covering vegetation) •Inspect vegetation on side slopes for erosion and formation of rills or gullies, correct as needed to design grade. • Mow and trim vegetation to ensure safety, aesthetics, proper swale operation, or to suppress weeds and invasive vegetation, dispose of cuttings in a local composting facility, mow only when swale is dry to avoid rutting • Inspect for litter; remove prior to mowing • Inspect for uniformity in cross-section and longitudinal slope, correct as needed • Inspect swale inlet (curb cuts, pipes, etc.) and outlet for signs of erosion or blockage, correct as aintenance activities to be done as needed:	Monthly inspection and within 48 hours after major storm event (greater than 1 inch rainfall depth)

		• Plant alternative grass species in the event of unsuccessful establishment	
Roof Runoff Controls (SD-11)	Property Owner	The owner will ensure that roof drain outlets are unobstructed and free of any debris. Inspect connections to storm drain system if conncected and verify tight connections and no leakage. If not connected to the storm drain system verfiy the splash block of other energry dissipator is in place and functional. Check landscapee plantings are not damanged and there is no erosion. Repair/replace if necessary.	Upon completion of the building roof drains and at the beginning of October each year and after each storm thereafter
Efficient Irrigation (SD-12)	Property Owner	The owner will replace or repair any damaged or broken components of the irrigation system. Check and re-calibrate as necessary moisture sensors, rain shut off valves and segment timing to minimize runoff of excess irrigation.	Upon completion of the irrigation system as it is installed and then weekly thereafter
Fuel Area	Property Owner	Conduct all regular and preventive maintenance identified in the SPCC Plan or facility maintenance plan. Dead-end sumps are underground vaults that collect liquids and are commonly found at gas stations where fuel spills may occur. These sumps are not connected to the stormwater system or the sewer. Sumps need liquids to be pumped out and disposed of correctly as the liquids may be contaminated. Sump to be inspected weekly and maintenance needed when: Sump is 75% full at the most. Gas, or odor of gas, is noticed. Notify property owner or manager immediately if Sump is overflowing. Keep ample supplies of spill response equipment and materials available nearby. See “Spill Cleanup BMPs (SC-11)” for a detailed list of recommended equipment and supplies. Inspect all fueling equipment and fuel islands at least daily for leaks, drips, corrosion, wear or damage. Keep a log of these inspections. Repair or replace all faulty equipment promptly. For underground storage tanks fitted with non-alarmed leak detection devices, take readings of these devices on a regular basis. State regulations for underground storage tanks will usually specify the reading intervals.	Sumps to be inspected weekly and as needed Fueling equipment to be inspected daily and repaired as needed

Car Wash	Property Owner	All vehicles must be washed in the designated washing area that drains to the sanitary sewer or an approved holding tank. Weekly maintenance of sand/oil separator in designated car wash areas will ensure proper drainage. Inspect and clean all oil/water separators according to the manufacturer's recommended intervals or according to municipal ordinance. If materials from sand/oil are stored on site, it must be contained and covered. Any water decanting from the material must go directly to sanitary sewer. If drains in a car wash area become clogged, it should not be used until the issue is resolved.	Upon operation and weekly thereafter
Employee Training and Education Program	Property Owner	Employees shall be trained in the proper care of the drainage facilities and their maintenance by a qualified and certified instructor in water quality management. Training shall occur within 3 months of employment and annually thereafter. Employees shall be provided with a copy of all applicable BMP details for their use	Within 3 months of hiring and yearly thereafter

Section 6 WQMP Attachments

6.1. Site Plan and Drainage Plan

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

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

6.2 Electronic Data Submittal

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

6.3 Post Construction

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

6.4 Other Supporting Documentation

- Point Precipitation
- Soil Infiltration Report
- Site Photos
- BMP Educational Materials
- Operation and Maintenance Plan
- Spill Prevention and Cleanup Plan
- Maintenance Agreement
- BMP Site Plan, Grading Plans and Landscape Plans

Appendix A
Calculations

Underground Infiltration Chamber Calculations

Storage Required for The Oasis at Glen Helen Project

The Oasis at Glen Helen project will utilize a combination of underground pipes:

96-inch diameter (8 feet) perforated storm drain pipe: Area = 50.27 sf Volume: 50.27 cf/ft
72-inch diameter (6 feet) perforated storm drain pipe: Area = 28.27 sf Volume: 28.27 cf/ft
60-inch diameter (5 feet) perforated storm drain pipe: Area = 19.63 sf Volume: 19.63 cf/ft
48-inch diameter (4 feet) perforated storm drain pipe: Area = 12.56 sf Volume: 12.56 cf/ft
36-inch diameter (3 feet) perforated storm drain pipe: Area = 7.07 sf Volume: 7.07cf/ft

See Unit Hydrograph for estimated required detention storage: North Area 41,710 c.f.
South Area 90,050 c.f.

Permeability Rate = Average rate = .33 in/hr w/ F.S of 2.2 = 0.15 in/hr (Soil Type A)
The infiltration rate for Soil D is 0.0 in/hr

HDPE or CMP perforations are AASHTO Class I perforation patterns. The rate of discharge per foot of pipe is calculated as follows:

½" diameter hole with 16 holes per foot of pipe. Assume the average head is 0.5 feet.

$Q = CA(2gH)^{1/2}$ A=.1963 s.i. = .0014 s.f.

$Q = .6(.0014)(64.4x.5)^{1/2}$
Q = .0048 cfs/hole
Q = .0048 x 16 holes/ft = .076 cfs/ft
Q = .076 cfs/foot of pipe is significantly greater than the soil infiltration rate of .000165 cfs/sf

Combination Water Quality and Detention Basin Design

Determine the length of pipe to store Volume: The following tables provides the individual sizing of each underground system by sub-drainage area. Design capture volume is only detained in the gravel layer under the pipes. As such, there will be no remining standing water in the pipes following the pipe discharge from a storm event.

Required Detention Storage Volume: Utilizing the AES Unit Hydrograph Model Flow By Storage Basin the estimated required storage volume is 41,710 c.f. and 90,050 c.f. for the two drainage areas contributing to the project outlets. The project site is fairly uniform with respect to impervious surfaces and runoff coefficients. Therefore, estimated flow rates for each subarea is determined by proportion. Allowable discharge rates and outlet restriction orifices in the catch basin were sized to restrict discharge to the storm drain system to the allowable discharge rate for each subarea. Orifice sizing is based upon the FHWA Chart 2 *Headwater Depth for Pipe Culverts with Inlet Control* and discharge through orifice calculations using weir flow and/or orifice flow depending upon the depth of the water at the entrance. Subarea volumes were determined using the AES Flow Thru Storage Basin Model and prorated for each subarea. See detention basin tables for allowable discharge rates and storage volumes.

In addition to the water quality treatment of the design capture volume for each Drainage Area, the underground chambers are also required to detain and retard the storm drainage discharge to reduce the peak flow outflow to at or less than 90 percent of the 100-year pre-project condition as follows:

North Area:	South Area
Area: 9.84 acres	Area: 21.5 acres
Pre-Condition: 31.4 cfs	Pre-Condition: 70.8 cfs
90%: 28.3 cfs	90%: 63.7 cfs
Post Condition: 58.9 cfs	Post Condition: 123.7 cfs
Required Detention Vol: 90,050 cf	Required Detention Vol: 41,710 cf

The following presents the typical calculation procedure used for the sizing the underground water quality and detention basin chambers.

DA-11

Estimated Required Detention Volume: 23,999 c.f.
Water Quality Volume to be detained and infiltrated: 30,182 c.f.
Sub-area peak flow rate: 32.9 cfs
Sub-area allowable discharge rate: 16.96 cfs
Determine an orifice size to attenuate peak flow: 16-inch diameter
Calculate the Elevation Storage Discharge Table
See computer printout of unit hydrograph: Peak flow: 33.09 cfs and the restricted out-flow is13.14 cfs.
Total detention volume required: 29,321 c.f by using 1,400 l.f. of 72" diameter pipe. (8 rows of pipe 175 feet long) Provided volume is 39,484 c.f.

Water Quality Volume in gravel layer under the pipes.
Area: 175'(area under pipes)+(area between and around perimeter)
Area: 175'(6' x 8 pipes) + (9 x 2') = 175 x 66 = 11,550 s.f.
WQ Storage Volume of Gravel: 11,500 x 3' deep x 0.4 = 13,860 c.f.
The remining DCV is retaining in additional bio-retention located in DA-11

Length of pipe to store Volume: The following tables provides the individual sizing of each underground system by sub-drainage area.

The sizes of the chambers are summarized in the following tables. An inflow outflow detention unit hydrograph was prepared for DA-11 indication the functioning the detention system. Detailed calculations of the remaining DA's will be provided with the final WQMP.

Detention and Water quality Volume Summary South Area

Drainage Area DA	Area (s.f.)(1)	Sub-Area DCV WQ Vol (c.f.)	Sub-Area Peak Flow Rate (cfs)	Sub-Area Allowable Discharge Rate (cfs)
DA-1	95,597	8,222	12.59	6.51
DA-2	77,367	5,624	10.24	5.26
DA-3	62,763	4,826	8.28	4.27
DA-4	44,507	3,297	5.87	3.02
DA-5	46,733	4,176	6.15	2.98
DA-6	45,100	4,181	5.98	3.12
DA-7	45,865	4,095	6.04	2.93
DA-11	249,184	30,182	32.90	16.96
DA-12	64,268	5,732	8.51	4.37
DA-13	66,376	6,389	8.74	4.52
DA-14	138,385	12,245	18.29	9.42
	936,145	88,969	123.7	63.7

(1) Per Form 4.2-1 of the WQMP

Detention and Water quality Volume Summary North Area

Drainage Area DA	Area (s.f.)(1)	Sub-Area DCV WQ Vol (c.f.)	Sub-Area Peak Flow Rate (cfs)	Sub-Area Allowable Discharge Rate (cfs)
DA-8	180,531	17,709	24.83	13.21
DA-9	76,784	5,376	10.56	5.62
DA-10	171,562	17,479	23.51	12.57
	428,877	40,564	58.9	31.4

Detention Basin Sizing South Area

Drainage Area DMA	Allowable Peak Flow Rate Q100 (cfs)	Actual Peak Flow Rate (cfs)	Sub-Area Detention Volume to be Stored(c.f.)	Underground Pipe Length(ft) (6ft Dia	Total Underground chamber Volume (c,f)	
DA-1	6.51		9,173	5@100’	14,135	
DA-2	5.26		7,455	3@135’	11,451	
DA-3	4.27		6,031	3@110’	9,330	
DA-4	3.02		4,272	3@80’	6,786	
DA-5	2.98		4,482	3@80’	6,786	
DA-6	3.12		4,356	3@80’	6,786	
DA-7	2.93		4,398	3@80’	6,786	
DA-11	16.96	13.140(1)	29,620	8@175’	39,584	
DA-12	4.37		6,199	3@110’	9,330	
DA-13	4.52		6,366	3@115’	9,756	
DA-14	9.42		13,319	5@160’	22,620	
Total	63.7		95,671		143,350	

(1) Actual Peak flow. See attached detailed unit hydrograph and detention basin calculations for DA-11

Detention Basin Sizing North Area

Drainage Area DMA	Allowable Peak Flow Rate Q100 (cfs)	Actual Peak Flow Rate (cfs)	Sub-Area Detention Volume to be Stored(c.f.)	Underground Pipe Length(ft) (6ft Dia)	Total Underground chamber Volume (c,f)	
DA-8	13.21		17,549	6@160’	27,549	
DA-9	5.62		7,460	3@135’	11,451	
DA-10	12.57		16,701	6@150’	25,447	
Total	31.4		41,710		64,447	

Pre and Post Condition Hydrology Calculations

Existing Condition 100-year

```
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          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
        (Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
       (c) Copyright 1983-2011 Advanced Engineering Software (aes)
          Ver. 18.0  Release Date: 07/01/2011  License ID 1542

                    Analysis prepared by:

                    Transtech Engineers, Inc.
                       413 Mackay Drive
                    San Bernardino, CA 92408


 ----------------------------------------------------------------------------
  FILE NAME: GH_EX.DAT
  TIME/DATE OF STUDY: 16:31 01/12/2018
 ============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
 ============================================================================
               --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 2.2900

  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
 ----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
 ============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1398.00
  ELEVATION DATA: UPSTREAM(FEET) =   2256.00  DOWNSTREAM(FEET) =   2030.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   24.395
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.930
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp        Ap     SCS   Tc
      LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
```

```
 NATURAL GOOD COVER
 "CHAPARRAL,BROADLEAF"      A       6.39      0.98     1.000    31   24.39
 NATURAL GOOD COVER
 "CHAPARRAL,BROADLEAF"      D       2.96      0.42     1.000    78   24.39
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA RUNOFF(CFS) =     26.32
 TOTAL AREA(ACRES) =      9.35   PEAK FLOW RATE(CFS) =     26.32

****************************************************************************
 FLOW PROCESS FROM NODE      2.00 TO NODE      2.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   24.39
 RAINFALL INTENSITY(INCH/HR) =   3.93
 AREA-AVERAGED Fm(INCH/HR) =  0.80
 AREA-AVERAGED Fp(INCH/HR) =  0.80
 AREA-AVERAGED Ap =  1.00
 EFFECTIVE STREAM AREA(ACRES) =       9.35
 TOTAL STREAM AREA(ACRES) =       9.35
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      26.32

****************************************************************************
 FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   657.00
 ELEVATION DATA: UPSTREAM(FEET) =   2213.00  DOWNSTREAM(FEET) =   2006.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   15.782
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.103
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 NATURAL GOOD COVER
 "CHAPARRAL,BROADLEAF"      A       2.64      0.98     1.000    31   15.78
 NATURAL GOOD COVER
 "CHAPARRAL,BROADLEAF"      D       2.01      0.42     1.000    78   15.78
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.74
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA RUNOFF(CFS) =     18.28
 TOTAL AREA(ACRES) =      4.65   PEAK FLOW RATE(CFS) =     18.28

****************************************************************************
 FLOW PROCESS FROM NODE      4.00 TO NODE      4.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   15.78
 RAINFALL INTENSITY(INCH/HR) =   5.10
 AREA-AVERAGED Fm(INCH/HR) =  0.74
 AREA-AVERAGED Fp(INCH/HR) =  0.74
 AREA-AVERAGED Ap =  1.00
 EFFECTIVE STREAM AREA(ACRES) =       4.65
 TOTAL STREAM AREA(ACRES) =       4.65
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      18.28

****************************************************************************
 FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
```

```
==============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   975.00
 ELEVATION DATA: UPSTREAM(FEET) =   2256.00  DOWNSTREAM(FEET) =   2006.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   19.259
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.528
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp        Ap     SCS   Tc
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 NATURAL GOOD COVER
 "CHAPARRAL,BROADLEAF"      A        1.28      0.98     1.000    31   19.26
 NATURAL GOOD COVER
 "CHAPARRAL,BROADLEAF"      D        7.04      0.42     1.000    78   19.26
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA RUNOFF(CFS) =     30.14
 TOTAL AREA(ACRES) =      8.32   PEAK FLOW RATE(CFS) =     30.14

****************************************************************************
 FLOW PROCESS FROM NODE      6.00 TO NODE      6.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
 TIME OF CONCENTRATION(MIN.) =   19.26
 RAINFALL INTENSITY(INCH/HR) =   4.53
 AREA-AVERAGED Fm(INCH/HR) =  0.50
 AREA-AVERAGED Fp(INCH/HR) =  0.50
 AREA-AVERAGED Ap =  1.00
 EFFECTIVE STREAM AREA(ACRES) =       8.32
 TOTAL STREAM AREA(ACRES) =       8.32
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      30.14

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)        (ACRES)    NODE
     1       26.32   24.39    3.930  0.80( 0.80) 1.00       9.4       1.00
     2       18.28   15.78    5.103  0.74( 0.74) 1.00       4.7       3.00
     3       30.14   19.26    4.528  0.50( 0.50) 1.00       8.3       5.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  3 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)        (ACRES)    NODE
     1       69.92   15.78    5.103  0.67( 0.67) 1.00      17.5       3.00
     2       70.77   19.26    4.528  0.66( 0.66) 1.00      20.4       5.00
     3       65.35   24.39    3.930  0.68( 0.68) 1.00      22.3       1.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      70.77    Tc(MIN.) =    19.26
 EFFECTIVE AREA(ACRES) =      20.35   AREA-AVERAGED Fm(INCH/HR) =  0.66
 AREA-AVERAGED Fp(INCH/HR) =  0.66  AREA-AVERAGED Ap =  1.00
 TOTAL AREA(ACRES) =       22.3
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =    1398.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      7.00 TO NODE      8.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =  1158.00
 ELEVATION DATA: UPSTREAM(FEET) =   2251.00  DOWNSTREAM(FEET) =   2070.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
```

```
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   22.777
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.095
SUBAREA Tc AND LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
    LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
NATURAL GOOD COVER
"CHAPARRAL,BROADLEAF"      A        8.27      0.98     1.000    31   22.78
NATURAL GOOD COVER
"CHAPARRAL,BROADLEAF"      D        0.73      0.42     1.000    78   22.78
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.93
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
SUBAREA RUNOFF(CFS) =     25.60
TOTAL AREA(ACRES) =      9.00   PEAK FLOW RATE(CFS) =     25.60

****************************************************************************
FLOW PROCESS FROM NODE      9.00 TO NODE     10.00 IS CODE =  21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
INITIAL SUBAREA FLOW-LENGTH(FEET) =   351.00
ELEVATION DATA: UPSTREAM(FEET) =   2178.00  DOWNSTREAM(FEET) =   2110.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   13.536
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.595
SUBAREA Tc AND LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
    LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
NATURAL GOOD COVER
"CHAPARRAL,BROADLEAF"      A        1.40      0.98     1.000    31   13.54
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.98
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
SUBAREA RUNOFF(CFS) =      5.82
TOTAL AREA(ACRES) =      1.40   PEAK FLOW RATE(CFS) =      5.82
============================================================================
============================================================================
END OF RATIONAL METHOD ANALYSIS
```

Developed Condition 100-year

```
****************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
        (Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
       (c) Copyright 1983-2012 Advanced Engineering Software (aes)
          Ver. 18.2  Release Date: 05/08/2012  License ID 1542

                    Analysis prepared by:

                  Transtech Engineers, Inc.
                      413 Mackay Drive
                   San Bernardino, CA 92408


 ----------------------------------------------------------------------------
  FILE NAME: GH_DEV.DAT
  TIME/DATE OF STUDY: 12:08 03/07/2024
```

North Area

```
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
 ============================================================================
                --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 2.2800

  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
    HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
    WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.  (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   20.0     10.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
   1. Relative Flow-Depth =  0.50 FEET
      as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
   2. (Depth)*(Velocity) Constraint = 10.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

 ****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
 ----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
 ============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   750.00
  ELEVATION DATA: UPSTREAM(FEET) =   2090.00  DOWNSTREAM(FEET) =   2080.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.184
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.608
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp        Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 A       3.94      0.74     0.100    52   10.18
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.74
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =     23.17
  TOTAL AREA(ACRES) =      3.94   PEAK FLOW RATE(CFS) =     23.17
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     81.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  2076.00  DOWNSTREAM(FEET) =  2074.00
  FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.37
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.17
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =   10.58
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     81.00 =     950.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     81.00 TO NODE     81.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.58
  RAINFALL INTENSITY(INCH/HR) =   6.46
  AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.74
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       3.94
  TOTAL STREAM AREA(ACRES) =       3.94
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      23.17

****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     81.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   850.00
  ELEVATION DATA: UPSTREAM(FEET) =   2098.00  DOWNSTREAM(FEET) =   2080.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.760
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.779
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 A       4.14      0.74     0.100    52    9.76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.74
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =     24.98
  TOTAL AREA(ACRES) =      4.14   PEAK FLOW RATE(CFS) =     24.98

****************************************************************************
  FLOW PROCESS FROM NODE     81.00 TO NODE     81.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.76
  RAINFALL INTENSITY(INCH/HR) =   6.78
  AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.74
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       4.14
  TOTAL STREAM AREA(ACRES) =       4.14
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      24.98

  ** CONFLUENCE DATA **
```

```
 STREAM      Q     Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)        (ACRES)    NODE
   1       23.17   10.58    6.458  0.74( 0.07) 0.10       3.9      10.00
   2       24.98    9.76    6.779  0.74( 0.07) 0.10       4.1      80.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR  2 STREAMS.

** PEAK FLOW RATE TABLE **
 STREAM      Q     Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)        (ACRES)    NODE
   1       47.43    9.76    6.779  0.74( 0.07) 0.10       7.8      80.00
   2       46.95   10.58    6.458  0.74( 0.07) 0.10       8.1      10.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =      47.43    Tc(MIN.) =     9.76
EFFECTIVE AREA(ACRES) =       7.77   AREA-AVERAGED Fm(INCH/HR) =  0.07
AREA-AVERAGED Fp(INCH/HR) =  0.74  AREA-AVERAGED Ap =  0.10
TOTAL AREA(ACRES) =        8.1
LONGEST FLOWPATH FROM NODE     10.00 TO NODE     81.00 =     950.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     81.00 TO NODE     91.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =  2072.00  DOWNSTREAM(FEET) =  2070.00
FLOW LENGTH(FEET) =   260.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  36.0 INCH PIPE IS  25.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   9.02
ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      47.43
PIPE TRAVEL TIME(MIN.) =   0.48    Tc(MIN.) =   10.24
LONGEST FLOWPATH FROM NODE     10.00 TO NODE     91.00 =    1210.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     91.00 TO NODE     91.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN.) =   10.24
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.586
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
    LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL                A        1.76      0.74     0.100    52
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.74
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
SUBAREA AREA(ACRES) =    1.76      SUBAREA RUNOFF(CFS) =   10.31
EFFECTIVE AREA(ACRES) =      9.53   AREA-AVERAGED Fm(INCH/HR) =  0.07
AREA-AVERAGED Fp(INCH/HR) =  0.74  AREA-AVERAGED Ap =  0.10
TOTAL AREA(ACRES) =        9.8      PEAK FLOW RATE(CFS) =      55.88
```

South Area

```
****************************************************************************
FLOW PROCESS FROM NODE     70.00 TO NODE     71.00 IS CODE =  21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
INITIAL SUBAREA FLOW-LENGTH(FEET) =   360.00
ELEVATION DATA: UPSTREAM(FEET) =   2098.00  DOWNSTREAM(FEET) =   2090.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.855
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  8.379
SUBAREA Tc AND LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
```

```
     LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL              A       0.81      0.74     0.100    52    6.86
  COMMERCIAL              D       0.24      0.21     0.100    91    6.86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.62
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      7.86
  TOTAL AREA(ACRES) =      1.05   PEAK FLOW RATE(CFS) =      7.86

****************************************************************************
  FLOW PROCESS FROM NODE     71.00 TO NODE     51.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 2090.00  DOWNSTREAM ELEVATION(FEET) = 2070.00
  STREET LENGTH(FEET) =   390.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  10.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      15.17
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.43
    HALFSTREET FLOOD WIDTH(FEET) =   14.96
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.44
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.74
  STREET FLOW TRAVEL TIME(MIN.) =   1.01   Tc(MIN.) =    7.87
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  7.716
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL              D       1.04      0.21     0.100    91
  COMMERCIAL              D       1.07      0.21     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    2.11      SUBAREA RUNOFF(CFS) =   14.61
  EFFECTIVE AREA(ACRES) =      3.16    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.35  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        3.2        PEAK FLOW RATE(CFS) =      21.85

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.47   HALFSTREET FLOOD WIDTH(FEET) =  17.30
  FLOW VELOCITY(FEET/SEC.) =  7.02   DEPTH*VELOCITY(FT*FT/SEC.) =   3.32
  LONGEST FLOWPATH FROM NODE     70.00 TO NODE     51.00 =     750.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     21.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  2070.00  DOWNSTREAM(FEET) =  2050.00
  FLOW LENGTH(FEET) =   330.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.06
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.85
  PIPE TRAVEL TIME(MIN.) =   0.34    Tc(MIN.) =    8.21
  LONGEST FLOWPATH FROM NODE     70.00 TO NODE     21.00 =    1080.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
 MAINLINE Tc(MIN.) =    8.21
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  7.521
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL               D       1.02      0.21     0.100    91
 COMMERCIAL               D       1.42      0.21     0.100    91
 COMMERCIAL               A       0.02      0.74     0.100    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    2.46      SUBAREA RUNOFF(CFS) =   16.60
 EFFECTIVE AREA(ACRES) =      5.62   AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =        5.6       PEAK FLOW RATE(CFS) =      37.90

****************************************************************************
 FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.21
 RAINFALL INTENSITY(INCH/HR) =   7.52
 AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.29
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       5.62
 TOTAL STREAM AREA(ACRES) =       5.62
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      37.90

****************************************************************************
 FLOW PROCESS FROM NODE    110.00 TO NODE    111.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   950.00
 ELEVATION DATA: UPSTREAM(FEET) =   2090.00  DOWNSTREAM(FEET) =   2065.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.771
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.774
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL               A       3.31      0.74     0.100    52    9.77
 COMMERCIAL               D       2.41      0.21     0.100    91    9.77
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.52
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =     34.61
 TOTAL AREA(ACRES) =      5.72   PEAK FLOW RATE(CFS) =     34.61

****************************************************************************
 FLOW PROCESS FROM NODE    111.00 TO NODE     21.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  2065.00  DOWNSTREAM(FEET) =  2050.00
 FLOW LENGTH(FEET) =   470.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.14
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      34.61
 PIPE TRAVEL TIME(MIN.) =   0.55    Tc(MIN.) =   10.32
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE     21.00 =    1420.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   10.32
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.554
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                A       4.11      0.74     0.100    52
 COMMERCIAL                D       4.25      0.21     0.100    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.47
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    8.36      SUBAREA RUNOFF(CFS) =   48.96
 EFFECTIVE AREA(ACRES) =     14.08   AREA-AVERAGED Fm(INCH/HR) =  0.05
 AREA-AVERAGED Fp(INCH/HR) =  0.49  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =       14.1       PEAK FLOW RATE(CFS) =      82.43

****************************************************************************
 FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.32
 RAINFALL INTENSITY(INCH/HR) =   6.55
 AREA-AVERAGED Fm(INCH/HR) =  0.05
 AREA-AVERAGED Fp(INCH/HR) =  0.49
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =      14.08
 TOTAL STREAM AREA(ACRES) =      14.08
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      82.43

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)        (ACRES)    NODE
    1       37.90    8.21    7.521  0.29( 0.03) 0.10       5.6      70.00
    2       82.43   10.32    6.554  0.49( 0.05) 0.10      14.1     110.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)        (ACRES)    NODE
    1      113.17    8.21    7.521  0.42( 0.04) 0.10      16.8      70.00
    2      115.44   10.32    6.554  0.43( 0.04) 0.10      19.7     110.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     115.44    Tc(MIN.) =    10.32
 EFFECTIVE AREA(ACRES) =      19.70   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.43  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =       19.7
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE     21.00 =    1420.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  2050.00  DOWNSTREAM(FEET) =  2040.00
 FLOW LENGTH(FEET) =   340.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  39.0 INCH PIPE IS  27.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  18.63
 ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     115.44
```

```
 PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =   10.63
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE     22.00 =    1760.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   10.63
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.441
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL               A       1.35      0.74     0.100    52
 COMMERCIAL               D       0.43      0.21     0.100    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.61
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    1.78      SUBAREA RUNOFF(CFS) =   10.22
 EFFECTIVE AREA(ACRES) =     21.48   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.45  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =       21.5      PEAK FLOW RATE(CFS) =     123.65
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =       21.5  TC(MIN.) =     10.63
 EFFECTIVE AREA(ACRES) =     21.48  AREA-AVERAGED Fm(INCH/HR)=  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.45  AREA-AVERAGED Ap = 0.100
 PEAK FLOW RATE(CFS)   =     123.65

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)        (ACRES)    NODE
    1      122.40    8.51    7.358  0.44( 0.04) 0.10      18.6      70.00
    2      123.65   10.63    6.441  0.45( 0.04) 0.10      21.5     110.00
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

Unit Hydrograph Detention Calculations

North Area

```
____________________________________________________________________________
****************************************************************************
                SMALL AREA UNIT HYDROGRAPH MODEL
============================================================================
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          Ver. 19.0  Release Date: 06/01/2012  License ID 1542

                     Analysis prepared by:

                   Transtech Engineers, Inc.
                      413 Mackay Drive
                   San Bernardino, CA 92408


****************************************************************************
----------------------------------------------------------------------------

 Problem Descriptions:
  GLEN HELEN 100 YEAR NORTH AREA


----------------------------------------------------------------------------
```

```
  RATIONAL METHOD CALIBRATION COEFFICIENT = 1.18
  TOTAL CATCHMENT AREA(ACRES) =    9.84
  SOIL-LOSS RATE, Fm,(INCH/HR) =  0.070
  LOW LOSS FRACTION = 0.993
  TIME OF CONCENTRATION(MIN.) = 10.24
  SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
  USER SPECIFIED RAINFALL VALUES ARE USED
  RETURN FREQUENCY(YEARS) = 100
    5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.57
   30-MINUTE POINT RAINFALL VALUE(INCHES) =  1.49
    1-HOUR   POINT RAINFALL VALUE(INCHES) =  2.28
    3-HOUR   POINT RAINFALL VALUE(INCHES) =  3.90
    6-HOUR   POINT RAINFALL VALUE(INCHES) =  5.62
   24-HOUR   POINT RAINFALL VALUE(INCHES) = 11.00

--------------------------------------------------------------------------------

  TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =    8.95
  TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =    0.07

********************************************************************************
 TIME     VOLUME      Q   0.      15.0     30.0     45.0     60.0
(HOURS)   (AF)      (CFS)
--------------------------------------------------------------------------------
 0.13     0.0094     1.77  .Q      .        .        .        .
 0.30     0.0343     1.78  .Q      .        .        .        .
 0.47     0.0595     1.80  .Q      .        .        .        .
 0.64     0.0849     1.80  .Q      .        .        .        .
 0.81     0.1105     1.83  .Q      .        .        .        .
 0.98     0.1363     1.84  .Q      .        .        .        .
 1.15     0.1624     1.86  .Q      .        .        .        .
 1.32     0.1886     1.87  .Q      .        .        .        .
 1.49     0.2151     1.89  .Q      .        .        .        .
 1.66     0.2418     1.90  .Q      .        .        .        .
 1.83     0.2687     1.92  .Q      .        .        .        .
 2.01     0.2959     1.93  .Q      .        .        .        .
 2.18     0.3233     1.96  .Q      .        .        .        .
 2.35     0.3510     1.97  .Q      .        .        .        .
 2.52     0.3789     1.99  .Q      .        .        .        .
 2.69     0.4071     2.00  .Q      .        .        .        .
 2.86     0.4355     2.03  .Q      .        .        .        .
 3.03     0.4642     2.04  .Q      .        .        .        .
 3.20     0.4932     2.07  .Q      .        .        .        .
 3.37     0.5224     2.08  .Q      .        .        .        .
 3.54     0.5519     2.11  .Q      .        .        .        .
 3.71     0.5817     2.12  .Q      .        .        .        .
 3.88     0.6118     2.15  .Q      .        .        .        .
 4.05     0.6422     2.16  .Q      .        .        .        .
 4.22     0.6730     2.19  .Q      .        .        .        .
 4.39     0.7040     2.21  .Q      .        .        .        .
 4.57     0.7353     2.24  .Q      .        .        .        .
 4.74     0.7670     2.25  .Q      .        .        .        .
 4.91     0.7990     2.28  .Q      .        .        .        .
 5.08     0.8313     2.30  .Q      .        .        .        .
 5.25     0.8640     2.33  .Q      .        .        .        .
 5.42     0.8971     2.35  .Q      .        .        .        .
 5.59     0.9305     2.39  .Q      .        .        .        .
 5.76     0.9643     2.40  .Q      .        .        .        .
 5.93     0.9984     2.44  .Q      .        .        .        .
 6.10     1.0330     2.46  .Q      .        .        .        .
 6.27     1.0680     2.50  .Q      .        .        .        .
 6.44     1.1034     2.52  .Q      .        .        .        .
 6.61     1.1392     2.56  .Q      .        .        .        .
 6.78     1.1755     2.58  .Q      .        .        .        .
 6.95     1.2122     2.62  .Q      .        .        .        .
```

```
7.13    1.2493    2.65 .Q     .     .     .     .
7.30    1.2870    2.69 .Q     .     .     .     .
7.47    1.3251    2.72 .Q     .     .     .     .
7.64    1.3638    2.76 .Q     .     .     .     .
7.81    1.4030    2.79 .Q     .     .     .     .
7.98    1.4427    2.84 .Q     .     .     .     .
8.15    1.4829    2.87 .Q     .     .     .     .
8.32    1.5238    2.92 .Q     .     .     .     .
8.49    1.5652    2.95 .Q     .     .     .     .
8.66    1.6072    3.01 . Q    .     .     .     .
8.83    1.6499    3.04 . Q    .     .     .     .
9.00    1.6932    3.10 . Q    .     .     .     .
9.17    1.7372    3.14 . Q    .     .     .     .
9.34    1.7819    3.20 . Q    .     .     .     .
9.51    1.8274    3.24 . Q    .     .     .     .
9.69    1.8736    3.31 . Q    .     .     .     .
9.86    1.9206    3.35 . Q    .     .     .     .
10.03   1.9684    3.43 . Q    .     .     .     .
10.20   2.0171    3.47 . Q    .     .     .     .
10.37   2.0667    3.56 . Q    .     .     .     .
10.54   2.1172    3.60 . Q    .     .     .     .
10.71   2.1687    3.70 . Q    .     .     .     .
10.88   2.2212    3.75 . Q    .     .     .     .
11.05   2.2748    3.85 . Q    .     .     .     .
11.22   2.3295    3.91 . Q    .     .     .     .
11.39   2.3855    4.02 . Q    .     .     .     .
11.56   2.4427    4.09 . Q    .     .     .     .
11.73   2.5012    4.21 . Q    .     .     .     .
11.90   2.5611    4.28 . Q    .     .     .     .
12.07   2.6231    4.50 .  Q   .     .     .     .
12.25   2.6899    4.97 .  Q   .     .     .     .
12.42   2.7612    5.14 .  Q   .     .     .     .
12.59   2.8343    5.23 .  Q   .     .     .     .
12.76   2.9093    5.42 .  Q   .     .     .     .
12.93   2.9864    5.52 .  Q   .     .     .     .
13.10   3.0658    5.74 .  Q   .     .     .     .
13.27   3.1476    5.86 .  Q   .     .     .     .
13.44   3.2321    6.12 .   Q  .     .     .     .
13.61   3.3195    6.27 .   Q  .     .     .     .
13.78   3.4102    6.59 .   Q  .     .     .     .
13.95   3.5043    6.76 .   Q  .     .     .     .
14.12   3.6001    6.83 .   Q  .     .     .     .
14.29   3.6963    6.81 .   Q  .     .     .     .
14.46   3.7959    7.33 .   Q  .     .     .     .
14.63   3.9014    7.63 .    Q .     .     .     .
14.81   4.0141    8.35 .    Q .     .     .     .
14.98   4.1350    8.79 .    Q .     .     .     .
15.15   4.2667    9.89 .     Q .    .     .     .
15.32   4.4112   10.60 .     Q .     .     .     .
15.49   4.5944   15.38 .      Q      .     .     .
15.66   4.8241   17.20 .      .Q     .     .     .
15.83   5.0832   19.53 .      . Q    .     .     .
16.00   5.3967   24.92 .      .  Q   .     .     .
16.17   5.9671   55.97 .      .      .     .     Q .  Estimated Detention Volume 40,710 c.f. @ Q existing 28.26 cfs
16.34   6.4962   19.05 .      . Q    .     .     .
16.51   6.7113   11.46 .     Q .     .     .     .
16.68   6.8577    9.29 .    Q .      .     .     .
16.85   6.9795    7.97 .   Q  .      .     .     .
17.02   7.0854    7.05 .  Q  .       .     .     .
17.19   7.1842    6.95 .  Q  .       .     .     .
17.37   7.2785    6.42 .  Q  .       .     .     .
17.54   7.3661    5.99 . Q   .       .     .     .
17.71   7.4480    5.63 . Q   .       .     .     .
17.88   7.5251    5.32 . Q   .       .     .     .
18.05   7.5983    5.05 . Q   .       .     .     .
18.22   7.6646    4.35 . Q   .       .     .     .
```

