

PLANNING COMMISSION

ATTACHMENT D

Initial Study Appendices



Date: November 27, 2023
To: Mr. Timothy Roofian, Rodeo Credit Enterprises, LLC
From: M. S. Hatch Consulting, LLC
Subject: **REVISED Air Quality Study – Tentative Tract Map (TTM) 20576 Housing Development – Corner of Mesa Street and Topaz Road, Victorville, CA**

M. S. Hatch Consulting, LLC (MSHC) appreciates the opportunity to prepare the air quality study for the proposed construction and operation of the housing development shown on Tentative Tract Map (TTM) 20576 for Rodeo Credit Enterprises, LLC. The project consists of 244 single family homes on 70.80 acres in the City of Victorville. This air quality study includes the estimated criteria pollutant and greenhouse gas emissions from the construction and operation of the proposed project.

Executive Summary

Table 1 and Table 2 compare the estimated annual and daily emissions summaries from the construction and operation of the proposed housing development to the significant emission thresholds described in the Mojave Desert Air Quality Management District (MDAQMD) California Environmental Quality Act (CEQA) and Federal Conformity Guidelines, dated February 2020, included in Attachment A. The estimated emissions of criteria pollutants and greenhouse gases for each year of construction and the total operational emissions **are well below the applicable thresholds**. Greenhouse gas emissions are presented in units of carbon dioxide equivalent (CO₂e). The proposed project is not considered one of the project types that the MDAQMD CEQA Guidelines require to be evaluated for potentially exposing sensitive receptors to substantial pollutant concentrations.¹ As such, hazardous air pollutants (HAP) emissions were not calculated, and the project was not evaluated for potential health risks to sensitive receptors. This project is consistent with the existing land use plan and conforms with the applicable MDAQMD attainment or maintenance plan(s). Based on the estimated emissions from construction and operation of the project, no violation of any ambient air quality standard is expected when emissions are added to the local background levels.

¹ Residences, schools, daycare centers, playgrounds and medical facilities are considered sensitive receptor land uses. The following project types proposed for sites within the specified distance to an existing or planned (zoned) sensitive receptor land use must be evaluated using significance threshold criteria number 4 (refer to the significance threshold discussion): any industrial project within 1000 feet; a distribution center (40 or more trucks per day) within 1000 feet; a major transportation project (50,000 or more vehicles per day) within 1000 feet; a dry cleaner using perchloroethylene within 500 feet; or a gasoline dispensing facility within 300 feet.

Table 1. Annual Emissions Summary and Significance Thresholds

Emissions Source	Total Emissions (tons per year)						
	ROG	NO _x	CO	SO _x	PM ₁₀	PM _{2.5}	CO ₂ e (MT/year)
Year 1 Construction Emissions (2024)	0.08	0.77	0.73	<0.01	0.14	0.09	111
Year 2 Construction Emissions (2025)	0.29	2.38	2.74	0.01	0.31	0.16	583
Year 3 Construction Emissions (2026)	0.19	1.46	2.40	<0.01	0.23	0.09	522
Year 4 Construction Emissions (2027)	0.18	1.39	2.34	<0.01	0.22	0.08	517
Year 5 Construction Emissions (2028)	0.18	1.32	2.30	<0.01	0.22	0.08	514
Year 6 Construction Emissions (2029)	1.96	1.24	2.22	<0.01	0.22	0.08	496
Total Operational Emissions	3.82	1.74	11.50	0.03	2.78	0.74	3,643
Significant Emissions Threshold	25	25	100	25	15	12	100,000
Threshold Exceedance (Yes/No)	No	No	No	No	No	No	No

ROG: Reactive Organic Compounds, used interchangeably with Volatile Organic Compounds (VOC); NO_x: oxides of nitrogen; CO: Carbon monoxide; SO_x: Oxides of sulfur; PM_{2.5}: particulate matter less than 2.5 micrometers in diameter; PM₁₀: particulate matter less than 10 micrometers in diameter; CO₂e: Carbon dioxide equivalent; MT: metric ton

Table 2. Maximum Daily Emissions Summary and Significance Thresholds

Emissions Source	Total Emissions (pounds per day)						
	ROG	NO _x	CO	SO _x	PM ₁₀	PM _{2.5}	CO ₂ e
Year 1 Construction Emissions (2024)	3.73	36.10	34.00	0.07	6.94	4.15	7,543
Year 2 Construction Emissions (2025)	3.32	30.50	30.10	0.07	4.06	2.20	7,561
Year 3 Construction Emissions (2026)	1.52	11.10	20.10	0.03	1.76	0.69	4,530
Year 4 Construction Emissions (2027)	1.45	10.60	19.50	0.03	1.72	0.65	4,486
Year 5 Construction Emissions (2028)	1.40	10.10	19.10	0.03	1.68	0.62	4,442
Year 6 Construction Emissions (2029)	49.30	10.50	20.80	0.03	1.90	0.66	4,770
Total Operational Emissions	22.70	9.46	81.30	0.18	15.60	4.15	23,555
Significant Emissions Threshold	137	137	548	137	82	65	548,000
Threshold Exceedance (Yes/No)	No	No	No	No	No	No	No

ROG: Reactive Organic Compounds, used interchangeably with Volatile Organic Compounds (VOC); NO_x: oxides of nitrogen; CO: Carbon monoxide; SO_x: Oxides of sulfur; PM_{2.5}: particulate matter less than 2.5 micrometers in diameter; PM₁₀: particulate matter less than 10 micrometers in diameter; CO₂e: Carbon dioxide equivalent

Project Description

The proposed project includes the construction of 244 single family homes and residential streets on 70.80 acres. The project site is located northeast of the intersection of Mesa Street and Catapa Road in the City of Victorville. The site location is included in Figure 1 and the proposed site plan is included in Figure 2.

Sources of Emissions

The emissions associated with the proposed project consist of construction and operational emissions from the housing development. Construction emissions are temporary and include emissions of criteria pollutants and greenhouse gases from construction activities during site preparation, grading, paving, building construction, and the application of architectural coatings. Operational emissions consist of area sources (i.e., re-applying architectural coatings, consumer products, and landscaping equipment), energy use (i.e., electricity and natural gas), mobile sources (e.g., commuting), solid waste disposal, water, and wastewater use (i.e., supplying and treating water and wastewater), and refrigerants (i.e., air conditioners).

Emissions Estimates

Table 3 and 4 present the annual and maximum daily emissions summaries from the construction and operation of the proposed project, respectively. Emissions were estimated using CalEEMod Version 2022.1. The detailed emissions model outputs are included in Attachment B.

This project is not considered one of the project types that the MDAQMD CEQA Guidelines require to be evaluated for potentially exposing sensitive receptors to substantial pollutant concentrations. As such, HAP emissions were not calculated, and the project was not evaluated for potential health risks to sensitive receptors.

Table 3. Annual Construction and Operational Emissions Summary

Emissions Source	Total Emissions (tons per year)						
	ROG	NO _x	CO	SO _x	PM ₁₀	PM _{2.5}	CO _{2e} (MT/year)
Construction Emissions							
Year 1 Construction Emissions (2024)	0.08	0.77	0.73	<0.01	0.14	0.09	111
Year 2 Construction Emissions (2025)	0.29	2.38	2.74	0.01	0.31	0.16	583
Year 3 Construction Emissions (2026)	0.19	1.46	2.40	<0.01	0.23	0.09	522
Year 4 Construction Emissions (2027)	0.18	1.39	2.34	<0.01	0.22	0.08	517
Year 5 Construction Emissions (2028)	0.18	1.32	2.30	<0.01	0.22	0.08	514
Year 6 Construction Emissions (2029)	1.96	1.24	2.22	<0.01	0.22	0.08	496
Operational Emissions							
Mobile	1.41	1.37	10.10	0.03	2.75	0.71	2,635
Area	2.40	0.01	1.25	<0.01	<0.01	<0.01	3
Energy	0.02	0.35	0.15	<0.01	0.03	0.03	856
Water	N/A	N/A	N/A	N/A	N/A	N/A	75
Waste	N/A	N/A	N/A	N/A	N/A	N/A	74
Refrigerants	N/A	N/A	N/A	N/A	N/A	N/A	1
Total Operational Emissions	3.82	1.74	11.50	0.03	2.78	0.74	3,643
Significant Emissions Threshold	25	25	100	25	15	12	100,000
Threshold Exceedance (Yes/No)	No	No	No	No	No	No	No

ROG: Reactive Organic Compounds, used interchangeably with Volatile Organic Compounds (VOC); NO_x: oxides of nitrogen; CO: Carbon monoxide; SO_x: Oxides of sulfur; PM_{2.5}: particulate matter less than 2.5 micrometers in diameter; PM₁₀: particulate matter less than 10 micrometers in diameter; CO_{2e}: Carbon dioxide equivalent; MT: metric ton

Table 4. Maximum Daily Construction and Operational Emissions Summary

Emissions Source	Total Emissions (pounds per day)						
	ROG	NO _x	CO	SO _x	PM ₁₀	PM _{2.5}	CO _{2e}
Construction Emissions							
Year 1 Construction Emissions (2024)	3.73	36.10	34.00	0.07	6.94	4.15	7,543
Year 2 Construction Emissions (2025)	3.32	30.50	30.10	0.07	4.06	2.20	7,561
Year 3 Construction Emissions (2026)	1.52	11.10	20.10	0.03	1.76	0.69	4,530
Year 4 Construction Emissions (2027)	1.45	10.60	19.50	0.03	1.72	0.65	4,486
Year 5 Construction Emissions (2028)	1.40	10.10	19.10	0.03	1.68	0.62	4,442
Year 6 Construction Emissions (2029)	49.30	10.50	20.80	0.03	1.90	0.66	4,770
Operational Emissions							
Mobile	8.81	7.53	66.60	0.17	15.40	3.99	17,448
Area	13.70	N/A	13.90	<0.01	0.01	<0.01	37
Energy	0.11	1.93	0.82	0.01	0.16	0.16	5,170
Water	N/A	N/A	N/A	N/A	N/A	N/A	451.00
Waste	N/A	N/A	N/A	N/A	N/A	N/A	445.00
Refrigerants	N/A	N/A	N/A	N/A	N/A	N/A	4
Total Operational Emissions	22.70	9.46	81.30	0.18	15.60	4.15	23,555
Significant Emissions Threshold	137	137	548	137	82	65	548,000
Threshold Exceedance (Yes/No)	No	No	No	No	No	No	No

ROG: Reactive Organic Compounds, used interchangeably with Volatile Organic Compounds (VOC); NO_x: oxides of nitrogen; CO: Carbon monoxide; SO_x: Oxides of sulfur; PM_{2.5}: particulate matter less than 2.5 micrometers in diameter; PM₁₀: particulate matter less than 10 micrometers in diameter; CO_{2e}: Carbon dioxide equivalent

Emissions Calculation Methodology

Construction and operational emissions were based on three CalEEMod land use types: *Single Family Housing*, *Other Asphalt Surfaces*, and *Other Non-Asphalt Surfaces*. A discussion on the land use types that were used for the emissions modeling is included below.

CalEEMod Land Use Type: Single Family Housing

The *Single-Family Housing* land use type was used to model the emissions associated with the proposed housing development. The total building square footage (536,800 square feet) and number of homes (244) were provided by Rodeo Credit Enterprises, LLC. The lot acreage (52.20 acres) was calculated based on the remaining area after other land use types (discussed below) were subtracted from the total project area (70.8 acres). The total landscaped area for the development was conservatively estimated based on the landscaped area for the homes and included the total area for Parcels A through C (i.e., open space, natural detention basins).²

² Landscape area for the homes was calculated based on the difference between the *Single Family Housing* lot area and the total combined area

CalEEMod Land Use Type: Other Asphalt Surfaces

The *Other Asphalt Surfaces* land use type was used to model the emissions associated with the residential streets and access roads that run through and around the housing development. The residential street and access road acreage (14.80 acres) was provided by Rodeo Credit Enterprises, LLC.³

CalEEMod Land Use Type: Other Non-Asphalt Surfaces

The *Other Non-Asphalt Surfaces* land use type was used to model the emissions associated with the sidewalks within the proposed housing development. The total sidewalk acreage (3.80 acres) was provided by Rodeo Credit Enterprises, LLC.⁴

Construction Emissions

Construction emissions were calculated using CalEEMod defaults and input provided by Rodeo Credit Enterprises, LLC. Rodeo Credit Enterprises, LLC reviewed and verified the list of construction equipment and the anticipated construction schedule.

Table 5 provides the anticipated construction schedule. Rodeo Credit Enterprises, LLC provided the proposed start date (11/4/2024) and end date (12/14/2029) and indicated that work would be conducted 5 days a week. Based on the review of other housing developments being constructed, the schedule was adjusted to have the *Paving* phase conducted prior to the *Building Construction* phase. Since construction will be conducted in multiple phases, the *Architectural Coating* phase was adjusted to overlap with end of the *Building Construction* phase. The phase durations listed in the schedule are based on CalEEMod default values.

Table 6 provides the anticipated number of equipment that will be used during each construction phase, the hours per day the equipment will be operated, and the horsepower of the equipment. The values in Table 6 are based on CalEEMod default values.

Based the data request form obtained from Rodeo Credit Enterprises, LLC, 7,900 cubic yards of material is expected to be imported during the *Grading* phase; as such, the emissions for material haul trips were included in the construction emissions. For fugitive dust emissions, CalEEMod defaults do not include any control of fugitive dust from construction sites. MDAQMD Rule 403 requires that fugitive dust from any “active operation, open storage pile, or disturbed surface area” be controlled so that no presence of dust

for the building footprint (1,950 sq. ft. for each home) and paved driveway space (480 sq. ft. for each home).

³ The total area for the residential streets and access roads was provided by Rodeo Credit Enterprises, LLC via data request form on 11/15/2022.

⁴ The total area for sidewalk acreage was provided by Rodeo Credit Enterprises, LLC via data request form on 11/15/2022.

remains visible beyond the property line. To meet this requirement, it was assumed the site would be watered three times per day.

Table 5. Construction Schedule

Construction Phase	Start Date	End Date	Days/week	Total Days
Demolition	N/A	N/A	N/A	N/A
Site Preparation	11/4/2024	12/27/2024	5	40
Grading	12/28/2024	5/30/2025	5	110
Paving	6/2/2025	9/12/2025	5	75
Building Construction	9/13/2025	12/14/2029	5	1,110
Architectural Coating	9/3/2029	12/14/2029	5	75

Table 6. Construction Equipment

Construction Phase	Equipment	Number of Equipment	Hours per day	Horsepower
Site Preparation	Rubber Tired Dozers	3	8	367
	Tractors/Loaders/Backhoes	4	8	84
Grading	Graders	1	8	148
	Excavators	2	8	36
	Tractors/Loaders/Backhoes	2	8	84
	Scrapers	2	8	423
	Rubber Tired Dozers	1	8	367
Paving	Pavers	2	8	81
	Paving Equipment	2	8	89
	Rollers	2	8	36
Building Construction	Forklifts	3	8	82
	Generator Sets	1	8	14
	Cranes	1	7	367
	Welders	1	8	46
	Tractors/Loaders/Backhoes	3	7	84
Architectural Coating	Air Compressors	1	6	37

Operational Emissions

Operational emissions consist of area sources (i.e., re-applying architectural coatings, consumer products, fireplaces, and landscaping equipment), energy use (i.e., electricity and natural gas), mobile sources (e.g., commuting), solid waste disposal, water, and wastewater use (i.e., supplying and treating water and wastewater), and refrigerants (i.e., air conditioners).

For area-source emissions, Rodeo Credit Enterprises, LLC indicated that woodstoves and fireplaces would not be installed on each home.⁵ All other operational emissions sources were calculated using CalEEMod default values.

Findings

The estimated emissions of criteria pollutants and greenhouse gases for each year of construction and the total operational emissions **are well below the applicable MDAQMD Significant Emissions Thresholds**; therefore, this project does not have a significant air quality impact on the environment. In addition, this project is not expected to expose sensitive receptors to substantial pollutant concentrations. This project is consistent with the existing land use plan and conforms with the applicable MDAQMD attainment or maintenance plan(s). Based on the estimated emissions from construction and operation of the project, no violation of any ambient air quality standard is expected when emissions are added to the local background levels. Since the construction and operational emissions are below the significance thresholds, emissions mitigation measures are not required.

⁵ Based on data request form provided by Rodeo Credit Enterprises, LLC on 11/15/2022.

**ATTACHMENT A – Mojave Desert AQMD California Environmental Quality Act (CEQA)
and Federal Conformity Guidelines**



MDAQMD

California Environmental Quality Act (CEQA)

And

Federal Conformity

Guidelines

February 2020

Planning and Rule Making Section
Air Monitoring Section

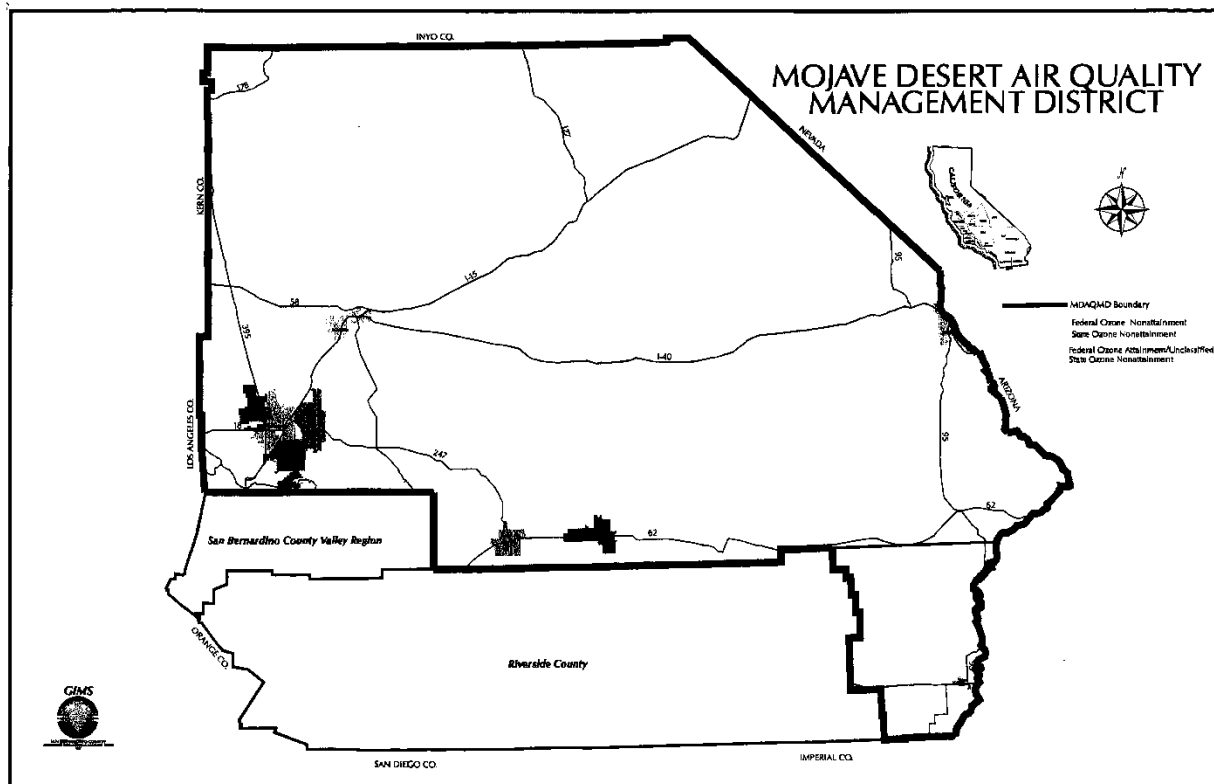
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Background

Under CEQA, the Mojave Desert Air Quality Management District (District) is an expert commenting agency on air quality and related matters within its jurisdiction or impacting on its jurisdiction. Under the Federal Clean Air Act the District has adopted federal attainment plans for ozone and PM₁₀. The District has dedicated assets to reviewing projects to ensure that they will not: (1) cause or contribute to any new violation of any air quality standard; (2) increase the frequency or severity of any existing violation of any air quality standard; or (3) delay timely attainment of any air quality standard or any required interim emission reductions or other milestones of any federal attainment plan. These Guidelines are intended to assist persons preparing environmental analysis or review documents for any project within the jurisdiction of the District by providing background information and guidance on the preferred analysis approach.

Map 1 - District Boundaries



Jurisdiction

The District has jurisdiction over the desert portion of San Bernardino County and the far eastern end of Riverside County (please refer to Map 1). This region includes the incorporated communities of Adelanto, Apple Valley, Barstow, Blythe, Hesperia, Needles, Twentynine Palms, Victorville, and Yucca Valley. This region also includes the National Training Center at Fort Irwin, the Marine Corps Air Ground Combat Center, the Marine Corps Logistics Base, the eastern portion of Edwards Air Force Base, and a portion of the China Lake Naval Air Weapons Station.

Non-attainment Designations and Classification Status

The United States Environmental Protection Agency and the California Air Resources Board have designated portions of the District non-attainment for a variety of pollutants, and some of those designations have an associated classification. Please refer to Table 1 for a chart of these designations and classifications.

Table 1 - Designations and Classifications

Ambient Air Quality Standard	MDAQMD
One-hour Ozone (Federal) – standard has been revoked	Proposed attainment in 2014; historical classification Severe-17*
Eight-hour Ozone (Federal 84 ppb (1997))	Subpart 2 Nonattainment; classified Severe-15**
Eight-hour Ozone (Federal 75 ppb (2008))	Nonattainment, classified Severe-15**
Eight-hour Ozone (Federal 70 ppb (2015))	Expected nonattainment; classified Severe-15**
Ozone (State)	Nonattainment; classified Moderate
PM ₁₀ 24-hour (Federal)	Nonattainment; classified Moderate (portion of MDAQMD in Riverside County is unclassifiable/attainment)
PM _{2.5} Annual (Federal)	Unclassified/attainment
PM _{2.5} 24-hour (Federal)	Unclassified/attainment
PM _{2.5} (State)	Nonattainment**
PM ₁₀ (State)	Nonattainment
Carbon Monoxide (State and Federal)	Unclassifiable/Attainment
Nitrogen Dioxide (State and Federal)	Unclassifiable/Attainment
Sulfur Dioxide (State and Federal)	Attainment/unclassified
Lead (State and Federal)	Unclassifiable/Attainment
Particulate Sulfate (State)	Attainment
Hydrogen Sulfide (State)	Unclassified (Searles Valley Planning Area is nonattainment)
Visibility Reducing Particles (State)	Unclassified

*Note: Portion of MDAQMD outside of Southeast Desert Modified AQMA is unclassified/attainment

**Note: Portion of MDAQMD outside of Western Mojave Desert Ozone Nonattainment Area is unclassifiable/attainment

Attainment Plans

The District has adopted a variety of attainment plans for a variety of nonattainment pollutants. Please refer to Table 2 for a chart of these attainment plans.

Table 2 – MDAQMD Attainment Plans

Name of Plan	Date of Adoption	Standard(s) Targeted	Applicable Area	Pollutant(s) Targeted	Attainment Date*
MDAQMD Federal 75 ppb Ozone Attainment Plan (Western Mojave Desert Nonattainment Area)	27-Feb-17	Federal eight hour ozone (75 ppb)	Western Mojave Desert Nonattainment Area (MDAQMD portion)	NO _x and VOC	2027
Federal 8-Hour Ozone Attainment Plan (Western Mojave Desert Nonattainment Area)	9-Jun-08	Federal eight hour ozone (84 ppb)	Western Mojave Desert Nonattainment Area (MDAQMD portion)	NO _x and VOC	2019 (revised from 2021)
2004 Ozone Attainment Plan (State and Federal)	26-Apr-04	Federal one hour ozone	Entire District	NO _x and VOC	2007
Attainment Demonstration, Maintenance Plan, and Redesignation Request for the Trona Portion of the Searles Valley PM ₁₀ Non-attainment Area	25-Mar-96	Federal daily and annual PM ₁₀	Searles Valley Planning Area	PM ₁₀	N/A
Triennial Revision to the 1991 Air Quality Attainment Plan	22-Jan-96	State one hour ozone	Entire District	NO _x and VOC	2005
Mojave Desert Planning Area Federal Particulate Matter Attainment Plan	31-Jul-95	Federal daily and annual PM ₁₀	Mojave Desert Planning Area	PM ₁₀	2000
Searles Valley PM ₁₀ Plan	28-Jun-95	Federal daily and annual PM ₁₀	Searles Valley Planning Area	PM ₁₀	1994
Post 1996 Attainment Demonstration and Reasonable Further Progress Plan	26-Oct-94	Federal one hour ozone	Southeast Desert Modified AQMA	NO _x and VOC	2007
Reasonable Further Progress Rate-Of-Progress Plan	26-Oct-94	Federal one hour ozone	Southeast Desert Modified AQMA	NO _x and VOC	2007

Name of Plan	Date of Adoption	Standard(s) Targeted	Applicable Area	Pollutant(s) Targeted	Attainment Date*
1991 Air Quality Attainment Plan	26-Aug-91	State one hour ozone	San Bernardino County portion	NO _x and VOC	1994

*Note: A historical attainment date given in an attainment plan does not necessarily mean that the affected area has been re-designated to attainment; please refer to Table 1.

Rules and Regulations

The District maintains a set of Rules and Regulations to improve air quality and maintain good air quality. Please visit www.mdaqmd.ca.gov.

Recommended Environmental Setting Elements

Air Quality Data

The District gathers a variety of air quality data from a variety of monitoring sites (from the USMC AGCC site on contract). Table 3 details the data available from the District for each monitoring site. Each site with current PM₁₀ monitoring is operating a Beta Attenuation Monitor (or BAM) with realtime hourly data, and BAMs replaced TEOMs and Hi-Vols beginning in 2011.

Table 3 - Available Air Quality Data

Site	Address	Pollutants	Dates
Barstow	225 E. Mountain View	O ₃ , NO _x , CO, PM ₁₀	5/1/80 to present
Hesperia	17288 Olive	O ₃ , PM ₁₀	1/2/86 to present
Lucerne Valley	8560 Aliento Road	PM ₁₀	6/1/89 to present
Phelan	Beekley and Phelan Road	O ₃	1/1/88 to present
Trona	Market Street	O ₃ , NO _x , SO ₂ , H ₂ S, PM ₁₀	8/1/80 to 2/13/93
Trona	Athol Street	O ₃ , NO _x , SO ₂ , H ₂ S, PM ₁₀	1/25/93 to 3/1997
Trona	Telescope	O ₃ , NO _x , SO ₂ , H ₂ S, PM ₁₀	4/1997 to present
Twentynine Palms	6136 Adobe Road	O ₃ , NO _x , SO ₂ , CO, PM ₁₀	8/1/80 to 12/2005
Victorville	County Fairgrounds	O ₃ , NO _x , SO ₂ , CO, TSP	8/1980 to 12/1985
Victorville	Eighth Street	O ₃ , NO _x , SO ₂ , CO, TSP	1/1985 to 12/1989
Victorville	County Fairgrounds	O ₃ , NO _x , SO ₂ , CO, PM ₁₀	1/1990 to 4/1991
Victorville	14029 Amargosa Rd	O ₃ , NO _x , SO ₂ , CO, PM ₁₀	4/1991 to 12/1999
Victorville	14306 Park Avenue	O ₃ , NO _x , SO ₂ , CO, PM _{2.5} (dual co-located), PM ₁₀	1/2000 to present

Meteorological Data

A variety of meteorological data is available from the District for several monitoring sites

throughout the District. Table 4 contains a list of monitoring sites and the date range the following data is available for: wind speed (hourly average and peak), wind direction, temperature, barometric pressure, and relative humidity.

Table 4 - Available Meteorological Data

Site	Address	Dates
Barstow	225 E. Mountain View	1/1988 to present
Hesperia	17288 Olive Street	1/1988 to present
Lucerne Valley	8560 Aliento Road	3/2020 to present
Phelan	Beekley and Phelan Road	1/88 to present
Trona	Athol Street	2/1993 to 3/1997
Trona	Telescope	4/1997 to present
Twentynine Palms	6136 Adobe Road	1/1988 to 12/2005
Victorville	14029 Amargosa Road	4/91 to 12/1999
Victorville	14306 Park Avenue	1/2000 to present

Topography and Climate Discussion

The District covers the majority of the Mojave Desert Air Basin (MDAB). The MDAB is an assemblage of mountain ranges interspersed with long broad valleys that often contain dry lakes. Many of the lower mountains which dot the vast terrain rise from 1,000 to 4,000 feet above the valley floor. Prevailing winds in the MDAB are out of the west and southwest. These prevailing winds are due to the proximity of the MDAB to coastal and central regions and the blocking nature of the Sierra Nevada mountains to the north; air masses pushed onshore in southern California by differential heating are channeled through the MDAB. The MDAB is separated from the southern California coastal and central California valley regions by mountains (highest elevation approximately 10,000 feet), whose passes form the main channels for these air masses. The Antelope Valley is bordered in the northwest by the Tehachapi Mountains, separated from the Sierra Nevadas in the north by the Tehachapi Pass (3,800 ft elevation). The Antelope Valley is bordered in the south by the San Gabriel Mountains, bisected by Soledad Canyon (3,300 ft). The Mojave Desert is bordered in the southwest by the San Bernardino Mountains, separated from the San Gabriels by the Cajon Pass (4,200 ft). A lesser channel lies between the San Bernardino Mountains and the Little San Bernardino Mountains (the Morongo Valley).

The Palo Verde Valley portion of the Mojave Desert lies in the low desert, at the eastern end of a series of valleys (notably the Coachella Valley) whose primary channel is the San Gorgonio Pass (2,300 ft) between the San Bernardino and San Jacinto Mountains.

During the summer the MDAB is generally influenced by a Pacific Subtropical High cell that sits off the coast, inhibiting cloud formation and encouraging daytime solar heating. The MDAB is rarely influenced by cold air masses moving south from Canada and Alaska, as these frontal systems are weak and diffuse by the time they reach the desert. Most desert moisture arrives from infrequent warm, moist and unstable air masses from the south. As can be seen from Table 5, the MDAB averages between three and seven inches of precipitation per year (from 16 to 30 days with at least 0.01 inches of precipitation). The MDAB is classified as a dry-hot desert

climate (BWh), with portions classified as dry-very hot desert (BWhh), to indicate at least three months have maximum average temperatures over 100.4° F.

Table 5 - MDAB Average Precipitation and Evaporation History

Location	Precipitation (inches)	Precipitation (days)	Evaporation (inches)	Length of Observations (years)
Trona	3.82	16		48
Randsburg	5.89	23		48
China Lake	4.42			34
Goldstone Echo	5.42	20		23
Daggett Airport	3.87	23		48
Barstow Fire	4.60	23		16
Barstow CIMIS	5.10	27	70	22
Granite Mountain	5.76	22		5
Victorville CIMIS	7.30	29	63	15
Mitchell Caverns	10.41	32		38
Mountain Pass	7.63	28		41
Parker Reservoir	5.38	24		48
Needles Airport	4.55	23		48
Twentynine Palms	3.95	19		48
Blythe Airport	3.57	17		48
Iron Mountain	3.40	19		48

Recommended Impacts Discussion Elements

Direct Impacts

Direct impacts are the result of the project itself (from its construction and operation), in the form of project activity and trips generated by the project. For example, in the case of a subdivision project, construction emissions (equipment exhaust, wind erosion, vehicle exhaust), housing use activity (natural gas consumption) and trips to and from the housing (vehicle exhaust, tire wear) represent direct impacts. In the case of a new mine project, construction emissions (equipment exhaust, wind erosion, vehicle exhaust), material handling (drilling, blasting, transfers, crushing, screening, bagging), operational emissions (wind erosion, vehicle travel, vehicle exhaust, tire wear), and employee/customer/delivery travel (vehicle exhaust, tire wear) represent direct impacts.

Indirect Impacts

Indirect impacts are the result of changes that would not occur without the project. In the case of a subdivision project, indirect impacts on the surrounding community can be generated in many ways: nearby construction of roadways (or roadway modifications) and other infrastructure to support the subdivision, construction and operation of new commercial/retail establishments, changes in traffic/circulation patterns that result in increased congestion/delays, etc. In the case of a new mine project, indirect impacts can be generated by nearby construction of infrastructure

to support the mine, housing constructed and/or occupied by mine employees, changes in traffic/circulation patterns that result in increased congestion/delays, etc.

Cumulative Impacts

Cumulative impacts are similar to direct and indirect impacts of the project, which the project contributes to. In the case of a subdivision project, a given project has a cumulative impact with all other subdivision projects, from the standpoint of each type of impact (cumulative construction emissions, residential natural gas consumption, solvent use, transportation emissions, congestion, etc.). Similarly, a new mine project has a cumulative impact with all other mining projects, from the standpoint of each type of impact (cumulative construction emissions, diesel equipment emissions, blasting emissions, fugitive emissions, transportation, congestion, etc.).

Conformity Impacts

A project is non-conforming if it conflicts with or delays implementation of any applicable attainment or maintenance plan. A project is conforming if it complies with all applicable District rules and regulations, complies with all proposed control measures that are not yet adopted from the applicable plan(s), and is consistent with the growth forecasts in the applicable plan(s) (or is directly included in the applicable plan). Conformity with growth forecasts can be established by demonstrating that the project is consistent with the land use plan that was used to generate the growth forecast. An example of a non-conforming project would be one that increases the gross number of dwelling units, increases the number of trips, and/or increases the overall vehicle miles traveled in an affected area (relative to the applicable land use plan).

Sensitive Receptor Land Uses

Residences, schools, daycare centers, playgrounds and medical facilities are considered sensitive receptor land uses. The following project types proposed for sites within the specified distance to an existing or planned (zoned) sensitive receptor land use must be evaluated using significance threshold criteria number 4 (refer to the significance threshold discussion):

- Any industrial project within 1000 feet;
- A distribution center (40 or more trucks per day) within 1000 feet;
- A major transportation project (50,000 or more vehicles per day) within 1000 feet;
- A dry cleaner using perchloroethylene within 500 feet;
- A gasoline dispensing facility within 300 feet.

Friant Ranch Decision

The MDAQMD does not currently have a methodology that would correlate the expected air quality emissions of project to the likely health consequences of those emissions. However, the MDAQMD does recommend the use of specific tools which are available (such as CalEEMod) for the purposes of project evaluation. Outside of existing tools, the MDAQMD does not currently have methodologies that would provide lead agencies and the public with a consistent, reliable and meaningful analysis to correlate specific health impacts that may result from a

proposed project's air emissions.

Recommended Substantiation Discussion Elements

For projects applying the emissions-based significance thresholds, project emissions quantification is required. In addition the environmental documentation must include support for the quantification methodology used, including emission factors, emission factors source, assumptions, and sample calculations where necessary. For projects using a calculation tool such as CalEEMod or URBEMIS, the support section must specify the inputs and settings used for the evaluation.

Significance Thresholds

Any project is significant if it triggers or exceeds the most appropriate evaluation criteria. The District will clarify upon request which threshold is most appropriate for a given project; in general, the emissions comparison (criteria number 1) is sufficient:

1. Generates total emissions (direct and indirect) in excess of the thresholds given in Table 6;
2. Generates a violation of any ambient air quality standard when added to the local background;
3. Does not conform with the applicable attainment or maintenance plan(s) ¹;
4. Exposes sensitive receptors to substantial pollutant concentrations, including those resulting in a cancer risk greater than or equal to 10 in a million and/or a Hazard Index (HI) (non-cancerous) greater than or equal to 1.*

**Refer to the Sensitive Receptor Land Use discussion above*

A significant project must incorporate mitigation sufficient to reduce its impact to a level that is not significant. A project that cannot be mitigated to a level that is not significant must incorporate all feasible mitigation. Note that the emission thresholds are given as a daily value and an annual value, so that multi-phased project (such as project with a construction phase and a separate operational phase) with phases shorter than one year can be compared to the daily value.

Table 6 – Significant Emissions Thresholds

Criteria Pollutant	Annual Threshold (short tons)	Daily Threshold (pounds)
Greenhouse Gases (CO ₂ e)	100,000	548,000
Carbon Monoxide (CO)	100	548
Oxides of Nitrogen (NO _x)	25	137
Volatile Organic Compounds (VOC)	25	137
Oxides of Sulfur (SO _x)	25	137
Particulate Matter (PM ₁₀)	15	82

¹ A project is deemed to not exceed this threshold, and hence not be significant, if it is consistent with the existing land use plan. Zoning changes, specific plans, general plan amendments and similar land use plan changes which do not increase dwelling unit density, do not increase vehicle trips, and do not increase vehicle miles traveled are also deemed to not exceed this threshold.

Criteria Pollutant	Annual Threshold (short tons)	Daily Threshold (pounds)
Particulate Matter (PM _{2.5})	12	65
Hydrogen Sulfide (H ₂ S)	10	54
Lead (Pb)	0.6	3

District Contacts

If an address is not listed, use the general address for the District, to the attention of the listed individual.

Mojave Desert Air Quality Management District General	(760) 245-1661 14306 Park Avenue Victorville, CA 92392-2310
Planning and Rules	Tracy Walters (760) 245-1661 x6122
Air Quality and Meteorological Data	Chris Collins (760) 245-1661 x6282
CEQA and Conformity	Alan De Salvio (760) 245-1661 x6726
Permitting	Sheri Haggard (760) 245-1661 x1864

Appendix A – Basic Definitions of Major Air Pollutants

Technical and/or legal definitions exist for many of these pollutants, depending on context. The following definitions are for general, introductory purposes only:

Carbon Dioxide (CO₂) – Common product of combustion. Not a criteria pollutant, but considered an important greenhouse gas. Important on a national or global scale.

Carbon Monoxide (CO) – Common product of incomplete combustion. A criteria pollutant with state and federal standards. Not a primary photochemical reaction compound, but involved in photochemical reactions. Dissipates rapidly, and is therefore only important on a local scale near sources.

Criteria Pollutants – Those air pollutants specifically identified for control under the Federal Clean Air Act (currently six: carbon monoxide, nitrogen oxides, lead, sulfur oxides, ozone and particulates).

Lead (Pb) – A heavy metal, present in the environment mainly due to historical use in motor vehicle fuel. Primarily associated with lead smelting operations. A criteria pollutant with state and federal standards. Primarily of concern near sources.

Oxides of Nitrogen (NO_x) – Common product of combustion in the presence of nitrogen. Includes NO₂, which is a criteria pollutant with state and federal standards. Locally and regionally important due to its involvement in the photochemical formation of ozone.

Oxides of Sulfur (SO_x) – Common product of combustion in the presence of sulfur. Associated primarily with diesel and coal burning. Includes SO₂, a criteria pollutant with state and federal standards. Primarily of concern near sources.

Ozone (O₃) – A gas mainly produced by a photochemical reaction between reactive organic gases and oxides of nitrogen in the presence of sunlight (also produced by molecular oxygen in the presence of ultraviolet light or electrical discharge). A strong oxidant that is damaging at ground level but necessary at high altitude (in the stratosphere, where it absorbs dangerous ultraviolet light). Also considered an important greenhouse gas. A criteria pollutant with state and federal standards.

Particulate Matter (TSP or PM₃₀) – Solid or liquid matter suspended in the atmosphere, excluding water. Includes aerosols and droplets that form in the atmosphere. Locally and regionally important.

Reactive/Volatile Organic Compounds/Gases (ROG, VOC, NMOG, NMOC) – A portion of total organic compounds or gases, excludes methane, ethane and acetone (due to low photochemical reactivity). “ROG” is generally used by the California Air Resources Board, “VOC” is generally used by the United States Environmental Protection Agency, but all four terms are interchangeable for most uses. Regionally important due to its involvement in the photochemical reaction that produces ozone.

Respirable Particulate Matter (coarse or PM₁₀, and fine or PM_{2.5}) – That portion of particulate matter that tends to penetrate into the human lung. The subscript refers to aerodynamic diameter. Criteria pollutants with state and federal standards. Locally and regionally important.

Total Organic Compounds/Gases (TOC or TOG) – Compounds containing at least one atom of carbon, except carbon monoxide, carbon dioxide, carbonic acid, metallic carbides and metallic carbonates. Primarily methane in the atmosphere, a greenhouse gas.

ATTACHMENT B – CalEEMod Emissions Model Output

Air Quality Study - TTM 20576 Housing Development, Victorville, CA Detailed Report

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1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	Air Quality Study - TTM 20576 Housing Development, Victorville, CA
Construction Start Date	11/4/2024
Operational Year	2030
Lead Agency	—
Land Use Scale	Plan/community
Analysis Level for Defaults	County
Windspeed (m/s)	2.80
Precipitation (days)	1.40
Location	Cataba Rd & Mesa St, Victorville, CA 92392, USA
County	San Bernardino-Mojave Desert
City	Victorville
Air District	Mojave Desert AQMD
Air Basin	Mojave Desert
TAZ	5106
EDFZ	10
Electric Utility	Southern California Edison
Gas Utility	Southwest Gas Corp.
App Version	2022.1.1.20

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
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Single Family Housing	244	Dwelling Unit	52.2	536,800	1,680,912	—	808	—
Other Asphalt Surfaces	14.8	Acre	14.8	0.00	0.00	—	—	—
Other Non-Asphalt Surfaces	3.80	Acre	3.80	0.00	0.00	—	—	—

1.3. User-Selected Emission Reduction Measures by Emissions Sector

No measures selected

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.	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	49.3	30.5	30.1	0.07	1.25	2.82	4.06	1.15	1.05	2.20	—	7,503	7,503	0.28	0.17	7,561
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	49.2	36.1	34.0	0.07	1.60	5.34	6.94	1.47	2.68	4.15	—	7,488	7,488	0.28	0.17	7,543
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	10.8	13.1	15.0	0.03	0.53	1.16	1.70	0.49	0.39	0.88	—	3,493	3,493	0.13	0.12	3,524
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.96	2.38	2.74	0.01	0.10	0.21	0.31	0.09	0.07	0.16	—	578	578	0.02	0.02	583

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	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2025	3.32	30.5	30.1	0.07	1.25	2.82	4.06	1.15	1.05	2.20	—	7,503	7,503	0.28	0.17	7,561
2026	1.52	11.1	20.1	0.03	0.39	1.37	1.76	0.36	0.33	0.69	—	4,468	4,468	0.15	0.17	4,530
2027	1.45	10.5	19.5	0.03	0.35	1.37	1.72	0.32	0.33	0.65	—	4,428	4,428	0.11	0.17	4,486
2028	1.40	9.99	19.1	0.03	0.31	1.37	1.68	0.29	0.33	0.62	—	4,385	4,385	0.11	0.17	4,442
2029	49.3	10.5	20.8	0.03	0.30	1.60	1.90	0.28	0.38	0.66	—	4,711	4,711	0.12	0.17	4,770
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	3.73	36.1	34.0	0.07	1.60	5.34	6.94	1.47	2.68	4.15	—	7,488	7,488	0.28	0.16	7,543
2025	3.30	30.5	29.6	0.07	1.25	2.82	4.06	1.15	1.05	2.20	—	7,471	7,471	0.28	0.17	7,526
2026	1.47	11.1	17.8	0.03	0.39	1.37	1.76	0.36	0.33	0.69	—	4,325	4,325	0.12	0.17	4,380
2027	1.41	10.6	17.5	0.03	0.35	1.37	1.72	0.32	0.33	0.65	—	4,288	4,288	0.12	0.17	4,341
2028	1.36	10.1	17.2	0.03	0.31	1.37	1.68	0.29	0.33	0.62	—	4,247	4,247	0.11	0.17	4,300
2029	49.2	10.5	18.7	0.03	0.30	1.60	1.90	0.28	0.38	0.66	—	4,550	4,550	0.12	0.17	4,604
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	0.44	4.23	3.99	0.01	0.19	0.61	0.79	0.17	0.30	0.47	—	665	665	0.03	0.01	668
2025	1.59	13.1	15.0	0.03	0.53	1.16	1.70	0.49	0.39	0.88	—	3,493	3,493	0.13	0.09	3,524
2026	1.06	7.98	13.1	0.02	0.28	0.98	1.26	0.26	0.24	0.49	—	3,112	3,112	0.08	0.12	3,153
2027	1.01	7.60	12.8	0.02	0.25	0.98	1.23	0.23	0.24	0.47	—	3,085	3,085	0.08	0.12	3,125
2028	0.98	7.24	12.6	0.02	0.22	0.98	1.20	0.21	0.24	0.44	—	3,064	3,064	0.08	0.12	3,103
2029	10.8	6.78	12.2	0.02	0.20	0.98	1.18	0.18	0.24	0.42	—	2,957	2,957	0.08	0.11	2,993
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

2024	0.08	0.77	0.73	< 0.005	0.03	0.11	0.14	0.03	0.06	0.09	—	110	110	< 0.005	< 0.005	111
2025	0.29	2.38	2.74	0.01	0.10	0.21	0.31	0.09	0.07	0.16	—	578	578	0.02	0.01	583
2026	0.19	1.46	2.40	< 0.005	0.05	0.18	0.23	0.05	0.04	0.09	—	515	515	0.01	0.02	522
2027	0.18	1.39	2.34	< 0.005	0.05	0.18	0.22	0.04	0.04	0.08	—	511	511	0.01	0.02	517
2028	0.18	1.32	2.30	< 0.005	0.04	0.18	0.22	0.04	0.04	0.08	—	507	507	0.01	0.02	514
2029	1.96	1.24	2.22	< 0.005	0.04	0.18	0.22	0.03	0.04	0.08	—	490	490	0.01	0.02	496

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.	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	22.7	9.05	81.3	0.18	0.28	15.3	15.6	0.27	3.88	4.15	147	22,735	22,882	15.7	0.80	23,555
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	20.5	9.46	53.3	0.17	0.28	15.3	15.6	0.27	3.88	4.15	147	21,200	21,347	15.7	0.82	21,990
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	20.9	9.51	63.1	0.17	0.28	15.0	15.2	0.27	3.79	4.06	147	21,202	21,349	15.7	0.82	22,005
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	3.82	1.74	11.5	0.03	0.05	2.73	2.78	0.05	0.69	0.74	24.3	3,510	3,535	2.60	0.14	3,643

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	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
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Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	8.81	6.99	66.6	0.17	0.12	15.3	15.4	0.11	3.88	3.99	—	17,179	17,179	0.56	0.72	17,448
Area	13.7	0.13	13.9	< 0.005	0.01	—	0.01	< 0.005	—	< 0.005	—	37.0	37.0	< 0.005	< 0.005	37.1
Energy	0.11	1.93	0.82	0.01	0.16	—	0.16	0.16	—	0.16	—	5,153	5,153	0.38	0.02	5,170
Water	—	—	—	—	—	—	—	—	—	—	19.5	366	386	2.02	0.05	451
Waste	—	—	—	—	—	—	—	—	—	—	127	0.00	127	12.7	0.00	445
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3.84
Total	22.7	9.05	81.3	0.18	0.28	15.3	15.6	0.27	3.88	4.15	147	22,735	22,882	15.7	0.80	23,555
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	7.85	7.53	52.5	0.15	0.12	15.3	15.4	0.11	3.88	3.99	—	15,681	15,681	0.59	0.75	15,920
Area	12.5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Energy	0.11	1.93	0.82	0.01	0.16	—	0.16	0.16	—	0.16	—	5,153	5,153	0.38	0.02	5,170
Water	—	—	—	—	—	—	—	—	—	—	19.5	366	386	2.02	0.05	451
Waste	—	—	—	—	—	—	—	—	—	—	127	0.00	127	12.7	0.00	445
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3.84
Total	20.5	9.46	53.3	0.17	0.28	15.3	15.6	0.27	3.88	4.15	147	21,200	21,347	15.7	0.82	21,990
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	7.71	7.52	55.4	0.15	0.12	15.0	15.1	0.11	3.79	3.90	—	15,664	15,664	0.59	0.74	15,917
Area	13.1	0.06	6.85	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	18.3	18.3	< 0.005	< 0.005	18.3
Energy	0.11	1.93	0.82	0.01	0.16	—	0.16	0.16	—	0.16	—	5,153	5,153	0.38	0.02	5,170
Water	—	—	—	—	—	—	—	—	—	—	19.5	366	386	2.02	0.05	451
Waste	—	—	—	—	—	—	—	—	—	—	127	0.00	127	12.7	0.00	445
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3.84
Total	20.9	9.51	63.1	0.17	0.28	15.0	15.2	0.27	3.79	4.06	147	21,202	21,349	15.7	0.82	22,005

Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	1.41	1.37	10.1	0.03	0.02	2.73	2.75	0.02	0.69	0.71	—	2,593	2,593	0.10	0.12	2,635
Area	2.40	0.01	1.25	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	3.02	3.02	< 0.005	< 0.005	3.03
Energy	0.02	0.35	0.15	< 0.005	0.03	—	0.03	0.03	—	0.03	—	853	853	0.06	< 0.005	856
Water	—	—	—	—	—	—	—	—	—	—	3.23	60.6	63.9	0.33	0.01	74.7
Waste	—	—	—	—	—	—	—	—	—	—	21.0	0.00	21.0	2.10	0.00	73.6
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.64
Total	3.82	1.74	11.5	0.03	0.05	2.73	2.78	0.05	0.69	0.74	24.3	3,510	3,535	2.60	0.14	3,643

3. Construction Emissions Details

3.1. Site Preparation (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	3.65	36.0	32.9	0.05	1.60	—	1.60	1.47	—	1.47	—	5,296	5,296	0.21	0.04	5,314
Dust From Material Movement	—	—	—	—	—	5.11	5.11	—	2.63	2.63	—	—	—	—	—	—
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
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Air Quality Study - TTM 20576 Housing Development, Victorville, CA Detailed Report, 11/22/2023

Off-Road Equipment	0.40	3.94	3.61	0.01	0.18	—	0.18	0.16	—	0.16	—	580	580	0.02	< 0.005	582
Dust From Material Movement	—	—	—	—	—	0.56	0.56	—	0.29	0.29	—	—	—	—	—	—
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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.07	0.72	0.66	< 0.005	0.03	—	0.03	0.03	—	0.03	—	96.1	96.1	< 0.005	< 0.005	96.4
Dust From Material Movement	—	—	—	—	—	0.10	0.10	—	0.05	0.05	—	—	—	—	—	—
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
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.09	0.11	1.06	0.00	0.00	0.23	0.23	0.00	0.05	0.05	—	231	231	0.01	0.01	234
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
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
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.13	0.00	0.00	0.03	0.03	0.00	0.01	0.01	—	26.0	26.0	< 0.005	< 0.005	26.4
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
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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.02	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	4.31	4.31	< 0.005	< 0.005	4.37

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
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

3.3. Grading (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	3.52	34.3	30.2	0.06	1.45	—	1.45	1.33	—	1.33	—	6,598	6,598	0.27	0.05	6,621
Dust From Material Movement	—	—	—	—	—	2.39	2.39	—	0.95	0.95	—	—	—	—	—	—
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
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.03	0.27	0.24	< 0.005	0.01	—	0.01	0.01	—	0.01	—	51.6	51.6	< 0.005	< 0.005	51.8
Dust From Material Movement	—	—	—	—	—	0.02	0.02	—	0.01	0.01	—	—	—	—	—	—
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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.05	0.04	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	8.55	8.55	< 0.005	< 0.005	8.58

Dust From Material Movement	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—
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
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.10	0.12	1.21	0.00	0.00	0.26	0.26	0.00	0.06	0.06	—	264	264	0.01	0.01	267
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
Hauling	0.01	0.74	0.16	< 0.005	0.01	0.16	0.17	0.01	0.04	0.05	—	626	626	< 0.005	0.10	656
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	2.13	2.13	< 0.005	< 0.005	2.15
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
Hauling	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	4.90	4.90	< 0.005	< 0.005	5.13
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.35	0.35	< 0.005	< 0.005	0.36
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
Hauling	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	0.81	0.81	< 0.005	< 0.005	0.85

3.5. Grading (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	3.20	29.7	28.3	0.06	1.23	—	1.23	1.14	—	1.14	—	6,599	6,599	0.27	0.05	6,622
Dust From Material Movement	—	—	—	—	—	2.39	2.39	—	0.95	0.95	—	—	—	—	—	—
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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	3.20	29.7	28.3	0.06	1.23	—	1.23	1.14	—	1.14	—	6,599	6,599	0.27	0.05	6,622
Dust From Material Movement	—	—	—	—	—	2.39	2.39	—	0.95	0.95	—	—	—	—	—	—
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
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.94	8.71	8.31	0.02	0.36	—	0.36	0.33	—	0.33	—	1,937	1,937	0.08	0.02	1,944
Dust From Material Movement	—	—	—	—	—	0.70	0.70	—	0.28	0.28	—	—	—	—	—	—
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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.17	1.59	1.52	< 0.005	0.07	—	0.07	0.06	—	0.06	—	321	321	0.01	< 0.005	322
Dust From Material Movement	—	—	—	—	—	0.13	0.13	—	0.05	0.05	—	—	—	—	—	—

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
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.11	0.10	1.66	0.00	0.00	0.26	0.26	0.00	0.06	0.06	—	292	292	0.01	0.01	296
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
Hauling	0.01	0.68	0.15	< 0.005	0.01	0.16	0.17	0.01	0.04	0.05	—	613	613	< 0.005	0.10	643
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.09	0.11	1.11	0.00	0.00	0.26	0.26	0.00	0.06	0.06	—	258	258	0.01	0.01	262
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
Hauling	0.01	0.72	0.15	< 0.005	0.01	0.16	0.17	0.01	0.04	0.05	—	613	613	< 0.005	0.10	643
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.03	0.37	0.00	0.00	0.08	0.08	0.00	0.02	0.02	—	78.0	78.0	< 0.005	< 0.005	79.1
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
Hauling	< 0.005	0.21	0.04	< 0.005	< 0.005	0.05	0.05	< 0.005	0.01	0.02	—	180	180	< 0.005	0.03	189
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	0.01	0.07	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	12.9	12.9	< 0.005	< 0.005	13.1
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
Hauling	< 0.005	0.04	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	29.8	29.8	< 0.005	< 0.005	31.2

3.7. Building Construction (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.13	10.4	13.0	0.02	0.43	—	0.43	0.40	—	0.40	—	2,398	2,398	0.10	0.02	2,406
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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.13	10.4	13.0	0.02	0.43	—	0.43	0.40	—	0.40	—	2,398	2,398	0.10	0.02	2,406
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
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.24	2.25	2.81	0.01	0.09	—	0.09	0.09	—	0.09	—	516	516	0.02	< 0.005	518
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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.04	0.41	0.51	< 0.005	0.02	—	0.02	0.02	—	0.02	—	85.5	85.5	< 0.005	< 0.005	85.7
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
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.48	0.43	7.29	0.00	0.00	1.15	1.15	0.00	0.27	0.27	—	1,281	1,281	0.05	0.04	1,300
Vendor	0.03	0.84	0.37	0.01	0.01	0.22	0.23	0.01	0.06	0.07	—	831	831	< 0.005	0.11	866
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

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.39	0.47	4.90	0.00	0.00	1.15	1.15	0.00	0.27	0.27	—	1,134	1,134	0.06	0.04	1,149
Vendor	0.03	0.89	0.38	0.01	0.01	0.22	0.23	0.01	0.06	0.07	—	832	832	< 0.005	0.11	865
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
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.09	0.11	1.18	0.00	0.00	0.25	0.25	0.00	0.06	0.06	—	251	251	0.01	0.01	255
Vendor	0.01	0.19	0.08	< 0.005	< 0.005	0.05	0.05	< 0.005	0.01	0.02	—	179	179	< 0.005	0.02	186
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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.22	0.00	0.00	0.05	0.05	0.00	0.01	0.01	—	41.6	41.6	< 0.005	< 0.005	42.2
Vendor	< 0.005	0.04	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	29.6	29.6	< 0.005	< 0.005	30.8
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

3.9. Building Construction (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.07	9.85	13.0	0.02	0.38	—	0.38	0.35	—	0.35	—	2,397	2,397	0.10	0.02	2,405
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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

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Off-Road Equipment	1.07	9.85	13.0	0.02	0.38	—	0.38	0.35	—	0.35	—	2,397	2,397	0.10	0.02	2,405
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
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.77	7.04	9.26	0.02	0.27	—	0.27	0.25	—	0.25	—	1,712	1,712	0.07	0.01	1,718
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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.14	1.28	1.69	< 0.005	0.05	—	0.05	0.05	—	0.05	—	283	283	0.01	< 0.005	284
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
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.42	0.39	6.78	0.00	0.00	1.15	1.15	0.00	0.27	0.27	—	1,256	1,256	0.05	0.04	1,274
Vendor	0.03	0.81	0.34	0.01	0.01	0.22	0.23	0.01	0.06	0.07	—	815	815	< 0.005	0.11	850
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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.37	0.43	4.51	0.00	0.00	1.15	1.15	0.00	0.27	0.27	—	1,112	1,112	0.02	0.04	1,126
Vendor	0.03	0.86	0.35	0.01	0.01	0.22	0.23	0.01	0.06	0.07	—	816	816	< 0.005	0.11	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
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.27	0.33	3.63	0.00	0.00	0.82	0.82	0.00	0.19	0.19	—	818	818	0.01	0.03	829
Vendor	0.02	0.61	0.25	< 0.005	0.01	0.16	0.17	0.01	0.04	0.05	—	582	582	< 0.005	0.08	607

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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.06	0.66	0.00	0.00	0.15	0.15	0.00	0.04	0.04	—	135	135	< 0.005	0.01	137
Vendor	< 0.005	0.11	0.05	< 0.005	< 0.005	0.03	0.03	< 0.005	0.01	0.01	—	96.4	96.4	< 0.005	0.01	100
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