```
18.39    7.7246    4.15 . Q    .    .    .    .
18.56    7.7818    3.96 . Q    .    .    .    .
18.73    7.8366    3.80 . Q    .    .    .    .
18.90    7.8891    3.65 . Q    .    .    .    .
19.07    7.9396    3.51 . Q    .    .    .    .
19.24    7.9883    3.39 . Q    .    .    .    .
19.41    8.0353    3.28 . Q    .    .    .    .
19.58    8.0808    3.17 . Q    .    .    .    .
19.75    8.1248    3.07 . Q    .    .    .    .
19.93    8.1675    2.98 .Q     .    .    .    .
20.10    8.2089    2.89 .Q     .    .    .    .
20.27    8.2492    2.81 .Q     .    .    .    .
20.44    8.2884    2.74 .Q     .    .    .    .
20.61    8.3265    2.67 .Q     .    .    .    .
20.78    8.3637    2.60 .Q     .    .    .    .
20.95    8.4000    2.54 .Q     .    .    .    .
21.12    8.4354    2.48 .Q     .    .    .    .
21.29    8.4699    2.42 .Q     .    .    .    .
21.46    8.5037    2.37 .Q     .    .    .    .
21.63    8.5368    2.32 .Q     .    .    .    .
21.80    8.5691    2.27 .Q     .    .    .    .
21.97    8.6008    2.22 .Q     .    .    .    .
22.14    8.6318    2.18 .Q     .    .    .    .
22.31    8.6622    2.13 .Q     .    .    .    .
22.49    8.6920    2.09 .Q     .    .    .    .
22.66    8.7213    2.05 .Q     .    .    .    .
22.83    8.7500    2.02 .Q     .    .    .    .
23.00    8.7781    1.98 .Q     .    .    .    .
23.17    8.8058    1.94 .Q     .    .    .    .
23.34    8.8330    1.91 .Q     .    .    .    .
23.51    8.8597    1.88 .Q     .    .    .    .
23.68    8.8859    1.85 .Q     .    .    .    .
23.85    8.9117    1.82 .Q     .    .    .    .
24.02    8.9371    1.79 .Q     .    .    .    .
24.19    8.9497    0.00 Q      .    .    .    .
--------------------------------------------------------------------------------
--------------------------------------------------------------------------------
  TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
  (Note: 100% of Peak Flow Rate estimate assumed to have
  an instantaneous time duration)

  Percentile of Estimated          Duration
    Peak Flow Rate               (minutes)
  ======================          =========
        0%                     1443.8
       10%                      286.7
       20%                       71.7
       30%                       51.2
       40%                       20.5
       50%                       10.2
       60%                       10.2
       70%                       10.2
       80%                       10.2
       90%                       10.2
```

South Area

```
****************************************************************************
                SMALL AREA UNIT HYDROGRAPH MODEL
============================================================================
      (C) Copyright 1989-2012 Advanced Engineering Software (aes)
         Ver. 19.0  Release Date: 06/01/2012  License ID 1542

                    Analysis prepared by:

                  Transtech Engineers, Inc.
                      413 Mackay Drive
                  San Bernardino, CA 92408


****************************************************************************
----------------------------------------------------------------------------

 Problem Descriptions:
  GLEN HELEN UNIT HYDROGRAPH 100 YEAR SOUTH AREA


----------------------------------------------------------------------------


   RATIONAL METHOD CALIBRATION COEFFICIENT = 1.21
   TOTAL CATCHMENT AREA(ACRES) =   21.50
   SOIL-LOSS RATE, Fm,(INCH/HR) =  0.040
   LOW LOSS FRACTION = 0.953
   TIME OF CONCENTRATION(MIN.) = 10.63
   SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
   USER SPECIFIED RAINFALL VALUES ARE USED
   RETURN FREQUENCY(YEARS) = 100
     5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.57
    30-MINUTE POINT RAINFALL VALUE(INCHES) =  1.49
     1-HOUR   POINT RAINFALL VALUE(INCHES) =  2.28
     3-HOUR   POINT RAINFALL VALUE(INCHES) =  3.90
     6-HOUR   POINT RAINFALL VALUE(INCHES) =  5.62
    24-HOUR   POINT RAINFALL VALUE(INCHES) = 11.00

----------------------------------------------------------------------------

   TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =    21.57
   TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =    -1.86

****************************************************************************
 TIME     VOLUME      Q   0.      32.5     65.0     97.5     130.0
(HOURS)   (AF)      (CFS)
----------------------------------------------------------------------------
 0.05     0.0000     0.00  Q       .       .       .       .
 0.23     0.0347     4.75  .Q      .       .       .       .
 0.41     0.1044     4.77  .Q      .       .       .       .
 0.59     0.1745     4.81  .Q      .       .       .       .
 0.76     0.2452     4.84  .Q      .       .       .       .
 0.94     0.3163     4.88  .Q      .       .       .       .
 1.12     0.3880     4.91  .Q      .       .       .       .
 1.30     0.4602     4.96  .Q      .       .       .       .
 1.47     0.5329     4.98  .Q      .       .       .       .
 1.65     0.6062     5.03  .Q      .       .       .       .
 1.83     0.6800     5.06  .Q      .       .       .       .
 2.00     0.7544     5.11  .Q      .       .       .       .
 2.18     0.8294     5.14  .Q      .       .       .       .
 2.36     0.9050     5.19  .Q      .       .       .       .
 2.54     0.9812     5.22  .Q      .       .       .       .
 2.71     1.0580     5.27  .Q      .       .       .       .
 2.89     1.1355     5.30  .Q      .       .       .       .
```

3.07	1.2135	5.36	.Q	.	.	.	.
3.24	1.2923	5.39	.Q	.	.	.	.
3.42	1.3717	5.45	.Q	.	.	.	.
3.60	1.4517	5.48	.Q	.	.	.	.
3.78	1.5325	5.55	.Q	.	.	.	.
3.95	1.6140	5.58	.Q	.	.	.	.
4.13	1.6962	5.65	.Q	.	.	.	.
4.31	1.7792	5.68	.Q	.	.	.	.
4.48	1.8629	5.75	.Q	.	.	.	.
4.66	1.9474	5.79	.Q	.	.	.	.
4.84	2.0327	5.86	.Q	.	.	.	.
5.02	2.1188	5.90	.Q	.	.	.	.
5.19	2.2057	5.98	.Q	.	.	.	.
5.37	2.2935	6.02	.Q	.	.	.	.
5.55	2.3822	6.10	.Q	.	.	.	.
5.72	2.4717	6.14	.Q	.	.	.	.
5.90	2.5622	6.22	.Q	.	.	.	.
6.08	2.6537	6.27	.Q	.	.	.	.
6.26	2.7461	6.36	.Q	.	.	.	.
6.43	2.8395	6.40	.Q	.	.	.	.
6.61	2.9339	6.50	.Q	.	.	.	.
6.79	3.0294	6.55	. Q	.	.	.	.
6.96	3.1260	6.65	. Q	.	.	.	.
7.14	3.2237	6.70	. Q	.	.	.	.
7.32	3.3225	6.80	. Q	.	.	.	.
7.50	3.4226	6.86	. Q	.	.	.	.
7.67	3.5238	6.97	. Q	.	.	.	.
7.85	3.6263	7.03	. Q	.	.	.	.
8.03	3.7301	7.15	. Q	.	.	.	.
8.20	3.8353	7.21	. Q	.	.	.	.
8.38	3.9419	7.34	. Q	.	.	.	.
8.56	4.0499	7.41	. Q	.	.	.	.
8.74	4.1594	7.55	. Q	.	.	.	.
8.91	4.2704	7.62	. Q	.	.	.	.
9.09	4.3831	7.77	. Q	.	.	.	.
9.27	4.4974	7.85	. Q	.	.	.	.
9.44	4.6134	8.01	. Q	.	.	.	.
9.62	4.7312	8.09	. Q	.	.	.	.
9.80	4.8510	8.26	. Q	.	.	.	.
9.98	4.9726	8.36	. Q	.	.	.	.
10.15	5.0964	8.54	. Q	.	.	.	.
10.33	5.2222	8.64	. Q	.	.	.	.
10.51	5.3503	8.85	. Q	.	.	.	.
10.68	5.4807	8.96	. Q	.	.	.	.
10.86	5.6136	9.19	. Q	.	.	.	.
11.04	5.7491	9.31	. Q	.	.	.	.
11.22	5.8873	9.57	. Q	.	.	.	.
11.39	6.0283	9.70	. Q	.	.	.	.
11.57	6.1724	9.98	. Q	.	.	.	.
11.75	6.3197	10.13	. Q	.	.	.	.
11.93	6.4704	10.45	. Q	.	.	.	.
12.10	6.6247	10.63	. Q	.	.	.	.
12.28	6.7906	12.03	. Q	.	.	.	.
12.46	6.9681	12.22	. Q	.	.	.	.
12.63	7.1501	12.64	. Q	.	.	.	.
12.81	7.3368	12.86	. Q	.	.	.	.
12.99	7.5287	13.35	. Q	.	.	.	.
13.17	7.7261	13.61	. Q	.	.	.	.
13.34	7.9297	14.19	. Q	.	.	.	.
13.52	8.1398	14.51	. Q	.	.	.	.
13.70	8.3573	15.21	. Q	.	.	.	.
13.87	8.5829	15.60	. Q	.	.	.	.
14.05	8.8176	16.47	. Q	.	.	.	.
14.23	9.0536	15.75	. Q	.	.	.	.
14.41	9.2920	16.81	. Q	.	.	.	.
14.58	9.5429	17.47	. Q	.	.	.	.

```
14.76    9.8104   19.06 .  Q  .     .     .     .
14.94   10.0964   20.02 .   Q .     .     .     .
15.11   10.4071   22.42 .   Q .     .     .     .
15.29   10.7468   23.98 .   Q .     .     .     .
15.47   11.1641   33.03 .     Q     .     .     .
15.65   11.6888   38.64 .     .Q    .     .     .
15.82   12.2959   44.29 .     . Q   .     .     .
16.00   13.0263   55.49 .     .   Q .     .     .
16.18   14.3381  123.69 .     .     .     .     Q .
16.35   15.5564   42.72 .     . Q   .     .     .
16.53   16.0586   25.88 .   Q .     .     .     .
16.71   16.4027   21.12 .   Q .     .     .     .
16.89   16.6907   18.22 .  Q  .     .     .     .
17.06   16.9428   16.21 . Q   .     .     .     .
17.24   17.1787   16.02 . Q   .     .     .     .
17.42   17.4046   14.85 . Q   .     .     .     .
17.59   17.6150   13.89 . Q   .     .     .     .
17.77   17.8127   13.10 . Q   .     .     .     .
17.95   17.9995   12.42 . Q   .     .     .     .
18.13   18.1762   11.70 . Q   .     .     .     .
18.30   18.3372   10.29 . Q   .     .     .     .
18.48   18.4845    9.84 . Q   .     .     .     .
18.66   18.6257    9.44 . Q   .     .     .     .
18.83   18.7612    9.07 . Q   .     .     .     .
19.01   18.8916    8.75 . Q   .     .     .     .
19.19   19.0175    8.45 . Q   .     .     .     .
19.37   19.1392    8.18 . Q   .     .     .     .
19.54   19.2571    7.92 . Q   .     .     .     .
19.72   19.3714    7.69 . Q   .     .     .     .
19.90   19.4825    7.48 . Q   .     .     .     .
20.07   19.5905    7.28 . Q   .     .     .     .
20.25   19.6957    7.09 . Q   .     .     .     .
20.43   19.7982    6.92 . Q   .     .     .     .
20.61   19.8983    6.75 . Q   .     .     .     .
20.78   19.9960    6.60 . Q   .     .     .     .
20.96   20.0915    6.45 .Q    .     .     .     .
21.14   20.1849    6.31 .Q    .     .     .     .
21.32   20.2764    6.18 .Q    .     .     .     .
21.49   20.3659    6.06 .Q    .     .     .     .
21.67   20.4537    5.94 .Q    .     .     .     .
21.85   20.5399    5.82 .Q    .     .     .     .
22.02   20.6244    5.72 .Q    .     .     .     .
22.20   20.7073    5.61 .Q    .     .     .     .
22.38   20.7888    5.52 .Q    .     .     .     .
22.56   20.8689    5.42 .Q    .     .     .     .
22.73   20.9476    5.33 .Q    .     .     .     .
22.91   21.0251    5.25 .Q    .     .     .     .
23.09   21.1013    5.16 .Q    .     .     .     .
23.26   21.1763    5.08 .Q    .     .     .     .
23.44   21.2501    5.01 .Q    .     .     .     .
23.62   21.3229    4.93 .Q    .     .     .     .
23.80   21.3945    4.86 .Q    .     .     .     .
23.97   21.4652    4.79 .Q    .     .     .     .
24.15   21.5349    4.73 .Q    .     .     .     .
24.33   21.5695    0.00 Q     .     .     .     .
-----------------------------------------------------------------------------
-----------------------------------------------------------------------------
  TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
  (Note: 100% of Peak Flow Rate estimate assumed to have
  an instantaneous time duration)

  Percentile of Estimated          Duration
    Peak Flow Rate               (minutes)
  ======================          =========
        0%                   1445.7
       10%                    329.5
```

Estimated Detention Volume 90,050 c.f. @ Existing Q = 63.7

20%	74.4
30%	53.2
40%	21.3
50%	10.6
60%	10.6
70%	10.6
80%	10.6
90%	10.6

DA-11 Detention Calculations

DA-11 AREA: 249184 SF
5.72 AC

16" DIA ORIFICE

A = 1.396
D = 1.33

Q_{100} = 32.9 CFS

1400' ~ 72" PIPE

Vol = 39,584 FT^3

Q_{ALLOW} = 16.96

18"-24"
S.D.

Q_{ACT} = 13.14 CFS

DETENTION FIELD

8 ~ 72" DIA PIPES
175' LONG

ELEV - STORAGE - DISCHARGE

D	H	VOL (A-F)	Q
.67	.33	.0056	2.12
1.33	.67	.1498	5.50
2.0	1.67	.2652	8.69
3.0	2.67	.4545	10.98
4.0	3.67	.6434	12.90
5.0	4.67	.8093	14.56
6.0	5.67	.909	16.01
7.0	6.67	.909	17.36

$Q = CA\sqrt{2gH}$

WQ VOL

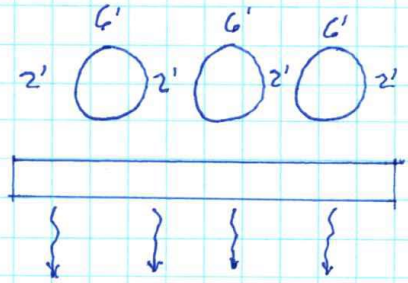
8 pipes X 6' = 48
9 spaces X 2' = 18
66

66' X 175' = 11550 SF
GRAVEL DEPTH 3'

SEE PRINTOUT

Q_{IN} = 33.09 CFS Q_{OUT} = 13.14 CFS

VOL = 3 X 11550 X .4
= 13860 FT^3



```
****************************************************************************
                SMALL AREA UNIT HYDROGRAPH MODEL
============================================================================
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         Ver. 19.0  Release Date: 06/01/2012  License ID 1542

                    Analysis prepared by:

                  Transtech Engineers, Inc.
                      413 Mackay Drive
                   San Bernardino, CA 92408


****************************************************************************
----------------------------------------------------------------------------

 Problem Descriptions:
  DA-11


----------------------------------------------------------------------------


   RATIONAL METHOD CALIBRATION COEFFICIENT = 1.21
   TOTAL CATCHMENT AREA(ACRES) =    5.72
   SOIL-LOSS RATE, Fm,(INCH/HR) =  0.040
   LOW LOSS FRACTION = 0.953
   TIME OF CONCENTRATION(MIN.) = 10.63
   SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
   USER SPECIFIED RAINFALL VALUES ARE USED
   RETURN FREQUENCY(YEARS) = 100
     5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.57
    30-MINUTE POINT RAINFALL VALUE(INCHES) =  1.49
     1-HOUR   POINT RAINFALL VALUE(INCHES) =  2.28
     3-HOUR   POINT RAINFALL VALUE(INCHES) =  3.90
     6-HOUR   POINT RAINFALL VALUE(INCHES) =  5.62
    24-HOUR   POINT RAINFALL VALUE(INCHES) = 11.00

----------------------------------------------------------------------------

   TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     5.75
   TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =    -0.51

****************************************************************************
 TIME     VOLUME      Q   0.      10.0     20.0     30.0     40.0
(HOURS)    (AF)     (CFS)
----------------------------------------------------------------------------
 0.05     0.0000     0.00 Q       .        .        .        .
 0.23     0.0093     1.27 .Q      .        .        .        .
 0.41     0.0278     1.27 .Q      .        .        .        .
 0.59     0.0465     1.28 .Q      .        .        .        .
 0.76     0.0654     1.29 .Q      .        .        .        .
 0.94     0.0844     1.30 .Q      .        .        .        .
 1.12     0.1035     1.31 .Q      .        .        .        .
 1.30     0.1227     1.32 .Q      .        .        .        .
 1.47     0.1421     1.33 .Q      .        .        .        .
 1.65     0.1617     1.34 .Q      .        .        .        .
 1.83     0.1814     1.35 .Q      .        .        .        .
 2.00     0.2012     1.36 .Q      .        .        .        .
 2.18     0.2212     1.37 .Q      .        .        .        .
 2.36     0.2414     1.38 .Q      .        .        .        .
 2.54     0.2617     1.39 .Q      .        .        .        .
 2.71     0.2822     1.41 .Q      .        .        .        .
 2.89     0.3028     1.41 .Q      .        .        .        .
 3.07     0.3237     1.43 .Q      .        .        .        .
```

3.24	0.3447	1.44	.Q	.	.	.	.
3.42	0.3658	1.45	.Q	.	.	.	.
3.60	0.3872	1.46	.Q	.	.	.	.
3.78	0.4087	1.48	.Q	.	.	.	.
3.95	0.4305	1.49	.Q	.	.	.	.
4.13	0.4524	1.51	.Q	.	.	.	.
4.31	0.4745	1.52	.Q	.	.	.	.
4.48	0.4968	1.53	.Q	.	.	.	.
4.66	0.5194	1.54	.Q	.	.	.	.
4.84	0.5421	1.56	.Q	.	.	.	.
5.02	0.5651	1.57	.Q	.	.	.	.
5.19	0.5883	1.59	.Q	.	.	.	.
5.37	0.6117	1.60	.Q	.	.	.	.
5.55	0.6353	1.63	.Q	.	.	.	.
5.72	0.6592	1.64	.Q	.	.	.	.
5.90	0.6834	1.66	.Q	.	.	.	.
6.08	0.7078	1.67	.Q	.	.	.	.
6.26	0.7324	1.70	.Q	.	.	.	.
6.43	0.7573	1.71	.Q	.	.	.	.
6.61	0.7825	1.73	.Q	.	.	.	.
6.79	0.8080	1.75	.Q	.	.	.	.
6.96	0.8337	1.77	.Q	.	.	.	.
7.14	0.8598	1.79	.Q	.	.	.	.
7.32	0.8861	1.81	.Q	.	.	.	.
7.50	0.9128	1.83	.Q	.	.	.	.
7.67	0.9398	1.86	.Q	.	.	.	.
7.85	0.9672	1.88	.Q	.	.	.	.
8.03	0.9949	1.91	.Q	.	.	.	.
8.20	1.0229	1.92	.Q	.	.	.	.
8.38	1.0513	1.96	.Q	.	.	.	.
8.56	1.0801	1.98	.Q	.	.	.	.
8.74	1.1093	2.01	. Q	.	.	.	.
8.91	1.1389	2.03	. Q	.	.	.	.
9.09	1.1690	2.07	. Q	.	.	.	.
9.27	1.1995	2.09	. Q	.	.	.	.
9.44	1.2304	2.14	. Q	.	.	.	.
9.62	1.2619	2.16	. Q	.	.	.	.
9.80	1.2938	2.20	. Q	.	.	.	.
9.98	1.3262	2.23	. Q	.	.	.	.
10.15	1.3592	2.28	. Q	.	.	.	.
10.33	1.3928	2.31	. Q	.	.	.	.
10.51	1.4270	2.36	. Q	.	.	.	.
10.68	1.4617	2.39	. Q	.	.	.	.
10.86	1.4972	2.45	. Q	.	.	.	.
11.04	1.5333	2.48	. Q	.	.	.	.
11.22	1.5702	2.55	. Q	.	.	.	.
11.39	1.6078	2.59	. Q	.	.	.	.
11.57	1.6462	2.66	. Q	.	.	.	.
11.75	1.6855	2.70	. Q	.	.	.	.
11.93	1.7257	2.79	. Q	.	.	.	.
12.10	1.7669	2.83	. Q	.	.	.	.
12.28	1.8111	3.21	. Q	.	.	.	.
12.46	1.8584	3.26	. Q	.	.	.	.
12.63	1.9070	3.37	. Q	.	.	.	.
12.81	1.9568	3.43	. Q	.	.	.	.
12.99	2.0080	3.56	. Q	.	.	.	.
13.17	2.0606	3.63	. Q	.	.	.	.
13.34	2.1149	3.79	. Q	.	.	.	.
13.52	2.1709	3.87	. Q	.	.	.	.
13.70	2.2290	4.06	. Q	.	.	.	.
13.87	2.2891	4.16	. Q	.	.	.	.
14.05	2.3517	4.39	. Q	.	.	.	.
14.23	2.4147	4.20	. Q	.	.	.	.
14.41	2.4782	4.48	. Q	.	.	.	.
14.58	2.5452	4.66	. Q	.	.	.	.
14.76	2.6165	5.08	. Q	.	.	.	.

```
14.94    2.6928    5.34 .   Q   .      .      .      .
15.11    2.7757    5.98 .   Q   .      .      .      .
15.29    2.8663    6.39 .   Q   .      .      .      .
15.47    2.9775    8.81 .     Q .      .      .      .
15.65    3.1175   10.31 .      Q      .      .      .
15.82    3.2790   11.76 .      .Q     .      .      .
16.00    3.4731   14.75 .      .  Q   .      .      .
16.18    3.8233   33.09 .      .      .      . Q    .
16.35    4.1490   11.39 .      .Q     .      .      .
16.53    4.2830    6.90 .   Q   .      .      .      .
16.71    4.3747    5.63 .   Q   .      .      .      .
16.89    4.4515    4.86 .  Q    .      .      .      .
17.06    4.5188    4.32 .  Q    .      .      .      .
17.24    4.5817    4.27 .  Q    .      .      .      .
17.42    4.6420    3.96 . Q     .      .      .      .
17.59    4.6981    3.71 . Q     .      .      .      .
17.77    4.7508    3.49 . Q     .      .      .      .
17.95    4.8006    3.31 . Q     .      .      .      .
18.13    4.8477    3.12 . Q     .      .      .      .
18.30    4.8907    2.74 .Q      .      .      .      .
18.48    4.9300    2.62 .Q      .      .      .      .
18.66    4.9676    2.52 .Q      .      .      .      .
18.83    5.0038    2.42 .Q      .      .      .      .
19.01    5.0385    2.33 .Q      .      .      .      .
19.19    5.0721    2.25 .Q      .      .      .      .
19.37    5.1046    2.18 .Q      .      .      .      .
19.54    5.1360    2.11 .Q      .      .      .      .
19.72    5.1665    2.05 .Q      .      .      .      .
19.90    5.1961    1.99 .Q      .      .      .      .
20.07    5.2249    1.94 .Q      .      .      .      .
20.25    5.2530    1.89 .Q      .      .      .      .
20.43    5.2803    1.84 .Q      .      .      .      .
20.61    5.3070    1.80 .Q      .      .      .      .
20.78    5.3331    1.76 .Q      .      .      .      .
20.96    5.3586    1.72 .Q      .      .      .      .
21.14    5.3835    1.68 .Q      .      .      .      .
21.32    5.4079    1.65 .Q      .      .      .      .
21.49    5.4318    1.62 .Q      .      .      .      .
21.67    5.4552    1.58 .Q      .      .      .      .
21.85    5.4781    1.55 .Q      .      .      .      .
22.02    5.5007    1.52 .Q      .      .      .      .
22.20    5.5228    1.50 .Q      .      .      .      .
22.38    5.5445    1.47 .Q      .      .      .      .
22.56    5.5659    1.45 .Q      .      .      .      .
22.73    5.5869    1.42 .Q      .      .      .      .
22.91    5.6075    1.40 .Q      .      .      .      .
23.09    5.6279    1.38 .Q      .      .      .      .
23.26    5.6479    1.36 .Q      .      .      .      .
23.44    5.6676    1.33 .Q      .      .      .      .
23.62    5.6870    1.32 .Q      .      .      .      .
23.80    5.7061    1.30 .Q      .      .      .      .
23.97    5.7249    1.28 .Q      .      .      .      .
24.15    5.7435    1.26 .Q      .      .      .      .
24.33    5.7528    0.00 Q       .      .      .      .
 ------------------------------------------------------------------------------
------------------------------------------------------------------------------
  TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
  (Note: 100% of Peak Flow Rate estimate assumed to have
  an instantaneous time duration)

  Percentile of Estimated          Duration
    Peak Flow Rate               (minutes)
  ======================          =========
        0%                     1445.7
       10%                      329.5
       20%                       74.4
```

30%	53.2
40%	21.3
50%	10.6
60%	10.6
70%	10.6
80%	10.6
90%	10.6

Problem Descriptions:
DA-11

```
==========================================================================
   FLOW-THROUGH DETENTION BASIN MODEL

   SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
   CONSTANT HYDROGRAPH TIME UNIT(MINUTES) =   10.630
   DEAD STORAGE(AF) =       0.00
   SPECIFIED DEAD STORAGE(AF) FILLED =       0.00
   ASSUMED INITIAL DEPTH(FEET) IN STORAGE BASIN =    0.00


             INFLOW
               |
               |
               |
               V              __effective depth
          -------------         |   (and volume)
          |         |    |    |
          | detention |    |....V.............
          |   basin   |<-->|         outflow
          |         |    |.........__________
          -------------    |        |   \
               |         | storage |     basin outlet
               V         -----------
             OUTFLOW


   DEPTH-VS.-STORAGE AND DEPTH-VS.-DISCHARGE INFORMATION:
   TOTAL NUMBER OF BASIN DEPTH INFORMATION ENTRIES =   9
   *BASIN-DEPTH  STORAGE    OUTFLOW  **BASIN-DEPTH  STORAGE    OUTFLOW  *
   *   (FEET)  (ACRE-FEET)   (CFS)   **   (FEET)  (ACRE-FEET)   (CFS)   *
   *     0.000     0.000     0.000**     0.670     0.056     2.120*
   *     1.330     0.150     5.500**     2.000     0.265     8.690*
   *     3.000     0.454    10.980**     4.000     0.643    12.900*
   *     5.000     0.809    14.560**     6.000     0.909    16.010*
   *     7.000     0.909    17.360**
---------------------------------------------------------------------------
   BASIN STORAGE, OUTFLOW AND DEPTH ROUTING VALUES:
    INTERVAL   DEPTH   {S-O*DT/2}   {S+O*DT/2}
     NUMBER   (FEET)   (ACRE-FEET)  (ACRE-FEET)
        1    0.00      0.00000     0.00000
        2    0.67      0.04008     0.07112
        3    1.33      0.10953     0.19007
        4    2.00      0.20158     0.32882
        5    3.00      0.37412     0.53488
        6    4.00      0.54896     0.73784
        7    5.00      0.70271     0.91589
        8    6.00      0.79179     1.02621
        9    7.00      0.78191     1.03609
   WHERE S=STORAGE(AF);O=OUTFLOW(AF/MIN.);DT=UNIT INTERVAL(MIN.)
---------------------------------------------------------------------------
   DETENTION BASIN ROUTING RESULTS:
```

NOTE: COMPUTED BASIN DEPTH, OUTFLOW, AND STORAGE QUANTITIES
OCCUR AT THE GIVEN TIME. BASIN INFLOW VALUES REPRESENT THE
AVERAGE INFLOW DURING THE RECENT HYDROGRAPH UNIT INTERVAL.

TIME (HRS)	DEAD-STORAGE FILLED(AF)	INFLOW (CFS)	EFFECTIVE DEPTH(FT)	OUTFLOW (CFS)	EFFECTIVE VOLUME(AF)
0.055	0.000	0.00	0.00	0.00	0.000
0.232	0.000	1.27	0.17	0.28	0.014
0.409	0.000	1.27	0.27	0.71	0.023
0.586	0.000	1.28	0.33	0.96	0.027
0.764	0.000	1.29	0.36	1.10	0.030
0.941	0.000	1.30	0.39	1.19	0.032
1.118	0.000	1.31	0.40	1.24	0.033
1.295	0.000	1.32	0.41	1.27	0.034
1.472	0.000	1.33	0.41	1.29	0.034
1.649	0.000	1.34	0.42	1.31	0.035
1.827	0.000	1.35	0.42	1.33	0.035
2.004	0.000	1.36	0.43	1.34	0.035
2.181	0.000	1.37	0.43	1.35	0.036
2.358	0.000	1.38	0.43	1.36	0.036
2.535	0.000	1.39	0.44	1.37	0.036
2.712	0.000	1.41	0.44	1.38	0.036
2.890	0.000	1.41	0.44	1.40	0.037
3.067	0.000	1.43	0.45	1.41	0.037
3.244	0.000	1.44	0.45	1.42	0.037
3.421	0.000	1.45	0.45	1.43	0.038
3.598	0.000	1.46	0.46	1.44	0.038
3.776	0.000	1.48	0.46	1.46	0.038
3.953	0.000	1.49	0.47	1.47	0.039
4.130	0.000	1.51	0.47	1.48	0.039
4.307	0.000	1.52	0.47	1.49	0.039
4.484	0.000	1.53	0.48	1.51	0.040
4.661	0.000	1.54	0.48	1.52	0.040
4.839	0.000	1.56	0.49	1.54	0.040
5.016	0.000	1.57	0.49	1.55	0.041
5.193	0.000	1.59	0.50	1.56	0.041
5.370	0.000	1.60	0.50	1.58	0.042
5.547	0.000	1.63	0.51	1.60	0.042
5.724	0.000	1.64	0.51	1.61	0.042
5.901	0.000	1.66	0.52	1.63	0.043
6.079	0.000	1.67	0.52	1.64	0.043
6.256	0.000	1.70	0.53	1.66	0.044
6.433	0.000	1.71	0.53	1.68	0.044
6.610	0.000	1.73	0.54	1.70	0.045
6.787	0.000	1.75	0.54	1.72	0.045
6.964	0.000	1.77	0.55	1.73	0.046
7.142	0.000	1.79	0.56	1.75	0.046
7.319	0.000	1.81	0.56	1.77	0.047
7.496	0.000	1.83	0.57	1.80	0.047
7.673	0.000	1.86	0.58	1.82	0.048
7.850	0.000	1.88	0.58	1.84	0.048
8.028	0.000	1.91	0.59	1.86	0.049
8.205	0.000	1.92	0.60	1.89	0.050
8.382	0.000	1.96	0.61	1.91	0.050
8.559	0.000	1.98	0.62	1.93	0.051
8.736	0.000	2.01	0.62	1.96	0.052
8.913	0.000	2.03	0.63	1.99	0.052
9.090	0.000	2.07	0.64	2.02	0.053
9.268	0.000	2.09	0.65	2.04	0.054
9.445	0.000	2.14	0.66	2.07	0.055
9.622	0.000	2.16	0.67	2.11	0.056
9.799	0.000	2.20	0.68	2.14	0.057
9.976	0.000	2.23	0.68	2.17	0.057
10.154	0.000	2.28	0.69	2.21	0.059
10.331	0.000	2.31	0.70	2.24	0.059

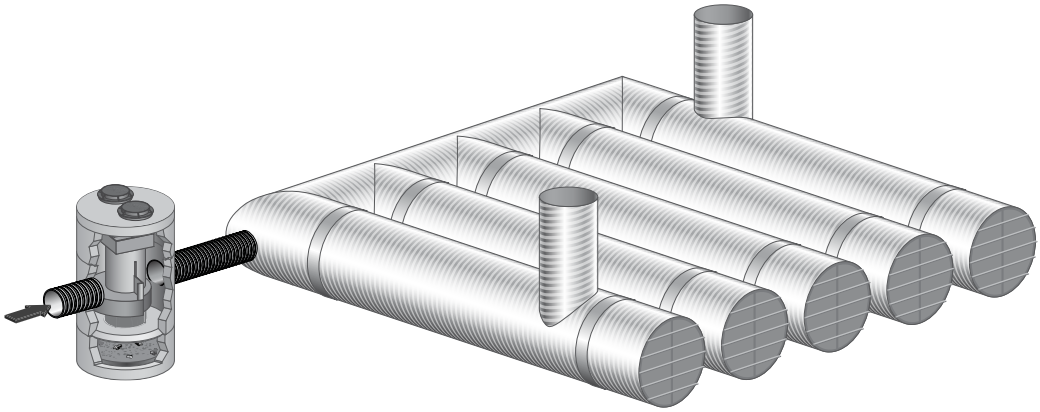
10.508	0.000	2.36	0.71	2.28	0.061
10.685	0.000	2.39	0.71	2.32	0.062
10.862	0.000	2.45	0.72	2.36	0.063
11.039	0.000	2.48	0.73	2.41	0.064
11.217	0.000	2.55	0.74	2.45	0.066
11.394	0.000	2.59	0.75	2.50	0.067
11.571	0.000	2.66	0.76	2.55	0.068
11.748	0.000	2.70	0.77	2.61	0.070
11.925	0.000	2.79	0.78	2.66	0.072
12.102	0.000	2.83	0.79	2.73	0.073
12.280	0.000	3.21	0.83	2.85	0.079
12.457	0.000	3.26	0.86	3.01	0.082
12.634	0.000	3.37	0.88	3.14	0.086
12.811	0.000	3.43	0.90	3.25	0.088
12.988	0.000	3.56	0.92	3.35	0.091
13.165	0.000	3.63	0.94	3.45	0.094
13.342	0.000	3.79	0.96	3.56	0.097
13.520	0.000	3.87	0.98	3.67	0.100
13.697	0.000	4.06	1.01	3.79	0.104
13.874	0.000	4.16	1.03	3.92	0.108
14.051	0.000	4.39	1.07	4.07	0.112
14.228	0.000	4.20	1.07	4.16	0.113
14.406	0.000	4.48	1.10	4.24	0.116
14.583	0.000	4.66	1.13	4.38	0.121
14.760	0.000	5.08	1.18	4.58	0.128
14.937	0.000	5.34	1.23	4.84	0.135
15.114	0.000	5.98	1.31	5.18	0.147
15.291	0.000	6.39	1.38	5.57	0.159
15.469	0.000	8.81	1.60	6.27	0.196
15.646	0.000	10.31	1.85	7.37	0.239
15.823	0.000	11.76	2.12	8.46	0.287
16.000	0.000	14.75	2.53	9.43	0.365
16.177	**0.000**	**33.09**	**4.22**	**11.58**	**0.680**
16.354	0.000	11.39	4.07	13.14	0.655
16.531	0.000	6.90	3.62	12.59	0.571
16.709	0.000	5.63	3.15	11.71	0.482
16.886	0.000	4.86	2.69	10.77	0.396
17.063	0.000	4.32	2.27	9.79	0.316
17.240	0.000	4.27	1.91	8.78	0.250
17.417	0.000	3.96	1.61	7.54	0.197
17.595	0.000	3.71	1.39	6.29	0.159
17.772	0.000	3.49	1.21	5.33	0.133
17.949	0.000	3.31	1.08	4.56	0.114
18.126	0.000	3.12	0.99	4.00	0.102
18.303	0.000	2.74	0.91	3.56	0.090
18.480	0.000	2.62	0.85	3.19	0.081
18.657	0.000	2.52	0.81	2.93	0.075
18.835	0.000	2.42	0.77	2.74	0.071
19.012	0.000	2.33	0.75	2.59	0.067
19.189	0.000	2.25	0.73	2.47	0.064
19.366	0.000	2.18	0.71	2.36	0.061
19.543	0.000	2.11	0.69	2.27	0.059
19.720	0.000	2.05	0.68	2.19	0.057
19.898	0.000	1.99	0.66	2.12	0.055
20.075	0.000	1.94	0.64	2.06	0.053
20.252	0.000	1.89	0.62	1.99	0.052
20.429	0.000	1.84	0.60	1.94	0.050
20.606	0.000	1.80	0.59	1.89	0.049
20.784	0.000	1.76	0.57	1.84	0.048
20.961	0.000	1.72	0.56	1.80	0.047
21.138	0.000	1.68	0.55	1.76	0.046
21.315	0.000	1.65	0.54	1.72	0.045
21.492	0.000	1.62	0.53	1.68	0.044
21.669	0.000	1.58	0.51	1.64	0.043
21.847	0.000	1.55	0.50	1.61	0.042
22.024	0.000	1.52	0.49	1.58	0.041

22.201	0.000	1.50	0.49	1.55	0.040
22.378	0.000	1.47	0.48	1.52	0.040
22.555	0.000	1.45	0.47	1.49	0.039
22.732	0.000	1.42	0.46	1.47	0.038
22.909	0.000	1.40	0.45	1.44	0.038
23.087	0.000	1.38	0.44	1.42	0.037
23.264	0.000	1.36	0.44	1.40	0.036
23.441	0.000	1.33	0.43	1.37	0.036
23.618	0.000	1.32	0.42	1.35	0.035
23.795	0.000	1.30	0.42	1.33	0.035
23.972	0.000	1.28	0.41	1.31	0.034
24.150	0.000	1.26	0.41	1.29	0.034
24.327	0.000	0.00	0.23	1.00	0.019
24.504	0.000	0.00	0.13	0.57	0.011
24.681	0.000	0.00	0.07	0.32	0.006
24.858	0.000	0.00	0.04	0.18	0.003
25.035	0.000	0.00	0.02	0.10	0.002
25.213	0.000	0.00	0.01	0.06	0.001

Corrugated Metal Pipe Detention Design Guide

CONTECH®
ENGINEERED SOLUTIONS

Corrugated Metal Pipe Detention Design Guide



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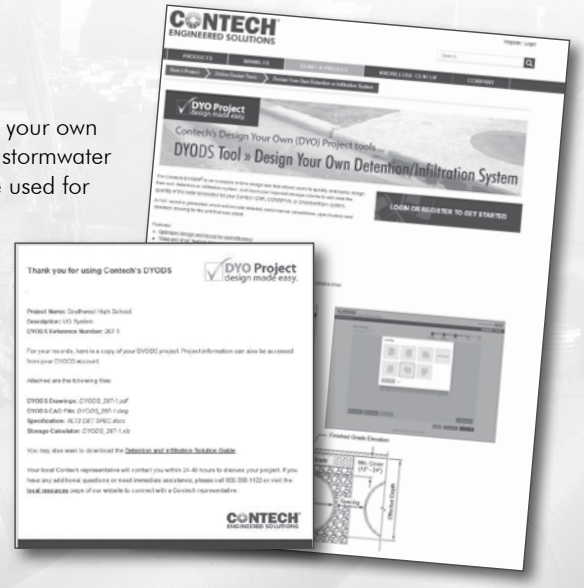

Design Your Own Detention System (DYODS®)

Contech's DYODS is an exclusive, online design tool that allows you to design your own detention or infiltration system. DYODS fully automates the layout process for stormwater detention and infiltration systems and produces CAD and PDF files that can be used for creating plans and specs, and for estimating total installed costs.
Features of the new tool include:

- Optimizes design and layout for cost efficiency
- "Drag and drop" feature allow users to customize layout
- Design multiple systems per project and save for future use
- Provides instant access to customized, project specific drawings
- CAD/PDF files provided for use in creating plans and specs
- Guides the selection of CMP material and coatings

The DYODS tool is available at www.conteches.com/DYO.

Online Product Design Worksheet (PDW)

Our in-house team of engineers can support you through the entire permitting process. Just enter your information into the online form, and one of our in-house engineers will contact you with specific recommendations for your project.

The Detention Product Design Worksheet
is available at www.conteches.com/detentionpdw

Engineering Services & Support

Contech has regional engineering offices and local stormwater consultants trained to provide regulatory guidance and permitting assistance, preliminary standard details and/or site specific final drawings and specifications, Low Impact Development design assistance, engineering calculations for hydraulics/hydrology, buoyancy, and stage-storage, installation support, maintenance support and more.

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Guidelines for Designing CMP Detention Systems

Please follows these guidelines when designing a custom fabricated CMP detention system.

- No riser or stubs on a weld.
- Minimum distance from riser or stub to a weld joint is 12".
- Riser minimum distance to end of pipe is 24".
- Stub minimum distance to end of pipe is 12".
- Spacing between pipe runs up to /incl 24"diameter pipe is 12", 24" to 72" diameter pipe is equal to half the diameter of pipe, =>72" Diameter pipe is 3 ft standard spacing.
- Minimum depth of earth cover is 1' above crown of pipe up 96" diameter pipe, 102" diameter pipe and over is 18" min. earth cover.
- Standardized length of pipe is 24' but can vary from one region to another. Speak to your local Contech representative for additional information.
- Minimum length of pipe needs to be 4 feet greater than the diameter of the pipe.
- Any system should be outside the building's foundation zone of influence and any system beneath a structure should be evaluated on an individual basis.

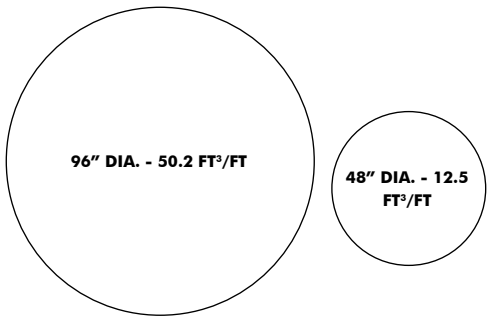
Cost-Effective Design and Layout

The three most important goals should be to shrink the footprint of the system by maximizing the storage volume within a given area, eliminate unnecessary welding and fabrication, and eliminate unnecessary structures.

Shrinking the Footprint

The goal of any CMP detention system should be to maximize the vertical space available to minimize the overall footprint, to reduce material, excavation, and backfill costs. To do this we recommend using the largest diameter pipe possible.

Increasing the depth of a CMP detention system allows for a smaller footprint while storing the same amount of water. For example, doubling the diameter of pipe yields four times as much storage volume per foot in the pipe. This provides significant cost savings per cubic foot of storage. Also, more vertical storage space means a smaller footprint equating to less excavation, less backfill and lower project costs.

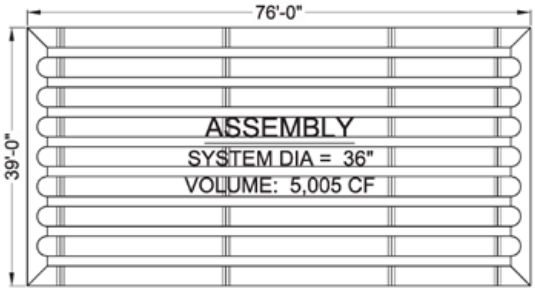


2X THE DIAMETER = 4 X THE STORAGE

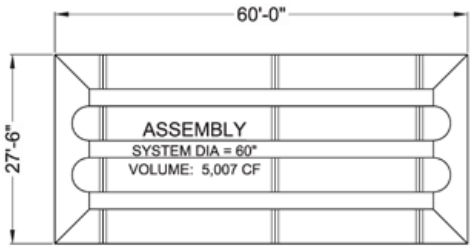
Larger pipe provides storage at a lower cost per cubic foot.

Consider the following example:

System 1 is made from 36" diameter pipe that provides 5,005 cubic feet of storage. System 2 is made from 60" diameter pipe that provides the same 5,005 cubic feet of storage. Both systems provide the same amount of storage, but System 2 is the most economical design as it reduces material costs, fabrication costs, excavation, and backfill costs. Having fewer runs of pipe will cut down on the number of welds and special fabrication requirements. Having fewer welds will also cut down on lead times. Lastly, System 2 has a footprint that is 1,300 square feet smaller than System 1, reducing excavation and backfill costs. The only instance, where System 2 may not be feasible, is when you do not have the available depth for the larger diameter pipe.



System 1

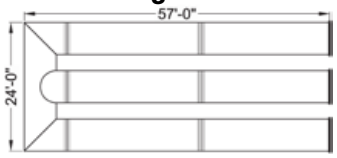


System 2

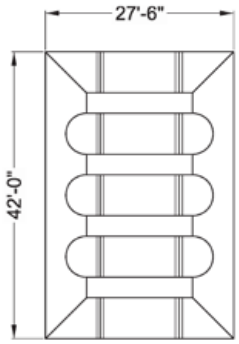
Eliminating Unnecessary Welds

The rule of thumb is to use as much straight pipe as possible to reduce the number of tees and elbows in your design. Doing so will result in a more cost effective and efficient design, and will also reduce lead times. In the example below, both systems are designed with 72" diameter pipe and roughly the same storage volume. System 1 uses only two elbows and one tee and will be much more cost effective than System Two that uses four elbows and six tees.

Efficient Design



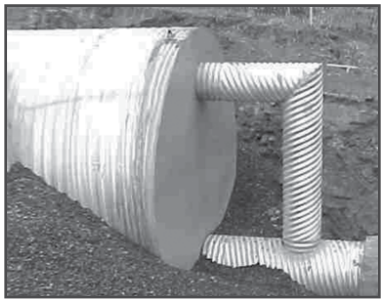
Inefficient Design



System 1 *System 2*

Eliminating Unnecessary Structures

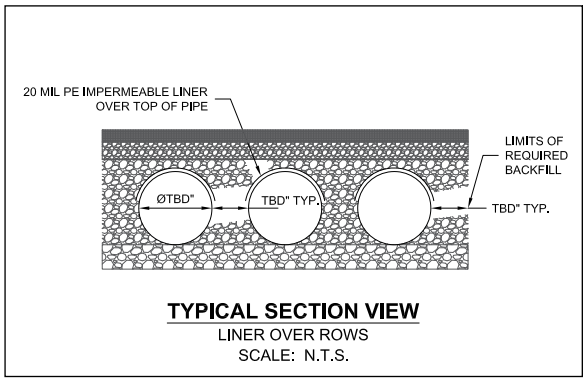
Costs can also be reduced by eliminating concrete structures such as catch basins and outlet control structures by incorporating them into the CMP system. For example, a riser can be added to a system in the low point of a parking lot with a grated inlet to eliminate a concrete catch basin. Internal weir plates and multiple external outlet stubs can often be used to eliminate a separate concrete outlet control structure downstream. Such designs may seem a bit unusual for an engineer that is used to designing with concrete structures. Contech's team of stormwater design engineers have experience in this and can assist with the routing designs of CMP detention systems.



CMP Detention Systems in Corrosive Environments

A site's resistivity may change over time when various types of salting agents are used, such as road salts for deicing purposes. If salting agents are used on or near the project site, a geomembrane barrier must be used with the system. The geomembrane liner is intended to help protect the system from the potential adverse effects that may result from the use of such salting agents including premature corrosion and reduced actual service life.

The project's Engineer of Record is to evaluate whether salting agents will be used on or near the project site, and use his/her best judgement to determine if any additional protective measures are required. Below is a typical detail showing the placement of a geomembrane barrier for projects where salting agents are used on or near the project site.



Standard Liner Over Rows

Detention Pipe Selection

Durability Design Guide for CMP Detention Products

Proper design of detention systems requires structural, hydraulic and durability considerations. While most designers are comfortable with structural and hydraulic design, the mechanics of evaluating abrasion, corrosion and water chemistry to perform a durability design are not found in most civil engineering handbooks.

The durability and service life of a CMP detention installation is directly related to the environmental conditions encountered at the site and the type of materials and coatings from which the system is fabricated. Two principle causes of early failure for CMP are corrosion and abrasion.

Service life can be affected by the corrosive action of the backfill in contact with the outside of a CMP detention or occasionally by the corrosive and abrasive action of the flow in the invert of the CMP detention. The design life analysis should include a check for both the water side and soil side environments to determine which is more critical— or which governs service life.

Metal loss in the invert of a CMP detention due to abrasive flows is not typical as the hydraulic dynamics are different as compared to a culvert application. An estimate for potential abrasion is required at each pipe location in order to determine the appropriate material and gage. Typical Detention applications are considered to have an Abrasion Level 1, or non-abrasive.

This manual is intended to guide specifiers through the mechanics of selecting appropriate materials to meet service life requirements. The information contained in the following pages is a composite of several national guidelines.

Procedure for Selection of the Appropriate System

The choice of material, gage and product type can be extremely important to service life. The following steps describe the procedure for selecting the appropriate CMP detention material and gage to meet a specific service life requirement.

Design Sequence:

1. Select pipe or structure based on hydraulic and clearance requirements.
2. Use Height of Cover tables for the chosen pipe or structure to determine the material gage required for the specific loading condition.
3. Use Table 2 to select the appropriate material for the site-specific environmental conditions. There may be some instances where more than one material is appropriate for the project environmental conditions. Generally speaking, the metal material types increase in price as you move from top down on Table 2. Please contact your local Contech Representative for pricing.
4. Use Table 3 to determine which abrasion level most accurately describes site conditions. The expected stream velocity and associated abrasion conditions should be based on a typical flow and not a 10 or 50-year design flood. Abrasion Level 1 is typically an accepted value for detention and infiltration applications.
5. Use Table 4 to determine whether the structural gage for the selected material is sufficient for the design service life. If the structural gage is greater than or equal to the gage required for a particular abrasion condition and service life, use the structural gage. Conversely, if the structural gage is less than the gage required for a particular abrasion condition and service life, use the gage required by Table 4.

Note: *Corrosive environments, such as seawater and road/de-icing salt infiltration, and other environments with pH and resistivity outside of the recommended range may cause premature corrosion and reduce actual service life. See page 19 for additional information.*

Table 1 - AASHTO Reference Specifications					
	Material Type	**Material**	**Pipe**	**Design***	**Installation***
Pipe & Pipe Arch	**CMP (1/2" or 1" deep corrugations)**				
	Galvanized (2 oz.)	M218	M36	Section 12	Section 26
	Asphalt Coated	M190	M36	Section 12	Section 26
	Asphalt Coated and Paved Invert	M190	M36	Section 12	Section 26
	Aluminized Type 2	M274	M36	Section 12	Section 26
	Polymer Coated	M246	M36 & M245	Section 12	Section 26
	Aluminum Alloy	M197	M196	Section 12	Section 26
	ULTRA FLO® (3/4" x 3/4" x 7-1/2" corrugation)				
	Galvanized (2 oz.)	M218	M36	Section 12	Section 26
	Aluminized Type 2	M274	M36	Section 12	Section 26
	Polymer Coated	M246	M36 & M245	Section 12	Section 26
	Aluminum Alloy	M197	M196	Section 12	Section 26
	Smooth Cor™				
	Polymer Coated	M246	M36 & M245	Section 12	Section 26

* *AASHTO LRFD Bridge Design Specification and AASHTO Standard Specification for Highway Bridges*

Table 2 — Recommended Environments

Material Type	Soil* and Water pH										Resistivity (ohm-cm)	
	3	4	5	6	7	8	9	10	11	12	Minimum	Maximum
Galvanized Steel*											2,000	10,000
Aluminized Steel Type 2											1,500	N/A
Polymer Coated											250	N/A
Aluminum Alloy											500	N/A

**Appropriate pH range for Galvanized Steel is 6.0 to 10*

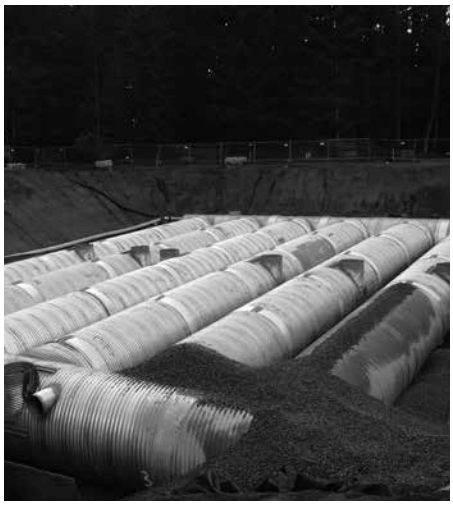


Table 3 — FHWA Abrasion Guidelines

Abrasion Level	Abrasion Condition	Bed Load	Flow Velocity (fps)
1*	Non-Abrasive	None	Minimal
2	Low Abrasion	Minor	< 5
3	Moderate Abrasion	Moderate	5 - 15
4	Severe Abrasion	Heavy	> 15

"Interim Direct Guidelines on CMP Drainage Alternative Selection." FHWA, 2005.
** Typical abrasion level for Detention and Infiltration applications is level 1.*

Table 4 – CMP Detention & Infiltration Typical Gage Recommendations

Design Service Life[1] Estimates Abrasion Level 1 & 2	25 Years	50 Years	75 Years	100 Years
Galvanized (2 oz.)[2]	16	12	10	8[5]
Aluminized Type 2[3]	16	16	16	14[6]
Polymer Coated[4]	16	16	16[7]	16[8]
Aluminum Alloy	16	16	16	16

"Interim Direct Guidelines on CMP Drainage Alternative Selection." FHWA, 2005.

1. *All service life guidance is based on use in certain recommended environments only.*
2. *The National Corrugated Steel Pipe Association (NCSPA) provides service life guidance for galvanized materials, with service life guidance up to 97 years for 8 GA galvanized.*
3. *Aluminized Type 2 is the typical coating for most detention and infiltration applications. The NCSPA service life guidance of 75+ years for ALT2 in recommended environments, for pH 5-9 and resistivity > 1,500 ohm-cm.*
4. *The NCSPA provides service life guidance for polymer coated materials. Service life guidance of up to 75 years for polymer coated materials is based on a pH range of 4-9 and resistivity greater than 750 ohm-cm and of up to 100 years for polymer coated is based on a pH range of 5-9 and resistivity greater than 1,500 ohm-cm.*
5. *Design service life for 8 GA galvanized is 97 years.*
6. *NCSPA states that 14 GA ALT2 can achieve a 100 year service life when the environmental conditions have a pH of 5 to 9 and a resistivity greater than 1,500 ohm-cm.*
7. *75 year service life for polymer-coated is based on a pH range of 4-9 and resistivity greater than 750 ohm-cm.*
8. *100 year service life for polymer-coated is based on a pH range of 5-9 and resistivity greater than 1,500 ohm-cm.*

CMP for Subsurface Infilitration

- CMP infiltration systems can be designed to meet HS 20 or greater load requirements with proper depths of cover.
- Protective pipe coatings such as Aluminized Type 2 (ALT2), Galvanized, and Polymer-Coated are matched to the pH and resistivity of the surrounding soil. See table 3 for additional information.
- CMP infiltration systems need to be surrounded by clean crushed stone to provide increased capacity utilizing storage in the void space. The system is then wrapped with fabric on the sides and top. The fabric is primarily used to keep native soils from filling stone voids and reducing long term storage capacity.

Storage Volumes for Corrugated Steel Pipe

Round Pipe - Hydraulic Storage per Linear Foot	
Diameter (Inches)	Hydraulic Storage (CF per FT)
12	0.8
15	1.2
18	1.8
21	2.4
24	3.1
30	4.9
36	7.1
42	9.6
48	12.6
54	15.9
60	19.6
66	23.8
72	28.3
78	33.2
84	38.5
90	44.2
96	50.3
102	56.7
108	63.6
114	70.9
120	78.5
126	86.6
132	95.0
138	103.9
144	113.1

Pipe Arch - Hydraulic Storage per Linear Foot		
2 2/3" x 1/2" Corrugated Steel Pipe		
Diameter (Inches)	Pipe Arch Equivalent Size (Inches)	Hydraulic Storage (CF per FT)
15	17 x 13	1.1
18	21 x 15	1.6
21	24 x 18	2.2
24	28 x 20	2.4
30	35 x 24	4.5
36	42 x 29	6.5
42	49 x 33	8.9
48	57 x 38	11.6
54	64 x 43	14.7
60	71 x 47	18.1
66	77 x 52	21.9
72	83 x 57	26.0

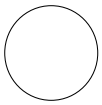
Pipe Arch - Hydraulic Storage per Linear Foot		
3" x 1" or 5" x 1" Corrugated Steel Pipe		
Diameter (Inches)	Pipe Arch Equivalent Size (Inches)	Hydraulic Storage (CF per FT)
54	60 x 46	15.6
60	66 x 51	19.3
66	73 x 55	23.2
72	81 x 59	27.4
78	87 x 63	32.1
84	95 x 67	37.0
90	103 x 71	42.4
96	112 x 75	48.0
102	117 x 79	54.2
108	128 x 83	60.5
114	137 x 87	67.4
120	142 x 91	74.5

Height of Cover and Weights Tables for HEL-COR® Corrugated Steel Pipe (CSP)

Heights of Cover Notes:

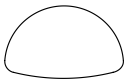
1. *These tables are for lock-seam or welded-seam construction. They are not for riveted construction. Consult your Contech Stormwater Consultant for Height of Cover tables on riveted pipe.*
2. *These values, where applicable, were calculated using a load factor of K=0.86 as adopted in the NCSPA CSP Design Manual, 2008.*
3. *The span and rise shown in these tables are nominal. Typically the actual rise that forms is greater than the specified nominal. This actual rise is within the tolerances as allowed by the AASHTO & ASTM specifications. The minimum covers shown are more conservative than required by the AASHTO and ASTM specifications to account for this anticipated increase in rise. Less cover height may be tolerated depending upon actual rise of supplied pipe arch.*
4. *H 20 and H 25 minimum cover is measured from top of pipe to bottom of flexible pavement or top of rigid pavement.*
5. *The H 20 and H 25 pipe-arch tables are based on 2 tons per square foot corner bearing pressures.*
6. *0.052" is 18 gage.*
   0.064" is 16 gage.
   0.079" is 14 gage.
   0.109" is 12 gage.
   0.138" is 10 gage.
   0.168" is 8 gage.
7. *For construction and firetruck loads, see Page 18.*
8. *1-1/2" x 1/4" corrugation. H 20, H 25 and E 80 loading.*
9. *Sewer gage (trench conditions) tables for corrugated steel pipe can be found in the AISI book "Modern Sewer Design," 4th Edition, 1999. These tables may reduce the minimum gage due to a higher flexibility factor allowed for a trench condition.*
10. *The haunch areas of a pipe-arch are the most critical zone for backfilling. Extra care should be taken to provide good material and compaction to a point above the spring line.*

Heights of Cover Limits – 2 2/3" x ½" HEL-COR CSP



H 20 and H 25 Live Loads

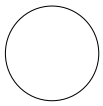
Diameter or Span, Inches	Minimum Cover, Inches	Maximum Cover, Feet – Specified Thickness, Inches					
		0.052	0.064	0.079	0.109	0.138	0.168
6[8]	12	388	486				
8[8]	12	291	365				
10[8]	12	233	392				
12	12	197	248	310			
15	12	158	198	248			
18	12	131	165	206			
21	12	113	141	177	248		
24	12	98	124	155	217		
30	12		99	124	173		
36	12		83	103	145	186	
42	12		71	88	124	159	195
48	12		62	77	108	139	171
54	12			67	94	122	150
60	12				80	104	128
66	12				68	88	109
72	12					75	93
78	12						79
84	12						66



H 20 and H 25 Live Loads, Pipe-Arch

Size – Round Equivalent, Inches	Size – Span x Rise, Inches	Minimum Structural Thickness, Inches	Minimum Cover, Inches	Maximum Cover, Feet – 2 Tons/Ft.² Corner Bearing Pressure
15	17 x 13	0.064	12	16
18	21 x 15	0.064	12	15
21	24 x 18	0.064	12	15
24	28 x 20	0.064	12	15
30	35 x 24	0.064	12	15
36	42 x 29	0.064	12	15
42	49 x 33	0.064*	12	15
48	57 x 38	0.064*	12	15
54	64 x 43	0.079*	12	15
60	71 x 47	0.109*	12	15
66	77 x 52	0.109*	12	15
72	83 x 57	0.138*	12	15

Heights of Cover Limits – 5" x 1" or 3" x 1" HEL-COR CSP



H 20 and H 25 Live Loads

Diameter or Span, Inches	Minimum Cover, Inches	Maximum Cover, Feet – Specified Thickness, Inches				
		0.064	0.079	0.109	0.138	0.168
54	12	56	70	98	127	155
60	12	50	63	88	114	139
66	12	46	57	80	103	127
72	12	42	52	74	95	116
78	12	39	48	68	87	107
84	12	36	45	63	81	99
90	12	33	42	59	76	93
96	12	31	39	55	71	87
102	18	29	37	52	67	82
108	18		35	49	63	77
114	18		32	45	58	72
120	18		30	42	54	66
126	18			39	50	61
132	18			36	46	58
138	18			33	43	53
144	18				39	49

Maximum cover heights shown are for 5" x 1".
To obtain maximum cover for 3" x 1", increase these values by 12%.

H 20 and H 25 Live Loads, Pipe-Arch

Size – Round Equivalent, Inches	Size – Span x Rise, Inches	Minimum Structural Thickness, Inches	Minimum Cover, Inches	Maximum Cover, Feet – 2 Tons/Ft.² Corner Bearing Pressure
72	81 x 59	0.109	18	21
78	87 x 63	0.109	18	20
84	95 x 67	0.109	18	20
90	103 x 71	0.109	18	20
96	112 x 75	0.109	21	20
102	117 x 79	0.109	21	19
108	128 x 83	0.109	24	19
114	137 x 87	0.109	24	19
120	142 x 91	0.138	24	19

Larger sizes are available in some areas of the United States. Check with your local Contech representative . Some minimum heights of cover for pipe-arches have been increased to take into account allowable "plus" tolerances on the manufactured rise.

Approximate Weight – Pounds/Foot
HEL-COR® CSP

(Estimated Average Weights—Not for Specification Use)

2 ²/₃″ x ¹/₂″ HEL-COR® CSP

Inside Diameter, Inches	Weight (Pounds/Feet) Specified Thickness (Gage) 0.052 18	0.064 16	0.079 14	0.109 12	0.138 10	0.168 8
12	8	10	12			
15	10	12	15			
18	12	15	18			
21	14	17	21	29		
24	15	19	24	33		
30		24	30	41		
36		29	36	49	62	
42		34	42	57	72	88
48		38	48	65	82	100
54			54	73	92	112
60				81	103	124
66				89	113	137
72					123	149
78						161
84						173

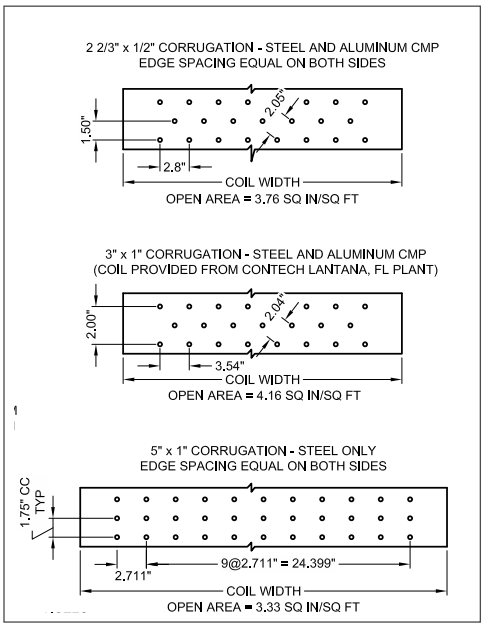
3″ x 1″ HEL-COR® CSP

Inside Diameter, Inches	Weight (Pounds/Feet) Specified Thickness (Gage) 0.052 18	0.064 16	0.079 14	0.109 12	0.138 10	0.168 8