3.11. 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	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.03	9.39	12.9	0.02	0.34	—	0.34	0.31	—	0.31	—	2,397	2,397	0.10	0.02	2,405
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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.03	9.39	12.9	0.02	0.34	—	0.34	0.31	—	0.31	—	2,397	2,397	0.10	0.02	2,405
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
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.74	6.71	9.24	0.02	0.24	—	0.24	0.22	—	0.22	—	1,712	1,712	0.07	0.01	1,718
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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.13	1.22	1.69	< 0.005	0.04	—	0.04	0.04	—	0.04	—	283	283	0.01	< 0.005	284
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
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.40	0.35	6.26	0.00	0.00	1.15	1.15	0.00	0.27	0.27	—	1,234	1,234	0.01	0.04	1,251
Vendor	0.03	0.79	0.33	0.01	0.01	0.22	0.23	0.01	0.06	0.07	—	797	797	< 0.005	0.10	830
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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.36	0.39	4.21	0.00	0.00	1.15	1.15	0.00	0.27	0.27	—	1,093	1,093	0.02	0.04	1,107
Vendor	0.02	0.83	0.34	0.01	0.01	0.22	0.23	0.01	0.06	0.07	—	798	798	< 0.005	0.11	829
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
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.26	0.30	3.36	0.00	0.00	0.82	0.82	0.00	0.19	0.19	—	804	804	0.01	0.03	815
Vendor	0.02	0.59	0.24	< 0.005	0.01	0.16	0.17	0.01	0.04	0.05	—	569	569	< 0.005	0.08	592
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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.06	0.61	0.00	0.00	0.15	0.15	0.00	0.04	0.04	—	133	133	< 0.005	0.01	135
Vendor	< 0.005	0.11	0.04	< 0.005	< 0.005	0.03	0.03	< 0.005	0.01	0.01	—	94.3	94.3	< 0.005	0.01	98.1
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

3.13. Building Construction (2028) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
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Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.99	8.92	12.9	0.02	0.30	—	0.30	0.28	—	0.28	—	2,397	2,397	0.10	0.02	2,406
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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.99	8.92	12.9	0.02	0.30	—	0.30	0.28	—	0.28	—	2,397	2,397	0.10	0.02	2,406
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
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.71	6.39	9.26	0.02	0.22	—	0.22	0.20	—	0.20	—	1,717	1,717	0.07	0.01	1,723
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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.13	1.17	1.69	< 0.005	0.04	—	0.04	0.04	—	0.04	—	284	284	0.01	< 0.005	285
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
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.39	0.31	5.83	0.00	0.00	1.15	1.15	0.00	0.27	0.27	—	1,211	1,211	0.01	0.04	1,227
Vendor	0.02	0.76	0.31	0.01	0.01	0.22	0.23	0.01	0.06	0.07	—	776	776	< 0.005	0.10	809
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

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.34	0.35	3.90	0.00	0.00	1.15	1.15	0.00	0.27	0.27	—	1,073	1,073	0.02	0.04	1,086
Vendor	0.02	0.80	0.32	0.01	0.01	0.22	0.23	0.01	0.06	0.07	—	777	777	< 0.005	0.10	808
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
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.25	0.28	3.13	0.00	0.00	0.82	0.82	0.00	0.19	0.19	—	791	791	0.01	0.03	801
Vendor	0.02	0.57	0.23	< 0.005	0.01	0.16	0.17	0.01	0.04	0.05	—	556	556	< 0.005	0.08	579
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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.05	0.57	0.00	0.00	0.15	0.15	0.00	0.04	0.04	—	131	131	< 0.005	< 0.005	133
Vendor	< 0.005	0.10	0.04	< 0.005	< 0.005	0.03	0.03	< 0.005	0.01	0.01	—	92.1	92.1	< 0.005	0.01	95.9
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

3.15. Building Construction (2029) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.97	8.58	12.9	0.02	0.28	—	0.28	0.25	—	0.25	—	2,397	2,397	0.10	0.02	2,405
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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

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Off-Road Equipment	0.97	8.58	12.9	0.02	0.28	—	0.28	0.25	—	0.25	—	2,397	2,397	0.10	0.02	2,405
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
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.66	5.84	8.79	0.02	0.19	—	0.19	0.17	—	0.17	—	1,632	1,632	0.07	0.01	1,638
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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.12	1.07	1.60	< 0.005	0.03	—	0.03	0.03	—	0.03	—	270	270	0.01	< 0.005	271
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
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.36	0.31	5.43	0.00	0.00	1.15	1.15	0.00	0.27	0.27	—	1,189	1,189	0.01	0.04	1,205
Vendor	0.02	0.73	0.30	0.01	0.01	0.22	0.23	0.01	0.06	0.07	—	755	755	< 0.005	0.10	786
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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.29	0.31	3.64	0.00	0.00	1.15	1.15	0.00	0.27	0.27	—	1,053	1,053	0.02	0.04	1,066
Vendor	0.02	0.78	0.31	0.01	0.01	0.22	0.23	0.01	0.06	0.07	—	755	755	< 0.005	0.10	785
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
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.22	0.23	2.77	0.00	0.00	0.78	0.78	0.00	0.18	0.18	—	738	738	0.01	0.03	748
Vendor	0.02	0.53	0.21	< 0.005	0.01	0.15	0.16	0.01	0.04	0.05	—	514	514	< 0.005	0.07	535

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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04	0.04	0.51	0.00	0.00	0.14	0.14	0.00	0.03	0.03	—	122	122	< 0.005	< 0.005	124
Vendor	< 0.005	0.10	0.04	< 0.005	< 0.005	0.03	0.03	< 0.005	0.01	0.01	—	85.1	85.1	< 0.005	0.01	88.5
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

3.17. Paving (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.80	7.45	9.98	0.01	0.35	—	0.35	0.32	—	0.32	—	1,511	1,511	0.06	0.01	1,517
Paving	0.52	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.16	1.53	2.05	< 0.005	0.07	—	0.07	0.07	—	0.07	—	311	311	0.01	< 0.005	312
Paving	0.11	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.03	0.28	0.37	< 0.005	0.01	—	0.01	0.01	—	0.01	—	51.4	51.4	< 0.005	< 0.005	51.6

Paving	0.02	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
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
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.07	1.25	0.00	0.00	0.20	0.20	0.00	0.05	0.05	—	219	219	0.01	0.01	222
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
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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.02	0.19	0.00	0.00	0.04	0.04	0.00	0.01	0.01	—	41.0	41.0	< 0.005	< 0.005	41.5
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
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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.04	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	6.78	6.78	< 0.005	< 0.005	6.88
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
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

3.19. Architectural Coating (2029) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.10	0.79	1.11	< 0.005	0.01	—	0.01	0.01	—	0.01	—	134	134	0.01	< 0.005	134
Architectural Coatings	47.8	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.10	0.79	1.11	< 0.005	0.01	—	0.01	0.01	—	0.01	—	134	134	0.01	< 0.005	134
Architectural Coatings	47.8	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
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
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.16	0.23	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	27.4	27.4	< 0.005	< 0.005	27.5
Architectural Coatings	9.82	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	0.03	0.04	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	4.54	4.54	< 0.005	< 0.005	4.56
Architectural Coatings	1.79	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
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
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.06	1.09	0.00	0.00	0.23	0.23	0.00	0.05	0.05	—	238	238	< 0.005	0.01	241
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
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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.06	0.73	0.00	0.00	0.23	0.23	0.00	0.05	0.05	—	211	211	< 0.005	0.01	213
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
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
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.17	0.00	0.00	0.05	0.05	0.00	0.01	0.01	—	44.6	44.6	< 0.005	< 0.005	45.1
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
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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.03	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	7.38	7.38	< 0.005	< 0.005	7.47
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
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

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	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
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Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	8.81	6.99	66.6	0.17	0.12	15.3	15.4	0.11	3.88	3.99	—	17,179	17,179	0.56	0.72	17,448
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	0.00	0.00	0.00	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	8.81	6.99	66.6	0.17	0.12	15.3	15.4	0.11	3.88	3.99	—	17,179	17,179	0.56	0.72	17,448
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	7.85	7.53	52.5	0.15	0.12	15.3	15.4	0.11	3.88	3.99	—	15,681	15,681	0.59	0.75	15,920
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	0.00	0.00	0.00	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	7.85	7.53	52.5	0.15	0.12	15.3	15.4	0.11	3.88	3.99	—	15,681	15,681	0.59	0.75	15,920
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	1.41	1.37	10.1	0.03	0.02	2.73	2.75	0.02	0.69	0.71	—	2,593	2,593	0.10	0.12	2,635
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	0.00	0.00	0.00	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	1.41	1.37	10.1	0.03	0.02	2.73	2.75	0.02	0.69	0.71	—	2,593	2,593	0.10	0.12	2,635
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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	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	2,706	2,706	0.17	0.02	2,716
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	2,706	2,706	0.17	0.02	2,716
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	2,706	2,706	0.17	0.02	2,716
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	2,706	2,706	0.17	0.02	2,716

Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	448	448	0.03	< 0.005	450
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	448	448	0.03	< 0.005	450

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	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	0.11	1.93	0.82	0.01	0.16	—	0.16	0.16	—	0.16	—	2,447	2,447	0.22	< 0.005	2,454
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	0.00	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	0.11	1.93	0.82	0.01	0.16	—	0.16	0.16	—	0.16	—	2,447	2,447	0.22	< 0.005	2,454
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	0.11	1.93	0.82	0.01	0.16	—	0.16	0.16	—	0.16	—	2,447	2,447	0.22	< 0.005	2,454

Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	0.00	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	0.11	1.93	0.82	0.01	0.16	—	0.16	0.16	—	0.16	—	2,447	2,447	0.22	< 0.005	2,454
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	0.02	0.35	0.15	< 0.005	0.03	—	0.03	0.03	—	0.03	—	405	405	0.04	< 0.005	406
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	0.00	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	0.02	0.35	0.15	< 0.005	0.03	—	0.03	0.03	—	0.03	—	405	405	0.04	< 0.005	406

4.3. Area Emissions by Source

4.3.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Source	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	11.6	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.98	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Landscap e	1.20	0.13	13.9	< 0.005	0.01	—	0.01	< 0.005	—	< 0.005	—	37.0	37.0	< 0.005	< 0.005	37.1
Total	13.7	0.13	13.9	< 0.005	0.01	—	0.01	< 0.005	—	< 0.005	—	37.0	37.0	< 0.005	< 0.005	37.1
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	11.6	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectu ral Coatings	0.98	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	12.5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	2.11	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectu ral Coatings	0.18	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscap e Equipmen t	0.11	0.01	1.25	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	3.02	3.02	< 0.005	< 0.005	3.03
Total	2.40	0.01	1.25	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	3.02	3.02	< 0.005	< 0.005	3.03

4.4. Water Emissions by Land Use

4.4.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Single Family Housing	—	—	—	—	—	—	—	—	—	—	19.5	366	386	2.02	0.05	451
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	—	—	—	—	—	—	—	—	—	—	19.5	366	386	2.02	0.05	451
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	19.5	366	386	2.02	0.05	451
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	—	—	—	—	—	—	—	—	—	—	19.5	366	386	2.02	0.05	451
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	3.23	60.6	63.9	0.33	0.01	74.7
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	—	—	—	—	—	—	—	—	—	—	3.23	60.6	63.9	0.33	0.01	74.7

4.5. Waste Emissions by Land Use

4.5.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	127	0.00	127	12.7	0.00	445
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	—	—	—	—	—	—	—	—	—	—	127	0.00	127	12.7	0.00	445
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	127	0.00	127	12.7	0.00	445
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	—	—	—	—	—	—	—	—	—	—	127	0.00	127	12.7	0.00	445
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Single Family Housing	—	—	—	—	—	—	—	—	—	—	21.0	0.00	21.0	2.10	0.00	73.6
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	—	—	—	—	—	—	—	—	—	—	21.0	0.00	21.0	2.10	0.00	73.6

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	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3.84
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3.84
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3.84
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3.84
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Single Family Housing	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.64
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.64

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)

Equipment Type	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	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	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
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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	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	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	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	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	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	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	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	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 Preparation	Site Preparation	11/04/2024	12/27/2024	5.00	40.0	—
Grading	Grading	12/28/2024	5/30/2025	5.00	110	—
Building Construction	Building Construction	9/13/2025	12/14/2029	5.00	1,110	—
Paving	Paving	6/2/2025	9/12/2025	5.00	75.0	—
Architectural Coating	Architectural Coating	9/3/2029	12/14/2029	5.00	75.0	—

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 Preparation	Rubber Tired Dozers	Diesel	Average	3.00	8.00	367	0.40
Site Preparation	Tractors/Loaders/Backhoes	Diesel	Average	4.00	8.00	84.0	0.37
Grading	Graders	Diesel	Average	1.00	8.00	148	0.41
Grading	Excavators	Diesel	Average	2.00	8.00	36.0	0.38
Grading	Tractors/Loaders/Backhoes	Diesel	Average	2.00	8.00	84.0	0.37
Grading	Scrapers	Diesel	Average	2.00	8.00	423	0.48
Grading	Rubber Tired Dozers	Diesel	Average	1.00	8.00	367	0.40
Building Construction	Forklifts	Diesel	Average	3.00	8.00	82.0	0.20

Building Construction	Generator Sets	Diesel	Average	1.00	8.00	14.0	0.74
Building Construction	Cranes	Diesel	Average	1.00	7.00	367	0.29
Building Construction	Welders	Diesel	Average	1.00	8.00	46.0	0.45
Building Construction	Tractors/Loaders/Backhoes	Diesel	Average	3.00	7.00	84.0	0.37
Paving	Pavers	Diesel	Average	2.00	8.00	81.0	0.42
Paving	Paving Equipment	Diesel	Average	2.00	8.00	89.0	0.36
Paving	Rollers	Diesel	Average	2.00	8.00	36.0	0.38
Architectural Coating	Air Compressors	Diesel	Average	1.00	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 Preparation	—	—	—	—
Site Preparation	Worker	17.5	18.5	LDA,LDT1,LDT2
Site Preparation	Vendor	—	10.2	HHDT,MHDT
Site Preparation	Hauling	0.00	20.0	HHDT
Site Preparation	Onsite truck	—	—	HHDT
Grading	—	—	—	—
Grading	Worker	20.0	18.5	LDA,LDT1,LDT2
Grading	Vendor	—	10.2	HHDT,MHDT
Grading	Hauling	8.98	20.0	HHDT
Grading	Onsite truck	—	—	HHDT
Building Construction	—	—	—	—
Building Construction	Worker	87.8	18.5	LDA,LDT1,LDT2
Building Construction	Vendor	26.1	10.2	HHDT,MHDT
Building Construction	Hauling	0.00	20.0	HHDT

Building Construction	Onsite truck	—	—	HHDT
Paving	—	—	—	—
Paving	Worker	15.0	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	17.6	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

Non-applicable. No control strategies activated by user.

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	1,087,020	362,340	0.00	0.00	48,613

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 Preparation	0.00	0.00	60.0	0.00	—
Grading	7,900	0.00	330	0.00	—

Paving	0.00	0.00	0.00	0.00	21.3
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5.6.2. Construction Earthmoving Control Strategies

Control Strategies Applied	Frequency (per day)	PM10 Reduction	PM2.5 Reduction
Water Exposed Area	3	74%	74%

5.7. Construction Paving

Land Use	Area Paved (acres)	% Asphalt
Single Family Housing	2.69	0%
Other Asphalt Surfaces	14.8	100%
Other Non-Asphalt Surfaces	3.80	0%

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	532	0.03	< 0.005
2025	0.00	532	0.03	< 0.005
2026	0.00	532	0.03	< 0.005
2027	0.00	532	0.03	< 0.005
2028	0.00	532	0.03	< 0.005
2029	0.00	532	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
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Single Family Housing	2,303	2,328	2,086	830,675	21,496	21,723	19,469	7,752,064
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	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

5.10.2. 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)
1087020	362,340	0.00	0.00	48,613

5.10.3. Landscape Equipment

Season	Unit	Value
Snow Days	day/yr	0.00
Summer Days	day/yr	180

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)
Single Family Housing	1,856,748	532	0.0330	0.0040	7,634,691

Other Asphalt Surfaces	0.00	532	0.0330	0.0040	0.00
Other Non-Asphalt Surfaces	0.00	532	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)
Single Family Housing	10,170,207	45,482,473
Other Asphalt Surfaces	0.00	0.00
Other Non-Asphalt Surfaces	0.00	0.00

5.13. Operational Waste Generation

5.13.1. Unmitigated

Land Use	Waste (ton/year)	Cogeneration (kWh/year)
Single Family Housing	236	—
Other Asphalt Surfaces	0.00	—
Other Non-Asphalt Surfaces	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
Single Family Housing	Average room A/C & Other residential A/C and heat pumps	R-410A	2,088	< 0.005	2.50	2.50	10.0
Single Family Housing	Household refrigerators and/or freezers	R-134a	1,430	0.12	0.60	0.00	1.00

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
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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
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5.16.2. Process Boilers

Equipment Type	Fuel Type	Number	Boiler Rating (MMBtu/hr)	Daily Heat Input (MMBtu/day)	Annual Heat Input (MMBtu/yr)
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5.17. User Defined

Equipment Type	Fuel Type
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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
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5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

Biomass Cover Type	Initial Acres	Final Acres
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5.18.2. Sequestration

5.18.2.1. Unmitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)
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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	33.0	annual days of extreme heat
Extreme Precipitation	2.15	annual days with precipitation above 20 mm
Sea Level Rise	—	meters of inundation depth
Wildfire	7.99	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 $\frac{3}{4}$ 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 (Radke et al., 2017, CEC-500-2017-008), and consider inundation location and depth for the San Francisco Bay, the Sacramento-San Joaquin River Delta and California coast resulting different increments of sea level rise coupled with extreme storm events.

Users may select from four scenarios to view the range in potential inundation depth for the grid cell. The four scenarios are: No rise, 0.5 meter, 1.0 meter, 1.41 meters

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
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Temperature and Extreme Heat	4	0	0	N/A
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	N/A	N/A	N/A	N/A
Wildfire	N/A	N/A	N/A	N/A
Flooding	N/A	N/A	N/A	N/A
Drought	0	0	0	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	N/A	N/A	N/A	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	4	1	1	4
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	N/A	N/A	N/A	N/A
Wildfire	N/A	N/A	N/A	N/A
Flooding	N/A	N/A	N/A	N/A
Drought	1	1	1	2
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	N/A	N/A	N/A	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 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	91.1
AQ-PM	32.2
AQ-DPM	57.9
Drinking Water	29.7
Lead Risk Housing	13.8
Pesticides	0.00
Toxic Releases	25.0
Traffic	83.1
Effect Indicators	—
CleanUp Sites	73.4
Groundwater	0.00
Haz Waste Facilities/Generators	65.9
Impaired Water Bodies	0.00
Solid Waste	0.00
Sensitive Population	—
Asthma	84.6
Cardio-vascular	99.5
Low Birth Weights	5.81
Socioeconomic Factor Indicators	—

Education	67.1
Housing	11.2
Linguistic	19.9
Poverty	67.2
Unemployment	82.7

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	66.22610035
Employed	25.70255357
Median HI	56.85871936
Education	—
Bachelor's or higher	31.64378288
High school enrollment	2.258437059
Preschool enrollment	41.10098807
Transportation	—
Auto Access	89.83703323
Active commuting	14.92364943
Social	—
2-parent households	97.98537149
Voting	43.48774541
Neighborhood	—
Alcohol availability	89.68304889
Park access	26.5622995
Retail density	22.41755422

Supermarket access	25.03528808
Tree canopy	7.25009624
Housing	—
Homeownership	84.70422174
Housing habitability	80.57230848
Low-inc homeowner severe housing cost burden	56.2941101
Low-inc renter severe housing cost burden	70.48633389
Uncrowded housing	64.30129603
Health Outcomes	—
Insured adults	59.70742974
Arthritis	0.6
Asthma ER Admissions	14.5
High Blood Pressure	1.1
Cancer (excluding skin)	0.9
Asthma	37.3
Coronary Heart Disease	1.0
Chronic Obstructive Pulmonary Disease	1.6
Diagnosed Diabetes	6.3
Life Expectancy at Birth	28.4
Cognitively Disabled	58.3
Physically Disabled	16.0
Heart Attack ER Admissions	1.2
Mental Health Not Good	58.7
Chronic Kidney Disease	1.3
Obesity	41.7
Pedestrian Injuries	90.6
Physical Health Not Good	24.5

Stroke	2.9
Health Risk Behaviors	—
Binge Drinking	95.3
Current Smoker	59.6
No Leisure Time for Physical Activity	48.5
Climate Change Exposures	—
Wildfire Risk	0.0
SLR Inundation Area	0.0
Children	33.8
Elderly	53.1
English Speaking	52.3
Foreign-born	39.5
Outdoor Workers	27.8
Climate Change Adaptive Capacity	—
Impervious Surface Cover	86.5
Traffic Density	80.1
Traffic Access	23.0
Other Indices	—
Hardship	53.1
Other Decision Support	—
2016 Voting	53.1

7.3. Overall Health & Equity Scores

Metric	Result for Project Census Tract
CalEnviroScreen 4.0 Score for Project Location (a)	52.0
Healthy Places Index Score for Project Location (b)	42.0
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	Information is provided by the client.
Construction: Construction Phases	An estimated start date of 11/04/2024 was provided by client. Since project is a housing development, assumed all paving was conducted prior to building construction. For architectural coating phase, assumed CalEEMod default number of days and assumed overlap with end of building construction phase.
Operations: Hearths	Based on client input, no woodstoves or fireplaces will be installed.

December 7, 2023

Mr. Tim Roofian, Esq.
Real Estate Development Associate
Rodeo Credit Enterprises, LLC
9595 Wilshire Blvd, Suite #708
Beverly Hills, CA 90212

Subject:

TTM 20576 – Greenhouse Gas Consistency Evaluation, City of Victorville, CA

Dear Mr. Roofian:

MD Acoustics, LLC (MD) has completed a Greenhouse Gas Consistency Evaluation for the proposed TTM 20576 Project located at the SWC of Verano Street & Cataba Road (APNs: 3136-441-01, 02 and 3136-411-04, 05) in the City of Victorville, County of San Bernardino, CA. The purpose of this focused study is to evaluate the greenhouse gas impact generated by the proposed project and to compare the project emissions to the City's Greenhouse Gas Emissions Screening Table.

The project proposes to develop 242 residential lots on approximately 70.8 acres. The proposed project site plan is in Appendix A.

The City of Victorville requires projects subject to CEQA to complete the City's Greenhouse Gas Emissions Screening Table Review in order to ensure compliance with the City's goals. The City requires projects to reach a minimum of 100 points based on project design features to be compliant. As shown in Appendix B, the project would earn 100 points by implementing the selected features highlighted in yellow. Therefore, with the selected project features, the project would be compliant and would have a less than significant impact in regards to greenhouse gas emissions.

MD is pleased to provide this Greenhouse Gas Consistency Evaluation. If you have any questions regarding this analysis, please don't hesitate to call us at (805) 426-4477.

Sincerely,
MD Acoustics, LLC

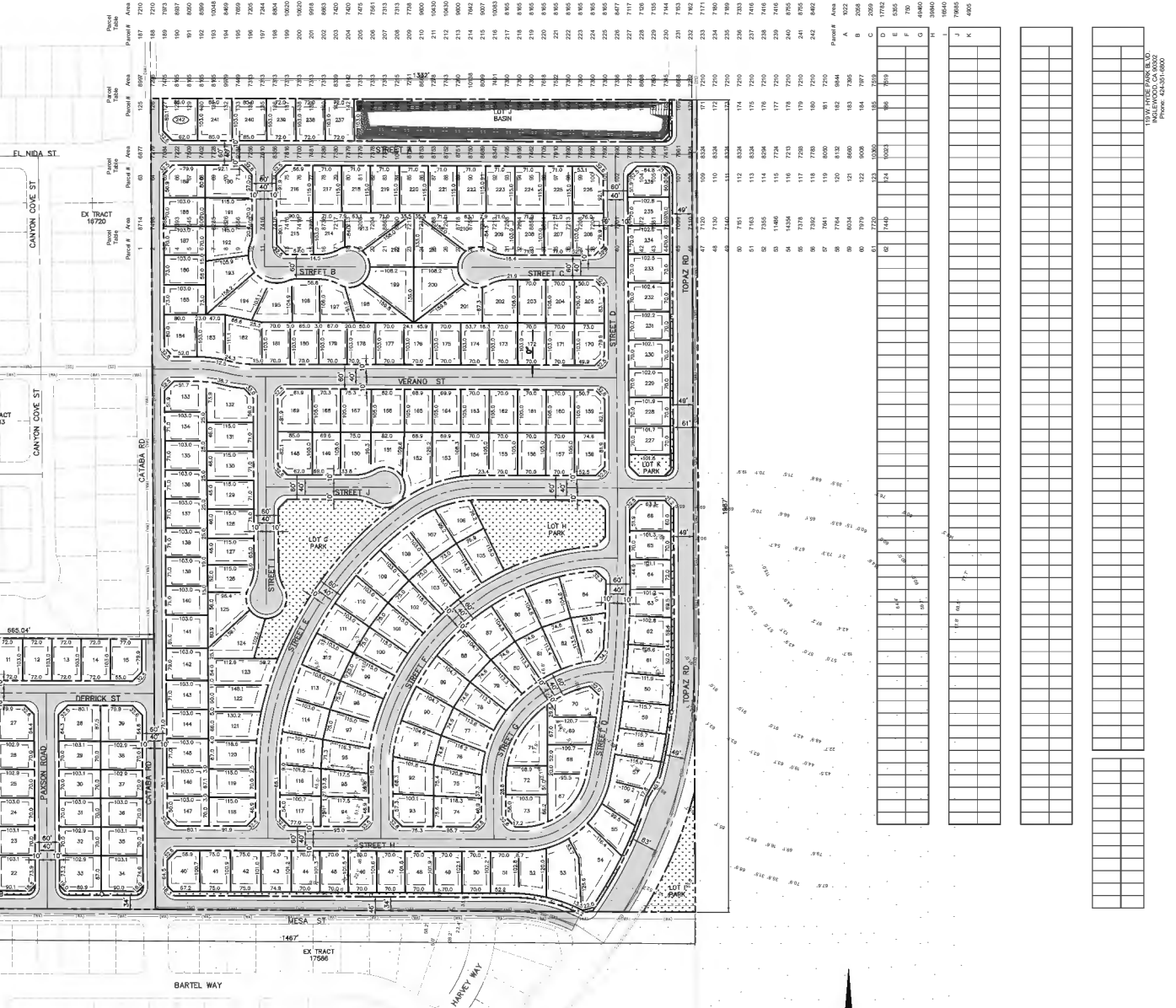


Tyler Klassen, EIT
Air Quality Specialist

Appendix A
Site Plan

IN THE CITY OF VICTORVILLE, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA

TENTATIVE TRACT MAP 20576



Appendix B

City of Victorville Greenhouse Gas Emissions Screening Table

City of Victorville Screening Table for Implementation of GHG Reduction Measures for Residential Development

Feature	Description	Assigned Point Values	Project Points
Building Envelope			
Insulation	2019 baseline (walls R-16; roof/attic R-32)	0	9
	Enhanced Insulation (rigid wall insulation R-13, roof/attic R-38)	9	
	Greatly Enhanced Insulation (spray foam insulated walls R-18 or higher, roof/attic R-38 or higher)	11	
Windows	2019 Baseline Windows (0.3 U-factor, 0.23 solar heat gain coefficient (SHGC))	0	9
	Enhanced Window Insulation (0.28 U-factor, 0.22 SHGC)	7	
	Greatly Enhanced Window Insulation (0.28 or less U-factor, 0.22 or less SHGC)	9	
Cool Roof	2019 Standard (none)	0	6
	Enhanced Cool Roof (CRRC Rated 0.2 aged solar reflectance, 0.75 thermal emittance)	6	
	Greatly Enhanced Cool Roof (CRRC Rated 0.35 aged solar reflectance, 0.75 thermal emittance)	7	
Air Filtration	Air barrier applied to exterior walls, calking, and visual inspection such as the HERS Verified Quality Insulation Installation (QII or equivalent)	6	6
	Blower Door HERS Verified Envelope Leakage or equivalent	5	5
Thermal Storage of Building	Modest Thermal Mass (10% of floor or 10% of walls 12" or more thick exposed concrete or masonry with no permanently installed floor covering such as carpet, linoleum, wood or other insulating materials)	1	1
Building Envelope Performance Standard	Enhanced Thermal Mass (20% of floor or 20% of walls: 12" or more thick exposed concrete or masonry. No permanently installed floor covering such as carpet, linoleum, wood or other insulating materials)	2	2
Indoor Space Efficiencies			
Heating/Cooling Distribution System	Minimum Duct Insulation (R-6 required)	0	5
	Enhanced Duct Insulation (R-8)	5	
	Distribution loss reduction with inspection (HERS Verified Duct Leakage or equivalent)	7	
Space Heating/Cooling Equipment	2019 Minimum HVAC Efficiency (EER 13/75% AFUE or 7.7 HSPF)	0	4
	Improved Efficiency HVAC (EER 14/78% AFUE or 8 HSPF)	2	
	High Efficiency HVAC (EER 15/80% AFUE or 8.5 HSPF)	4	
	Very High Efficiency HVAC (EER 16/82% AFUE or 9 HSPF)	5	
Water Heaters	2019 Minimum Efficiency (0.57 Energy Factor)	0	11
	Improved Efficiency Water Heater (0.675 Energy Factor)	7	
	High Efficiency Water Heater (0.72 Energy Factor)	9	
	Very High Efficiency Water Heater (0.92 Energy Factor)	11	
	Solar Pre-heat System (0.2 Net Solar Fraction)	2	
	Enhanced Solar Pre-heat System (0.35 Net Solar Fraction)	5	
Daylighting	All peripheral rooms within building have at least one window or skylight	0	1
	All rooms within building have daylight (through use of windows, solar tubes, skylights, etc.)	1	
	All rooms daylighted	1	
Artificial Lighting	2019 Minimum (required)	0	6
	Efficient Lights (25% of in-unit fixtures considered high efficacy. High efficacy is defined as 40 lumens/watt for 15 watt or less fixtures; 50 lumens/watt for 15-40 watt fixtures, 60 lumens/watt for fixtures >40watt)	5	
	High Efficiency Lights (50% of in-unit fixtures are high efficacy)	6	
	Very High Efficiency Lights (100% of in-unit fixtures are high efficacy)	7	
Appliances	Star Commercial Refrigerator (new)	1	1
	Energy Star Commercial Dish Washer (new)	1	1
	Energy Star Commercial Cloths Washing	1	
Miscellaneous Residential Building Efficiencies			
Building Placement	North/South alignment of building or other building placement such that the orientation of the buildings optimizes conditions for natural heating, cooling, and lighting.	3	3
Shading	At least 90% of south-facing glazing will be shaded by vegetation or overhangs at noon on Jun 21st.	2	2
Energy Star Homes	EPA Energy Star for Homes (version 3 or above)	15	15
Renewable Energy			
Photovoltaic	30 percent of the power needs of the project	9	
	40 percent of the power needs of the project	12	
	50 percent of the power needs of the project	17	
	60 percent of the power needs of the project	20	
	70 percent of the power needs of the project	23	
	80 percent of the power needs of the project	25	
	90 percent of the power needs of the project	28	
	100 percent of the power needs of the project	31	
Wind Turbines	30 percent of the power needs of the project	9	
	40 percent of the power needs of the project	12	
	50 percent of the power needs of the project	17	
	60 percent of the power needs of the project	20	
	70 percent of the power needs of the project	23	
	80 percent of the power needs of the project	25	
	90 percent of the power needs of the project	28	
	100 percent of the power needs of the project	31	

Irrigation and Landscaping			
Water Efficient Landscaping	Limit conventional turf to < 25% of each lot (required)	0	5
	Limit conventional turf to < 50% of each lot	2	
	Non-conventional turf warm season turf <50% of required landscape area and/or low-water using plants allowed)	4	
	Only California Native landscape that requires no or only supplemental irrigation	5	
Water Efficient Irrigation Systems	Low precipitation spray heads< .75"/hr or drip irrigation	1	2
	Weather based irrigation control systems combined with drip irrigation (demonstrate 20 reduced water use)	2	
Recycled Water	Recycled water connection (purple pipe) to irrigation system on site	6	
Water Reuse	Gray water Reuse System collects Gray-water from clothes-washers, showers and faucets for irrigation use	12	
Potable Water			
Showers	Water Efficient Showerheads (2.0 gpm)	2	2
Toilets	Water Efficient Toilets (1.5gpm)	2	2
Faucets	Water Efficient faucets (1.28gpm)	2	2
Employment Based Trip and VMT Reduction Policy			
Bicycle Infrastructure	Provide bicycle paths within project boundaries.	TBD	
	Provide bicycle path linkages between residential and other land uses.	2	
	Provide bicycle path linkages between residential and transit.	5	
Install EV Chargers			
Electric Vehicle Recharging	Level 1 110 volt AC chargers	2 per charger	
	Level 2 240 volt AC Fast Chargers	5 per charger	
Traffic Flow Improvements			
	Signal Synchronization	1	
	Signal connected to existing ITS	3	
Total Points			100

Source: Greenhouse Gas Emissions Screening Table Review, City of Victorville Department of Development.

BIOLOGICAL RESOURCES TECHNICAL REPORT

Tentative Tract Map (TTM) 20576 Project

Prepared for:

Rodeo Credit Enterprises, LLC.
9595 Wilshire Blvd. Suite #708
Beverly Hills, CA 90212

Prepared by:

Aspen Environmental Group
615 N. Benson Avenue, Suite E
Upland, CA 91786



October 2023

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Attachments

Attachment 1: Figures

Figure 1: Project Overview

Figure 2: Vegetation and Land Cover

Figure 3: Biological Resources

Attachment 2: CNDDDB Query Results

Attachment 3: IPaC Resource List

Attachment 4: Special-status Species Not Addressed

Attachment 5: Project Species List

Attachment 6: Project Photos

Attachment 7: Western Joshua Tree Data Table

1.0 Introduction

This report was prepared by Aspen Environmental Group (Aspen) to describe biological resources at the Tentative Tract Map 20576 Project (project). The project is located within the City of Hesperia, California. Rodeo Credit Enterprises, LLC. proposes to develop approximately 64 acres of the property. Throughout this report, “project” refers to the proposed residential development, while “project site” refers to all areas that may be directly or indirectly impacted by project activities. This report provides baseline information on biological resources to support the regulatory review and permitting process.

2.0 Project and Property Description

2.1 Project Description

Rodeo Credit Enterprises, LLC proposes to develop 246 residential parcels and three additional larger parcels on the 64.9-acre project site.

2.2 Project Location

The project is located along Catapa Road south of Eucalyptus Street in the City of Victorville, California (APNs: 3136-441-01, 3136-441-02, 3136-411-04, and 3136-411-05). The project site is in Section 10, Township 4 North, Range 5 West (USGS Baldy Mesa, CA 7.5-minute quadrangle) (Figure 1, Attachment 1). The project site is surrounded by existing single family residential housing developments to the west, and natural areas to the north, south, and east.

3.0 Methods

3.1 Literature Review

Prior to conducting field surveys, Aspen biologists reviewed available literature to identify special-status biological resources known from the vicinity of the project site. The literature and databases listed below were reviewed.

- U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) for the project site (USFWS, 2023a).
- California Natural Diversity Database (CNDDDB) for the following 7.5-minute USGS topographic quads: Adelanto, Baldy Mesa, Cajon, Hesperia, Phelan, Shadow Mountain SE, Silverwood, Telegraph Peak, and Victorville (CDFW, 2023a).
- California Native Plant Society (CNPS) Electronic Inventory of Rare and Endangered Vascular Plants of California for the same topographic quads (CNPS, 2023).

The CNDDDB results are listed in Attachment 2 and the IPaC Resource List is provided as Attachment 3. Several special-status species identified during the literature review only occur in specialized native habitats that are absent from the project site or occur at higher or lower elevations. These plants and animals are listed in Attachment 4 but are not addressed further in this report.

3.2 Field Surveys

Aspen biologists Nikolai Starzak, Haley Jensen, and Kala Barron conducted a site visit to the project site on April 3, 2023, to evaluate project impacts to vegetation and wildlife species, and to conduct a focused botanical survey, map vegetation, and conduct general wildlife surveys. Aspen senior biologist Justin Wood also visited the project site on September 27, 2023, to assess the habitat for special-status species. On October 3, 2023, Ms. Barron revisited the project site to collect additional data on western Joshua tree (*Yucca brevifolia*) within and adjacent to the site.

During the surveys, biologists conducted 100 percent coverage of the project site. All plant and wildlife species observed were recorded in field notes and special-status species locations were recorded using hand-held GPS units. All plant and wildlife species observed during the surveys are listed in Attachment 5. Representative site photos were captured during the survey and are included in Attachment 6.

The botanical surveys were conducted in conformance with California Department of Fish and Wildlife (CDFW) guidelines (CDFW, 2018). The surveys were (a) conducted during flowering seasons for the special status plants known from the area, (b) floristic in nature, (c) consistent with conservation ethics, (d) systematically covered all habitat types on the sites, and (e) well documented by this report and by voucher specimens to be deposited at the California Botanic Garden (formerly Rancho Santa Ana Botanic Garden) and other herbaria. Plants of uncertain identity were collected and identified later using keys, descriptions, and illustrations in Baldwin et al. (2012).

Vegetation mapping was done by drawing tentative boundaries onto high-resolution aerial images during the site visit on April 3, 2023. These boundaries were then digitized into Geographic Information System (GIS) shapefiles (see Attachment 1; Figure 2: Vegetation and Land Cover). Vegetation within the project site is further described below using the names and descriptions in *A Manual of California Vegetation* (Sawyer et al., 2009). Vegetation was mapped digitally using ArcGIS (version 10.7) and one-foot pixel aerial imagery. The smallest mapping unit was approximately 0.05-acre and most mapped vegetation boundaries are accurate to within approximately 5-ft. Any vegetation map is subject to imprecision for several reasons:

1. Vegetation types tend to intergrade on the landscape so that there are no true boundaries in the vegetation itself. In these cases, a mapped boundary represents best professional judgment.
2. Vegetation types as they are named and described tend to intergrade; that is, a given stand of real-world vegetation may not fit into any named type in the classification scheme used. Thus, a mapped and labeled polygon is given the best name available in the classification, but this name does not imply that the vegetation unambiguously matches its mapped name.
3. Vegetation tends to be patchy. Small patches of one named type are often included within mapped polygons of another type. The size of these patches varies, depending on the minimum mapping units and scale of available aerial imagery.

Rainfall: Rainfall is greatest during the months of November through March, with an average annual precipitation total of 5.06 inches, as reported in Victorville, approximately seven miles northeast of the project site (U.S. Climate Data, 2023). Rainfall to-date has been lower than average with approximately 3.94 inches falling in the region since October 1, 2022 (CoCoRaHS, 2023).

4.0 General Biological Survey Results

4.1 Vegetation and Cover Types

Vegetation within the project site consists of upland vegetation and other land cover types. They are described in detail below and acreages of the vegetation and land cover areas are presented in Table 1 and shown in Figure 2 (Attachment 1).

Table 1. Vegetation and Other Cover Types on the Project Site (acres)

Vegetation Type	Project Site (Acres)
Rubber rabbitbrush scrub	64.68
Joshua tree woodland	0.87
Other Cover Types	
Developed	3.80
Total	69.35

Upland Vegetation Types

Rubber rabbitbrush scrub (*Ericameria nauseosa* Shrubland Alliance). Rubber rabbitbrush scrub is a scrub community dominated by sparse rubber rabbitbrush (*Ericameria nauseosa*). Other species such as annual burweed (*Ambrosia acanthicarpa*), Devil's lettuce (*Amsinckia tessellata*), Nevada ephedra (*Ephedra nevadensis*), valley lessingia (*Lessingia glandulifera*), and Russian thistle (*Salsola tragus*) are also present. Rubber rabbitbrush scrub is the most common vegetation within the project site. The rubber rabbitbrush scrub within the project site has been subjected to regular clearing since approximately 2006. Rubber rabbitbrush scrub has a State rank of S5 and is therefore not recognized as a sensitive natural community by CDFW (CDFW, 2022).

Joshua tree woodland (*Yucca brevifolia* Woodland Alliance). Joshua tree woodland is a desert woodland community dominated by Joshua trees (*Yucca brevifolia*). Other species present within the understory include white bursage (*Ambrosia dumosa*), burrobrush (*Ambrosia salsola*), and California buckwheat (*Eriogonum fasciculatum*). Joshua tree woodland is located within the southeast corner of the project site. Joshua tree woodland has a State rank of S3 and is therefore recognized as a sensitive natural community by CDFW (CDFW, 2022).

Other Cover Types

Developed. This cover type includes disturbed and developed areas within the project site including unpaved roads, and unvegetated or sparsely vegetated areas. Vegetation present includes weedy species such as red stemmed filaree (*Erodium cicutarium*), brome grass (*Bromus* sp.), and shortpod mustard (*Hirschfeldia incana*). Developed is not a vegetation type and is therefore not described in *A Manual of California Vegetation* and is also not recognized as a sensitive natural community by CDFW (CDFW, 2022).

4.2 Sensitive Natural Communities

Sensitive vegetation communities are defined by CDFW (2022) as, "...communities that are of limited distribution statewide or within a county or region and are often vulnerable to environmental effects of projects." The literature review identified one sensitive vegetation community: southern sycamore alder

riparian woodland, near the project site (CDFW, 2023a). One sensitive vegetation community, Joshua tree woodland is present within the project site.

4.3 Wildlife Habitat

The term habitat refers to the environment and ecological conditions where a species is found. Wildlife habitat is often described in terms of vegetation, though a more thorough explanation includes detail such as availability or proximity to water, suitable nesting or denning sites, shade, foraging perches, cover sites to escape from predators, soils that are suitable for burrowing or hiding, proximity of noise and disturbance, and other factors that are unique to each species. For many wildlife species, vegetation reflects important components of habitat, including regional climate, physical structure, and biological productivity and food resources. Thus, the vegetation descriptions in Section 4.1 are useful overarching descriptors for wildlife habitat.

Wildlife and wildlife sign observed during the field surveys included species common in the region, such as horned lark (*Eremophila alpestris*), common raven (*Corvus corax*), western bluebird (*Sialia mexicana*), house finch (*Haemorhous mexicanus*), turkey vulture (*Cathartes aura*), coyote (*Canis latrans*), and California ground squirrel (*Otospermophilus beecheyi*). No special-status wildlife species were observed or otherwise detected during the surveys.

5.0 Special-Status Species Results

Based on review of the literature and databases listed above, and on local expertise with the flora and fauna of the project site, lists of special-status plants and wildlife with potential to occur on the project site or in the project vicinity were compiled (Table 3). Plant and wildlife taxa were considered to be special-status species if they were classified in one or more of the categories listed in Table 2. All special-status plants and wildlife occurring in the region in habitats similar to those found on the project site are addressed in Table 3, with brief descriptions of habitat and distribution, conservation status, and probability of occurrence on the site.

Table 2. Definitions of Special-Status Species

Species Designation	Agency	Definition
Federal Endangered	USFWS	A species that is in danger of extinction throughout all or a significant portion of its range.
Federal Threatened	USFWS	A species that is likely to become endangered within the foreseeable future throughout all or a significant portion of its range.
Federal Candidate	USFWS	A species the US Fish and Wildlife Service (USFWS) has designated as a candidate for listing under Section 4 of the federal Endangered Species Act (ESA), published in its annual candidate review, and defined as a species that has sufficient information on its biological status and threats to propose it as endangered or threatened under the ESA, but for which development of a proposed listing regulation is precluded by other higher priority listing activities.
Federal Proposed	USFWS	A species that the USFWS has proposed for listing under Section 4 of the ESA, by publishing a Proposed Rule in the Federal Register.
Protected under the federal Bald and Golden Eagle Protection Act (BGEPA)	USFWS	Bald and golden eagles are protected from take, including harassment, except as permitted by USFWS.

Table 2. Definitions of Special-Status Species

Species Designation	Agency	Definition
State Endangered	CDFW	A species that is in serious danger of becoming extinct throughout all or a significant portion of its range due to one or more causes, including loss or change in habitat, overexploitation, predation, competition, or disease.
State Threatened	CDFW	A species that, although not presently threatened with extinction, is likely to become an endangered species in the foreseeable future in the absence of special protection and management efforts.
State Candidate	CDFW	A species that has been officially noticed by the California Fish and Game Commission as being under review by the CDFW for addition to the threatened or endangered species lists. CDFW candidate species are given no extra-legal protection under state laws.
Fully Protected	CDFW	Animal species fully protected under the California Fish and Game Code. The CDFW may not issue take authorization except for scientific purposes or as provided under SB 618 (2011).
Species of Special Concern	CDFW	<p>A species, subspecies, or distinct population of an animal native to California that currently satisfies one or more of the following (not necessarily mutually exclusive) criteria:</p> <ul style="list-style-type: none"> Is extirpated from the state or, in the case of birds, in its primary seasonal or breeding role. Is on the federal, but not state list, of threatened or endangered species. Meets the state definition of threatened or endangered but has not formally been listed. Is experiencing or formerly experienced serious (nonscyclical) population declines or range retractions (not reversed) that, if continued or resumed, could qualify it for state threatened or endangered status; or Has naturally small populations exhibiting high susceptibility to risk from any factor(s) that if realized, could lead to declines that would qualify it for state threatened or endangered status. <p>This is an administrative designation and carries no formal legal status. This designation is intended to focus attention on animals at conservation risk, to stimulate research on poorly known species, and to achieve conservation and recovery before these species meet the California Endangered Species Act (CESA) criteria for listing. California Species of Special Concern are considered under the California Environmental Quality Act (CEQA) and require a discussion of impacts and appropriate mitigation to reduce impacts.</p>
Watch List	CDFW	Taxa that were previously Species of Special Concern, but no longer merit that status or which do not meet criteria for designation as Species of Special Concern, but for which there is concern and a need for additional information to clarify status.
Special Animal	CDFW	An animal species that is tracked in the CNDDDB but has no other status at the state or federal level.
California Rare Plant Rank (CRPR) 1A	CDFW	Plants presumed to be extinct in California.
CRPR 1B	CDFW	Plants rare or endangered in California and elsewhere.
CRPR 2A	CDFW	Plants presumed extinct in California but more common elsewhere.
CRPR 2B	CDFW	Plants rare or endangered in California but more common elsewhere.
CRPR 3	CDFW	Plants about which more information is needed – a review list.

Table 2. Definitions of Special-Status Species

Species Designation	Agency	Definition
CRPR 4	CDFW	Plants of limited distribution – a watch list.

Plants or wildlife may be ranked as special-status species due to declining populations, vulnerability to habitat change, or restricted distributions. Certain species have been listed as threatened or endangered under the Federal Endangered Species Act (FESA) or California Endangered Species Act (CESA). Others have not been listed, but declining populations or habitat availability cause concern for their long-term viability. These species of conservation concern appear on lists compiled by resource agencies or private conservation organizations. In this report, “special-status species” includes all plants and wildlife listed as threatened or endangered or included in these other compilations. All special-status plants and wildlife occurring in the region in habitats similar to those found on the project site are addressed in Table 3, with brief descriptions of habitat and distribution, conservation status, and probability of occurrence on the site.

Table 3. Special-Status Species Addressed

Species Name	Habitat Requirements	Flowering or Activity Season	Conservation Status	Potential to Occur
PLANTS				
<i>Canbya Candida</i> White pygmy-poppy	Annual shrub; Joshua tree woodland, Mojavean desert scrub, pinyon/juniper woodland. 600-4790 ft elev.; Inyo, Kern, Los Angeles, and San Bernardino Cos.	Mar-Jun	Fed: None CA: S3S4, 4.2	Low: suitable habitat is present. Historic records are present within two miles of the project site.
<i>Muilla coronata</i> Crowned muilla	Perennial bulb; desert shrublands and woodlands; Mar-Apr; 3,300-5,300 ft. elev.; San Bernardino Co. north to Tulare and Inyo Cos.	Mar-Apr (May)	Fed: None CA: S3, 4.2	Present: 20 individuals observed within the project site, additional plants expected.
<i>Opuntia basilaris</i> var. <i>brachyciada</i> Short-joint beavertail	Perennial stem; open chaparral, Joshua tree woodland, pinyon/juniper woodland, or Mojavean desert scrub. 425-5905 ft elev.; Los Angeles and San Bernardino Cos.	Apr-Jun (Aug)	Fed: None CA: S3, 1B.2	Low: Marginally suitable habitat present, nearest known occurrence about five miles.
<i>Pediomelum castoreum</i> BeaverDam breadroot	Perennial herb; Joshua tree woodland, Mojavean desert scrub. 610-1525 ft elev.; Inyo and San Bernardino Co.	Apr-May	Fed: None CA: S2, 1B.2	Low: Minimally suitable habitat present, nearest historic occurrence about 10 miles.
<i>Syntrichopappus lemmonii</i> Lemmon's syntrichopappus	Annual; open sandy areas, chaparral & desert shrubland, about 1,700-6,000 ft. elev.; cent. Coast Ranges (Monterey Co.), W Mojave Des, Transverse Ranges, to San Jacinto Mtns.	Apr-Jun	Fed: None CA: S4, 4.3	Low: Minimally suitable habitat present, nearest occurrence about 10 miles south and west.

Table 3. Special-Status Species Addressed

Species Name	Habitat Requirements	Flowering or Activity Season	Conservation Status	Potential to Occur
<i>Yucca brevifolia</i> Western Joshua tree	Tree; desert flats and slopes within Joshua tree woodland, montane chaparral, pinyon and juniper woodland, Sonoran and Mojavean desert scrub; about 2,400-7,300 ft. elev.; Mojave Desert from north slopes of the San Bernardino and San Gabriel Mountain ranges, and Antelope Valley	Apr-May	Fed: None CA: SCT, SNR, WJTCA	Present: Four individuals observed in southeast corner of project site; several individuals were also observed just outside of project site.
INVERTEBRATES				
<i>Bombus crotchii</i> Crotch bumble bee	Colonial insect; open grassland and scrub; underground colonies, often in old rodent burrows. Many food plants including <i>Chaenactis</i> , <i>Lupinus</i> , <i>Phacelia</i> , <i>Salvia</i> , and <i>Eriogonum</i> . Much of southern and central CA, SW Nevada, and Baja.	Spring – Summer	Fed: None CA: CAN END , S2	Low: Suitable habitat and food plants present; historical records from within about 10 miles.
REPTILES				
<i>Gopherus agassizii</i> Desert tortoise	Mohave population. Sandy flats, rocky foothills, alluvial fans, washes, and canyons; Arid land with sparse vegetation. Hibernated in burrows for 9 months each year, most active from march to June/ September to October.	Year-round	Fed: THR CA: THR , S2S3	Low: Marginally suitable habitat present, nearest known occurrence about 5 miles.
<i>Phrynosoma blainvillii</i> Coast horned lizard	Forest, shrubland or grassland; sandy soils; W Calif. from LA Co S through N Baja Calif., below about 6000 ft. elev.	Spring – Summer	Fed: None CA: S3S4, CSC	Moderate: Marginally suitable habitat present. Multiple occurrences within a mile radius.
BIRDS				
<i>Accipiter cooperii</i> Cooper's hawk	Nests in forest and woodland, hunts in woods and open areas; breeds through most of US, winters south through Mexico	Year-round	Fed: None CA: S4, WL	Minimal (nesting); Moderate (foraging); suitable foraging habitat present.
<i>Aquila chrysaetos</i> Golden eagle	Nests in remote trees and cliffs; forages over shrublands and grasslands; breeds throughout W N America, winters to E coast	Year-round	Fed: BGEPA CA: S3, FP	Minimal (nesting), Moderate: (foraging); no suitable nesting habitat, suitable foraging habitat present.
<i>Artemisiospiza belli belli</i> Bell's sparrow	Coastal sage scrub, chaparral, saltbush scrub, cismontane central and southern Calif. NW Baja Calif	Year-round	Fed: None CA: S3, WL	Low (nesting), Low (foraging); no suitable nesting habitat, no suitable foraging habitat present.

Table 3. Special-Status Species Addressed

Species Name	Habitat Requirements	Flowering or Activity Season	Conservation Status	Potential to Occur
<i>Athene cunicularia</i> Burrowing owl	Nests mainly in rodent burrows, usually in open grassland or shrubland; forages in open habitat; increasingly uncommon in S Calif.; through W US and Mexico	Year-round	Fed: None CA: S3, CSC	Moderate (nesting), High (foraging); suitable nesting and foraging habitat present. Records within 2 miles.
<i>Buteo swainsonii</i> Swainson's hawk	Breeds in open habitats (e.g., grassland), Central Valley and W Mojave Desert (Calif.) and east to cent. US, S. Canada, New Mexico; winters in S America	Spring – Summer	Fed: None CA: THR, S3	Minimal (nesting), Low (foraging); outside of nesting range of this species, suitable foraging habitat present.
<i>Lanius ludovicianus</i> Loggerhead shrike	Broken woodland, savannah pinyon-juniper woodland, Joshua tree woodland, riparian woodland, desert oases, scrub, and washes; prefers open country for hunting with perches for scanning and fairly dense shrubs and brush for nesting.	Year-round	Fed: None CA: S4, CSC	Moderate (nesting), High (foraging); some suitable nesting habitat, minimal suitable foraging habitat present. Records within 2 miles.
<i>Toxostoma lecontei</i> Le Conte's thrasher	Low, Sandy Open deserts, preferring open areas with shrubs and bushes. Stays perching and eats insects and other arthropods. Nests usually concealed in cholla cactus and other desert shrubs.	Year-round	Fed: None CA: S3, CSC	Low (nesting), Moderate (foraging); some suitable nesting habitat, minimal suitable foraging habitat present. Records are within 1 mile.
MAMMALS				
<i>Antrozous pallidus</i> Pallid bat	Desert, grassland, shrubland, woodland, forest; most common in open, dry habitats with rocky areas for roosting.	Spring – Summer	Fed: None CA: S2, CSC	Low (roosting) Minimal (foraging). Suitable foraging habitat is present; suitable roosting habitat is absent.
<i>Corynorhinus townsendii</i> Townsend's big-eared bat	Coastal conifer and broadleaved forests, oak and conifer woodlands, arid grasslands and deserts, and high-elevation forests and meadows. Primarily roosts in caves and abandoned mines, but may roost in buildings, bridges, rock crevices, and hollow trees in many habitat types.	Year-round	Fed: None CA: S2, CSC	Minimal (roosting) Low (foraging). Suitable foraging habitat is present; suitable roosting habitat is absent.
<i>Eumops perotis californicus</i> Western mastiff bat	Lowlands (with rare exceptions); cent. and S Calif., S Ariz., NM, SW Tex., N Mexico; roost in deep rock crevices, forage over wide area.	Year-round	Fed: None CA: S3S4, CSC	Minimal (roosting); Low (foraging); suitable roosting habitat absent, marginally suitable foraging habitat present.

Table 3. Special-Status Species Addressed

Species Name	Habitat Requirements	Flowering or Activity Season	Conservation Status	Potential to Occur
<i>Lasiurus cinereus</i> Hoary bat	Prefers deciduous and coniferous woodlands, primarily roosts in tree foliage. Widespread throughout most of North America into Central America.	Year-round	Fed: None CA: S4	Minimal (roosting): Low (foraging): suitable roosting habitat absent, marginally suitable foraging habitat present.
<i>Taxidea badger</i> American badger	Mountains, deserts, interior valleys where burrowing animals are avail as prey and soil permits digging; throughout cent and W N Amer	Year-round	Fed: None CA: S3, CSC	Minimal : suitable habitat present. No near occurrences.
<i>Xerospermophilus mohavensis</i> Mohave ground squirrel	Primarily desert species, spends majority of the year underground. Endemic to Western Mohave Desert.	Year-round	Fed: None CA: THR , S2S3	Low : Marginally suitable habitat present. Records one mile west of project site.

General references (botany): Baldwin et al., 2012; CDFW, 2023a; CDFW, 2023b; CNPS, 2023; and CCH, 2023. General references (wildlife): American Ornithologists Union, 1998 (including supplements through 2013); Barbour and Davis, 1969; eBird.org, 2023; Feldhamer et al., 2003; Garrett and Dunn, 1981; Hall, 1981; iNaturalist, 2023; Jennings and Hayes, 1994; Stebbins, 2003; Wilson and Ruff, 1999; and Zeiner et al., 1990b.

Conservation Status

Federal designations (Fed): (federal ESA, USFWS).

THR: Federally listed, threatened.

BGEPA: Bald and Golden Eagle Protection Act

State designations (CA): (CESA, CDFW)

END: State listed, endangered.

THR: State listed, threatened.

CAND: Sufficient data are available to support federal listing, but not yet listed.

CSC: California Species of Special Concern. Considered vulnerable to extinction due to declining numbers, limited geographic ranges, or ongoing threats.

WL: Species that were either previously listed as SC and have not been state listed under CESA; or were previously state or federally listed and now are on neither list; or are on the list of "Fully Protected" species.

FP: Fully protected. May not be taken or possessed without permit from CDFW.

WJTCA: Western Joshua Tree Conservation Act

CDFW Natural Diversity Data Base Designations: Applied to special-status plants and sensitive plant communities; where correct category is uncertain, CDFW uses two categories or question marks.