54		50	61	83	106	129
60		55	67	92	118	143
66		60	74	101	129	157
72		66	81	110	140	171
78		71	87	119	152	185
84		77	94	128	164	199
90		82	100	137	175	213
96		87	107	147	188	228
102		93	114	155	198	241
108			120	165	211	256
114			127	174	222	271
120			134	183	234	284
126				195	247	299
132				204	259	259
138				213	270	328
144					282	344

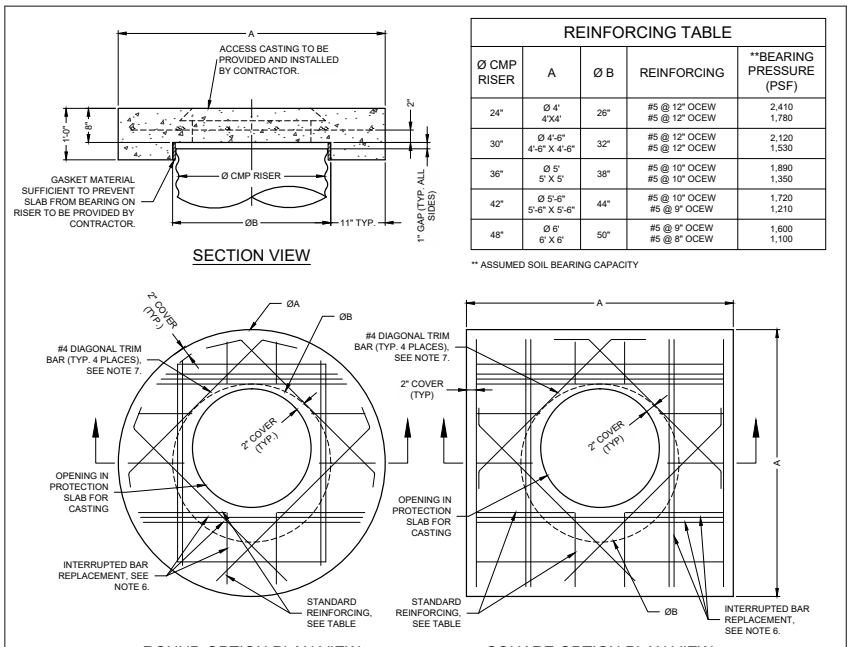
Notes::

1. *Weights shown apply to galvanized and aluminized type 2 (ALT2) CSP only. Weights for polymer coated CSP are 1% to 4% higher, varying by gage.*
2. *Please contact your Contech Stormwater Consultant.*
3. *Weights listed in the 3″ x 1″ or 5″ x 1″ table are for 3″ x 1″ pipe. Weights for 5″ x 1″ are approximately 12% less than those used in this table, for metallic coated pipe.*

CMP Perforation Details



Manhole Cap Detail

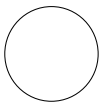


NOTES:

1. DESIGN IN ACCORDANCE WITH AASHTO, 17th EDITION.
2. DESIGN LOAD HS25.
3. EARTH COVER = 1' MAX.
4. CONCRETE STRENGTH = 3,500 psi
5. REINFORCING STEEL = ASTM A615, GRADE 60.
6. PROVIDE ADDITIONAL REINFORCING AROUND OPENINGS EQUAL TO THE BARS INTERRUPTED, HALF EACH SIDE. ADDITIONAL BARS TO BE IN THE SAME PLANE.
7. TRIM OPENING WITH DIAGONAL #4 BARS, EXTEND BARS A MINIMUM OF 12" BEYOND OPENING, BEND BARS AS REQUIRED TO MAINTAIN BAR COVER.
8. PROTECTION SLAB AND ALL MATERIALS TO BE PROVIDED AND INSTALLED BY CONTRACTOR.
9. DETAIL DESIGN BY DELTA ENGINEERING, BINGHAMTON, NY.

Height of Cover and Weights Tables - CORLIX® Corrugated Aluminum Pipe (CAP)

Heights of Cover Limits – 2 ²/₃" x ½" CORLIX CAP



HL 93 Live Load

Diameter or Span, Inches	Minimum Cover, Inches	Maximum Cover, Feet[2] Specified Thickness (Gage) 18	16	14	12	10	8[5]
6[4]	12	197	247				
8[4]	12	147	185				
10[4]	12	119	148				
12	12		125	157			
15	12		100	125			
18	12		83	104			
21	12		71	89			
24	12		62	78	109		
27	12			69	97		
30	12			62	87		
36	12			51	73	94	
42	12				62	80	
48	12				54	70	85
54	15				48	62	76
60	15					52	64
66	18						52
72	18						43

HL 93 Live Load, Pipe-Arch

Round Pipe Dia. (Inches)	Size, Inches Span x Rise	Minimum Gage	Minimum[3] Cover (Inches)	Maximum Cover, (Ft.) Aluminum Pipe-Arch[2] 2 Tons/Ft.² for Corner Bearing Pressures
15	17 x 13	16	12	13
18	21 x 15	16	12	12
21	24 x 18	16	12	12
24	28 x 20	14	12	12
30	35 x 24	14	12	12
36	42 x 29	12	12	12
42	49 x 33	12	15	12
48	57 x 38	10	15	12
54	64 x 43	10	18	12
60	71 x 47	8[5]	18	12

Notes:

1. *Height of cover is measured to top of rigid pavement or to bottom of flexible pavement.*
2. *Maximum cover meets AASHTO LRFD design criteria.*
3. *Minimum cover meets AASHTO and ASTM B 790 design criteria.*
4. *1 1/2" x 1/4" corrugation.*
5. *8-gage pipe has limited availability.*
6. *For construction loads, see page 18.*

Approximate Weight – Pounds/Foot
CORLIX® CAP

(Estimated Average Weights—Not for Specification Use)

2 ²/₃" x ¹/₂" CORLIX® CAP

Diameter or Span, Inches	Weight (Pounds/Feet) Specified Thickness (Gage) 0.048 18	0.060 16	0.075 14	0.105 12	0.135 10	0.164 8[3]
6[4]	1.3	1.6				
8[4]	1.7	2.1				
10[4]	2.1	2.6				
12		3.2	4			
15		4	4.9			
18		4.8	5.9			
21		5.6	6.9			
24		6.3	7.9	10.8		
27			8.8	12.2		
30			9.8	13.5		
36			11.8	16.3	20.7	
42				19	24.2	
48				21.7	27.6	33.5
54				24.4	31.1	37.7
60					34.6	41.9
66						46
72						50.1

3" x 1" CORLIX® CAP

Diameter or Span, Inches	Weight (Pounds/Feet) Specified Thickness (Gage) 0.060 16	0.075 14	0.105 12	0.135 10	0.164 8[3]
30	9.3	11.5	15.8	20.2	
36	11.1	13.7	18.9	24.1	
42	12.9	16	22	28	
48	14.7	18.2	25.1	32	38.8
54	16.5	20.5	28.2	35.9	43.6
60	18.3	22.7	31.3	40	48.3
66	20.2	24.9	34.3	43.7	53
72	22	27.1	37.4	47.6	57.8
78		29.3	40.4	51.5	62.5
84			43.5	55.4	67.2
90			46.6	59.3	71.9
96			49.6	63.2	76.7
102				66.6	80.8
108				71	86.1
114					90.9
120					95.6

Notes:

1. *Helical lockseam pipe only. Annular riveted pipe weights will be higher.*
2. *1 ½" x ¼" Corrugation.*
3. *8-gage pipe has limited availability.*

Pretreatment Options

Regardless of infiltration material type and configuration, one of the most important components to consider is pretreatment. A pretreatment device prolongs the life of the infiltration system by removing debris and sediment that can collect on the invert and within the stone backfill voids. Pretreatment will maintain the efficiency of an infiltration system as well as extend the life cycle, therefore preventing a premature replacement. Pretreatment also offers these additional benefits:

- Pretreatment creates a single collection point which is easier to clean and maintain compared to the infiltration system alone.
- Cost savings due to the extended service life of the system.
- Removing trash and debris protects downstream outlet control structures from clogging.

Contech offers a number of pretreatment options, all of which will extend the life of subsurface infiltration systems and improve water quality. The type of system chosen will depend on a number of factors including footprint, soil conditions, local regulations, and the desired level of pretreatment.

Hydrodynamic Separation

Hydrodynamic Separation (HDS) provides a basic level of pretreatment by capturing and retaining trash and debris, sediment, and oil from stormwater runoff.

Cascade Separator™
The Cascade Separator™ is the latest innovation in hydrodynamic separation from Contech. The Cascade uses advanced sediment capture technology to provide the highest sediment removal efficiency of any Contech HDS product. Cascade also captures trash and hydrocarbons.

CDS®
The CDS® uses both swirl concentration and a nonblocking screen to capture and retain 100% of floatables and neutrally buoyant debris 4.7mm or larger.

Vortechs®
Vortechs combines swirl concentration and flow controls into a shallow treatment unit that traps and retains trash, debris, sediment, and hydrocarbons from stormwater runoff. Vortechs removes sediment down to 50 microns and is the ideal solution for projects that require a shallow treatment device due to groundwater, utility, or bedrock constraints.

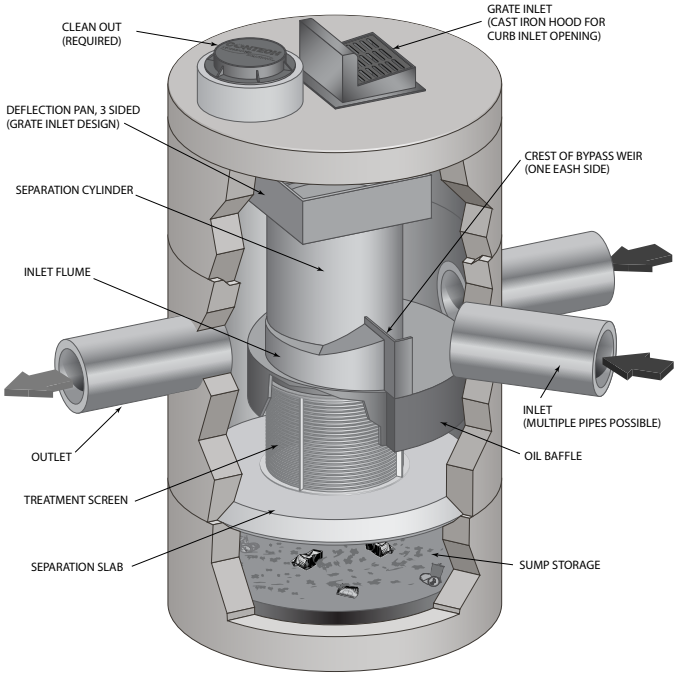
Filtration

Filtration provides a higher level of pretreatment and improved water quality by removing trash and debris, oil, fine solids, and dissolved pollutants such as metals, hydrocarbons, and nutrients.

Filterra® Bioretention System
Filterra is an engineered bioretention system that has been optimized for high volume/flow treatment and high pollutant removal.

The Stormwater Management StormFilter®
The StormFilter system is comprised of a structure that houses rechargeable, media-filled cartridges. The media can be customized to target site-specific pollutants.

Jellyfish® Filter
The Jellyfish filter uses membrane filtration in a compact footprint to remove a high level and a wide variety of stormwater pollutants such as fine particulates, oil, trash and debris, metals, and nutrients.



CDS® Hydrodynamic Separator

Custom Fabrication and Fittings

One of the benefits of CMP detention systems is its flexibility. With the addition of elbows, tees, stubs, and other components, CMP detention systems can be configured to meet sight specific constraints.

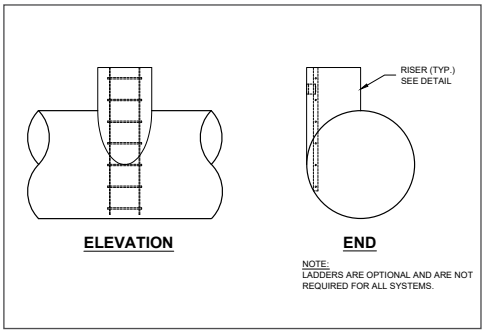
Benefits of Custom Fabrication

- More efficiently match site constraints
- System components are easy to install
- Provide maintenance ready structures - easily accessible
- Easily control influent and effluent
- Eliminate concrete structures such as junction boxes

CMP is also versatile enough for use for the entire stormwater system, including:

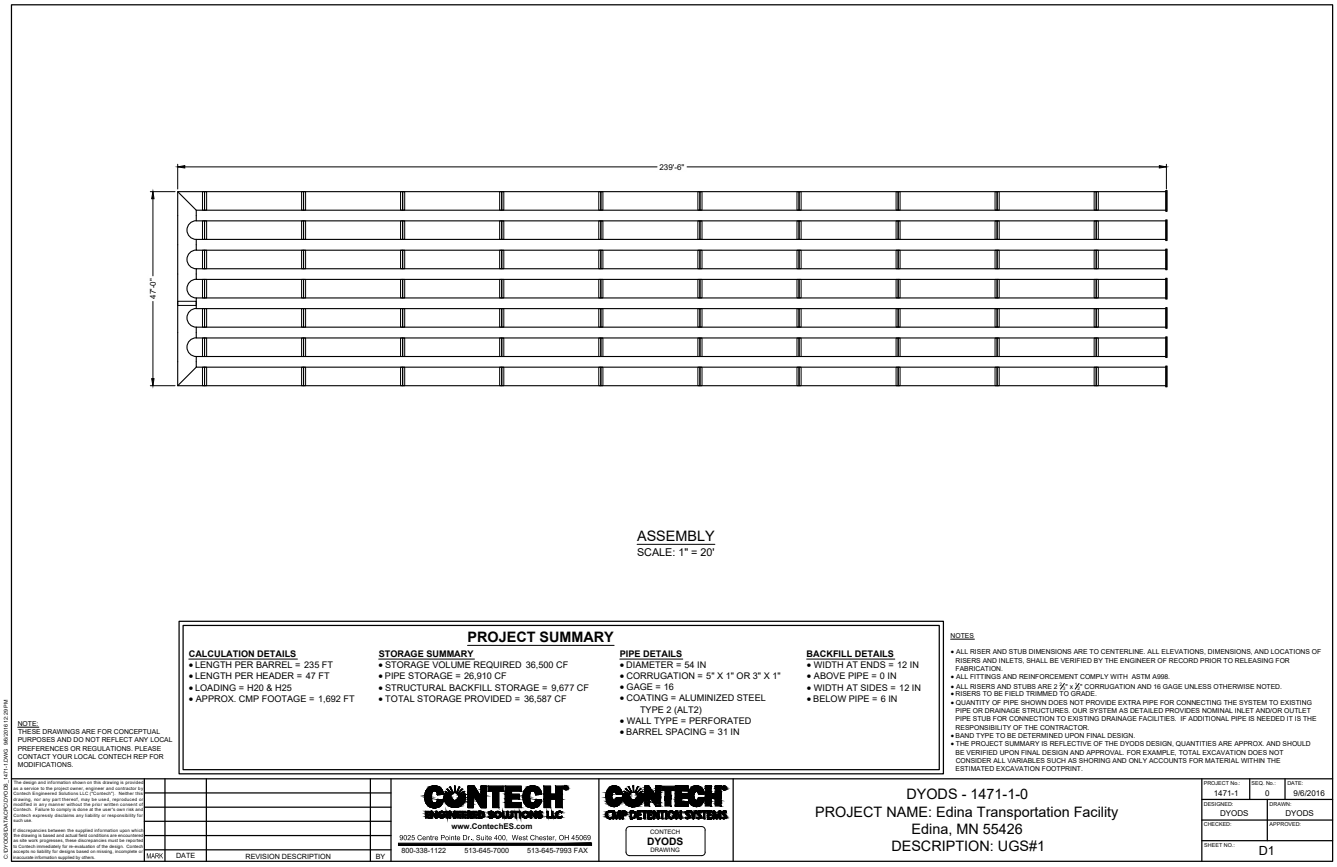
- Slotted drain pipe
- Storm sewer pipe
- Manholes / Inlet structures

Typical Riser Detail



One benefit to CMP detention systems is that we can integrate the manhole risers so you don't have to have an additional concrete junction box which can add cost to the project. Vertical risers can be used as manholes or inlets…or both, and ladders can be added so the opening can be used for access. We typically locate the manhole on the side of the pipe so that the ladder can be extend down the wall of the pipe to the invert.

Sample Proposal Drawing



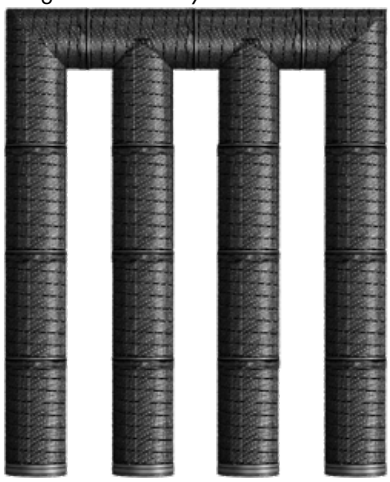
Note: Fittings will need to be structurally checked for reinforcements.

CMP Detention System Bedding and Backfill

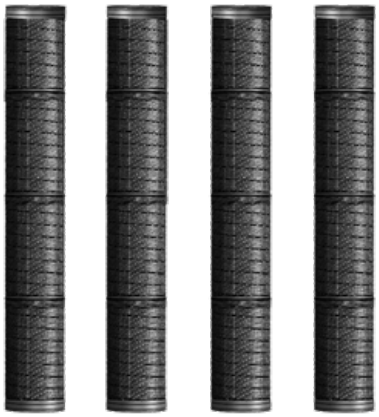
Please follow the guidelines below regarding pipe bedding and backfill.

1. Minimum trench width must allow room for proper compaction of haunch materials under pipe. min. width = (1.5 x diameter) + 12″ (follow AASHTO Section 12 & 26).
   a. The minimum embankment width is 3 pipe diameters.
2. The foundation shall be well consolidated & stable.
3. The bedding material shall be a relatively loose material that is roughly shaped to fit the bottom of the pipe, 4″ to 6″ in depth.
4. Bedding material shall be a relatively loose material that is roughly shaped to fit the bottom of the pipe, and a minimum of twice the corrugation depth in thickness, with the maximum particle size of one-half of the corrugation depth (AASHTO Section 26.3.8.1, 26.5.3).
   a. Haunch zone material shall be hand shoveled or shovel sliced into place to allow for proper compaction.
5. H 20 and H 25 minimum cover is measured from top of pipe to bottom of flexible pavement or top of rigid pavement. Minimum cover is 12 inches for diameters up to and including 96″, 18 inches for diameters ranging from 102″ and greater.
6. Final backfill material selection and compaction requirements per the project plans, specifications, or engineer of record.
7. Geotextile shall be used as required to prevent soil migration.
8. Final backfill material selection and compaction requirements shall follow the project plans and specifications per the engineer of record (26.5.4.1).

Single Manifold System



No Manifold System



CMP Detention System Installation

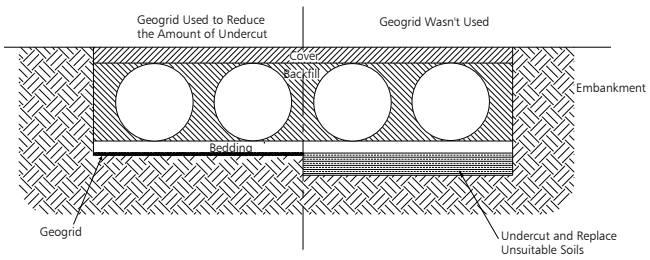
Overview

Proper installation of a flexible underground detention system will ensure long-term performance. The configuration of these systems often requires special construction practices that differ from conventional flexible pipe construction. Contech Engineered Solutions strongly suggests scheduling a pre-construction meeting with your local Sales Engineer to determine if additional measures, not covered in this guide, are appropriate for your site.

Foundation

Construct a foundation that can support the design loading applied by the pipe and adjacent backfill weight as well as maintain its integrity during construction.

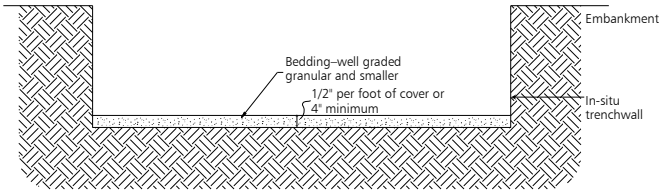
If soft or unsuitable soils are encountered, remove the poor soils down to a suitable depth and then build up to the appropriate elevation with a competent backfill material. The structural fill material gradation should not allow the migration of fines, which can cause settlement of the detention system or pavement above. If the structural fill material is not compatible with the underlying soils an engineering fabric should be used as a separator. In some cases, using a stiff reinforcing geogrid reduces over excavation and replacement fill quantities.



Grade the foundation subgrade to a uniform or slightly sloping grade. If the subgrade is clay or relatively non-porous and the construction sequence will last for an extended period of time, it is best to slope the grade to one end of the system. This will allow excess water to drain quickly, preventing saturation of the subgrade.

Bedding

A 4 to 6-inch thick, well-graded, granular material is the preferred pipe bedding. If construction equipment will operate for an extended period of time on the bedding, use either an engineering fabric or a stiff geogrid to ensure the base material maintains its integrity.

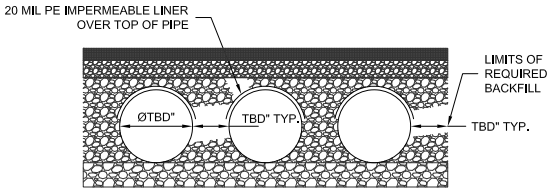


Using a relatively loose material, grade the base to a smooth, uniform grade to allow for the proper placement of the pipe. Using an open-graded bedding material is acceptable; however, an engineering fabric separator is required between the base and the subgrade.

Geomembrane Barrier

A site's resistivity may change over time when various types of salting agents are used, such as road salts for deicing purposes. If salting agents are used on or near the project site, a geomembrane barrier must be used with the system. The geomembrane liner is intended to help protect the system from the potential adverse effects that may result from the use of such salting agents including premature corrosion and reduced actual service life.

The project's Engineer of Record is to evaluate whether salting agents will be used on or near the project site, and use his/her best judgement to determine if any additional protective measures are required. Below is a typical detail showing the placement of a geomembrane barrier for projects where salting agents are used on or near the project site.



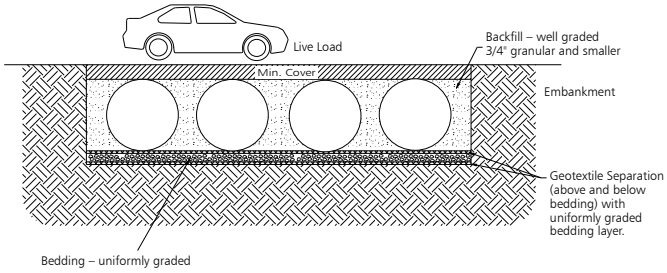
Standard Liner Over Rows

In-Situ Trench Wall

If excavation is required, the trench wall needs to be capable of supporting the load that the pipe sheds as the system is loaded. If soils are not capable of supporting these loads, the pipe can deflect. Perform a simple soil pressure check using the applied loads to determine the limits of excavation beyond the spring line of the outer most pipes. In most cases the requirements for a safe work environment and proper backfill placement and compaction take care of this concern.

Backfill Material

Typically, the best backfill material is an angular, well-graded, granular fill meeting the requirements of AASHTO A-1, A-2 or A-3. In some cases, it may be desirable to use a uniformly graded material for the first 18- to 24-inches. This type of material is easier to place under the haunches of the pipe and requires little compactive effort. Depending on the bedding material, a separation geotextile might be required above and below these initial lifts.

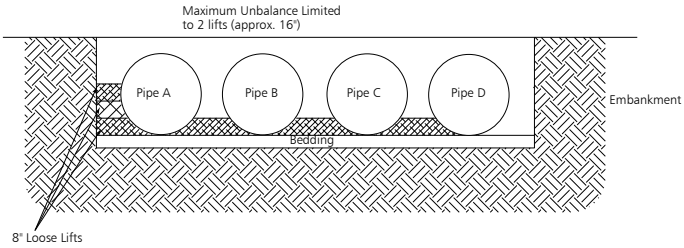


Open-graded fill is typically not used beyond the initial 18- to 24-inches because this type of fill often does not provide adequate confining restraint to the pipes. If a uniformly graded material (particles all one size) is used, install a geotextile separation fabric to prevent the migration of fines into the backfill.

Backfill using controlled low-strength material (CLSM or "flowable fill") when the spacing between the pipes will not allow for placement and adequate compaction of the backfill. Work closely with the local Contech Stormwater Consultant regarding the special installation techniques required when using CLSM.

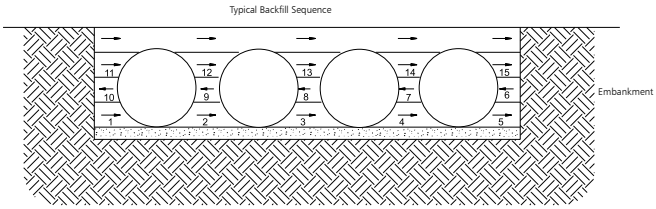
Backfill Placement

Place backfill in 8-inch loose lifts and compact to 90% AASHTO T99 standard proctor density. Material shall be worked into the pipe haunches by means of shovel-slicing, rodding, air tamper, vibratory rod, or other effective methods. If AASHTO T99 procedures are determined infeasible by the geotechnical engineer of record, compaction is considered adequate when no further yielding of the material is observed under the compactor, or under foot, and the geotechnical engineer of record (or representative thereof) is satisfied with the level of compaction.

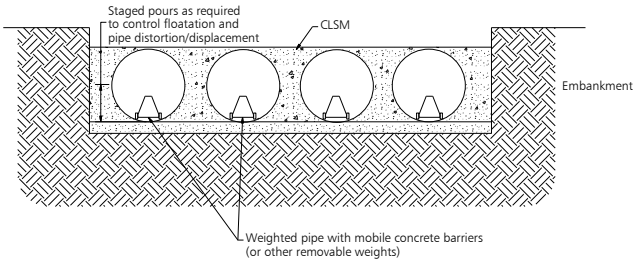


For large systems, conveyor systems, backhoes with long reaches or draglines with stone buckets may be used to place backfill.

Once minimum cover for construction loading across the entire width of the system is reached, advance the equipment to the end of the recently placed fill, and begin the sequence again until the system is completely backfilled. This type of construction sequence provides room for stockpiled backfill directly behind the backhoe, as well as the movement of construction traffic. Material stockpiles on top of the backfilled detention system should be limited to 8- to 10-feet high and must provide balanced loading across all barrels. To determine the proper cover over the pipes to allow the movement of construction equipment see Table 1, or contact your local Contech Stormwater Consultant.



When flowable fill is used, you must prevent pipe floatation. Typically, small lifts are placed between the pipes and then allowed to set-up prior to the placement of the next lift. The allowable thickness of the CLSM lift is a function of a proper balance between the uplift force of the CLSM, the opposing weight of the pipe, and the effect of other restraining measures. The pipe can carry limited fluid pressure without pipe distortion or displacement, which also affects the CLSM lift thickness. Your local Contech Stormwater Consultant can help determine the proper lift thickness.

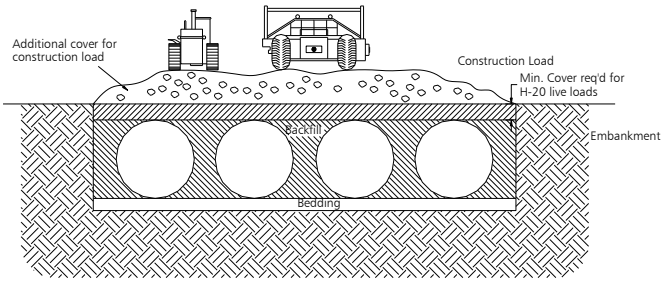


Construction Loading

Typically, the minimum cover specified for a project assumes H-20 live load. Because construction loads often exceed design live loads, increased temporary minimum cover requirements are necessary. Since construction equipment varies from job to job, it is best to address equipment specific minimum cover requirements with your local Contech Stormwater Consultant during your pre-construction meeting.

HEL-COR® CSP Minimum Height of Cover Requirements for Heavy Off-Road Construction Equipment

Pipe Span, Inches	Minimum Cover, Inches for Indicated Axle Loads (kips)			
	18-50	50-75	75-110	110-150
12 - 42	24	30	36	36
48-72	36	36	42	48
78-120	36	42	48	48
126 - 144	42	48	54	54



Firetruck Loading

Please use the table below for general guidance.

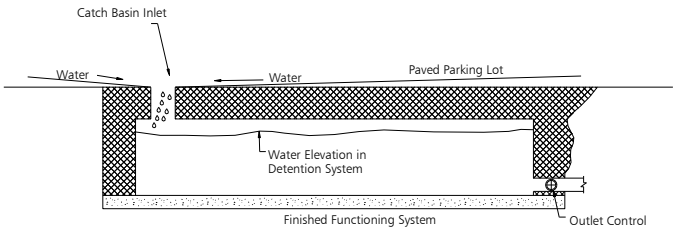
HEL-COR® CSP Minimum Height of Cover Requirements for Firetruck Loading[1]

Pipe Span, Inches	Corrugation Profile, Inches	Minimum Cover, Inches for Firetruck Outrigger Load (64 kips)[2,3]			
		16 GA 0.064	14 GA 0.079	12 GA 0.109	10 GA 0.138
12 - 36	2 2/3 x ½	12	12	12	12
42 - 48	2 2/3 x ½	18	18	18	18
54 - 60	3 x 1 or 5 x 1	24	18		
72	3 x 1 or 5 x 1	30	24		
78 - 120	3 x 1 or 5 x 1		36	30	
126 - 144	3 x 1 or 5 x 1			42	36

1. *Minimum cover may vary depending on local conditions. The contractor must provide additional cover required to avoid damage to the pipe.* ***Minimum cover is measured from the top of the pipe to the top of the maintained construction roadway surface****.*
2. *Table is based on a typical 85,000 lb GVW firetruck with an outrigger load of 64,000 lbs. The 64,000 lb outrigger force is applied over a surface area of about 850.6 in2. The dimensions of the outrigger square pad are 25-7/8" x 32-7/8".*
3. *The outrigger load will be the heaviest load applied from the firetruck.*

Additional Considerations

Because most systems are constructed below-grade, rainfall can rapidly fill the excavation; potentially causing floatation and movement of the previously placed pipes. To help mitigate potential problems, it is best to start the installation at the downstream end with the outlet already constructed to allow a route for the water to escape. Temporary diversion measures may be required for high flows due to the restricted nature of the outlet pipe.



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www.ContechES.com
800-338-1122

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ENGINEERED SOLUTIONS

BRO-CMP-DETENTION DESIGN 8/19 MC

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Appendix B
Point Precipitation

NOAA Atlas 14, Volume 6, Version 2
Location name: San Bernardino, California, USA*
Latitude: 34.2052°, Longitude: -117.4122°
Elevation: 2153 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

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

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

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

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.156 (0.129-0.189)	0.220 (0.182-0.267)	0.300 (0.248-0.366)	0.363 (0.298-0.447)	0.445 (0.353-0.567)	0.506 (0.393-0.659)	0.567 (0.429-0.756)	0.627 (0.462-0.861)	0.707 (0.499-1.01)	0.767 (0.522-1.14)
10-min	0.223 (0.185-0.271)	0.315 (0.261-0.383)	0.430 (0.356-0.525)	0.520 (0.427-0.640)	0.638 (0.506-0.813)	0.726 (0.564-0.944)	0.813 (0.615-1.08)	0.899 (0.662-1.23)	1.01 (0.715-1.45)	1.10 (0.749-1.63)
15-min	0.270 (0.224-0.328)	0.381 (0.316-0.464)	0.520 (0.431-0.635)	0.629 (0.517-0.774)	0.772 (0.612-0.983)	0.878 (0.682-1.14)	0.983 (0.744-1.31)	1.09 (0.800-1.49)	1.23 (0.864-1.76)	1.33 (0.906-1.97)
30-min	0.409 (0.340-0.497)	0.577 (0.479-0.702)	0.788 (0.652-0.962)	0.953 (0.782-1.17)	1.17 (0.928-1.49)	1.33 (1.03-1.73)	1.49 (1.13-1.98)	1.65 (1.21-2.26)	1.86 (1.31-2.66)	2.01 (1.37-2.99)
60-min	0.628 (0.522-0.763)	0.886 (0.735-1.08)	1.21 (1.00-1.48)	1.46 (1.20-1.80)	1.80 (1.42-2.29)	2.04 (1.58-2.66)	2.28 (1.73-3.05)	2.53 (1.86-3.47)	2.85 (2.01-4.08)	3.09 (2.11-4.59)
2-hr	0.976 (0.811-1.19)	1.31 (1.09-1.60)	1.73 (1.44-2.12)	2.07 (1.70-2.54)	2.50 (1.99-3.19)	2.83 (2.20-3.68)	3.15 (2.39-4.20)	3.48 (2.56-4.77)	3.90 (2.75-5.59)	4.22 (2.88-6.26)
3-hr	1.27 (1.05-1.54)	1.67 (1.39-2.04)	2.18 (1.81-2.66)	2.59 (2.12-3.18)	3.12 (2.47-3.97)	3.51 (2.73-4.57)	3.90 (2.96-5.21)	4.30 (3.16-5.90)	4.81 (3.40-6.89)	5.20 (3.54-7.72)
6-hr	1.92 (1.59-2.33)	2.48 (2.06-3.02)	3.20 (2.65-3.91)	3.77 (3.09-4.64)	4.52 (3.58-5.75)	5.07 (3.94-6.60)	5.62 (4.26-7.50)	6.18 (4.54-8.48)	6.90 (4.87-9.89)	7.45 (5.07-11.1)
12-hr	2.62 (2.18-3.18)	3.40 (2.82-4.14)	4.39 (3.64-5.36)	5.17 (4.25-6.37)	6.20 (4.92-7.89)	6.96 (5.40-9.05)	7.71 (5.84-10.3)	8.46 (6.22-11.6)	9.44 (6.66-13.5)	10.2 (6.93-15.1)
24-hr	3.56 (3.15-4.10)	4.70 (4.16-5.42)	6.14 (5.42-7.10)	7.28 (6.37-8.49)	8.77 (7.43-10.6)	9.88 (8.20-12.1)	11.0 (8.89-13.8)	12.1 (9.51-15.6)	13.5 (10.2-18.2)	14.6 (10.7-20.4)
2-day	4.38 (3.88-5.04)	5.92 (5.24-6.83)	7.90 (6.97-9.14)	9.49 (8.31-11.1)	11.6 (9.84-14.0)	13.2 (11.0-16.3)	14.9 (12.0-18.7)	16.5 (13.0-21.4)	18.7 (14.2-25.3)	20.4 (14.9-28.5)
3-day	4.69 (4.15-5.40)	6.46 (5.71-7.45)	8.77 (7.74-10.1)	10.7 (9.33-12.4)	13.2 (11.2-15.9)	15.2 (12.6-18.7)	17.2 (14.0-21.7)	19.3 (15.2-25.0)	22.2 (16.8-30.0)	24.5 (17.9-34.1)
4-day	5.02 (4.44-5.78)	6.99 (6.19-8.07)	9.60 (8.48-11.1)	11.8 (10.3-13.7)	14.7 (12.5-17.7)	17.0 (14.1-20.9)	19.4 (15.7-24.4)	21.9 (17.2-28.3)	25.3 (19.1-34.1)	28.0 (20.4-39.0)
7-day	5.67 (5.02-6.54)	8.08 (7.15-9.32)	11.3 (9.95-13.0)	13.9 (12.2-16.2)	17.6 (14.9-21.2)	20.5 (17.0-25.2)	23.4 (19.0-29.5)	26.6 (20.9-34.4)	30.9 (23.4-41.7)	34.4 (25.1-48.0)
10-day	6.05 (5.36-6.97)	8.72 (7.71-10.1)	12.3 (10.8-14.2)	15.3 (13.4-17.8)	19.4 (16.4-23.4)	22.7 (18.8-27.9)	26.1 (21.1-32.8)	29.6 (23.3-38.4)	34.6 (26.2-46.7)	38.6 (28.2-53.9)
20-day	7.21 (6.39-8.31)	10.5 (9.32-12.1)	15.1 (13.3-17.4)	18.9 (16.5-22.0)	24.3 (20.6-29.3)	28.7 (23.8-35.2)	33.2 (26.9-41.9)	38.1 (30.0-49.3)	45.0 (34.0-60.7)	50.6 (37.0-70.6)
30-day	8.44 (7.47-9.72)	12.3 (10.9-14.2)	17.6 (15.6-20.4)	22.2 (19.4-25.9)	28.8 (24.4-34.6)	34.1 (28.3-41.9)	39.7 (32.1-50.0)	45.8 (36.1-59.3)	54.4 (41.2-73.5)	61.6 (45.0-85.9)
45-day	10.2 (9.05-11.8)	14.7 (13.0-17.0)	21.0 (18.5-24.3)	26.4 (23.1-30.8)	34.4 (29.1-41.4)	40.9 (33.9-50.2)	47.8 (38.7-60.3)	55.4 (43.7-71.8)	66.5 (50.3-89.7)	75.6 (55.3-106)
60-day	12.0 (10.6-13.8)	17.0 (15.0-19.6)	24.1 (21.2-27.8)	30.2 (26.5-35.2)	39.3 (33.3-47.3)	46.8 (38.8-57.6)	55.0 (44.5-69.2)	63.9 (50.4-82.8)	77.1 (58.3-104)	88.1 (64.4-123)

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

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

Please refer to NOAA Atlas 14 document for more information.

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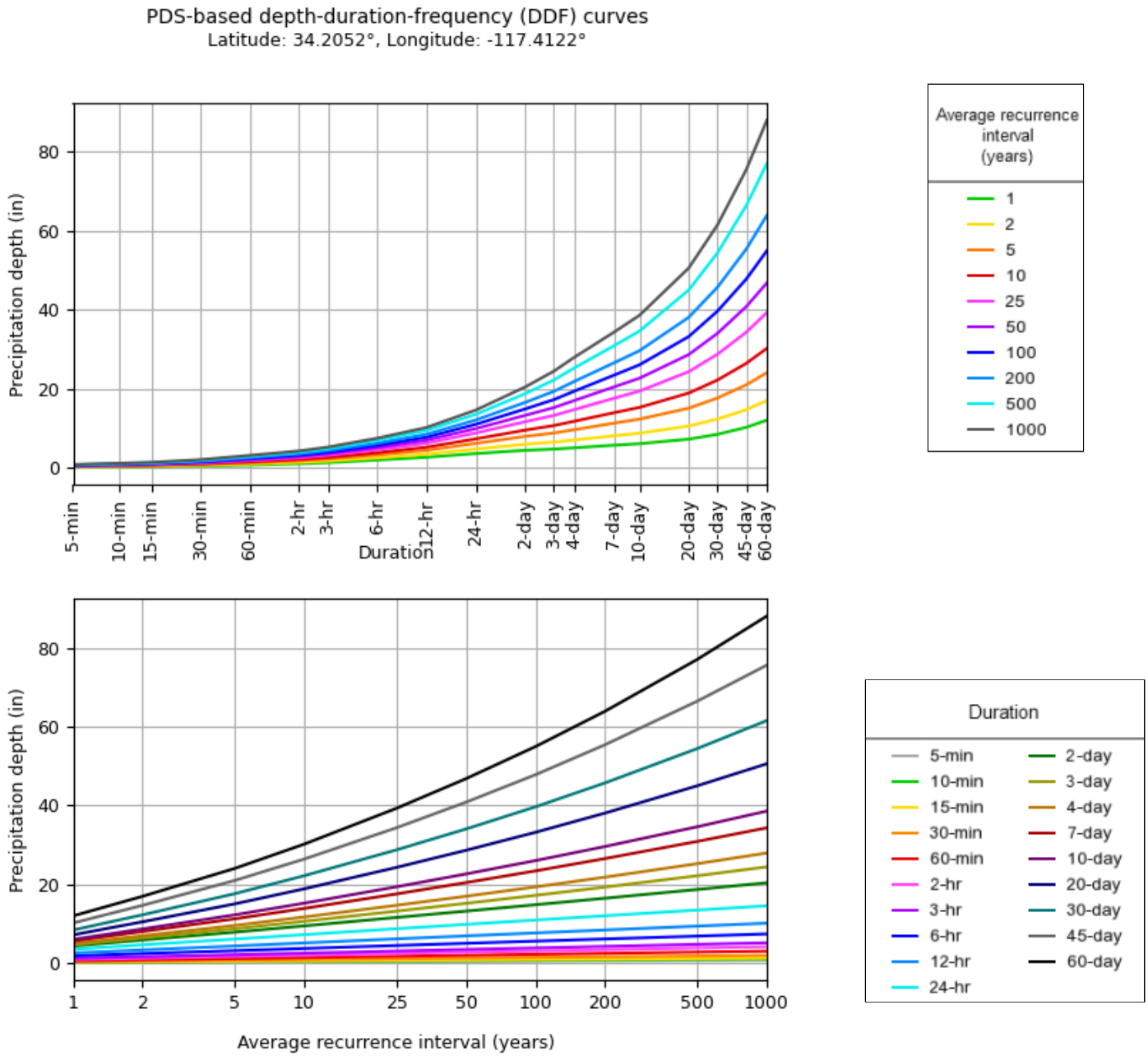
PF graphical



NOAA Atlas 14, Volume 6, Version 2

Created (GMT): Tue Mar 5 00:55:04 2024

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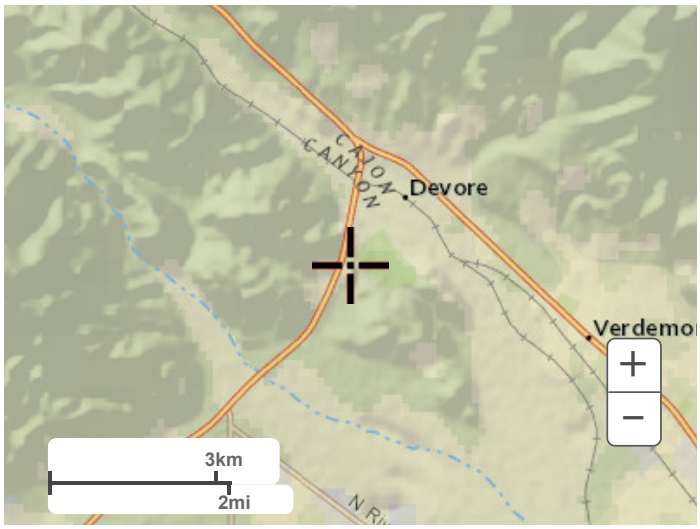
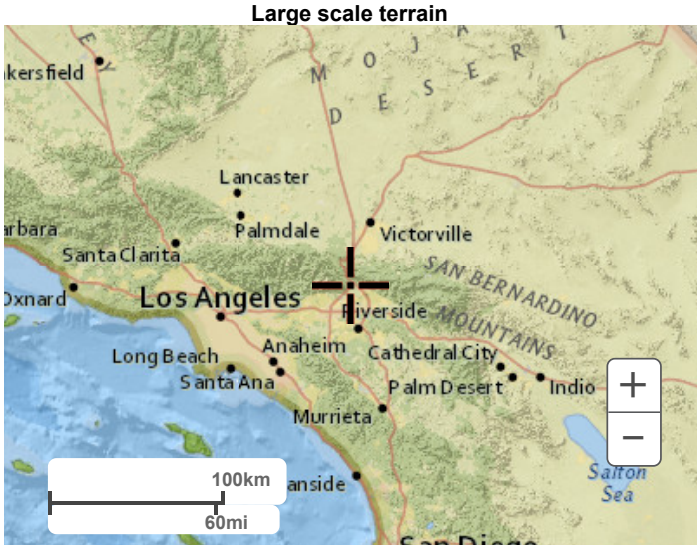
Maps & aerials

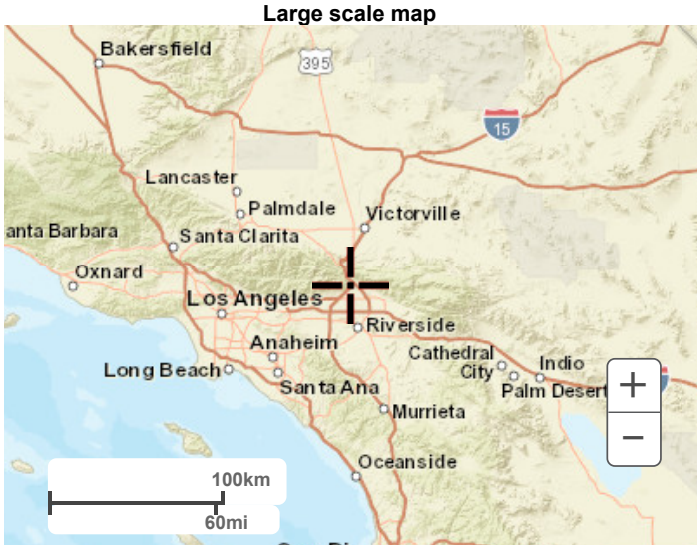
Small scale terrain



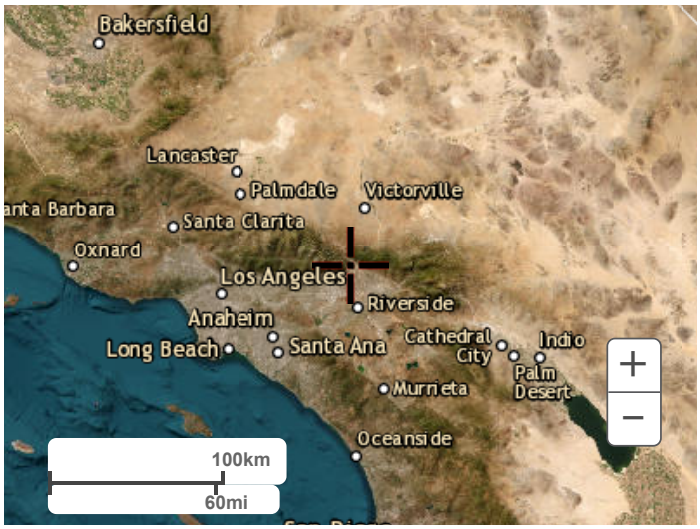
Large scale terrain



Large scale map



Large scale aerial



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

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Appendix C
Infiltration

Worksheet H: Factor of Safety and Design Infiltration Rate and Worksheet

Factor Category		Factor Description	Assigned Weight (w)	Factor Value (v)	Product (p) p = w x v
A	Suitability Assessment	Soil assessment methods	0.25	[redacted]	[redacted]
		Predominant soil texture	0.25	[redacted]	[redacted]
		Site soil variability	0.25	[redacted]	[redacted]
		Depth to groundwater / impervious layer	0.25	[redacted]	[redacted]
		Suitability Assessment Safety Factor, $S_A = \Sigma p$			[redacted]
B	Design	Tributary area size	0.25	[redacted]	[redacted]
		Level of pretreatment/ expected sediment loads	0.25	2	..5
		Redundancy	0.25	[redacted]	[redacted]
		Compaction during construction	0.25	[redacted]	[redacted]
		Design Safety Factor, $S_B = \Sigma p$			1.75
Combined Safety Factor, $S_{TOT} = S_A \times S_B$				[redacted]	
Measured Infiltration Rate, inch/hr, K_M (corrected for test-specific bias)				0.33	
Design Infiltration Rate, in/hr, $K_{DESIGN} = S_{TOT} \times K_M$				0.15	

Supporting Data

Briefly describe infiltration test and provide reference to test forms:

[redacted]

Note: The minimum combined adjustment factor shall not be less than 2.0 and the maximum combined adjustment factor shall not exceed 9.0.

APPENDIX D

BMP FACT SHEETS

SC-10	Non-Stormwater Discharges
SC-11	Spill Prevention, Control & Cleanup
SC-41	Building & Grounds Maintenance
SC-42	Building Repair & Construction
SC-43	Parking Area Maintenance
SC-44	Drainage System Maintenance
SC-60	Housekeeping Practices
SC-73	Landscape Maintenance (Provided for Information only)
SD-10	Site Design & Landscape Planning
SD-11	Roof Runoff Controls
SD-12	Efficient Irrigation
SD-13	Storm Drain Signage
SD-21	Alternative Buildings
SD-32	Trash Storage Areas
SD-33	Vehicle Wash Areas
SD-34	Outdoor Material Storage Areas
TC-11	Infiltration
TC-30	Vegetated Swales
MP-52	Drain Inserts
RET-1	Bio Retention
3.5	Bio Retention
BG-22	Automotive Services – Service Stations
BMP 6.4	Porous Pavement
	Food Service
	Hazardous Waste Generator Requirements

APPENDIX E

EDUCATIONAL MATERIALS
To be provided with Lease/Sales Agreement

APPENDIX F

RECORD OF BMP IMPLEMENTATION, MAINTENANCE, AND INSPECTION

RECORD OF BMP IMPLEMENTATION, MAINTENANCE, AND INSPECTION

Today's Date: _____

Name of Person Performing Activity (Printed): _____

Signature: _____

BMP Name (As Shown in O&M Plan)	Brief Description of Implementation, Maintenance and Inspection Activity Performed

APPENDIX G

Spill Prevention and Cleanup Plan Guide for Oasis at Glen Helen

Purpose

The purpose of this document is to present a simple guide for developing a spill prevention and cleanup plan for The Oasis at Gelen Helen project developed land uses and retail gas station. This guide takes into consideration the requirements of the County's Water Quality Management Ordinance. The purpose of this ordinance is to protect our local water quality. As a landlord and leaseee, you are responsible for actions, incidents, or conditions which occur on your property and for complying with the ordinance.

Spill Prevention and Cleanup Plans

Effective spill prevention and cleanup plan consist of the following components:

- List of potential sources of pollutants
- Best management practices to prevent stormwater pollution and accidental spills/discharges
- Emergency contact information, notification procedures, and procedures for cleanup of spills and discharges of pollutants
- Employee training
- Tenant notification to manager of any leaks, spills or discharges.

Potential Sources of Pollutants

The following are typical sources of pollutants that occur on residential rental properties:

- Sewage spills resulting from pipe failures, grease and rag blockages, pump failures, and improper connections.
- Automotive fluid spills (used motor oil, antifreeze, lubricants, & solvents) from leaky vehicles and activities associated with auto repair/maintenance (oil changes, engine work, etc.).
- Wash water discharges from vehicle washing activities.
- Heating oil discharges from leaking above ground storage tanks.
- Improper disposal of yard wastes (leaves and grass clippings) to the drainage system.

Best Management Practices (BMPs) to Prevent Stormwater Pollution and Accidental Spills/Discharges

Some of the practices that will help prevent spills and discharges are:

- Frequently maintain and inspect the property's sewer collection system.
- Educate tenants regarding proper cooking grease disposal.
- Routinely inspect parking lots and other outdoor areas for automotive fluid spills
- Establish a written policy that either prohibits vehicle maintenance activities onsite or limits the activity to a specific area where potential discharges can be contained (such as an enclosed bay).
- Acquire a spill cleanup kit that addresses automotive fluid discharges and discharges of other types of chemicals that are stored and/or used onsite will be kept onsite for access by employees and contract maintenance personnel. (See typical absorbent material attached)
- Educate maintenance crew regarding proper disposal and/or recycling of yard wastes

(leaves and grass clippings).

- Immediately cleanup up any spills upon discovery and properly dispose of wastes.

Emergency Contact Information

Develop and routinely update an emergency contact list. For each contact make sure to include:

- Primary and secondary contact person's name
- Name and address of company or organization represented
- Primary office number and after-hours emergency contact number(s)

To address potential sewage discharges, each commercial business should keep the following contacts:

- 2 plumbing contractors
- 2 environmental cleanup contractors
- Local plumbing supply store(s)

To address potential automotive fluid and other pollutant discharges, each gas station business should keep the following contacts:

- 2 environmental cleanup contractors
- Local vendors of containment and cleanup products
- Contractor for proper disposal of these wastes.

Cleanup Procedures for Spills/Discharges

Cleanup procedures should address each potential source of pollution on your property.

- Check for unsafe conditions. Do not attempt cleanup if there is a safety risk. Instead, call a professional cleanup company.
- If deemed safe, clean spills up immediately and completely.
- Used absorbent materials should be picked up and properly disposed of as soon as possible. (Never wash and/or dispose of used absorbents down floor drains or into the storm drainage system.)
- Obtain emergency spill containment and cleanup kits that are appropriate for the type and quantities of chemical or goods stored at the facility.
- Do not use emulsifiers or dispersants for cleaning up chemical spills.

Employee Training

Provide regular training to field employees and/or contractors regarding cleaning of paved areas and proper operation of equipment. Train employees and contractors in proper techniques for spill containment and cleanup. Use a training log or similar method to document training.
All employees in the operation should have a general understanding of this document. The rationale is simple: the more people trained in spotting problems, the more prepared the operation can be to either prevent or respond to them. Maintenance/landscape contractors should have a thorough understanding of this document. It is important to maintain records of which employees have been trained. These records should be kept on file by the owner/manager.

STORMWATER BMPS: FOOD SERVICE FACILITIES AFFECTED FACILITIES

These BMPs apply at all fixed facilities that prepare, cook, handle and serve food and generate food wastes.

BACKGROUND

Restaurants and cafeterias generate food wastes and cleaning wastes. These wastes contain organics and nutrients that can pollute storm water and receiving waters. These materials can cause algae blooms and deplete oxygen thus harming fish and wildlife. Cleaners used by food handling operations can contain caustic materials that can harm receiving waters. Pathogens from decaying food can also harm animals and humans. This BMP is designed to minimize the release of food wastes and restaurant cleaning wastes into storm water.

BEST MANAGEMENT PRACTICES

- Keep outdoor dumpster areas clean. Practice good housekeeping. (See BMP: Good Housekeeping & Spill Prevention.)
- Do NOT clean floor mats, air vents, hoods, meat trays, garbage cans and other equipment outdoors unless it is performed in an area where wastewater will drain to the sanitary sewer (if approved) or collected for proper disposal.
- Dispose of waste mop water in the mop sink, floor drain, or toilet. Do not dump mop water outdoors.
- Place food and grease waste in leak-proof containers with tight-fitting lids where they cannot be knocked over by wind.
- Do not place liquids or liquid-containing food wastes in dumpsters or outdoor waste receptacles. If liquid wastes must be disposed in the trash, absorb them on kitty litter or other absorbents before disposal.
- Regularly inspect and clean grease traps and/or grease interceptors. Refer to municipal ordinance for frequency requirements. Grease and solids removed from the trap or interceptor must be disposed or reclaimed at an approved facility.
- Keep areas around grease bins clean. Use “Dry Clean up Methods”. If pressure washing, collect any wastewater from cleaning and dispose of in a sanitary sewer.
- Practice “Zero Waste” practice and compost and recycle materials whenever possible.

REQUIRED STRUCTURES AND EQUIPMENT

- Food waste containers (dumpsters) located outdoors must be sturdy and leak-tight. Liners may be used to keep containers leak-tight. Containers located where wild or domestic animals are known to scavenge must be animal-proof.
- Locate dumpsters on a flat, paved surface and install berms or curbs around the storage area to prevent run-on and run-off.

INSTALLATIONS REQUIRED FOR NEW CONSTRUCTION OR RENOVATIONS

- If food and grease waste containers must be stored outdoors, consider designing a bermed or diked area where food and grease wastes can be stored and stormwater runon will be diverted.

REQUIRED EMPLOYEE AND CONTRACTOR TRAINING

- Train all current employees and contractors who perform food serving or handling on these BMPs.
- Train new hires and job transferees who will perform food serving or handling on this BMP.

- Conduct refresher training on this BMP for all employees and contractors who perform food serving or handling as needed.
- Contracts should stipulate that all contracted employees have been trained in proper stormwater management BMPs.

RECORDS

- Keep records of employee and contractor trainings.
- Keep records of the dates of grease trap/interceptor and tallow bin cleanings and the amount of materials removed.
- Keep records of grease and tallow sent to reclaimers

Typical Fuel Station Spill Kit

Email us at: support@SpillKit.com Free Shipping & Returns REQUEST A QUOTE

Search the store

$145.00

FREE SHIPPING

Quantity:

1

ADD TO CART

ADD TO WISH LIST

Bulk Discount Rates

3 - 5	$142.10
6 +	$137.75

Product Description

Additional Info

Email us at: support@SpillKit.com

Free Shipping & Returns REQUEST A QUOTE

- (4) 4" Oil Only Absorbent Socks
- (1) Pair Gloves (Chemical Resistant, Nitrile)
- (1) Safety Goggle (w/ Indirect Ventilation)
- (1) Disposal Bag with Tie
- (1) Instruction Sheet and SDS

Related Products

Economy Spill Kit - Oil Only

$65.00

ADD TO CART

Fast Pack Spill Kit - Oil Only

$95.00

ADD TO CART

Speedy Duffel Spill Kit - Universal

$145.00

ADD TO CART

Speedy Duffel Spill Kit - HazMat

$145.00

ADD TO CART

Truck Spill Kit - Oil Only

$275.00

ADD TO CART

Customers Also Viewed

Truck Spill Kit - HazMat

$275.00

ADD TO CART

Truck Spill Kit - Oil Only

$275.00

ADD TO CART

30 Gallon Overpack Salvage Drum Spill Kit - Oil Only

$325.00

ADD TO CART

Truck Spill Kit - Universal

$275.00

ADD TO CART

5 Gallon Bucket Spill Kit - Only

$95.00

ADD TO CART

Email us at: support@SpillKit.com

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APPENDIX H

STORMWATER TREATMENT DEVICE AND CONTROL MEASURE ACCESS AND MAINTENANCE AGREEMENT

RECORDING REQUESTED BY:
County of San Bernardino
Department of Public Works

AND WHEN RECORDED MAIL TO:
County of San Bernardino
Department of Public Works
825 E. Third Street, Room 117
San Bernardino, CA 92415-0835

SPACE ABOVE THIS LINE FOR RECORDER'S USE

COVENANT AND AGREEMENT REGARDING WATER QUALITY MANAGEMENT PLAN AND STORMWATER BEST MANAGEMENT PRACTICES TRANSFER, ACCESS AND MAINTENANCE

THIS PAGE ADDED TO PROVIDE ADEQUATE SPACE FOR RECORDING INFORMATION

Covenant and Agreement Regarding Water Quality Management Plan and Stormwater Best Management Practices
Transfer, Access and Maintenance

OWNER NAME: **215 Table Top LLC, a California Limited Liability Company**

PROPERTY ADDRESS: **Glen Helen Parkway**

APN: **239-031-04, 239-031-32, 239-031-37, 230-031-50**

THIS AGREEMENT is made and entered into in

_____ ,California, this _____ day of

_____ , by and between

215 Table Top LLC, a California limited liability company _____ , hereinafter

referred to as Owner, and the COUNTY OF SAN BERNARDINO, a political subdivision of the State of California, hereinafter referred to as "the County";

WHEREAS, the Owner owns real property ("Property") in the County of San Bernardino, State of California, more specifically described in Exhibit "A" and depicted in Exhibit "B", each of which exhibits is attached hereto and incorporated herein by this reference; and

WHEREAS, at the time of initial approval of development project known as

The Oasis at Glen Helen within the Property described herein, the County required the project to employ Best Management Practices, hereinafter referred to as "BMPs," to minimize pollutants in urban runoff; and

WHEREAS, the Owner has chosen to install and/or implement BMPs as described in the Water Quality Management Plan, dated _____, on file with the County and incorporated herein by this reference, hereinafter referred to as "WQMP", to minimize pollutants in urban runoff and to minimize other adverse impacts of urban runoff; and

WHEREAS, said WQMP has been certified by the Owner and reviewed and approved by the County; and

WHEREAS, the Owner is aware that periodic and continuous maintenance, including, but not necessarily limited to, filter material replacement and sediment removal, is required to assure peak performance of all BMPs in the WQMP and that, furthermore, such maintenance activity will require compliance with all Local, State, or Federal laws and regulations, including those pertaining to confined space and waste disposal methods, in effect at the time such maintenance occurs.

NOW THEREFORE, it is mutually stipulated and agreed as follows:

1. Owner shall comply with the WQMP.

2. All maintenance or replacement of BMPs proposed as part of the WQMP are the sole responsibility of the Owner in accordance with the terms of this Agreement.

3. Owner hereby provides the County's designee complete access, of any duration, to the BMPs and their immediate vicinity at any time, upon reasonable notice, or in the event of emergency, as determined by the County Director of Public Works, no advance notice, for the purpose of inspection, sampling, testing of the BMPs, and in case of emergency, to undertake all necessary repairs or other preventative measures at owner's expense as provided in paragraph 5 below. The County shall make every effort at all times to minimize or avoid interference with Owner's use of the Property. Denial of access to any premises or facility that contains WQMP features is a breach of this Agreement and may also be a violation of the County's Pollutant Discharge Elimination System regulations, which on the effective date of this Agreement are found in County Code Sections 35.0101 et seq. If there is reasonable cause to believe that an illicit discharge or breach of this Agreement is occurring on the premises then the authorized enforcement agency may seek issuance of a search warrant from any court of competent jurisdiction in addition to other enforcement actions. Owner recognizes that the County may perform routine and regular inspections, as well as emergency inspections, of the BMPs. Owner or Owner's successors or assigns shall pay County for all costs incurred by County in the inspection, sampling, testing of the BMPs within thirty (30) calendar days of County invoice.

4. Owner shall use its best efforts diligently to maintain all BMPs in a manner assuring peak performance at all times. All reasonable precautions shall be exercised by Owner and Owner's representative or contractor in the removal and extraction of any material(s) from the BMPs and the ultimate disposal of the material(s) in a manner consistent with all relevant laws and regulations in effect at the time. As may be requested from time to time by the County, the Owner shall provide the County with documentation identifying the material(s) removed, the quantity, and disposal destination), testing construction or reconstruction.

5. In the event Owner, or its successors or assigns, fails to accomplish the necessary maintenance contemplated by this Agreement, within five (5) business days of being given written notice by the County , the County is hereby authorized to cause any maintenance necessary to be done and charge the entire cost and expense against the Property and/or to the Owner or Owner's successors or assigns, including administrative costs, attorneys fees and interest thereon at the maximum rate authorized by the County Code from the date of the notice of expense until paid in full. Owner or Owner's successors or assigns shall pay County within thirty (30) calendar days of County invoice.

6. The County may require the owner to post security in form and for a time period satisfactory to the County to guarantee the performance of the obligations stated herein. Should the Owner fail to perform the obligations under the Agreement, the County may, in the case of a cash bond, act for the Owner using the proceeds from it, or in the case of a surety bond, require the surety(ies) to perform the obligations of this Agreement.

7. The County agrees, from time to time, within ten (10) business days after request of Owner, to execute and deliver to Owner, or Owner's designee, an estoppel certificate requested by Owner, stating that this Agreement is in full force and effect, and that Owner is not in default hereunder with regard to any maintenance or payment obligations (or specifying in detail the nature of Owner's default). Owner shall pay all costs and expenses incurred by the County in its investigation of whether to issue an estoppel certificate within thirty (30) calendar days after receipt of a County invoice and prior to the County's issuance of such certificate. Where the County cannot issue an estoppel certificate, Owner shall pay the County within thirty (30) calendar days of receipt of a County invoice.

8. Owner shall not change any BMPs identified in the WQMP without an amendment to this Agreement approved by authorized representatives of both the County and the Owner.

9. County and Owner shall comply with all applicable laws, ordinances, rules, regulations, court orders and government agency orders now or hereinafter in effect in carrying out the terms of this Agreement. If a provision of this Agreement is terminated or held to be invalid, illegal or unenforceable, the validity, legality and enforceability of the remaining provisions shall remain in full effect.

10. In addition to any remedy available to County under this Agreement, if Owner violates any term of this Agreement and does not cure the violation within the time already provided in this Agreement, or, if not provided, within thirty (30) calendar days, or within such time authorized by the County if said cure reasonably requires more than the subject time, the County may bring an action at law or in equity in a court of competent jurisdiction to enforce compliance by the Owner with the terms of this Agreement. In such action, the County may recover any damages to which the County may be entitled for the violation, enjoin the violation by temporary or permanent injunction without the necessity of proving actual damages or the inadequacy of otherwise available legal remedies, or obtain other equitable relief, including, but not limited to, the restoration of the Property and/or the BMPs identified in the WQMP to the condition in which it/they existed prior to any such violation or injury.

11. This Agreement shall be recorded in the Office of the Recorder of San Bernardino County, California, at the expense of the Owner and shall constitute notice to all successors and assigns of the title to said Property of the obligation herein set forth, and also a lien in such amount as will fully reimburse the County, including interest as herein above set forth, subject to foreclosure in event of default in payment.

12. In event of legal action occasioned by any default or action of the Owner, or its successors or assigns, then the Owner and its successors or assigns agree(s) to hold the County harmless and pay all costs incurred by the County in enforcing the terms of this Agreement, including reasonable attorney's fees and costs, and that the same shall become a part of the lien against said Property.

13. It is the intent of the parties hereto that burdens and benefits herein undertaken shall constitute covenants that run with said Property and constitute a lien there against.

14. The obligations herein undertaken shall be binding upon the heirs, successors, executors, administrators and assigns of the parties hereto. The term "Owner" shall include not only the present Owner, but also its heirs, successors, executors, administrators, and assigns. Owner shall notify any successor to title of all or part of the Property about the existence of this Agreement. Owner shall provide such notice prior to such successor obtaining an

interest in all or part of the Property. Owner shall provide a copy of such notice to the County at the same time such notice is provided to the successor.

15. Time is of the essence in the performance of this Agreement.

16. Any notice to a party required or called for in this Agreement shall be served in person, or by deposit in the U.S. Mail, first class postage prepaid, to the address set forth below. Notice(s) shall be deemed effective upon receipt, or seventy-two (72) hours after deposit in the U.S. Mail, whichever is earlier. A party may change a notice address only by providing written notice thereof to the other party.

17. Owner agrees to indemnify, defend (with counsel reasonably approved by the County) and hold harmless the County and its authorized officers, employees, agents and volunteers from any and all claims, actions, losses, damages, and/or liability arising out of this Agreement from any cause whatsoever, including the acts, errors or omissions of any person and for any costs or expenses incurred by the County on account of any claim except where such indemnification is prohibited by law. This indemnification provision shall apply regardless of the existence or degree of fault of indemnitees. The Owner's indemnification obligation applies to the County's "active" as well as "passive" negligence but does not apply to the County's "sole negligence" or "willful misconduct" within the meaning of Civil Code Section 2782, or to any claims, actions, losses, damages, and/or liabilities, to the extent caused by the acts or omissions of any third party contractors undertaking any work (other than field inspections) or other maintenance on the Property on behalf of the County under this Agreement..

[REMAINDER OF THIS PAGE INTENTIONALLY LEFT BLANK]

IF TO COUNTY :

Director of Public Works

825 E. Third Street, Room 117

San Bernardino, CA 92415-0835

IF TO OWNER:

215 Table Top LLC

P.O. Box 9716

Redlands, CA 92375

IN WITNESS THEREOF, the parties hereto have affixed their signatures as of the date first written above.

OWNER:

Company/Trust:_____

Signature: _____

Name: _____

Title: _____

Date: _____

OWNER:

Company/Trust:_____

Signature: _____

Name: _____

Title: _____

Date: _____

FOR: Maintenance Agreement, dated

_____, for the

project known as

The Oasis at Glen Helen Parkway

_____

(APN) 0239-031-04, 32, 37, & 0230-031-50

As described in the WQMP dated

_____.

NOTARIES ON FOLLOWING PAGE

A notary acknowledgement is required for recordation.

ACCEPTED BY:

_____

BRENDON BIGGS, M.S., P.E., Director of Public Works

Date: _____

Attachment: Notary Acknowledgement

ATTACHMENT 1
Notary Acknowledgement)

EXHIBIT A
(Legal Description)

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

Government Lot 6 (formerly Lot 1) and Government Lot 4, in Section 4, Township 1 North, Range 5 West, San Bernardino Base and Meridian, in the County of San Bernardino, State of California, per supplemental plat of amended lottings on file and accepted by the U.S. Bureau of Land Management January 18, 1980, shown on survey as C.S. 1729 in the office of the County Surveyor of said County Except therefrom that portion of land conveyed to the State of California by deed recorded July 14, 1981 as Instrument No. 1981-154338, Official Records.

Also except therefrom that portion of land conveyed to the County of San Bernardino, body corporate by deed recorded July 14, 1981, Instrument No. 1981-154339, Official Records.

Also excepting therefrom that portion of land lying with the Homestead Entry Survey No. 164 situated in Government Lot 1 of Fraction Section 4, Township 1 North, Range 5 West, San Bernardino Base and Meridian Also excepting therefrom that portion lying Easterly of the Westerly line of that portion conveyed to the County of San Bernardino for highway and road purposes, recorded July 14, 1981 as Instrument No. 1981-154342, Official Records.

Also except any portion lying within Parcel Map No. 415, as per plat recorded in Book 4 Page 46 of Parcel Maps, records of said County and also excepting therefrom that portion thereof conveyed to the County of San Bernardino, body corporate by deed recorded November 2, 1994 as Instrument No. 1994-445921, Official Records and also excepting therefrom that portion thereof conveyed to the County of San Bernardino, body corporate by deed recorded November 2, 1994 as Instrument No. 1994-445922, Official Records.

Together with all that portion of Government Lot 4 in Section 4, Township 1 North, Range 5 West, San Bernardino Base and Meridian, per supplemental plat of amended lottings on file and accepted by the U.S. Bureau of Land Management January 18, 1980, shown on survey filed as C.S. 1729 in the office of the County Surveyor of said County of San Bernardino recorded July 14, 1981 as Instrument No. 1981-154342, Official Records of said County and lying Northwesterly and Westerly of the Westerly line of a strip of land 104.00 feet wide, 52.00 feet on each side of the following described centerline;

Commencing at the centerline intersections of Devore Road relocated and Stage Highway 15 as shown per state highway right-of-way Map No. 404571, Sheet 1 of 5; Thence along said center line of Devore Road relocated South 74º 50' 27" East 138.00 59 feet to the true point of beginning; Thence continuing along said centerline South 74º 50' 27" East, 50.84 feet to the beginning of a tangent curve concave Southerly and having a radius of 1800.00 feet; Thence Easterly along said curve, 217.11 feet through a central angle of 6º 54' 38" to a point of tangency with a having a bearing of South 67º 45' 49" East Thence along said tangent line 67º 45' 49" East, 245.33 feet to the beginning of a tangent curve to the North, Northwest and West and having a radius of 600.00 feet; Thence Easterly, Northeasterly and Northerly along said curve 1280.50 feet through a central angle of 122º 16' 43" to a point of tangency with a line having a bearing of North 10º 02' 32" West; Thence along said tangent line North 10º 02' 32" West 294.32 feet to the beginning of a tangent curve concave Easterly and Southeasterly and having a radius of 1800.00 feet; thence Northerly and Northeasterly along said curve 1734.83 feet through a central angle of 55º 13' 17" to a point of tangency with a line having a bearing of North 45º 10' 45" East; thence along said tangent line North 45º 10' 45" East, 177.09 feet to a point is such 45º 10' 45" West, 810.09 feet from Point “A” as described in that certain Declaration of road right-of-way (Devore Road and Glen Helen Road, Devore Area - Second District, Resolution No. 93-18) recorded as Instrument No. 1993-067483 of Official Records of said County, said point being the point of terminus and all that portion of Government Lots 4 and 6 (formerly Government Lot 1) in Section 4, Township 1 North, Range 5 West, San Bernardino Base and Meridian, per supplemental plat of amended lottings on file and accepted by the U.S. Bureau of and Management January 18, 1980, shown on survey filed C.S. 1729 in the office of the County Surveyor of said County, lying within the described boundaries of that certain grant of easement to the County of San Bernardino recorded July 14, 1981, as Instrument No. 1981-154342, Official Records of said County and lying Northwesterly and Westerly of the Westerly line of a strip of land 104.00 feet wide, 52.00 feet on each side of the following described centerline:

Commencing at the centerline intersections of Devore Road relocated and State Highway 15 as shown per State Highway 15 as shown per state highway right-of-way Map No. 404571, Sheet 1 of 5; Thence along said centerline of Devore Road relocated South 74º 40' 27" East, 138.59 feet to the true point of beginning; Thence continuing along said centerline 74º 40' 27" East, 50.84 feet to the beginning of a tangent curve concave Southerly and having a radius of 1800.00 feet Thence Easterly along said curve 217.11 feet through a central angle of 6º 54' 38" to a point of tangency with a line having a bearing of South 67º 45' 40" East; Thence along said tangent line South 67º 45' 40" East, 245.33 feet to the beginning of a tangent curve concave to the North, Northwest and West and having a radius of 600.00 feet; thence Easterly, Northeasterly and Northerly along said curve 1280.50 feet through a central angle of 122º 16' 43" to a point of tangency with a line having a bearing of North 10º 02' 32" West; Thence along said tangent line North 10º 02' 32" West, 294.32 feet to the beginning of a tangent curve concave Easterly and Southeasterly and having a radius of 1800.00 feet; thence Northerly and Northeasterly along said curve 1734.83 feet through a central angle of 55º 13' 17" to a point of tangency with a line having a bearing of North 45º 10' 45" East; Thence along said tangent line North 45º 10' 45" East, 177.09 feet to a point that is South 45º 10' 45" West, 810.09 feet from Point “A” as described in that certain declaration of road right-of-way (Devore Road and Glen Helen Road, Devore Area - Second District Resolution No. 93-18) recorded as Instrument No. 1993-067483 of Official Records of said County, said point being the point of terminus.