S1: Fewer than 6 occurrences or fewer than 1000 individuals or less than 2000 acres.

S2: 6-20 occurrences or 1,000-3,000 individuals or 2,000-10,000 acres (decimal suffixes same as above).

S3: 21-100 occurrences or 3,000-10,000 individuals or 10,000-50,000 acres (decimal suffixes same as above).

S4: Apparently secure in California; this rank is clearly lower than S3 but factors exist to cause some concern, i.e., there is some threat or somewhat narrow habitat. No threat rank.

S5: Demonstrably secure or ineradicable in California. No threat rank.

SNR: State rank not yet assessed

California Rare Plant Rank designations. Note: According to the California Native Plant Society

(<http://www.cnps.org/cnps/rareplants/ranking.php>), plants ranked as CRPR 1A, 1B, and 2 meet definitions as threatened or endangered and are eligible for state listing. That interpretation of the state Endangered Species Act is not in general use.

1A: Plants presumed extinct in California.

1B: Plants rare and endangered in California and throughout their range.

2A: Plants presumed extinct in California but more common elsewhere in their range.

2B: Plants rare, threatened or endangered in California but more common elsewhere in their range.

3: Plants about which we need more information; a review list.

4: Plants of limited distribution; a watch list.

California Rare Plant Rank Threat designation extensions:

.1 Seriously endangered in California (over 80% of occurrences threatened / high degree and immediacy of threat)

- .2 Fairly endangered in California (20-80% occurrences threatened)
- .3 Not very endangered in California (<20% of occurrences threatened or no current threats known)

Definitions of occurrence probability: Estimated occurrence probabilities are based on literature sources cited earlier, field surveys, and habitat analyses reported here.

Present: Observed on the site by qualified biologists.

High: Habitat is a type often utilized by the species and the site is within the known range of the species.

Moderate: Site is within the known range of the species and habitat on the site is a type occasionally used.

Low: Site is within the species' known range but habitat is rarely used, or the species was not found during focused surveys covering less than 100% of potential habitat or completed in marginal seasons.

Minimal: No suitable habitat on the site; or well outside the species' known elevational or geographic ranges; or a focused study covering 100% of all suitable habitat, completed during the appropriate season and during a year of appropriate rainfall, did not detect the species.

5.1 Special-Status Plants

5.1.1 Listed Threatened or Endangered Plants

This section describes plant species reported from the region that are listed as threatened or endangered under the federal ESA or CESA and are present or have a potential to be present on the project site. Several listed plant species were identified during the literature review. Only one listed plant species was observed or found to have at least a moderate potential to occur.

Western Joshua tree (*Yucca brevifolia*). The western Joshua tree is a State candidate for listing under the CESA. The western Joshua tree is predominantly found in the Mojave Desert, with its northern range extending into Nevada and its southern range extending into the San Gabriel Mountains (USFWS, 2018). They can be found in desert grasslands and shrublands within alluvial fans, plains, bajadas, mesas, and gentle slopes (Gucker, 2006). Western Joshua trees are usually associated with creosote bush and white bursage scrublands at lower elevations (2,461 feet) and with juniper and pinyon woodlands at higher elevations (7,218 feet) (USFWS, 2018). Soils in prime habitat include silts, loams, and/or sands, which are variously described as fine, loose, well drained, and/or gravelly (Gucker, 2006).

Five western Joshua trees were observed within the project site. Four western Joshua trees were observed in the southeastern portion of the project site. One dead individual is located near the center of the project site. Additional western Joshua trees are located along the northern and eastern edges of the project site. Based on CDFW guidance for obtaining take coverage through CESA, it is assumed that the seed bank associated with these trees extends 186-feet from the source trees. Based on this guidance, approximately 13.90 acres of western Joshua tree seedbank are present on the project site in addition to the four live western Joshua trees. The Western Joshua Tree Conservation Act, passed in July of 2023, requires documentation of western Joshua trees within 50 feet of the project footprint in order to limit incidental take of the species. There are currently 19 additional western Joshua trees within 50 feet of the project site. If take coverage is obtained through the Western Joshua Tree Conservation Act, this would include the five trees within the project site and the 19 additional trees within the buffer.

5.1.2 Other Special-Status Plants

In addition to the federal and state endangered species regulations noted above, CDFW and CNPS maintain lists of plants of conservation concern. The CDFW compiles these species including CDFW and CNPS rankings as CRPR 1, 2, 3, or 4 in its compendium of "Special Plants" (CDFW, 2023b). These plants are treated here as "special-status species" and are discussed below. No CRPR 1, 2, or 3 species were identified or have at least a moderate potential to be present. One CRPR 4 species (i.e., a "watch list," not indicating rarity), crowned muilla (*Muilla coronata*), was observed on the northern portion of the project

site and included twenty individual plants scattered among five locations (Attachment 1, Figure 3). No other CRPR 4 species were determined to have at least a moderate potential to occur.

5.2 Special-Status Wildlife

5.2.1 Listed Threatened or Endangered Wildlife

This section includes species listed as threatened or endangered under CESA or FESA which were detected or have a low to high potential to be present on the project site. No listed species are known from the project site, and none were observed during the surveys described in this report. Four State or federally listed species with a low potential to be present are discussed below because they were once more widespread in the region. No designated critical habitat for federally listed wildlife species is present within the project site but is located nearby and is discussed below.

Crotch bumble bee (*Bombus crotchii*). Crotch bumble bee is a State candidate for listing under the CESA. Crotch bumble bee is a widespread secretive species that is known from more than two hundred locations over a broad geographic range (CDFW, 2023a). It is typically found in openings in grassland and scrub habitats where it burrows into the ground and lives in colonies. It feeds on native plants including milkweed, pincushion, lupine, phacelia, sage, snapdragon, clarkia, bush poppy, and buckwheat. Many of these food plants are present on the project site or in the project vicinity, and suitable burrowing habitat is also present. Crotch bumblebee has a low potential to be present on the project site and is known from numerous observations in the region.

Desert tortoise (*Gopherus agassizii*). The desert tortoise is listed as threatened under CESA, and the Mojave population (i.e., west of the Colorado River) is listed as threatened under the federal ESA. The desert tortoise occupies a variety of habitats from flats and slopes, typically characterized by creosote bush scrub at lower elevations, to rocky slopes in blackbrush scrub and juniper woodland ecotones (transition zones) at higher elevations. Throughout most of the Mojave Desert, tortoises occur most commonly on gently sloping terrain with sandy-gravel soils and where there is herbaceous (non-woody) plants and sparse cover of low-growing shrubs. However, surveys at the Nevada Test Site revealed that tortoise sign (e.g., scat, burrows, tracks, shells) was more abundant on upper alluvial fans and lower mountain slopes than on the valley bottom. Soils must be friable (easily crumbled) enough for digging burrows, but firm enough so that burrows do not collapse. In general, desert tortoise populations do not occur above about 4,000 feet, although reliable sources have reported desert tortoises as high as 7,300 feet elevation in Death Valley National Monument. Marginal habitat is present within the project site due to the disturbed nature of the habitat and low amount of suitable forage. No desert tortoise or their burrows were observed during surveys. There are several records of desert tortoise within five miles of the project site but the habitat in the area has been heavily disturbed and fragmented in the recent past. Desert tortoise has a low potential to be present on the project site.

Swainson's Hawk (*Buteo swainsoni*). Swainson's hawks are listed as threatened under the CESA (CDFW, 2023a). In California, they nest in the San Joaquin Valley, western Antelope Valley, western Mojave Desert, and Owens Valley. They migrate to South America every fall and return to California every spring. The foraging habitat of Swainson's hawks is relatively open stands of grass-dominated vegetation and relatively sparse shrublands. Trees are typically widely scattered or found in bands along riparian corridors. Much of the original habitat has been converted to either urban development or cultivated agricultural uses. Swainson's hawks forage in agricultural fields with many types of crops. However, some studies have found that this species is more abundant in areas of moderate agricultural development than in either grassland or areas of extensive agricultural development. Alfalfa fields are routinely used by

foraging Swainson's hawks. Orchards and vineyards in general are not suitable foraging habitat for Swainson's hawk due to the dense woody cover (Zeiner et al, 1990a). The primary nest trees in the western Mojave Desert are Joshua trees and Fremont cottonwoods (*Populus fremontii*), but other large trees could also be used, especially were planted in narrow bands such as agricultural windbreaks (e.g., cottonwoods).

Swainson's hawks are observed occasionally in the vicinity of the project site during migration. Several Swainson's hawks have been reported from the region during the nesting season (eBird, 2023). The project site lacks suitable nesting habitat, but Joshua trees suitable for nesting are present to the north and east of the project site. Swainson's hawks have a low potential to nest and forage within 0.5-miles of the project site.

Mohave ground squirrel (*Xerospermophilus mohavensis*). The Mohave ground squirrel is a small rodent endemic to the western Mojave Desert in San Bernardino, Los Angeles, Kern, and Inyo Counties (Best, 1995). It was first listed as rare under the CESA in 1971 and was later reclassified as "Threatened" in 1984 (§670.5(b)(6)(A), T14, CCR) (Leitner, 2008). Generally, little is still known about the habitat requirements and extent of the current range of this species, especially in the southwestern Mojave (Leitner, 2015; Leitner and Leitner, 2017). The Mohave ground squirrel is rare throughout its range and typically occurs in desert scrub habitats, usually on flat to gently sloping terrain with alluvial soils (Best, 1995). They can also be found in alkali desert scrub, Joshua tree woodland, and annual grassland habitats (CDFW, 2023a). Optimal habitats typically have sandy to gravelly soils which allows them to dig burrows, which are frequently excavated at the base of shrubs. Mohave ground squirrels can be found between 1,800- and 5,000-feet elevation. They typically forage on perennial shrub foliage such as winterfat (*Krascheninnikovia lanata*), spiny hopsage (*Grayia spinosa*), and saltbushes (*Atriplex* spp.), as well as annual leaves, seeds, flowers, and pollen from annual forbs and herbaceous plants (Leitner and Leitner, 2017).

Suitable habitat for Mojave ground squirrel is limited within the project site and is highly disturbed. There is also a lack of forage species, and the presence of California ground squirrel (*Otospermophilus beecheyi*) presents strong competition. No Mohave ground squirrels, or potential burrows were observed on the project site. A recent record for the species is located approximately one mile to the west of the project site, but the habitat has been heavily developed and fragmented and Mohave ground squirrel has a low potential to occur within the project site.

5.2.2 Species Protected Under the Federal Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (16 U.S.C. §§ 668-668d; BGEPA) prohibits take of bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*). The BGEPA defines *take* to include "pursuing, shooting, shooting at, poisoning, wounding, killing, capturing, trapping, collecting, molesting, and disturbing." The USFWS (2007) further defines *disturb* as "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior."

Both bald eagle and golden eagle are observed periodically in the region but are not expected to utilize the project site for nesting because no nesting habitat is present. Bald eagles are not expected to forage on the site because of a lack of suitable prey items and golden eagles have a moderate potential to forage on the site given the small area of the project site and the limited amount of prey items.

5.2.3 California Wildlife Species of Special Concern

Coast Horned Lizard (*Phrynosoma blainvillii*). The coast horned lizard is a CDFW Species of Special Concern. The coast horned lizard occurs in a wide variety of habitats throughout its range, though is found primarily in chaparral and mixed chaparral-coastal sage scrub, to stands of pure coastal sage scrub. It is also known to occur in riparian habitats, washes, and most desert habitats. They are occasionally locally abundant in conifer-hardwood and conifer forests. This species is most common in open, sandy areas where abundant populations of native ant species (e.g., *Pogonomyrmex* and *Messor* spp.) are present. Suitable habitat is present at the project site for this species, and multiple records of the species are located within a mile of the project site. There is a moderate potential for coast horned lizard to be present on the project site.

Burrowing owl (*Athene cunicularia*). The burrowing owl is a CDFW Species of Special Concern. Burrowing owl are uncommon throughout much of southern California with the highest densities occurring near agricultural lands in the Imperial Valley. Burrowing owls are yearlong residents of flat, open, dry grassland and desert habitats at lower elevations (Bates, 2006). They typically inhabit annual and perennial grasslands and scrublands characterized by low-growing vegetation and may occur in areas that include trees and shrubs if the cover is less than 30% (Bates, 2006); however, they prefer treeless grasslands. Although burrowing owls prefer large, contiguous areas of treeless grasslands, they have also been observed in fallow agriculture fields, golf courses, cemeteries, road allowances, airports, vacant lots in residential areas, and fairgrounds when nest burrows are present (Bates 2006). The availability of numerous small mammal burrows, such as those of California ground squirrel (*Otospermophilus beecheyi*), is a major factor in determining whether an area with apparently suitable habitat supports burrowing owls (Coulombe, 1971). No burrowing owl or their burrows were observed on the project site. However, the habitat at the project site is suitable for this species and more than 40 ground squirrel burrows were observed within the project site that provide suitable burrowing owl burrows (see Figure 3). Records of breeding and wintering burrowing owls are located within a mile of the project site. There is a moderate potential for burrowing owls to nest within the project site and high potential for them to forage or overwinter on the project site.

Loggerhead shrike (*Lanius ludovicianus*). The loggerhead shrike is a CDFW Species of Special Concern. The loggerhead shrike prefers open habitats with scattered shrubs, trees, posts, fences, utility lines, or other perches. This species most often occurs in open-canopied valley foothill hardwood forests, valley-foothill hardwood-conifer forests, valley foothill riparian, pinyon-juniper woodlands, desert riparian, and Joshua tree habitats. Nests are typically constructed in well-concealed microsites in densely foliated trees or shrubs (Miller, 1931; Bent, 1950). This species preys primarily on large insects, but will also take small birds, mammals, amphibians, reptiles, fish, carrion, and various invertebrates. Loggerhead shrikes often impale their prey on barbed wire or other sharp objects. Suitable habitat is present at the project site for this species, and multiple records of the species are located within two miles of the project site. There is a moderate to high potential for loggerhead shrike to be present on the site.

Le Conte's thrasher (*Toxostoma lecontei*). The Le Conte's thrasher is a CDFW Species of Special Concern. Sparse desert scrub such as creosote bush, Joshua tree, and saltbush scrubs, or sandy-soiled cholla-dominated vegetation. Nests in dense, spiny shrubs or densely branched cactus in desert wash habitat. The Le Conte's thrasher forages on the ground for insects and spiders, as well as some seeds and berries. Suitable habitat is present at the project site for this species, and records of the species are located within two miles of the project site. There is a low to moderate potential for Le Conte's thrasher to be present on the site.

5.2.3 Other Special-Status Wildlife Species

Raptors: One additional special-status bird of prey is found throughout the region. Cooper's hawk (*Accipiter cooperii*; CDFW Watch List species), is known to nest in urban areas of Southern California and forages on birds. Suitable foraging habitat for Cooper's hawk is present within the project site. Cooper's hawks have a moderate potential to forage within the project site.

5.3 Designated Critical Habitat

The literature review conducted prior to conducting field surveys determined that the project site is not within federally designated critical habitat for any species. The nearest designated critical habitat is for arroyo toad (*Anaxyrus californicus*) and is located approximately nine miles south of the project site (USFWS, 2023b).

5.4 Native Birds: Migratory Bird Treaty Act (MBTA) / California Fish and Game Code

The federal MBTA prohibits take of any migratory bird, including eggs or active nests, except as permitted by regulation (e.g., licensed hunting of waterfowl or upland game species). Under the MBTA, "migratory bird" is broadly defined as "any species or family of birds that live, reproduce or migrate within or across international borders at some point during their annual life cycle" and thus applies to most native bird species. California Fish and Game Code Section 3503 prohibits take, possession, or needless destruction of bird nests or eggs; Section 3503.5 prohibits take or possession of birds of prey or their eggs; and Section 3513 prohibits take or possession of any migratory nongame bird. Except for a few non-native birds, such as European starling (*Sturnus vulgaris*), the take of any birds or loss of active bird nests or young is regulated by these statutes. Most of these species have no other special conservation status as defined above.

The project site has trees, shrubs, and open areas that may provide nesting habitat. Numerous common and special-status birds are known to nest in the area and many of these are likely to nest on the project site. No active nests were observed during the biological surveys.

Many adult birds would flee from equipment during project construction; however, nestlings and eggs would be vulnerable. If project activities include site grading or brush removal during nesting season, then it would likely destroy bird nests, including eggs or nestling birds. For most birds, these impacts can be avoided by scheduling initial clearing and grading outside the nesting season. Or, if initial clearing and grading are undertaken during nesting season, work may be limited only to areas where no nesting birds are present, as documented by pre-construction nest surveys.

Some birds are likely to nest in the project site during construction, even after initial grading and clearing have been completed. Depending on the species, birds may nest on the ground; in adjacent vegetation; or on construction equipment that is left overnight or during a long weekend. The species most likely to nest in the project site during construction are common ravens (*Corvus corax*), house finches (*Haemorhous mexicanus*), killdeer (*Charadrius vociferus*), and mourning doves (*Zenaida macroura*), all of which are protected by the MBTA and Fish and Game Code. Due to the high probability that birds may nest on site during construction, regular monitoring and nest site management may be necessary throughout the breeding season.

5.5 Wildlife Movement

The ability for wildlife to move freely among populations and habitat areas is important to long-term genetic variation and demography. Fragmentation and isolation of natural habitat may cause loss of native species diversity in fragmented habitats. In the short term, wildlife movement may also be important to individual animals' ability to occupy their home ranges, if their ranges extend across a potential movement barrier. These considerations are especially important for rare, threatened, or endangered species, and wide-ranging species such as large mammals, which exist in low population densities.

The California Essential Habitat Connectivity Project was commissioned by the California Department of Transportation (Caltrans) and CDFW to create a statewide assessment of essential habitat connectivity to be used for conservation and infrastructure planning (Caltrans and CDFW, 2010). One of its goals was to create the Essential Connectivity Map, which depicts large, relatively natural habitat blocks that support native biodiversity (natural landscape blocks) and areas essential for ecological connectivity between them (essential connectivity areas). This map does not reflect the needs of particular species but is based on overall biological connectivity and ecological integrity. A more detailed analysis is required to assess local and regional needs for connectivity and develop linkage designs based on the requirements of individual species (Caltrans and CDFW, 2010). The project site is not located within any identified Essential Habitat Connectivity Areas or Natural Landscape Blocks. The project site is more likely to support more localized movement within the region, with some species such as coyotes (*Canis latrans*), black-tailed jackrabbits (*Lepus californicus*), and desert cottontails (*Sylvilagus audubonii*) occupying the project site and radiating out into the adjacent development to forage.

6.0 Conclusions

No State and federally listed wildlife species are known from the project site or the immediate vicinity. Several State and federally listed species are known from the region and have a low potential to be present. These include Crotch's bumble bee, desert tortoise, Swainson's hawk, and Mohave ground squirrel.

No special-status wildlife species were observed, but several species have at least a moderate potential to be present and include coast horned lizard, burrowing owl, loggerhead shrike, Le Conte's thrasher, and Cooper's hawk (refer to Table 3).

In addition to special-status wildlife, one State listed special-status plant, western Joshua tree, was identified within the project site. No additional State or federally listed species are known from the project site or the immediate vicinity. One CNPS Rank 4 species, crowned muilla, is present on the project site. No additional special-status plants were identified within the vicinity of the project were determined to have at least a moderate potential to occur.

One sensitive natural community, Joshua Tree Woodland was identified within the project. The project site is not within any designated wildlife corridors but is expected to provide localized wildlife movement in the immediate surrounding. The project site is likely to be used as a forage or dispersal area for wildlife in the immediate vicinity of the project site.

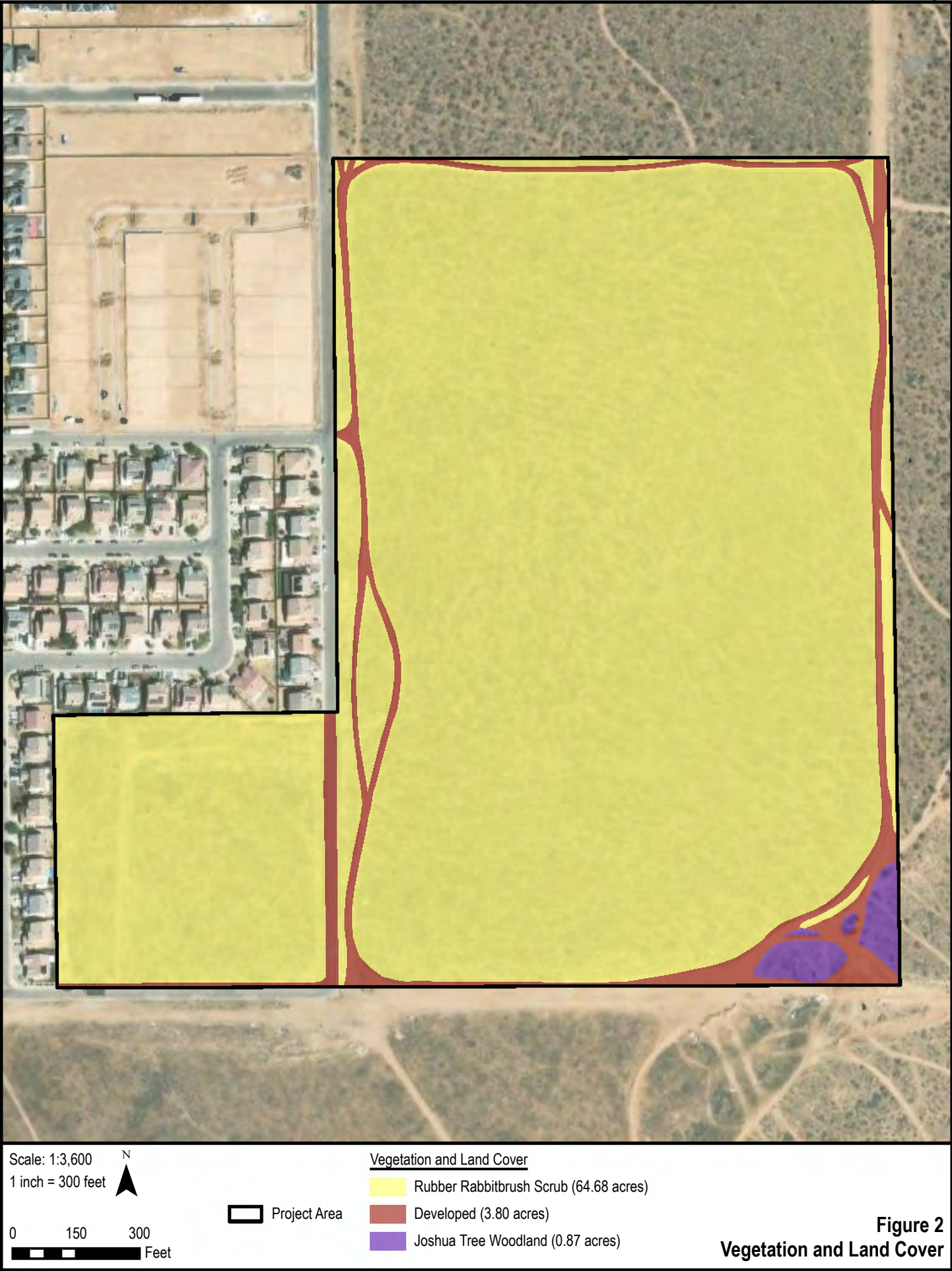
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Attachment 1 – Figures





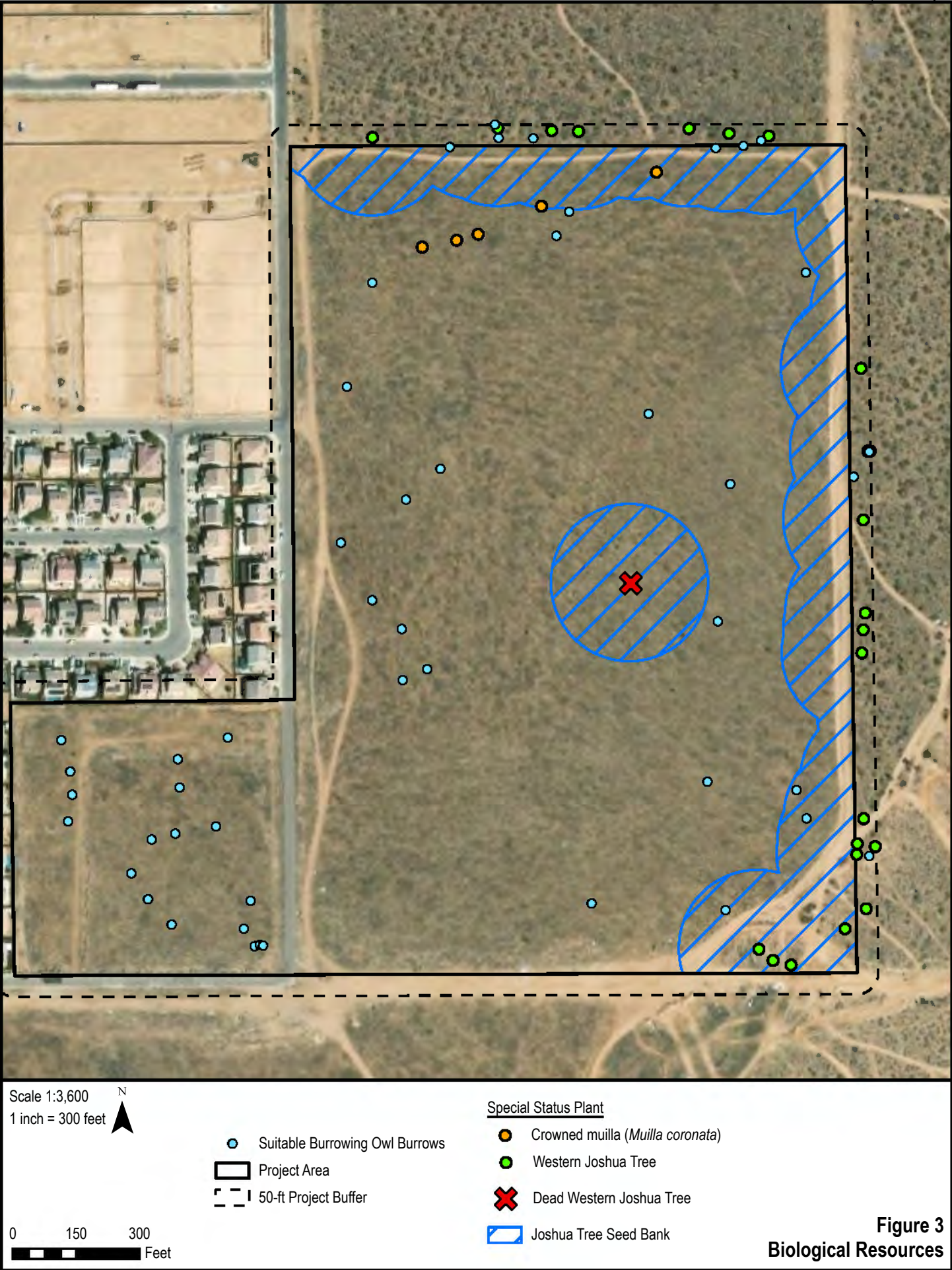


Figure 3
Biological Resources

Attachment 2 – CNDDDB Query Results



Selected Elements by Scientific Name
California Department of Fish and Wildlife
California Natural Diversity Database



Query Criteria: Quad(Adelanto (3411754) OR Baldy Mesa (3411744) OR Cajon (3411734) OR Hesperia (3411743) OR Phelan (3411745) OR Shadow Mountains SE (3411755) OR Silverwood Lake (3411733) OR Telegraph Peak (3411735) OR Victorville (3411753))

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
<i>Accipiter cooperii</i> Cooper's hawk	ABNKC12040	None	None	G5	S4	WL
<i>Agelaius tricolor</i> tricolored blackbird	ABPBXB0020	None	Threatened	G1G2	S2	SSC
<i>Anaxyrus californicus</i> arroyo toad	AAABB01230	Endangered	None	G2G3	S2	SSC
<i>Antrozous pallidus</i> pallid bat	AMACC10010	None	None	G4	S3	SSC
<i>Aphyllon validum ssp. validum</i> Rock Creek broomrape	PDORO040G2	None	None	G4T2	S2	1B.2
<i>Aquila chrysaetos</i> golden eagle	ABNKC22010	None	None	G5	S3	FP
<i>Artemisiospiza belli belli</i> Bell's sparrow	ABPBX97021	None	None	G5T2T3	S3	WL
<i>Asclepias nyctaginifolia</i> Mojave milkweed	PDASC02190	None	None	G4?	S2	2B.1
<i>Asio otus</i> long-eared owl	ABNSB13010	None	None	G5	S3?	SSC
<i>Aspidoscelis tigris stejnegeri</i> coastal whiptail	ARACJ02143	None	None	G5T5	S3	SSC
<i>Astragalus lentiginosus var. antonius</i> San Antonio milk-vetch	PDFAB0FB92	None	None	G5T2	S2	1B.3
<i>Athene cunicularia</i> burrowing owl	ABNSB10010	None	None	G4	S2	SSC
<i>Batrachoseps gabrieli</i> San Gabriel slender salamander	AAAAD02110	None	None	G2G3	S2S3	
<i>Bombus crotchii</i> Crotch bumble bee	IIHYM24480	None	Candidate Endangered	G2	S2	
<i>Botrychium ascendens</i> upswept moonwort	PPOPH010S0	None	None	G4	S2	2B.3
<i>Botrychium crenulatum</i> scalloped moonwort	PPOPH010L0	None	None	G4	S3	2B.2
<i>Buteo swainsoni</i> Swainson's hawk	ABNKC19070	None	Threatened	G5	S4	
<i>Calochortus palmeri var. palmeri</i> Palmer's mariposa-lily	PMLIL0D122	None	None	G3T2	S2	1B.2



Selected Elements by Scientific Name
California Department of Fish and Wildlife
California Natural Diversity Database



Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
<i>Calochortus plummerae</i> Plummer's mariposa-lily	PMLIL0D150	None	None	G4	S4	4.2
<i>Canbya candida</i> white pygmy-poppy	PDPAP05020	None	None	G3G4	S3S4	4.2
<i>Castilleja lasiorhyncha</i> San Bernardino Mountains owl's-clover	PDSCR0D410	None	None	G2?	S2?	1B.2
<i>Chaetodipus fallax pallidus</i> pallid San Diego pocket mouse	AMAFD05032	None	None	G5T3T4	S3S4	
<i>Charina umbratica</i> southern rubber boa	ARADA01011	None	Threatened	G2G3	S2	
<i>Chorizanthe xanti var. leucotheca</i> white-bracted spineflower	PDPGN040Z1	None	None	G4T3	S3	1B.2
<i>Claytonia peirsonii ssp. peirsonii</i> Peirson's spring beauty	PDPOR03121	None	None	G2G3T2	S2	1B.2
<i>Coccyzus americanus occidentalis</i> western yellow-billed cuckoo	ABNRB02022	Threatened	Endangered	G5T2T3	S1	
<i>Corynorhinus townsendii</i> Townsend's big-eared bat	AMACC08010	None	None	G4	S2	SSC
<i>Deinandra mohavensis</i> Mojave tarplant	PDAST4R0K0	None	Endangered	G3	S3	1B.3
<i>Diadophis punctatus modestus</i> San Bernardino ringneck snake	ARADB10015	None	None	G5T2T3	S2?	
<i>Diplacus mohavensis</i> Mojave monkeyflower	PDSCR1B1V0	None	None	G2	S2	1B.2
<i>Empidonax traillii extimus</i> southwestern willow flycatcher	ABPAE33043	Endangered	Endangered	G5T2	S3	
<i>Emys marmorata</i> western pond turtle	ARAAD02030	None	None	G3G4	S3	SSC
<i>Eremothera boothii ssp. boothii</i> Booth's evening-primrose	PDONA03052	None	None	G5T4	S3	2B.3
<i>Euchloe hyantis andrewsi</i> Andrew's marble butterfly	IILEPA5032	None	None	G4G5T1	S2	
<i>Eumops perotis californicus</i> western mastiff bat	AMACD02011	None	None	G4G5T4	S3S4	SSC
<i>Euphydryas editha quino</i> quino checkerspot butterfly	IILEPK405L	Endangered	None	G5T1T2	S1S2	
<i>Glaucomys oregonensis californicus</i> San Bernardino flying squirrel	AMAFB09021	None	None	G5T1T2	S1S2	SSC
<i>Gopherus agassizii</i> desert tortoise	ARAAF01012	Threatened	Threatened	G3	S2S3	
<i>Haliaeetus leucocephalus</i> bald eagle	ABNKC10010	Delisted	Endangered	G5	S3	FP



Selected Elements by Scientific Name
California Department of Fish and Wildlife
California Natural Diversity Database



Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
<i>Helianthus nuttallii</i> ssp. <i>parishii</i> Los Angeles sunflower	PDAST4N102	None	None	G5TX	SX	1A
<i>Helminthoglypta mohaveana</i> Victorville shoulderband	IMGASC2340	None	None	G1	S1	
<i>Helminthoglypta taylori</i> westfork shoulderband	IMGASC2640	None	None	G1	S1	
<i>Heuchera parishii</i> Parish's alumroot	PDSAX0E1F0	None	None	G3	S3	1B.3
<i>Icaricia saepiolus aureolus</i> San Gabriel Mountains blue butterfly	IILEPG6011	None	None	G5T1	S1	
<i>Icteria virens</i> yellow-breasted chat	ABPBX24010	None	None	G5	S4	SSC
<i>Juniperella mirabilis</i> juniper metallic wood-boring beetle	IICOLX9010	None	None	G1	S1	
<i>Lanius ludovicianus</i> loggerhead shrike	ABPBR01030	None	None	G4	S4	SSC
<i>Lasiurus cinereus</i> hoary bat	AMACC05032	None	None	G3G4	S4	
<i>Lilium parryi</i> lemon lily	PMLIL1A0J0	None	None	G3	S3	1B.2
<i>Linanthus concinnus</i> San Gabriel linanthus	PDPLM090D0	None	None	G2	S2	1B.2
<i>Loeflingia squarrosa</i> var. <i>artemisiarum</i> sagebrush loeflingia	PDCAR0E011	None	None	G5T3	S2	2B.2
<i>Lycium parishii</i> Parish's desert-thorn	PDSOL0G0D0	None	None	G4	S1	2B.3
<i>Microtus californicus mohavensis</i> Mohave river vole	AMAFF11031	None	None	G5T1	S1	SSC
<i>Monardella australis</i> ssp. <i>jokerstii</i> Jokerst's monardella	PDLAM18112	None	None	G4T1?	S1?	1B.1
<i>Muhlenbergia californica</i> California muhly	PMPOA480A0	None	None	G4	S4	4.3
<i>Neotamias speciosus speciosus</i> lodgepole chipmunk	AMAFB02172	None	None	G4T3T4	S2	
<i>Opuntia basilaris</i> var. <i>brachyclada</i> short-joint beavertail	PDCAC0D053	None	None	G5T3	S3	1B.2
<i>Oreonana vestita</i> woolly mountain-parsley	PDAP11G030	None	None	G3	S3	1B.3
<i>Ovis canadensis nelsoni</i> desert bighorn sheep	AMALE04013	None	None	G4T4	S3	FP
<i>Palaeoxenus dohrni</i> Dohrn's elegant eucnemid beetle	IICOL5K010	None	None	G3?	S1S2	



Selected Elements by Scientific Name
California Department of Fish and Wildlife
California Natural Diversity Database



Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
<i>Pandion haliaetus</i> osprey	ABNKC01010	None	None	G5	S4	WL
<i>Pedionelasma castoreum</i> Beaver Dam breadroot	PDFAB5L050	None	None	G3	S2	1B.2
<i>Phrynosoma blainvillii</i> coast horned lizard	ARACF12100	None	None	G4	S4	SSC
<i>Piranga rubra</i> summer tanager	ABPBX45030	None	None	G5	S1	SSC
<i>Plebulina emigdionis</i> San Emigdio blue butterfly	IILEPG7010	None	None	G1G2	S1S2	
<i>Rana draytonii</i> California red-legged frog	AAABH01022	Threatened	None	G2G3	S2S3	SSC
<i>Rana muscosa</i> southern mountain yellow-legged frog	AAABH01330	Endangered	Endangered	G1	S2	WL
<i>Rhinichthys osculus ssp. 8</i> Santa Ana speckled dace	AFCJB3705K	None	None	G5T1	S1	SSC
<i>Schoenus nigricans</i> black bog-rush	PMCYP0P010	None	None	G4	S2	2B.2
<i>Scutellaria bolanderi ssp. austromontana</i> southern mountains skullcap	PDLAM1U0A1	None	None	G4T3	S3	1B.2
<i>Setophaga petechia</i> yellow warbler	ABPBX03010	None	None	G5	S3	SSC
<i>Siphateles bicolor mohavensis</i> Mohave tui chub	AFCJB1303H	Endangered	Endangered	G4T1	S1	FP
<i>Southern Sycamore Alder Riparian Woodland</i> Southern Sycamore Alder Riparian Woodland	CTT62400CA	None	None	G4	S4	
<i>Symphyotrichum defoliatum</i> San Bernardino aster	PDASTE80C0	None	None	G2	S2	1B.2
<i>Symphyotrichum greatae</i> Greata's aster	PDASTE80U0	None	None	G2	S2	1B.3
<i>Taxidea taxus</i> American badger	AMAJF04010	None	None	G5	S3	SSC
<i>Thamnophis hammondi</i> two-striped gartersnake	ARADB36160	None	None	G4	S3S4	SSC
<i>Toxostoma lecontei</i> Le Conte's thrasher	ABPBK06100	None	None	G4	S3	SSC
<i>Vireo bellii pusillus</i> least Bell's vireo	ABPBW01114	Endangered	Endangered	G5T2	S3	
<i>Vireo vicinior</i> gray vireo	ABPBW01140	None	None	G5	S2	SSC
<i>Xerospermophilus mohavensis</i> Mohave ground squirrel	AMAFB05150	None	Threatened	G3	S2	

Record Count: 81

Attachment 3 – IPaC Resource List

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

San Bernardino County, California



Local office

Carlsbad Fish And Wildlife Office

☎ (760) 431-9440

📠 (760) 431-5901

2177 Salk Avenue - Suite 250

<https://ipac.ecosphere.fws.gov/location/IVZKGG4DBVERDK4JZCHM2SESUM/resources>

Carlsbad, CA 92008-7385

NOT FOR CONSULTATION

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species¹ and their critical habitats are managed by the [Ecological Services Program](#) of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries²).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact [NOAA Fisheries](#) for [species under their jurisdiction](#).

-
1. Species listed under the [Endangered Species Act](#) are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the [listing status page](#) for more information. IPaC only shows species that are regulated by USFWS (see FAQ).

2. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Birds

NAME	STATUS
Least Bell's Vireo <i>Vireo bellii pusillus</i> Wherever found There is final critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/5945	Endangered
Southwestern Willow Flycatcher <i>Empidonax traillii extimus</i> Wherever found There is final critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/6749	Endangered

Reptiles

NAME	STATUS
Desert Tortoise <i>Gopherus agassizii</i> There is final critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/4481	Threatened

Amphibians

NAME	STATUS
Arroyo (=arroyo Southwestern) Toad <i>Anaxyrus californicus</i> Wherever found There is final critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/3762	Endangered

Insects

NAME	STATUS
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Monarch Butterfly *Danaus plexippus*

Candidate

Wherever found

No critical habitat has been designated for this species.

<https://ecos.fws.gov/ecp/species/9743>

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

There are no critical habitats at this location.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act¹ and the Bald and Golden Eagle Protection Act².

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described [below](#).

1. The [Migratory Birds Treaty Act](#) of 1918.
2. The [Bald and Golden Eagle Protection Act](#) of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern <https://www.fws.gov/program/migratory-birds/species>
- Measures for avoiding and minimizing impacts to birds
<https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds>
- Nationwide conservation measures for birds
<https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf>

The birds listed below are birds of particular concern either because they occur on the [USFWS Birds of Conservation Concern](#) (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ [below](#). This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the [E-bird data mapping tool](#) (Tip: enter your location, desired date

range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found [below](#).

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
California Thrasher <i>Toxostoma redivivum</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Jan 1 to Jul 31
Costa's Hummingbird <i>Calypte costae</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9470	Breeds Jan 15 to Jun 10
Lawrence's Goldfinch <i>Carduelis lawrencei</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9464	Breeds Mar 20 to Sep 20
Western Grebe <i>Aechmophorus occidentalis</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/6743	Breeds Jun 1 to Aug 31

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey

effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is $0.25/0.25 = 1$; at week 20 it is $0.05/0.25 = 0.2$.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

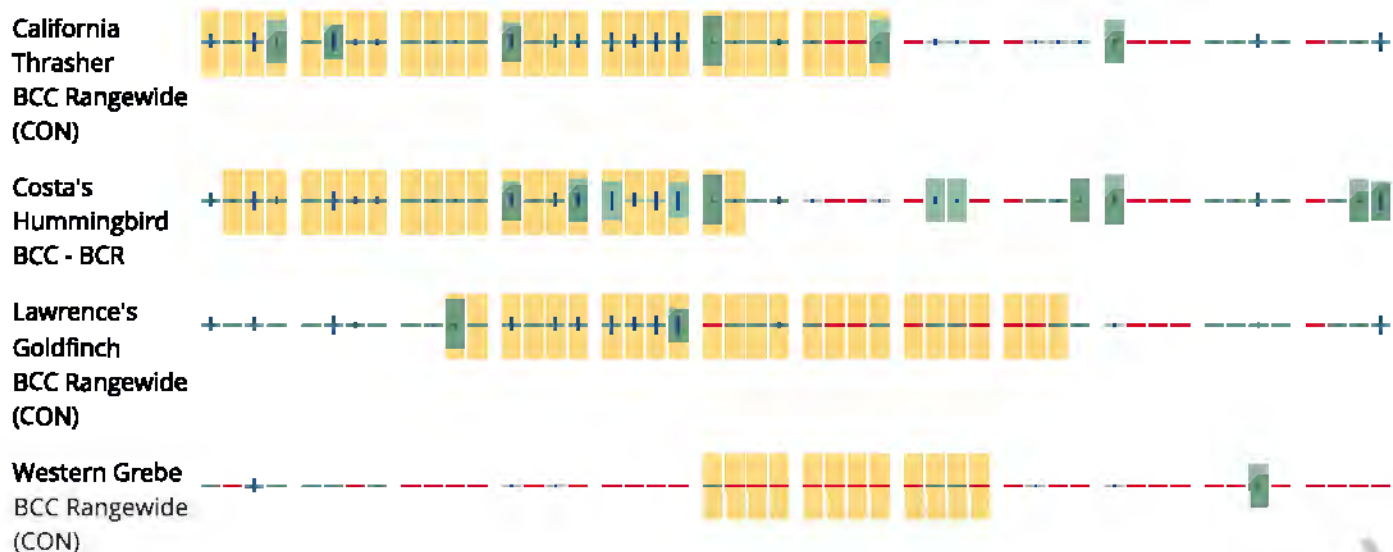
No Data (—)

A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.





Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

[Nationwide Conservation Measures](#) describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. [Additional measures](#) or [permits](#) may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of USFWS [Birds of Conservation Concern \(BCC\)](#) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle ([Eagle Act](#) requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the [Rapid Avian Information Locator \(RAIL\) Tool](#).

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the [Avian Knowledge Network \(AKN\)](#). This data is derived from a growing collection of [survey, banding, and citizen science datasets](#).

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the [RAIL Tool](#) and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are [Birds of Conservation Concern](#) (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the [Eagle Act](#) requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the [Northeast Ocean Data Portal](#). The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the [NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf](#) project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the [Diving Bird Study](#) and the [nanotag studies](#) or contact [Caleb Spiegel](#) or [Pam Loring](#).

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to [obtain a permit](#) to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the [National Wildlife Refuge](#) system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

There are no refuge lands at this location.

Fish hatcheries

There are no fish hatcheries at this location.

Wetlands in the National Wetlands Inventory

(NWI)

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

Wetland information is not available at this time

This can happen when the National Wetlands Inventory (NWI) map service is unavailable, or for very large projects that intersect many wetland areas. Try again, or visit the [NWI map](#) to view wetlands at this location.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tubercid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should

seek the advice of appropriate Federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

NOT FOR CONSULTATION

Attachment 4 – Special-status Species Not Addressed

Attachment 4. Special-Status Species Not Addressed¹

Latin Name	Common Name	Reason for Exclusion
PLANTS		
<i>Acanthoscyphus parishii</i> var. <i>parishii</i>	Parish's oxytheca	Well below elevational range.
<i>Allium howellii</i> var. <i>clokeyi</i>	Mt. Pinos onion	Well below elevational range.
<i>Allium parishii</i>	Parish's onion	No suitable rocky soils.
<i>Androsace elongata</i> ssp. <i>acuta</i>	California androsace	Well outside of the geographic range.
<i>Aphyllon validum</i> ssp. <i>validum</i>	Rock Creek broomrape	Well outside of the geographic range.
<i>Asclepias nyctaginifolia</i>	Mojave milkweed	Well outside of the geographic range.
<i>Astragalus lentiginosus</i> var. <i>antonius</i>	San Antonio milk-vetch	No suitable coniferous forest habitat.
<i>Azolla microphylla</i>	Mexican mosquito fern	No suitable wetland habitat.
<i>Boechera dispar</i>	Pinyon rockcress	Well below elevational range.
<i>Botrychium ascendens</i>	Upswept moonwort	Well below elevational range.
<i>Botrychium crenulatum</i>	Scalloped moonwort	Well below elevational range.
<i>Calochortus palmeri</i> var. <i>palmeri</i>	Palmer's mariposa-lily	Well outside of the geographic range.
<i>Calochortus plummerae</i>	Plummer's mariposa-lily	Well outside of the geographic range.
<i>Castilleja lasiorhyncha</i>	San Bernardino Mountains owl's-clover	Well below elevational range.
<i>Castilleja plagiotoma</i>	Mojave paintbrush	No suitable woodland habitat.
<i>Chorizanthe spinosa</i>	Mojave spineflower	No suitable alkaline soils.
<i>Chorizanthe xanti</i> var. <i>leucotheca</i>	White-bracted spineflower	Well outside of the geographic range.
<i>Claytonia peirsonii</i> ssp. <i>peirsonii</i>	Peirson's spring beauty	Well below elevational range.
<i>Cymopterus deserticola</i>	Desert cymopterus	No suitable sandy soils.
<i>Deinandra mohavensis</i>	Mojave tarplant	No suitable chaparral, coastal or riparian scrub habitat.
<i>Diplacus johnstonii</i>	Johnston's monkeyflower	No suitable montane coniferous forest.
<i>Diplacus mohavensis</i>	Mojave monkeyflower	No suitable gravelly soils or washes.
<i>Dudleya abramsii</i> ssp. <i>affinis</i>	San Bernardino Mountains dudleya	Well below elevational range.
<i>Eremothera boothii</i> ssp. <i>boothii</i>	Booth's evening-primrose	No suitable woodland habitat.
<i>Erigeron parishii</i>	Parish's daisy	No suitable carbonate soils.
<i>Eriophyllum lanatum</i> var. <i>obovatum</i>	Southern Sierra woolly sunflower	Well below elevational range.
<i>Eriophyllum lanatum</i> var. <i>obovatum</i>	Southern Sierra woolly sunflower	No suitable coniferous forest habitat.
<i>Fimbristylis thermalis</i>	Hot springs fimbristylis	No suitable hot spring habitat.
<i>Frasera neglecta</i>	Pine green-gentian	Well below elevational range.
<i>Galium johnstonii</i>	Johnston's bedstraw	No suitable chaparral or woodland habitat.
<i>Helianthus nuttallii</i> ssp. <i>parishii</i>	Los Angeles sunflower	No suitable wetland habitat.
<i>Heuchera parishii</i>	Parish's alumroot	Well below elevational range.
<i>Ivesia argyrocoma</i> var. <i>argyrocoma</i>	Silver-haired ivesia	Well below elevational range.
<i>Johnstonella costata</i>	Ribbed cryptantha	Well above elevational range.
<i>Juglans californica</i>	Southern California black walnut	No suitable chaparral or woodland habitat.
<i>Juncus duranii</i>	Duran's rush	No suitable wetland habitat.
<i>Lilium humboldtii</i> ssp. <i>ocellatum</i>	Ocellated Humboldt lily	No suitable chaparral or woodland habitat.
<i>Lilium parryi</i>	Lemon lily	Well below elevational range.
<i>Linanthus concinnus</i>	San Gabriel linanthus	Well below elevational range.
<i>Loetlingia squarrosa</i> var. <i>artemisiarum</i>	Sagebrush loetlingia	No suitable sandy soils.
<i>Lycium parishii</i>	Parish's desert storm	Conspicuous species not observed.
<i>Lycium torreyi</i>	Torrey's box-thorn	Conspicuous species not observed.

Attachment 4. Special-Status Species Not Addressed¹

Latin Name	Common Name	Reason for Exclusion
<i>Monardella australis</i> ssp. <i>jokerstii</i>	Jokerst's monardella	Well below elevational range.
<i>Muhlenbergia californica</i>	California muhly	No suitable streambanks or rocky slopes.
<i>Nemacladus gracilis</i>	Slender nemacladus	No suitable cismontane or grassland habitat.
<i>Oreonana vestita</i>	Woolly mountain-parsley	Well below elevational range.
<i>Orobanche valida</i> ssp. <i>valida</i>	Rock creek broomrape	No suitable granite soils.
<i>Packera ionophylla</i>	Tehachapi ragwort	No suitable montane coniferous forest.
<i>Pentachaeta aurea</i> ssp. <i>aurea</i>	Golden-rayed pentachaeta	No suitable woodland, chaparral, or coastal scrub habitat.
<i>Perideridia parishii</i> ssp. <i>parishii</i>	Parish's yampah	No suitable montane coniferous forest.
<i>Phacelia exilis</i>	Transverse Range phacelia	No suitable montane coniferous forest.
<i>Phacelia mohavensis</i>	Mojave phacelia	No suitable woodland habitat.
<i>Romneya coulteri</i>	Coulter's matilija poppy	No suitable coastal scrub or chaparral habitat.
<i>Saltugilia latimeri</i>	Latimer's woodland-gilia	No suitable arid mountains and foothill habitat.
<i>Schoenus nigricans</i>	Black bog-rush	No suitable wetland habitat.
<i>Sclerocactus polyancistrus</i>	Mojave fish-hook cactus	Conspicuous species not observed.
<i>Scutellaria bolanderi</i> ssp. <i>austromontana</i>	Southern mountains skullcap	No mesic chaparral and woodlands.
<i>Selaginella asprella</i>	Bluish spike-moss	No suitable montane coniferous forest.
<i>Sidothea caryophylloides</i>	Chickweed oxytheca	No suitable montane coniferous forest.
<i>Streptanthus bernardinus</i>	Laguna Mountains jewelflower	No suitable chaparral habitat.
<i>Symphyotrichum defoliatum</i>	San Bernardino aster	No suitable meadow habitat.
<i>Symphyotrichum greatae</i>	Greata's aster	No suitable mesic canyon habitat.
<i>Trichostema micranthum</i>	Small-flowered bluecurls	No suitable montane coniferous forest.
INVERTEBRATES		
<i>Euchloe hyantis andrewsi</i>	Andrew's marble butterfly	No suitable shrubland and woodland habitat.
<i>Euphydryas editha quino</i>	Quino checkerspot butterfly	No suitable coastal scrub and chaparral habitat.
<i>Helminthoglypta mohaveans</i>	Victorville shoulderband	No suitable rock outcrops.
<i>Helminthoglypta taylori</i>	Westfork shoulderband	Well outside of geographical range.
<i>Icaricia saepiolus aureolus</i>	San Gabriel Mountains blue butterfly	No suitable wet meadow habitat.
<i>Juniperella mirabilis</i>	Juniper metallic wood-boring beetle	No Juniper woodland habitat.
<i>Palaeoxenus dohrni</i>	Dohrn's elegant eucernid beetle	No suitable coniferous woodland habitat.
<i>Plebulina emigdonis</i>	San Emigdio blue butterfly	No suitable saltbush scrub habitat.
FISHES		
<i>Rhinichthys osculus</i> ssp. 8	Santa Ana Speckled dace	No suitable aquatic habitat.
<i>Siphateles bicolor mohavnesis</i>	Mohave tui chub	No suitable aquatic habitat.
AMPHIBIANS		
<i>Anaxyrus californicus</i>	Arroyo toad	No suitable wash habitat.
<i>Batrachoseps gabrielli</i>	San Gabriel slender salamander	No suitable talus habitat.
<i>Rana draytonii</i>	California red-legged frog	No suitable aquatic habitat.
<i>Rana mucosa</i>	Southern mountain yellow-legged frog	No suitable aquatic habitat.
REPTILES		

Attachment 4. Special-Status Species Not Addressed¹

Latin Name	Common Name	Reason for Exclusion
<i>Aspidoscelis tigris stejnegeri</i>	Coastal whiptail	Well outside of geographical range.
<i>Charina umbratica</i>	Southern rubber boa	Well below elevation range.
<i>Diadophis punctatus modestus</i>	San Bernardino ringneck snake	No suitable moist habitat.
<i>Emys marmorata</i>	Western pond turtle	No suitable aquatic habitat.
<i>Thamnophis hammondi</i>	Two-striped gartersnake	No suitable aquatic habitat.
BIRDS		
<i>Agelaius tricolor</i>	Tricolored blackbird	No suitable wetland habitat.
<i>Asio otus</i>	Long-eared owl	Not adequately sized trees to support nesting.
<i>Coccyzus americanus occidentalis</i>	Western yellow-billed cuckoo	No suitable riparian habitat.
<i>Empidonax trailii extimus</i>	Southwestern willow flycatcher	No suitable riparian habitat.
<i>Haliaeetus leucocephalus</i>	Bald eagle	No suitable nesting or foraging habitat.
<i>Icteria virens</i>	Yellow-breasted chat	No suitable riparian habitat.
<i>Pandion haliaetus</i>	Osprey	Not adequately sized trees to support nesting.
<i>Piranga rubra</i>	Summer tanager	No suitable riparian habitat.
<i>Setophaga petechia</i>	Yellow warbler	No suitable riparian habitat.
<i>Vireo bellii pusillus</i>	Least Bell's vireo	No suitable riparian scrub habitat.
<i>Vireo vicinior</i>	Gray vireo	No suitable chaparral habitat.
MAMMALS		
<i>Chaetodipus fallax pallidus</i>	Pallid San Diego pocket mouse	No suitable sandy soils.
<i>Glaucomys oregonensis californicus</i>	San Bernardino flying squirrel	No suitable montane coniferous forest.
<i>Microtus californicus mohavensis</i>	Mohave river vole	No suitable riparian habitat.
<i>Neotamias speciosus speciosus</i>	Lodgepole chipmunk	No suitable montane coniferous forest.
<i>Ovis canadensis nelsoni</i>	Desert bighorn sheep	Well outside of geographic range.

Note:

¹ Special-status species reported from the region, but not addressed in this report due to habitat or geographic range.

Attachment 5 – Project Species List

Attachment 5. Project Species List

Latin Name	Common Name
VASCULAR PLANTS	
Gymnosperms	
EPHEDRACEAE	EPHEDRA FAMILY
<i>Ephedra nevadensis</i>	Nevada ephedra
Dicotyledons	
AMARANTHACEAE	AMARANTH FAMILY
<i>Amaranthus fimbriatus</i>	Fringed amaranth
ASTERACEAE	ASTER FAMILY
<i>Ambrosia acanthicarpa</i>	Annual bur-sage
<i>Ambrosia dumosa</i>	White bur-sage
<i>Ambrosia salsola</i>	Burrobrush
<i>Ericameria nauseosa</i>	Rubber rabbitbrush
<i>Lessingia glandulifera</i>	Valley lessingia
<i>Pectis papposa</i> var. <i>papposa</i>	Chinch-weed
<i>Stephanomeria pauciflora</i>	Wire-lettuce
BORAGINACEAE	BORAGE OR WATERLEAF FAMILY
<i>Amsinckia tessellata</i>	Fiddleneck
BRASSICACEAE	MUSTARD FAMILY
<i>Caulanthus lasiophyllus</i>	California mustard
* <i>Hirschfeldia incana</i>	Shortpod mustard
* <i>Sisymbrium altissimum</i>	Tumble mustard
CACTACEAE	CACTUS FAMILY
<i>Cylindropuntia echinocarpa</i>	Silver cholla
CHENOPODIACEAE	GOOSEFOOT FAMILY
* <i>Salsola tragus</i>	Russian thistle
EUPHORBIACEAE	SPURGE FAMILY
<i>Croton setiger</i>	Turkey-mullein
FABACEAE	PEA FAMILY
<i>Acmispon strigosus</i>	Strigose lotus
GERANIACEAE	GERANIUM FAMILY
* <i>Erodium cicutarium</i>	Red stemmed filaree
HYDROPHYLLACEAE	WATERLEAF FAMILY
<i>Phacelia distans</i>	Common phacelia
LAMIACEAE	MINT FAMILY
<i>Salvia carduacea</i>	Thistle sage
<i>Scutellaria mexicana</i>	Bladder-sage
LILIACEAE	LILY FAMILY
** <i>Muilla coronata</i>	Crowned muilla
PLANTAGINACEAE	PLANTAIN FAMILY
<i>Plantago ovata</i>	Desert plantain
POLYGONACEAE	BUCKWHEAT FAMILY
<i>Eriogonum</i> sp.	Unid. annual buckwheat
<i>Eriogonum fasciculatum</i>	California buckwheat
PORTULACACEAE	PURSLANE FAMILY
* <i>Portulaca oleracea</i>	Common purslane
SOLANACEAE	NIGHTSHADE FAMILY
<i>Datura wrightii</i>	Jimsonweed
Monocotyledons	
AGAVACEAE	AGAVE FAMILY
<i>Yucca brevifolia</i> var. <i>brevifolia</i>	Joshua tree
POACEAE	GRASS FAMILY

* <i>Bromus tectorum</i>	Cheat grass
* <i>Bromus rubens</i>	Red brome
* <i>Schismus barbatus</i>	Mediterranean schismus
ZYGOPHYLLACEAE	CALTROP FAMILY
<i>Larrea tridentata</i>	Creosote bush
VERTEBRATE ANIMALS	
AVES	BIRDS
COLUMBIDAE	PIGEONS AND DOVES
<i>Columba livia</i>	Rock dove
CORVIDAE	CROWS AND JAYS
<i>Corvus corax</i>	Common raven
ALAUDIDAE	LARKS
<i>Eremophila alpestris</i>	Horned lark
PHASIANIDAE	GROUSE AND QUAIL
<i>Callipepla californica</i>	California quail
TROGLODYTIDAE	WRENS
<i>Campylorhynchus brunneicapillus</i>	Cactus wren
TURDIDAE	THRUSHES AND ALLIES
<i>Sialia mexicana</i>	Western bluebird
TYRANNIDAE	TYRANT FLYCATCHERS
<i>Sayornis saya</i>	Say's phoebe
EMBERIZIDAE	SPARROWS, WARBLERS, TANAGERS
<i>Zonotrichia leucophrys</i>	White-crowned sparrow
FRINGILLIDAE	FINCHES
<i>Haemorhous mexicanus</i>	House finch
MAMMALIA	MAMMALS
SCIURIDAE	SQUIRRELS
<i>Otospermophilus beecheyi</i>	California ground squirrel

Species introduced to California are indicated by an asterisk. This list includes only species observed on the site. Other species may have been overlooked or unidentifiable due to season (amphibians are active during rains, reptiles during summer, some birds (and bats) migrate out of the area for summer or winter, some mammals hibernate, many plants are identifiable only in spring). Plants were identified using keys, descriptions, and illustrations in Baldwin et al (2012). Plant taxonomy and nomenclature generally follow Baldwin et al. (2012). Wildlife taxonomy and nomenclature generally follow Stebbins (2003) for amphibians and reptiles, AOU (1998) for birds, and Wilson and Ruff (1999) for mammals.

Attachment 6 – Project Photos



Photo 1: Western portion of project site facing southeast on April 3, 2023.



Photo 2: Western portion of project site facing northeast from southwest corner on April 3, 2023.



Photo 3: Eastern portion of project site facing south from northeast corner on April 3, 2023.



Photo 4: Overview of project site on September 27, 2023.



Photo 5: Typical western Joshua tree in project area.



Photo 6: Suitable burrowing owl burrow found within project site.



Photo 7: View of habitat in southeast corner of project site.



Photo 8: View of habitat in southeast corner of project site.

Attachment 7 – Western Joshua Tree Data Table

Attachment 7. Western Joshua Tree Census Data

Tree ID	Latitude	Longitude	Size Class	Height of Tree (m)	Live or Dead	Branched	Flowering or Fruiting Stage	Impact to Tree	Project activities within 15 meters of tree?	Relocation Site	Additional Notes
1	34.454005	-117.385701	C	8.5	Live	Y	None	None	Yes	Not Applicable	
2	34.454061	-117.384715	C	5.7	Live	Y	Flowers	None	Yes	Not Applicable	
3	34.454043	-117.384294	B	4.5	Live	Y	Flowers	None	Yes	Not Applicable	
4	34.454036	-117.384084	B	3.7	Live	Y	None	None	Yes	Not Applicable	
5	34.454049	-117.383214	B	2.7	Live	Y	Flowers	None	Yes	Not Applicable	
6	34.454017	-117.382901	B	4.4	Live	Y	None	None	Yes	Not Applicable	
7	34.453999	-117.382589	B	4.6	Live	Y	None	None	Yes	Not Applicable	
8	34.453449	-117.381759	A	0.4	Live	N	None	None	Yes	Not Applicable	
9	34.451947	-117.381827	B	4	Live	Y	None	None	Yes	Not Applicable	
10	34.4515	-117.381865	A	0.7	Live	Y	None	None	Yes	Not Applicable	
11	34.450895	-117.381855	B	1.1	Live	Y	None	None	Yes	Not Applicable	
12	34.450786	-117.381871	B	2.8	Live	Y	Flowers	None	Yes	Not Applicable	
13	34.450635	-117.381884	C	5.8	Live	Y	Flowers	None	Yes	Not Applicable	
14	34.449558	-117.381877	B	4.2	Live	Y	None	None	Yes	Not Applicable	
15	34.449395	-117.381929	C	6.5	Live	Y	Flowers	None	Yes	Not Applicable	
16	34.449376	-117.381788	B	4	Live	Y	None	None	Yes	Not Applicable	

BIOLOGICAL RESOURCES TECHNICAL REPORT
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17	34.449326	-117.381934	C	5	Live	Y	None	None	Yes	Not Applicable
18	34.448972	-117.381862	C	5.5	Live	Y	Flowers	None	Yes	Not Applicable
19	34.448843	-117.382029	C	6	Live	Y	None	Removal	Yes	Not Applicable
20	34.44861	-117.382454	B	1.5	Live	Y	None	Removal	Yes	Not Applicable
21	34.44864	-117.3826	C	5	Live	Y	Flowers	Removal	Yes	Not Applicable
22	34.448714	-117.382706	B	2.2	Live	Y	Flowers	Removal	Yes	Not Applicable
23	34.451097	-117.383693	A	0.1	Dead	N	None	Removal	Yes	Not Applicable
24	34.451947	-117.381810	B	4.8	Live	Y	Flowers	None	Yes	Not Applicable

A
PHASE I CULTURAL RESOURCE SURVEY,
TTM 20576,
NORTHWEST CORNER OF TOPAZ ROAD AND MESA STREET,
CITY OF VICTORVILLE, CALIFORNIA

Submitted to:
RCE, LLC
26415 Carl Boyer Drive #220
Santa Clarita, California 91350

Keywords:
Baldy Mesa 7.5' Quadrangle, City of Victorville,
California Environmental Quality Act

Submitted by:
Hudlow Cultural Resource Associates
1405 Sutter Lane
Bakersfield, California 93309

Author:
Scott M. Hudlow

November 2022

Management Summary

At the request of RCE, LLC, a Phase I Cultural Resource Survey was conducted on approximately sixty-five acres. The property lies at both the northwest corner of Topaz Road and Mesa Street and the northwest corner of Mesa Street and Cataba Road in the City of Victorville, California. The Phase I Cultural Resource Survey consisted of a pedestrian survey of the 162.45-acre site and a cultural resource record search.

No cultural resources were identified. No further work is required. If archaeological resources are encountered during the course of construction, a qualified archaeologist should be consulted for further evaluation.

If human remains or potential human remains are observed during construction, work in the vicinity of the remains will cease, and they will be treated in accordance with the provisions of State Health and Safety Code Section 7050.5. The protection of human remains follows California Public Resources Codes, Sections 5097.94, 5097.98, and 5097.99.

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1.0 Introduction

At the request of RCE, LLC, *Hudlow Cultural Resource Associates* conducted a Phase I Cultural Resource Survey on approximately sixty-five acres. The property lies at both the northwest corner of Topaz Road and Mesa Street and the northwest corner of Mesa Street and Cataba Road in the City of Victorville, California. This project is being undertaken in accordance with the California Environmental Quality Act (CEQA) with the City of Victorville responsible as Lead Agency to implement CEQA. The Phase I Cultural Resource Survey consisted of a pedestrian survey and a cultural resource record search.

2.0 Survey Location

The project area is in the City of Victorville. The parcel is the majority of the E $\frac{1}{2}$ of the NE $\frac{1}{4}$ and a portion of the SE $\frac{1}{4}$ of the SW $\frac{1}{4}$ of the NE $\frac{1}{4}$ of Section 10, T.4N., R.5W., San Bernardino Baseline and Meridian, as displayed on the United States Geological Survey (USGS) Baldy Mesa 7.5-minute quadrangle map at both the northwest corner of Topaz Road and Mesa Street and the northwest corner of Mesa Street and Cataba Road in the City of Victorville, California (Figure 1).

3.0 Record Search

A record search of the project area and the environs within one-half mile was conducted at the South Central Coastal Information Center. Scott M. Hudlow conducted the record search on November 14, 2022. The record search revealed that seven cultural resource surveys have been conducted within one-half mile radius of the project area, including two surveys, which are adjacent to the current project area. No previous surveys have addressed the current project area. One historic cultural resource has been recorded within one half-mile of the current project area; it is one complex with a series of three historic buildings. No previous cultural resources have been identified within the project area.

4.0 Environmental Background

The project area is found west of the Mojave River and adjacent to the west of Oro Grande Wash in the western Mojave Desert. the project area is found at elevations between 3380 and 3420 feet above mean sea level. The project area was in the process of being grubbed to remove modern trash; it was being scraped and denuded of native vegetation, particularly in the northern and eastern portions of the property (Figures 2 and 3). The parcel is partially covered in a creosote scrub. Modern trash is strewn within the parcel, particularly along the southern, eastern, and western edges of the property.

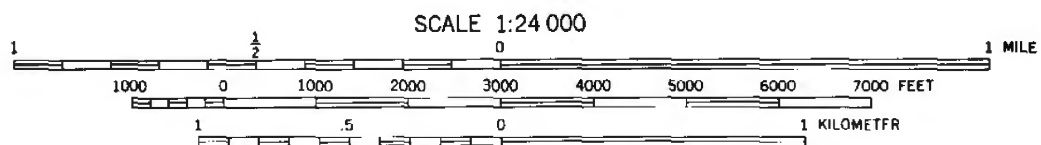
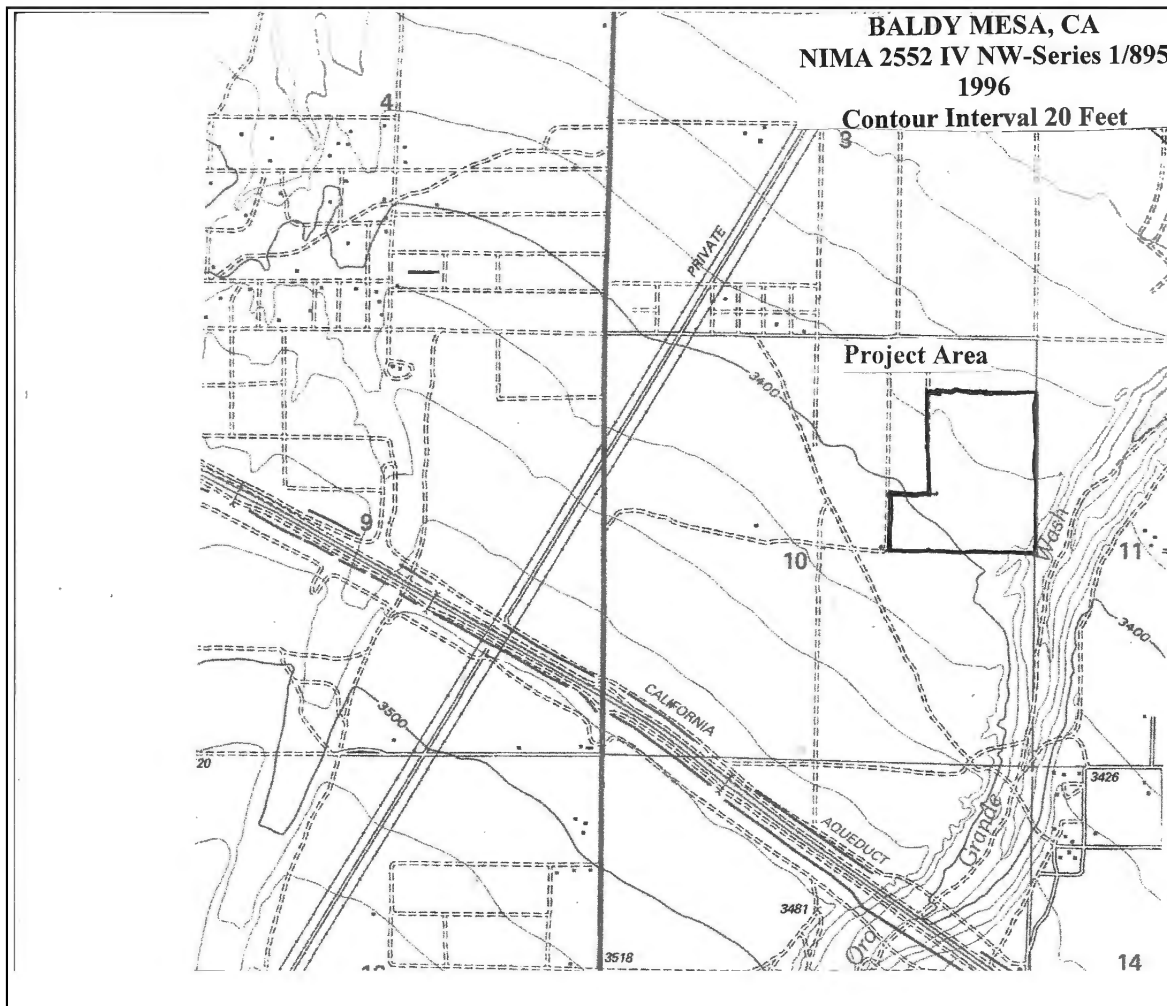


Figure 1
Project Area Location Map

5.0 Prehistoric Archaeological Context

A generally accepted prehistoric cultural chronology for the western Mojave Desert region has yet to be developed, partially because sparse local chronometric data is available to use as a foundation. Consequently, most

proposed local culture histories have been borrowed from other regions, with minor modifications based on sparse local data. The most common pattern is the tripartite Early/Middle/ Late sequence familiar in Californian culture history, often with the addition of a Post-Contact (Norwood 1987) or Protohistoric Period (Sutton 1988). The differences between the sequences are mainly in the inclusion of various horizons, technologies, or stages. The following chronology is based on Claude Warren's Lake Mojave, Pinto, Gypsum, Saratoga Springs, and Protohistoric Periods, which is partially based on time-sensitive projectile points and shell bead sequences (Warren 1984; Warren and Crabtree 1986).

Lake Mojave Period - ca. 10,000-5,000 B.C.

Most Lake Mojave Period sites within the northern Mojave Desert and southwestern Great Basin are early Holocene lakeshore occupations. Sutton stated that the subsistence strategy during this period was presumably one of hunting and utilization of lacustrine resources (Sutton 1988:30). The best examples of sites from this period are associated with the shoreline of Pleistocene Lake Mojave (Campbell *et al.* 1937). Artifacts include percussion-flaked foliate points and knives, Lake Mojave and Silver Lake projectile points, and an unspecialized tool kit of scrapers, graters, and perforating tools.

Pinto Period - ca. 5,000-2,000 B.C.

Some scholars have interpreted the association of Pinto Basin sites and a now extinct riverbed as indicative of occupation during a time of abundant moisture (Campbell and Campbell 1935). Settlement patterns appear to be associated with ephemeral lakes and now-dry streams and springs (Warren 1984). Though the Pinto Period is roughly concurrent with the Altithermal climatic event, (a time when human populations were supposedly reduced in size and more widely dispersed due to the desiccation of wetter habitats), the occurrence of a milder, wetter, Little Pluvial period within the Altithermal has been noted by several archaeologists (Moratto 1984:546). The extent to which the Little Pluvial climatic period may coincide with Pinto Period sites is unknown.

To date, at least seventeen Pinto points and six Pinto Period sites have been recorded in the vicinity (Campbell 1994a). Norwood (1987:104) noted that the lowland areas in the northern portions of adjacent Edwards Air Force Base (AFB) contain evidence of substantial occupations which may date to the Pinto Period; such a conclusion would contradict the hypothesis of a small, dispersed population distribution at this time. Recent evaluation of a Lake Mojave/Pinto

Period site at Phillips Laboratory supports Norwood's observation about substantial occupations (Campbell 1994b).



Figure 2
Project Area, View to the Northeast



Figure 3
Project Area, View to the Southwest

Gypsum Period - ca. 2000 B.C.-A.D. 500

During the Gypsum Period, evidence of a millingstone culture becomes much more common. The mortar and pestle were probably introduced during this period (Wallace 1955:222-223; Warren 1984:4163). Wallace noted evidence of expanded subsistence activities where late period peoples around Mesquite Flat were believed to have extended their food-collecting activities into the surrounding mountains (Wallace 1977:121).

A gradual transition from the use of large dart points to smaller projectile points associated with use of the bow and arrow occurred toward the end of the Gypsum Period. Approximately A.D. 500, the bow and arrow essentially replaced the atlatl (a device used for throwing spears or darts that consists of a rod with a hook at the rear end to hold the projectile in place until release) (Warren 1984:415). Shutler postulated that Anasazi ceramics were initially introduced into the eastern Mojave at about the same time (Shutler *et al* 1961). Diagnostic projectile points associated with the Gypsum Period include the Humboldt, Gypsum Cave, Elko Eared, and Elko Corner-notched types (Warren 1984:414-415). Other temporal designations, which may be correlated with Warren's Gypsum Period, include the Early and Middle Rose Spring Periods (Lanning 1963; Clewlow *et al.* 1970) and the Newberry Period (Bettinger and Taylor 1974).

The scant published literature reports relatively little local evidence of Gypsum material (Robinson 1977:45; Sutton 1988:38). Norwood (1987:101-104) however, notes several isolated examples of projectile points from this period at Edwards AFB. A study of projectile points in the Base Historic Preservation Officer's database has identified ten Humboldt points, four Elko Corner-notched points, one Elko Side-notched point, five undifferentiated Elko points, and three Gypsum Cave points (Campbell 1994a). If isolated points are eliminated from the sample, the remaining 17 points from the Gypsum Period come from 16 sites. Radiocarbon data identifies another five Antelope Valley sites (LAN-82, LAN-192, KER-303, KER-526, and KER-533) with materials that fall within the Gypsum Period. Hydration readings suggest the possibility that a number of additional Gypsum Period sites are present. Therefore, a Gypsum presence in the area is well represented.

Saratoga Springs Period - ca. A.D. 500-1200

The Saratoga Springs Period is marked by what appears to be the establishment of large villages, or village complexes. This reflects a transition from the previous seasonal transhumance pattern into one of semi-, or fully-sedentary occupation within the Antelope Valley (Sutton 1988).

This period also marks the beginning of the Shoshonean period, named for the Shoshonean peoples who occupied the Western Mojave Desert during this period (Robinson 1977). The Numic and Tatic Shoshonean groups were expanding during this period. Both groups made use of a millingstone

technology-- other aspects of their material culture include marine shell, bone, and perishable artifacts. Takic sociopolitical organizations differ from those of Northern Numic groups. The Kitanemuk (a Takic group) are reported as having well developed social ranking and prestige systems (Blackburn and Bean 1978). Grover Krantz postulated that the Takic expansion to the south was stimulated by Northern groups who "...overran their neighbors for a considerable distance to the south" (Krantz 1978:64) in order to obtain acorn resources. This migration occurred at about 2000 B.P. (Sutton 1988:40).

Time-sensitive projectile points from this period include the Rose Spring, Cottonwood, and Desert Side-Notched series. It has been argued that assemblages with Cottonwood points and no Desert Side-Notched points represent an earlier occupation than sites with both Cottonwood and Desert Side-notched points, and that the earlier occupation is associated with the Hakataya influence from the Southwest (Warren 1984:423-424; Warren and Crabtree 1986:191). In the western Mojave Desert, diagnostic materials from this period include various types or examples of poorly understood brownware pottery and desert side notch series projectile points (Warren and Crabtree 1986:191). The use of pottery in the Antelope Valley is currently poorly understood.

A current local projectile point database includes four complete Rose Spring points and three projectile point fragments identified as Rose Spring. These seven items were recovered from six sites (CA-KER-562, CA-KER-672, CA-KER-1171, CA-KER-2533, CA-KER-2817, and CA-LAN-828). Twenty-five complete points and twenty-seven point fragments recovered from twenty sites represent the Cottonwood series of projectile points (Campbell 1994a). One complete Desert Side-notched point and three fragments identified as Desert Side-notched have been recovered from four sites (CA-KER-672, CA-KER-1180, CA-KER-2025, and CA-LAN-769).

Protohistoric Period- ca. A.D. 1200-Historic

Warren used the term "Protohistoric" to describe the period, which reflects a transition from the prehistoric to historic eras (Warren 1984). However, Arkush, noting this term has distinct cultural implications, argued this time is more properly designated the "Late Archaic," while many archaeologists colloquially call this period the "Late Prehistoric" (Arkush 1990:29). This period is also termed the "Shoshonean" Period (Warren 1984; Warren and Crabtree 1986), potentially clouding the culture history sequence by adding a name, which has cultural and linguistic meanings when describing modern groups. Whatever its name, the period markers are considered to be Desert Side-notched arrow points "...and various poorly defined types of brownware pottery including Owens Valley Brownware" (Warren and Crabtree 1986:191).

This period reflects a continuation of cultural developments established during the previous period, but with adaptive modifications. Trade along the Mojave River likely affected the people of the Eastern Antelope Valley, allowing

active groups to acquire considerable amounts of wealth. Socioeconomic and sociopolitical organizations continued to increase in complexity. However, most Antelope Valley groups appear to have developed stronger ties with coastal groups rather than those of the eastern desert and Great Basin (Warren 1984:426). By approximately A.D. 1300, the Hakataya expansion reached its western extreme. Warren (1984) interprets the paucity of ceramic ware in Antelope Valley village sites as evidence that Hakatayan influence upon local groups was minimal.

6.0 Ethnographic Background

The "Contact" period is difficult to define in theory and to detect in practice. The earliest contact between the native populations of the New and Old Worlds traditionally dates to Columbus' landfall. Native Americans felt the Europeans' impact (and later, the Euro-Americans) in a variety of ways, and direct, face-to-face contact was not necessary for their lives to be changed irrevocably. For example, trade items like guns, horses, metal, and cloth spread quickly, and were rapidly incorporated into the indigenous cultures; in many cases, trade with Europeans altered an entire culture or dramatically shifted power balances between groups. Diseases to which Native Americans had little or no resistance preceded the Euro-Americans to the furthest corners of the continent, decimating entire populations within months (Cook 1955). Specific types of osteological damage or mass burials can indicate the onset of Euro-American diseases. However, such evidence has been elusive. Thus, "contact" in North America is usually perceived by anthropologists not as a single point in time, but rather, as a period of centuries, the beginning and ending points of which are frustratingly vague and vary from region to region. Such population shifts rippled across the continent, exacerbated by the expansion of European and Euro-American settlements. Even word-of-mouth spread the news of alien people, goods, and events.

In the archaeological record, clear evidence of contact takes three forms: a mix of aboriginal and Euro-American artifacts, aboriginal-style artifacts made from Euro-American materials (e.g., glass projectile points or thimble finklers), or European forms, designs, and motifs utilized in aboriginal crafts (i.e. basketry or pottery).

The term "Protohistoric" is also sometimes used in this context. Arkush (1990:29) defined this Protohistoric Period as "...a distinct span of time during which native cultures were modified by the introduction of Euro-American diseases, material, and/or practices prior to intensive, face-to-face contact with whites." In fact, historical documents from explorers and others describe many tribes long before "intensive" contact occurred, and other groups experienced such contact without much, if any, historical documentation.

Just as the dates are hard to define, it is a challenge to determine which aboriginal groups inhabited the Antelope Valley, particularly the area, which is now Edwards AFB. Generally, people occupied core areas in the hills and

mountains surrounding the valley and traveled into the desert to gather particular plants, or to escape mountain weather; consequently, the desert boundaries were neither strict nor firmly embedded in the "memory culture" of the ethnographic present. The peripatetic hunter-gatherers of the area do not seem to have been particularly territorial. According to Earle, Harrington's informants indicated "...that all of the clan groups of Serrano/Haminat speech affiliation north of Cajon Pass and east of Soledad Pass constituted a single ethnic domain," although differences in dialect, social organization, and material culture are present (Earle 1990:97).

To add to the ethnographic tangle, or perhaps causing some of it, the cultures of the Antelope Valley were severely impacted by repeated diasporas, a common tale in California: first, missionization under the Spanish; then transfer to "reserved" land under the Americans; then dispossession from the reservations as the land was converted (sometimes questionably) to claims by Euro-Americans under the Homestead Laws, and last, another removal to still more distant reservations or marginal land.

Each dislocation effectively removed the people further from the traditional patterns of the generations before, adding a new layer of custom and habit, creating a cultural mosaic by the time ethnographers arrived.

For these and a variety of other reasons, determining contact-period aboriginal territories on the Base may be a futile exercise, if not impossible. In fact, in the available ethnographic territorial information for the Antelope Valley, by far the vaguest data concerns an area almost exactly described by the boundaries of Edwards AFB.

In the following discussions, it should be kept firmly in mind that the "territories" are all somewhat arbitrary, descriptions from "memory culture," and different author's comments may be based on the same sources, giving a false impression of corroborating evidence. Generally, four groups occupied the western Mojave at the time of contact: Kitanemuk, Tataviam ("Alliklik"), Kawaiisu, and Vanyume ("Serrano"). Additionally, other groups, particularly the Mojave from the east, were known to pass through the area while trading with coastal groups. The Kawaiisu are known to have occasionally utilized portions of the Base (Cultural Systems Research 1980:190-191). Lowell Bean and Sylvia Brakke Vane speculated the Tataviam and Gabrielino may have also exploited resources found on the Base. It is also probable that Mojave and Quechan groups, wide-ranging travelers and traders, utilized resources as they passed through the region (Cultural Systems Research 1980:191).

Kitanemuk and Tataviam

The Kitanemuk and the Tataviam occupied the western portion of the Antelope Valley, but no distinct line can be drawn between their lands. Kroeber's description of Tataviam (or, as he called them, "Alliklik") territory did not include the Antelope Valley, but clearly was centered on the nearby upper

Santa Clara River in the mountains west of the valley (Kroeber 1925: 556). According to Kroeber, the Sawmill Mountains and adjacent Liebre Mountains at the western rim of the valley were the territory of the Kitanemuk. King and Blackburn rejected this division, agreeing that the Tataviam were centered on the southern-facing slopes of the Santa Clara River drainage, but arguing it was the Tataviam whose "...territory extended over the Sawmill Mountains to the north [of the Santa Clara River] to include at least the southwestern fringes of the Antelope Valley" and Lake Elizabeth (King and Blackburn 1978:535-536). Their map placed the Tataviam south of Pastoria Creek, midway up the western edge of the Antelope Valley.

David Earle, however, compared Garcés diary, upon which most of the preceding discussions were based, against J. P. Harrington's unpublished notes. Earle determined that the "Beñeme" of whom Garcés wrote were Vanyume proper, not a generic name assigned by the Mojave to all of the Antelope Valley Indians. Such misinterpretations of Garcés' comments and place names resulted in the mis-assignment of the southwestern Antelope Valley to the Tataviam or Kitanemuk. Earle's conclusions seem stronger than earlier arguments, because it supports a more straightforward reading of Garcés, agrees with ethnographic testimony, and is consistent with mission records.

Kawaiisu

Moving to the northern portion of the Antelope Valley, the Kawaiisu are generally agreed to have occupied the Sierra Nevada south of the Kern River fork (now Lake Isabella), and eastward for an unknown distance. Kroeber stated the Kawaiisu territory went to the boundaries of the "westernmost of the Chemehuevi [i.e., the Southern Paiute of California]" who "visited and owned" the northwestern corner of San Bernardino County--far north of Edwards AFB (Kroeber 1925:593, 594, 601).

On the other hand, Zigmond illustrated a far more limited range for the Kawaiisu, encompassing a "core area" from the northern edge of the Tehachapis to the fork of the Kern River (Zigmond 1986:398). Zigmond's map also indicates a seasonal range extending east just north of Rosamond Lake but dipping southeast to encompass Rogers Lake and the central portion of the Mojave River. This outline roughly agrees with the northeastern border of the Kitanemuk as defined by Blackburn and Bean. These boundaries should not be considered mutually exclusive, however, as among the Kawaiisu, "...the concept of territory was weakly developed, and the idea of boundary was probably nonexistent.... The characteristic shifting about in relation to the seasons makes it impossible to devise a static map of land occupation" (Zigmond 1986:398)

Vanyume

The last group is the Vanyume, occasionally referred to as "Serrano" in the literature (Kroeber 1925; Bean and Smith 1978). Kroeber stated they were found as far east as Barstow, a statement which would preclude their presence in the

Antelope Valley. However, King and Blackburn (1978:535) speculated that "the major portion of the Antelope Valley itself was probably held by Kitanemuk and Vanyume speakers." Further clouding the issue, Bean and Smith (1978:570), writing about the Vanyume in the same volume, state the language of the Vanyume cannot be identified. Bean and Smith did not fully depict the Vanyume territory in their map, omitting the northern and western portions, which may have included the Antelope Valley.

Earle correctly realized that the location of the Vanyume is the key to understanding the ethnogeography of the Antelope Valley. As previously mentioned, Harrington's notes revealed his Kitanemuk informants grouped the languages in the southern Antelope Valley and east to Cajon Pass under the name "Haminat." Dialect differences were noted and conform to the Kitanemuk, Serrano, and Vanyume "language" divisions of earlier research (Earle 1990: 98-99). This would indicate that an emphasis on determining (or despairing over) the ethnographic boundaries between these groups is wasted effort. A more productive approach, Earle argues, is an examination of the chiefs, clans and/or moieties, and *naciones*, or intermediate sociopolitical groups, which seem to have been hierarchical and reflected in inter-village organization (Earle 1990:101).

7.0 Field Procedures and Methods

Between November 15 and 17, 2022, Scott M. Hudlow (for qualifications see Appendix I) conducted a pedestrian survey of the entire project area. Hudlow surveyed in north/south transects at 15-meter (33 feet) intervals. All archaeological material more than fifty years of age or earlier encountered during the inventory was recorded.

8.0 Report of Findings

No cultural resources were identified.

9.0 Management Recommendations

At the request of RCE, LLC, a Phase I Cultural Resource Survey was conducted on approximately sixty-five acres. The property lies at both the northwest corner of Topaz Road and Mesa Street and the northwest corner of Mesa Street and Catapa Road in the City of Victorville, California. The Phase I Cultural Resource Survey consisted of a pedestrian survey of the 162.45-acre site and a cultural resource record search.

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Appendix I

Scott M. Hudlow
1405 Sutter Lane
Bakersfield, California 93309
(661) 834-9183

Education

The George Washington University
M.A. American Studies, 1993
Specialization in Historical Archaeology
and Architectural History

University of California, Berkeley
B.A. History, 1987
B.A. Anthropology, 1987
Specialization in Historical Archaeology
and Colonial History

Public Service

3/94-12/02 *Historic Preservation Commission*. City of Bakersfield, Bakersfield, California 93305.

7/97-12/01 *Newsletter Editor*. *California History Action*, newsletter for the California Council for the Promotion of History.

Relevant Work Experience

8/96- *Adjutant Faculty*. Bakersfield College, 1801 Panorama Drive, Bakersfield, California, 93305. Teach History 17A, Introduction to American History and Anthropology 5, Introduction to North American Indians.

Owner, Sole Proprietorship. Hudlow Cultural Resource Associates. 1405 Sutter Lane, Bakersfield California 93309. Operate small cultural resource management business. Manage contracts, respond to RFP's, bill clients, manage temporary employees. Conduct Phase I archaeological and architectural surveys for private and public clients; including the cultural resource survey, documentary photography, measured drawings, mapping of structures, filing of survey forms, historic research, assessing impact and writing reports. Evaluated archaeological and architectural sites and properties in lieu of their eligibility for the National Register of Historic Places in association with Section 106 and 110 requirements of the National Historic Preservation Act of 1966 and CEQA (California Environmental Quality Act).

Full resume available upon request.

MOJAVE RIVER WATERSHED

Water Quality Management Plan

For:

TTM 20576

APN: 313-644-101, 313-644-102

Prepared for:

Rodeo Credit Enterprises, LLC

26415 Carl Boyer Dr., Suite 220

Santa Clarita, CA 91350

818-981-3000

Prepared by:

D&D Engineering, Inc.

119 W. Hyde Park Boulevard

Inglewood, CA 90302

424-351-6800

Submittal Date: October 17, 2023

Revision No. and Date: Insert No and Current Revision Date

Revision No. and Date: Insert No and Current Revision Date

Revision No. and Date: Insert No and Current Revision Date

Revision No. and Date: Insert No and Current Revision Date

Revision No. and Date: Insert No and Current Revision Date

Final Approval Date: _____

Project Owner's Certification

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

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

Project Data			
Permit/Application Number(s):	TBD	Grading Permit Number(s):	TBD
Tract/Parcel Map Number(s):	TTM 20576	Building Permit Number(s):	TBD
CUP, SUP, and/or APN (Specify Lot Numbers if Portions of Tract):			313-644-101, 313-644-102
Owner's Signature			
Owner Name: Kris Pinero			
Title	Project Manager		
Company	Rodeo Credit Enterprises, LLC		
Address	9595 Wilshire Boulevard, Suite 708		
Email	kris@rcellc.us		
Telephone #	818-981-3000		
Signature			Date

Preparer's Certification

Project Data			
Permit/Application Number(s):	TBD	Grading Permit Number(s):	TBD
Tract/Parcel Map Number(s):	TTM 20576	Building Permit Number(s):	TBD
CUP, SUP, and/or APN (Specify Lot Numbers if Portions of Tract):			313-644-101, 313-644-102

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

Engineer: Henrik Nazarian, PE		PE Stamp Below
Title	Principal	
Company	D&D Engineering, Inc.	
Address	119 W. Hyde Park Boulevard	
Email	hnazarian@danddengineeringinc.com	
Telephone #	424-351-6800	
Signature		
Date		

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Insert Appendix Title if Applicable - Otherwise, please delete text

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Section I – Introduction

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

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

Section 1 Discretionary Permit(s)

Form 1-1 Project Information					
Project Name		TTM 20576			
Project Owner Contact Name:		Kris Pinero			
Mailing Address:	9595 Wilshire Boulevard, Suite 708 Beverly Hills, CA 90212	E-mail Address:	kris@rcellc.us	Telephone:	818-981-3000
Permit/Application Number(s):		TBD	Tract/Parcel Map Number(s):	TTM 20576	
Additional Information/ Comments:					
Description of Project:		<p>The project is located within the City of Victorville, northwest of the intersection of Mesa Street and Topaz Road. Latitude: 34.45043°, Longitude: -117.38391°</p> <p>The project site proposes to develop 243 single-family residential lots. The development will include streets, driveways, landscape areas, and utilities and other facilities usually associated with such development.</p>			
Provide summary of Conceptual WQMP conditions (if previously submitted and approved). Attach complete copy.					

Section 2 Project Description

2.1 Project Information

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

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

2.1.1 Project Sizing Categorization

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

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

Form 2.1-1 Description of Proposed Project					
1 Regulated Development Project Category (Select all that apply):					
<input checked="" type="checkbox"/> #1 New development involving the creation of 5,000 ft ² or more of impervious surface collectively over entire site	<input type="checkbox"/> #2 Significant re-development involving the addition or replacement of 5,000 ft ² or more of impervious surface on an already developed site	<input type="checkbox"/> #3 Road Project – any road, sidewalk, or bicycle lane project that creates greater than 5,000 square feet of contiguous impervious surface	<input type="checkbox"/> #4 LUPs – linear underground/overhead projects that has a discrete location with 5,000 sq. ft. or more new constructed impervious surface		
<input type="checkbox"/> Site Design Only (Project Total Square Feet > 2,500 but < 5,000 sq.ft.) Will require source control Site Design Measures. Use the "PCMP" Template. Do not use this WQMP Template.					
2 Project Area (ft ²):	3,081,700	3 Number of Dwelling Units:	243	4 SIC Code:	1521
5 Is Project going to be phased? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> If yes, ensure that the WQMP evaluates each phase as a distinct DA, requiring LID BMPs to address runoff at time of completion.					

2.2 Property Ownership/Management

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

Form 2.2-1 Property Ownership/Management

Describe property ownership/management responsible for long-term maintenance of WQMP stormwater facilities:

Ownership of the project will be held with Rodeo Credit Enterprises, LLC. Long-term maintenance will be the responsibility of the owners. This includes BMP maintenance of efficient irrigation, landscape area, trash, etc. until the property is sold or transferred.

Rodeo Credit Enterprises, LLC
9595 Wilshire Boulevard, Suite 708
Beverly Hills, CA 90212
Phone: 818-981-3000
Contact: Kris Pinero, Project Manager

The City of Victorville will provide long-term maintenance of project stormwater facilities and BMP maintenance which includes catch basin inspection, replacement of insert filters, and basin maintenance.

Refer to Section 5 and Attachment E of this WQMP report for detailed maintenance activities.

2.3 Potential Stormwater Pollutants

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

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

Form 2.3-1 Pollutants of Concern			
Pollutant	Please check: E=Expected, N=Not Expected		Additional Information and Comments
Pathogens (Bacterial / Virus)	E <input checked="" type="checkbox"/>	N <input type="checkbox"/>	Wild bird and pet waste, garbage, food waste, animals, restrooms
Nutrients - Phosphorous	E <input checked="" type="checkbox"/>	N <input type="checkbox"/>	Fertilizers, waste and garbage, landscape area
Nutrients - Nitrogen	E <input checked="" type="checkbox"/>	N <input type="checkbox"/>	Landscape, fertilizer, food waste, garbage
Noxious Aquatic Plants	E <input type="checkbox"/>	N <input checked="" type="checkbox"/>	N/A
Sediment	E <input checked="" type="checkbox"/>	N <input type="checkbox"/>	Solid materials / suspended solids from land surfaces are expected in addition to sediments from erosion, landscape areas, and undeveloped pads
Metals	E <input checked="" type="checkbox"/>	N <input type="checkbox"/>	Metal pollutants from vehicles in the street and driveways
Oil and Grease	E <input checked="" type="checkbox"/>	N <input type="checkbox"/>	Surface area from streets and driveways will contribute from leaking vehicles
Trash/Debris	E <input checked="" type="checkbox"/>	N <input type="checkbox"/>	Pollutants from landscape maintenance is expected
Pesticides / Herbicides	E <input checked="" type="checkbox"/>	N <input type="checkbox"/>	Chemicals used in landscape maintenance is expected
Organic Compounds	E <input checked="" type="checkbox"/>	N <input type="checkbox"/>	Chemicals used in landscape maintenance is expected
Other:	E <input type="checkbox"/>	N <input type="checkbox"/>	
Other:	E <input type="checkbox"/>	N <input type="checkbox"/>	
Other:	E <input type="checkbox"/>	N <input type="checkbox"/>	

Section 3 Site and Watershed Description

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

Form 3-1 Site Location and Hydrologic Features			
Site coordinates take GPS measurement at approximate center of site	Latitude 34.45043°	Longitude -117.38391°	Thomas Bros Map page
¹ San Bernardino County climatic region: <input checked="" type="checkbox"/> Desert			
² Does the site have more than one drainage area (DA): Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> <i>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</i>			
<pre> graph LR A[DA-1, DMA-A] --> B[OUTLET] </pre>			
Conveyance	Briefly describe on-site drainage features to convey runoff that is not retained within a DMA		
DA1 DMA C flows to DA1 DMA A	Ex. Bioretention overflow to vegetated bioswale with 4' bottom width, 5:1 side slopes and bed slope of 0.01. Conveys runoff for 1000' through DMA 1 to existing catch basin on SE corner of property		
DA1 DMA A to Outlet 1	Site runoff flows to infiltration basin with 33,300 SF bottom area and 2:1 side slopes.		
DA1 DMA B to Outlet 1			
DA2 to Outlet 2			

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)	3,081,700			
2 Existing site impervious area (ft ²)	0			
3 Antecedent moisture condition <i>For desert areas, use http://www.sbcounty.gov/dpw/floodcontrol/pdf/20100412_map.pdf</i>	III			
4 Hydrologic soil group <i>Refer to County Hydrology Manual Addendum for Arid Regions – http://www.sbcounty.gov/dpw/floodcontrol/pdf/20100412_addendum.pdf</i>	A			
5 Longest flowpath length (ft)	2,800			
6 Longest flowpath slope (ft/ft)	0.017			
7 Current land cover type(s) <i>Select from Fig C-3 of Hydrology Manual</i>	Natural Cover Barren			
8 Pre-developed pervious area condition: <i>Based on the extent of wet season vegetated cover good >75%; Fair 50-75%; Poor <50% Attach photos of site to support rating</i>	Poor			

Form 3-2 Existing Hydrologic Characteristics for Drainage Area 1 (use only as needed for additional DMA w/in DA 1)				
For Drainage Area 1's sub-watershed DMA, provide the following characteristics	DMA E	DMA F	DMA G	DMA H
1 DMA drainage area (ft ²)				
2 Existing site impervious area (ft ²)				
3 Antecedent moisture condition <i>For desert areas, use http://www.sbcounty.gov/dpw/floodcontrol/pdf/20100412_map.pdf</i>				
4 Hydrologic soil group <i>County Hydrology Manual Addendum for Arid Regions – http://www.sbcounty.gov/dpw/floodcontrol/pdf/20100412_addendum.pdf</i>				
5 Longest flowpath length (ft)				
6 Longest flowpath slope (ft/ft)				
7 Current land cover type(s) <i>Select from Fig C-3 of Hydrology Manual</i>				
8 Pre-developed pervious area condition: <i>Based on the extent of wet season vegetated cover good >75%; Fair 50-75%; Poor <50% Attach photos of site to support rating</i>				

Form 3-3 Watershed Description for Drainage Area

Receiving waters Refer to SWRCB site: http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml	Mojave River
Applicable TMDLs http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml	None
303(d) listed impairments http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml	None
Environmentally Sensitive Areas (ESA) Refer to Watershed Mapping Tool – http://sbcounty.permitrack.com/WAP	None
Hydromodification Assessment	<input checked="" type="checkbox"/> Yes <i>Complete Hydromodification Assessment. Include Forms 4.2-2 through Form 4.2-5 and Hydromodification BMP Form 4.3-9 in submittal</i> <input type="checkbox"/> No

Section 4 Best Management Practices (BMP)

4.1 Source Control BMPs and Site Design BMP Measures

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

4.1.1 Source Control BMPs

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

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

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

Form 4.1-1 Non-Structural Source Control BMPs				
Identifier	Name	Check One		Describe BMP Implementation OR, if not applicable, state reason
		Included	Not Applicable	
N1	Education of Property Owners, Tenants and Occupants on Stormwater BMPs	<input checked="" type="checkbox"/>	<input type="checkbox"/>	General information will be provided to the owner on housekeeping practices that contribute to the protection of storm water. The property owners will be familiar with the contents of this document and the BMPs used on site, and the owners will provide education materials to tenants as applicable.
N2	Activity Restrictions	<input checked="" type="checkbox"/>	<input type="checkbox"/>	The property owner shall control the discharge of stormwater pollutants from this site through activity restrictions. Restrictions shall be provided to all new occupants and annually thereafter. Enforcement of activity restrictions shall be ongoing during the operation of the project site.
N3	Landscape Management BMPs	<input checked="" type="checkbox"/>	<input type="checkbox"/>	The property owner and landscape maintenance contractors will practice ongoing landscape maintenance BMPs consistent with applicable local ordinances and will regularly inspect the irrigation system for signs of erosion or sediment
N4	BMP Maintenance	<input checked="" type="checkbox"/>	<input type="checkbox"/>	The City of Victorville will maintain post-construction public BMPs consistent with the O&M plan described in Section 5 of this document. The property owner shall maintain BMPs on lot.
N5	Title 22 CCR Compliance (How development will comply)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Storage of hazardous materials or waste on site must comply with all Title 22 CCR regulations.
N6	Local Water Quality Ordinances	<input checked="" type="checkbox"/>	<input type="checkbox"/>	The owners shall comply with the City of Victorville's Stormwater Ordinance through the implementation of BMPs
N7	Spill Contingency Plan	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Building operators shall prepare specific plans based on materials onsite for the cleanup of spills. Plans shall mandate stockpiling of cleanup materials. Storage shall comply with Hazmat Regulations and any required contingency plans.
N8	Underground Storage Tank Compliance	<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A

Form 4.1-1 Non-Structural Source Control BMPs

N9

Hazardous Materials Disclosure
Compliance

☐☐

N/A

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	
N10	Uniform Fire Code Implementation	<input checked="" type="checkbox"/>	<input type="checkbox"/>	The site shall conform to all building code requirements for fire safety.
N11	Litter/Debris Control Program	<input checked="" type="checkbox"/>	<input type="checkbox"/>	The owner shall be responsible for trash and litter to be swept from the site and dumped into a City approved dumpster with lids. The owner shall contract with the City of Victorville or local trash collector to empty dumpsters on a weekly basis.
N12	Employee Training	<input checked="" type="checkbox"/>	<input type="checkbox"/>	The owners will be familiar with onsite BMPs and necessary maintenance required by the City. The owner will check with the City and County at least once a year to obtain a new updated educational materials and provide these materials to the tenants as applicable.
N13	Housekeeping of Loading Docks	<input type="checkbox"/>	<input checked="" type="checkbox"/>	No loading docks in this project.
N14	Catch Basin Inspection Program	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Catch basins shall be inspected visually monthly. The entire storm drain system shall be inspected and cleaned prior to the start of the rainy season by the City of Victorville.
N15	Vacuum Sweeping of Private Streets and Parking Lots	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Street and parking areas will be swept regularly using a vacuum assisted sweeper. Frequency will depend on waste accumulation with a minimum of once per month and prior to the start of the rainy season.
N16	Other Non-structural Measures for Public Agency Projects	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Project not classified as a public agency project.
N17	Comply with all other applicable NPDES permits	<input checked="" type="checkbox"/>	<input type="checkbox"/>	The developer will comply with the California Statewide Construction General Permit during construction and all future occupants of the site shall comply with the requirements of the Statewide General Stormwater Permit.

Form 4.1-2 Structural Source Control BMPs

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

Form 4.1-2 Structural Source Control BMPs

Identifier	Name	Check One		Describe BMP Implementation OR, If not applicable, state reason
		Included	Not Applicable	
S11	Equipment wash areas with spill containment plans (CASQA New Development BMP Handbook SD-33)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	No wash area on site. Owner will not allow outdoor processing area on this site.
S12	Fueling areas (CASQA New Development BMP Handbook SD-30)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	No fueling area on site. Owner will not allow fueling area on this site.
S13	Hillside landscaping (CASQA New Development BMP Handbook SD-10)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Not a hillside project.
S14	Wash water control for food preparation areas	<input type="checkbox"/>	<input checked="" type="checkbox"/>	No food preparation area on site.
S15	Community car wash racks (CASQA New Development BMP Handbook SD-33)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	No community car wash racks on site.

4.1.2 Site Design BMPs

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

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

Describe site design and drainage plan including:

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

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

Form 4.1-3 Site Design Practices Checklist
Site Design Practices <i>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</i>
Minimize impervious areas: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Explanation: Landscaped areas and trees will increase the pervious area and decrease the impervious areas.
Maximize natural infiltration capacity; Including improvement and maintenance of soil: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Explanation: Infiltration / detention basin system bottom with natural soils, no compaction.
Preserve existing drainage patterns and time of concentration: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Explanation: The proposed project will follow the existing drainage direction and pattern as the existing condition.
Disconnect impervious areas. Including rerouting of rooftop drainage pipes to drain stormwater to storage or infiltration BMPs instead of to storm drain : Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Explanation: Landscaped areas next to the buildings disconnect the impervious areas.
Use of Porous Pavement.: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Explanation: This project does not proposed the use of porous pavement.
Protect existing vegetation and sensitive areas: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Explanation: There are no significant existing vegetation and sensitive areas to protect.
Re-vegetate disturbed areas. Including planting and preservation of drought tolerant vegetation. : Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Explanation: There are no re-vegetation areas on site.
Minimize unnecessary compaction in stormwater retention/infiltration basin/trench areas: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Explanation: The bottom of the detention / infiltration basin will not be compacted.

Utilize naturalized/rock-lined drainage swales in place of underground piping or imperviously lined swales: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Explanation: No drainage swales in this project.
Stake off areas that will be used for landscaping to minimize compaction during construction : Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Explanation: Public recreation areas will not be compacted during construction.
Use of Rain Barrels and Cisterns, Including the use of on-site water collection systems.: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Explanation: No barrels or cisterns are proposed for the project site.
Stream Setbacks. Includes a specified distance from an adjacent stream: : Yes <input type="checkbox"/> No <input type="checkbox"/> Explanation: The project is adjacent to the Oro Grande Wash but will be separated from the Wash by the proposed Topaz Road.

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

San Bernardino County Special Districts:

Guide to High Desert Landscaping -

<http://www.specialdistricts.org/Modules/ShowDocument.aspx?documentid=795>

Recommended High-Desert Plants -

<http://www.specialdistricts.org/modules/showdocument.aspx?documentid=553>

Mojave Water Agency:

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

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

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

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

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

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

4.2 Treatment BMPs

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

4.2.1 Project Specific Hydrology Characterization

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

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

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

Methods applied in the following forms include:

- For LID BMP Design Capture Volume (DCV), San Bernardino County requires use of the P_6 method (Form 4.2-1) For pre- and post-development hydrologic calculation, San Bernardino County requires the use of the Rational Method (San Bernardino County Hydrology Manual Section D). Forms 4.2-2 through Form 4.2-5 calculate hydrologic variables including runoff volume, time of concentration, and peak runoff from the project site pre- and post-development using the Hydrology Manual Rational Method approach. For projects greater than 640 acres (1.0 mi²), the Rational Method and these forms should not be used. For such projects, the Unit Hydrograph Method (San Bernardino County Hydrology Manual Section E) shall be applied for hydrologic calculations for hydromodification performance criteria.

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

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

¹ Project area DA 1 (ft²): <div style="text-align: center; font-size: 1.2em;">3,081,700</div>	² Imperviousness after applying preventative site design practices (Imp%): 60%	³ Runoff Coefficient (Rc): _0.409 $R_c = 0.858(\text{Imp}\%)^{0.3} - 0.78(\text{Imp}\%)^{0.2} + 0.774(\text{Imp}\%) + 0.04$
⁴ Determine 1-hour rainfall depth for a 2-year return period $P_{2\text{yr}-1\text{hr}}$ (in): 0.422 http://hdsc.nws.noaa.gov/hdsc/pfds/qa/sca_pfds.html		
⁵ Compute P_6, Mean 6-hr Precipitation (inches): 0.522 <i>$P_6 = \text{Item 4} * C_1$, where C_1 is a function of site climatic region specified in Form 3-1 Item 1 (Desert = 1.2371)</i>		
⁶ Drawdown Rate <i>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.</i>		24-hrs <input type="checkbox"/> 48-hrs <input checked="" type="checkbox"/>
⁷ Compute design capture volume, DCV (ft³): 107,627 <i>$DCV = 1/12 * [\text{Item 1} * \text{Item 3} * \text{Item 5} * C_2]$, 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</i>		

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

Is the change in post- and pre- condition flows captured on-site? : Yes ☒ No ☐

If "Yes", then complete Hydromodification assessment of site hydrology for 10yr storm event using Forms 4.2-3 through 4.2-5 and insert results below (*Forms 4.2-3 through 4.2-5 may be replaced by computer software analysis based on the San Bernardino County Hydrology Manual- Addendum 1*)

If "No," then proceed to Section 4.3 BMP Selection and Sizing

Condition	Runoff Volume (ft ³)	Time of Concentration (min)	Peak Runoff (cfs)
Pre-developed	¹ 167,804 <i>Form 4.2-3 Item 12</i>	² 55 <i>Form 4.2-4 Item 13</i>	³ 5.28 <i>Form 4.2-5 Item 10</i>
Post-developed	⁴ 241,538 <i>Form 4.2-3 Item 13</i>	⁵ 57 <i>Form 4.2-4 Item 14</i>	⁶ 19.28 <i>Form 4.2-5 Item 14</i>
Difference	⁷ 73,734 <i>Item 4 – Item 1</i>	⁸ -2 <i>Item 2 – Item 5</i>	⁹ 13.00 <i>Item 6 – Item 3</i>
Difference (as % of pre-developed)	¹⁰ 43.9% <i>Item 7 / Item 1</i>	¹¹ -3.6% <i>Item 8 / Item 2</i>	¹² 246% <i>Item 9 / Item 3</i>

Form 4.2-3 Hydromodification 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	Barren															
2a Hydrologic Soil Group (HSG)	A															
3a DMA Area, ft ² <i>sum of areas of DMA should equal area of DA</i>	3,081,700															
4a Curve Number (CN) <i>use Items 1 and 2 to select the appropriate CN from Appendix C-2 of the TGD for WQMP</i>	66															
Weighted Curve Number Determination for: Post-developed DA	DMA A	DMA B	DMA C	DMA D	DMA E	DMA F	DMA G	DMA H								
1b Land Cover type	Res.															
2b Hydrologic Soil Group (HSG)	A															
3b DMA Area, ft ² <i>sum of areas of DMA should equal area of DA</i>	3,081,700															
4b Curve Number (CN) <i>use Items 5 and 6 to select the appropriate CN from Appendix C-2 of the TGD for WQMP</i>	72															
5 Pre-Developed area-weighted CN: 66	7 Pre-developed soil storage capacity, S (in): 5.15 $S = (1000 / \text{Item 5}) - 10$					9 Initial abstraction, I _a (in): 1.03 $I_a = 0.2 * \text{Item 7}$										
6 Post-Developed area-weighted CN: 72	8 Post-developed soil storage capacity, S (in): 3.89 $S = (1000 / \text{Item 6}) - 10$					10 Initial abstraction, I _a (in): 0.78 $I_a = 0.2 * \text{Item 8}$										
11 Precipitation for 10 yr, 24 hr storm (in): 3.22 Go to: http://hdsc.nws.noaa.gov/hdsc/pfds/qa/sca_pfds.html																
12 Pre-developed Volume (ft ³): 167,804 $V_{pre} = (1 / 12) * (\text{Item sum of Item 3}) * [(\text{Item 11} - \text{Item 9})^2 / ((\text{Item 11} - \text{Item 9} + \text{Item 7}))]$																
13 Post-developed Volume (ft ³): 241,538 $V_{pre} = (1 / 12) * (\text{Item sum of Item 3}) * [(\text{Item 11} - \text{Item 10})^2 / ((\text{Item 11} - \text{Item 10} + \text{Item 8}))]$																
14 Volume Reduction needed to meet hydromodification requirement, (ft ³): 61,657 $V_{hydro} = (\text{Item 13} * 0.95) - \text{Item 12}$																

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

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

Variables	Pre-developed DA1 <i>Use additional forms if there are more than 4 DMA</i>				Post-developed DA1 <i>Use additional forms if there are more than 4 DMA</i>			
	DMA A	DMA B	DMA C	DMA D	DMA A	DMA B	DMA C	DMA D
1 Length of flowpath (ft) <i>Use Form 3-2 Item 5 for pre-developed condition</i>	2,800				3,600			
2 Change in elevation (ft)	47				47			
3 Slope (ft/ft), $S_o = \text{Item 2} / \text{Item 1}$	0.017				0.013			
4 Land cover	Barren				Res.			
5 Initial DMA Time of Concentration (min) <i>Appendix C-1 of the TGD for WQMP</i>	55				57			
6 Length of conveyance from DMA outlet to project site outlet (ft) <i>May be zero if DMA outlet is at project site outlet</i>	0				0			
7 Cross-sectional area of channel (ft ²)	N/A				N/A			
8 Wetted perimeter of channel (ft)	N/A				N/A			
9 Manning's roughness of channel (n)	N/A				N/A			
10 Channel flow velocity (ft/sec) $V_{fps} = (1.49 / \text{Item 9}) * (\text{Item 7}/\text{Item 8})^{0.67} * (\text{Item 3})^{0.5}$	N/A				N/A			
11 Travel time to outlet (min) $T_t = \text{Item 6} / (\text{Item 10} * 60)$	N/A				N/A			
12 Total time of concentration (min) $T_c = \text{Item 5} + \text{Item 11}$	55				57			
13 Pre-developed time of concentration (min): 55 <i>Minimum of Item 12 pre-developed DMA</i>								
14 Post-developed time of concentration (min): 57 <i>Minimum of Item 12 post-developed DMA</i>								
15 Additional time of concentration needed to meet hydromodification requirement (min): 0 $T_{C-Hydro} = (\text{Item 13} * 0.95) - \text{Item 14}$								

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

Compute peak runoff for pre- and post-developed conditions							
Variables		Pre-developed DA to Project Outlet (Use additional forms if more than 3 DMA)			Post-developed DA to Project Outlet (Use additional forms if more than 3 DMA)		
		DMA A	DMA B	DMA C	DMA A	DMA B	DMA C
1 Rainfall Intensity for storm duration equal to time of concentration $I_{peak} = 10^{(LOG Form 4.2-1 Item 4 - 0.7 LOG Form 4.2-4 Item 5 / 60)}$		0.403			0.403		
2 Drainage Area of each DMA (Acres) <i>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)</i>		70.7			70.7		
3 Ratio of pervious area to total area <i>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)</i>		1			0.4		
4 Pervious area infiltration rate (in/hr) <i>Use pervious area CN and antecedent moisture condition with Appendix C-3 of the TGD for WQMP</i>		0.32			0.24		
5 Maximum loss rate (in/hr) $F_m = Item 3 * Item 4$ <i>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)</i>		0.32			0.10		
6 Peak Flow from DMA (cfs) $Q_p = Item 2 * 0.9 * (Item 1 - Item 5)$		5.28			19.28		
7 Time of concentration adjustment factor for other DMA to site discharge point <i>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)</i>		DMA A	n/a		n/a		
		DMA B		n/a		n/a	
		DMA C			n/a		n/a
8 Pre-developed Q_p at T_c for DMA A: $Q_p = Item 6_{DMAA} + [Item 6_{DMAB} * (Item 1_{DMAA} - Item 5_{DMAB}) / (Item 1_{DMAB} - Item 5_{DMAB}) * Item 7_{DMAA/2}] + [Item 6_{DMAC} * (Item 1_{DMAA} - Item 5_{DMAC}) / (Item 1_{DMAC} - Item 5_{DMAC}) * Item 7_{DMAA/3}]$		9 Pre-developed Q_p at T_c for DMA B: $Q_p = Item 6_{DMAB} + [Item 6_{DMAA} * (Item 1_{DMAB} - Item 5_{DMAA}) / (Item 1_{DMAA} - Item 5_{DMAA}) * Item 7_{DMAB/1}] + [Item 6_{DMAC} * (Item 1_{DMAB} - Item 5_{DMAC}) / (Item 1_{DMAC} - Item 5_{DMAC}) * Item 7_{DMAB/3}]$			10 Pre-developed Q_p at T_c for DMA C: $Q_p = Item 6_{DMAC} + [Item 6_{DMAA} * (Item 1_{DMAC} - Item 5_{DMAA}) / (Item 1_{DMAA} - Item 5_{DMAA}) * Item 7_{DMAC/1}] + [Item 6_{DMAB} * (Item 1_{DMAC} - Item 5_{DMAB}) / (Item 1_{DMAB} - Item 5_{DMAB}) * Item 7_{DMAC/2}]$		
10 Peak runoff from pre-developed condition confluence analysis (cfs): 5.28 Maximum of Item 8, 9, and 10 (including additional forms as needed)							
11 Post-developed Q_p at T_c for DMA A: <i>Same as Item 8 for post-developed values</i>		12 Post-developed Q_p at T_c for DMA B: <i>Same as Item 9 for post-developed values</i>			13 Post-developed Q_p at T_c for DMA C: <i>Same as Item 10 for post-developed values</i>		
14 Peak runoff from post-developed condition confluence analysis (cfs): 19.28 Maximum of Item 11, 12, and 13 (including additional forms as needed)							
15 Peak runoff reduction needed to meet Hydromodification Requirement (cfs): 13.04 $Q_{p-hydro} = (Item 14 * 0.95) - Item 10$							

4.3 BMP Selection and Sizing

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

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

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

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

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

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

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

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

4.3.1 Exceptions to Requirements for Bioretention Facilities

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

- 1) Projects creating or replacing an acre or less of impervious area, and located in a designated pedestrian-oriented commercial district (i.e., smart growth projects), and having at least 85% of the entire project site covered by permanent structures;
- 2) Facilities receiving runoff solely from existing (pre-project) impervious areas; and
- 3) Historic sites, structures or landscapes that cannot alter their original configuration in order to maintain their historic integrity.