EXHIBIT B
(Map/illustration)

APPENDIX I

WQMP Site Plan

STRUCTURAL SOURCE CONTROL BMPs

S1	STORM DRAIN STENCILING/SIGNAGE
S3	TRASH STORAGE
S4	EFFICIENT IRRIGATION
S5	LANDSCAPE AREAS FINISH GRADE, MINIMUM OR 1" TO 2" BELOW TC, SIDEWALK OR PAVEMENT. TYPICAL ALL LANDSCAPE AREAS
S6	SLOPE, CHANNEL & ENERGY DISSIPATION PROTECTION
S9	VEHICLE WASHING
S12	FUELING AREAS
S13	HILLSIDE DEVELOPMENT
S14	FOOD PREPARATION AREAS

NON-STRUCTURAL SOURCE CONTROL BMPs

N1	EDUCATION
N2	ACTIVITY RESTRICTIONS
N3	LANDSCAPE MAINTENANCE
N4	BMP MAINTENANCE
N5	TITLE 22 HAZARDOUS MATERIAL COMPLIANCE
N6	WATER QUALITY ORDINACES
N7	SPILL CONTINGENCY PLAN
N8	UNDERGROUND STORAGE TANK COMPLIANCE
N9	HAZARDOUS MATERIAL DISCLOSURE
N10	UNIFORM FIRE CODE IMPLEMENTATION
N11	LITTER/DEBRIS CONTROL
N12	EMPLOYEE TRAINING
N14	CATCH BASIN INSPECTION
N15	STREET AND PARKING LOT SWEEPING
N17	NPDES, SWPPP COMPLIANCE

WQMP LEGEND / BEST MANAGEMENT PRACTICES (BMP'S)

(REFERENCE: CALIFORNIA STORMWATER BMP HANDBOOK 2011)

SC-10	NON-STORMWATER DISCHARGES
SC-41	BUILDING & GROUNDS MAINTENANCE
SC-42	BUILDING REPAIR & CONSTRUCTION
SC-43	PARKING AREA MAINTENANCE
SC-44	DRAINAGE SYSTEM MAINTENANCE
SD-10	SITE DESIGN & LANDSCAPE PLANNING
TC-11	INFILTRATION BASIN
RET-1	BIORETENTION

BMP TABLE BIO-RETENTION BASINS:

DA	AREA(SF)	IMP AREA	REQ DCV(CF)	PROVIDED DCV(CF)	PONDED WATER DEPTH	SOIL DEPTH	GRAVEL THICKNESS
DA 1	95597	56402	8222	9494			
DMA A					0	0	4
DMA B					0	2	4
DMA C					0	2	4
DMA D					0	0	2
DA 2	77367	38684	5324	6254			
DMA A					0	2	4
DMA B					0	0	2
DA 3	62763	33264	4826	7543			
DMA A					0	2	4
DMA B					0	0	2
DA 4	44507	22699	3297	6350			
DMA A					0	2	4
DA 5	46773	28531	4176	6475			
DMA A					0	2	4
DA 6	45100	28413	4181	5029			
DMA A					0	2	4
DA 7	45865	27978	4095	6774	0	2	4
DMA A							
DA 8	180531	119150	17709	20184			
DMA A					0	2	4
DMA B					0	2	4
DMA C					0	0	2
DA 9	76784	36856	5376	8910			
DMA A					0	0	2
DMA B					0	2	4
DA 10	171562	116662	17479	18386			
DMA A					0	2	4
DMA B					0	0	2
DA 11	249184	191872	30182	34042			
DMA A					0	2	4
DMA B					0	2	4
DMA C					0	0	3
DMA D					0	2	4
DMA E					0	2	4
DA 12	64268	39203	5732	6479			
DMA A					0	2	4
DMA B					0	0	4
DMA C					0	0	2
DA 13	66376	43144	6389	6588			
DMA A					0	2	4
DMA B					0	0	4
DMA C					0	0	2
DA 14	138385	83031	12245	13752			
DMA A					0	2	4
DMA B					0	2	4
DMA C					0	0	2
TOTALS	1365022	865889	129533	158260			

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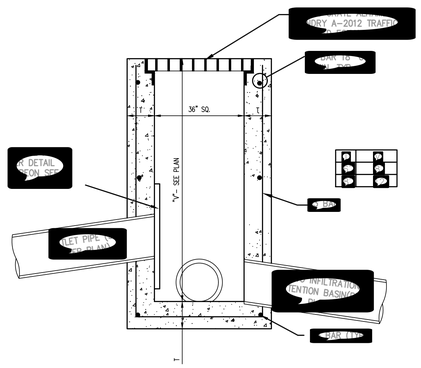
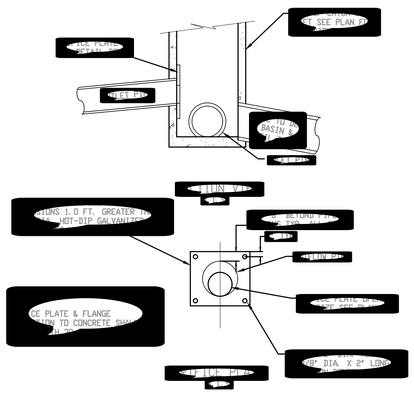
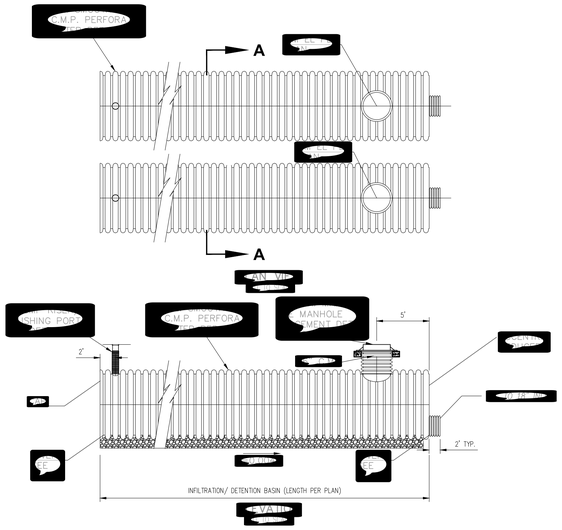
THE OASIS AT GLEN HELEN
WQMP SITE PLAN



TYPICAL CATCH BASIN DETAIL



ORIFICE PLATE DETAIL



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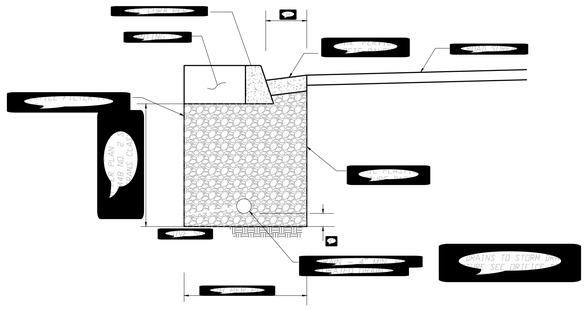

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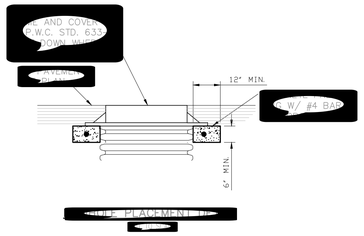
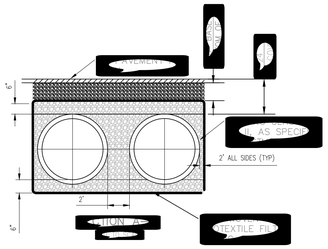
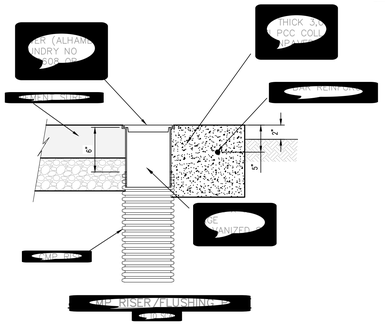
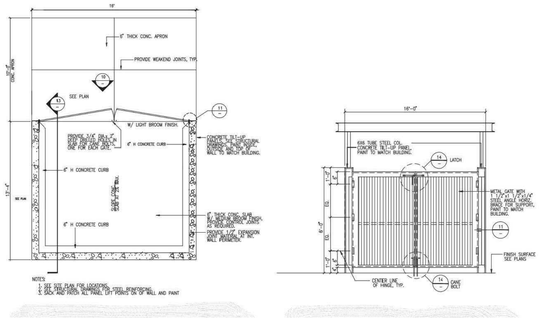
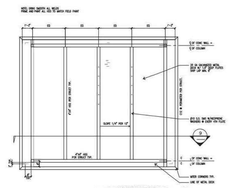


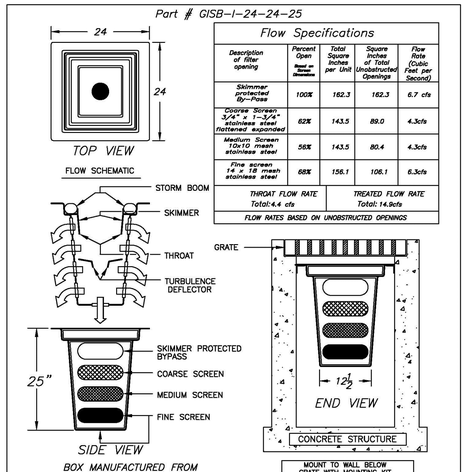


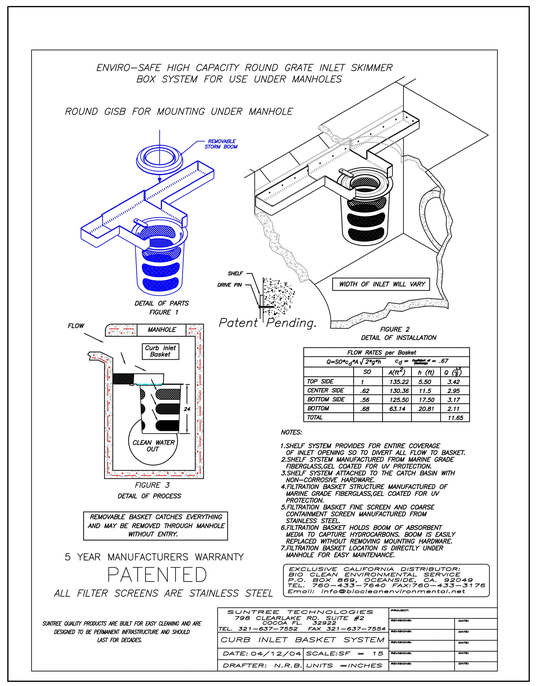


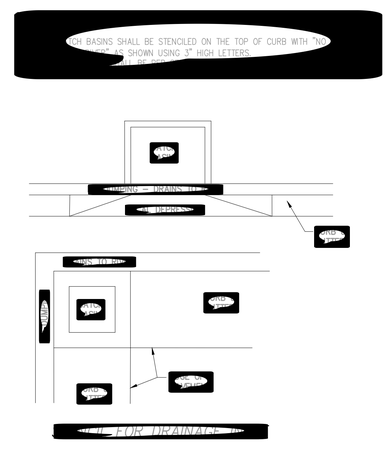


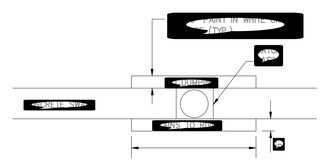


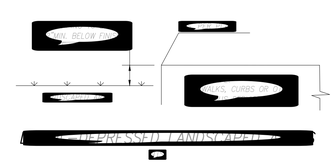
TRASH ENCLOSURE WITH ROOF

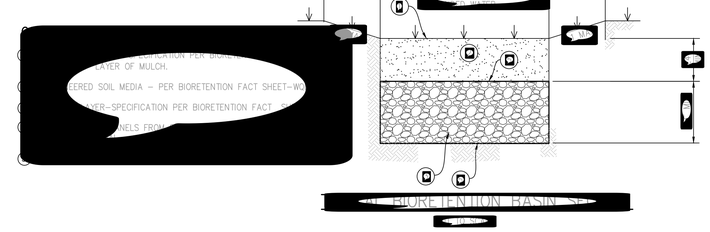












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THE OASIS AT GLEN HELEN
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APPENDIX J

GRADING PLANS

APPENDIX K

LANDSCAPE PLANS

Appendix F:
Noise and Vibration Study

The Oasis at Glen Helen Parkway Project

Noise and Vibration Study

prepared for

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November 2023

RINCON CONSULTANTS, INC.
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1 Project Description and Impact Summary

1.1 Introduction

This study analyzes the potential noise and vibration impacts of the proposed The Oasis at Glen Helen Parkway Project (project), located near the community of Devore, in unincorporated San Bernardino County, California. Rincon Consultants, Inc. (Rincon) prepared this study under contract to 215 Table Top, LLC. The purpose of this study is to analyze the project's noise and vibration impacts related to both temporary construction activity and long-term operation of the project. Table 1 provides a summary of project impacts.

Table 1 Summary of Impacts

Issue	Impact
Would the project result in generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	Less than significant impact with mitigation (Construction) Less than significant (Operation)
Would the project result in the exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	Less than significant impact (Construction) Less than significant impact (Operation)
For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	No Impact

1.2 Project Summary

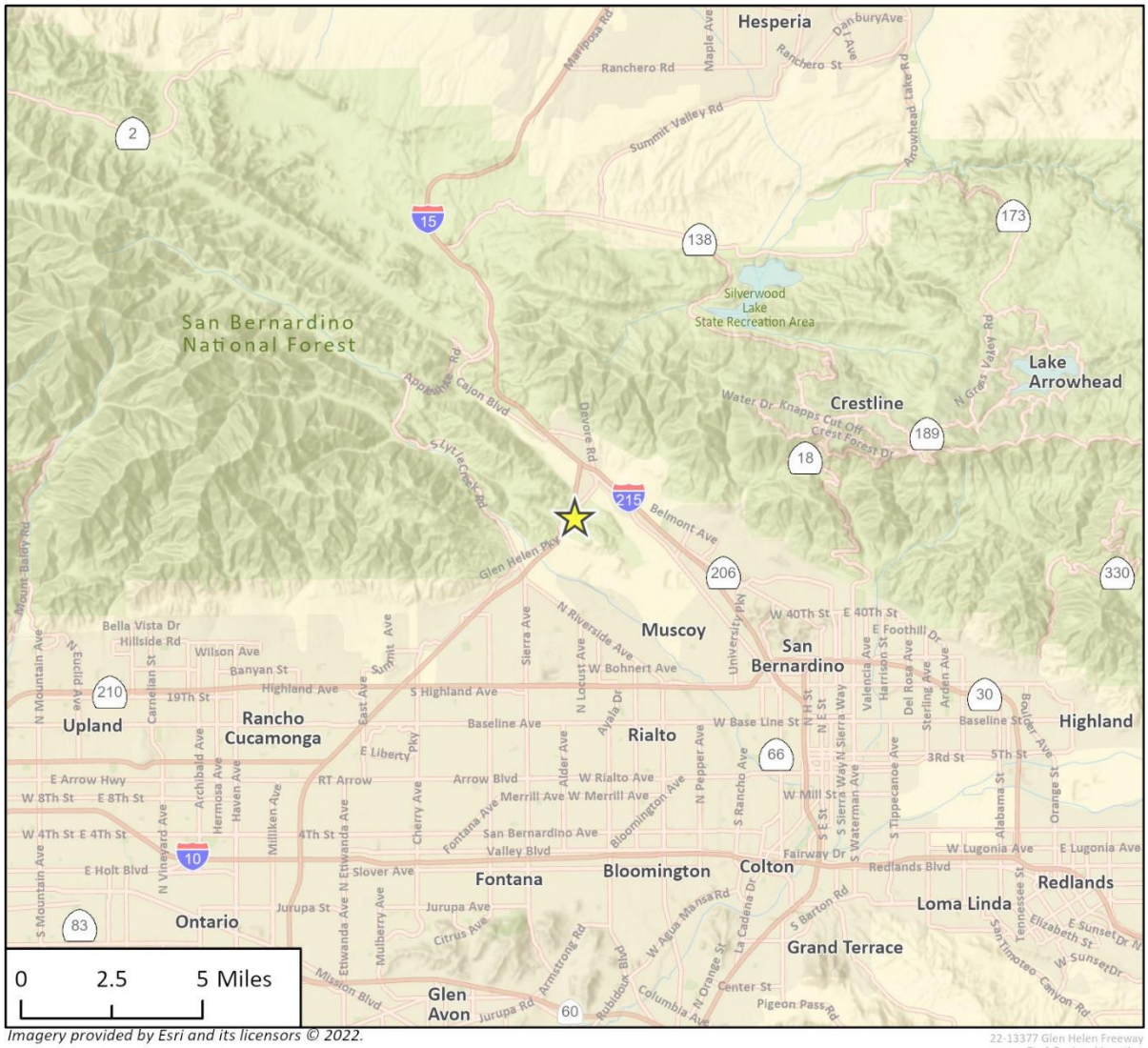
Project Location

The project site is located on the northeast corner of Interstate 15 and Glen Helen Parkway. The project site is zoned Glen Helen/Specific Plan-Destination Recreation (GH/SP-DR). The project site is currently vacant and undeveloped property. It is bounded to the north by rural residential properties, to the south by Glen Helen Parkway and vacant/undeveloped properties, to the west by Interstate 15 and the northbound on-ramp from Glen Helen Parkway to I-15, and to the east by vacant/undeveloped properties. Figure 1 shows the regional location of the site.

Project Description

The approximately 33-acre site is proposed as a community and highway-oriented retail center consisting of uses serving residents of the area including a grocery store, a drug store, and a fitness center and uses that would attract customers passing by on I-15 including a hotel, gas stations, a carwash, sit-down restaurants, and fast-food restaurants with drive-through windows. At the far northern end of the site is proposed a fire station and /or sheriff's substation. Figure 2 shows the project site plan.

Figure 1 Regional Location



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22-13377 Glen Helen Freeway
Fig 1 Regional Location

Project Location

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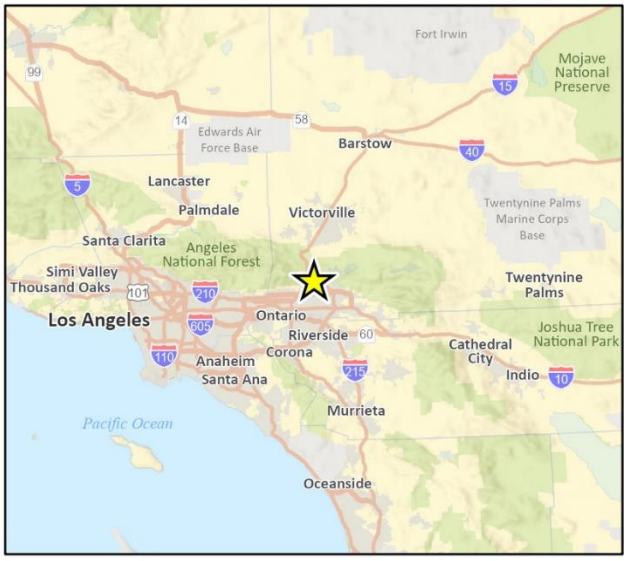
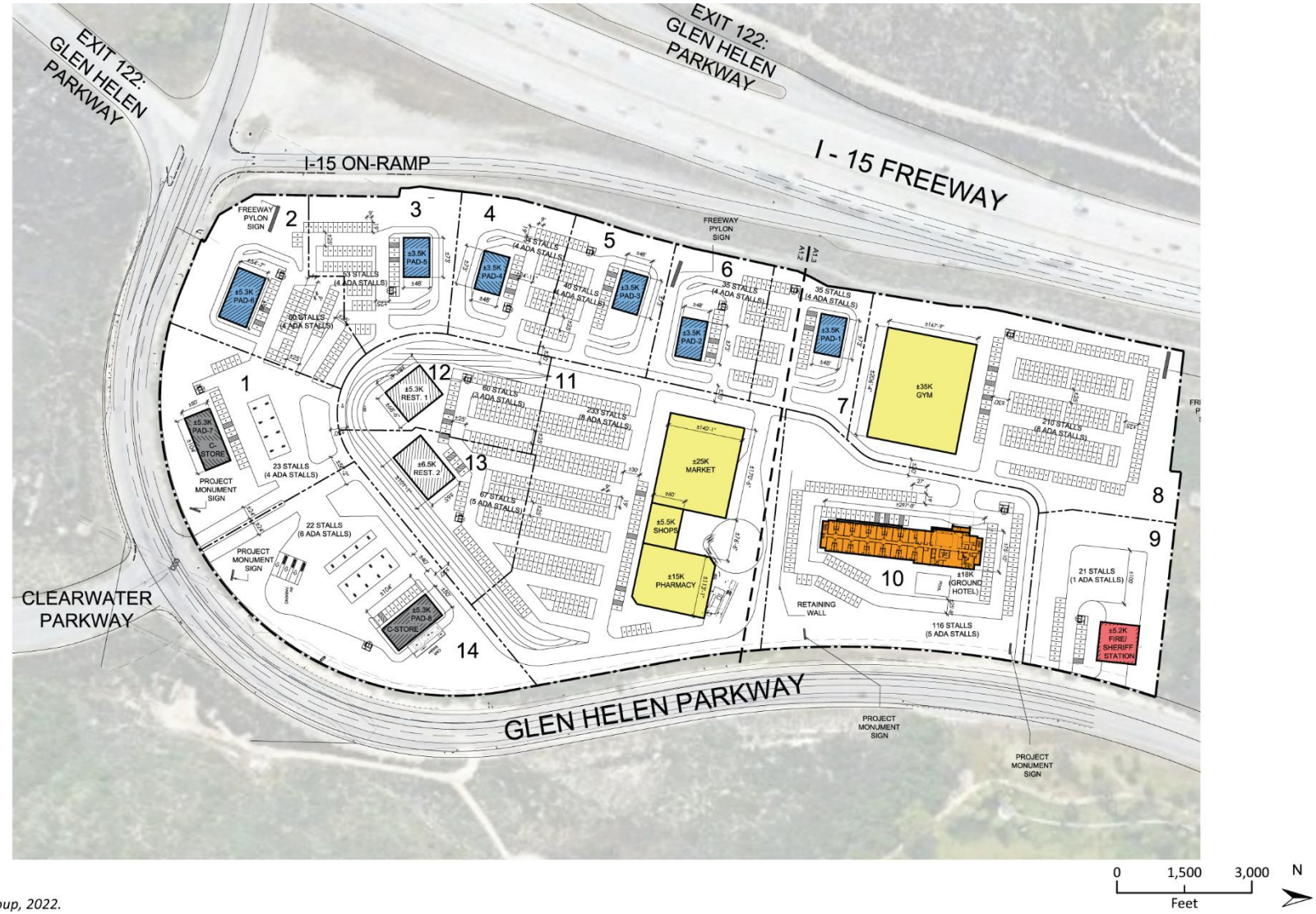


Figure 2 Site Plan



Source: UCR Group, 2022.

2 Background

2.1 Overview of Sound Measurement

Sound is a vibratory disturbance created by a moving or vibrating source, which is capable of being detected by the hearing organs. Noise is defined as sound that is loud, unpleasant, unexpected, or undesired and may therefore be classified as a more specific group of sounds. The effects of noise on people can include general annoyance, interference with speech communication, sleep disturbance, and, in the extreme, hearing impairment (California Department of Transportation [Caltrans] 2013).

Noise levels are commonly measured in decibels (dB) using the A-weighted sound pressure level (dBA). The A-weighting scale is an adjustment to the actual sound pressure levels so that they are consistent with the human hearing response, which is most sensitive to frequencies around 4,000 Hertz and less sensitive to frequencies around and below 100 Hertz (Kinsler, et. al. 1999). Decibels are measured on a logarithmic scale that quantifies sound intensity in a manner similar to the Richter scale used to measure earthquake magnitudes. A doubling of the energy of a noise source, such as doubling of traffic volume, would increase the noise level by 3 dBA; dividing the energy in half would result in a 3 dBA decrease (Crocker 2007).

Human perception of noise has no simple correlation with sound energy: the perception of sound is not linear in terms of dBA or in terms of sound energy. Two sources do not “sound twice as loud” as one source. It is widely accepted that the average healthy ear can barely perceive changes of 3 dBA, increase or decrease (i.e., twice the sound energy); that a change of 5 dBA is readily perceptible; and that an increase (or decrease) of 10 dBA sounds twice (or half) as loud (Crocker 2007).

Sound changes in both level and frequency spectrum as it travels from the source to the receptor. The most obvious change is the decrease in level as the distance from the source increases. The manner by which noise reduces with distance depends on factors such as the type of sources (e.g., point or line, the path the sound will travel, site conditions, and obstructions). Noise levels from a point source typically attenuate, or drop off, at a rate of 6 dBA per doubling of distance (e.g., construction, industrial machinery, ventilation units). Noise from a line source (e.g., roadway, pipeline, railroad) typically attenuates at about 3 dBA per doubling of distance (Caltrans 2013). The propagation of noise is also affected by the intervening ground, known as ground absorption. A hard site, such as a parking lot or smooth body of water, receives no additional ground attenuation and the changes in noise levels with distance (drop-off rate) result from simply the geometric spreading of the source. An additional ground attenuation value of 1.5 dBA per doubling of distance applies to a soft site (e.g., soft dirt, grass, or scattered bushes and trees) (Caltrans 2013). Noise levels may also be reduced by intervening structures; the amount of attenuation provided by this “shielding” depends on the size of the object and the frequencies of the noise levels. Natural terrain features such as hills and dense woods, and man-made features such as buildings and walls, can significantly alter noise levels. Generally, any large structure blocking the line of sight will provide at least a 5 dBA reduction in source noise levels at the receptor (Federal Highway Administration [FHWA] 2011). Structures can substantially reduce exposure to interior noise as well. The FHWA’s guidelines indicate that modern building construction generally provides an exterior-to-interior noise level reduction of 20 to 35 dBA with closed windows.

The impact of noise is not a function of loudness alone. The time of day when noise occurs, and the duration of the noise are also important factors of project noise impact. Most noise that lasts for more than a few seconds is variable in its intensity. Consequently, a variety of noise descriptors have been developed. One of the most frequently used noise metrics is the equivalent noise level (L_{eq}); it considers both duration and sound power level. L_{eq} is defined as the single steady A-weighted level equivalent to the same amount of energy as that contained in the actual fluctuating levels over time.

Noise that occurs at night tends to be more disturbing than that occurring during the day. Community noise is usually measured using Day-Night Average Level (L_{dn}), which is the 24-hour average noise level with a +10 dBA penalty for noise occurring during nighttime (10:00 p.m. to 7:00 a.m.) hours. It is also measured using CNEL, which is the 24-hour average noise level with a +5 dBA penalty for noise occurring from 7:00 p.m. to 10:00 p.m. and a +10 dBA penalty for noise occurring from 10:00 p.m. to 7:00 a.m. (Caltrans 2013). Noise levels described by L_{dn} and CNEL usually differ by about 1 dBA. The relationship between the peak-hour L_{eq} value and the L_{dn}/CNEL depends on the distribution of traffic during the day, evening, and night.

2.2 Vibration

Groundborne vibration of concern in environmental analysis consists of the oscillatory waves that move from a source through the ground to adjacent structures. The number of cycles per second of oscillation makes up the vibration frequency, described in terms of Hz. The frequency of a vibrating object describes how rapidly it oscillates. The normal frequency range of most groundborne vibration that can be felt by the human body starts from a low frequency of less than 1 Hz and goes to a high of about 200 Hz (Crocker 2007).

While people have varying sensitivities to vibrations at different frequencies, in general they are most sensitive to low-frequency vibration. Vibration in buildings, such as from nearby construction activities, may cause windows, items on shelves, and pictures on walls to rattle. Vibration of building components can also take the form of an audible low-frequency rumbling noise, referred to as groundborne noise. Groundborne noise is usually only a problem when the originating vibration spectrum is dominated by frequencies in the upper end of the range (60 to 200 Hz), or when foundations or utilities, such as sewer and water pipes, physically connect the structure and the vibration source (FTA 2018). Although groundborne vibration is sometimes noticeable in outdoor environments, it is almost never annoying to people who are outdoors. The primary concern from vibration is that it can be intrusive and annoying to building occupants and vibration-sensitive land uses.

Vibration amplitudes are usually expressed in peak particle velocity (PPV), which is normally described in inches per second (in/sec). PPV is defined as the maximum instantaneous positive or negative peak of a vibration signal. PPV is often used in monitoring of blasting vibration and other construction activities because it is related to the stresses that are experienced by buildings (Caltrans 2020).

2.3 Sensitive Receptors

Noise exposure goals for various types of land uses reflect the varying noise sensitivities associated with those uses. In San Bernardino County, noise sensitive land uses include residential uses, schools, hospitals, nursing homes, religious institutions, libraries, and similar uses (County of San Bernardino 2023). The nearest noise sensitive receptors to the project site are the single-family homes adjacent to the project site to the north and Glen Helen Regional Park to the east across Glen Helen Parkway.

Vibration-sensitive receptors, which are similar to noise-sensitive receptors, include residences and institutional uses, such as schools, churches, hospitals and museums. Vibration-sensitive receptors also include buildings where vibrations may interfere with vibration-sensitive equipment that is affected by vibration levels that may be well below those associated with human annoyance (e.g., recording studies or medical facilities with sensitive equipment). The nearest vibration sensitive receptors to the project site are the single-family homes adjacent to the project site to the north.

2.4 Project Noise Setting

The most common source of noise in the project site vicinity is vehicular traffic from Glen Helen Parkway and Interstate 15 (I-15). To characterize ambient sound levels at and near the project site, four 15-minute sound level measurements were conducted on Tuesday, November 29, 2022. Short-Term Noise Measurement 1 (ST-1) was taken at the northeastern edge of the project site to capture noise levels from Glen Helen Regional Park. ST-2 was taken at the eastern edge of the project site to capture noise levels from Glen Helen Parkway. ST-3 was conducted south of the project site to capture noise levels from Clearwater Parkway. Finally, ST-4 was conducted along the southwestern boundary of the project site to capture noise levels from the I-15. One long-term 24-hour noise level measurement was conducted from September 28 through September 29, 2023. Long-Term Noise Measurement (LT-1) was conducted at the northern boundary of the Project site, approximately 240 from Glen Helen Parkway. Table 2 and Table 3 summarize the results of the noise measurements and Table 4 shows the recorded traffic volumes. Noise measurement locations are shown in Figure 3. Detailed sound level measurement data are included in Appendix A.

Table 2 Project Site Vicinity Sound Level Monitoring Results- Short-Term

Measurement Location	Sample Times	Approximate Distance to Primary Noise Source	L_{eq} (dBA)	L_{min} (dBA)	L_{max} (dBA)
ST-1	9:35 – 9:50 a.m.	1,200 feet from I-15	53.0	47.4	63.4
ST-2	11:05 – 11:20 a.m.	100 feet from centerline of Glen Helen Parkway	52.5	38.3	65.1
ST-3	10:07 – 10:22 a.m.	50 feet from centerline of Clearwater Parkway	66.4	48.0	81.4
ST-4	10:31 – 10:46 a.m.	240 feet from centerline of Glen Helen Parkway	70.0	55.3	95.2

L_{eq} = average noise level equivalent; dBA = A-weighted decibel; L_{min} = minimum instantaneous noise level; L_{max} = maximum instantaneous noise level

Detailed sound level measurement data are included in Appendix A.

Table 3 Project Site Vicinity Noise Monitoring Results – Long Term

Sample Time	dBA L_{eq}	Sample Time	dBA L_{eq}
24-hour Measurement – Northern Boundary of Project Site, 240 Feet from Glen Helen Parkway – November 29-30, 2022			
11:43 a.m.	42.9	11:43 p.m.	53.0
12:43 p.m.	43.8	12:43 a.m.	62.1
1:43 p.m.	43.9	1:43 a.m.	48.5
2:43 p.m.	43.7	2:43 a.m.	47.1
3:43 p.m.	51.8	3:43 a.m.	50.9
4:43 p.m.	58.9	4:43 a.m.	59.1
5:43 p.m.	50.2	5:43 a.m.	57.6
6:43 p.m.	52.2	6:43 a.m.	55.6
7:43 p.m.	53.1	7:43 a.m.	46.3
8:43 p.m.	52.1	8:43 a.m.	50.1
9:43 p.m.	49.9	9:43 a.m.	55.2
10:43 p.m.	57.4	10:43 a.m.	51.8
24-hour Noise Level (CNEL)			**63**

L_{eq} = average noise level equivalent; dBA = A-weighted decibel; CNEL = Community Noise Equivalent Level

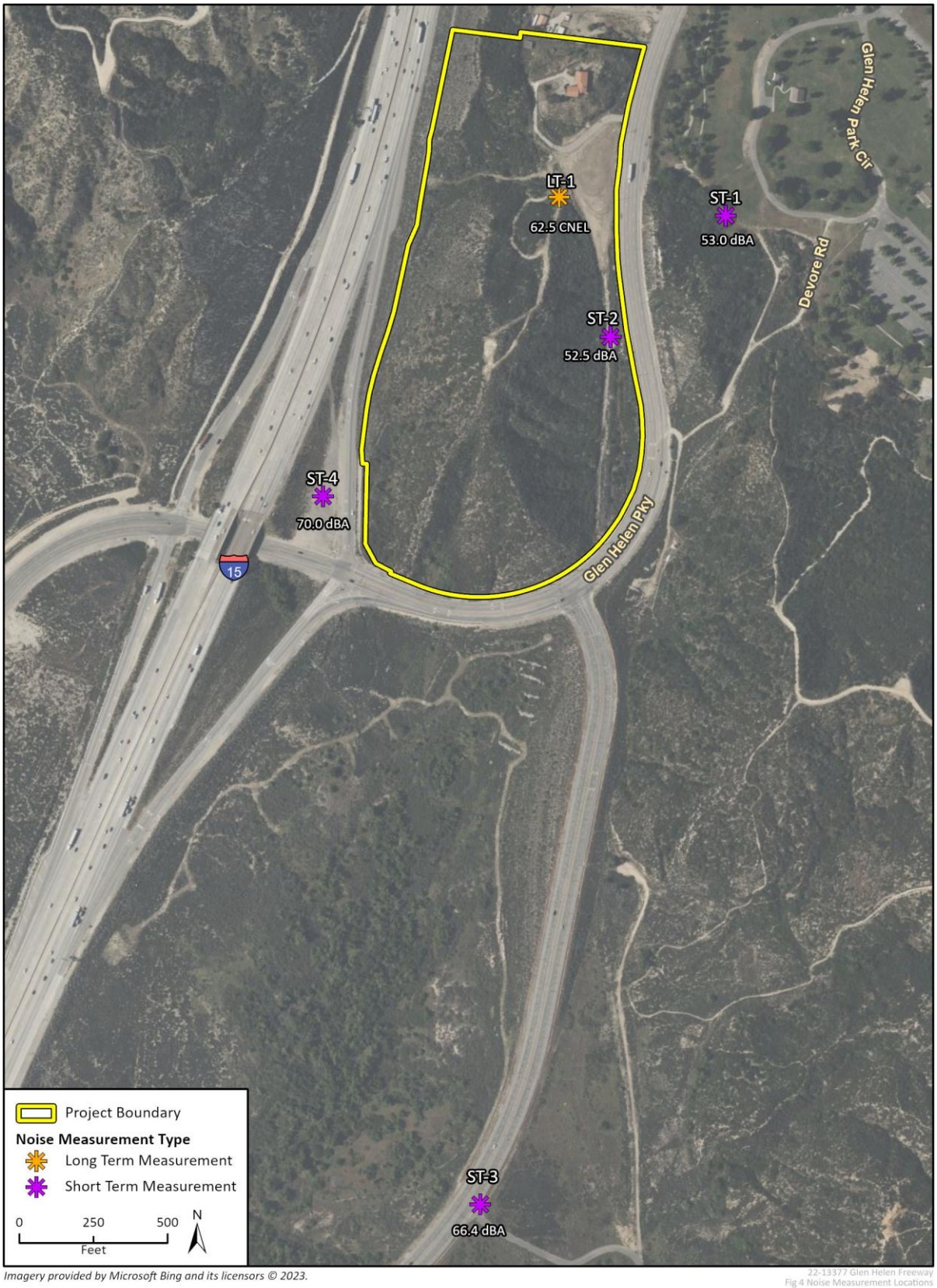
Detailed sound level measurement data are included in Appendix A.

Table 4 Sound Level Monitoring Traffic Counts

Measurement	Roadway	Traffic	Autos	Medium Trucks	Heavy Trucks
ST-2	Glen Helen Parkway	15-minute count	35	0	8
		One-hour Equivalent	140	0	32
Percent			**81%**	**0%**	**19%**
ST-3	Clearwater Parkway	15-minute count	43	2	1
		One-hour Equivalent	172	8	4
Percent			**94%**	**4%**	**2%**

Detailed sound level measurement data are included in Appendix A.

Figure 3 Noise Measurement Locations



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22-13377 Glen Helen Freeway
Fig 4 Noise Measurement Locations

2.5 Regulatory Setting

Federal

FTA Transit and Noise Vibration Impact Assessment Manual

The FTA provides reasonable criteria for assessing construction noise impacts based on the potential for adverse community reaction in the *Transit and Noise Vibration Impact Assessment Manual* (FTA 2018). For residential uses, the daytime noise threshold is 80 dBA L_{eq}.

State

California regulates freeway noise, sets standards for sound transmission, provides occupational noise control criteria, identifies noise standards, and provides guidance for local land use compatibility. State law requires each county and city to adopt a General Plan that includes a Noise Element prepared per guidelines adopted by the Governor's Office of Planning and Research. The purpose of the Noise Element is to limit the exposure of the community to excessive noise levels. CEQA requires all known environmental effects of a project be analyzed, including environmental noise impacts.

California Building Code

The California Building Code is Title 24 of the California Code of Regulations. California Building Code Part 2, Volume 1, Chapter 12, Section 1207.11.2, Allowable Interior Noise Levels, requires that interior noise levels attributable to exterior sources shall not exceed 45 dB in any habitable room. The noise metric is evaluated as either the L_{dn} or the CNEL, consistent with the noise element of the local general plan.

California Building Code: California Green Building Standards Code

The State of California's noise insulation standards for nonresidential uses are codified in the California Code of Regulations, Title 24, Building Standards Administrative Code, Part 11, California Green Building Standards Code. The California Green Building Standards Code noise standards are applied to new or renovation construction projects in California to control interior noise levels resulting from exterior noise sources. Proposed projects may use either the prescriptive method (Section 5.507.4.1) or the performance method (Section 5.507.4.2) to show compliance. Under the prescriptive method, a project must demonstrate transmission loss ratings for the wall and roof-ceiling assemblies and exterior windows when located within a noise environment of 65 dBA CNEL or higher. Under the performance method, a project must demonstrate that interior noise levels do not exceed 50 dBA $L_{eq(1hr)}$.

County of San Bernardino Noise Standards

County of San Bernardino General Plan

The San Bernardino County Countywide Plan was adopted in October 2020. The Hazards Element aims to protect life, property, and commerce from impacts associated with natural hazards, human-generated hazards, and increased risk due to climate change. The following policies are applicable to the project (County of San Bernardino 2020):

Goal HZ-2: Human-Generated Hazards

Policy HZ-2.8: Proximity to noise generating uses. We limit or restrict new noise sensitive land uses in proximity to existing conforming noise generating uses and planned industrial areas.

Policy HZ-2.9: Control sound at the source. We prioritize noise mitigation measures that control sound at the source before buffers, soundwalls, and other perimeter measures.

County of San Bernardino Municipal Code

The County implements and enforces noise control through the San Bernardino County Municipal Code (SBCMC). The County's Noise Ordinance is included in SBCMC Chapter 83.01.080, *Noise*. The following sections of the SBCMC are relevant to the analysis:

Section 83.01.080(B), *Noise Impacted Areas*, identifies noise-sensitive land uses as residential uses, schools, hospitals, nursing homes, religious institutions, libraries, and similar uses.

Section 83.01.080(C)(1), *Noise Standards*, provides noise standards for stationary noise sources as shown in as shown in Table 5.

Table 5 Noise Standards for Stationary Noise Sources

Affected Land Uses (Receiving Noise)	7:00 a.m. – 10:00 p.m. L_{eq}	10:00 p.m. – 7:00 a.m. L_{eq}
Residential	55 dBA	45 dBA
Professional Services	55 dBA	55 dBA
Other Commercial	60 dBA	60 dBA
Industrial	70 dBA	70 dBA

L_{eq} = (Equivalent Energy Level). The sound level corresponding to a steady-state sound level containing the same total energy as a time-varying signal over a given sample period, typically one, eight or 24 hours.

dBA = (A-weighted Sound Pressure Level). The sound pressure level, in decibels, as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound, placing greater emphasis on those frequencies within the sensitivity range of the human ear.

Source: San Bernardino County Municipal Code Section 83.01.080(C)(1)

Section 83.01.080(C)(2), *Noise Limit Categories,* provides noise limit categories. No person shall operate or cause to be operated a source of sound at a location or allow the creation of noise on property owned, leased, occupied, or otherwise controlled by the person, which causes the noise level, when measured on another property, either incorporated or unincorporated, to exceed any one of the following:

a) The noise standard for the receiving land use as specified in Section 83.01.080(B), above, for a cumulative period of more than 30 minutes in any hour.
b) The noise standard plus five dB(A) for a cumulative period of more than 15 minutes in any hour.
c) The noise standard plus ten dB(A) for a cumulative period of more than five minutes in any hour.
d) The noise standard plus 15 dB(A) for a cumulative period of more than one minute in any hour.
e) The noise standard plus 20 dB(A) for any period of time.

Section 83.01.080(D), *Noise Standards for Adjacent Mobile Noise Sources,* provides noise standards for adjacent mobile noise sources as shown in as shown in Table 6. Noise from mobile sources that

affects adjacent properties adversely shall be mitigated for any new development to a level that shall not exceed the standards described in Table 6.

Table 6 Noise Standards for Adjacent Mobile Noise Sources

Land Use		L_{dn} (or CNEL) dBA	
Categories	**Uses**	**Interior**	**Exterior**
Residential	Single and multi-family, duplex, mobile homes	45	60
Open Space	Park	N/A	65

CNEL = (Community Noise Equivalent Level). The average equivalent A-weighted sound level during a 24-hour day, obtained after addition of approximately five decibels to sound levels in the evening from 7:00 p.m. to 10:00 p.m. and ten decibels to sound levels in the night from 10:00 p.m. to 7:00 a.m.

dBA = (A-weighted Sound Pressure Level). The sound pressure level, in decibels, as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound, placing greater emphasis on those frequencies within the sensitivity range of the human ear.

Source: San Bernardino County Municipal Code Section 83.01.080(D)

Section 83.01.080(G), *Exempt Noise*, identifies noise sources that are exempt from the noise standards discussed above. Temporary construction, maintenance, repair, or demolition activities that occur between the hours of 7:00 a.m. and 7:00 p.m., except on Sundays and Federal holidays, are exempt from the noise standards. In addition, noise from emergency equipment, vehicles, and devices is exempt.

Section 83.01.090(A), *Vibration Standard,* states that no ground vibration shall be allowed that can be felt without the aid of instruments at or beyond the lot line, nor shall any vibration be allowed which produces a particle velocity greater than or equal to two-tenths inches per second measured at or beyond the lot line.

3 Methodology

3.1 Construction Noise

Construction noise was estimated using the FHWA Roadway Construction Noise Model (RCNM) (FHWA 2006). RCNM predicts construction noise levels for a variety of construction operations based on empirical data and the application of acoustical propagation formulas. Using RCNM, construction noise levels were estimated at noise sensitive receivers near the project site. RCNM provides reference noise levels for standard construction equipment, with an attenuation rate of 6 dBA per doubling of distance for stationary equipment.

Variation in power imposes additional complexity in characterizing the noise source level from construction equipment. Power variation is accounted for by describing the noise at a reference distance from the equipment operating at full power and adjusting it based on the duty cycle of the activity to determine the L_{eq} of the operation (FHWA 2018). Each phase of construction has a specific equipment mix, depending on the work to be accomplished during that phase. Each phase also has its own noise characteristics; some will have higher continuous noise levels than others, and some have high-impact noise levels.

Construction activity would result in temporary noise in the project site vicinity, exposing surrounding nearby receivers to increased noise levels. Construction noise would typically be higher during the heavier periods of initial construction (i.e., site preparation and grading) and would be lower during the later construction phases (i.e., building construction and paving). Typical heavy construction equipment during project grading could include dozers, loaders, graders, and dump trucks. It is assumed that diesel engines would power all construction equipment. Construction equipment would not all operate at the same time or location. In addition, construction equipment would not be in constant use during the 8-hour operating day.

Construction activities would be located as close as 100 feet to the closest sensitive receptors but would typically be located at an average distance further away due to the nature of construction. Construction equipment is typically dispersed in various areas of the site, with only a limited amount of equipment operating near a given location at a particular time. The FTA 2018 *Transit Noise and Vibration Impact Assessment* document recommends this approach on page 177, stating that for the distance variable in its construction noise calculation “assumes that all equipment operates at the center of the project.” Therefore, it is common industry standard practice to analyze average construction noise from the center of the site because this is the approximate center of where noise is being generated, as equipment moves around the site throughout the workday. In accordance with FTA recommendations, construction noise from site preparation/grading was analyzed from the center of the site, as construction equipment for this phase would be moving throughout the site. Construction noise from building construction, paving, and architectural coating was analyzed based upon the closest proposed parking area or building to the sensitive receptors, as buildings and parking areas are proposed at different locations throughout the project site. The closest sensitive receptors to the project site are the single-family residences to the north and Glen Helen Regional Park to the east across Glen Helen Parkway.

Temporary construction activities that occur between the hours of 7:00 a.m. and 7:00 p.m., except on Sundays and Federal holidays, would be exempt from noise standards pursuant to the County’s Municipal Code Section 83.01.080. Construction noise is typically loudest during activities that

involve excavation and moving soil, such as site preparation and grading. Noise levels from each phase of construction were modeled in RCNM based on the equipment list provided by the project applicant. Construction traffic noise impacts are evaluated based on the relative increase in project construction traffic volume compared with existing traffic volumes on affected roadways.

3.2 Groundborne Vibration

The project does not include any substantial vibration sources associated with operation. Thus, construction activities have the greatest potential to generate ground-borne vibration affecting nearby receptors, especially during grading and excavation and paving of the project site. Table 7 shows vibration levels of anticipated grading and excavation equipment used during construction. The greatest vibratory source during construction in the project vicinity would be a vibratory roller. Neither blasting nor pile driving would be required for construction of the project.

Table 7 Project Construction Vibration Levels

Equipment	PPV at 25 ft. (in/sec)
Vibratory Roller	0.210
Large Bulldozer	0.089
Loaded Trucks	0.076
Small Bulldozer	0.003

Source: FTA 2018

3.3 Operational Noise Sources

Based on information provided by the project applicant, the hotel and gas stations, including the car wash, would operate 24 hours a day and all other uses, including the drive thrus, would operate from 7:00 a.m. to 11:00 p.m. Therefore, operational stationary source noise could occur from all uses during the nighttime period of 10:00 p.m. to 7:00 a.m. Noise from drive-thru speaker is assumed to generate a noise level of 65 dBA at a distance of 4 feet based on typical speaker box systems such as a 3M Model XT-1 (see Appendix B). Noise-generating mechanical equipment would also include HVAC equipment at the proposed buildings. This analysis conservatively assumes the equipment would operate continuously for a full hour during the daytime and nighttime. HVAC equipment was assumed to generate noise levels of 70 dBA L_{eq} at a distance of 3 feet based on a sound power level of 78 dBA for typical HVAC equipment such as a Goodman GPHH33641-PRS4110 (see Appendix B). To determine the noise level at the nearby residential receptors, the distance between source and receiver property line is measured and principles of sound attenuation applied. To provide a reasonable worst-case analysis, noise sources from the four closest project commercial uses (i.e., the fire station, the hotel, the gym, and the Pad-1 drive-thru) to sensitive receptors were modeled as operating simultaneously. This represents a reasonable worst-case analysis due to the logarithmic nature of decibel addition since adding more sources at further distances would be expected to have a negligible contribution to the overall project noise level ay nearby receptors. Since the proposed car wash is located over 1,000 feet from the nearest residence, it would have a negligible contribution to project operational noise impacts to sensitive receptors.

3.4 Traffic Noise

Traffic noise resulting from the operation of the proposed project would primarily affect Glen Helen Parkway, Clearwater Parkway, and I-15. Project traffic noise increases were estimated using the following formula: 10xLOG(future traffic volume/existing traffic volume) with average daily traffic (ADT) data provided by David Evans and Associates, Inc (David Evans and Associates, Inc 2023). Existing traffic volume estimates along the roadway study segments along with project ADT are shown in Table 8. Cumulative and Cumulative with Project traffic volumes were obtained from David Evans and Associates, Inc and are shown in Table 9.

Table 8 Existing and Background Plus Project Roadway ADT Volumes

Roadway	Existing ADT	Background Plus Project ADT
Glen Helen Parkway - West of I-15 Southbound Ramps	1,870	3,290
Glen Helen Parkway - Between I-15 Southbound and Northbound Ramps	5,340	10,060
Glen Helen Parkway - Between I-15 Northbound Ramps and Clearwater Parkway	8,590	18,930
Glen Helen Parkway - Between Clearwater Parkway and Project Driveway B	5,150	6,630
Glen Helen Parkway - Between Project Driveway B and Glen Helen Road	5,150	7,980
Glen Helen Parkway - Between Glen Helen Road and Cajon Boulevard	5,190	14,490
Glen Helen Parkway - Between Cajon Boulevard and I-215 Southbound Ramps	5,860	17,490
Glen Helen Parkway - Between I-215 Southbound and Northbound Ramps	4,470	10,890
Glen Helen Parkway - North of I-215 Northbound Ramps	2,460	3,460

ADT = average daily traffic

Source: David Evans and Associates, Inc 2023

Table 9 Cumulative and Cumulative With Project Roadway ADT Volumes

Roadway	Cumulative ADT	Cumulative Plus Project ADT
Glen Helen Parkway - West of I-15 Southbound Ramps	2,420	3,430
Glen Helen Parkway - Between I-15 Southbound and Northbound Ramps	8,280	11,580
Glen Helen Parkway - Between I-15 Northbound Ramps and Clearwater Parkway	13,420	20,970
Glen Helen Parkway - Between Clearwater Parkway and Project Driveway B	9,500	10,170
Glen Helen Parkway - Between Project Driveway B and Glen Helen Road	9,240	11,250
Glen Helen Parkway - Between Glen Helen Road and Cajon Boulevard	15,640	17,650
Glen Helen Parkway - Between Cajon Boulevard and I-215 Southbound Ramps	17,860	19,200
Glen Helen Parkway - Between I-215 Southbound and Northbound Ramps	11,650	12,670
Glen Helen Parkway - North of I-215 Northbound Ramps	3,910	4,580

ADT = average daily traffic

Source: David Evans and Associates, Inc 2023

3.5 Significance Thresholds

To determine whether a project would have a significant noise impact, Appendix G of the California Environmental Quality Act (CEQA) Guidelines requires consideration of whether a project would result in:

1. Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies
2. Generation of excessive groundborne vibration or groundborne noise levels
3. For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, expose people residing or working in the project area to excessive noise levels

Where applicable, thresholds of significance from the Glen Helen Specific Plan (GHSP) EIR (County of San Bernardino, 2000) are applied.

Construction Noise

The FTA-recommended criterion of 80 dBA L_{eq} for daytime receptors is used as a significance threshold for the residences to the north and Glen Helen Park to the east.

Construction Vibration

Vibration impacts were not addressed in the GHSP EIR. Vibration limits used in this analysis to determine a potential impact to local land uses from construction activities, such as, vibratory compaction or excavation, are based on information contained in the FTA *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018). Groundborne vibration levels that could induce potential architectural damage to buildings are identified in Table 10. Based on FTA recommendations, limiting vibration levels to below 0.2 in/sec PPV at non-engineered timber and masonry buildings (which would apply to the nearby residential structures) would prevent architectural damage. This is also consistent with the County's Municipal Code Section 83.01.090(A).

Table 10 Groundborne Vibration Architectural Damage Criteria

Building Category	PPV (in/sec)
I. Reinforced concrete, steel, or timber (no plaster)	0.5
II. Engineered concrete and masonry (no plaster)	0.3
III. Nonengineered timber and masonry buildings	0.2
IV. Buildings extremely susceptible to vibration damage	0.12

in/sec = inches per second; PPV = peak particle velocity

Source: FTA 2018

On-site Operational Noise

The County has adopted noise standards in the Municipal Code regulating operational stationary noise sources in the County. The project would result in a significant impact if noise from project operational stationary sources (e.g., HVAC equipment and drive-thru noise) exceeds the Municipal Code standards shown in Table 5.

Traffic Noise

The GHSP EIR used a significance threshold of a 5 dBA ambient noise level increase for traffic noise impacts. Therefore, a threshold of 5 dBA CNEL increase is applied to project traffic noise impacts. For a project to contribute significantly to a cumulative noise impact, the traffic noise increase from the project would need to contribute more than 1 dBA CNEL to a cumulative traffic noise increase of greater than 5 dBA CNEL.

Aircraft Noise

For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, if the project exposes people residing or working in the project area to excessive noise levels such as noise levels exceeding normally acceptable noise levels in the General Plan there would be a significant impact.

Land Use Compatibility

As a result of the Supreme Court decision regarding the assessment of the environment's impacts on projects (*California Building Industry Association (CBIA) v. Bay Area Air Quality Management District (BAAQMD)*, 62 Cal. 4th 369 (No. S 213478) issued December 17, 2015), it is generally no longer the purview of the CEQA process to evaluate the impact of existing environmental conditions on any given project. As a result, while the noise from existing sources (e.g., adjacent roadways) is taken into account as part of the baseline condition, the direct effects of exterior noise from nearby noise sources relative to land use compatibility of a proposed project is typically no longer a required topic for impact evaluation under CEQA. Generally, no determination of significance is required except for certain school projects, projects affected by airport noise, and projects that would exacerbate existing conditions (i.e., projects that would have a significant operational impact). Since these exceptions do not apply to the project, this topic is not be discussed further in the report.

4 Impact Analysis

4.1 Issue 1

Issue: Would the project result in generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Impact N-1 CONSTRUCTION OF THE PROJECT WOULD NOT GENERATE A SUBSTANTIAL INCREASE IN AMBIENT NOISE LEVELS IN EXCESS OF STANDARDS ESTABLISHED IN THE LOCAL GENERAL PLAN OR NOISE ORDINANCE, OR APPLICABLE STANDARDS OF OTHER AGENCIES. HOWEVER, IF UNCONTROLLED, COULD CREATE A NUISANCE AT NEARBY SENSITIVE RECEPTORS. PROJECT CONSTRUCTION NOISE WOULD BE LESS THAN SIGNIFICANT WITH MITIGATION. PROJECT OPERATIONAL NOISE IMPACTS WOULD BE LESS THAN SIGNIFICANT.

Construction

On-Site Construction Noise

As described under Section 3, *Methodology*, over the course of a typical construction day, construction equipment would be located as close as 100 feet to the nearest sensitive receptors but would typically be located at an average distance further away due to the nature of construction where equipment is mobile throughout the site during the day. Table 11 identifies the expected noise levels at the closest sensitive receptors from the center of the specific phase based on the conservatively assumed combined use of all construction equipment during each phase of construction.

Table 11 Estimated Noise Levels by Construction Phase

	L_{eq} dBA		
Construction Phase	**RCNM Reference Noise Level**	**Residences to the North**	**Glen Helen Park to the East**
Distance in feet	**50**	**880**	**950**
Site Preparation / Grading	88	63	63
Distance in feet	**50**	**400**	**890**
Building Construction	84	66	59
Architectural Coating	76	58	51
Distance in feet	**50**	**425**	**730**
Paving	85	66	61

Source: Roadway Construction Noise Model. See Appendix C for modeling outputs.

Project construction activities would occur between the hours of 7:00 a.m. and 7:00 p.m., pursuant to the County's Municipal Code. As shown in Table 11, construction noise could be as high as approximately 66 dBA L_{eq} during building construction and paving at the residences north of the project site. Therefore, project construction activity would not exceed the significance threshold of

80 dBA L_{eq} and construction noise impacts would be less than significant. Nevertheless, Mitigation Measure 4.5-3 from the GHSP EIR requires that construction projects adjacent to noise-sensitive land use submit a noise mitigation plan to reduce construction noise. Mitigation Measure NOI-1 is recommended to reduce project construction noise. Project construction noise would not be substantially more severe than addressed in the GHSP EIR.

Off-Site Construction Noise

Off-site construction noise would be generated by hauling trucks transporting debris from the project site. Construction of the project would generate approximately up to 352 one-way inbound and outbound haul trips per day over the duration of three years. Outbound haul trucks would travel on designated haul routes via I-15 and I-215, would not pass sensitive receptors, and would occur during daytime hours. Therefore, the noise generated by 352 daily haul trips generated by construction of the project would be negligible in comparison to the existing traffic noise on I-15 and I-215, and off-site construction noise impacts would be less than significant and off-site construction noise would not be substantially more severe than addressed in the GHSP EIR.

Operation

On-Site Stationary Sources

The project would introduce sources of operational noise to the site, including mechanical equipment (i.e., HVAC units, drive-thru speakers, and car wash equipment). Assumptions for these sources are discussed in Section 3.3, *Operational Noise Sources*. Noise levels from the combination of on-site project sources are calculated at the nearest residential use to the north. As shown in Table 12, the combined noise level is estimated to be up to 37 dBA L_{eq}, which would not exceed the residential nighttime threshold of 45 dBA L_{eq}. In addition, the project would include a fire station and, at times, emergency sirens would be audible at nearby sensitive receptors. However, noise from emergency equipment, vehicles, and devices is exempt from the noise standards of the SBMC per Section 83.01.080(G), *Exempt Noise*, and tends to be for very brief periods of time. Therefore, occasional emergency siren noise would be considered less significant. Operational stationary source noise impacts would not be substantially more severe than addressed in the GHSP EIR.

Table 12 Project Stationary Operational Nosie Levels

Noise Source	Quantity	Noise Level at the Source (dBA Leq)	Noise Level at Single-Family Residence to the North (dBA Leq)
Distance from HVAC (feet)		**3**	**150**
Fire Station - HVAC	1	70	36
Distance from HVAC (feet)		**3**	**355**
Hotel - HVAC	1	70	29
Distance from HVAC (feet)		**3**	**420**
Gym - HVAC	1	70	27

Distance from HVAC (feet)		**3**	**685**
Pad 1 - HVAC	1	70	23
Distance from Drive-thru (feet)		**4**	**685**
Pad 1 – Drive Thru	1	65	20
Combined Noise Level			**37**

Notes: dBA = A-weighted sound-pressure level.

Shielding effects from buildings, terrain or other barriers are conservatively not factored into the attenuation calculations for the purposes of this analysis.

Off-site Traffic Noise

The project would generate new vehicle trips that would increase noise levels on nearby roadways. The project would not make substantial alterations to roadway alignments or substantially change the vehicle classifications mix on local roadways. Therefore, the primary factor affecting off-site noise levels would be increased traffic volumes.

Table 13 summarizes the estimated project and cumulative traffic noise increases based on ADT traffic volume provided by David Evans and Associates, Inc (David Evans and Associates, Inc 2023). As shown in Table 13, project traffic noise increases would be below the significance threshold of 5 dBA CNEL. While certain segments along Glen Helen Parkway would have a cumulative increase of more than 5 dBA CNEL, the project's contribution to the cumulative increase would be less than 1.0 dBA CNEL along these roadway segments and would, therefore, be less than significant. Operational traffic noise impacts would not be substantially more severe than addressed in the GHSP EIR.

Table 13 Summary of Project and Cumulative Traffic Noise Increases

	Roadway Segment Volumes (ADT)				dBA (CNEL)		
Roadway	**Existing**	**Background + Project**	**Cumulative**	**Cumulative + Project**	**Project Noise Increase**	**Cumulative Increase**	**Project Cumulative Contribution**
Glen Helen Parkway - West of I-15 Southbound Ramps	1,870	3,290	2,420	3,430	2.5	2.6	1.5
Glen Helen Parkway - Between I-15 Northbound Ramps and Clearwater Parkway	8,590	18,930	13,420	20,970	3.4	3.9	1.9
Glen Helen Parkway - Between Clearwater Parkway and Project Driveway B	5,150	6,630	9,500	10,170	1.1	3.0	0.3
Glen Helen Parkway - Between Project Driveway B and Glen Helen Road	5,150	7,980	9,240	11,250	1.9	3.4	0.9

Roadway	Roadway Segment Volumes (ADT)				dBA (CNEL)		
	Existing	Background + Project	Cumulative	Cumulative + Project	Project Noise Increase	Cumulative Increase	Project Cumulative Contribution
Glen Helen Parkway - Between Glen Helen Road and Cajon Boulevard	5,190	14,490	15,640	17,650	4.5	5.3	0.5
Glen Helen Parkway - Between Cajon Boulevard and I-215 Southbound Ramps	5,860	17,490	17,860	19,200	4.7	5.2	0.3
Glen Helen Parkway - North of I-215 Northbound Ramps	2,460	3,460	3,910	4,580	1.5	2.7	0.7

ADT = Average Daily Traffic

CNEL = Community Noise Equivalent Level

Source: David Evans and Associates, Inc 2023

Mitigation

Mitigation Measure 4.5-3 from the GHSP EIR requires that construction projects adjacent to noise-sensitive land use submit a noise mitigation plan to reduce construction noise. Mitigation Measure NOI-1 is recommended to reduce project construction noise.

NOI-1 Construction Noise Reduction Measures

The project applicant shall implement the following construction noise reduction measures:

- At least 10 days prior to the start of construction activities, a sign shall be posted at each construction site entrance, or other conspicuous location, that includes a 24-hour telephone number for project information, and a procedure where a construction manager will respond to and investigate noise complaints and take corrective action, if necessary, in a timely manner. The sign shall have a minimum dimension of 48 inches wide by 24 inches high with a one-inch minimum font height and shall also include contact information for Community Development Department staff. The sign shall be placed five feet above ground level.
- At least 21 days prior to the start of construction activities, all off-site businesses and residents within 500 feet of the project site shall be notified of the planned construction activities. The notification shall include a brief description of the project, the activities that would occur, the hours when construction would occur, and the construction period's overall duration. The notification shall include the telephone numbers of the County's and contractor's authorized representatives that are assigned to respond in the event of a noise or vibration complaint.
- If a construction noise complaint(s) is registered, and if County code enforcement is not available to make noise measurements, the contractor shall retain a County-approved noise consultant to conduct noise measurements at the properties that registered the complaint. The noise measurements shall be conducted for a minimum of one hour. The consultant shall prepare a letter report for code enforcement summarizing the measurements, calculation data used in determining impacts, and potential measures to reduce noise levels to the maximum extent feasible.
- Staging and delivery areas shall be located as far as feasible from existing residences.
- Material hauling and deliveries shall be coordinated by the construction contractor to reduce the potential of trucks waiting to unload for protracted periods of time.
- To the extent feasible, hydraulic equipment shall be used instead of pneumatic impact tools, and electric powered equipment shall be used instead of diesel-powered equipment.
- For smaller equipment (such as air compressors and small pumps), line powered (electric) equipment shall be used to the extent feasible.
- Stationary noise sources (e.g., generators and air compressors) shall be located as far from sensitive receptors as possible, and they shall be muffled and enclosed within temporary sheds, or insulation barriers, as necessary.
- Signs shall be posted at the job site entrance(s), within the on-site construction zones, and along queueing lanes (if any) to reinforce the prohibition of unnecessary engine idling. All other equipment shall be turned off if not in use for more than 5 minutes. The construction manager shall be responsible for enforcing this.

4.2 Issue 2

Issue:	Would the project result in generation of excessive groundborne vibration or ground-borne noise levels?

Impact N-2 PROJECT CONSTRUCTION WOULD NOT GENERATE EXCESSIVE GROUNDBORNE VIBRATION OR GROUNDBORNE NOISE LEVELS. VIBRATION WOULD NOT BE GENERATED DURING PROJECT OPERATION. IMPACTS WOULD BE LESS THAN SIGNIFICANT.

Construction activities known to generate excessive ground-borne vibration, such as pile driving, would not be conducted to construct the project. Based on FTA recommendations, limiting vibration levels to below 0.2 in/sec PPV at residential structures would prevent architectural damage regardless of building construction type. The greatest anticipated source of vibration during project construction activities would be from a vibratory roller, which may be used within 125 feet of residential structures to the north. A roller would create approximately 0.019 in/sec PPV at a distance of 125 feet (FTA 2018). This would be lower than the 0.2 in/sec PPV threshold. Therefore, temporary vibration impacts associated with the roller (and other potential equipment) would be less than significant.

The project does not include substantial vibration sources associated with operation. Therefore, operational vibration impacts would be less than significant.

4.3 Issue 3

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

Impact N-3 THE PROJECT WOULD NOT EXPOSE PEOPLE RESIDING OR WORKING IN THE PROJECT AREA TO EXCESSIVE NOISE LEVELS RELATED TO AIRSTRIP/AIRPORT OPERATION. NO IMPACT WOULD OCCUR.

The project site is not located within an airport land use plan or within two miles of a public or private airport (San Bernardino International Airport Authority 2010). The closest airport is the San Bernardino International Airport, which is approximately 12 miles southeast of the project site. Therefore, the project would not expose people residing or working in the project area to excessive noise levels related to airstrip/airport operation. No impact would occur.

5 Conclusion

The project would generate both temporary construction-related noise and long-term noise associated with operation of the project. The project's noise exposure from construction would not exceed the FTA's noise threshold of 80 dBA. Project construction would occur between the hours of 7:00 a.m. and 7:00 p.m., pursuant to the County's Municipal Code. Implementation of Mitigation Measure NOI-1 would reduce construction noise to the degree feasible and impacts would be less than significant. Project construction noise would not be substantially more severe than addressed in the GHSP EIR.

The project's stationary noise sources (i.e., HVAC units, drive-thru speakers, and car wash equipment) would not exceed County noise standards at the nearest sensitive receiver. Therefore, stationary noise impacts would be less than significant. Operational stationary source noise impacts would not be substantially more severe than addressed in the GHSP EIR.

Project traffic noise increases would be below the significance threshold of 5 dBA CNEL. While certain segments along Glen Helen Parkway would have a cumulative increase of more than 5 dBA CNEL, the project's contribution to the cumulative increase would be less than 1.0 dBA CNEL along these roadway segments and would, therefore, be less than significant. Operational traffic noise impacts would not be substantially more severe than addressed in the GHSP EIR.

The project would generate groundborne vibration during construction, but vibration would not exceed the applicable thresholds at the closest residential structures to the north. Therefore, construction-related vibration impacts would be less than significant.

The project site is not located within an airport land use plan or within two miles of a public or private airport. Therefore, the project would not result in impacts from airport noise.

6 References

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Appendix A

Noise Measurement Data

ST-1

- Freq Weight : A
- Time Weight : SLOW
- Level Range : 40-100
- Max dB : 63.4 - 2022/11/29 09:38:06
- Level Range : 40-100
- SEL : 82.5
- Leq : 53.0
-

No.s	Date Time	(dB)				
1	2022/11/29 09:34:38	55.1	56.8	55.9	55.6	55.1
6	2022/11/29 09:34:53	56.5	57.2	56.8	56.1	55.8
11	2022/11/29 09:35:08	55.9	55.7	54.9	54.9	54.6
16	2022/11/29 09:35:23	54.8	53.7	53.2	53.6	52.3
21	2022/11/29 09:35:38	52.8	53.2	53.4	53.6	53.5
26	2022/11/29 09:35:53	54.0	53.6	52.7	52.2	52.4
31	2022/11/29 09:36:08	51.7	52.7	53.2	52.8	52.8
36	2022/11/29 09:36:23	51.6	51.4	51.6	52.0	52.3
41	2022/11/29 09:36:38	52.7	53.5	53.2	52.7	52.2