Form 4.3-1 Infiltration BMP Feasibility (DA 1)

Feasibility Criterion – Complete evaluation for each DA on the Project Site

¹ Would infiltration BMP pose significant risk for groundwater related concerns?

Yes ☐ No ☒

Refer to Section 5.3.2.1 of the TGD for WQMP

If Yes, Provide basis: (attach)

² Would installation of infiltration BMP significantly increase the risk of geotechnical hazards?

Yes ☐ No ☒

(Yes, if the answer to any of the following questions is yes, as established by a geotechnical expert):

- The location is less than 50 feet away from slopes steeper than 15 percent
- The location is less than ten feet from building foundations or an alternative setback.
- A study certified by a geotechnical professional or an available watershed study determines that stormwater infiltration would result in significantly increased risks of geotechnical hazards.

If Yes, Provide basis: (attach)

³ Would infiltration of runoff on a Project site violate downstream water rights?

Yes ☐ No ☒

If Yes, Provide basis: (attach)

⁴ Is proposed infiltration facility located on hydrologic soil group (HSG) D soils or does the site geotechnical investigation indicate presence of soil characteristics, which support categorization as D soils?

Yes ☐ No ☒

If Yes, Provide basis: (attach)

⁵ Is the design infiltration rate, after accounting for safety factor of 2.0, below proposed facility less than 0.3 in/hr (accounting for soil amendments)?

Yes ☐ No ☒

If Yes, Provide basis: (attach)

⁶ Would on-site infiltration or reduction of runoff over pre-developed conditions be partially or fully inconsistent with watershed management strategies as defined in the WAP, or impair beneficial uses?

Yes ☐ No ☒

See Section 3.5 of the TGD for WQMP and WAP

If Yes, Provide basis: (attach)

⁷ Any answer from Item 1 through Item 3 is "Yes":

Yes ☐ No ☒

If yes, infiltration of any volume is not feasible onsite. Proceed to Form 4.3-4, Selection and Evaluation of Biotreatment BMP.

If no, then proceed to Item 8 below.

⁸ Any answer from Item 4 through Item 6 is "Yes":

Yes ☐ No ☒

If yes, infiltration is permissible but is not required to be considered. Proceed to Form 4.3-2, Site Design BMP.

If no, then proceed to Item 9, below.

⁹ All answers to Item 1 through Item 6 are "No":

Infiltration of the full DCV is potentially feasible, LID infiltration BMP must be designed to infiltrate the full DCV to the MEP.

Proceed to Form 4.3-2, Site Design BMPs.

4.3.2 Site Design BMP

Section E.12.e. of the Small Phase II MS4 Permit emphasizes the use of LID preventative measures; and the use of Site Design Measures reduces the portion of the DCV that must be addressed in downstream BMPs. Therefore, all applicable Site Design Measures shall be provided except where they are mutually exclusive with each other, or with other BMPs. Mutual exclusivity may result from overlapping BMP footprints such that

either would be potentially feasible by itself, but both could not be implemented. Please note that while there are no numeric standards regarding the use of Site Design BMPs. If a project cannot feasibly meet BMP sizing requirements or cannot fully address hydromodification, feasibility of all applicable Site Design BMPs must be part of demonstrating that the BMP system has been designed to retain the maximum feasible portion of the DCV. Complete Form 4.3-2 to identify and calculate estimated retention volume from implementing site design BMP. Refer to Section 5.4 in the TGD for more detailed guidance.

Form 4.3-2 Site Design BMPs (DA 1)

1 Implementation of Impervious Area Dispersion BMP (i.e. routing runoff from impervious to pervious areas), excluding impervious areas planned for routing to on-lot infiltration BMP: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> 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) $V = \text{Item 2} * \text{Item 3} * (0.5/12)$, assuming retention of 0.5 inches of runoff			
5 Sum of retention volume achieved from impervious area dispersion (ft ³): 0 $V_{\text{retention}} = \text{Sum of Item 4 for all BMPs}$			
6 Implementation of Localized On-lot Infiltration BMPs (e.g. on-lot rain gardens): Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> If yes, complete Items 7-13 for aggregate of all on-lot infiltration BMP in each DA; If no, proceed to Item 14	DA DMA BMP Type	DA DMA BMP Type	DA DMA BMP Type (Use additional forms for more BMPs)
7 Ponding surface area (ft ²)			
8 Ponding depth (ft) (min. 0.5 ft.)			
9 Surface area of amended soil/gravel (ft ²)			
10 Average depth of amended soil/gravel (ft) (min. 1 ft.)			
11 Average porosity of amended soil/gravel			
12 Retention volume achieved from on-lot infiltration (ft ³) $V_{\text{retention}} = (\text{Item 7} * \text{Item 8}) + (\text{Item 9} * \text{Item 10} * \text{Item 11})$			
13 Runoff volume retention from on-lot infiltration (ft ³): 0 $V_{\text{retention}} = \text{Sum of Item 12 for all BMPs}$			

Form 4.3-2 Site Design BMPs (DA 1)

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

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

4.3.3 Infiltration BMPs

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

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

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

4.3.3.1 Allowed Variations for Special Site Conditions

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

- 1) Facilities located within 10 feet of structures or other potential geotechnical hazards established by the geotechnical expert for the project may incorporate an impervious cutoff wall between the bioretention facility and the structure or other geotechnical hazard.
- 2) Facilities with documented high concentrations of pollutants in underlying soil or groundwater, facilities located where infiltration could contribute to a geotechnical hazard, and facilities located on elevated plazas or other structures may incorporate an impervious liner and may locate the underdrain discharge at the bottom of the subsurface drainage/storage layer (this configuration is commonly known as a “flow-through planter”).
- 3) Facilities located in areas of high groundwater, highly infiltrative soils or where connection of underdrain to a surface drain or to a subsurface storm drain are infeasible, may omit the underdrain.
- 4) Facilities serving high-risk areas such as fueling stations, truck stops, auto repairs, and heavy industrial sites may be required to provide adequate pretreatment to address pollutants of concern unless these high-risk areas are isolated from storm water runoff or bioretention areas with no chance of spill migration.

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

1 Remaining LID DCV not met by site design BMP (ft ³): $V_{unmet} = \text{Form 4.2-1 Item 7} - \text{Form 4.3-2 Item 19}$			
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 1 BMP Type Infiltration Basin	DA DMA BMP Type	DA DMA BMP Type (Use additional forms for more BMPs)
2 Infiltration rate of underlying soils (in/hr) See Section 5.4.2 and Appendix C of the TGD for WQMP for minimum requirements for assessment methods	4		
3 Infiltration safety factor See TGD Section 5.4.2 and Appendix D	4		
4 Design percolation rate (in/hr) $P_{design} = \text{Item 2} / \text{Item 3}$	1		
5 Pondered water drawdown time (hr) Copy Item 6 in Form 4.2-1	48		
6 Maximum ponding depth (ft) BMP specific, see Table 5-4 of the TGD for WQMP for BMP design details	7		
7 Ponding Depth (ft) $d_{BMP} = \text{Minimum of } (1/12 * \text{Item 4} * \text{Item 5}) \text{ or Item 6}$	3		
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	33,300		
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	0		
10 Amended soil porosity			
11 Gravel depth, d_{media} (ft) Only included in certain BMP types, see Table 5-4 of the TGD for WQMP for BMP design details	0		
12 Gravel porosity			
13 Duration of storm as basin is filling (hrs) Typical ~ 3hrs	3		
14 Above Ground Retention Volume (ft ³) $V_{retention} = \text{Item 8} * [\text{Item 7} + (\text{Item 9} * \text{Item 10}) + (\text{Item 11} * \text{Item 12}) + (\text{Item 13} * (\text{Item 4} / 12))]$	108,225		
15 Underground Retention Volume (ft ³) Volume determined using manufacturer's specifications and calculations	0		
16 Total Retention Volume from LID Infiltration BMPs: 108,225 (Sum of Items 14 and 15 for all infiltration BMP included in plan)			
17 Fraction of DCV achieved with infiltration BMP: 101% $\text{Retention\%} = \text{Item 16} / \text{Form 4.2-1 Item 7}$			
18 Is full LID DCV retained onsite with combination of hydrologic source control and LID retention/infiltration BMPs? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> If yes, demonstrate conformance using Form 4.3-10; If no, then reduce Item 3, Factor of Safety to 2.0 and increase Item 8, Infiltrating Surface Area, such that the portion of the site area used for retention and infiltration BMPs equals or exceeds the minimum effective area thresholds (Table 5-7 of the TGD for WQMP) for the applicable category of development and repeat all above calculations.			

4.3.4 Biotreatment BMP

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

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

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

Form 4.3-4 Selection and Evaluation of Biotreatment BMP (DA 1)		
1 Remaining LID DCV not met by site design , or infiltration, BMP for potential biotreatment (ft ³): 0 <i>Form 4.2-1 Item 7 - Form 4.3-2 Item 19 – Form 4.3-3 Item 16</i>		List pollutants of concern <i>Copy from Form 2.3-1.</i>
2 Biotreatment BMP Selected <i>(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)</i>	Volume-based biotreatment <i>Use Forms 4.3-5 and 4.3-6 to compute treated volume</i>	Flow-based biotreatment <i>Use Form 4.3-7 to compute treated flow</i>
	<input type="checkbox"/> Bioretention with underdrain <input type="checkbox"/> Planter box with underdrain <input type="checkbox"/> Constructed wetlands <input type="checkbox"/> Wet extended detention <input type="checkbox"/> Dry extended detention	<input type="checkbox"/> Vegetated swale <input type="checkbox"/> Vegetated filter strip <input type="checkbox"/> Proprietary biotreatment
3 Volume biotreated in volume based biotreatment BMP (ft ³): <i>Form 4.3-5 Item 15 + Form 4.3-6 Item 13</i>	4 Compute remaining LID DCV with implementation of volume based biotreatment BMP (ft ³): <i>Item 1 – Item 3</i>	5 Remaining fraction of LID DCV for sizing flow based biotreatment BMP: % <i>Item 4 / Item 1</i>
6 Flow-based biotreatment BMP capacity provided (cfs): <i>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)</i>		
7 Metrics for MEP determination: <ul style="list-style-type: none"> • 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: <input type="checkbox"/> <i>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.</i> 		

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

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

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

Biotreatment BMP Type <i>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.</i>	DA DMA BMP Type		DA DMA BMP Type <i>(Use additional forms for more BMPs)</i>	
	Forebay	Basin	Forebay	Basin
1 Pollutants addressed with BMP forebay and basin <i>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</i>				
2 Bottom width (ft)				
3 Bottom length (ft)				
4 Bottom area (ft ²) $A_{bottom} = \text{Item 2} * \text{Item 3}$				
5 Side slope (ft/ft)				
6 Depth of storage (ft)				
7 Water surface area (ft ²) $A_{surface} = (\text{Item 2} + (2 * \text{Item 5} * \text{Item 6})) * (\text{Item 3} + (2 * \text{Item 5} * \text{Item 6}))$				
8 Storage volume (ft ³) <i>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</i> $V = \text{Item 6} / 3 * [\text{Item 4} + \text{Item 7} + (\text{Item 4} * \text{Item 7})^{0.5}]$				
9 Drawdown Time (hrs) <i>Copy Item 6 from Form 2.1</i>				
10 Outflow rate (cfs) $Q_{BMP} = (\text{Item 8}_{forebay} + \text{Item 8}_{basin}) / (\text{Item 9} * 3600)$				
11 Duration of design storm event (hrs)				
12 Biotreated Volume (ft ³) $V_{biotreated} = (\text{Item 8}_{forebay} + \text{Item 8}_{basin}) + (\text{Item 10} * \text{Item 11} * 3600)$				
13 Total biotreated volume from constructed wetlands, extended dry detention, or extended wet detention : 0 <i>(Sum of Item 12 for all BMP included in plan)</i>				

Form 4.3-7 Flow Based Biotreatment (DA 1)

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

4.3.5 Conformance Summary

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

Form 4.3-8 Conformance Summary and Alternative Compliance Volume Estimate (DA 1)	
1	Total LID DCV for the Project DA-1 (ft ³): 107,627 <i>Copy Item 7 in Form 4.2-1</i>
2	On-site retention with site design BMP (ft ³): 0 <i>Copy Item 18 in Form 4.3-2</i>
3	On-site retention with LID infiltration BMP (ft ³): 108,225 <i>Copy Item 16 in Form 4.3-3</i>
4	On-site biotreatment with volume based biotreatment BMP (ft ³): 0 <i>Copy Item 3 in Form 4.3-4</i>
5	Flow capacity provided by flow based biotreatment BMP (cfs): 0 <i>Copy Item 6 in Form 4.3-4</i>
6	<p>LID BMP performance criteria are achieved if answer to any of the following is "Yes":</p> <ul style="list-style-type: none"> Full retention of LID DCV with site design or infiltration BMP: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> <i>If yes, sum of Items 2, 3, and 4 is greater than Item 1</i> 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 <input type="checkbox"/> No <input type="checkbox"/> <i>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</i> On-site retention and infiltration is determined to be infeasible; therefore biotreatment BMP provides biotreatment for all pollutants of concern for full LID DCV: Yes <input type="checkbox"/> No <input type="checkbox"/> <i>If yes, Form 4.3-1 Items 7 and 8 were both checked yes</i>
7	<p>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:</p> <ul style="list-style-type: none"> Combination of Site Design, retention and infiltration, , and biotreatment BMPs provide less than full LID DCV capture: <input type="checkbox"/> <i>Checked yes if Form 4.3-4 Item 7 is checked yes, Form 4.3-4 Item 6 is zero, and sum of Items 2, 3, 4, and 5 is less than Item 1. If so, apply water quality credits and calculate volume for alternative compliance, $V_{alt} = (Item\ 1 - Item\ 2 - Item\ 3 - Item\ 4 - Item\ 5) * (100 - Form\ 2.4-1\ Item\ 2)\%$</i> Facilities, or a combination of facilities, of a different design than in Section E.12.e.(ii)(f) may be permitted if all of the following Phase II Small MS4 General Permit 2013-0001-DWQ 55 February 5, 2013 measures of equivalent effectiveness are demonstrated: <ul style="list-style-type: none"> 1) Equal or greater amount of runoff infiltrated or evapotranspired; <input type="checkbox"/> 2) Equal or lower pollutant concentrations in runoff that is discharged after biotreatment; <input type="checkbox"/> 3) Equal or greater protection against shock loadings and spills; <input type="checkbox"/> 4) Equal or greater accessibility and ease of inspection and maintenance. <input type="checkbox"/>

4.3.6 Hydromodification Control BMP

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

Form 4.3-9 Hydromodification Control BMPs (DA 1)	
1 Volume reduction needed for hydromodification performance criteria (ft ³): 61,657 <i>(Form 4.2-2 Item 4 * 0.95) – Form 4.2-2 Item 1</i>	2 On-site retention with site design and infiltration, BMP (ft ³): 108,225 <i>Sum of Form 4.3-8 Items 2, 3, and 4. Evaluate option to increase implementation of on-site retention in Forms 4.3-2, 4.3-3, and 4.3-4 in excess of LID DCV toward achieving hydromodification volume reduction</i>
3 Remaining volume for hydromodification volume capture (ft ³): 0 <i>Item 1 – Item 2</i>	4 Volume capture provided by incorporating additional on-site BMPs (ft ³): 0
5 Is Form 4.2-2 Item 11 less than or equal to 5%: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> <i>If yes, hydromodification performance criteria is achieved. If no, select one or more mitigation options below:</i> <ul style="list-style-type: none"> Demonstrate increase in time of concentration achieved by proposed LID site design, LID BMP, and additional on-site BMP <input type="checkbox"/> 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 <input type="checkbox"/> 	
6 Form 4.2-2 Item 12 less than or equal to 5%: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> <i>If yes, hydromodification performance criteria is achieved. If no, select one or more mitigation options below:</i> <ul style="list-style-type: none"> Demonstrate reduction in peak runoff achieved by proposed LID site design, LID BMPs, and additional on-site retention BMPs <input checked="" type="checkbox"/> 	

4.4 Alternative Compliance Plan (if applicable)

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

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

- 1) Equal or greater amount of runoff infiltrated or evapotranspired;
- 2) Equal or lower pollutant concentrations in runoff that is discharged after biotreatment;
- 3) Equal or greater protection against shock loadings and spills;
- 4) Equal or greater accessibility and ease of inspection and maintenance.

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

Section 5 Inspection and Maintenance Responsibility for Post Construction BMP

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

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

Form 5-1 BMP Inspection and Maintenance (use additional forms as necessary)			
BMP	Responsible Party(s)	Inspection/ Maintenance Activities Required	Minimum Frequency of Activities
Detention / Infil. Basin	City of Victorville	Inspect the basin for accumulated sediment and debris levels and cleanout solids when > 6" build up occurs. Inspect for standing water with 48 hours of heavy rain events to ensure proper drawdown. Clean and flush outlet pipe to restore free drainage.	Annually, and after heavy rainfall
Signage & Stencil	City of Victorville	Clean the stencil / signage surface to remove excess dirt. Re-paint as necessary	Annually
Catch Basins / Insert Filter	City of Victorville	Inspect catchment area and inlet for excessive sediment, trash, and / or debris accumulation. Litter, leaves, and debris should be removed from the insert filter to reduce the risk of clogging. Replace the insert filters as necessary.	Annually, and after heavy rainfall
Litter Control	City of Victorville	Vacuum sweep streets to remove potential stormwater contamination before anticipated storm events.	Weekly / Monthly
Landscape Areas	Owner	Landscape maintenance to prevent discharge of landscape waste into on-site retention structures. Control fertilizer, herbicide & pesticide	Weekly

MOJAVE RIVER WATERSHED Water Quality Management Plan (WQMP)

		applications to prevent stormwater contamination.	
Irrigation System	Owner	Check and repair the irrigation system to ensure proper function and verify there are no leaks or runoff from landscape areas. Adjust run time as necessary to prevent overwatering.	Weekly
Trash Enclosures	Owner	Empty trash receptacles and clean area around enclosures to prevent discharge of contaminated water.	Weekly

Section 6 WQMP Attachments

6.1. Site Plan and Drainage Plan

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

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

6.2 Electronic Data Submittal

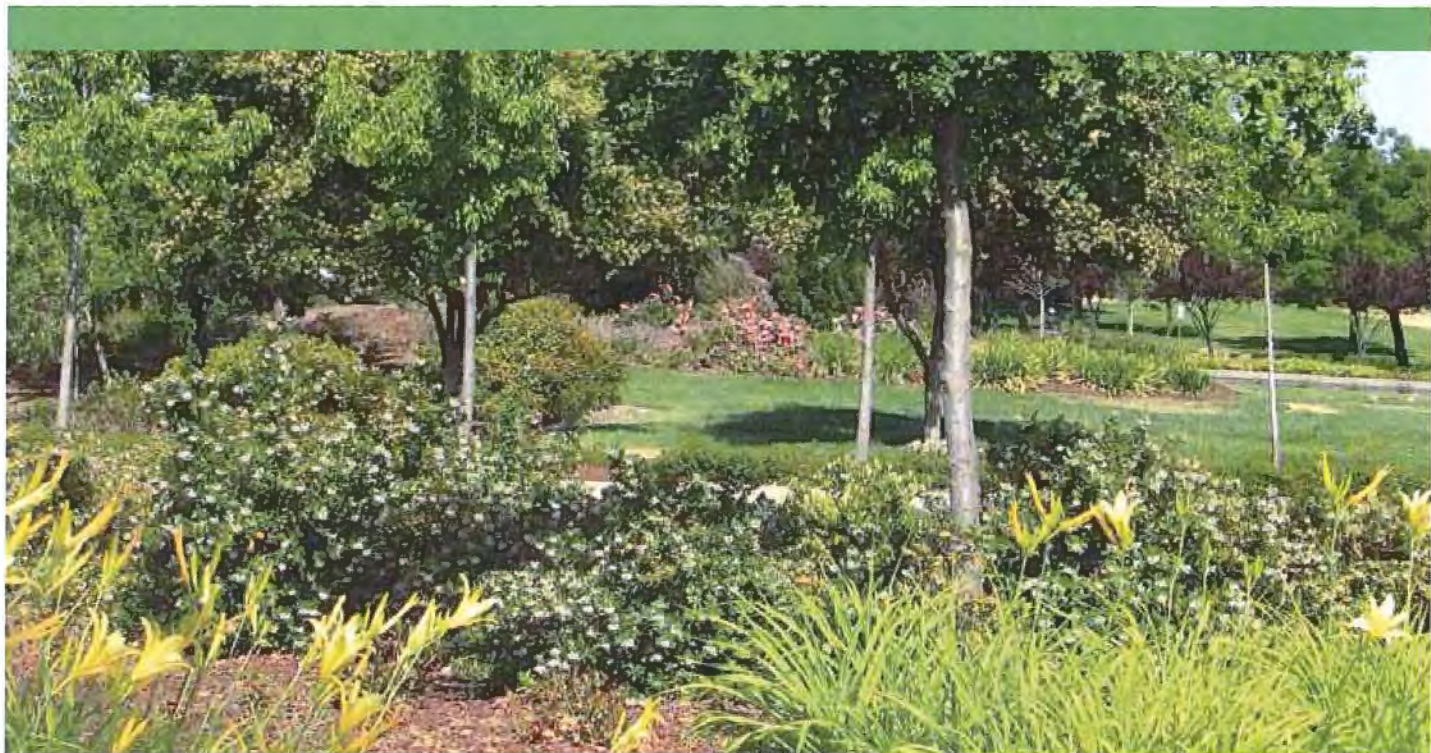
Minimum requirements include submittal of PDF exhibits in addition to hard copies. Format must not require specialized software to open. If the local jurisdiction requires specialized electronic document formats (as described in their Local Implementation Plan), this section will describe the contents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

6.3 Post Construction

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

6.4 Other Supporting Documentation

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



The Updated Model Water Efficient Landscape Ordinance

CALIFORNIA DEPARTMENT OF WATER RESOURCES

Landscapes are essential to the quality of life in California. They provide areas for recreation, enhance the environment, clean the air and water, prevent erosion, offer fire protection and replace ecosystems lost to development.

California's economic prosperity and environmental quality are dependant on an adequate supply of water for beneficial uses. In California, about half of the urban water used is for landscape irrigation. Ensuring **efficient landscapes** in new developments and reducing water waste in existing landscapes are the most cost-effective ways to stretch our limited water supplies and ensure that we continue to have sufficient water for California to prosper.

The Water Conservation in Landscaping Act of 2006 (Assembly Bill 1881, Laird) requires cities, counties, and charter cities and charter counties, to adopt landscape water conservation ordinances by January 1, 2010. Pursuant to this law, the Department of Water Resources (DWR) has prepared a Model Water Efficient Landscape Ordinance (Model Ordinance) for use by local agencies. The Model Ordinance was approved by the Office of Administrative Law on September 10, 2009. The Model Ordinance became effective on September 10.

All local agencies must adopt a water efficient landscape ordinance by **January 1, 2010**. The local agencies may adopt the state Model Ordinance, or craft an ordinance to fit local conditions. In addition, several local agencies may collaborate and craft a region-wide ordinance. In any case, the adopted ordinance must be as effective as the Model Ordinance in regard to water conservation.

For more information, please visit our web site at
<http://www.water.ca.gov/wateruseefficiency/landscapeordinance/>



DWR October 2009

Important points to consider...



Water purveyors have an important role.

The enabling statute was directed to local agencies that make land use decisions and approve land development. Active participation by water purveyors can make the implementation, enforcement and follow-up actions of an ordinance more effective.

Most new and rehabilitated landscapes are subject to a water efficient landscape ordinance. Public landscapes and private development projects including developer installed single family and multi-family residential landscapes with at least 2500 sq. ft. of landscape area are subject to the Model Ordinance .

Homeowner provided landscaping at single family and multi-family homes are subject to the Model Ordinance if the landscape area is at least 5000 sq. ft

Existing landscapes are also subject to the Model Ordinance.

Water waste is common in landscapes that are poorly designed or not well maintained. Water waste (from runoff, overspray, low head drainage, leaks and excessive amounts of applied irrigation water in landscapes is prohibited by Section 2, Article X of the California Constitution.

Any landscape installed prior to January 1, 2010, that is at least one acre in size may be subject to irrigation audits, irrigation surveys or water use analysis programs for evaluating irrigation system performance and adherence to the Maximum Applied Water Allowance as defined in the 1992 Model Ordinance with an Evapotranspiration Adjustment Factor (ETAF) of 0.8. Local agencies and water purveyors (designated by the local agency) may institute these or other programs to increase efficiency in existing landscapes.

All new landscapes will be assigned a water budget.

The water budget approach is a provision in the statute that ensures a landscape is allowed sufficient water. There are two water budgets in the Model Ordinance; the Maximum Applied Water Allowance (MAWA) and the Estimated Total Water Use (ETWU).

The MAWA, is the water budget used for compliance and is an annual water allowance based on landscape area, local evapotranspiration and ETAF of 0.7. The ETWU is an annual water use estimation for design purposes and is based on the water needs of the plants actually chosen for a given landscape. The ETWU may not exceed the MAWA.

Water efficient landscapes offer multiple benefits.

Water efficient landscapes will stretch our limited water supplies. Other benefits include reduced irrigation runoff, reduced pollution of waterways, less property damage, less green waste, increased drought resistance and a smaller carbon footprint.

The Department of Water Resources will offer technical assistance.

The Department plans to offer a series of workshops, publications and other assistance for successful adoption and implementation of the Model Ordinance or local water efficient landscape ordinances. Information regarding these resources may be found on the DWR website: <http://www.water.ca.gov/wateruseefficiency/landscapeordinance/> Questions on the Model Ordinance may be sent by e-mail to DWR staff at: mweo@water.ca.gov.



R-3 AUTOMOBILE PARKING

Parked automobiles may contribute pollutants to the storm drain because poorly maintained vehicles may leak fluids containing hydrocarbons, metals, and other pollutants. In addition, heavily soiled automobiles may drop clods of dirt onto the parking surface, contributing to the sediment load when runoff is present. During rain events, or wash-down activities, the pollutants may be carried into the storm drain system. The pollution prevention activities outlined in this fact sheet are used to prevent the discharge of pollutants to the storm drain system.

The activities outlined in this fact sheet target the following pollutants:	
Sediment	x
Nutrients	
Bacteria	
Foaming Agents	
Metals	X
Hydrocarbons	X
Hazardous Materials	x
Pesticides and Herbicides	
Other	

Think before parking your car. Remember - The ocean starts at your front door.

Required Activities

- If required, vehicles have to be removed from the street during designated street sweeping/cleaning times.
- If the automobile is leaking, place a pan or similar collection device under the automobile, until such time as the leak may be repaired.
- Use dry cleaning methods to remove any materials deposited by vehicles (e.g. adsorbents for fluid leaks, sweeping for soil clod deposits).

Recommended Activities

- Park automobiles over permeable surfaces (e.g. gravel, or porous cement).
- Limit vehicle parking to covered areas.
- Perform routine maintenance to minimize fluid leaks, and maximize fuel efficiency.

For additional information contact:

County of Orange, **OC Watershed**

Main: (714) 955-0600/ 24hr Water Pollution Discharge Hotline 1-877-89-SPILL

or visit our website at: www.ocwatersheds.com



R-5 DISPOSAL OF PET WASTES

Pet wastes left in the environment may introduce solids, bacteria, and nutrients to the storm drain. The type and quantity of waste will dictate the proper disposal method. Small quantities of waste are best disposed with regular trash or flushed down a toilet. Large quantities of wastes from herbivore animals may be composted for subsequent use or disposal to landfill.

Pick up after your pet! It's as easy as 1-2-3. 1) Bring a bag. 2) Clean it up. 3) Dispose of it properly (toilet or trash). The pollution prevention activities outlined in this fact sheets are used to prevent the discharge of pollutants to the storm drain system.

The activities outlined in this fact sheet target the following pollutants:	
Sediment	x
Nutrients	x
Bacteria	x
Foaming Agents	
Metals	
Hydrocarbons	
Hazardous Materials	
Pesticides and Herbicides	
Other	

Think before you dispose of any pet wastes. Remember - The ocean starts at your front door.

Required Activities

- All pet wastes must be picked up and properly disposed of. Pet waste should be disposed of in the regular trash, flushed down a toilet, or composted as type and quantities dictate.
- Properly dispose of unused flea control products (shampoo, sprays, or collars).
- Manure produced by livestock in uncovered areas should be removed at least daily for composting, or storage in water-tight container prior to disposal. Never hose down to stream or storm drain. Composting or storage areas should be configured and maintained so as not to allow contact with runoff. Compost may be donated to greenhouses, nurseries, and botanical parks. Topsoil companies and composting centers may also accept composted manure.
- Line waste pits or trenches with an impermeable layer, such as thick plastic sheeting.
- When possible, allow wash water to infiltrate into the ground, or collect in an area that is routed to the sanitary sewer.
- Confine livestock in fenced in areas except during exercise and grazing times. Restrict animal access to creeks and streams, preferably by fencing.

For additional information contact:

County of Orange, **OC Watershed**

Main: (714) 955-0600/ 24hr Water Pollution Discharge Hotline 1-877-89-SPILL

or visit our website at: www.ocwatersheds.com

- Install gutters that will divert roof runoff away from livestock areas.

Recommended Activities

- In order to properly dispose of pet waste, carry bags, pooper-scooper, or equivalent to safely pick up pet wastes while walking with pets.
- Bathe pets indoors and use less toxic shampoos. When possible, have pets professionally groomed.
- Properly inoculate your pet in order to maintain their health and reduce the possibility of pathogens in pet wastes.
- Maintain healthy and vigorous pastures with at least three inches of leafy material.
- Consider indoor feeding of livestock during heavy rainfall, to minimize manure exposed to potential runoff.
- Locate barns, corrals, and other high use areas on portions of property that either drain away from or are located distant from nearby creeks or storm drains.

For additional information contact:

County of Orange, **OC Watershed**

Main: (714) 955-0600/ 24hr Water Pollution Discharge Hotline 1-877-89-SPILL

or visit our website at: www.ocwatersheds.com



R-7 HOUSEHOLD HAZARDOUS WASTE

Household hazardous wastes (HHW) are defined as waste materials which are typically found in homes or similar sources, which exhibit characteristics such as: corrosivity, ignitability, reactivity, and/or toxicity, or are listed as hazardous materials by EPA.

List of most common HHW products:

Drain openers
Oven cleaners
Wood and metal cleaners and polishes
Automotive oil and fuel additives
Grease and rust solvents
Carburetor and fuel injection cleaners
Starter fluids
Batteries
Paint Thinners
Paint strippers and removers
Adhesives
Herbicides
Pesticides
Fungicides/wood preservatives

Many types of waste can be recycled, however options for each waste type are limited. Recycling is always preferable to disposal of unwanted materials. All gasoline, antifreeze, waste oil, and lead-acid batteries can be recycled. Latex and oil-based paint can be reused, as well as recycled. Materials that cannot be reused or recycled should be disposed of at a properly permitted landfill.

Think before disposing of any household hazardous waste. Remember - The ocean starts at your front door.

The activities outlined in this fact sheet target the following pollutants:

Sediment	
Nutrients	
Bacteria	
Foaming Agents	x
Metals	x
Hydrocarbons	x
Hazardous Materials	x
Pesticides and Herbicides	x
Other	x



Required Activities

- Dispose of HHW at a local collection facility. Call (714) 834-6752 for the household hazardous waste center closest to your area.
- Household hazardous materials must be stored indoors or under cover, and in closed and labeled containers.
- If safe, contain, clean up, and properly dispose all household hazardous waste spills. If an unsafe condition exists, call 911 to activate the proper response team.

Recommended Activities

- Use non-hazardous or less-hazardous products.
- Participate in HHW reuse and recycling. Call (714) 834-6752 for the participating household hazardous waste centers.

The California Integrated Waste Management Board has a Recycling Hotline (800) 553-2962, that provides information and recycling locations for used oil.

For additional information contact:

County of Orange, **OC Watershed**

Main: (714) 955-0600/ 24hr Water Pollution Discharge Hotline 1-877-89-SPILL

or visit our website at: www.ocwatersheds.com



R-8 WATER CONSERVATION

Excessive irrigation and/or the overuse of water is often the most significant factor in transporting pollutants to the storm drain system. Pollutants from a wide variety of sources including automobile repair and maintenance, automobile washing, automobile parking, home and garden care activities and pet care may dissolve in the water and be transported to the storm drain. In addition, particles and materials coated with fertilizers and pesticides may be suspended in the flow and be transported to the storm drain.

Hosing off outside areas to wash them down not only consumes large quantities of water, but also transports any pollutants, sediments, and waste to the storm drain system. The pollution prevention activities outlined in this fact sheets are used to prevent the discharge of pollutants to the storm drain system.

The activities outlined in this fact sheet target the following pollutants:	
Sediment	x
Nutrients	x
Bacteria	x
Foaming Agents	x
Metals	x
Hydrocarbons	x
Hazardous Materials	x
Pesticides and Herbicides	x
Other	x

Think before using water. Remember - The ocean starts at your front door.

Required Activities

- Irrigation systems must be properly adjusted to reflect seasonal water needs.
- Do not hose off outside surfaces to clean, sweep with a broom instead.

Recommended Activities

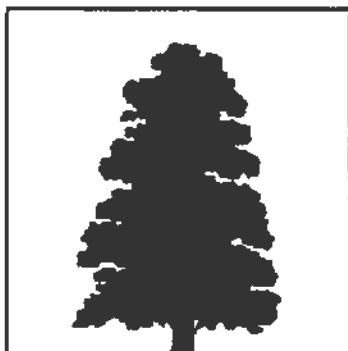
- Fix any leaking faucets and eliminate unnecessary water sources.
- Use xeriscaping and drought tolerant landscaping to reduce the watering needs.
- Do not over watering lawns or gardens. Over watering wastes water and promotes diseases.
- Use a bucket to re-soak sponges/rags while washing automobiles and other items outdoors. Use hose only for rinsing.
- Wash automobiles at a commercial car wash employing water recycling.

For additional information contact:

County of Orange, **OC Watershed**

Main: (714) 955-0600/ 24hr Water Pollution Discharge Hotline 1-877-89-SPILL

or visit our website at: www.ocwatersheds.com



FP-2

LANDSCAPE MAINTENANCE

The model procedures described below focus on minimizing the discharge of pesticides and fertilizers, landscape waste, trash, debris, and other pollutants to the storm drain system and receiving waters. Landscape maintenance practices may involve one or more of the following activities:

- 1. Mowing, Trimming/Weeding, and Planting**
- 2. Irrigation**
- 3. Fertilizer and Pesticide Management**
- 4. Managing Landscape Waste**
- 5. Erosion Control**

POLLUTION PREVENTION:

Pollution prevention measures have been considered and incorporated in the model procedures. Implementation of these measures may be more effective and reduce or eliminate the need to implement other more complicated or costly procedures. Possible pollution prevention measures for landscape maintenance include:

- Implement an integrated pest management (IPM) program. IPM is a sustainable approach to managing pests by combining biological, cultural, physical, and chemical tools. Refer to Appendix D, Fertilizer and Pesticide Management Guidance for further details.
- Choose low water using flowers, trees, shrubs, and groundcover.
- Appropriate maintenance (i.e. properly timed fertilizing, weeding, pest control, and pruning) will preserve the landscapes water efficiency.
- Once per year, educate municipal staff on pollution prevention measures.

MODEL PROCEDURES:

1. Mowing, Trimming/Weeding, and Planting

Mowing, Trimming/Weeding

- ✓ Whenever possible, use mechanical methods of vegetation removal rather than applying herbicides. Use hand weeding where practical.

FP-2

- ✓ When conducting mechanical or manual weed control, avoid loosening the soil, which could erode into streams or storm drains.
- ✓ Use coarse textured mulches or geotextiles to suppress weed growth and reduce the use of herbicides.
- ✓ Do not blow or rake leaves, etc. into the street or place yard waste in gutters or on dirt shoulders. Sweep up any leaves, litter or residue in gutters or on street.
- ✓ Collect lawn and garden clippings, pruning waste, tree trimmings, and weeds. Chip if necessary, and compost or dispose of at a landfill (see waste management section of this procedure sheet).
- ✓ Place temporarily stockpiled material away from watercourses, and berm or cover stockpiles to prevent material releases to storm drains.

Planting

- ✓ Where feasible, retain and/or plant selected native vegetation whose features are determined to be beneficial. Native vegetation usually requires less maintenance (e.g., irrigation, fertilizer) than planting ornamental vegetation.
- ✓ When planting or replanting consider using low water use groundcovers.

OPTIONAL:

- Careful soil mixing and layering techniques using a topsoil mix or composted organic material can be used as an effective measure to reduce herbicide use and watering.

2. Irrigation

- ✓ Utilize water delivery rates that do not exceed the infiltration rate of the soil.
- ✓ Use timers appropriately or a drip system to prevent runoff and then only irrigate as much as is needed.
- ✓ Inspect irrigation system periodically to ensure that the right amount of water is being applied and that excessive runoff is not occurring. Minimize excess watering, and repair leaks in the irrigation system as soon as they are observed.
- ✓ Where practical, use automatic timers to minimize runoff.
- ✓ Use popup sprinkler heads in areas with a lot of activity or where there is a chance the pipes may be broken. Consider the use of mechanisms that reduce water flow to sprinkler heads if broken.
- ✓ If re-claimed water is used for irrigation, ensure that there is no runoff from the landscaped area(s).
- ✓ If bailing of muddy water is required (e.g. when repairing a water line leak), do not put it in the storm drain; pour over landscaped areas.

3. Fertilizer and Pesticide Management

Usage

- ✓ Utilize a comprehensive management system that incorporates integrated pest management techniques.
- ✓ Follow all federal, state, and local laws and regulations governing the use, storage, and disposal of fertilizers and pesticides and training of applicators and pest control advisors.
- ✓ Educate and train employees on use of pesticides and in pesticide application techniques to prevent pollution.
- ✓ Pesticide application must be under the supervision of a California qualified pesticide applicator.
- ✓ When applicable use the least toxic pesticides that will do the job. Avoid use of copper-based pesticides if possible.
- ✓ Do not mix or prepare pesticides or fertilizers for application near storm drains.
- ✓ Prepare the minimum amount of pesticide needed for the job and use the lowest rate that will effectively control the pest.
- ✓ Employ techniques to minimize off-target application (e.g. spray drift) of pesticides, including consideration of alternative application techniques.
- ✓ Calibrate fertilizer and pesticide application equipment to avoid excessive application.
- ✓ Periodically test soils for determining proper fertilizer use.
- ✓ Sweep pavement and sidewalk if fertilizer is spilled on these surfaces before applying irrigation water.
- ✓ Inspect pesticide/fertilizer equipment and transportation vehicles daily.
- ✓ Refer to Appendix D for further guidance on Fertilizer and Pesticide management

OPTIONAL:

- Work fertilizers into the soil rather than dumping or broadcasting them onto the surface.
- Use beneficial insects where possible to control pests (green lacewings, ladybugs, praying mantis, ground beetles, parasitic nematodes, trichogramma wasps, seedhead weevils, and spiders prey on detrimental pest species).
- Use slow release fertilizers whenever possible to minimize leaching.

Scheduling

- ✓ Do not use pesticides if rain is expected within 24 hours.
- ✓ Apply pesticides only when wind speeds are low (less than 5 mph).

Disposal

- ✓ Purchase only the amount of pesticide that you can reasonably use in a given time period (month or year depending on the product).
- ✓ Triple rinse containers, and use rinse water as product. Dispose of unused pesticide as hazardous waste.
- ✓ Dispose of empty pesticide containers according to the instructions on the container label.

4. Managing Landscape Waste

Also see Waste Handling and Disposal procedure sheet

- ✓ Compost leaves, sticks, or other collected vegetation or dispose of at a permitted landfill. Do not dispose of collected vegetation into waterways or storm drainage systems.
- ✓ Place temporarily stockpiled material away from watercourses and storm drain inlets, and berm or cover stockpiles to prevent material releases to the storm drain system.
- ✓ Reduce the use of high nitrogen fertilizers that produce excess growth requiring more frequent mowing or trimming.
- ✓ Inspection of drainage facilities should be conducted to detect illegal dumping of clippings/cuttings in or near these facilities. Materials found should be picked up and properly disposed of.
- ✓ Landscape wastes in and around storm drain inlets should be avoided by either using bagging equipment or by manually picking up the material.

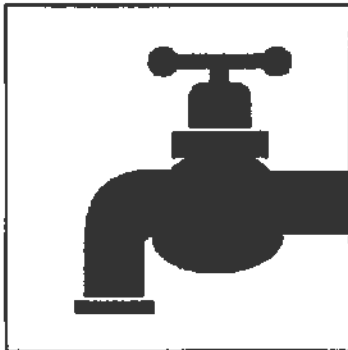
5. Erosion Control

Also see Waste Handling and Disposal procedure sheet

- ✓ Maintain vegetative cover on medians and embankments to prevent soil erosion. Apply mulch or leave clippings to serve as additional cover for soil stabilization and to reduce the velocity of storm water runoff.
- ✓ Minimize the use of disking as a means of vegetation management because the practice may result in erodible barren soil.
- ✓ Confine excavated materials to pervious surfaces away from storm drain inlets, sidewalks, pavement, and ditches. Material must be covered if rain is expected.

LIMITATIONS:

Alternative pest/weed controls may not be available, suitable, or effective in every case.



FP-6

WATER AND SEWER UTILITY OPERATION AND MAINTENANCE

Although the operation and maintenance of public utilities are not considered themselves a chronic source of stormwater pollution, some activities and accidents can result in the discharge of pollutants that can pose a threat to both human health and the quality of receiving waters if they enter the storm drain system. Activities associated with the operation and maintenance of water and sewer utilities to prevent and handle such incidents include the following:

- 1. Water Line Maintenance**
- 2. Sanitary Sewer Maintenance**
- 3. Spill/Leak/Overflow Control, Response, and Containment**

Cities that do not provide maintenance of water and sewer utilities should coordinate with the contracting agency responsible for these activities and ensure that these model procedures are followed.

POLLUTION PREVENTION:

Pollution prevention measures have been considered and incorporated in the model procedures. Implementation of these measures may be more effective and reduce or eliminate the need to implement other more complicated or costly procedures. Possible pollution prevention measures for water and sewer utility operation and maintenance include:

- Inspect potential non-storm water discharge flow paths and clear/cleanup any debris or pollutants found (i.e. remove trash, leaves, sediment, and wipe up liquids, including oil spills).
- Once per year, educate municipal staff on pollution prevention measures.

MODEL PROCEDURES:

1. Water Line Maintenance

Procedures can be employed to reduce pollutants from discharges associated with water utility operation and maintenance activities. Planned discharges may include fire hydrant testing, flushing water supply mains after new construction, flushing lines due to complaints of taste and odor, dewatering mains for maintenance work. Unplanned discharges from treated, recycled water, raw water, and groundwater systems operation and maintenance activities can occur from water main breaks, sheared fire hydrants, equipment malfunction, and operator error.

Planned Discharges

- ✓ For planned discharges use one of the following options:
 - Reuse water for dust suppression, irrigation, or construction compaction
 - Discharge to the sanitary sewer system with approval
 - Discharge to the storm drain system or to a creek using applicable pollution control measures listed below (this option is ONLY applicable to uncontaminated pumped ground water, water line flushing, fire hydrant testing and flushing, discharges from potable water sources other than water main breaks) and may require a permit from the Regional Water Quality Control Board.
- ✓ If water is discharged to a storm drain inlet (catch basin), control measures must be put in place to control potential pollutants (i.e. sediment, chlorine, etc.). Examples of some storm drain inlet protection options include:
 - Silt fence – appropriate where the inlet drains a relatively flat area.
 - Gravel and wire mesh sediment filter – Appropriate where concentrated flows are expected.
 - Wooden weir and fabric – use at curb inlets where a compact installation is desired.
- ✓ Prior to discharge, inspect discharge flow path and clear/cleanup any debris or pollutants found (i.e. remove trash, leaves, sediment, and wipe up liquids, including oil spills).
- ✓ Select appropriate pollution control measure(s) considering the receiving system (i.e. curb inlet, drop inlet, culvert, creek, etc.) and ensure that the control device(s) fit properly.

- ✓ General design considerations for inlet protection devices include the following:
 - The device should be constructed such that cleaning and disposal of trapped sediment is made easy, while minimizing interference with discharge activities.
 - Devices should be constructed so that any standing water resulting from the discharge will not cause excessive inconvenience or flooding/damage to adjacent land or structures.
- ✓ The effectiveness of control devices must be monitored during the discharge period and any necessary repairs or modifications made as needed.

OPTIONAL:

- Sediment removal may be enhanced by placing filter fabric, gravel bags, etc. at storm drain inlets.

Unplanned Discharges

- ✓ Stop the discharge as quickly as possible by turning off water source.
- ✓ Inspect flow path of the discharged water:
 - Control erosion along the flow path.
 - Identify areas that may produce significant sediment or gullies, use sandbags to redirect the flow.
 - Identify erodible areas which may need to be repaired or protected during subsequent repairs or corrective actions
- ✓ If repairs or corrective action will cause additional discharges of water, select the appropriate procedures for erosion control, chlorine residual, turbidity, and chemical additives. Prevent potential pollutants from entering the flow path and ensure that no additional discharged water enters storm drain inlets.

2. Sanitary Sewer Maintenance

Applicable to municipalities who own and operated a sewage collection system. Facilities that are covered under this program include sanitary sewer pipes and pump stations owned and operated by the Permittee. The owner of the sanitary sewer facilities is the entity responsible for carrying out this prevention and response program.

Sewer System Cleaning

- ✓ Sewer lines should be cleaned on a regular basis to remove grease, grit, and other debris that may lead to sewer backups.
- ✓ Establish routine maintenance program. Cleaning should be conducted at an established minimum frequency and more frequently for problem areas such as restaurants that are identified
- ✓ Cleaning activities may require removal of tree roots and other identified obstructions.

Preventative and Corrective Maintenance

- ✓ During routine maintenance and inspection note the condition of sanitary sewer structures and identify areas that need repair or maintenance. Items to note may include the following:
 - cracked/deteriorating pipes
 - leaking joints/seals at manhole
 - frequent line plugs
 - line generally flows at or near capacity
 - suspected infiltration or exfiltration
- ✓ Document suggestions and requests for repair and report the information to the appropriate manager or supervisor.
- ✓ Prioritize repairs based on the nature and severity of the problem. Immediate clearing of blockage or repair is required where an overflow is currently occurring or for urgent problems that may cause an imminent overflow (e.g. pump station failures, sewer line ruptures, sewer line blockages). These repairs may be temporary until scheduled or capital improvements can be completed.
- ✓ Review previous sewer maintenance records to help identify "hot spots" or areas with frequent maintenance problems and locations of potential system failure.

3. Spill/Leak/Overflow Control, Response, and Containment

Control

Also see Drainage System procedures sheet

- ✓ Refer to countywide *Illicit Discharge Detection and Elimination Program*. Components of this program include:
 - Investigation/inspection and follow-up
 - Elimination of illicit discharges and connections
 - Enforcement of ordinances
 - Respond to sewage spills

- Facilitate public reporting of illicit discharges and connections. A citizen's hotline for reporting observed overflow conditions should be established to supplement the field screening efforts being conducted by the Principal Permittee.

Response and Containment

- ✓ Establish lead department/agency responsible for spill response and containment. Provide coordination within departments.
- ✓ When a spill, leak, and/or overflow occurs, keep sewage from entering the storm drain system to the maximum extent practicable by covering or blocking storm drain inlets or by containing and diverting the sewage away from open channels and other storm drain facilities (using sandbags, inflatable dams, etc.).
- ✓ If a spill reaches the storm drain notify County of Orange Health Care Agency through Control One at (714) 628-7208.
- ✓ Remove the sewage using vacuum equipment or use other measures to divert it back to the sanitary sewer system.
- ✓ Record required information at the spill site.
- ✓ Perform field tests as necessary to determine the source of the spill.
- ✓ Develop additional notification procedures regarding spill reporting as needed.

LIMITATIONS:

Private property access rights needed to perform testing along storm drain right-of-ways. Requirements of municipal ordinance authority for suspected source verification testing necessary for guaranteed rights of entry.

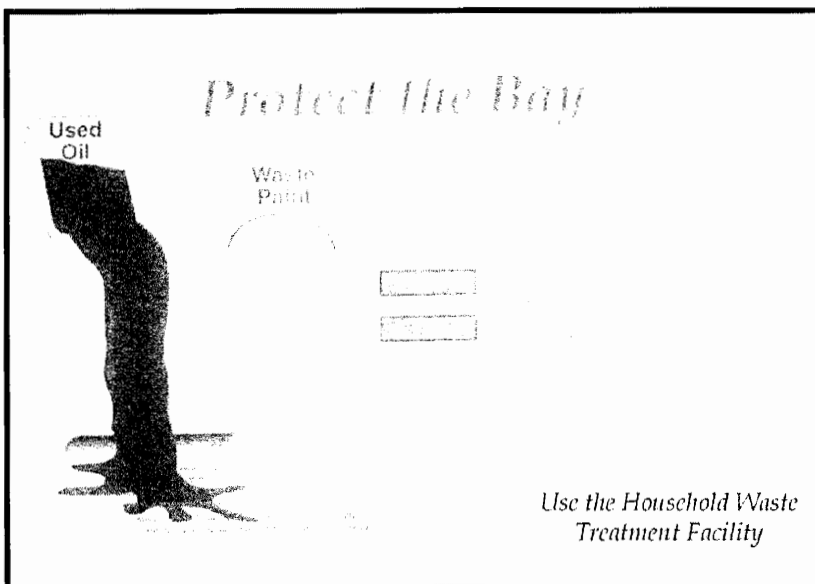
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http://ladpw.org/wmd/npdes/public_TC.cfm

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Santa Clara Valley Urban Runoff Pollution Prevention Program. Water Utility Pollution Prevention Plan.



Graphic by: Margie Winter

Description

Non-stormwater discharges are those flows that do not consist entirely of stormwater. For municipalities non-stormwater discharges present themselves in two situations. One is from fixed facilities owned and/or operated by the municipality. The other situation is non-stormwater discharges that are discovered during the normal operation of a field program. Some non-stormwater discharges do not include pollutants and may be discharged to the storm drain. These include uncontaminated groundwater and natural springs. There are also some non-stormwater discharges that typically do not contain pollutants and may be discharged to the storm drain with conditions. These include car washing, and surface cleaning. However, there are certain non-stormwater discharges that pose environmental concern. These discharges may originate from illegal dumping or from internal floor drains, appliances, industrial processes, sinks, and toilets that are connected to the nearby storm drainage system. These discharges (which may include: process waste waters, cooling waters, wash waters, and sanitary wastewater) can carry substances (such as paint, oil, fuel and other automotive fluids, chemicals and other pollutants) into storm drains. The ultimate goal is to effectively eliminate non-stormwater discharges to the stormwater drainage system through implementation of measures to detect, correct, and enforce against illicit connections and illegal discharges.

Approach

The municipality must address non-stormwater discharges from its fixed facilities by assessing the types of non-stormwater discharges and implementing BMPs for the discharges determined to pose environmental concern. For field programs the field staff must be

Objectives

- Contain
- Educate
- Reduce/Minimize

Targeted Constituents

Sediment	✓
Nutrients	✓
Trash	✓
Metals	✓
Bacteria	✓
Oil and Grease	✓
Organics	✓
Oxygen Demanding	✓



trained to now what to look for regarding non-stormwater discharges and the procedures to follow in investigating the detected discharges.

Suggested Protocols**Fixed Facility***General*

- Post “No Dumping” signs with a phone number for reporting dumping and disposal. Signs should also indicate fines and penalties for illegal dumping.
- Stencil storm drains, where applicable, to prevent illegal disposal of pollutants. Storm drain inlets should have messages such as “Dump No Waste Drains to Stream” stenciled next to them to warn against ignorant or intentional dumping of pollutants into the storm drainage system.
- Landscaping and beautification efforts of hot spots might also discourage future dumping, as well as provide open space and increase property values.
- Lighting or barriers may also be needed to discourage future dumping.

Illicit Connections

- Locate discharges from the fixed facility drainage system to the municipal storm drain system through review of “as-built” piping schematics.
- Use techniques such as smoke testing, dye testing and television camera inspection (as noted below) to verify physical connections.
- Isolate problem areas and plug illicit discharge points.

Visual Inspection and Inventory

- Inventory and inspect each discharge point during dry weather.
- Keep in mind that drainage from a storm event can continue for several days following the end of a storm and groundwater may infiltrate the underground stormwater collection system. Also, non-stormwater discharges are often intermittent and may require periodic inspections.

Review Infield Piping

- Review the “as-built” piping schematic as a way to determine if there are any connections to the stormwater collection system.
- Inspect the path of floor drains in older buildings.

Smoke Testing

- Smoke testing of wastewater and stormwater collection systems is used to detect connections between the two systems.

- During dry weather the stormwater collection system is filled with smoke and then traced to sources. The appearance of smoke at the base of a toilet indicates that there may be a connection between the sanitary and the stormwater system.

Dye Testing

- A dye test can be performed by simply releasing a dye into either your sanitary or process wastewater system and examining the discharge points from the stormwater collection system for discoloration.

TV Inspection of Storm Sewer

- TV Cameras can be employed to visually identify illicit connections to the fixed facility storm drain system.

Illegal Dumping

- Regularly inspect and clean up hot spots and other storm drainage areas where illegal dumping and disposal occurs.
- Clean up spills on paved surfaces with as little water as possible. Use a rag for small spills, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be sent to a certified laundry (rags) or disposed of as hazardous waste.
- Never hose down or bury dry material spills. Sweep up the material and dispose of properly.
- Use adsorbent materials on small spills rather than hosing down the spill. Remove the adsorbent materials promptly and dispose of properly.
- For larger spills, a private spill cleanup company or Hazmat team may be necessary.
- See fact sheet SC-11 Spill Prevention, Control, and Clean Up.

Field Program

General

- Develop clear protocols and lines of communication for effectively prohibiting non-stormwater discharges, especially ones that involve more than one jurisdiction and those that are not classified as hazardous, which are often not responded to as effectively as they need to be.
- Stencil storm drains, where applicable, to prevent illegal disposal of pollutants. Storm drain inlets should have messages such as “Dump No Waste Drains to Stream” stenciled next to them to warn against ignorant or intentional dumping of pollutants into the storm drainage system.
- See SC-74 Stormwater Drainage System Maintenance for additional information.

Field Inspection

- Regularly inspect and clean up hot spots and other storm drainage areas where illegal dumping and disposal occurs.
- During routine field program maintenance field staff should look for evidence of illegal discharges or illicit connection:
 - Is there evidence of spills such as paints, discoloring, etc.
 - Are there any odors associated with the drainage system
 - Record locations of apparent illegal discharges/illicit connections and notify appropriate investigating agency.
- If trained, conduct field investigation of non-stormwater discharges to determine whether they pose a threat to water quality.

Recommended Complaint Investigation Equipment

- Field Screening Analysis
 - pH paper or meter
 - Commercial stormwater pollutant screening kit that can detect for reactive phosphorus, nitrate nitrogen, ammonium nitrogen, specific conductance, and turbidity
 - Sample jars
 - Sample collection pole
 - A tool to remove access hole covers
- Laboratory Analysis
 - Sample cooler
 - Ice
 - Sample jars and labels
 - Chain of custody forms.
- Documentation
 - Camera
 - Notebook
 - Pens
 - Notice of Violation forms

- Educational materials

Reporting

- A database is useful for defining and tracking the magnitude and location of the problem.
- Report prohibited non-stormwater discharges observed during the course of normal daily activities so they can be investigated, contained and cleaned up or eliminated.
- Document that non-stormwater discharges have been eliminated by recording tests performed, methods used, dates of testing, and any onsite drainage points observed.
- Maintain documentation of illicit connection and illegal dumping incidents, including significant conditionally exempt discharges that are not properly managed.

Enforcement

- Educate the responsible party if identified on the impacts of their actions, explain the stormwater requirements, and provide information regarding Best Management Practices (BMP), as appropriate. Initiate follow-up and/or enforcement procedures.
- If an illegal discharge is traced to a commercial, residential or industrial source, conduct the following activities or coordinate the following activities with the appropriate agency:
 - Contact the responsible party to discuss methods of eliminating the non-stormwater discharge, including disposal options, recycling, and possible discharge to the sanitary sewer (if within POTW limits).
 - Provide information regarding BMPs to the responsible party, where appropriate.
 - Begin enforcement procedures, if appropriate.
 - Continue inspection and follow-up activities until the illicit discharge activity has ceased.
- If an illegal discharge is traced to a commercial or industrial activity, coordinate information on the discharge with the jurisdiction's commercial and industrial facility inspection program.

Training

- Train technical staff to identify and document illegal dumping incidents.
- Well-trained employees can reduce human errors that lead to accidental releases or spills. The employee should have the tools and knowledge to immediately begin cleaning up a spill if one should occur. Employees should be familiar with the Spill Prevention Control and Countermeasure Plan.
- Train employees to identify non-stormwater discharges and report them to the appropriate departments.
- Train staff who have the authority to conduct surveillance and inspections, and write citations for those caught illegally dumping.

- Train municipal staff responsible for surveillance and inspection in the following:
 - OSHA-required Health and Safety Training (29 CFR 1910.120) plus annual refresher training (as needed).
 - OSHA Confined Space Entry training (Cal-OSHA Confined Space, Title 8 and federal OSHA 29 CFR 1910.146).
 - Procedural training (field screening, sampling, smoke/dye testing, TV inspection).
- Educate the identified responsible party on the impacts of his or her actions.

Spill Response and Prevention

- See SC-11 Spill Prevention Control and Clean Up

Other Considerations

- The elimination of illegal dumping is dependent on the availability, convenience, and cost of alternative means of disposal. The cost of fees for dumping at a proper waste disposal facility are often more than the fine for an illegal dumping offense, thereby discouraging people from complying with the law. The absence of routine or affordable pickup service for trash and recyclables in some communities also encourages illegal dumping. A lack of understanding regarding applicable laws or the inadequacy of existing laws may also contribute to the problem.
- Municipal codes should include sections prohibiting the discharge of soil, debris, refuse, hazardous wastes, and other pollutants into the storm drain system.
- Many facilities do not have accurate, up-to-date schematic drawings.
- Can be difficult to locate illicit connections especially if there is groundwater infiltration.

Requirements***Costs***

- Eliminating illicit connections can be expensive especially if structural modifications are required such re-plumbing cross connections under an existing slab.
- Minor cost to train field crews regarding the identification of non-stormwater discharges. The primary cost is for a fully integrated program to identify and eliminate illicit connections and illegal dumping. However, by combining with other municipal programs (i.e. pretreatment program) cost may be lowered.
- Municipal cost for containment and disposal may be borne by the discharger.

Maintenance

Not applicable

Supplemental Information

Further Detail of the BMP

What constitutes a “non-stormwater” discharge?

- Non-stormwater discharges are discharges not made up entirely of stormwater and include water used directly in the manufacturing process (process wastewater), air conditioning condensate and coolant, non-contact cooling water, cooling equipment condensate, outdoor secondary containment water, vehicle and equipment wash water, landscape irrigation, sink and drinking fountain wastewater, sanitary wastes, or other wastewaters.

Permit Requirements

- Current municipal NPDES permits require municipalities to effectively prohibit non-stormwater discharges unless authorized by a separate NPDES permit or allowed in accordance with the current NPDES permit conditions. Typically the current permits allow certain non-stormwater discharges in the storm drain system as long as the discharges are not significant sources of pollutants. In this context the following non-stormwater discharges are typically allowed:
 - Diverted stream flows;
 - Rising found waters;
 - Uncontaminated ground water infiltration (as defined at 40 CFR 35.2005(20));
 - Uncontaminated pumped ground water;
 - Foundation drains;
 - Springs;
 - Water from crawl space pumps;
 - Footing drains;
 - Air conditioning condensation;
 - Flows from riparian habitats and wetlands;
 - Water line and hydrant flushing ;
 - Landscape irrigation;
 - Planned and unplanned discharges from potable water sources;
 - Irrigation water;
 - Individual residential car washing; and
 - Lawn watering.

Municipal facilities subject to industrial general permit requirements must include a certification that the stormwater collection system has been tested or evaluated for the presence of non-stormwater discharges. The state's General Industrial Stormwater Permit requires that non-stormwater discharges be eliminated prior to implementation of the facility's SWPPP.

Illegal Dumping

- Establish a system for tracking incidents. The system should be designed to identify the following:
 - Illegal dumping hot spots
 - Types and quantities (in some cases) of wastes
 - Patterns in time of occurrence (time of day/night, month, or year)
 - Mode of dumping (abandoned containers, "midnight dumping" from moving vehicles, direct dumping of materials, accidents/spills)
 - Responsible parties

Outreach

One of the keys to success of reducing or eliminating illegal dumping is increasing the number of people on the street who are aware of the problem and who have the tools to at least identify the incident, if not correct it. There are a number of ways of accomplishing this:

- Train municipal staff from all departments (public works, utilities, street cleaning, parks and recreation, industrial waste inspection, hazardous waste inspection, sewer maintenance) to recognize and report the incidents.
- Deputize municipal staff who may come into contact with illegal dumping with the authority to write illegal dumping tickets for offenders caught in the act (see below).
- Educate the public. As many as 3 out of 4 people do not understand that in most communities the storm drain does not go to the wastewater treatment plant. Unfortunately, with the heavy emphasis in recent years on public education about solid waste management, including recycling and household hazardous waste, the sewer system (both storm and sanitary) has been the likely recipient of cross-media transfers of waste.
- Provide the public with a mechanism for reporting incidents such as a hot line and/or door hanger (see below).
- Help areas where incidents occur more frequently set up environmental watch programs (like crime watch programs).
- Train volunteers to notice and report the presence and suspected source of an observed pollutant to the appropriate public agency.

What constitutes a “non-stormwater” discharge?

- Non-stormwater discharges are discharges not made up entirely of stormwater and include water used directly in the manufacturing process (process wastewater), air conditioning condensate and coolant, non-contact cooling water, cooling equipment condensate, outdoor secondary containment water, vehicle and equipment wash water, landscape irrigation, sink and drinking fountain wastewater, sanitary wastes, or other wastewaters.

Permit Requirements

- Current municipal NPDES permits require municipalities to effectively prohibit non-stormwater discharges unless authorized by a separate NPDES permit or allowed in accordance with the current NPDES permit conditions. Typically the current permits allow certain non-stormwater discharges in the storm drain system as long as the discharges are not significant sources of pollutants. In this context the following non-stormwater discharges are typically allowed:
 - Diverted stream flows;
 - Rising found waters;
 - Uncontaminated ground water infiltration (as defined at 40 CFR 35.2005(20));
 - Uncontaminated pumped ground water;
 - Foundation drains;
 - Springs;
 - Water from crawl space pumps;
 - Footing drains;
 - Air conditioning condensation;
 - Flows from riparian habitats and wetlands;
 - Water line and hydrant flushing ;
 - Landscape irrigation;
 - Planned and unplanned discharges from potable water sources;
 - Irrigation water;
 - Individual residential car washing; and
 - Lawn watering.

Municipal facilities subject to industrial general permit requirements must include a certification that the stormwater collection system has been tested or evaluated for the presence of non-stormwater discharges. The state's General Industrial Stormwater Permit requires that non-stormwater discharges be eliminated prior to implementation of the facility's SWPPP.

Storm Drain Stenciling

- Stencil storm drain inlets with a message to prohibit illegal dumpings, especially in areas with waste handling facilities.
- Encourage public reporting of improper waste disposal by a HOTLINE number stenciled onto the storm drain inlet.
- See Supplemental Information section of this fact sheet for further detail on stenciling program approach.

Oil Recycling

- Contract collection and hauling of used oil to a private licensed used oil hauler/recycler.
- Comply with all applicable state and federal regulations regarding storage, handling, and transport of petroleum products.
- Create procedures for collection such as; collection locations and schedule, acceptable containers, and maximum amounts accepted.
- The California Integrated Waste Management Board has a Recycling Hotline, (800) 553-2962, that provides information and recycling locations for used oil.

Household Hazardous Waste

- Provide household hazardous waste (HHW) collection facilities. Several types of collection approaches are available including permanent, periodic, or mobile centers, curbside collection, or a combination of these systems.

Training

- Train municipal employees and contractors in proper and consistent methods for waste disposal.
- Train municipal employees to recognize and report illegal dumping.
- Train employees and subcontractors in proper hazardous waste management.

Spill Response and Prevention

- Refer to SC-11, Spill Prevention, Control & Cleanup
- Have spill cleanup materials readily available and in a known location.
- Cleanup spills immediately and use dry methods if possible.
- Properly dispose of spill cleanup material.

Other Considerations

- Federal Regulations (RCRA, SARA, CERCLA) and state regulations exist regarding the disposal of hazardous waste.
- Municipalities are required to have a used oil recycling and a HHW element within their integrate waste management plan.
- Significant liability issues are involved with the collection, handling, and disposal of HHW.

Examples

The City of Palo Alto has developed a public participation program for reporting dumping violations. When a concerned citizen or public employee encounters evidence of illegal dumping, a door hanger (similar in format to hotel “Do Not Disturb” signs) is placed on the front doors in the neighborhood. The door hanger notes that a violation has occurred in the neighborhood, informs the reader why illegal dumping is a problem, and notes that illegal dumping carries a significant financial penalty. Information is also provided on what citizens can do as well as contact numbers for more information or to report a violation.

The Port of Long Beach has a state of the art database incorporating storm drain infrastructure, potential pollutant sources, facility management practices, and a pollutant tracking system.

The State Department of Fish and Game has a hotline for reporting violations called CalTIP (1-800-952-5400). The phone number may be used to report any violation of a Fish and Game code (illegal dumping, poaching, etc.).

The California Department of Toxic Substances Control’s Waste Alert Hotline, 1-800-69TOXIC, can be used to report hazardous waste violations.

References and Resources

<http://www.stormwatercenter.net/>

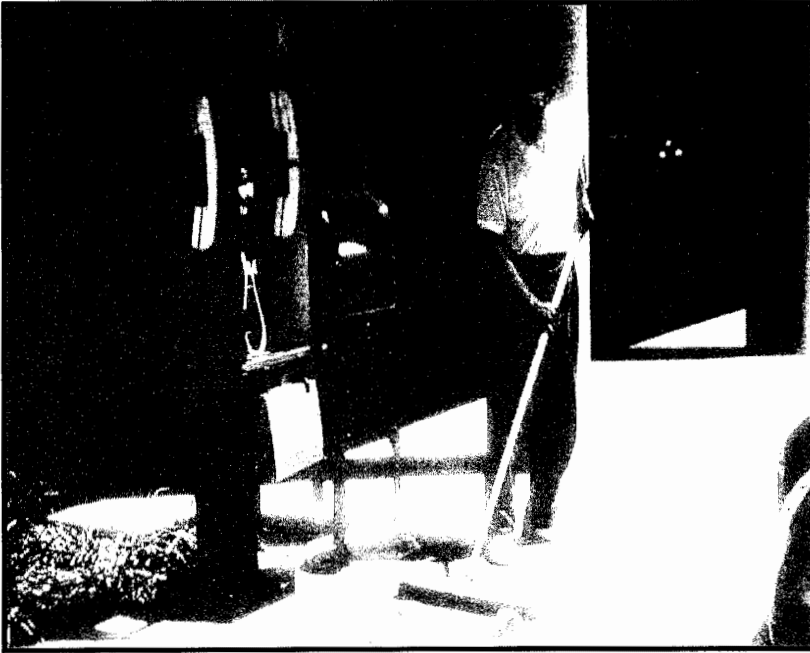
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King County Stormwater Pollution Control Manual - <http://dnr.metrokc.gov/wlr/dss/spcm.htm>

Orange County Stormwater Program,
http://www.ocwatersheds.com/stormwater/swp_introduction.asp

San Diego Stormwater Co-permittees Jurisdictional Urban Runoff Management Program
(<http://www.projectcleanwater.org>)

Santa Clara Valley Urban Runoff Pollution Prevention Program
http://www.scvurppp-w2k.com/pdf%20documents/PS_ICID.PDF



Description

Pollutants on sidewalks and other pedestrian traffic areas and plazas are typically due to littering and vehicle use. This fact sheet describes good housekeeping practices that can be incorporated into the municipality's existing cleaning and maintenance program.

Approach

Pollution Prevention

- Use dry cleaning methods whenever practical for surface cleaning activities.
- Use the least toxic materials available (e.g. water based paints, gels or sprays for graffiti removal).

Suggested Protocols

Surface Cleaning

- Regularly broom (dry) sweep sidewalk, plaza and parking lot areas to minimize cleaning with water.
- Dry cleanup first (sweep, collect, and dispose of debris and trash) when cleaning sidewalks or plazas, then wash with or without soap.
- Block the storm drain or contain runoff when cleaning with water. Discharge wash water to landscaping or collect water and pump to a tank or discharge to sanitary sewer if allowed. (Permission may be required from local sanitation district.)

Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	<input checked="" type="checkbox"/>
Trash	<input checked="" type="checkbox"/>
Metals	<input checked="" type="checkbox"/>
Bacteria	<input checked="" type="checkbox"/>
Oil and Grease	<input checked="" type="checkbox"/>
Organics	<input checked="" type="checkbox"/>
Oxygen Demanding	<input checked="" type="checkbox"/>



- Block the storm drain or contain runoff when washing parking areas, driveways or drive-throughs. Use absorbents to pick up oil; then dry sweep. Clean with or without soap. Collect water and pump to a tank or discharge to sanitary sewer if allowed. Street Repair and Maintenance.

Graffiti Removal

- Avoid graffiti abatement activities during rain events.
- Implement the procedures under Painting and Paint Removal in SC-70 Roads, Streets, and Highway Operation and Maintenance fact sheet when graffiti is removed by painting over.
- Direct runoff from sand blasting and high pressure washing (with no cleaning agents) into a dirt or landscaped area after treating with an appropriate filtering device.
- Plug nearby storm drain inlets and vacuum/pump wash water to the sanitary sewer if authorized to do so if a graffiti abatement method generates wash water containing a cleaning compound (such as high pressure washing with a cleaning compound). Ensure that a non-hazardous cleaning compound is used or dispose as hazardous waste, as appropriate.

Surface Removal and Repair

- Schedule surface removal activities for dry weather if possible.
- Avoid creating excess dust when breaking asphalt or concrete.
- Take measures to protect nearby storm drain inlets prior to breaking up asphalt or concrete (e.g. place hay bales or sand bags around inlets). Clean afterwards by sweeping up as much material as possible.
- Designate an area for clean up and proper disposal of excess materials.
- Remove and recycle as much of the broken pavement as possible to avoid contact with rainfall and stormwater runoff.
- When making saw cuts in pavement, use as little water as possible. Cover each storm drain inlet completely with filter fabric during the sawing operation and contain the slurry by placing straw bales, sandbags, or gravel dams around the inlets. After the liquid drains or evaporates, shovel or vacuum the slurry residue from the pavement or gutter and remove from site.
- Always dry sweep first to clean up tracked dirt. Use a street sweeper or vacuum truck. Do not dump vacuumed liquid in storm drains. Once dry sweeping is complete, the area may be hosed down if needed. Wash water should be directed to landscaping or collected and pumped to the sanitary sewer if allowed.

Concrete Installation and Repair

- Schedule asphalt and concrete activities for dry weather.

- Take measures to protect any nearby storm drain inlets and adjacent watercourses, prior to breaking up asphalt or concrete (e.g. place sand bags around inlets or work areas).
- Limit the amount of fresh concrete or cement mortar mixed, mix only what is needed for the job.
- Store concrete materials under cover, away from drainage areas. Secure bags of cement after they are open. Be sure to keep wind-blown cement powder away from streets, gutters, storm drains, rainfall, and runoff.
- Return leftover materials to the transit mixer. Dispose of small amounts of hardened excess concrete, grout, and mortar in the trash.
- Do not wash sweepings from exposed aggregate concrete into the street or storm drain. Collect and return sweepings to aggregate base stockpile, or dispose in the trash.
- Protect applications of fresh concrete from rainfall and runoff until the material has dried.
- Do not allow excess concrete to be dumped onsite, except in designated areas.
- Wash concrete trucks off site or in designated areas on site designed to preclude discharge of wash water to drainage system.

Controlling Litter

- Post “No Littering” signs and enforce anti-litter laws.
- Provide litter receptacles in busy, high pedestrian traffic areas of the community, at recreational facilities, and at community events.
- Cover litter receptacles and clean out frequently to prevent leaking/spillage or overflow.
- Clean parking lots on a regular basis with a street sweeper.

Training

- Provide regular training to field employees and/or contractors regarding surface cleaning and proper operation of equipment.
- Train employee and contractors in proper techniques for spill containment and cleanup.
- Use a training log or similar method to document training.

Spill Response and Prevention

- Refer to SC-11, Spill Prevention, Control & Cleanup.
- Have spill cleanup materials readily available and in a known location.
- Cleanup spills immediately and use dry methods if possible.
- Properly dispose of spill cleanup material.

Other Considerations

- Limitations related to sweeping activities at large parking facilities may include current sweeper technology to remove oil and grease.
- Surface cleaning activities that require discharges to the local sewerage agency will require coordination with the agency.
- Arrangements for disposal of the swept material collected must be made, as well as accurate tracking of the areas swept and the frequency of sweeping.

Requirements***Costs***

- The largest expenditures for sweeping and cleaning of sidewalks, plazas, and parking lots are in staffing and equipment. Sweeping of these areas should be incorporated into street sweeping programs to reduce costs.

Maintenance

Not applicable

Supplemental Information***Further Detail of the BMP***

Community education, such as informing residents about their options for recycling and waste disposal, as well as the consequences of littering, can instill a sense of citizen responsibility and potentially reduce the amount of maintenance required by the municipality.

Additional BMPs that should be considered for parking lot areas include:

- Allow sheet runoff to flow into biofilters (vegetated strip and swale) and infiltration devices.
- Utilize sand filters or oleophilic collectors for oily waste in low concentrations.
- Arrange rooftop drains to prevent drainage directly onto paved surfaces.
- Design lot to include semi-permeable hardscape.
- Structural BMPs such as storm drain inlet filters can be very effective in reducing the amount of pollutants discharged from parking facilities during periods of rain.

References and Resources

Bay Area Stormwater Management Agencies Association (BASMAA). 1996. Pollution From Surface Cleaning Folder <http://www.basmaa.org>

Model Urban Runoff Program: A How-To Guide for Developing Urban Runoff Programs for Small Municipalities. Prepared by City of Monterey, City of Santa Cruz, California Coastal Commission, Monterey Bay National Marine Sanctuary, Association of Monterey Bay Area Governments, Woodward-Clyde, Central Coast Regional Water Quality Control Board. July. 1998.

Oregon Association of Clean Water Agencies. Oregon Municipal Stormwater Toolbox for Maintenance Practices. June 1998.

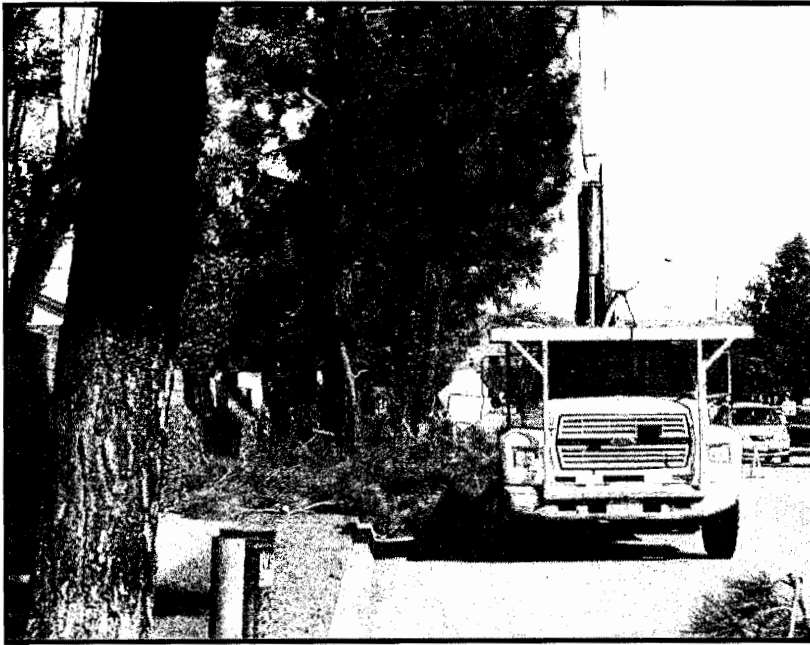
Orange County Stormwater Program

http://www.ocwatersheds.com/stormwater/swp_introduction.asp

Santa Clara Valley Urban Runoff Pollution Prevention Program. 1997 Urban Runoff Management Plan. September 1997, updated October 2000.

Santa Clara Valley Urban Runoff Pollution Prevention Program. Maintenance Best Management Practices for the Construction Industry. Brochures: Landscaping, Gardening, and Pool; Roadwork and Paving; and Fresh Concrete and Mortar Application. June 2001.

San Diego Stormwater Co-permittees Jurisdictional Urban Runoff Management Plan. 2001. Municipal Activities Model Program Guidance. November.



Description

Landscape maintenance activities include vegetation removal; herbicide and insecticide application; fertilizer application; watering; and other gardening and lawn care practices. Vegetation control typically involves a combination of chemical (herbicide) application and mechanical methods. All of these maintenance practices have the potential to contribute pollutants to the storm drain system. The major objectives of this BMP are to minimize the discharge of pesticides, herbicides and fertilizers to the storm drain system and receiving waters; prevent the disposal of landscape waste into the storm drain system by collecting and properly disposing of clippings and cuttings, and educating employees and the public.

Approach

Pollution Prevention

- Implement an integrated pest management (IPM) program. IPM is a sustainable approach to managing pests by combining biological, cultural, physical, and chemical tools.
- Choose low water using flowers, trees, shrubs, and groundcover.
- Consider alternative landscaping techniques such as naturescaping and xeriscaping.
- Conduct appropriate maintenance (i.e. properly timed fertilizing, weeding, pest control, and pruning) to help preserve the landscapes water efficiency.

Objectives

- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	<input checked="" type="checkbox"/>
Trash	<input checked="" type="checkbox"/>
Metals	
Bacteria	
Oil and Grease	
Organics	
Oxygen Demanding	<input checked="" type="checkbox"/>



- Consider grass cycling (grass cycling is the natural recycling of grass by leaving the clippings on the lawn when mowing. Grass clippings decompose quickly and release valuable nutrients back into the lawn).

Suggested Protocols***Mowing, Trimming, and Weeding***

- Whenever possible use mechanical methods of vegetation removal (e.g mowing with tractor-type or push mowers, hand cutting with gas or electric powered weed trimmers) rather than applying herbicides. Use hand weeding where practical.
- Avoid loosening the soil when conducting mechanical or manual weed control, this could lead to erosion. Use mulch or other erosion control measures when soils are exposed.
- Performing mowing at optimal times. Mowing should not be performed if significant rain events are predicted.
- Mulching mowers may be recommended for certain flat areas. Other techniques may be employed to minimize mowing such as selective vegetative planting using low maintenance grasses and shrubs.
- Collect lawn and garden clippings, pruning waste, tree trimmings, and weeds. Chip if necessary, and compost or dispose of at a landfill (see waste management section of this fact sheet).
- Place temporarily stockpiled material away from watercourses, and berm or cover stockpiles to prevent material releases to storm drains.

Planting

- Determine existing native vegetation features (location, species, size, function, importance) and consider the feasibility of protecting them. Consider elements such as their effect on drainage and erosion, hardiness, maintenance requirements, and possible conflicts between preserving vegetation and the resulting maintenance needs.
- Retain and/or plant selected native vegetation whose features are determined to be beneficial, where feasible. Native vegetation usually requires less maintenance (e.g., irrigation, fertilizer) than planting new vegetation.
- Consider using low water use groundcovers when planting or replanting.

Waste Management

- Compost leaves, sticks, or other collected vegetation or dispose of at a permitted landfill. Do not dispose of collected vegetation into waterways or storm drainage systems.
- Place temporarily stockpiled material away from watercourses and storm drain inlets, and berm or cover stockpiles to prevent material releases to the storm drain system.
- Reduce the use of high nitrogen fertilizers that produce excess growth requiring more frequent mowing or trimming.

- Avoid landscape wastes in and around storm drain inlets by either using bagging equipment or by manually picking up the material.

Irrigation

- Where practical, use automatic timers to minimize runoff.
- Use popup sprinkler heads in areas with a lot of activity or where there is a chance the pipes may be broken. Consider the use of mechanisms that reduce water flow to sprinkler heads if broken.
- Ensure that there is no runoff from the landscaped area(s) if re-claimed water is used for irrigation.
- If bailing of muddy water is required (e.g. when repairing a water line leak), do not put it in the storm drain; pour over landscaped areas.
- Irrigate slowly or pulse irrigate to prevent runoff and then only irrigate as much as is needed.
- Apply water at rates that do not exceed the infiltration rate of the soil.

Fertilizer and Pesticide Management

- Utilize a comprehensive management system that incorporates integrated pest management (IPM) techniques. There are many methods and types of IPM, including the following:
 - Mulching can be used to prevent weeds where turf is absent, fencing installed to keep rodents out, and netting used to keep birds and insects away from leaves and fruit.
 - Visible insects can be removed by hand (with gloves or tweezers) and placed in soapy water or vegetable oil. Alternatively, insects can be sprayed off the plant with water or in some cases vacuumed off of larger plants.
 - Store-bought traps, such as species-specific, pheromone-based traps or colored sticky cards, can be used.
 - Slugs can be trapped in small cups filled with beer that are set in the ground so the slugs can get in easily.
 - In cases where microscopic parasites, such as bacteria and fungi, are causing damage to plants, the affected plant material can be removed and disposed of (pruning equipment should be disinfected with bleach to prevent spreading the disease organism).
 - Small mammals and birds can be excluded using fences, netting, tree trunk guards.
 - Beneficial organisms, such as bats, birds, green lacewings, ladybugs, praying mantis, ground beetles, parasitic nematodes, trichogramma wasps, seed head weevils, and spiders that prey on detrimental pest species can be promoted.
- Follow all federal, state, and local laws and regulations governing the use, storage, and disposal of fertilizers and pesticides and training of applicators and pest control advisors.

- Use pesticides only if there is an actual pest problem (not on a regular preventative schedule).
- Do not use pesticides if rain is expected. Apply pesticides only when wind speeds are low (less than 5 mph).
- Do not mix or prepare pesticides for application near storm drains.
- Prepare the minimum amount of pesticide needed for the job and use the lowest rate that will effectively control the pest.
- Employ techniques to minimize off-target application (e.g. spray drift) of pesticides, including consideration of alternative application techniques.
- Fertilizers should be worked into the soil rather than dumped or broadcast onto the surface.
- Calibrate fertilizer and pesticide application equipment to avoid excessive application.
- Periodically test soils for determining proper fertilizer use.
- Sweep pavement and sidewalk if fertilizer is spilled on these surfaces before applying irrigation water.
- Purchase only the amount of pesticide that you can reasonably use in a given time period (month or year depending on the product).
- Triple rinse containers, and use rinse water as product. Dispose of unused pesticide as hazardous waste.
- Dispose of empty pesticide containers according to the instructions on the container label.

Inspection

- Inspect irrigation system periodically to ensure that the right amount of water is being applied and that excessive runoff is not occurring. Minimize excess watering, and repair leaks in the irrigation system as soon as they are observed.
- Inspect pesticide/fertilizer equipment and transportation vehicles daily.

Training

- Educate and train employees on use of pesticides and in pesticide application techniques to prevent pollution. Pesticide application must be under the supervision of a California qualified pesticide applicator.
- Train/encourage municipal maintenance crews to use IPM techniques for managing public green areas.
- Annually train employees within departments responsible for pesticide application on the appropriate portions of the agency's IPM Policy, SOPs, and BMPs, and the latest IPM techniques.

- Employees who are not authorized and trained to apply pesticides should be periodically (at least annually) informed that they cannot use over-the-counter pesticides in or around the workplace.
- Use a training log or similar method to document training.

Spill Response and Prevention

- Refer to SC-11, Spill Prevention, Control & Cleanup
- Have spill cleanup materials readily available and in a known location
- Cleanup spills immediately and use dry methods if possible.
- Properly dispose of spill cleanup material.

Other Considerations

- The Federal Pesticide, Fungicide, and Rodenticide Act and California Title 3, Division 6, Pesticides and Pest Control Operations place strict controls over pesticide application and handling and specify training, annual refresher, and testing requirements. The regulations generally cover: a list of approved pesticides and selected uses, updated regularly; general application information; equipment use and maintenance procedures; and record keeping. The California Department of Pesticide Regulations and the County Agricultural Commission coordinate and maintain the licensing and certification programs. All public agency employees who apply pesticides and herbicides in “agricultural use” areas such as parks, golf courses, rights-of-way and recreation areas should be properly certified in accordance with state regulations. Contracts for landscape maintenance should include similar requirements.
- All employees who handle pesticides should be familiar with the most recent material safety data sheet (MSDS) files.
- Municipalities do not have the authority to regulate the use of pesticides by school districts, however the California Healthy Schools Act of 2000 (AB 2260) has imposed requirements on California school districts regarding pesticide use in schools. Posting of notification prior to the application of pesticides is now required, and IPM is stated as the preferred approach to pest management in schools.

Requirements

Costs

Additional training of municipal employees will be required to address IPM techniques and BMPs. IPM methods will likely increase labor cost for pest control which may be offset by lower chemical costs.

Maintenance

Not applicable

Supplemental Information***Further Detail of the BMP******Waste Management***

Composting is one of the better disposal alternatives if locally available. Most municipalities either have or are planning yard waste composting facilities as a means of reducing the amount of waste going to the landfill. Lawn clippings from municipal maintenance programs as well as private sources would probably be compatible with most composting facilities

Contractors and Other Pesticide Users

Municipal agencies should develop and implement a process to ensure that any contractor employed to conduct pest control and pesticide application on municipal property engages in pest control methods consistent with the IPM Policy adopted by the agency. Specifically, municipalities should require contractors to follow the agency's IPM policy, SOPs, and BMPs; provide evidence to the agency of having received training on current IPM techniques when feasible; provide documentation of pesticide use on agency property to the agency in a timely manner.

References and Resources

King County Stormwater Pollution Control Manual. Best Management Practices for Businesses. 1995. King County Surface Water Management. July. On-line: <http://dnr.metrokc.gov/wlr/dss/spcm.htm>

Los Angeles County Stormwater Quality Model Programs. Public Agency Activities http://ladpw.org/wmd/npdes/model_links.cfm

Model Urban Runoff Program: A How-To Guide for Developing Urban Runoff Programs for Small Municipalities. Prepared by City of Monterey, City of Santa Cruz, California Coastal Commission, Monterey Bay National Marine Sanctuary, Association of Monterey Bay Area Governments, Woodward-Clyde, Central Coast Regional Water Quality Control Board. July. 1998.

Orange County Stormwater Program http://www.ocwatersheds.com/StormWater/swp_introduction.asp

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United States Environmental Protection Agency (USEPA). 2002. Pollution Prevention/Good Housekeeping for Municipal Operations Landscaping and Lawn Care. Office of Water. Office of Wastewater Management. On-line: http://www.epa.gov/npdes/menuofbmps/poll_8.htm



Photo Credit: Geoff Brosseau

Description

As a consequence of its function, the stormwater conveyance system collects and transports urban runoff that may contain certain pollutants. Maintaining catch basins, stormwater inlets, and other stormwater conveyance structures on a regular basis will remove pollutants, prevent clogging of the downstream conveyance system, restore catch basins' sediment trapping capacity, and ensure the system functions properly hydraulically to avoid flooding.

Approach

Suggested Protocols

Catch Basins/Inlet Structures

- Municipal staff should regularly inspect facilities to ensure the following:
 - Immediate repair of any deterioration threatening structural integrity.
 - Cleaning before the sump is 40% full. Catch basins should be cleaned as frequently as needed to meet this standard.
 - Stenciling of catch basins and inlets (see SC-75 Waste Handling and Disposal).
- Clean catch basins, storm drain inlets, and other conveyance structures in high pollutant load areas just before the wet season to remove sediments and debris accumulated during the summer.

Objectives

- Contain
- Educate
- Reduce/Minimize

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	<input checked="" type="checkbox"/>
Trash	<input checked="" type="checkbox"/>
Metals	<input checked="" type="checkbox"/>
Bacteria	<input checked="" type="checkbox"/>
Oil and Grease	<input checked="" type="checkbox"/>
Organics	<input checked="" type="checkbox"/>
Oxygen Demanding	<input checked="" type="checkbox"/>



SC-74 **Drainage System Maintenance**

- Conduct inspections more frequently during the wet season for problem areas where sediment or trash accumulates more often. Clean and repair as needed.
- Keep accurate logs of the number of catch basins cleaned.
- Record the amount of waste collected.
- Store wastes collected from cleaning activities of the drainage system in appropriate containers or temporary storage sites in a manner that prevents discharge to the storm drain.
- Dewater the wastes with outflow into the sanitary sewer if permitted. Water should be treated with an appropriate filtering device prior to discharge to the sanitary sewer. If discharge to the sanitary sewer is not allowed, water should be pumped or vacuumed to a tank and properly disposed of. Do not dewater near a storm drain or stream.
- Except for small communities with relatively few catch basins that may be cleaned manually, most municipalities will require mechanical cleaners such as eductors, vacuums, or bucket loaders.

Storm Drain Conveyance System

- Locate reaches of storm drain with deposit problems and develop a flushing schedule that keeps the pipe clear of excessive buildup.
- Collect flushed effluent and pump to the sanitary sewer for treatment.

Pump Stations

- Clean all storm drain pump stations prior to the wet season to remove silt and trash.
- Do not allow discharge from cleaning a storm drain pump station or other facility to reach the storm drain system.
- Conduct quarterly routine maintenance at each pump station.
- Inspect, clean, and repair as necessary all outlet structures prior to the wet season.
- Sample collected sediments to determine if landfill disposal is possible, or illegal discharges in the watershed are occurring.

Open Channel

- Consider modification of storm channel characteristics to improve channel hydraulics, to increase pollutant removals, and to enhance channel/creek aesthetic and habitat value.
- Conduct channel modification/improvement in accordance with existing laws. Any person, government agency, or public utility proposing an activity that will change the natural (emphasis added) state of any river, stream, or lake in California, must enter into a stream or Lake Alteration Agreement with the Department of Fish and Game. The developer-applicant should also contact local governments (city, county, special districts), other state agencies

(SWRCB, RWQCB, Department of Forestry, Department of Water Resources), and Federal Corps of Engineers and USFWS

Illicit Connections and Discharges

- During routine maintenance of conveyance system and drainage structures field staff should look for evidence of illegal discharges or illicit connections:
 - Is there evidence of spills such as paints, discoloring, etc.
 - Are there any odors associated with the drainage system
 - Record locations of apparent illegal discharges/illicit connections
 - Track flows back to potential dischargers and conduct aboveground inspections. This can be done through visual inspection of up gradient manholes or alternate techniques including zinc chloride smoke testing, fluorometric dye testing, physical inspection testing, or television camera inspection.
 - Once the origin of flow is established, require illicit discharger to eliminate the discharge.
- Stencil storm drains, where applicable, to prevent illegal disposal of pollutants. Storm drain inlets should have messages such as “Dump No Waste Drains to Stream” stenciled next to them to warn against ignorant or intentional dumping of pollutants into the storm drainage system.
- Refer to fact sheet SC-10 Non-Stormwater Discharges.

Illegal Dumping

- Regularly inspect and clean up hot spots and other storm drainage areas where illegal dumping and disposal occurs.
- Establish a system for tracking incidents. The system should be designed to identify the following:
 - Illegal dumping hot spots
 - Types and quantities (in some cases) of wastes
 - Patterns in time of occurrence (time of day/night, month, or year)
 - Mode of dumping (abandoned containers, “midnight dumping” from moving vehicles, direct dumping of materials, accidents/spills)
 - Responsible parties
- Post “No Dumping” signs in problem areas with a phone number for reporting dumping and disposal. Signs should also indicate fines and penalties for illegal dumping.
- Refer to fact sheet SC-10 Non-Stormwater Discharges.

- The State Department of Fish and Game has a hotline for reporting violations called Cal TIP (1-800-952-5400). The phone number may be used to report any violation of a Fish and Game code (illegal dumping, poaching, etc.).
- The California Department of Toxic Substances Control's Waste Alert Hotline, 1-800-69TOXIC, can be used to report hazardous waste violations.

Training

- Train crews in proper maintenance activities, including record keeping and disposal.
- Only properly trained individuals are allowed to handle hazardous materials/wastes.
- Train municipal employees from all departments (public works, utilities, street cleaning, parks and recreation, industrial waste inspection, hazardous waste inspection, sewer maintenance) to recognize and report illegal dumping.
- Train municipal employees and educate businesses, contractors, and the general public in proper and consistent methods for disposal.
- Train municipal staff regarding non-stormwater discharges (See SC-10 Non-Stormwater Discharges).

Spill Response and Prevention

- Refer to SC-11, Prevention, Control & Cleanup
- Have spill cleanup materials readily available and in a known location.
- Cleanup spills immediately and use dry methods if possible.
- Properly dispose of spill cleanup material.

Other Considerations

- Cleanup activities may create a slight disturbance for local aquatic species. Access to items and material on private property may be limited. Trade-offs may exist between channel hydraulics and water quality/riparian habitat. If storm channels or basins are recognized as wetlands, many activities, including maintenance, may be subject to regulation and permitting.
- Storm drain flushing is most effective in small diameter pipes (36-inch diameter pipe or less, depending on water supply and sediment collection capacity). Other considerations associated with storm drain flushing may include the availability of a water source, finding a downstream area to collect sediments, liquid/sediment disposal, and disposal of flushed effluent to sanitary sewer may be prohibited in some areas.
- Regulations may include adoption of substantial penalties for illegal dumping and disposal.
- Municipal codes should include sections prohibiting the discharge of soil, debris, refuse, hazardous wastes, and other pollutants into the storm drain system.
- Private property access rights may be needed to track illegal discharges up gradient.

- Requirements of municipal ordinance authority for suspected source verification testing for illicit connections necessary for guaranteed rights of entry.

Requirements

Costs

- An aggressive catch basin cleaning program could require a significant capital and O&M budget. A careful study of cleaning effectiveness should be undertaken before increased cleaning is implemented. Catch basin cleaning costs are less expensive if vacuum street sweepers are available; cleaning catch basins manually can cost approximately twice as much as cleaning the basins with a vacuum attached to a sweeper.
- Methods used for illicit connection detection (smoke testing, dye testing, visual inspection, and flow monitoring) can be costly and time-consuming. Site-specific factors, such as the level of impervious area, the density and ages of buildings, and type of land use will determine the level of investigation necessary. Encouraging reporting of illicit discharges by employees can offset costs by saving expense on inspectors and directing resources more efficiently. Some programs have used funds available from “environmental fees” or special assessment districts to fund their illicit connection elimination programs.

Maintenance

- Two-person teams may be required to clean catch basins with vector trucks.
- Identifying illicit discharges requires teams of at least two people (volunteers can be used), plus administrative personnel, depending on the complexity of the storm sewer system.
- Arrangements must be made for proper disposal of collected wastes.
- Requires technical staff to detect and investigate illegal dumping violations, and to coordinate public education.

Supplemental Information

Further Detail of the BMP

Storm Drain flushing

Sanitary sewer flushing is a common maintenance activity used to improve pipe hydraulics and to remove pollutants in sanitary sewer systems. The same principles that make sanitary sewer flushing effective can be used to flush storm drains. Flushing may be designed to hydraulically convey accumulated material to strategic locations, such as to an open channel, to another point where flushing will be initiated, or over to the sanitary sewer and on to the treatment facilities, thus preventing re-suspension and overflow of a portion of the solids during storm events. Flushing prevents “plug flow” discharges of concentrated pollutant loadings and sediments. The deposits can hinder the designed conveyance capacity of the storm drain system and potentially cause backwater conditions in severe cases of clogging.

Storm drain flushing usually takes place along segments of pipe with grades that are too flat to maintain adequate velocity to keep particles in suspension. An upstream manhole is selected to place an inflatable device that temporarily plugs the pipe. Further upstream, water is pumped into the line to create a flushing wave. When the upstream reach of pipe is sufficiently full to

cause a flushing wave, the inflated device is rapidly deflated with the assistance of a vacuum pump, releasing the backed up water and resulting in the cleaning of the storm drain segment.

To further reduce the impacts of stormwater pollution, a second inflatable device, placed well downstream, may be used to re-collect the water after the force of the flushing wave has dissipated. A pump may then be used to transfer the water and accumulated material to the sanitary sewer for treatment. In some cases, an interceptor structure may be more practical or required to re-collect the flushed waters.

It has been found that cleansing efficiency of periodic flush waves is dependent upon flush volume, flush discharge rate, sewer slope, sewer length, sewer flow rate, sewer diameter, and population density. As a rule of thumb, the length of line to be flushed should not exceed 700 feet. At this maximum recommended length, the percent removal efficiency ranges between 65-75 percent for organics and 55-65 percent for dry weather grit/inorganic material. The percent removal efficiency drops rapidly beyond that. Water is commonly supplied by a water truck, but fire hydrants can also supply water. To make the best use of water, it is recommended that reclaimed water be used or that fire hydrant line flushing coincide with storm drain flushing.

Flow Management

Flow management has been one of the principal motivations for designing urban stream corridors in the past. Such needs may or may not be compatible with the stormwater quality goals in the stream corridor.

Downstream flood peaks can be suppressed by reducing through flow velocity. This can be accomplished by reducing gradient with grade control structures or increasing roughness with boulders, dense vegetation, or complex banks forms. Reducing velocity correspondingly increases flood height, so all such measures have a natural association with floodplain open space. Flood elevations laterally adjacent to the stream can be lowered by increasing through flow velocity.

However, increasing velocity increases flooding downstream and inherently conflicts with channel stability and human safety. Where topography permits, another way to lower flood elevation is to lower the level of the floodway with drop structures into a large but subtly excavated bowl where flood flows we allowed to spread out.

Stream Corridor Planning

Urban streams receive and convey stormwater flows from developed or developing watersheds. Planning of stream corridors thus interacts with urban stormwater management programs. If local programs are intended to control or protect downstream environments by managing flows delivered to the channels, then it is logical that such programs should be supplemented by management of the materials, forms, and uses of the downstream riparian corridor. Any proposal for steam alteration or management should be investigated for its potential flow and stability effects on upstream, downstream, and laterally adjacent areas. The timing and rate of flow from various tributaries can combine in complex ways to alter flood hazards. Each section of channel is unique, influenced by its own distribution of roughness elements, management activities, and stream responses.

Flexibility to adapt to stream features and behaviors as they evolve must be included in stream reclamation planning. The amenity and ecology of streams may be enhanced through the landscape design options of 1) corridor reservation, 2) bank treatment, 3) geomorphic restoration, and 4) grade control.

Corridor reservation - Reserving stream corridors and valleys to accommodate natural stream meandering, aggradation, degradation, and over bank flows allows streams to find their own form and generate less ongoing erosion. In California, open stream corridors in recent urban developments have produced recreational open space, irrigation of streamside plantings, and the aesthetic amenity of flowing water.

Bank treatment - The use of armoring, vegetative cover, and flow deflection may be used to influence a channel's form, stability, and biotic habitat. To prevent bank erosion, armoring can be done with rigid construction materials, such as concrete, masonry, wood planks and logs, riprap, and gabions. Concrete linings have been criticized because of their lack of provision of biotic habitat. In contrast, riprap and gabions make relatively porous and flexible linings. Boulders, placed in the bed reduce velocity and erosive power.

Riparian vegetation can stabilize the banks of streams that are at or near a condition of equilibrium. Binding networks of roots increase bank shear strength. During flood flows, resilient vegetation is forced into erosion-inhibiting mats. The roughness of vegetation leads to lower velocity, further reducing erosive effects. Structural flow deflection can protect banks from erosion or alter fish habitat. By concentrating flow, a deflector causes a pool to be scoured in the bed.

Geomorphic restoration – Restoration refers to alteration of disturbed streams so their form and behavior emulate those of undisturbed streams. Natural meanders are retained, with grading to gentle slopes on the inside of curves to allow point bars and riffle-pool sequences to develop. Trees are retained to provide scenic quality, biotic productivity, and roots for bank stabilization, supplemented by plantings where necessary.

A restorative approach can be successful where the stream is already approaching equilibrium. However, if upstream urbanization continues new flow regimes will be generated that could disrupt the equilibrium of the treated system.

Grade Control - A grade control structure is a level shelf of a permanent material, such as stone, masonry, or concrete, over which stream water flows. A grade control structure is called a sill, weir, or drop structure, depending on the relation of its invert elevation to upstream and downstream channels.

A sill is installed at the preexisting channel bed elevation to prevent upstream migration of nick points. It establishes a firm base level below which the upstream channel can not erode.

A weir or check dam is installed with invert above the preexisting bed elevation. A weir raises the local base level of the stream and causes aggradation upstream. The gradient, velocity, and erosive potential of the stream channel are reduced. A drop structure lowers the downstream invert below its preexisting elevation, reducing downstream gradient and velocity. Weirs and drop structure control erosion by dissipating energy and reducing slope velocity.

SC-74 Drainage System Maintenance

When carefully applied, grade control structures can be highly versatile in establishing human and environmental benefits in stabilized channels. To be successful, application of grade control structures should be guided by analysis of the stream system both upstream and downstream from the area to be reclaimed.

Examples

The California Department of Water Resources began the Urban Stream Restoration Program in 1985. The program provides grant funds to municipalities and community groups to implement stream restoration projects. The projects reduce damages from streambank and watershed instability and floods while restoring streams' aesthetic, recreational, and fish and wildlife values.

In Buena Vista Park, upper floodway slopes are gentle and grassed to achieve continuity of usable park land across the channel of small boulders at the base of the slopes.

The San Diego River is a large, vegetative lined channel, which was planted in a variety of species to support riparian wildlife while stabilizing the steep banks of the floodway.

References and Resources

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http://www.ocwatersheds.com/StormWater/swp_introduction.asp

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San Diego Stormwater Co-permittees Jurisdictional Urban Runoff Management Program (URMP) Municipal Activities Model Program Guidance. 2001. Project Clean Water. November.

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United States Environmental Protection Agency (USEPA). 2002. Pollution Prevention/Good Housekeeping for Municipal Operations Storm Drain System Cleaning. On line:
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Site Design & Landscape Planning SD-10



Design Objectives

- ☒ Maximize Infiltration
- ☒ Provide Retention
- ☒ Slow Runoff
- ☒ Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- Contain Pollutants
- Collect and Convey

Description

Each project site possesses unique topographic, hydrologic, and vegetative features, some of which are more suitable for development than others. Integrating and incorporating appropriate landscape planning methodologies into the project design is the most effective action that can be done to minimize surface and groundwater contamination from stormwater.

Approach

Landscape planning should couple consideration of land suitability for urban uses with consideration of community goals and projected growth. Project plan designs should conserve natural areas to the extent possible, maximize natural water storage and infiltration opportunities, and protect slopes and channels.

Suitable Applications

Appropriate applications include residential, commercial and industrial areas planned for development or redevelopment.

Design Considerations

Design requirements for site design and landscapes planning should conform to applicable standards and specifications of agencies with jurisdiction and be consistent with applicable General Plan and Local Area Plan policies.



SD-10 Site Design & Landscape Planning

Designing New Installations

Begin the development of a plan for the landscape unit with attention to the following general principles:

- Formulate the plan on the basis of clearly articulated community goals. Carefully identify conflicts and choices between retaining and protecting desired resources and community growth.
- Map and assess land suitability for urban uses. Include the following landscape features in the assessment: wooded land, open unwooded land, steep slopes, erosion-prone soils, foundation suitability, soil suitability for waste disposal, aquifers, aquifer recharge areas, wetlands, floodplains, surface waters, agricultural lands, and various categories of urban land use. When appropriate, the assessment can highlight outstanding local or regional resources that the community determines should be protected (e.g., a scenic area, recreational area, threatened species habitat, farmland, fish run). Mapping and assessment should recognize not only these resources but also additional areas needed for their sustenance.

Project plan designs should conserve natural areas to the extent possible, maximize natural water storage and infiltration opportunities, and protect slopes and channels.

Conserve Natural Areas during Landscape Planning

If applicable, the following items are required and must be implemented in the site layout during the subdivision design and approval process, consistent with applicable General Plan and Local Area Plan policies:

- Cluster development on least-sensitive portions of a site while leaving the remaining land in a natural undisturbed condition.
- Limit clearing and grading of native vegetation at a site to the minimum amount needed to build lots, allow access, and provide fire protection.
- Maximize trees and other vegetation at each site by planting additional vegetation, clustering tree areas, and promoting the use of native and/or drought tolerant plants.
- Promote natural vegetation by using parking lot islands and other landscaped areas.
- Preserve riparian areas and wetlands.

Maximize Natural Water Storage and Infiltration Opportunities Within the Landscape Unit

- Promote the conservation of forest cover. Building on land that is already deforested affects basin hydrology to a lesser extent than converting forested land. Loss of forest cover reduces interception storage, detention in the organic forest floor layer, and water losses by evapotranspiration, resulting in large peak runoff increases and either their negative effects or the expense of countering them with structural solutions.
- Maintain natural storage reservoirs and drainage corridors, including depressions, areas of permeable soils, swales, and intermittent streams. Develop and implement policies and

Site Design & Landscape Planning SD-10

regulations to discourage the clearing, filling, and channelization of these features. Utilize them in drainage networks in preference to pipes, culverts, and engineered ditches.

- Evaluating infiltration opportunities by referring to the stormwater management manual for the jurisdiction and pay particular attention to the selection criteria for avoiding groundwater contamination, poor soils, and hydrogeological conditions that cause these facilities to fail. If necessary, locate developments with large amounts of impervious surfaces or a potential to produce relatively contaminated runoff away from groundwater recharge areas.

Protection of Slopes and Channels during Landscape Design

- Convey runoff safely from the tops of slopes.
- Avoid disturbing steep or unstable slopes.
- Avoid disturbing natural channels.
- Stabilize disturbed slopes as quickly as possible.
- Vegetate slopes with native or drought tolerant vegetation.
- Control and treat flows in landscaping and/or other controls prior to reaching existing natural drainage systems.
- Stabilize temporary and permanent channel crossings as quickly as possible, and ensure that increases in run-off velocity and frequency caused by the project do not erode the channel.
- Install energy dissipaters, such as riprap, at the outlets of new storm drains, culverts, conduits, or channels that enter unlined channels in accordance with applicable specifications to minimize erosion. Energy dissipaters shall be installed in such a way as to minimize impacts to receiving waters.
- Line on-site conveyance channels where appropriate, to reduce erosion caused by increased flow velocity due to increases in tributary impervious area. The first choice for linings should be grass or some other vegetative surface, since these materials not only reduce runoff velocities, but also provide water quality benefits from filtration and infiltration. If velocities in the channel are high enough to erode grass or other vegetative linings, riprap, concrete, soil cement, or geo-grid stabilization are other alternatives.
- Consider other design principles that are comparable and equally effective.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define “redevelopment” in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of “redevelopment” must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under “designing new installations” above should be followed.

SD-10 Site Design & Landscape Planning

Redevelopment may present significant opportunity to add features which had not previously been implemented. Examples include incorporation of depressions, areas of permeable soils, and swales in newly redeveloped areas. While some site constraints may exist due to the status of already existing infrastructure, opportunities should not be missed to maximize infiltration, slow runoff, reduce impervious areas, disconnect directly connected impervious areas.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Stormwater Management Manual for Western Washington, Washington State Department of Ecology, August 2001.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.



Rain Garden

Design Objectives

- ☒ Maximize Infiltration
- ☒ Provide Retention
- ☒ Slow Runoff
- Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- ☒ Contain Pollutants
- Collect and Convey

Description

Various roof runoff controls are available to address stormwater that drains off rooftops. The objective is to reduce the total volume and rate of runoff from individual lots, and retain the pollutants on site that may be picked up from roofing materials and atmospheric deposition. Roof runoff controls consist of directing the roof runoff away from paved areas and mitigating flow to the storm drain system through one of several general approaches: cisterns or rain barrels; dry wells or infiltration trenches; pop-up emitters, and foundation planting. The first three approaches require the roof runoff to be contained in a gutter and downspout system. Foundation planting provides a vegetated strip under the drip line of the roof.

Approach

Design of individual lots for single-family homes as well as lots for higher density residential and commercial structures should consider site design provisions for containing and infiltrating roof runoff or directing roof runoff to vegetative swales or buffer areas. Retained water can be reused for watering gardens, lawns, and trees. Benefits to the environment include reduced demand for potable water used for irrigation, improved stormwater quality, increased groundwater recharge, decreased runoff volume and peak flows, and decreased flooding potential.

Suitable Applications

Appropriate applications include residential, commercial and industrial areas planned for development or redevelopment.

Design Considerations

Designing New Installations

Cisterns or Rain Barrels

One method of addressing roof runoff is to direct roof downspouts to cisterns or rain barrels. A cistern is an above ground storage vessel with either a manually operated valve or a permanently open outlet. Roof runoff is temporarily stored and then released for irrigation or infiltration between storms. The number of rain



barrels needed is a function of the rooftop area. Some low impact developers recommend that every house have at least 2 rain barrels, with a minimum storage capacity of 1000 liters. Roof barrels serve several purposes including mitigating the first flush from the roof which has a high volume, amount of contaminants, and thermal load. Several types of rain barrels are commercially available. Consideration must be given to selecting rain barrels that are vector proof and childproof. In addition, some barrels are designed with a bypass valve that filters out grit and other contaminants and routes overflow to a soak-away pit or rain garden.

If the cistern has an operable valve, the valve can be closed to store stormwater for irrigation or infiltration between storms. This system requires continual monitoring by the resident or grounds crews, but provides greater flexibility in water storage and metering. If a cistern is provided with an operable valve and water is stored inside for long periods, the cistern must be covered to prevent mosquitoes from breeding.

A cistern system with a permanently open outlet can also provide for metering stormwater runoff. If the cistern outlet is significantly smaller than the size of the downspout inlet (say 1/4 to 1/2 inch diameter), runoff will build up inside the cistern during storms, and will empty out slowly after peak intensities subside. This is a feasible way to mitigate the peak flow increases caused by rooftop impervious land coverage, especially for the frequent, small storms.

Dry wells and Infiltration Trenches

Roof downspouts can be directed to dry wells or infiltration trenches. A dry well is constructed by excavating a hole in the ground and filling it with an open graded aggregate, and allowing the water to fill the dry well and infiltrate after the storm event. An underground connection from the downspout conveys water into the dry well, allowing it to be stored in the voids. To minimize sedimentation from lateral soil movement, the sides and top of the stone storage matrix can be wrapped in a permeable filter fabric, though the bottom may remain open. A perforated observation pipe can be inserted vertically into the dry well to allow for inspection and maintenance.

In practice, dry wells receiving runoff from single roof downspouts have been successful over long periods because they contain very little sediment. They must be sized according to the amount of rooftop runoff received, but are typically 4 to 5 feet square, and 2 to 3 feet deep, with a minimum of 1-foot soil cover over the top (maximum depth of 10 feet).

To protect the foundation, dry wells must be set away from the building at least 10 feet. They must be installed in solids that accommodate infiltration. In poorly drained soils, dry wells have very limited feasibility.