46	2022/11/29 09:36:53	52.4	53.0	52.8	52.7	52.6
51	2022/11/29 09:37:08	52.6	53.4	54.9	54.6	56.2
56	2022/11/29 09:37:23	55.9	55.7	54.9	56.6	55.6
61	2022/11/29 09:37:38	54.6	55.7	57.5	57.3	59.0
66	2022/11/29 09:37:53	61.3	58.9	59.2	58.5	60.9
71	2022/11/29 09:38:08	56.4	55.5	54.7	60.3	57.4
76	2022/11/29 09:38:23	57.1	56.6	56.3	57.3	58.0
81	2022/11/29 09:38:38	55.8	55.4	54.4	53.3	54.6
86	2022/11/29 09:38:53	53.0	52.8	52.7	52.5	52.8
91	2022/11/29 09:39:08	52.2	52.3	52.2	52.3	52.5
96	2022/11/29 09:39:23	52.2	52.6	52.5	51.7	52.4
101	2022/11/29 09:39:38	51.9	51.9	51.9	52.3	52.3
106	2022/11/29 09:39:53	53.7	53.5	53.9	52.8	52.6
111	2022/11/29 09:40:08	54.1	53.3	54.0	52.8	53.5
116	2022/11/29 09:40:23	53.1	53.9	53.6	53.6	52.1
121	2022/11/29 09:40:38	52.8	52.5	52.4	52.0	50.6
126	2022/11/29 09:40:53	50.7	52.3	51.2	50.0	51.9
131	2022/11/29 09:41:08	50.7	49.8	50.9	52.6	53.7
136	2022/11/29 09:41:23	52.1	50.4	55.2	52.5	50.8
141	2022/11/29 09:41:38	50.7	51.1	51.6	49.8	51.7
146	2022/11/29 09:41:53	51.7	51.0	52.4	55.1	51.7
151	2022/11/29 09:42:08	51.7	51.7	50.6	50.1	49.9
156	2022/11/29 09:42:23	50.4	49.8	49.7	49.7	50.1
161	2022/11/29 09:42:38	49.5	48.9	49.2	49.2	49.7
166	2022/11/29 09:42:53	50.0	50.2	49.4	52.0	50.0
171	2022/11/29 09:43:08	50.1	50.4	51.2	50.6	50.8
176	2022/11/29 09:43:23	53.1	52.9	50.6	50.7	51.9
181	2022/11/29 09:43:38	50.0	49.2	49.2	50.8	49.6
186	2022/11/29 09:43:53	50.1	48.4	52.7	49.1	49.8
191	2022/11/29 09:44:08	49.7	50.1	49.3	48.7	47.6
196	2022/11/29 09:44:23	48.8	49.4	50.4	51.0	50.3
201	2022/11/29 09:44:38	50.6	51.6	53.8	51.5	52.0
206	2022/11/29 09:44:53	52.8	52.6	51.5	53.4	52.2
211	2022/11/29 09:45:08	51.4	52.8	51.3	50.9	50.1
216	2022/11/29 09:45:23	49.6	49.0	49.4	49.6	50.0
221	2022/11/29 09:45:38	50.0	49.4	48.4	48.4	50.2
226	2022/11/29 09:45:53	49.3	51.0	50.1	50.0	50.1
231	2022/11/29 09:46:08	50.7	49.4	50.2	49.4	50.7
236	2022/11/29 09:46:23	50.2	49.4	49.8	50.0	50.2
241	2022/11/29 09:46:38	53.1	53.1	52.7	52.2	51.4
246	2022/11/29 09:46:53	50.9	50.4	53.5	51.3	52.1
251	2022/11/29 09:47:08	53.8	55.9	53.7	51.9	52.5
256	2022/11/29 09:47:23	51.9	52.5	53.3	52.5	52.2
261	2022/11/29 09:47:38	53.2	52.2	51.9	50.6	50.5
266	2022/11/29 09:47:53	52.0	52.9	53.6	52.1	51.9
271	2022/11/29 09:48:08	52.8	51.4	50.9	50.8	51.1
276	2022/11/29 09:48:23	51.1	50.6	50.0	49.2	49.1
281	2022/11/29 09:48:38	49.4	48.7	49.4	50.4	52.6
286	2022/11/29 09:48:53	50.6	50.4	50.8	51.6	51.5
291	2022/11/29 09:49:08	52.5	54.2	52.6	51.9	51.3
296	2022/11/29 09:49:23	52.5	51.6	51.4	52.2	52.4

ST-2

- Freq Weight : A
- Time Weight : SLOW
- Level Range : 40-100
- Max dB : 65.1 - 2022/11/29 11:13:12
- Level Range : 40-100
- SEL : 82.0
- Leq : 52.5
-

No.s	Date Time	(dB)				
1	2022/11/29 11:05:17	56.3	60.2	55.7	52.9	50.6
6	2022/11/29 11:05:32	48.0	49.3	43.6	43.1	48.2
11	2022/11/29 11:05:47	60.7	54.7	52.0	52.9	51.8
16	2022/11/29 11:06:02	45.4	40.9	42.4	43.9	45.1
21	2022/11/29 11:06:17	43.4	40.4	38.6	41.6	43.8
26	2022/11/29 11:06:32	45.3	42.2	38.9	40.5	44.7
31	2022/11/29 11:06:47	44.7	43.8	49.1	44.3	46.0
36	2022/11/29 11:07:02	42.3	48.8	60.3	60.8	56.2
41	2022/11/29 11:07:17	52.8	51.5	50.1	45.9	41.0
46	2022/11/29 11:07:32	47.6	46.9	49.0	47.2	52.1
51	2022/11/29 11:07:47	43.8	41.3	43.9	43.3	51.2
56	2022/11/29 11:08:02	56.6	51.9	47.3	45.8	50.3
61	2022/11/29 11:08:17	52.1	50.9	51.8	46.2	42.1
66	2022/11/29 11:08:32	41.0	43.7	52.9	47.8	46.5
71	2022/11/29 11:08:47	45.2	44.2	42.9	45.3	55.5
76	2022/11/29 11:09:02	49.5	47.6	45.6	42.0	45.3
81	2022/11/29 11:09:17	45.9	42.1	40.6	42.0	44.1
86	2022/11/29 11:09:32	44.1	44.1	46.3	49.6	48.2
91	2022/11/29 11:09:47	43.7	42.4	42.8	47.1	46.6
96	2022/11/29 11:10:02	54.9	55.1	52.2	53.5	53.6
101	2022/11/29 11:10:17	55.9	54.6	60.3	58.3	51.1
106	2022/11/29 11:10:32	50.1	55.1	57.8	57.4	61.2
111	2022/11/29 11:10:47	62.9	55.2	47.1	45.3	46.3
116	2022/11/29 11:11:02	44.3	43.3	42.3	41.7	41.7
121	2022/11/29 11:11:17	40.7	40.3	40.0	40.1	40.2
126	2022/11/29 11:11:32	41.0	42.4	57.3	55.7	51.1
131	2022/11/29 11:11:47	53.0	55.8	57.5	51.9	44.1
136	2022/11/29 11:12:02	44.5	45.7	47.1	48.0	45.2
141	2022/11/29 11:12:17	44.7	46.8	46.0	48.3	50.5
146	2022/11/29 11:12:32	52.5	56.1	57.4	56.6	48.7
151	2022/11/29 11:12:47	43.9	43.9	43.5	41.8	44.5
156	2022/11/29 11:13:02	43.4	45.1	60.2	63.6	56.1
161	2022/11/29 11:13:17	50.4	52.7	50.8	48.2	44.8
166	2022/11/29 11:13:32	40.5	38.5	38.9	38.9	39.4
171	2022/11/29 11:13:47	39.3	39.8	39.6	40.5	39.8
176	2022/11/29 11:14:02	42.6	41.6	42.3	44.2	43.3
181	2022/11/29 11:14:17	41.9	43.8	48.3	47.6	45.6
186	2022/11/29 11:14:32	50.1	47.3	44.9	47.4	47.4
191	2022/11/29 11:14:47	49.2	54.9	54.1	50.0	47.9
196	2022/11/29 11:15:02	51.1	51.1	51.5	50.0	43.1
201	2022/11/29 11:15:17	41.9	40.8	41.3	44.9	45.0
206	2022/11/29 11:15:32	45.1	44.9	44.4	46.6	46.2
211	2022/11/29 11:15:47	43.7	42.2	41.6	41.2	42.5
216	2022/11/29 11:16:02	44.5	57.4	57.0	54.8	50.6
221	2022/11/29 11:16:17	44.5	43.4	44.3	44.4	43.9
226	2022/11/29 11:16:32	45.1	47.2	49.0	50.3	55.8
231	2022/11/29 11:16:47	60.4	62.3	55.8	50.1	51.4
236	2022/11/29 11:17:02	54.7	53.5	47.6	45.7	43.4
241	2022/11/29 11:17:17	42.0	41.1	41.3	40.1	40.4
246	2022/11/29 11:17:32	45.6	41.4	40.2	42.4	42.8
251	2022/11/29 11:17:47	43.5	46.3	43.8	42.4	39.8
256	2022/11/29 11:18:02	39.1	39.1	39.8	41.5	41.5
261	2022/11/29 11:18:17	48.6	62.4	56.5	54.3	54.9
266	2022/11/29 11:18:32	53.3	56.6	50.1	45.8	44.6
271	2022/11/29 11:18:47	45.7	52.2	56.3	53.0	53.2
276	2022/11/29 11:19:02	49.9	45.4	41.7	40.7	45.9
281	2022/11/29 11:19:17	51.8	63.5	60.3	56.0	52.1
286	2022/11/29 11:19:32	48.4	46.1	43.4	41.8	41.9
291	2022/11/29 11:19:47	42.7	44.5	52.1	55.5	58.2
296	2022/11/29 11:20:02	57.6	57.2	64.0	60.4	50.4

ST-3

- Freq Weight : A
- Time Weight : SLOW
- Level Range : 40-100
- Max dB : 81.4 - 2022/11/29 10:17:00
- Level Range : 40-100
- SEL : 95.9
- Leq : 66.4
-

No.s	Date Time	(dB)				
1	2022/11/29 10:06:51	52.9	50.8	51.3	49.8	49.2
6	2022/11/29 10:07:06	52.9	66.0	66.4	61.8	58.6
11	2022/11/29 10:07:21	55.9	53.4	55.7	60.7	69.7
16	2022/11/29 10:07:36	64.9	60.2	57.6	62.6	68.0
21	2022/11/29 10:07:51	62.7	67.2	73.5	70.6	67.2
26	2022/11/29 10:08:06	62.5	74.2	68.2	64.8	59.9
31	2022/11/29 10:08:21	55.4	54.0	52.0	50.8	52.4
36	2022/11/29 10:08:36	51.5	51.3	51.8	51.9	51.2
41	2022/11/29 10:08:51	51.8	51.8	51.7	51.4	53.4
46	2022/11/29 10:09:06	56.0	61.8	66.4	71.3	63.3
51	2022/11/29 10:09:21	60.0	56.7	58.9	65.4	67.4
56	2022/11/29 10:09:36	61.0	55.2	54.1	65.9	68.0
61	2022/11/29 10:09:51	73.7	66.2	64.4	61.3	55.6
66	2022/11/29 10:10:06	53.6	56.8	61.7	73.3	72.4
71	2022/11/29 10:10:21	80.8	74.5	67.6	66.0	57.6
76	2022/11/29 10:10:36	55.2	73.1	74.4	66.8	77.1
81	2022/11/29 10:10:51	70.2	65.7	60.1	55.2	52.6
86	2022/11/29 10:11:06	51.1	51.1	51.6	51.7	52.6
91	2022/11/29 10:11:21	54.0	58.7	62.5	70.6	65.5
96	2022/11/29 10:11:36	60.4	67.1	69.8	66.6	62.4
101	2022/11/29 10:11:51	60.2	54.7	52.8	50.9	51.1
106	2022/11/29 10:12:06	52.8	52.2	51.9	51.2	50.4
111	2022/11/29 10:12:21	49.8	52.9	76.8	69.1	61.3
116	2022/11/29 10:12:36	59.7	66.8	69.3	60.3	57.0
121	2022/11/29 10:12:51	55.8	56.6	67.9	71.6	70.3
126	2022/11/29 10:13:06	67.7	62.5	75.8	67.2	61.7
131	2022/11/29 10:13:21	57.7	55.9	54.7	51.7	50.8
136	2022/11/29 10:13:36	52.2	52.9	52.3	51.3	51.4
141	2022/11/29 10:13:51	52.6	51.6	51.1	52.4	56.3
146	2022/11/29 10:14:06	74.0	66.1	60.4	59.1	56.1
151	2022/11/29 10:14:21	54.9	53.9	53.8	54.3	53.4
156	2022/11/29 10:14:36	53.4	52.1	52.9	52.4	52.3
161	2022/11/29 10:14:51	52.7	52.1	53.4	53.0	62.9
166	2022/11/29 10:15:06	73.1	64.9	61.0	56.2	55.5
171	2022/11/29 10:15:21	67.8	76.5	72.8	73.8	75.5
176	2022/11/29 10:15:36	68.8	68.4	72.0	66.0	62.3
181	2022/11/29 10:15:51	57.6	55.9	73.3	70.7	63.8
186	2022/11/29 10:16:06	61.8	58.3	54.8	53.5	55.7
191	2022/11/29 10:16:21	60.2	61.4	71.2	69.7	63.4
196	2022/11/29 10:16:36	59.4	55.6	53.6	52.6	52.1
201	2022/11/29 10:16:51	55.5	60.1	80.8	75.8	65.7
206	2022/11/29 10:17:06	73.4	73.1	70.4	64.7	63.1
211	2022/11/29 10:17:21	59.0	56.5	54.2	52.2	51.4
216	2022/11/29 10:17:36	50.0	49.5	49.6	49.9	51.3
221	2022/11/29 10:17:51	51.0	50.9	50.3	52.5	61.2
226	2022/11/29 10:18:06	63.2	56.9	53.0	54.9	56.5
231	2022/11/29 10:18:21	61.4	68.9	63.5	62.4	70.9
236	2022/11/29 10:18:36	63.9	56.9	53.8	49.2	48.7
241	2022/11/29 10:18:51	48.7	49.3	48.1	49.0	55.9
246	2022/11/29 10:19:06	72.1	66.2	61.6	56.8	53.0
251	2022/11/29 10:19:21	52.1	53.1	52.5	53.9	54.8
256	2022/11/29 10:19:36	61.5	67.9	67.2	67.9	62.8
261	2022/11/29 10:19:51	60.1	57.9	56.8	54.9	54.3
266	2022/11/29 10:20:06	55.9	57.6	60.6	67.5	66.8
271	2022/11/29 10:20:21	73.2	65.3	60.8	59.6	57.2
276	2022/11/29 10:20:36	54.7	53.3	51.9	53.0	53.2
281	2022/11/29 10:20:51	53.3	54.5	58.4	61.7	66.4
286	2022/11/29 10:21:06	66.8	58.4	55.6	54.5	53.3
291	2022/11/29 10:21:21	53.6	54.0	71.4	64.2	58.8
296	2022/11/29 10:21:36	60.7	61.3	67.9	65.4	56.4

ST-4

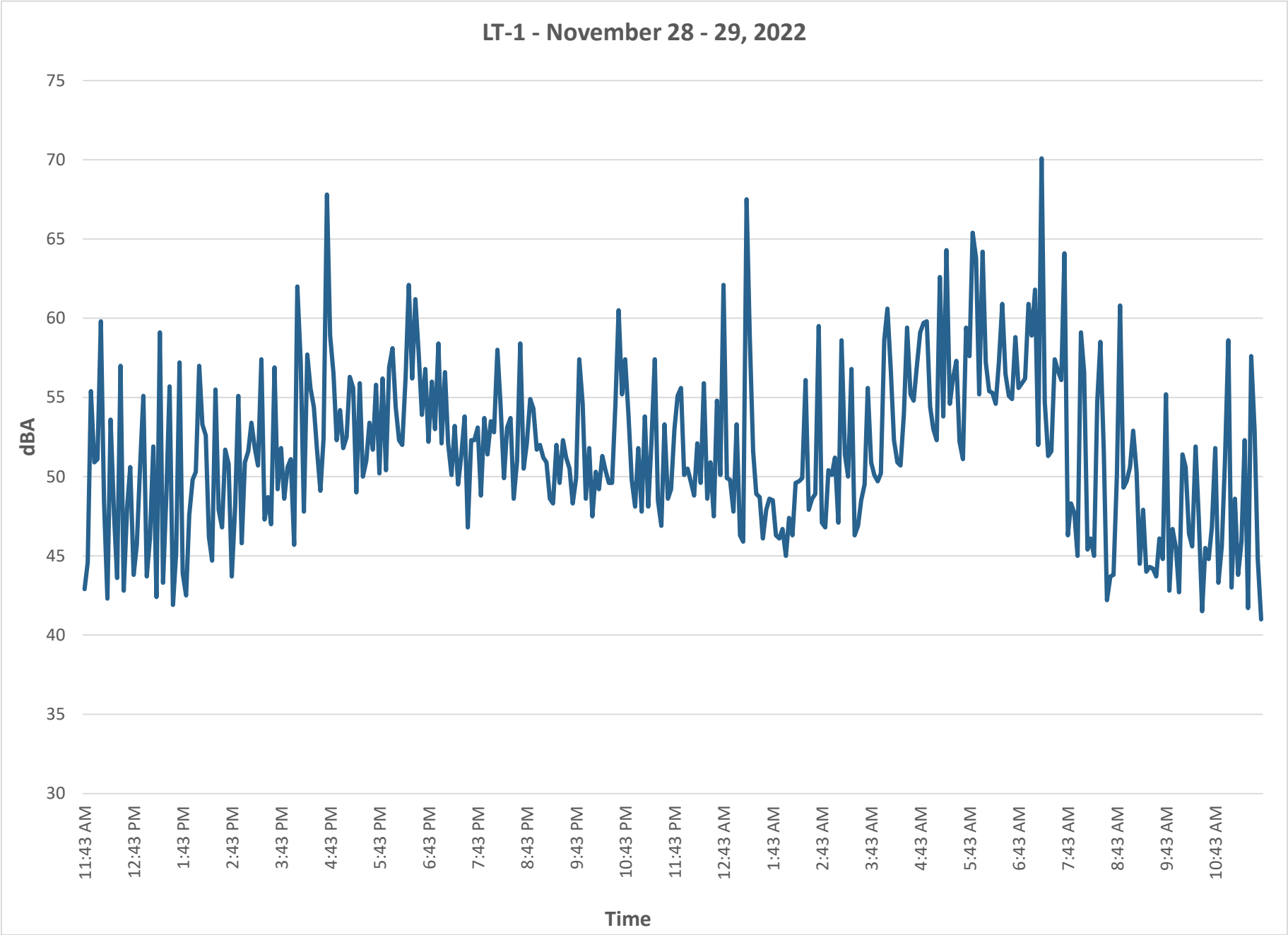
- Freq Weight : A
- Time Weight : SLOW
- Level Range : 40-100
- Max dB : 95.2 - 2022/11/29 10:42:21
- Level Range : 40-100
- SEL : 99.5
- Leq : 70.0
-

No.s	Date Time	(dB)				
1	2022/11/29 10:30:37	69.1	70.9	68.0	64.6	64.5
6	2022/11/29 10:30:52	63.7	64.4	62.8	64.5	65.9
11	2022/11/29 10:31:07	66.2	64.7	62.1	61.9	64.1
16	2022/11/29 10:31:22	64.1	63.1	62.1	62.0	62.4
21	2022/11/29 10:31:37	63.8	64.2	62.5	62.5	61.9
26	2022/11/29 10:31:52	62.4	64.2	63.5	62.4	63.1
31	2022/11/29 10:32:07	64.3	64.6	65.3	62.1	60.5
36	2022/11/29 10:32:22	60.4	62.6	63.0	62.8	61.3
41	2022/11/29 10:32:37	64.2	66.1	66.2	66.8	65.1
46	2022/11/29 10:32:52	65.3	64.8	65.7	66.2	64.5
51	2022/11/29 10:33:07	62.0	62.3	62.4	64.3	67.0
56	2022/11/29 10:33:22	65.8	63.4	62.9	64.6	63.4
61	2022/11/29 10:33:37	64.3	63.0	62.1	63.6	64.4
66	2022/11/29 10:33:52	64.0	62.5	62.6	64.7	65.9
71	2022/11/29 10:34:07	66.2	66.7	66.2	64.8	64.8
76	2022/11/29 10:34:22	63.3	64.2	67.2	65.4	64.9
81	2022/11/29 10:34:37	64.5	64.2	64.0	63.0	64.0
86	2022/11/29 10:34:52	65.7	63.7	62.1	61.3	63.2
91	2022/11/29 10:35:07	65.9	65.7	64.2	64.1	64.4
96	2022/11/29 10:35:22	64.5	64.9	64.7	64.3	62.6
101	2022/11/29 10:35:37	63.2	64.8	72.2	80.1	78.8
106	2022/11/29 10:35:52	72.2	68.5	68.0	65.7	65.0
111	2022/11/29 10:36:07	64.6	65.5	62.6	62.0	62.2
116	2022/11/29 10:36:22	64.1	64.4	64.7	62.5	61.2
121	2022/11/29 10:36:37	59.6	59.7	58.1	61.3	62.7
126	2022/11/29 10:36:52	67.4	66.6	72.3	67.9	62.7
131	2022/11/29 10:37:07	62.1	63.9	64.5	62.6	61.8
136	2022/11/29 10:37:22	62.5	61.6	60.3	59.9	60.4
141	2022/11/29 10:37:37	69.9	79.0	71.3	66.7	65.3
146	2022/11/29 10:37:52	64.1	64.4	66.1	64.3	63.5
151	2022/11/29 10:38:07	64.2	65.4	66.7	67.4	65.4
156	2022/11/29 10:38:22	62.9	62.2	61.8	62.7	64.1
161	2022/11/29 10:38:37	66.8	64.3	64.8	69.7	68.1
166	2022/11/29 10:38:52	65.2	65.4	66.2	65.9	66.4
171	2022/11/29 10:39:07	64.8	65.5	63.3	61.8	62.8
176	2022/11/29 10:39:22	63.6	63.6	64.2	63.4	64.1
181	2022/11/29 10:39:37	69.8	65.3	64.2	64.3	63.8
186	2022/11/29 10:39:52	63.4	62.9	62.2	63.4	63.8
191	2022/11/29 10:40:07	61.0	62.1	63.0	62.2	61.5
196	2022/11/29 10:40:22	62.8	62.7	62.6	62.8	60.3
201	2022/11/29 10:40:37	59.5	60.5	61.7	62.8	64.0
206	2022/11/29 10:40:52	68.8	67.7	65.4	61.8	59.4
211	2022/11/29 10:41:07	59.3	58.0	57.5	58.5	59.6
216	2022/11/29 10:41:22	60.5	61.7	62.1	60.0	59.6
221	2022/11/29 10:41:37	59.2	60.6	59.0	60.9	62.8
226	2022/11/29 10:41:52	62.2	61.0	61.2	59.6	59.0
231	2022/11/29 10:42:07	59.6	61.3	66.4	81.3	94.1
236	2022/11/29 10:42:22	86.7	80.7	73.3	65.9	62.4
241	2022/11/29 10:42:37	63.0	62.8	63.9	62.9	58.6
246	2022/11/29 10:42:52	58.8	60.3	63.7	64.0	61.8
251	2022/11/29 10:43:07	60.8	61.8	60.0	60.8	64.9
256	2022/11/29 10:43:22	64.0	67.7	68.1	69.0	67.6
261	2022/11/29 10:43:37	62.8	58.3	55.3	56.7	60.4
266	2022/11/29 10:43:52	62.1	59.3	60.9	59.3	57.7
271	2022/11/29 10:44:07	56.7	57.5	58.1	57.6	58.4
276	2022/11/29 10:44:22	58.8	59.4	60.7	58.9	61.0
281	2022/11/29 10:44:37	64.0	63.0	65.7	62.8	62.5
286	2022/11/29 10:44:52	62.0	62.1	63.8	63.3	68.9
291	2022/11/29 10:45:07	63.6	62.9	62.7	62.9	61.5
296	2022/11/29 10:45:22	59.2	58.9	61.7	62.0	60.4

LT-1

- Freq Weight : A
- Time Weight : SLOW
- Level Range : 30-90
- Max dB : 84.3 - 2022/11/28 17:37:26
- Level Range : 30-90
- SEL : 119.3
- Leq : 70.0
-

No.s	Date Time	(dB)				
1	2022/11/28 11:43:45	42.9	44.6	55.4	50.9	51.1
6	2022/11/28 12:03:45	59.8	48.4	42.3	53.6	47.7
11	2022/11/28 12:23:45	43.6	57.0	42.8	48.0	50.6
16	2022/11/28 12:43:45	43.8	45.7	50.8	55.1	43.7
21	2022/11/28 13:03:45	46.1	51.9	42.4	59.1	43.3
26	2022/11/28 13:23:45	49.0	55.7	41.9	45.2	57.2
31	2022/11/28 13:43:45	43.9	42.5	47.6	49.8	50.3
36	2022/11/28 14:03:45	57.0	53.3	52.6	46.2	44.7
41	2022/11/28 14:23:45	55.5	47.9	46.8	51.7	50.8
46	2022/11/28 14:43:45	43.7	48.1	55.1	45.8	50.9
51	2022/11/28 15:03:45	51.6	53.4	51.8	50.7	57.4
56	2022/11/28 15:23:45	47.3	48.7	47.0	56.9	49.2
61	2022/11/28 15:43:45	51.8	48.6	50.6	51.1	45.7
66	2022/11/28 16:03:45	62.0	57.2	47.8	57.7	55.6
71	2022/11/28 16:23:45	54.4	51.7	49.1	52.4	67.8
76	2022/11/28 16:43:45	58.9	56.5	52.3	54.2	51.8
81	2022/11/28 17:03:45	52.5	56.3	55.6	49.0	55.9
86	2022/11/28 17:23:45	50.0	51.0	53.4	51.7	55.8
91	2022/11/28 17:43:45	50.2	56.2	50.4	56.9	58.1
96	2022/11/28 18:03:45	54.4	52.3	52.0	56.3	62.1
101	2022/11/28 18:23:45	56.2	61.2	57.7	53.9	56.8
106	2022/11/28 18:43:45	52.2	56.0	53.0	58.4	52.1
111	2022/11/28 19:03:45	56.6	52.1	50.1	53.2	49.5
116	2022/11/28 19:23:45	51.3	53.8	46.8	52.3	52.3
121	2022/11/28 19:43:45	53.1	48.8	53.7	51.4	53.5
126	2022/11/28 20:03:45	52.8	58.0	54.5	49.9	53.1
131	2022/11/28 20:23:45	53.7	48.6	51.0	58.4	50.5
136	2022/11/28 20:43:45	52.1	54.9	54.3	51.7	52.0
141	2022/11/28 21:03:45	51.2	50.9	48.6	48.3	52.0
146	2022/11/28 21:23:45	49.6	52.3	51.2	50.5	48.3
151	2022/11/28 21:43:45	49.9	57.4	54.6	48.6	51.8
156	2022/11/28 22:03:45	47.5	50.3	49.2	51.3	50.4
161	2022/11/28 22:23:45	49.6	49.6	54.6	60.5	55.2
166	2022/11/28 22:43:45	57.4	53.8	49.8	48.1	51.8
171	2022/11/28 23:03:45	47.8	53.8	48.1	52.1	57.4
176	2022/11/28 23:23:45	48.5	46.9	53.3	48.6	49.2
181	2022/11/28 23:43:45	53.0	55.1	55.6	50.1	50.5
186	2022/11/29 00:03:45	49.7	48.8	52.1	49.6	55.9
191	2022/11/29 00:23:45	48.6	50.9	47.5	54.8	50.1
196	2022/11/29 00:43:45	62.1	49.9	49.8	47.8	53.3
201	2022/11/29 01:03:45	46.3	45.9	67.5	58.9	51.6
206	2022/11/29 01:23:45	48.9	48.7	46.1	47.9	48.6
211	2022/11/29 01:43:45	48.5	46.3	46.1	46.7	45.0
216	2022/11/29 02:03:45	47.4	46.3	49.6	49.7	49.9
221	2022/11/29 02:23:45	56.1	47.9	48.6	48.9	59.5
226	2022/11/29 02:43:45	47.1	46.8	50.4	50.1	51.2
231	2022/11/29 03:03:45	47.1	58.6	51.4	50.0	56.8
236	2022/11/29 03:23:45	46.3	46.9	48.5	49.5	55.6
241	2022/11/29 03:43:45	50.9	50.1	49.7	50.2	58.6
246	2022/11/29 04:03:45	60.6	56.7	52.3	50.9	50.7
251	2022/11/29 04:23:45	54.0	59.4	55.2	54.8	57.1
256	2022/11/29 04:43:45	59.1	59.7	59.8	54.4	53.0
261	2022/11/29 05:03:45	52.3	62.6	53.8	64.3	54.6
266	2022/11/29 05:23:45	56.2	57.3	52.2	51.1	59.4
271	2022/11/29 05:43:45	57.6	65.4	63.8	55.2	64.2
276	2022/11/29 06:03:45	57.2	55.4	55.3	54.6	57.2
281	2022/11/29 06:23:45	60.9	56.5	55.1	54.9	58.8
286	2022/11/29 06:43:45	55.6	55.9	56.2	60.9	58.9
291	2022/11/29 07:03:45	61.8	52.0	70.1	54.7	51.3
296	2022/11/29 07:23:45	51.6	57.4	56.7	56.1	64.1
301	2022/11/29 07:43:45	46.3	48.3	47.7	45.0	59.1
306	2022/11/29 08:03:45	56.6	45.4	46.1	45.0	54.7
311	2022/11/29 08:23:45	58.5	51.6	42.2	43.7	43.8
316	2022/11/29 08:43:45	50.1	60.8	49.3	49.7	50.6
321	2022/11/29 09:03:45	52.9	50.3	44.5	47.9	44.0
326	2022/11/29 09:23:45	44.3	44.2	43.7	46.1	44.8
331	2022/11/29 09:43:45	55.2	42.8	46.7	45.5	42.7
336	2022/11/29 10:03:45	51.4	50.6	46.4	45.6	51.9
341	2022/11/29 10:23:45	47.4	41.5	45.5	44.8	46.8
346	2022/11/29 10:43:45	51.8	43.3	45.6	51.0	58.6
351	2022/11/29 11:03:45	43.0	48.6	43.8	45.9	52.3
356	2022/11/29 11:23:45	41.7	57.6	52.9	44.8	41.0


LT-1 - November 28 - 29, 2022
75
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dBA
11:43 AM
12:43 PM
1:43 PM
2:43 PM
3:43 PM
4:43 PM
5:43 PM
6:43 PM
7:43 PM
8:43 PM
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Time

Appendix B

Speaker Box and HVAC Manufacturer Specifications

3M™ Wireless Communication System Model XT-1
Technical Data

3M Wireless Communications System Model XT-1's Night Volume feature to comply with City Decibel Level output ordinance.

With the concern over environmental noise today, many communities restrict the audio level of drive-thru intercom systems during normal day-time business hours and for business operations during night time. Usually, this audio level is specified to be below some number at the property line.

Audio levels are measured in terms of "Sound Pressure Level" with the unit of change being the "Decibel". For example, the city of South Plainfield, NJ requires that sound levels not exceed 65 decibels SPL (sound pressure level) in an industrial area. Taking this into consideration, 3M intercom systems provide an adjustable menu speaker volume to assure compliance with city sound ordinances.

The 3M XT-1 Intercom System can be adjusted at installation to produce an audio sound pressure level of 65 decibels (*) at a distance of 4 feet on axis to the center of the speaker. It is VERY easy for the installation company to verify this reading using an Audio dB meter (set to A weighing, slow response). Please note that sound diminishes at the rate of 6 decibels every time the distance from the sound source is doubled. So, at a distance of 8 feet, the level is 59 decibels, at 16 feet it is 53 decibels and so on.

The 3M XT-1 Intercom System also provides an AUTOMATIC reduction of sound volume for night time operation to maintain compliance with cities that require lower operating sound levels after normal business hours. This feature assures compliance 24 hours a day.

To give you a reference of comparative audio levels, please peruse the attached list of typical sound levels. Be aware that acoustic barriers (shrubbery, trees, fences, walls, etc) will reduce the distance faster than shown in the chart.

(* These level measurements assume the use of recommended 3M components.)

3M

Building and Commercial Services Division

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Table of Sound Levels and Corresponding Sound Pressure and Sound Intensity

To get a feel for decibels, look at the table below which gives values for the sound pressure levels of common sounds in our environment. Also shown are the corresponding sound pressures and sound intensities.

From these, you can see that the decibel scale gives numbers in a much more manageable range.

Chart of sound levels *L* and corresponding sound pressure and sound intensity			
Examples	**Sound Pressure Level dBSPL**	**Sound Pressure *p* N/m² = Pa**	**Sound Intensity *I* watts/m²**
Jet aircraft, 50 m away	140	200	100
Threshold of pain	130	63.2	10
Threshold of discomfort	120	20	1
Chainsaw 1m distance	110	6.3	0.1
Disco, 1 m from speaker	100	2	0.01
Diesel truck, 10 m away	90	0.63	0.001
Curbside of busy road, 5 m	80	0.2	0.0001
Vacuum cleaner, distance 1 m	70	0.063	0.00001
Conversational speech, 1m	60	0.02	0.000001
Average home	50	0.0063	1E-07
Quiet library	40	0.002	1E-08
Quiet bedroom at night	30	0.00063	1E-09
Background in TV studio	20	0.0002	1E-10
Rustling leaf	10	0.000063	1E-11
Threshold of hearing	0	0.00002	1E-12

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A given sound pressure level L_p in dBSPL without the distance of the measurement to the specific sound source is useless.

The reference for 0 dBSPL sound pressure level is p = 20 µPa = 2 * 10^{-5} pascal, the threshold of hearing.
The sound pressure level decreases in the free field with 6dB per distance doubling.
That is the 1/r law.

Often it is argued the sound pressure would decrease after the $1/r^2$ law (inverse square law).
That is wrong.

The sound pressure in a free field is inversely proportional to the distance from the mic to the source.
p ~ 1/r

Distance From Menu Post	3M Intercom SPL (dB)
4'	65
8'	59
16'	53
32'	47
64'	41
128'	35
256'	29
512'	23
1024'	17
2048'	11
4096'	5

Note: *20 dB is approximately the threshold of hearing. This occurs at approximately 700 feet from the speaker post in a very QUIET environment. In an environment of average traffic noise, a 35 dB limit is virtually inaudible and should be considered the practical limit. This occurs are approximately 125 feet from the speaker post.*

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GPHH3 | PACKAGED HEAT PUMP

13.4 SEER2 | 6.7 HSPF2 | ENERGY-EFFICIENT SCROLL COMPRESSOR

Model	Nominal Capacities			Electric Heat (kW)	SEER2/ EER2	Voltage-Phase	Dimensions			dBs	Ship Weight (lbs)
	Cooling [1]	Heating [1]	CFM				W"	D"	H"		
GPHH32441**	24,000	875	22,800	5, 8, 10	14.5 / 12.0	208/230-1	66	34	30	76	324
GPHH33041**	30,000	1,050	27,600	5, 8, 10,15	14.0 / 12.0	208/230-1	66	34	30	76	324
GPHH33641**	36,000	1,200	32,200	5, 8, 10,15	14.0 / 11.5	208/230-1	66	34	35	78	387
GPHH34241**	42,000	1,300	37,600	5, 8, 10,15, 20	14.0 / 12.0	208/230-1	66	34	35	78	387
GPHH34841**	48,000	1,600	44,000	5, 8, 10,15, 20	14.0 / 12.0	208/230-1	66	34	35	80	412
GPHH36041**	60,000	1,700	54,500	5, 8, 10,15, 20	14.0 / 11.5	208/230-1	66	34	38¾	80	412

[1] Tons

Daikin Comfort Technologies Manufacturing, L.P. reserves the right to discontinue, or change at any time, specifications or designs without notice or without incurring obligations.

Standard Features

- Energy-efficient scroll compressor
- Multi-speed ECM indoor blower motor
- Quiet horizontal discharge
- All-aluminum evaporator coil
- Copper tube/aluminum fin condenser coil
- Totally enclosed, permanently lubricated condenser fan motor
- Fully charged system
- Electric heat kit available as a field-installed option
- AHRI certified; ETL listed

Cabinet Features

- Heavy-gauge galvanized-steel cabinet with architectural gray powder-paint finish
- Aluminum foil-facing internal insulation reinforced with fiberglass scrim
- Fully insulated blower compartment with convenient access panels
- Meets cabinet air leakage requirements when tested in accordance with ASHRAE standard 193
- Louvered condenser coil protection
- One footprint for all tonnages
- When properly anchored, meets the 2020 Florida Building Code unit integrity requirements for hurricane-type winds (Anchor bracket kits available.)

2023 SEER2

10 YEAR PARTS LIMITED WARRANTY*

* Complete warranty details available from your local dealer or at www.goodmanmfg.com. To receive the 10-Year Parts Limited Warranty, online registration must be completed within 60 days of installation. Online registration is not required in California or Quebec.

Appendix C

Construction, Traffic, and Operational Stationary Noise Modeling Results

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 04/18/2023
Case Description: Site Prep/Grading

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Site Prep/Grading	Residential	60.0	55.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40	85.0		50.0	0.0
Grader	No	40	85.0		50.0	0.0
Dozer	No	40	85.0		50.0	0.0
Dozer	No	40	85.0		50.0	0.0
Scraper	No	40	85.0		50.0	0.0
Backhoe	No	40	80.0		50.0	0.0

Results

Equipment	Calculated (dBA) Lmax	Leq	Noise Limit Exceedance (dBA) Day Lmax	Leq	Evening Lmax	Leq	Night Lmax	Leq	Noise Limits (dBA) Day Lmax	Leq	Evening Lmax	Leq	Night Lmax	Leq
Excavator	85.0	81.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	85.0	81.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	85.0	81.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	85.0	81.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	85.0	81.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

N/A	N/A	N/A	N/A	N/A	N/A	N/A				
Backhoe			80.0	76.0	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	N/A	N/A	N/A				
	Total		85.0	88.3	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	N/A	N/A	N/A				

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 04/18/2023
Case Description: Building Construction

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Building Construction	Residential	60.0	55.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16	85.0		50.0	0.0
Man Lift	No	20	85.0		50.0	0.0
Generator	No	50	82.0		50.0	0.0
Backhoe	No	40	80.0		50.0	0.0
Welder / Torch	No	40	73.0		50.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane	85.0	77.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	85.0	78.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Generator	82.0	79.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	80.0	76.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Welder / Torch	73.0	69.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Total	85.0	83.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 04/18/2023
Case Description: Paving

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Paving	Commercial	60.0	55.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Paver	No	50	85.0		50.0	0.0
Pavement Scarafier	No	20	85.0		50.0	0.0
Roller	No	20	85.0		50.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA)				
			Day		Evening		
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Paver	85.0	82.0	N/A	N/A	N/A	N/A	N/A
Pavement Scarafier	85.0	78.0	N/A	N/A	N/A	N/A	N/A
Roller	85.0	78.0	N/A	N/A	N/A	N/A	N/A
Total	85.0	84.5	N/A	N/A	N/A	N/A	N/A

	Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Paver	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pavement Scarafier	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 04/18/2023
Case Description: Architectural Coating

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Architectural Coating	Residential	60.0	55.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Compressor (air)	No	40	80.0		50.0	0.0

Results

	Calculated (dBA)			Noise Limits (dBA)			Noise Limit Exceedance (dBA)		
	Day			Evening			Night		
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Compressor (air)	80.0	76.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	80.0	76.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Glen Helen Construction Noise

Distance Attenuation Calculations

	Noise Level @ 50 ft	Residential Area to N	Glen Helen Park to E
Distance (ft)		880	950
Site Prep/Grading	**88.3**	**63.390**	**62.725**

	Noise Level @ 50 ft	Residential Area to N	Glen Helen Park to E
Distance (ft)		400	890
Building Construction	**83.8**	**65.738**	**58.792**
Architectural Coating	**76**	**57.938**	**50.992**

	Noise Level @ 50 ft	Residential Area to N	Glen Helen Park to E
Distance		425	730
Paving	**84.5**	**65.912**	**61.213**

STREET SEGMENT	EXISTING CONDITONS (ADT)	BKGRND (2028) CONDITIONS (ADT)	BKGRND (2028) + PROJECT CONDITIONS (ADT)	FUTURE (2040) CONDITIONS (ADT)	FUTURE (2040) + PROJECT CONDITIONS (ADT)	Project Noise Increase	Cumulative Increase	Project Cumulative Contribution
GLEN HELEN PARKWAY								
1 WEST OF I-15 SB RAMPS	1,870	2,280	3,290	2,420	3,430	2.5	2.6	1.5
2 BETWEEN 1-15 SB AND NB RAMPS	5,340	6,760	10,060	8,280	11,580	2.8	3.4	1.5
3 BETWEEN I-15 NB RAMPS AND CLEARWATER PKWY	8,590	11,010	18,930	13,420	20,970	3.4	3.9	1.9
4 BETWEEN CLEARWATER PKWY AND PROJECT DWY B	5,150	5,960	6,630	9,500	10,170	1.1	3.0	0.3
5 BETWEEN PROJECT DWY B AND GLEN HELEN RD	5,150	5,970	7,980	9,240	11,250	1.9	3.4	0.9
6 BETWEEN GLEN HELEN RD AND CAJON BLVD	5,190	12,480	14,490	15,640	17,650	4.5	5.3	0.5
7 BETWEEN CAJON BLVD AND I-215 SB RAMPS	5,860	16,150	17,490	17,860	19,200	4.7	5.2	0.3
8 BETWEEN I-215 SB AND NB RAMPS	4,470	9,870	10,890	11,650	12,670	3.9	4.5	0.4
9 NORTH OF I-215 NB RAMPS	2,460	2,790	3,460	3,910	4,580	1.5	2.7	0.7

Source	L1	Distance (ft)	L2	Distance (ft)
Fire Station - HVAC	70	3	36.0	150
Hotel - HVAC	70	3	28.5	355
Gym - HVAC	70	3	27.1	420
Pad 1 - Drive Thru	65	4	20.3	685
Pad 1 - HVAC	70	3	22.8	685
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