Infiltration trenches function in a similar manner and would be particularly effective for larger roof areas. An infiltration trench is a long, narrow, rock-filled trench with no outlet that receives stormwater runoff. These are described under Treatment Controls.

Pop-up Drainage Emitter

Roof downspouts can be directed to an underground pipe that daylights some distance from the building foundation, releasing the roof runoff through a pop-up emitter. Similar to a pop-up irrigation head, the emitter only opens when there is flow from the roof. The emitter remains flush to the ground during dry periods, for ease of lawn or landscape maintenance.

Foundation Planting

Landscape planting can be provided around the base to allow increased opportunities for stormwater infiltration and protect the soil from erosion caused by concentrated sheet flow coming off the roof. Foundation plantings can reduce the physical impact of water on the soil and provide a subsurface matrix of roots that encourage infiltration. These plantings must be sturdy enough to tolerate the heavy runoff sheet flows, and periodic soil saturation.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define “redevelopment” in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of “redevelopment” must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under “designing new installations” above should be followed.

Supplemental Information

Examples

- City of Ottawa’s Water Links Surface –Water Quality Protection Program
- City of Toronto Downspout Disconnection Program
- City of Boston, MA, Rain Barrel Demonstration Program

Other Resources

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Low Impact Urban Design Tools, Low Impact Development Design Center, Beltsville, MD.
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Start at the Source, Bay Area Stormwater Management Agencies Association, 1999 Edition



Design Objectives

- ☒ Maximize Infiltration
- ☒ Provide Retention
- ☒ Slow Runoff
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- Prohibit Dumping of Improper Materials
- Contain Pollutants
- Collect and Convey

Description

Irrigation water provided to landscaped areas may result in excess irrigation water being conveyed into stormwater drainage systems.

Approach

Project plan designs for development and redevelopment should include application methods of irrigation water that minimize runoff of excess irrigation water into the stormwater conveyance system.

Suitable Applications

Appropriate applications include residential, commercial and industrial areas planned for development or redevelopment. (Detached residential single-family homes are typically excluded from this requirement.)

Design Considerations

Designing New Installations

The following methods to reduce excessive irrigation runoff should be considered, and incorporated and implemented where determined applicable and feasible by the Permittee:

- Employ rain-triggered shutoff devices to prevent irrigation after precipitation.
- Design irrigation systems to each landscape area's specific water requirements.
- Include design featuring flow reducers or shutoff valves triggered by a pressure drop to control water loss in the event of broken sprinkler heads or lines.
- Implement landscape plans consistent with County or City water conservation resolutions, which may include provision of water sensors, programmable irrigation times (for short cycles), etc.



- Design timing and application methods of irrigation water to minimize the runoff of excess irrigation water into the storm water drainage system.
- Group plants with similar water requirements in order to reduce excess irrigation runoff and promote surface filtration. Choose plants with low irrigation requirements (for example, native or drought tolerant species). Consider design features such as:
 - Using mulches (such as wood chips or bar) in planter areas without ground cover to minimize sediment in runoff
 - Installing appropriate plant materials for the location, in accordance with amount of sunlight and climate, and use native plant materials where possible and/or as recommended by the landscape architect
 - Leaving a vegetative barrier along the property boundary and interior watercourses, to act as a pollutant filter, where appropriate and feasible
 - Choosing plants that minimize or eliminate the use of fertilizer or pesticides to sustain growth
- Employ other comparable, equally effective methods to reduce irrigation water runoff.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define “redevelopment” in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of “redevelopment” must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under “designing new installations” above should be followed.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.



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Description

Waste materials dumped into storm drain inlets can have severe impacts on receiving and ground waters. Posting notices regarding discharge prohibitions at storm drain inlets can prevent waste dumping. Storm drain signs and stencils are highly visible source controls that are typically placed directly adjacent to storm drain inlets.

Approach

The stencil or affixed sign contains a brief statement that prohibits dumping of improper materials into the urban runoff conveyance system. Storm drain messages have become a popular method of alerting the public about the effects of and the prohibitions against waste disposal.

Suitable Applications

Stencils and signs alert the public to the destination of pollutants discharged to the storm drain. Signs are appropriate in residential, commercial, and industrial areas, as well as any other area where contributions or dumping to storm drains is likely.

Design Considerations

Storm drain message markers or placards are recommended at all storm drain inlets within the boundary of a development project. The marker should be placed in clear sight facing toward anyone approaching the inlet from either side. All storm drain inlet locations should be identified on the development site map.

Designing New Installations

The following methods should be considered for inclusion in the project design and show on project plans:

- Provide stenciling or labeling of all storm drain inlets and catch basins, constructed or modified, within the project area with prohibitive language. Examples include "NO DUMPING



– DRAINS TO OCEAN” and/or other graphical icons to discourage illegal dumping.

- Post signs with prohibitive language and/or graphical icons, which prohibit illegal dumping at public access points along channels and creeks within the project area.

Note - Some local agencies have approved specific signage and/or storm drain message placards for use. Consult local agency stormwater staff to determine specific requirements for placard types and methods of application.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define “redevelopment” in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. If the project meets the definition of “redevelopment”, then the requirements stated under “designing new installations” above should be included in all project design plans.

Additional Information

Maintenance Considerations

- Legibility of markers and signs should be maintained. If required by the agency with jurisdiction over the project, the owner/operator or homeowner’s association should enter into a maintenance agreement with the agency or record a deed restriction upon the property title to maintain the legibility of placards or signs.

Placement

- Signage on top of curbs tends to weather and fade.
- Signage on face of curbs tends to be worn by contact with vehicle tires and sweeper brooms.

Supplemental Information

Examples

- Most MS4 programs have storm drain signage programs. Some MS4 programs will provide stencils, or arrange for volunteers to stencil storm drains as part of their outreach program.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

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Photo Credit: Geoff Brosseau

Design Objectives

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Description

Vehicle washing, equipment washing, and steam cleaning may contribute high concentrations of metals, oil and grease, solvents, phosphates, and suspended solids to wash waters that drain to stormwater conveyance systems.

Approach

Project plans should include appropriately designed area(s) for washing-steam cleaning of vehicles and equipment. Depending on the size and other parameters of the wastewater facility, wash water may be conveyed to a sewer, an infiltration system, recycling system or other alternative. Pretreatment may be required for conveyance to a sanitary sewer.

Suitable Applications

Appropriate applications include commercial developments, restaurants, retail gasoline outlets, automotive repair shops and others.

Design Considerations

Design requirements for vehicle maintenance are governed by Building and Fire Codes, and by current local agency ordinances, and zoning requirements. Design criteria described in this fact sheet are meant to enhance and be consistent with these code requirements.

Designing New Installations

Areas for washing/steam cleaning should incorporate one of the following features:

- Be self-contained and/or covered with a roof or overhang
- Be equipped with a clarifier or other pretreatment facility
- Have a proper connection to a sanitary sewer



- Include other features which are comparable and equally effective

CAR WASH AREAS - Some jurisdictions' stormwater management plans include vehicle-cleaning area source control design requirements for community car wash racks in complexes with a large number of dwelling units. In these cases, wash water from the areas may be directed to the sanitary sewer, to an engineered infiltration system, or to an equally effective alternative. Pre-treatment may also be required.

Depending on the jurisdiction, developers may be directed to divert surface water runoff away from the exposed area around the wash pad (parking lot, storage areas), and wash pad itself to alternatives other than the sanitary sewer. Roofing may be required for exposed wash pads.

It is generally advisable to cover areas used for regular washing of vehicles, trucks, or equipment, surround them with a perimeter berm, and clearly mark them as a designated washing area. Sumps or drain lines can be installed to collect wash water, which may be treated for reuse or recycling, or for discharge to the sanitary sewer. Jurisdictions may require some form of pretreatment, such as a trap, for these areas.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of " redevelopment" must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment.

Additional Information

Maintenance Considerations

Stormwater and non-stormwater will accumulate in containment areas and sumps with impervious surfaces. Contaminated accumulated water must be disposed of in accordance with applicable laws and cannot be discharged directly to the storm drain or sanitary sewer system without the appropriate permit.

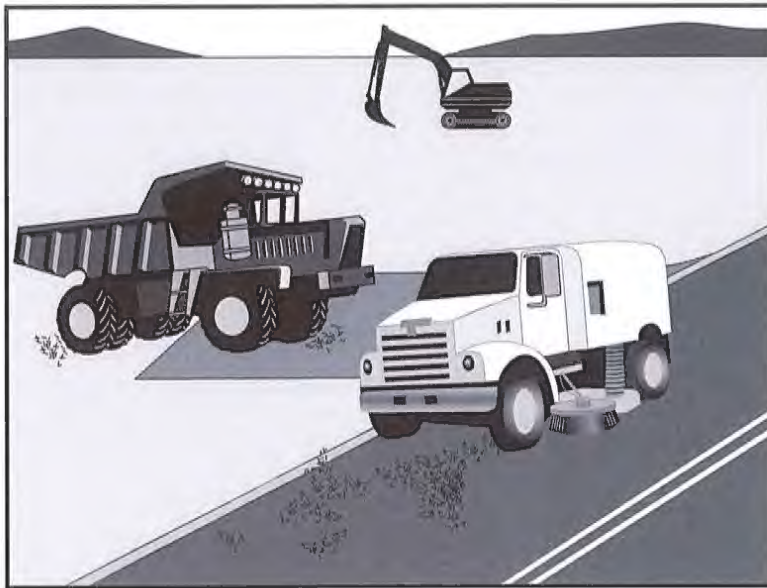
Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.



Description and Purpose

Street sweeping and vacuuming includes use of self-propelled and walk-behind equipment to remove sediment from streets and roadways, and to clean paved surfaces in preparation for final paving. Sweeping and vacuuming prevents sediment from the project site from entering storm drains or receiving waters.

Suitable Applications

Sweeping and vacuuming are suitable anywhere sediment is tracked from the project site onto public or private paved streets and roads, typically at points of egress. Sweeping and vacuuming are also applicable during preparation of paved surfaces for final paving.

Limitations

Sweeping and vacuuming may not be effective when sediment is wet or when tracked soil is caked (caked soil may need to be scraped loose).

Implementation

- Controlling the number of points where vehicles can leave the site will allow sweeping and vacuuming efforts to be focused, and perhaps save money.
- Inspect potential sediment tracking locations daily.
- Visible sediment tracking should be swept or vacuumed on a daily basis.
- Do not use kick brooms or sweeper attachments. These tend to spread the dirt rather than remove it.

Categories

EC	Erosion Control	
SE	Sediment Control	<input checked="" type="checkbox"/>
TC	Tracking Control	<input checked="" type="checkbox"/>
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

- ☒ Primary Objective
- ☒ Secondary Objective

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	
Trash	<input checked="" type="checkbox"/>
Metals	
Bacteria	
Oil and Grease	<input checked="" type="checkbox"/>
Organics	

Potential Alternatives

None



Street Sweeping and Vacuuming **SE-7**

- If not mixed with debris or trash, consider incorporating the removed sediment back into the project

Costs

Rental rates for self-propelled sweepers vary depending on hopper size and duration of rental. Expect rental rates from \$58/hour (3 yd³ hopper) to \$88/hour (9 yd³ hopper), plus operator costs. Hourly production rates vary with the amount of area to be swept and amount of sediment. Match the hopper size to the area and expect sediment load to minimize time spent dumping.

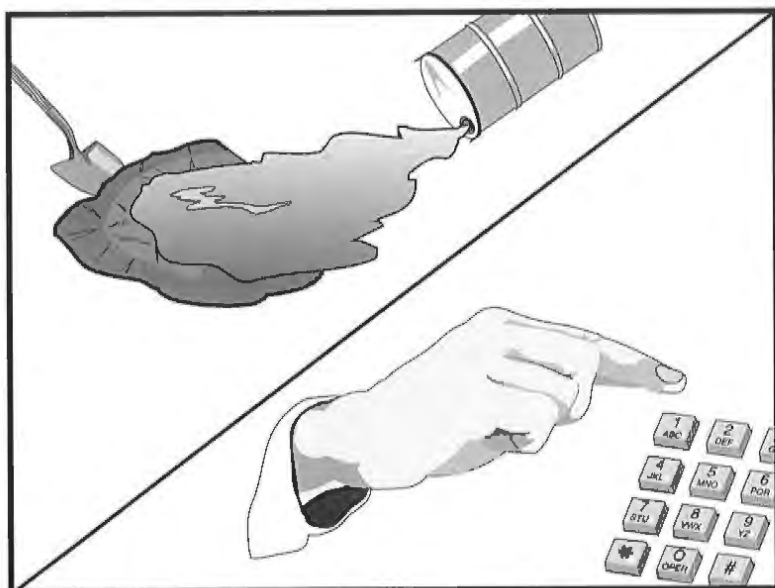
Inspection and Maintenance

- Inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- When actively in use, points of ingress and egress must be inspected daily.
- When tracked or spilled sediment is observed outside the construction limits, it must be removed at least daily. More frequent removal, even continuous removal, may be required in some jurisdictions.
- Be careful not to sweep up any unknown substance or any object that may be potentially hazardous.
- Adjust brooms frequently; maximize efficiency of sweeping operations.
- After sweeping is finished, properly dispose of sweeper wastes at an approved dumpsite.

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Labor Surcharge and Equipment Rental Rates, State of California Department of Transportation (Caltrans), April 1, 2002 – March 31, 2003.



Description and Purpose

Prevent or reduce the discharge of pollutants to drainage systems or watercourses from leaks and spills by reducing the chance for spills, stopping the source of spills, containing and cleaning up spills, properly disposing of spill materials, and training employees.

This best management practice covers only spill prevention and control. However, WM-1, Materials Delivery and Storage, and WM-2, Material Use, also contain useful information, particularly on spill prevention. For information on wastes, see the waste management BMPs in this section.

Suitable Applications

This BMP is suitable for all construction projects. Spill control procedures are implemented anytime chemicals or hazardous substances are stored on the construction site, including the following materials:

- Soil stabilizers/binders
- Dust palliatives
- Herbicides
- Growth inhibitors
- Fertilizers
- Deicing/anti-icing chemicals

Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	<input checked="" type="checkbox"/>

Legend:

- ☒ Primary Objective
- ☒ Secondary Objective

Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	<input checked="" type="checkbox"/>
Trash	<input checked="" type="checkbox"/>
Metals	<input checked="" type="checkbox"/>
Bacteria	
Oil and Grease	<input checked="" type="checkbox"/>
Organics	<input checked="" type="checkbox"/>

Potential Alternatives

None



- Fuels
- Lubricants
- Other petroleum distillates

Limitations

- In some cases it may be necessary to use a private spill cleanup company.
- This BMP applies to spills caused by the contractor and subcontractors.
- Procedures and practices presented in this BMP are general. Contractor should identify appropriate practices for the specific materials used or stored onsite

Implementation

The following steps will help reduce the stormwater impacts of leaks and spills:

Education

- Be aware that different materials pollute in different amounts. Make sure that each employee knows what a “significant spill” is for each material they use, and what is the appropriate response for “significant” and “insignificant” spills.
- Educate employees and subcontractors on potential dangers to humans and the environment from spills and leaks.
- Hold regular meetings to discuss and reinforce appropriate disposal procedures (incorporate into regular safety meetings).
- Establish a continuing education program to indoctrinate new employees.
- Have contractor’s superintendent or representative oversee and enforce proper spill prevention and control measures.

General Measures

- To the extent that the work can be accomplished safely, spills of oil, petroleum products, substances listed under 40 CFR parts 110,117, and 302, and sanitary and septic wastes should be contained and cleaned up immediately.
- Store hazardous materials and wastes in covered containers and protect from vandalism.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- Train employees in spill prevention and cleanup.
- Designate responsible individuals to oversee and enforce control measures.
- Spills should be covered and protected from stormwater runoff during rainfall to the extent that it doesn’t compromise clean up activities.
- Do not bury or wash spills with water.

- Store and dispose of used clean up materials, contaminated materials, and recovered spill material that is no longer suitable for the intended purpose in conformance with the provisions in applicable BMPs.
- Do not allow water used for cleaning and decontamination to enter storm drains or watercourses. Collect and dispose of contaminated water in accordance with WM-10, Liquid Waste Management.
- Contain water overflow or minor water spillage and do not allow it to discharge into drainage facilities or watercourses.
- Place proper storage, cleanup, and spill reporting instructions for hazardous materials stored or used on the project site in an open, conspicuous, and accessible location.
- Keep waste storage areas clean, well organized, and equipped with ample cleanup supplies as appropriate for the materials being stored. Perimeter controls, containment structures, covers, and liners should be repaired or replaced as needed to maintain proper function.

Cleanup

- Clean up leaks and spills immediately.
- Use a rag for small spills on paved surfaces, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be sent to either a certified laundry (rags) or disposed of as hazardous waste.
- Never hose down or bury dry material spills. Clean up as much of the material as possible and dispose of properly. See the waste management BMPs in this section for specific information.

Minor Spills

- Minor spills typically involve small quantities of oil, gasoline, paint, etc. which can be controlled by the first responder at the discovery of the spill.
- Use absorbent materials on small spills rather than hosing down or burying the spill.
- Absorbent materials should be promptly removed and disposed of properly.
- Follow the practice below for a minor spill:
 - Contain the spread of the spill.
 - Recover spilled materials.
 - Clean the contaminated area and properly dispose of contaminated materials.

Semi-Significant Spills

- Semi-significant spills still can be controlled by the first responder along with the aid of other personnel such as laborers and the foreman, etc. This response may require the cessation of all other activities.

- Spills should be cleaned up immediately:
 - Contain spread of the spill.
 - Notify the project foreman immediately.
 - If the spill occurs on paved or impermeable surfaces, clean up using "dry" methods (absorbent materials, cat litter and/or rags). Contain the spill by encircling with absorbent materials and do not let the spill spread widely.
 - If the spill occurs in dirt areas, immediately contain the spill by constructing an earthen dike. Dig up and properly dispose of contaminated soil.
 - If the spill occurs during rain, cover spill with tarps or other material to prevent contaminating runoff.

Significant/Hazardous Spills

- For significant or hazardous spills that cannot be controlled by personnel in the immediate vicinity, the following steps should be taken:
 - Notify the local emergency response by dialing 911. In addition to 911, the contractor will notify the proper county officials. It is the contractor's responsibility to have all emergency phone numbers at the construction site.
 - Notify the Governor's Office of Emergency Services Warning Center, (916) 845-8911.
 - For spills of federal reportable quantities, in conformance with the requirements in 40 CFR parts 110, 119, and 302, the contractor should notify the National Response Center at (800) 424-8802.
 - Notification should first be made by telephone and followed up with a written report.
 - The services of a spills contractor or a Haz-Mat team should be obtained immediately. Construction personnel should not attempt to clean up until the appropriate and qualified staffs have arrived at the job site.
 - Other agencies which may need to be consulted include, but are not limited to, the Fire Department, the Public Works Department, the Coast Guard, the Highway Patrol, the City/County Police Department, Department of Toxic Substances, California Division of Oil and Gas, Cal/OSHA, etc.

Reporting

- Report significant spills to local agencies, such as the Fire Department; they can assist in cleanup.
- Federal regulations require that any significant oil spill into a water body or onto an adjoining shoreline be reported to the National Response Center (NRC) at 800-424-8802 (24 hours).

Use the following measures related to specific activities:

Vehicle and Equipment Maintenance

- If maintenance must occur onsite, use a designated area and a secondary containment, located away from drainage courses, to prevent the runoff of stormwater and the runoff of spills.
- Regularly inspect onsite vehicles and equipment for leaks and repair immediately
- Check incoming vehicles and equipment (including delivery trucks, and employee and subcontractor vehicles) for leaking oil and fluids. Do not allow leaking vehicles or equipment onsite.
- Always use secondary containment, such as a drain pan or drop cloth, to catch spills or leaks when removing or changing fluids.
- Place drip pans or absorbent materials under paving equipment when not in use.
- Use absorbent materials on small spills rather than hosing down or burying the spill. Remove the absorbent materials promptly and dispose of properly.
- Promptly transfer used fluids to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around
- Oil filters disposed of in trashcans or dumpsters can leak oil and pollute stormwater. Place the oil filter in a funnel over a waste oil-recycling drum to drain excess oil before disposal. Oil filters can also be recycled. Ask the oil supplier or recycler about recycling oil filters.
- Store cracked batteries in a non-leaking secondary container. Do this with all cracked batteries even if you think all the acid has drained out. If you drop a battery, treat it as if it is cracked. Put it into the containment area until you are sure it is not leaking.

Vehicle and Equipment Fueling

- If fueling must occur onsite, use designate areas, located away from drainage courses, to prevent the runoff of stormwater and the runoff of spills.
- Discourage “topping off” of fuel tanks.
- Always use secondary containment, such as a drain pan, when fueling to catch spills/ leaks.

Costs

Prevention of leaks and spills is inexpensive. Treatment and/ or disposal of contaminated soil or water can be quite expensive.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

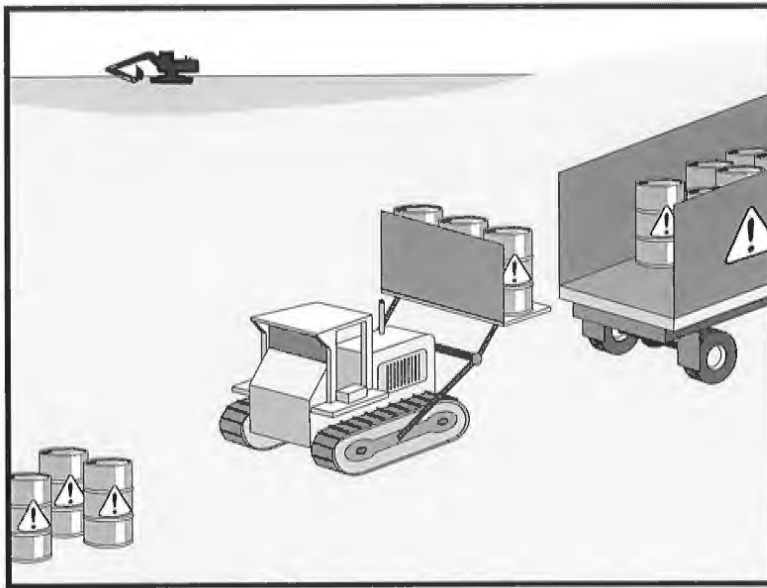
- Inspect BMPs subject to non-stormwater discharge daily while non-stormwater discharges occur.
- Keep ample supplies of spill control and cleanup materials onsite, near storage, unloading, and maintenance areas.
- Update your spill prevention and control plan and stock cleanup materials as changes occur in the types of chemicals onsite.

References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	<input checked="" type="checkbox"/>

Legend:

- ☒ Primary Objective
- ☒ Secondary Objective

Description and Purpose

Prevent or reduce the discharge of pollutants to stormwater from hazardous waste through proper material use, waste disposal, and training of employees and subcontractors.

Suitable Applications

This best management practice (BMP) applies to all construction projects. Hazardous waste management practices are implemented on construction projects that generate waste from the use of:

- Petroleum Products
- Concrete Curing Compounds
- Palliatives
- Septic Wastes
- Stains
- Wood Preservatives
- Asphalt Products
- Pesticides
- Acids
- Paints
- Solvents
- Roofing Tar
- Any materials deemed a hazardous waste in California, Title 22 Division 4.5, or listed in 40 CFR Parts 110, 117, 261, or 302

Targeted Constituents

Sediment	
Nutrients	<input checked="" type="checkbox"/>
Trash	<input checked="" type="checkbox"/>
Metals	<input checked="" type="checkbox"/>
Bacteria	<input checked="" type="checkbox"/>
Oil and Grease	<input checked="" type="checkbox"/>
Organics	<input checked="" type="checkbox"/>

Potential Alternatives

None



In addition, sites with existing structures may contain wastes, which must be disposed of in accordance with federal, state, and local regulations. These wastes include:

- Sandblasting grit mixed with lead-, cadmium-, or chromium-based paints
- Asbestos
- PCBs (particularly in older transformers)

Limitations

- Hazardous waste that cannot be reused or recycled must be disposed of by a licensed hazardous waste hauler.
- Nothing in this BMP relieves the contractor from responsibility for compliance with federal, state, and local laws regarding storage, handling, transportation, and disposal of hazardous wastes.
- This BMP does not cover aerially deposited lead (ADL) soils. For ADL soils refer to WM-7, Contaminated Soil Management.

Implementation

The following steps will help reduce stormwater pollution from hazardous wastes:

Material Use

- Wastes should be stored in sealed containers constructed of a suitable material and should be labeled as required by Title 22 CCR, Division 4.5 and 49 CFR Parts 172, 173, 178, and 179.
- All hazardous waste should be stored, transported, and disposed as required in Title 22 CCR, Division 4.5 and 49 CFR 261-263.
- Waste containers should be stored in temporary containment facilities that should comply with the following requirements:
 - Temporary containment facility should provide for a spill containment volume equal to 1.5 times the volume of all containers able to contain precipitation from a 25 year storm event, plus the greater of 10% of the aggregate volume of all containers or 100% of the capacity of the largest tank within its boundary, whichever is greater.
 - Temporary containment facility should be impervious to the materials stored there for a minimum contact time of 72 hours.
 - Temporary containment facilities should be maintained free of accumulated rainwater and spills. In the event of spills or leaks, accumulated rainwater and spills should be placed into drums after each rainfall. These liquids should be handled as a hazardous waste unless testing determines them to be non-hazardous. Non-hazardous liquids should be sent to an approved disposal site.
 - Sufficient separation should be provided between stored containers to allow for spill cleanup and emergency response access.

- Incompatible materials, such as chlorine and ammonia, should not be stored in the same temporary containment facility.
- Throughout the rainy season, temporary containment facilities should be covered during non-working days, and prior to rain events. Covered facilities may include use of plastic tarps for small facilities or constructed roofs with overhangs.
- Drums should not be overfilled and wastes should not be mixed.
- Unless watertight, containers of dry waste should be stored on pallets.
- Do not over-apply herbicides and pesticides. Prepare only the amount needed. Follow the recommended usage instructions. Over application is expensive and environmentally harmful. Apply surface dressings in several smaller applications, as opposed to one large application. Allow time for infiltration and avoid excess material being carried offsite by runoff. Do not apply these chemicals just before it rains. People applying pesticides must be certified in accordance with federal and state regulations.
- Paint brushes and equipment for water and oil based paints should be cleaned within a contained area and should not be allowed to contaminate site soils, watercourses, or drainage systems. Waste paints, thinners, solvents, residues, and sludges that cannot be recycled or reused should be disposed of as hazardous waste. When thoroughly dry, latex paint and paint cans, used brushes, rags, absorbent materials, and drop cloths should be disposed of as solid waste.
- Do not clean out brushes or rinse paint containers into the dirt, street, gutter, storm drain, or stream. "Paint out" brushes as much as possible. Rinse water-based paints to the sanitary sewer. Filter and reuse thinners and solvents. Dispose of excess oil-based paints and sludge as hazardous waste.
- The following actions should be taken with respect to temporary contaminant:
 - Ensure that adequate hazardous waste storage volume is available.
 - Ensure that hazardous waste collection containers are conveniently located.
 - Designate hazardous waste storage areas onsite away from storm drains or watercourses and away from moving vehicles and equipment to prevent accidental spills.
 - Minimize production or generation of hazardous materials and hazardous waste on the job site.
 - Use containment berms in fueling and maintenance areas and where the potential for spills is high.
 - Segregate potentially hazardous waste from non-hazardous construction site debris.
 - Keep liquid or semi-liquid hazardous waste in appropriate containers (closed drums or similar) and under cover.

- Clearly label all hazardous waste containers with the waste being stored and the date of accumulation.
- Place hazardous waste containers in secondary containment.
- Do not allow potentially hazardous waste materials to accumulate on the ground.
- Do not mix wastes.
- Use all of the product before disposing of the container.
- Do not remove the original product label; it contains important safety and disposal information.

Waste Recycling Disposal

- Select designated hazardous waste collection areas onsite.
- Hazardous materials and wastes should be stored in covered containers and protected from vandalism.
- Place hazardous waste containers in secondary containment.
- Do not mix wastes, this can cause chemical reactions, making recycling impossible and complicating disposal.
- Recycle any useful materials such as used oil or water-based paint.
- Make sure that toxic liquid wastes (used oils, solvents, and paints) and chemicals (acids, pesticides, additives, curing compounds) are not disposed of in dumpsters designated for construction debris.
- Arrange for regular waste collection before containers overflow.
- Make sure that hazardous waste (e.g., excess oil-based paint and sludge) is collected, removed, and disposed of only at authorized disposal areas.

Disposal Procedures

- Waste should be disposed of by a licensed hazardous waste transporter at an authorized and licensed disposal facility or recycling facility utilizing properly completed Uniform Hazardous Waste Manifest forms.
- A Department of Health Services certified laboratory should sample waste to determine the appropriate disposal facility.
- Properly dispose of rainwater in secondary containment that may have mixed with hazardous waste.
- Attention is directed to "Hazardous Material", "Contaminated Material", and "Aerially Deposited Lead" of the contract documents regarding the handling and disposal of hazardous materials.

Education

- Educate employees and subcontractors on hazardous waste storage and disposal procedures.
- Educate employees and subcontractors on potential dangers to humans and the environment from hazardous wastes.
- Instruct employees and subcontractors on safety procedures for common construction site hazardous wastes.
- Instruct employees and subcontractors in identification of hazardous and solid waste.
- Hold regular meetings to discuss and reinforce hazardous waste management procedures (incorporate into regular safety meetings).
- The contractor's superintendent or representative should oversee and enforce proper hazardous waste management procedures and practices.
- Make sure that hazardous waste is collected, removed, and disposed of only at authorized disposal areas.
- Warning signs should be placed in areas recently treated with chemicals.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- If a container does spill, clean up immediately.

Costs

All of the above are low cost measures.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events..
- Inspect BMPs subject to non-stormwater discharge daily while non-stormwater discharges occur
- Hazardous waste should be regularly collected.
- A foreman or construction supervisor should monitor onsite hazardous waste storage and disposal procedures.
- Waste storage areas should be kept clean, well organized, and equipped with ample cleanup supplies as appropriate for the materials being stored.
- Perimeter controls, containment structures, covers, and liners should be repaired or replaced as needed to maintain proper function.

- Hazardous spills should be cleaned up and reported in conformance with the applicable Material Safety Data Sheet (MSDS) and the instructions posted at the project site.
- The National Response Center, at (800) 424-8802, should be notified of spills of federal reportable quantities in conformance with the requirements in 40 CFR parts 110, 117, and 302. Also notify the Governors Office of Emergency Services Warning Center at (916) 845-8911.
- A copy of the hazardous waste manifests should be provided.

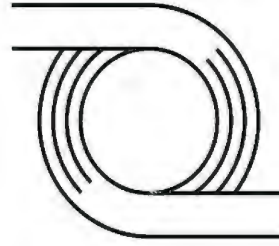
References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Processes, Procedures and Methods to Control Pollution Resulting from All Construction Activity, 430/9-73-007, USEPA, 1973.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.



D & D ENGINEERING, INC.

TTM 20576

Hydrology Report

October 17, 2023

INGLEWOOD

119 W. Hyde Park Boulevard
Inglewood, CA 90302

424-351-6800

North Hollywood

5708 Cahuenga Boulevard
North Hollywood, CA 91601



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FIGURES:

Figure 1 — Pre-Developed Hydrology Map

Figure 2 — Post-Developed Hydrology Map

APPENDICES:

Appendix A – Hydrology Calculations

- *NOAA Atlas 14 Precipitation Data*
- *USDA Web Soil Survey – Soil Type Map*

Appendix B – Hydrology Calculations

- *Rational Method Calculation – Existing 100-Year*
- *Rational Method Calculation – Proposed 100-Year*
- *Rational Method Calculation – Proposed 10-Year*
- *Subarea Hydrographs*

Appendix C – Hydraulic Calculations

- *Hydraulic Toolbox – Detention Basin Calculation*

I. Introduction

The purpose of this report is to outline and describe the existing and proposed peak flow characteristics of the TTM 20576 site as well as the required underground storm drain system and detention basins infrastructure to handle the proposed site.

II. Project Description

The TTM 20576 project site is located northwest of the intersection of Mesa Street and Topaz Road, within the City of Victorville. The project proposes 243 residential lots, open space areas, and streets within a 70.8-acre site. The site is currently vacant and drains in a northeasterly direction, sheet flowing toward the Oro Grande Wash.

III. Hydrologic Summary and Calculations

Per the San Bernardino County Hydrology Manual, the project must provide protection for the 100-year storm event. Existing and proposed 100-year storm peak runoff values were calculated with the Rational Method as shown in Appendix B. The project site is located within soil group A and has a 100-year, 24-hour precipitation depth of 5.85 inches (see Appendix A). In the pre-developed condition, the site is split into five subareas, which results in an existing peak flow of 136.9 CFS from the site as shown in Figure 1: Pre-Developed Hydrology Map and Table 1 below.

Table 1: Existing Condition Summary

<i>Subarea</i>	<i>Tributary Area [Ac.]</i>	<i>100-Year Peak Flow [CFS]</i>
A1	16.18	31.3
A2	12.21	23.6
A3	17.11	33.1
A4	19.39	37.5
A5	5.87	11.4
TOTAL	70.8	136.9

In the post-developed condition, the site is split into thirteen subareas, which results in a proposed peak flow of 170.8 CFS from the site as shown in Figure 2: Post-Developed Hydrology map and Table 2 below.

Table 2: Proposed Condition Summary

<i>Subarea</i>	<i>Tributary Area [Ac.]</i>	<i>100-Year Peak Flow [CFS]</i>
A1	9.05	21.7
A2	6.47	14.0
A3	10.38	24.9
A4	8.33	18.1
A5	3.83	8.3
A6	3.95	9.5

A7	5.95	13.4
A8	6.10	19.3
A9	6.73	17.9
A10	5.57	13.3
A11	2.06	4.9
A12	1.09	2.6
A13	1.28	2.9
TOTAL	70.8	170.8

IV. Hydraulics Summary and Calculations

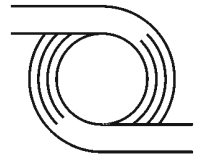
Based on the results above, the proposed peak flow is higher than the existing peak flow. This will be mitigated using a detention basin which will receive runoff from A1 through A10 and have a maximum storage volume of 7.2 acre-ft. The detention basin will outflow via the access ramp as a weir outlet into Topaz Road and flow north along Topaz Road, which will preserve the existing drainage pattern. Runoff from subareas A11, A12, and A13 represent public streets and will not drain to any detention basin.

The pre-developed peak flow is 136.9 CFS and the combined peak runoff from subareas A11-A13 is 10.5 CFS. The difference between both of these values represents the maximum allowable outflow from the East Detention Basin, which is 126.4 CFS. Hydrographs were created for subareas A1-A10 as shown in Appendix B and used to create a composite hydrograph for detention basin analysis. Note that the peak flow from the composite hydrograph is less than the peak flow obtained from adding the individual peak flows of each subarea. This is because the composite hydrograph is the sum of the individual hydrographs, which may have peak flows at different times. The detention basins were modeled using the FHWA Hydraulic Toolbox software. As shown in the detention basin calculations in Appendix C, the proposed detention basin receives a peak inflow of 150.1 CFS and has a peak outflow of 126.3 CFS, which is less than the allowable limit of 126.4 CFS. The total post-developed runoff from the site, after detention, will be 126.3 CFS + 10.5 CFS = 136.8 CFS, which is less than the pre-developed peak runoff of 136.9 CFS.

Pipe capacity calculations were performed using Manning's equation, with a Manning's roughness coefficient of 0.013. The full flow capacities are summarized in Table 3 below.

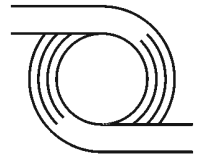
Table 3: Full Flow Pipe Capacity

<i>Diameter [inches]</i>	<i>Slope [%]</i>	<i>Full Flow Capacity [CFS]</i>
24	0.5	16.0
36	0.5	47.2
48	0.5	101.6

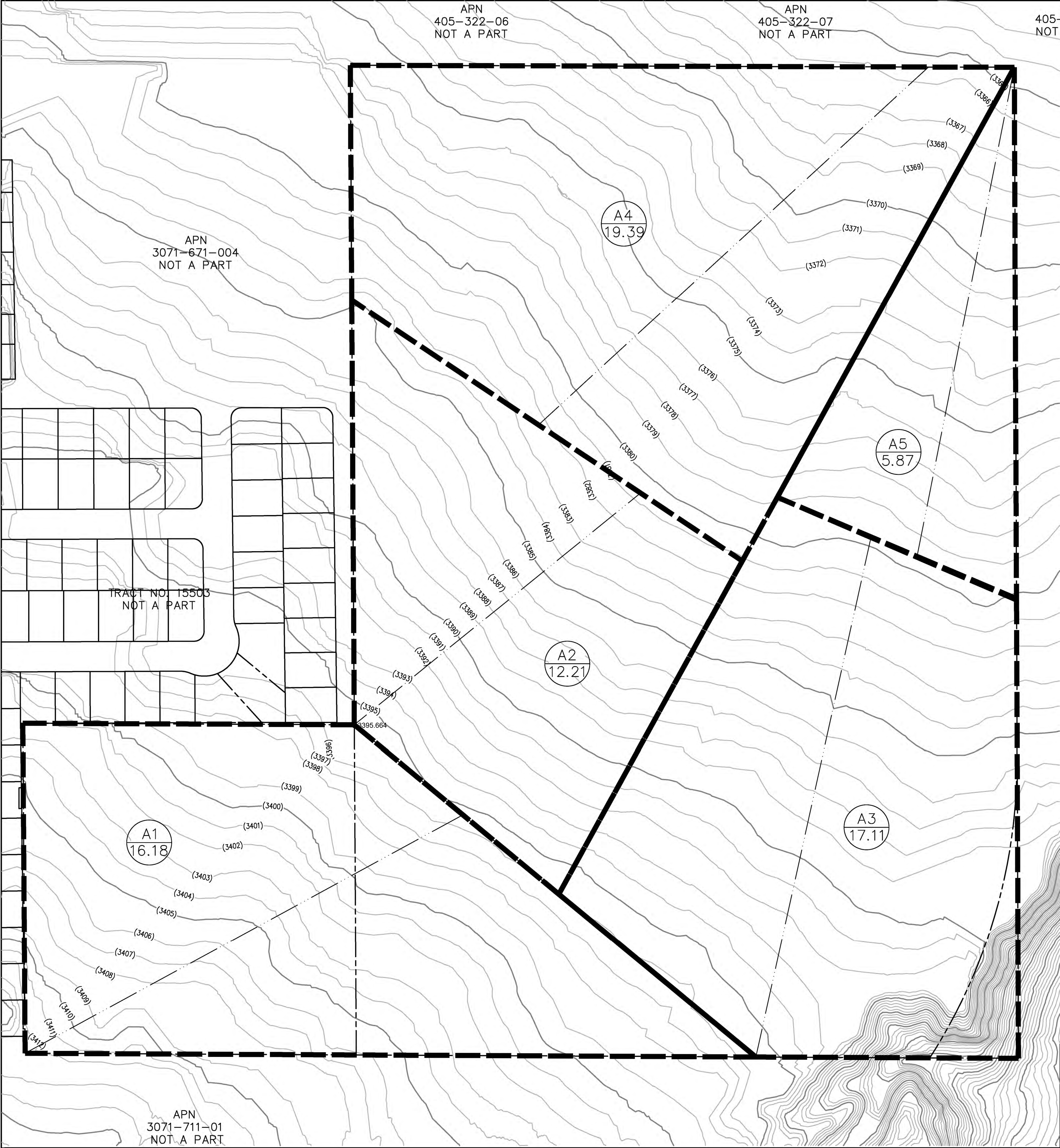


V. Conclusion

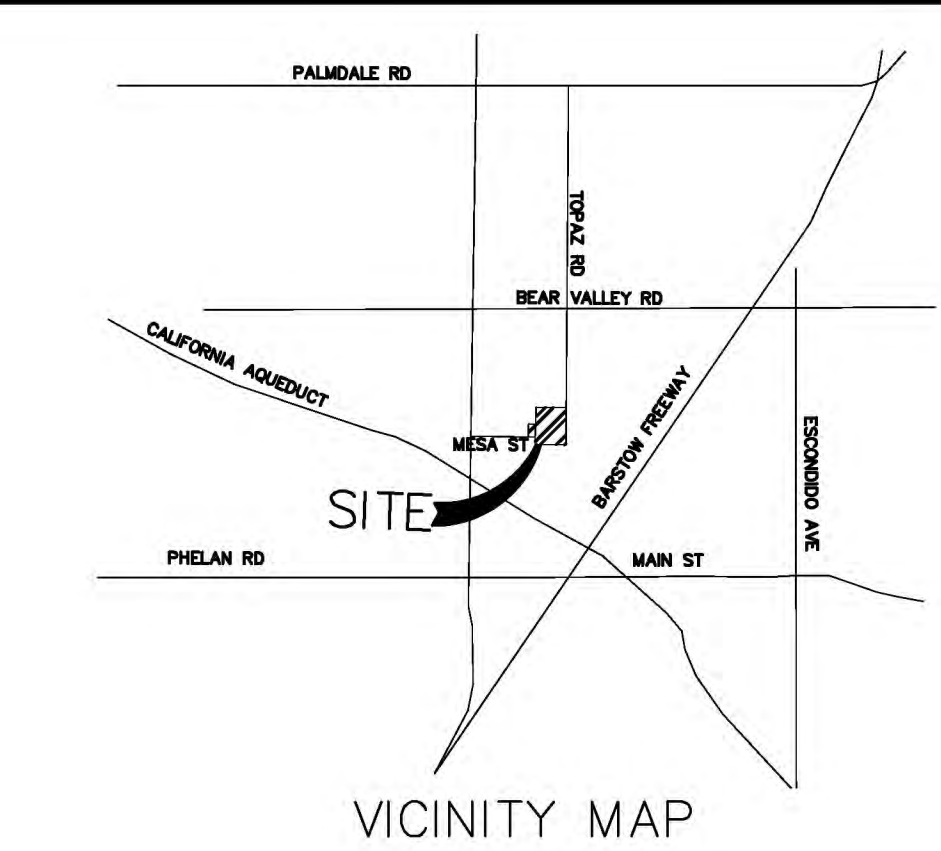
Based on the results shown above, the proposed storm drain infrastructure has the capacity to convey the proposed runoff from the TTM 20576 site. In addition, the proposed detention basin will reduce the post-developed runoff to less than the pre-developed condition. Runoff from the site will continue the same drainage pattern as the existing condition and will flow north via Topaz Road and east along Eucalyptus Street to the Oro Grande Wash.



Figures

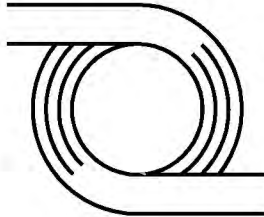
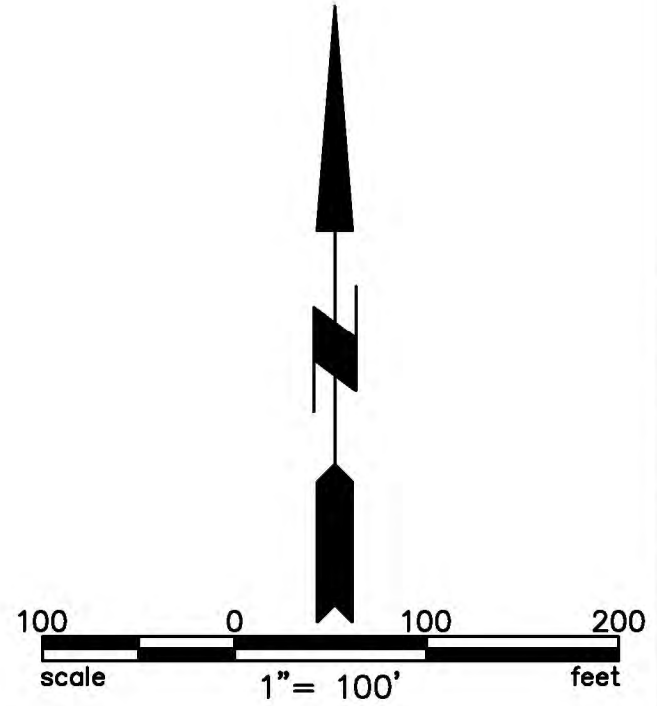


HYDROLOGY SUMMARY		
SUBAREA	AREA [ACRES]	Q100 [CFS]
A1	16.18	31.3
A2	12.21	23.6
A3	17.11	33.1
A4	19.39	37.5
A5	5.87	11.4
TOTAL	70.76	136.9



LEGEND

- SUBAREA BOUNDARY
- FLOWPATH
- FLOW DIRECTION
- SUBAREA NAME
AREA SIZE [ACRES]

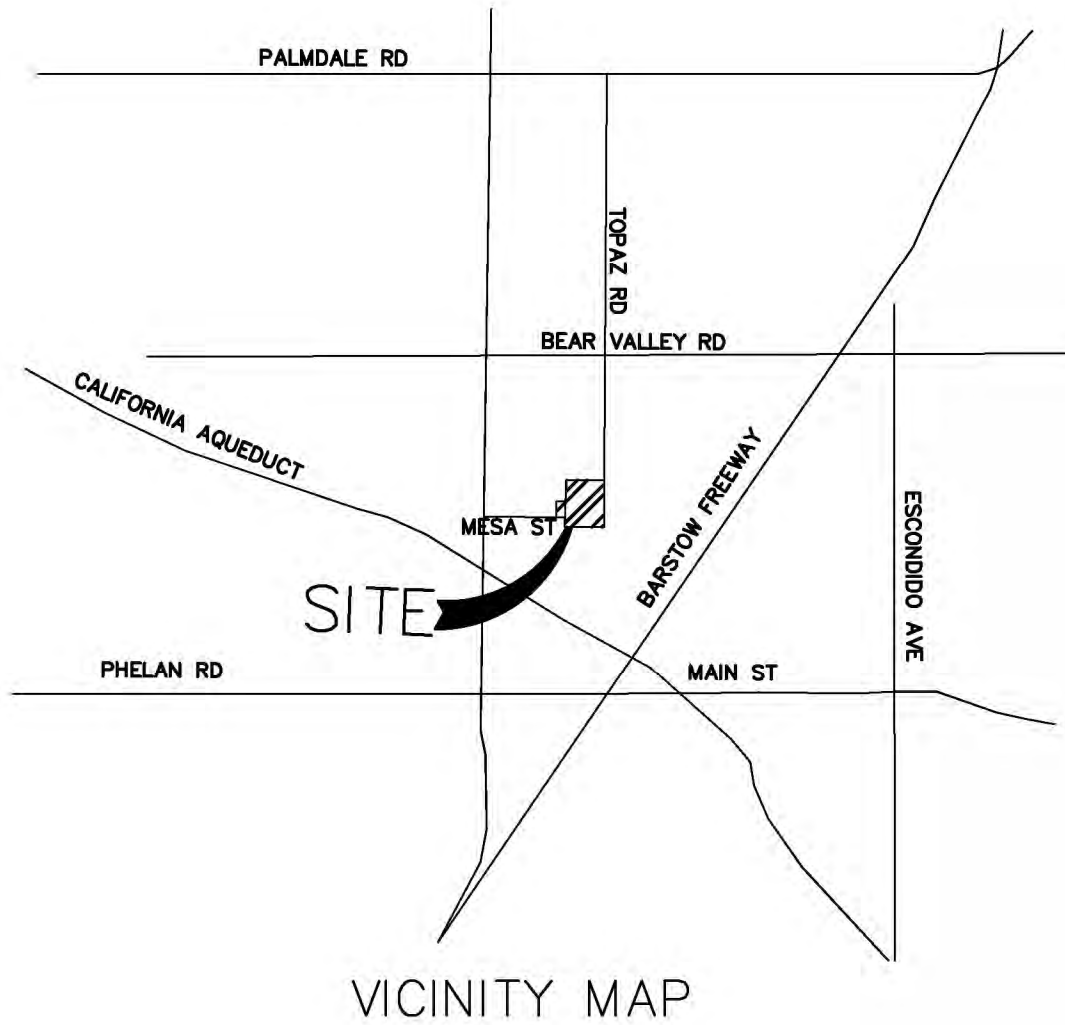
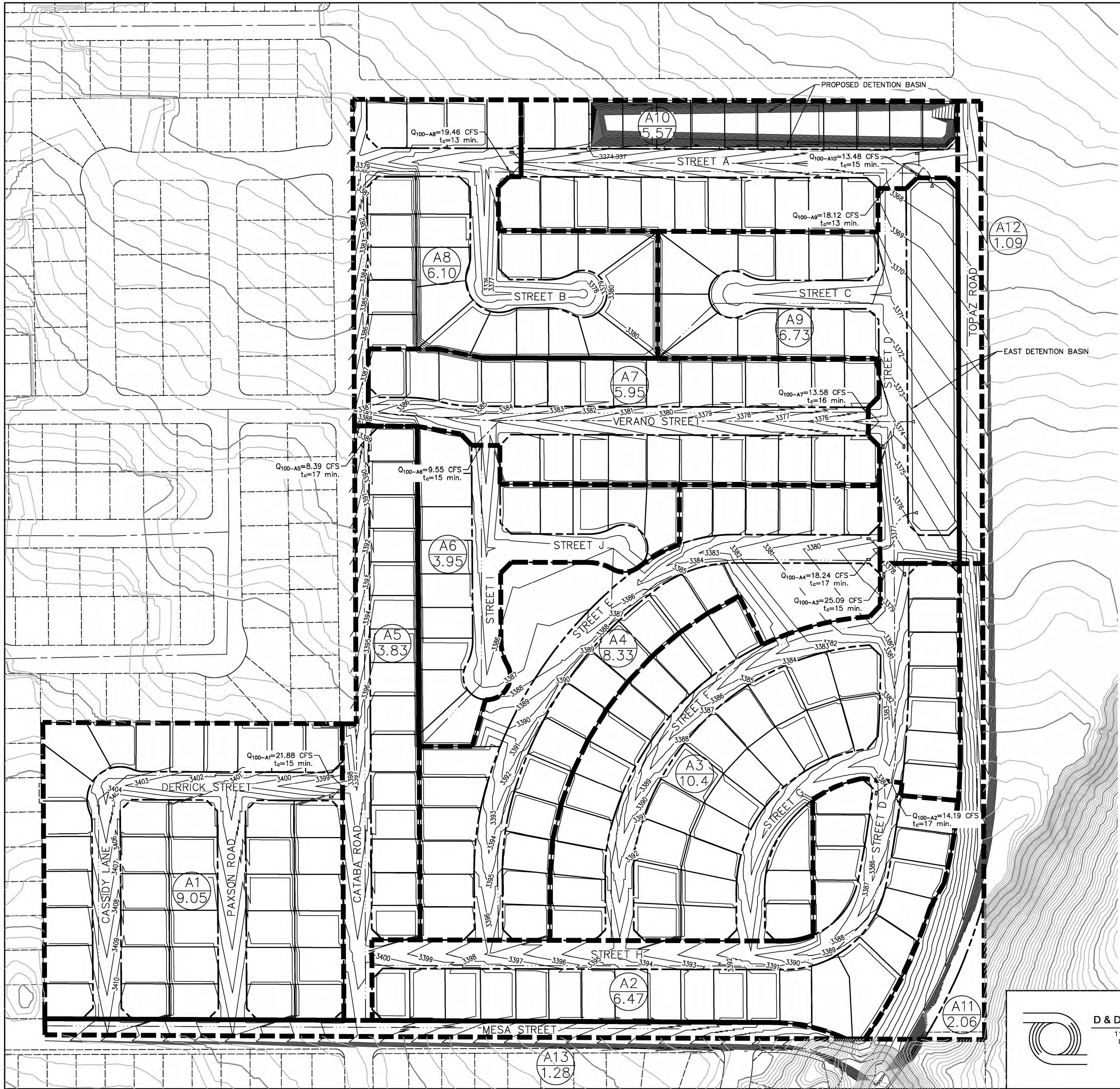


D & D ENGINEERING, INC.
119 W. HYDE PARK BLVD.
INGLEWOOD, CA 90302
Phone: 424-351-8800

TTM 20576

FIGURE 1:
PRE-DEVELOPED HYDROLOGY MAP

SCALE:
1" = 100'
DATE:
12/23/2022
SHEET NO.:
01 of 01



LEGEND

- SUBAREA BOUNDARY
- PROPOSED STORM DRAIN
- FLOWPATH
- SUBAREA NAME
AREA SIZE [ACRES]
- FLOW DIRECTION

HYDROLOGY SUMMARY		
SUBAREA	AREA [ACRES]	Q100 [CFS]
A1	9.05	21.7
A2	6.47	14.0
A3	10.38	24.9
A4	8.33	18.1
A5	3.83	8.3
A6	3.95	9.5
A7	5.95	13.4
A8	6.10	19.3
A9	6.73	17.9
A10	5.57	13.3
A11	2.06	4.9
A12	1.09	2.6
A13	1.28	2.9
TOTAL	70.79	170.8



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119 W. HYDE PARK BLVD.
INGLEWOOD, CA 90302
Phone: 424-351-8800

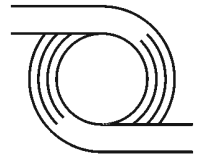
TTM 20576

FIGURE 2:
POST-DEVELOPED HYDROLOGY MAP

SCALE:
1" = 100'

DATE:
09/21/2023

SHEET NO.:
01 of 01



Appendix A



NOAA Atlas 14, Volume 6, Version 2
Location name: Victorville, California, USA*
Latitude: 34.4508°, Longitude: -117.3845°
Elevation: 3388.64 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 & aeries](#)

PF tabular

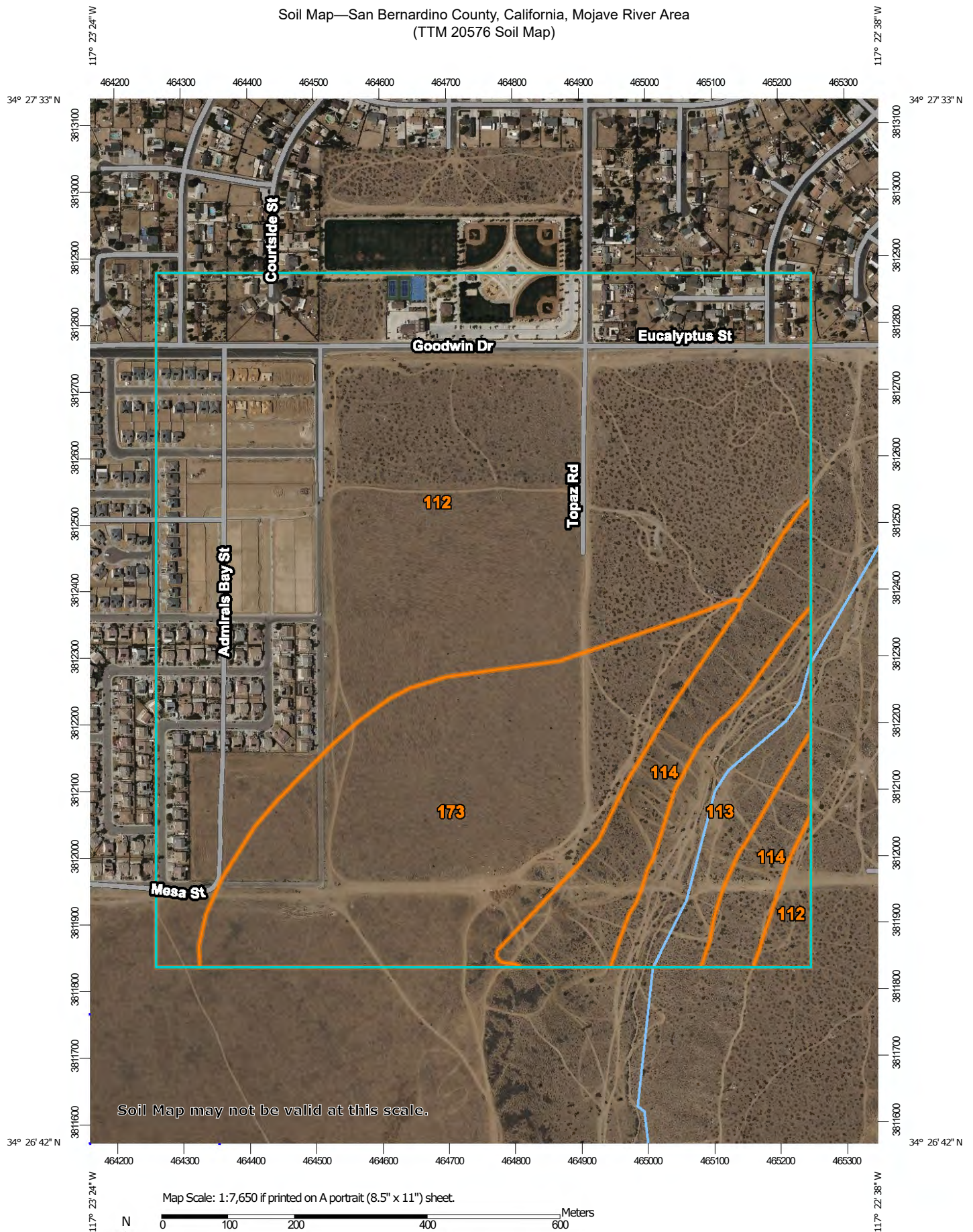
PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.080 (0.066-0.097)	0.115 (0.095-0.141)	0.162 (0.133-0.198)	0.200 (0.163-0.247)	0.251 (0.198-0.321)	0.291 (0.225-0.380)	0.331 (0.250-0.443)	0.373 (0.274-0.513)	0.429 (0.302-0.616)	0.474 (0.322-0.703)
10-min	0.114 (0.094-0.139)	0.165 (0.136-0.202)	0.232 (0.191-0.284)	0.286 (0.234-0.354)	0.360 (0.284-0.460)	0.417 (0.323-0.544)	0.475 (0.358-0.635)	0.534 (0.392-0.735)	0.616 (0.434-0.883)	0.679 (0.462-1.01)
15-min	0.138 (0.114-0.169)	0.200 (0.165-0.244)	0.280 (0.231-0.344)	0.346 (0.283-0.428)	0.435 (0.344-0.556)	0.504 (0.390-0.658)	0.574 (0.433-0.768)	0.646 (0.475-0.889)	0.744 (0.524-1.07)	0.821 (0.559-1.22)
30-min	0.211 (0.174-0.257)	0.305 (0.252-0.373)	0.428 (0.353-0.525)	0.528 (0.432-0.653)	0.665 (0.525-0.850)	0.770 (0.596-1.00)	0.877 (0.662-1.17)	0.987 (0.725-1.36)	1.14 (0.801-1.63)	1.25 (0.853-1.86)
60-min	0.292 (0.241-0.356)	0.422 (0.348-0.516)	0.592 (0.488-0.726)	0.731 (0.597-0.903)	0.920 (0.727-1.18)	1.07 (0.824-1.39)	1.21 (0.916-1.62)	1.37 (1.00-1.88)	1.57 (1.11-2.26)	1.73 (1.18-2.58)
2-hr	0.415 (0.343-0.506)	0.565 (0.466-0.690)	0.768 (0.633-0.941)	0.939 (0.767-1.16)	1.18 (0.932-1.51)	1.37 (1.06-1.79)	1.57 (1.19-2.10)	1.78 (1.31-2.45)	2.08 (1.47-2.98)	2.32 (1.58-3.44)
3-hr	0.524 (0.433-0.639)	0.700 (0.578-0.856)	0.943 (0.777-1.16)	1.15 (0.940-1.42)	1.45 (1.14-1.85)	1.69 (1.31-2.20)	1.94 (1.47-2.59)	2.21 (1.63-3.04)	2.60 (1.83-3.73)	2.92 (1.99-4.34)
6-hr	0.724 (0.599-0.885)	0.959 (0.793-1.17)	1.29 (1.06-1.58)	1.58 (1.29-1.95)	2.00 (1.58-2.55)	2.34 (1.81-3.06)	2.71 (2.05-3.63)	3.12 (2.29-4.29)	3.72 (2.62-5.33)	4.21 (2.87-6.25)
12-hr	0.914 (0.756-1.12)	1.26 (1.04-1.54)	1.74 (1.43-2.13)	2.16 (1.76-2.67)	2.77 (2.19-3.54)	3.28 (2.54-4.28)	3.83 (2.89-5.12)	4.43 (3.25-6.09)	5.31 (3.74-7.61)	6.04 (4.11-8.97)
24-hr	1.25 (1.11-1.44)	1.80 (1.59-2.07)	2.56 (2.26-2.96)	3.22 (2.82-3.75)	4.19 (3.55-5.04)	4.98 (4.14-6.13)	5.85 (4.73-7.36)	6.79 (5.35-8.79)	8.16 (6.17-11.0)	9.30 (6.79-13.0)
2-day	1.37 (1.21-1.57)	1.95 (1.72-2.24)	2.77 (2.44-3.20)	3.48 (3.05-4.06)	4.54 (3.85-5.47)	5.42 (4.50-6.67)	6.38 (5.17-8.04)	7.44 (5.86-9.64)	9.00 (6.80-12.1)	10.3 (7.53-14.4)
3-day	1.46 (1.29-1.68)	2.06 (1.82-2.37)	2.92 (2.57-3.37)	3.67 (3.21-4.27)	4.78 (4.05-5.76)	5.71 (4.74-7.03)	6.73 (5.45-8.48)	7.86 (6.19-10.2)	9.53 (7.20-12.9)	10.9 (7.99-15.3)
4-day	1.58 (1.40-1.81)	2.21 (1.96-2.55)	3.12 (2.76-3.61)	3.92 (3.44-4.57)	5.11 (4.33-6.15)	6.10 (5.06-7.50)	7.18 (5.82-9.05)	8.38 (6.60-10.9)	10.2 (7.68-13.7)	11.7 (8.51-16.3)
7-day	1.73 (1.54-2.00)	2.41 (2.13-2.77)	3.36 (2.97-3.88)	4.20 (3.68-4.89)	5.43 (4.60-6.54)	6.45 (5.35-7.93)	7.57 (6.13-9.53)	8.79 (6.93-11.4)	10.6 (8.01-14.3)	12.1 (8.85-16.9)
10-day	1.86 (1.65-2.14)	2.57 (2.28-2.96)	3.57 (3.15-4.12)	4.43 (3.88-5.17)	5.71 (4.84-6.87)	6.76 (5.61-8.31)	7.91 (6.41-9.96)	9.17 (7.22-11.9)	11.0 (8.32-14.9)	12.5 (9.17-17.5)
20-day	2.28 (2.02-2.62)	3.11 (2.75-3.58)	4.27 (3.77-4.94)	5.28 (4.63-6.16)	6.76 (5.72-8.13)	7.97 (6.61-9.80)	9.28 (7.51-11.7)	10.7 (8.44-13.9)	12.8 (9.67-17.3)	14.5 (10.6-20.3)
30-day	2.69 (2.38-3.09)	3.64 (3.22-4.19)	4.96 (4.38-5.73)	6.10 (5.35-7.11)	7.77 (6.58-9.35)	9.13 (7.58-11.2)	10.6 (8.59-13.4)	12.2 (9.63-15.8)	14.6 (11.0-19.7)	16.5 (12.1-23.1)
45-day	3.17 (2.81-3.65)	4.23 (3.75-4.88)	5.70 (5.04-6.59)	6.98 (6.11-8.13)	8.82 (7.47-10.6)	10.3 (8.58-12.7)	12.0 (9.69-15.1)	13.8 (10.8-17.8)	16.3 (12.4-22.1)	18.5 (13.5-25.8)
60-day	3.60 (3.19-4.14)	4.72 (4.18-5.44)	6.29 (5.55-7.27)	7.64 (6.69-8.90)	9.60 (8.13-11.6)	11.2 (9.30-13.8)	12.9 (10.5-16.3)	14.8 (11.7-19.2)	17.6 (13.3-23.8)	19.9 (14.5-27.8)

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.

[Back to Top](#)

PF graphical

Soil Map—San Bernardino County, California, Mojave River Area
(TTM 20576 Soil Map)



Soil Map may not be valid at this scale.

Map Scale: 1:7,650 if printed on A portrait (8.5" x 11") sheet.



Natural Resources
Conservation Service


Web Soil Survey
National Cooperative Soil Survey

12/23/2022
Page 1 of 3

Soil Map—San Bernardino County, California, Mojave River Area
(TTM 20576 Soil Map)

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

Water Features



Streams and Canals

Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

Background



Aerial Photography

MAP INFORMATION

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

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

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

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

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: San Bernardino County, California, Mojave River Area

Survey Area Data: Version 14, Sep 1, 2022

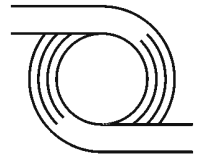
Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 17, 2022—Jun 12, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
112	CAJON SAND, 0 TO 2 PERCENT SLOPES	160.2	62.8%
113	CAJON SAND, 2 TO 9 PERCENT SLOPES	15.6	6.1%
114	CAJON SAND, 9 TO 15 PERCENT SLOPES	22.4	8.8%
173	WASCO SANDY LOAM, COOL, 0 TO 2 PERCENT SLOPES	56.9	22.3%
Totals for Area of Interest		255.1	100.0%



Appendix B

Study Name:		TTM 20576 Existing				1-Hour Rainfall [inches] =			1.21		Slope Intensity Duration Curve (S) =			0.70					Victorville
Storm Return Interval:		100 Year				24-Hour Rainfall [inches] =			5.85								Date:	9/21/2023	
Pervious CN (AMC-II) =		46				Pervious CN = 66			for		AMC-III								
Subarea Name	Concentration Point	Subarea [Acres]	Total [Acres]	Soil Type	Development Type	Percent Impervious (Ai)	Percent Pervious (Ap)	Weighted Curve Number	Tc [min]	I [in / hr]	Fm [in / hr]	Storm Runoff Yield Fraction (Y)	Low Loss Fraction (F*)	Qpeak [CFS]	Flow Path Length [FT]	Elevation Difference [FT]	Slope	Hydraulic Notes	
A1		16.18		A	Vacant	0.00	1.00	66	19	2.50	0.35	0.40	1.50	31.31	1000	17.0	0.017		
A2		12.21		A	Vacant	0.00	1.00	66	19	2.50	0.35	0.40	1.50	23.63	1000	15.0	0.015		
A3		17.11		A	Vacant	0.00	1.00	66	19	2.50	0.35	0.40	1.50	33.11	1000	16.0	0.016		
A4		19.39		A	Vacant	0.00	1.00	66	19	2.50	0.35	0.40	1.50	37.52	1000	17.0	0.017		
A5		5.87		A	Vacant	0.00	1.00	66	19	2.50	0.35	0.40	1.50	11.36	1000	15.0	0.015		
	Site Total		70.76											136.92					

Study Name:		TTM 20576 Proposed				1-Hour Rainfall [inches] =				1.21		Slope Intensity Duration Curve (S) =			0.70				Victorville
Storm Return Interval:		100 Year				24-Hour Rainfall [inches] =				5.85							Date:		9/18/2023
Pervious CN (AMC-II) =		32				Pervious CN =		52		Impervious CN =		98		for AMC-III					
Subarea Name	Concentration Point	Subarea [Acres]	Total [Acres]	Soil Type	Development Type	Percent Impervious (Ai)	Percent Pervious (Ap)	Weighted Curve Number	Tc [min]	I [in / hr]	Fm [in / hr]	Storm Runoff Yield Fraction (Y)	Low Loss Fraction (F*)	Qpeak [CFS]	Flow Path Length [FT]	Elevation Difference [FT]	Slope	Total Runoff Volume [Acre-Ft]	Hydraulic Notes
A1		9.05		A	Residential	0.60	0.40	79.6	15	2.95	0.29	0.62	1.13	21.67	980	12.0	0.012	2.720	
A2		6.47		A	Residential	0.60	0.40	79.6	17	2.70	0.29	0.62	1.04	14.03	1300	16.0	0.012	1.944	
A3		10.38		A	Residential	0.60	0.40	79.6	15	2.95	0.29	0.62	1.13	24.85	1090	16.0	0.015	3.119	
A4		8.33		A	Residential	0.60	0.40	79.6	17	2.70	0.29	0.62	1.04	18.07	1300	18.0	0.014	2.503	
A5		3.83		A	Residential	0.60	0.40	79.6	17	2.70	0.29	0.62	1.04	8.31	1200	13.0	0.011	1.151	
A6		3.95		A	Residential	0.60	0.40	79.6	15	2.95	0.29	0.62	1.13	9.46	680	4.5	0.007	1.187	
A7		5.95		A	Residential	0.60	0.40	79.6	16	2.80	0.29	0.62	1.07	13.44	1100	11.0	0.010	1.788	
A8		6.10		A	Residential	0.60	0.40	79.6	13	3.80	0.29	0.62	1.46	19.27	830	13.0	0.016	1.833	
A9		6.73		A	Residential	0.60	0.40	79.6	13	3.25	0.29	0.62	1.25	17.93	750	12.0	0.016	2.022	
A10		5.57		A	Residential	0.60	0.40	79.6	15	2.95	0.29	0.62	1.13	13.33	840	8.0	0.010	1.674	
A11		2.06		A	Residential	0.60	0.40	79.6	15	2.95	0.29	0.62	1.13	4.93	1000	8.0	0.008	0.619	
A12		1.09		A	Residential	0.60	0.40	79.6	15	2.95	0.29	0.62	1.13	2.61	1000	11.0	0.011	0.328	
A13		1.28		A	Residential	0.60	0.40	79.6	16	2.80	0.29	0.62	1.07	2.89	1300	19.0	0.015	0.385	
	Site Total		70.79							Average Yield =		0.62		170.79				21.27	

Study Name:		TTM 20576 Proposed				1-Hour Rainfall [inches] =				0.731		Slope Intensity Duration Curve (S) =				0.70				Victorville
Storm Return Interval:		10 Year				24-Hour Rainfall [inches] =				3.22								Date:		9/21/2023
Pervious CN (AMC-II) =		32				Pervious CN =			32		Impervious CN =			98						
Subarea Name	Concentration Point	Subarea [Acres]	Total [Acres]	Soil Type	Development Type	Percent Impervious (Ai)	Percent Pervious (Ap)	Weighted Curve Number	Tc [min]	I [in / hr]	Fm [in / hr]	Storm Runoff Yield Fraction (Y)	Low Loss Fraction (F*)	Qpeak [CFS]	Flow Path Length [FT]	Elevation Difference [FT]	Slope	Total Runoff Volume [Acre-Ft]	Hydraulic Notes	
A1		9.05		A	Residential	0.60	0.40	71.6	15	1.94	0.39	0.29	1.39	12.62	980	12.0	0.012	0.695		
A2		6.47		A	Residential	0.60	0.40	71.6	17	1.75	0.39	0.29	1.25	7.92	1300	16.0	0.012	0.497		
A3		10.38		A	Residential	0.60	0.40	71.6	15	1.94	0.39	0.29	1.39	14.48	1090	16.0	0.015	0.797		
A4		8.33		A	Residential	0.60	0.40	71.6	17	1.75	0.39	0.29	1.25	10.20	1300	18.0	0.014	0.639		
A5		3.83		A	Residential	0.60	0.40	71.6	17	1.75	0.39	0.29	1.25	4.69	1200	13.0	0.011	0.294		
A6		3.95		A	Residential	0.60	0.40	71.6	15	1.94	0.39	0.29	1.39	5.51	680	4.5	0.007	0.303		
A7		5.95		A	Residential	0.60	0.40	71.6	16	1.85	0.39	0.29	1.32	7.82	1100	11.0	0.010	0.457		
A8		6.10		A	Residential	0.60	0.40	71.6	13	2.15	0.39	0.29	1.53	9.66	830	13.0	0.016	0.468		
A9		6.73		A	Residential	0.60	0.40	71.6	13	2.15	0.39	0.29	1.53	10.66	750	12.0	0.016	0.517		
A10		5.57		A	Residential	0.60	0.40	71.6	15	1.94	0.39	0.29	1.39	7.77	840	8.0	0.010	0.428		
A11		2.06		A	Residential	0.60	0.40	71.6	15	1.94	0.39	0.29	1.39	2.87	1000	8.0	0.008	0.158		
A12		1.09		A	Residential	0.60	0.40	71.6	15	1.94	0.39	0.29	1.39	1.52	1000	11.0	0.011	0.084		
A13		1.28		A	Residential	0.60	0.40	71.6	15	1.94	0.39	0.29	1.39	1.79	1300	19.0	0.015	0.098		
	Site Total		70.79							Average Yield =		0.29		97.51				5.43		

Study Name:		TTM 20576 Proposed - Subarea A1			
Storm Return Interval:		100 Year			
Estimated Tc [Min] =		15			
Calculated Peak Flow [CFS]				21.67	
S-Graph Type				Valley: Undeveloped	
Lag [Min]				66	
Tributary Subarea A1					
S-Graph Percent of Lag [%]	Time [Min]	Unit Hydrograph	Flow [CFS]	Interval Volume [CF]	Cumulative Volume [CF]
0	0.0	0.000	0.00	-	-
5	3.3	0.700	0.52	52	52
10	6.6	1.500	1.12	163	215
15	9.9	2.500	1.87	297	512
20	13.2	3.700	2.77	460	972
25	16.5	5.000	3.75	646	1,618
30	19.8	6.500	4.87	854	2,472
35	23.1	8.200	6.15	1,091	3,563
40	26.4	10.300	7.72	1,373	4,936
45	29.7	11.900	8.92	1,648	6,584
50	33.0	13.500	10.12	1,886	8,470
55	36.3	15.700	11.77	2,168	10,638
60	39.6	17.800	13.35	2,487	13,124
65	42.9	19.800	14.85	2,791	15,916
70	46.2	21.700	16.27	3,081	18,996
75	49.5	23.700	17.77	3,370	22,366
80	52.8	25.400	19.05	3,645	26,011
85	56.1	26.900	20.17	3,882	29,894
90	59.4	28.300	21.22	4,098	33,991
95	62.7	28.900	21.67	4,246	38,237
100	66.0	28.800	21.60	4,283	42,521
105	69.3	28.500	21.37	4,254	46,774
110	72.6	27.700	20.77	4,172	50,946
115	75.9	26.400	19.80	4,016	54,962
120	79.2	24.700	18.52	3,793	58,755
125	82.5	22.700	17.02	3,519	62,274
130	85.8	20.600	15.45	3,214	65,488
135	89.1	18.400	13.80	2,895	68,383
140	92.4	16.600	12.45	2,598	70,981
145	95.7	14.700	11.02	2,323	73,305
150	99.0	13.200	9.90	2,071	75,376
155	102.3	11.900	8.92	1,863	77,239
160	105.6	10.900	8.17	1,693	78,932
165	108.9	10.200	7.65	1,566	80,498
170	112.2	9.600	7.20	1,470	81,968
175	115.5	9.000	6.75	1,381	83,349

Study Name:		TTM 20576 Proposed - Subarea A1			
Storm Return Interval:		100 Year			
Estimated Tc [Min] =		15			
Calculated Peak Flow [CFS]				21.67	
S-Graph Type				Valley: Undeveloped	
Lag [Min]				66	
Tributary Subarea A1					
S-Graph Percent of Lag [%]	Time [Min]	Unit Hydrograph	Flow [CFS]	Interval Volume [CF]	Cumulative Volume [CF]
180	118.8	8.400	6.30	1,292	84,640
185	122.1	8.100	6.07	1,225	85,865
190	125.4	7.800	5.85	1,180	87,045
195	128.7	7.500	5.62	1,136	88,181
200	132.0	7.100	5.32	1,084	89,265
205	135.3	6.600	4.95	1,017	90,282
210	138.6	6.100	4.57	943	91,225
215	141.9	5.700	4.27	876	92,101
220	145.2	5.500	4.12	831	92,932
225	148.5	5.300	3.97	802	93,734
230	151.8	4.900	3.67	757	94,491
235	155.1	4.500	3.37	698	95,189
240	158.4	4.200	3.15	646	95,835
245	161.7	4.000	3.00	609	96,443
250	165.0	3.800	2.85	579	97,022
255	168.3	3.600	2.70	549	97,572
260	171.6	3.400	2.55	520	98,091
265	174.9	3.200	2.40	490	98,581
270	178.2	3.200	2.40	475	99,056
275	181.5	3.200	2.40	475	99,531
280	184.8	3.200	2.40	475	100,007
285	188.1	3.200	2.40	475	100,482
290	191.4	3.200	2.40	475	100,957
295	194.7	3.200	2.40	475	101,432
300	198.0	3.200	2.40	475	101,907
305	201.3	3.200	2.40	475	102,382
310	204.6	3.200	2.40	475	102,857
315	207.9	3.200	2.40	475	103,332
320	211.2	3.200	2.40	475	103,807
325	214.5	3.000	2.25	460	104,267
330	217.8	2.800	2.10	431	104,698
335	221.1	2.600	1.95	401	105,099
340	224.4	2.400	1.80	371	105,470
345	227.7	2.200	1.65	341	105,812
350	231.0	2.000	1.50	312	106,123
355	234.3	1.800	1.35	282	106,405

Study Name:		TTM 20576 Proposed - Subarea A1			
Storm Return Interval:		100 Year			
Estimated Tc [Min] =		15			
Calculated Peak Flow [CFS]				21.67	
S-Graph Type				Valley: Undeveloped	
Lag [Min]				66	
Tributary Subarea A1					
S-Graph Percent of Lag [%]	Time [Min]	Unit Hydrograph	Flow [CFS]	Interval Volume [CF]	Cumulative Volume [CF]
360	237.6	1.600	1.20	252	106,658
365	240.9	1.600	1.20	238	106,895
370	244.2	1.600	1.20	238	107,133
375	247.5	1.600	1.20	238	107,370
380	250.8	1.600	1.20	238	107,608
385	254.1	1.600	1.20	238	107,846
390	257.4	1.600	1.20	238	108,083
395	260.7	1.600	1.20	238	108,321
400	264.0	1.600	1.20	238	108,558
405	267.3	1.580	1.18	236	108,794
410	270.6	1.560	1.17	233	109,027
415	273.9	1.540	1.15	230	109,257
420	277.2	1.520	1.14	227	109,485
425	280.5	1.500	1.12	224	109,709
430	283.8	1.480	1.11	221	109,930
435	287.1	1.460	1.09	218	110,148
440	290.4	1.440	1.08	215	110,363
445	293.7	1.440	1.08	214	110,577
450	297.0	1.440	1.08	214	110,791
455	300.3	1.440	1.08	214	111,005
460	303.6	1.440	1.08	214	111,219
465	306.9	1.440	1.08	214	111,432
470	310.2	1.440	1.08	214	111,646
475	313.5	1.440	1.08	214	111,860
480	316.8	1.440	1.08	214	112,074
485	320.1	1.440	1.08	214	112,288
490	323.4	1.440	1.08	214	112,501
495	326.7	1.440	1.08	214	112,715
500	330.0	1.440	1.08	214	112,929
505	333.3	1.360	1.02	208	113,137
510	336.6	1.280	0.96	196	113,333
515	339.9	1.200	0.90	184	113,517
520	343.2	1.120	0.84	172	113,689
525	346.5	1.040	0.78	160	113,849
530	349.8	0.960	0.72	148	113,998
535	353.1	0.880	0.66	137	114,135

Study Name:		TTM 20576 Proposed - Subarea A1			
Storm Return Interval:		100 Year			
Estimated Tc [Min] =		15			
Calculated Peak Flow [CFS]				21.67	
S-Graph Type				Valley: Undeveloped	
Lag [Min]				66	
Tributary Subarea A1					
S-Graph Percent of Lag [%]	Time [Min]	Unit Hydrograph	Flow [CFS]	Interval Volume [CF]	Cumulative Volume [CF]
540	356.4	0.800	0.60	125	114,259
545	359.7	0.800	0.60	119	114,378
550	363.0	0.800	0.60	119	114,497
555	366.3	0.800	0.60	119	114,616
560	369.6	0.800	0.60	119	114,734
565	372.9	0.800	0.60	119	114,853
570	376.2	0.800	0.60	119	114,972
575	379.5	0.800	0.60	119	115,091
580	382.8	0.800	0.60	119	115,209
585	386.1	0.800	0.60	119	115,328
590	389.4	0.800	0.60	119	115,447
595	392.7	0.800	0.60	119	115,566
600	396.0	0.800	0.60	119	115,685
605	399.3	0.770	0.58	117	115,801
610	402.6	0.740	0.55	112	115,913
615	405.9	0.710	0.53	108	116,021
620	409.2	0.680	0.51	103	116,124
625	412.5	0.650	0.49	99	116,223
630	415.8	0.620	0.46	94	116,317
635	419.1	0.590	0.44	90	116,407
640	422.4	0.560	0.42	85	116,492
645	425.7	0.560	0.42	83	116,575
650	429.0	0.560	0.42	83	116,658
655	432.3	0.560	0.42	83	116,742
660	435.6	0.560	0.42	83	116,825
665	438.9	0.560	0.42	83	116,908
670	442.2	0.560	0.42	83	116,991
675	445.5	0.560	0.42	83	117,074
680	448.8	0.560	0.42	83	117,157
685	452.1	0.560	0.42	83	117,240
690	455.4	0.560	0.42	83	117,324
695	458.7	0.560	0.42	83	117,407
700	462.0	0.560	0.42	83	117,490
705	465.3	0.530	0.40	81	117,571
710	468.6	0.500	0.37	76	117,647
715	471.9	0.470	0.35	72	117,719

Study Name:		TTM 20576 Proposed - Subarea A1			
Storm Return Interval:		100 Year			
Estimated Tc [Min] =		15			
Calculated Peak Flow [CFS]				21.67	
S-Graph Type				Valley: Undeveloped	
Lag [Min]				66	
Tributary Subarea A1					
S-Graph Percent of Lag [%]	Time [Min]	Unit Hydrograph	Flow [CFS]	Interval Volume [CF]	Cumulative Volume [CF]
720	475.2	0.440	0.33	68	117,787
725	478.5	0.410	0.31	63	117,850
730	481.8	0.380	0.28	59	117,909
735	485.1	0.350	0.26	54	117,963
740	488.4	0.320	0.24	50	118,012
745	491.7	0.320	0.24	48	118,060
750	495.0	0.320	0.24	48	118,107
755	498.3	0.320	0.24	48	118,155
760	501.6	0.320	0.24	48	118,202
765	504.9	0.320	0.24	48	118,250
770	508.2	0.320	0.24	48	118,298
775	511.5	0.320	0.24	48	118,345
780	514.8	0.320	0.24	48	118,393
785	518.1	0.320	0.24	48	118,440
790	521.4	0.320	0.24	48	118,488
795	524.7	0.320	0.24	48	118,535
800	528.0	0.320	0.24	48	118,583

Study Name:		TTM 20576 Proposed - Subarea A2			
Storm Return Interval:		100 Year			
Estimated Tc [Min] =		17			
Calculated Peak Flow [CFS]				14.03	
S-Graph Type				Valley: Undeveloped	
Lag [Min]				72	
Onsite Tributary Areas					
S-Graph Percent of Lag [%]	Time [Min]	Unit Hydrograph	Flow [CFS]	Interval Volume [CF]	Cumulative Volume [CF]
0	0.0	0.000	0.00	-	-
5	3.6	0.700	0.34	37	37
10	7.2	1.500	0.73	115	152
15	10.8	2.500	1.21	210	362
20	14.4	3.700	1.80	325	687
25	18.0	5.000	2.43	456	1,143
30	21.6	6.500	3.16	603	1,746
35	25.2	8.200	3.98	771	2,517
40	28.8	10.300	5.00	970	3,487
45	32.4	11.900	5.78	1,164	4,651
50	36.0	13.500	6.55	1,332	5,982
55	39.6	15.700	7.62	1,531	7,513
60	43.2	17.800	8.64	1,756	9,270
65	46.8	19.800	9.61	1,971	11,241
70	50.4	21.700	10.53	2,176	13,417
75	54.0	23.700	11.51	2,380	15,797
80	57.6	25.400	12.33	2,574	18,372
85	61.2	26.900	13.06	2,742	21,114
90	64.8	28.300	13.74	2,894	24,008
95	68.4	28.900	14.03	2,999	27,007
100	72.0	28.800	13.98	3,025	30,032
105	75.6	28.500	13.84	3,004	33,036
110	79.2	27.700	13.45	2,947	35,983
115	82.8	26.400	12.82	2,836	38,820
120	86.4	24.700	11.99	2,679	41,499
125	90.0	22.700	11.02	2,485	43,984
130	93.6	20.600	10.00	2,270	46,254
135	97.2	18.400	8.93	2,045	48,299
140	100.8	16.600	8.06	1,835	50,134
145	104.4	14.700	7.14	1,641	51,775
150	108.0	13.200	6.41	1,463	53,238
155	111.6	11.900	5.78	1,316	54,554
160	115.2	10.900	5.29	1,195	55,749
165	118.8	10.200	4.95	1,106	56,856
170	122.4	9.600	4.66	1,038	57,894
175	126.0	9.000	4.37	975	58,869

Study Name:		TTM 20576 Proposed - Subarea A2			
Storm Return Interval:		100 Year			
Estimated Tc [Min] =		17			
Calculated Peak Flow [CFS]				14.03	
S-Graph Type				Valley: Undeveloped	
Lag [Min]				72	
Onsite Tributary Areas					
S-Graph Percent of Lag [%]	Time [Min]	Unit Hydrograph	Flow [CFS]	Interval Volume [CF]	Cumulative Volume [CF]
180	129.6	8.400	4.08	912	59,781
185	133.2	8.100	3.93	865	60,646
190	136.8	7.800	3.79	834	61,480
195	140.4	7.500	3.64	802	62,282
200	144.0	7.100	3.45	765	63,048
205	147.6	6.600	3.20	718	63,766
210	151.2	6.100	2.96	666	64,432
215	154.8	5.700	2.77	619	65,050
220	158.4	5.500	2.67	587	65,638
225	162.0	5.300	2.57	566	66,204
230	165.6	4.900	2.38	535	66,739
235	169.2	4.500	2.18	493	67,232
240	172.8	4.200	2.04	456	67,688
245	176.4	4.000	1.94	430	68,118
250	180.0	3.800	1.84	409	68,527
255	183.6	3.600	1.75	388	68,915
260	187.2	3.400	1.65	367	69,282
265	190.8	3.200	1.55	346	69,628
270	194.4	3.200	1.55	336	69,963
275	198.0	3.200	1.55	336	70,299
280	201.6	3.200	1.55	336	70,634
285	205.2	3.200	1.55	336	70,970
290	208.8	3.200	1.55	336	71,305
295	212.4	3.200	1.55	336	71,641
300	216.0	3.200	1.55	336	71,977
305	219.6	3.200	1.55	336	72,312
310	223.2	3.200	1.55	336	72,648
315	226.8	3.200	1.55	336	72,983
320	230.4	3.200	1.55	336	73,319
325	234.0	3.000	1.46	325	73,644
330	237.6	2.800	1.36	304	73,948
335	241.2	2.600	1.26	283	74,231
340	244.8	2.400	1.17	262	74,493
345	248.4	2.200	1.07	241	74,734
350	252.0	2.000	0.97	220	74,955
355	255.6	1.800	0.87	199	75,154

Study Name:		TTM 20576 Proposed - Subarea A2			
Storm Return Interval:		100 Year			
Estimated Tc [Min] =		17			
Calculated Peak Flow [CFS]				14.03	
S-Graph Type				Valley: Undeveloped	
Lag [Min]				72	
Onsite Tributary Areas					
S-Graph Percent of Lag [%]	Time [Min]	Unit Hydrograph	Flow [CFS]	Interval Volume [CF]	Cumulative Volume [CF]
360	259.2	1.600	0.78	178	75,332
365	262.8	1.600	0.78	168	75,500
370	266.4	1.600	0.78	168	75,668
375	270.0	1.600	0.78	168	75,835
380	273.6	1.600	0.78	168	76,003
385	277.2	1.600	0.78	168	76,171
390	280.8	1.600	0.78	168	76,339
395	284.4	1.600	0.78	168	76,507
400	288.0	1.600	0.78	168	76,674
405	291.6	1.580	0.77	167	76,841
410	295.2	1.560	0.76	165	77,006
415	298.8	1.540	0.75	163	77,168
420	302.4	1.520	0.74	160	77,329
425	306.0	1.500	0.73	158	77,487
430	309.6	1.480	0.72	156	77,643
435	313.2	1.460	0.71	154	77,797
440	316.8	1.440	0.70	152	77,949
445	320.4	1.440	0.70	151	78,100
450	324.0	1.440	0.70	151	78,251
455	327.6	1.440	0.70	151	78,402
460	331.2	1.440	0.70	151	78,553
465	334.8	1.440	0.70	151	78,704
470	338.4	1.440	0.70	151	78,855
475	342.0	1.440	0.70	151	79,006
480	345.6	1.440	0.70	151	79,157
485	349.2	1.440	0.70	151	79,308
490	352.8	1.440	0.70	151	79,459
495	356.4	1.440	0.70	151	79,610
500	360.0	1.440	0.70	151	79,761
505	363.6	1.360	0.66	147	79,908
510	367.2	1.280	0.62	138	80,047
515	370.8	1.200	0.58	130	80,177
520	374.4	1.120	0.54	122	80,298
525	378.0	1.040	0.50	113	80,412
530	381.6	0.960	0.47	105	80,516
535	385.2	0.880	0.43	96	80,613

Study Name:		TTM 20576 Proposed - Subarea A2			
Storm Return Interval:		100 Year			
Estimated Tc [Min] =		17			
Calculated Peak Flow [CFS]				14.03	
S-Graph Type				Valley: Undeveloped	
Lag [Min]				72	
Onsite Tributary Areas					
S-Graph Percent of Lag [%]	Time [Min]	Unit Hydrograph	Flow [CFS]	Interval Volume [CF]	Cumulative Volume [CF]
540	388.8	0.800	0.39	88	80,701
545	392.4	0.800	0.39	84	80,785
550	396.0	0.800	0.39	84	80,869
555	399.6	0.800	0.39	84	80,953
560	403.2	0.800	0.39	84	81,037
565	406.8	0.800	0.39	84	81,120
570	410.4	0.800	0.39	84	81,204
575	414.0	0.800	0.39	84	81,288
580	417.6	0.800	0.39	84	81,372
585	421.2	0.800	0.39	84	81,456
590	424.8	0.800	0.39	84	81,540
595	428.4	0.800	0.39	84	81,624
600	432.0	0.800	0.39	84	81,708
605	435.6	0.770	0.37	82	81,790
610	439.2	0.740	0.36	79	81,869
615	442.8	0.710	0.34	76	81,945
620	446.4	0.680	0.33	73	82,018
625	450.0	0.650	0.32	70	82,088
630	453.6	0.620	0.30	67	82,154
635	457.2	0.590	0.29	63	82,218
640	460.8	0.560	0.27	60	82,278
645	464.4	0.560	0.27	59	82,337
650	468.0	0.560	0.27	59	82,396
655	471.6	0.560	0.27	59	82,454
660	475.2	0.560	0.27	59	82,513
665	478.8	0.560	0.27	59	82,572
670	482.4	0.560	0.27	59	82,630
675	486.0	0.560	0.27	59	82,689
680	489.6	0.560	0.27	59	82,748
685	493.2	0.560	0.27	59	82,807
690	496.8	0.560	0.27	59	82,865
695	500.4	0.560	0.27	59	82,924
700	504.0	0.560	0.27	59	82,983
705	507.6	0.530	0.26	57	83,040
710	511.2	0.500	0.24	54	83,094
715	514.8	0.470	0.23	51	83,145

Study Name:		TTM 20576 Proposed - Subarea A2			
Storm Return Interval:		100 Year			
Estimated Tc [Min] =		17			
Calculated Peak Flow [CFS]				14.03	
S-Graph Type				Valley: Undeveloped	
Lag [Min]				72	
Onsite Tributary Areas					
S-Graph Percent of Lag [%]	Time [Min]	Unit Hydrograph	Flow [CFS]	Interval Volume [CF]	Cumulative Volume [CF]
720	518.4	0.440	0.21	48	83,192
725	522.0	0.410	0.20	45	83,237
730	525.6	0.380	0.18	41	83,278
735	529.2	0.350	0.17	38	83,317
740	532.8	0.320	0.16	35	83,352
745	536.4	0.320	0.16	34	83,385
750	540.0	0.320	0.16	34	83,419
755	543.6	0.320	0.16	34	83,452
760	547.2	0.320	0.16	34	83,486
765	550.8	0.320	0.16	34	83,520
770	554.4	0.320	0.16	34	83,553
775	558.0	0.320	0.16	34	83,587
780	561.6	0.320	0.16	34	83,620
785	565.2	0.320	0.16	34	83,654
790	568.8	0.320	0.16	34	83,687
795	572.4	0.320	0.16	34	83,721
800	576.0	0.320	0.16	34	83,754

Study Name:		TTM 20576 Proposed - Subarea A3			
Storm Return Interval:		100 Year			
Estimated Tc [Min] =		15			
Calculated Peak Flow [CFS]				24.85	
S-Graph Type				Valley: Undeveloped	
Lag [Min]				64	
Onsite Tributary Areas					
S-Graph Percent of Lag [%]	Time [Min]	Unit Hydrograph	Flow [CFS]	Interval Volume [CF]	Cumulative Volume [CF]
0	0.0	0.000	0.00	-	-
5	3.2	0.700	0.60	58	58
10	6.4	1.500	1.29	182	239
15	9.6	2.500	2.15	330	570
20	12.8	3.700	3.18	512	1,081
25	16.0	5.000	4.30	718	1,800
30	19.2	6.500	5.59	949	2,749
35	22.4	8.200	7.05	1,213	3,962
40	25.6	10.300	8.86	1,527	5,489
45	28.8	11.900	10.23	1,833	7,322
50	32.0	13.500	11.61	2,097	9,419
55	35.2	15.700	13.50	2,410	11,829
60	38.4	17.800	15.31	2,765	14,594
65	41.6	19.800	17.03	3,104	17,698
70	44.8	21.700	18.66	3,426	21,124
75	48.0	23.700	20.38	3,748	24,871
80	51.2	25.400	21.84	4,053	28,924
85	54.4	26.900	23.13	4,317	33,242
90	57.6	28.300	24.33	4,557	37,798
95	60.8	28.900	24.85	4,722	42,520
100	64.0	28.800	24.76	4,763	47,283
105	67.2	28.500	24.51	4,730	52,013
110	70.4	27.700	23.82	4,639	56,652
115	73.6	26.400	22.70	4,466	61,118
120	76.8	24.700	21.24	4,218	65,336
125	80.0	22.700	19.52	3,913	69,248
130	83.2	20.600	17.71	3,574	72,823
135	86.4	18.400	15.82	3,219	76,042
140	89.6	16.600	14.27	2,889	78,931
145	92.8	14.700	12.64	2,584	81,515
150	96.0	13.200	11.35	2,303	83,818
155	99.2	11.900	10.23	2,072	85,890
160	102.4	10.900	9.37	1,882	87,772
165	105.6	10.200	8.77	1,742	89,514
170	108.8	9.600	8.25	1,634	91,148
175	112.0	9.000	7.74	1,535	92,683

Study Name:		TTM 20576 Proposed - Subarea A3			
Storm Return Interval:		100 Year			
Estimated Tc [Min] =		15			
Calculated Peak Flow [CFS]				24.85	
S-Graph Type				Valley: Undeveloped	
Lag [Min]				64	
Onsite Tributary Areas					
S-Graph Percent of Lag [%]	Time [Min]	Unit Hydrograph	Flow [CFS]	Interval Volume [CF]	Cumulative Volume [CF]
180	115.2	8.400	7.22	1,436	94,120
185	118.4	8.100	6.96	1,362	95,482
190	121.6	7.800	6.71	1,312	96,794
195	124.8	7.500	6.45	1,263	98,057
200	128.0	7.100	6.11	1,205	99,262
205	131.2	6.600	5.68	1,131	100,393
210	134.4	6.100	5.25	1,048	101,442
215	137.6	5.700	4.90	974	102,416
220	140.8	5.500	4.73	925	103,340
225	144.0	5.300	4.56	892	104,232
230	147.2	4.900	4.21	842	105,074
235	150.4	4.500	3.87	776	105,850
240	153.6	4.200	3.61	718	106,568
245	156.8	4.000	3.44	677	107,245
250	160.0	3.800	3.27	644	107,889
255	163.2	3.600	3.10	611	108,499
260	166.4	3.400	2.92	578	109,077
265	169.6	3.200	2.75	545	109,622
270	172.8	3.200	2.75	528	110,150
275	176.0	3.200	2.75	528	110,679
280	179.2	3.200	2.75	528	111,207
285	182.4	3.200	2.75	528	111,735
290	185.6	3.200	2.75	528	112,264
295	188.8	3.200	2.75	528	112,792
300	192.0	3.200	2.75	528	113,320
305	195.2	3.200	2.75	528	113,848
310	198.4	3.200	2.75	528	114,377
315	201.6	3.200	2.75	528	114,905
320	204.8	3.200	2.75	528	115,433
325	208.0	3.000	2.58	512	115,945
330	211.2	2.800	2.41	479	116,424
335	214.4	2.600	2.24	446	116,870
340	217.6	2.400	2.06	413	117,282
345	220.8	2.200	1.89	380	117,662
350	224.0	2.000	1.72	347	118,009
355	227.2	1.800	1.55	314	118,322

Study Name:		TTM 20576 Proposed - Subarea A3			
Storm Return Interval:		100 Year			
Estimated Tc [Min] =		15			
Calculated Peak Flow [CFS]				24.85	
S-Graph Type				Valley: Undeveloped	
Lag [Min]				64	
Onsite Tributary Areas					
S-Graph Percent of Lag [%]	Time [Min]	Unit Hydrograph	Flow [CFS]	Interval Volume [CF]	Cumulative Volume [CF]
360	230.4	1.600	1.38	281	118,603
365	233.6	1.600	1.38	264	118,867
370	236.8	1.600	1.38	264	119,131
375	240.0	1.600	1.38	264	119,396
380	243.2	1.600	1.38	264	119,660
385	246.4	1.600	1.38	264	119,924
390	249.6	1.600	1.38	264	120,188
395	252.8	1.600	1.38	264	120,452
400	256.0	1.600	1.38	264	120,716
405	259.2	1.580	1.36	262	120,979
410	262.4	1.560	1.34	259	121,238
415	265.6	1.540	1.32	256	121,494
420	268.8	1.520	1.31	253	121,746
425	272.0	1.500	1.29	249	121,996
430	275.2	1.480	1.27	246	122,242
435	278.4	1.460	1.26	243	122,484
440	281.6	1.440	1.24	239	122,724
445	284.8	1.440	1.24	238	122,962
450	288.0	1.440	1.24	238	123,199
455	291.2	1.440	1.24	238	123,437
460	294.4	1.440	1.24	238	123,675
465	297.6	1.440	1.24	238	123,913
470	300.8	1.440	1.24	238	124,150
475	304.0	1.440	1.24	238	124,388
480	307.2	1.440	1.24	238	124,626
485	310.4	1.440	1.24	238	124,863
490	313.6	1.440	1.24	238	125,101
495	316.8	1.440	1.24	238	125,339
500	320.0	1.440	1.24	238	125,577
505	323.2	1.360	1.17	231	125,808
510	326.4	1.280	1.10	218	126,026
515	329.6	1.200	1.03	205	126,230
520	332.8	1.120	0.96	192	126,422
525	336.0	1.040	0.89	178	126,600
530	339.2	0.960	0.83	165	126,765
535	342.4	0.880	0.76	152	126,917

Study Name:		TTM 20576 Proposed - Subarea A3			
Storm Return Interval:		100 Year			
Estimated Tc [Min] =		15			
Calculated Peak Flow [CFS]				24.85	
S-Graph Type				Valley: Undeveloped	
Lag [Min]				64	
Onsite Tributary Areas					
S-Graph Percent of Lag [%]	Time [Min]	Unit Hydrograph	Flow [CFS]	Interval Volume [CF]	Cumulative Volume [CF]
540	345.6	0.800	0.69	139	127,056
545	348.8	0.800	0.69	132	127,188
550	352.0	0.800	0.69	132	127,320
555	355.2	0.800	0.69	132	127,452
560	358.4	0.800	0.69	132	127,584
565	361.6	0.800	0.69	132	127,716
570	364.8	0.800	0.69	132	127,848
575	368.0	0.800	0.69	132	127,980
580	371.2	0.800	0.69	132	128,112
585	374.4	0.800	0.69	132	128,245
590	377.6	0.800	0.69	132	128,377
595	380.8	0.800	0.69	132	128,509
600	384.0	0.800	0.69	132	128,641
605	387.2	0.770	0.66	130	128,770
610	390.4	0.740	0.64	125	128,895
615	393.6	0.710	0.61	120	129,015
620	396.8	0.680	0.58	115	129,129
625	400.0	0.650	0.56	110	129,239
630	403.2	0.620	0.53	105	129,344
635	406.4	0.590	0.51	100	129,444
640	409.6	0.560	0.48	95	129,539
645	412.8	0.560	0.48	92	129,631
650	416.0	0.560	0.48	92	129,724
655	419.2	0.560	0.48	92	129,816
660	422.4	0.560	0.48	92	129,909
665	425.6	0.560	0.48	92	130,001
670	428.8	0.560	0.48	92	130,094
675	432.0	0.560	0.48	92	130,186
680	435.2	0.560	0.48	92	130,279
685	438.4	0.560	0.48	92	130,371
690	441.6	0.560	0.48	92	130,463
695	444.8	0.560	0.48	92	130,556
700	448.0	0.560	0.48	92	130,648
705	451.2	0.530	0.46	90	130,738
710	454.4	0.500	0.43	85	130,823
715	457.6	0.470	0.40	80	130,903

Study Name:		TTM 20576 Proposed - Subarea A3			
Storm Return Interval:		100 Year			
Estimated Tc [Min] =		15			
Calculated Peak Flow [CFS]				24.85	
S-Graph Type				Valley: Undeveloped	
Lag [Min]				64	
Onsite Tributary Areas					
S-Graph Percent of Lag [%]	Time [Min]	Unit Hydrograph	Flow [CFS]	Interval Volume [CF]	Cumulative Volume [CF]
720	460.8	0.440	0.38	75	130,979
725	464.0	0.410	0.35	70	131,049
730	467.2	0.380	0.33	65	131,114
735	470.4	0.350	0.30	60	131,174
740	473.6	0.320	0.28	55	131,229
745	476.8	0.320	0.28	53	131,282
750	480.0	0.320	0.28	53	131,335
755	483.2	0.320	0.28	53	131,388
760	486.4	0.320	0.28	53	131,441
765	489.6	0.320	0.28	53	131,494
770	492.8	0.320	0.28	53	131,546
775	496.0	0.320	0.28	53	131,599
780	499.2	0.320	0.28	53	131,652
785	502.4	0.320	0.28	53	131,705
790	505.6	0.320	0.28	53	131,758
795	508.8	0.320	0.28	53	131,811
800	512.0	0.320	0.28	53	131,863

Study Name:		TTM 20576 Proposed - Subarea A4			
Storm Return Interval:		100 Year			
Estimated Tc [Min] =		17			
Calculated Peak Flow [CFS]				18.07	
S-Graph Type				Valley: Undeveloped	
Lag [Min]				72	
Onsite Tributary Areas					
S-Graph Percent of Lag [%]	Time [Min]	Unit Hydrograph	Flow [CFS]	Interval Volume [CF]	Cumulative Volume [CF]
0	0.0	0.000	0.00	-	-
5	3.6	0.700	0.44	47	47
10	7.2	1.500	0.94	149	196
15	10.8	2.500	1.56	270	466
20	14.4	3.700	2.31	419	885
25	18.0	5.000	3.13	587	1,472
30	21.6	6.500	4.06	777	2,249
35	25.2	8.200	5.13	993	3,241
40	28.8	10.300	6.44	1,249	4,491
45	32.4	11.900	7.44	1,499	5,990
50	36.0	13.500	8.44	1,715	7,705
55	39.6	15.700	9.82	1,972	9,677
60	43.2	17.800	11.13	2,262	11,939
65	46.8	19.800	12.38	2,539	14,478
70	50.4	21.700	13.57	2,802	17,280
75	54.0	23.700	14.82	3,066	20,346
80	57.6	25.400	15.88	3,316	23,662
85	61.2	26.900	16.82	3,532	27,194
90	64.8	28.300	17.69	3,728	30,921
95	68.4	28.900	18.07	3,863	34,784
100	72.0	28.800	18.01	3,896	38,680
105	75.6	28.500	17.82	3,869	42,549
110	79.2	27.700	17.32	3,795	46,344
115	82.8	26.400	16.51	3,653	49,998
120	86.4	24.700	15.44	3,451	53,448
125	90.0	22.700	14.19	3,201	56,649
130	93.6	20.600	12.88	2,924	59,573
135	97.2	18.400	11.50	2,634	62,207
140	100.8	16.600	10.38	2,363	64,570
145	104.4	14.700	9.19	2,114	66,684
150	108.0	13.200	8.25	1,884	68,568
155	111.6	11.900	7.44	1,695	70,263
160	115.2	10.900	6.82	1,540	71,803
165	118.8	10.200	6.38	1,425	73,227
170	122.4	9.600	6.00	1,337	74,564
175	126.0	9.000	5.63	1,256	75,820

Study Name:		TTM 20576 Proposed - Subarea A4			
Storm Return Interval:		100 Year			
Estimated Tc [Min] =		17			
Calculated Peak Flow [CFS]				18.07	
S-Graph Type				Valley: Undeveloped	
Lag [Min]				72	
Onsite Tributary Areas					
S-Graph Percent of Lag [%]	Time [Min]	Unit Hydrograph	Flow [CFS]	Interval Volume [CF]	Cumulative Volume [CF]
180	129.6	8.400	5.25	1,175	76,995
185	133.2	8.100	5.06	1,114	78,110
190	136.8	7.800	4.88	1,074	79,183
195	140.4	7.500	4.69	1,033	80,217
200	144.0	7.100	4.44	986	81,202
205	147.6	6.600	4.13	925	82,128
210	151.2	6.100	3.81	858	82,985
215	154.8	5.700	3.56	797	83,782
220	158.4	5.500	3.44	756	84,538
225	162.0	5.300	3.31	729	85,268
230	165.6	4.900	3.06	689	85,956
235	169.2	4.500	2.81	635	86,591
240	172.8	4.200	2.63	587	87,179
245	176.4	4.000	2.50	554	87,732
250	180.0	3.800	2.38	527	88,259
255	183.6	3.600	2.25	500	88,759
260	187.2	3.400	2.13	473	89,232
265	190.8	3.200	2.00	446	89,677
270	194.4	3.200	2.00	432	90,109
275	198.0	3.200	2.00	432	90,542
280	201.6	3.200	2.00	432	90,974
285	205.2	3.200	2.00	432	91,406
290	208.8	3.200	2.00	432	91,838
295	212.4	3.200	2.00	432	92,270
300	216.0	3.200	2.00	432	92,702
305	219.6	3.200	2.00	432	93,135
310	223.2	3.200	2.00	432	93,567
315	226.8	3.200	2.00	432	93,999
320	230.4	3.200	2.00	432	94,431
325	234.0	3.000	1.88	419	94,850
330	237.6	2.800	1.75	392	95,242
335	241.2	2.600	1.63	365	95,606
340	244.8	2.400	1.50	338	95,944
345	248.4	2.200	1.38	311	96,254
350	252.0	2.000	1.25	284	96,538
355	255.6	1.800	1.13	257	96,795

Study Name:		TTM 20576 Proposed - Subarea A4			
Storm Return Interval:		100 Year			
Estimated Tc [Min] =		17			
Calculated Peak Flow [CFS]				18.07	
S-Graph Type				Valley: Undeveloped	
Lag [Min]				72	
Onsite Tributary Areas					
S-Graph Percent of Lag [%]	Time [Min]	Unit Hydrograph	Flow [CFS]	Interval Volume [CF]	Cumulative Volume [CF]
360	259.2	1.600	1.00	230	97,024
365	262.8	1.600	1.00	216	97,240
370	266.4	1.600	1.00	216	97,456
375	270.0	1.600	1.00	216	97,673
380	273.6	1.600	1.00	216	97,889
385	277.2	1.600	1.00	216	98,105
390	280.8	1.600	1.00	216	98,321
395	284.4	1.600	1.00	216	98,537
400	288.0	1.600	1.00	216	98,753
405	291.6	1.580	0.99	215	98,968
410	295.2	1.560	0.98	212	99,180
415	298.8	1.540	0.96	209	99,389
420	302.4	1.520	0.95	207	99,596
425	306.0	1.500	0.94	204	99,800
430	309.6	1.480	0.93	201	100,001
435	313.2	1.460	0.91	199	100,199
440	316.8	1.440	0.90	196	100,395
445	320.4	1.440	0.90	194	100,590
450	324.0	1.440	0.90	194	100,784
455	327.6	1.440	0.90	194	100,979
460	331.2	1.440	0.90	194	101,173
465	334.8	1.440	0.90	194	101,368
470	338.4	1.440	0.90	194	101,562
475	342.0	1.440	0.90	194	101,757
480	345.6	1.440	0.90	194	101,951
485	349.2	1.440	0.90	194	102,146
490	352.8	1.440	0.90	194	102,340
495	356.4	1.440	0.90	194	102,535
500	360.0	1.440	0.90	194	102,729
505	363.6	1.360	0.85	189	102,918
510	367.2	1.280	0.80	178	103,096
515	370.8	1.200	0.75	167	103,264
520	374.4	1.120	0.70	157	103,421
525	378.0	1.040	0.65	146	103,566
530	381.6	0.960	0.60	135	103,701
535	385.2	0.880	0.55	124	103,826

Study Name:		TTM 20576 Proposed - Subarea A4			
Storm Return Interval:		100 Year			
Estimated Tc [Min] =		17			
Calculated Peak Flow [CFS]				18.07	
S-Graph Type				Valley: Undeveloped	
Lag [Min]				72	
Onsite Tributary Areas					
S-Graph Percent of Lag [%]	Time [Min]	Unit Hydrograph	Flow [CFS]	Interval Volume [CF]	Cumulative Volume [CF]
540	388.8	0.800	0.50	113	103,939
545	392.4	0.800	0.50	108	104,047
550	396.0	0.800	0.50	108	104,155
555	399.6	0.800	0.50	108	104,263
560	403.2	0.800	0.50	108	104,371
565	406.8	0.800	0.50	108	104,479
570	410.4	0.800	0.50	108	104,587
575	414.0	0.800	0.50	108	104,695
580	417.6	0.800	0.50	108	104,803
585	421.2	0.800	0.50	108	104,912
590	424.8	0.800	0.50	108	105,020
595	428.4	0.800	0.50	108	105,128
600	432.0	0.800	0.50	108	105,236
605	435.6	0.770	0.48	106	105,342
610	439.2	0.740	0.46	102	105,444
615	442.8	0.710	0.44	98	105,542
620	446.4	0.680	0.43	94	105,635
625	450.0	0.650	0.41	90	105,725
630	453.6	0.620	0.39	86	105,811
635	457.2	0.590	0.37	82	105,893
640	460.8	0.560	0.35	78	105,970
645	464.4	0.560	0.35	76	106,046
650	468.0	0.560	0.35	76	106,122
655	471.6	0.560	0.35	76	106,197
660	475.2	0.560	0.35	76	106,273
665	478.8	0.560	0.35	76	106,349
670	482.4	0.560	0.35	76	106,424
675	486.0	0.560	0.35	76	106,500
680	489.6	0.560	0.35	76	106,575
685	493.2	0.560	0.35	76	106,651
690	496.8	0.560	0.35	76	106,727
695	500.4	0.560	0.35	76	106,802
700	504.0	0.560	0.35	76	106,878
705	507.6	0.530	0.33	74	106,952
710	511.2	0.500	0.31	70	107,021
715	514.8	0.470	0.29	66	107,087

Study Name:		TTM 20576 Proposed - Subarea A4			
Storm Return Interval:		100 Year			
Estimated Tc [Min] =		17			
Calculated Peak Flow [CFS]				18.07	
S-Graph Type				Valley: Undeveloped	
Lag [Min]				72	
Onsite Tributary Areas					
S-Graph Percent of Lag [%]	Time [Min]	Unit Hydrograph	Flow [CFS]	Interval Volume [CF]	Cumulative Volume [CF]
720	518.4	0.440	0.28	61	107,148
725	522.0	0.410	0.26	57	107,205
730	525.6	0.380	0.24	53	107,259
735	529.2	0.350	0.22	49	107,308
740	532.8	0.320	0.20	45	107,353
745	536.4	0.320	0.20	43	107,397
750	540.0	0.320	0.20	43	107,440
755	543.6	0.320	0.20	43	107,483
760	547.2	0.320	0.20	43	107,526
765	550.8	0.320	0.20	43	107,569
770	554.4	0.320	0.20	43	107,613
775	558.0	0.320	0.20	43	107,656
780	561.6	0.320	0.20	43	107,699
785	565.2	0.320	0.20	43	107,742
790	568.8	0.320	0.20	43	107,786
795	572.4	0.320	0.20	43	107,829
800	576.0	0.320	0.20	43	107,872

Study Name:		TTM 20576 Proposed - Subarea A5			
Storm Return Interval:		100 Year			
Estimated Tc [Min] =		17			
Calculated Peak Flow [CFS]				8.31	
S-Graph Type				Valley: Undeveloped	
Lag [Min]				73	
Onsite Tributary Areas					
S-Graph Percent of Lag [%]	Time [Min]	Unit Hydrograph	Flow [CFS]	Interval Volume [CF]	Cumulative Volume [CF]
0	0.0	0.000	0.00	-	-
5	3.7	0.700	0.20	22	22
10	7.3	1.500	0.43	69	91
15	11.0	2.500	0.72	126	217
20	14.6	3.700	1.06	195	412
25	18.3	5.000	1.44	274	686
30	21.9	6.500	1.87	362	1,048
35	25.6	8.200	2.36	463	1,511
40	29.2	10.300	2.96	582	2,094
45	32.9	11.900	3.42	699	2,793
50	36.5	13.500	3.88	800	3,593
55	40.2	15.700	4.51	919	4,512
60	43.8	17.800	5.12	1,055	5,567
65	47.5	19.800	5.69	1,184	6,751
70	51.1	21.700	6.24	1,307	8,057
75	54.8	23.700	6.81	1,429	9,487
80	58.4	25.400	7.30	1,546	11,033
85	62.1	26.900	7.73	1,647	12,679
90	65.7	28.300	8.14	1,738	14,417
95	69.4	28.900	8.31	1,801	16,218
100	73.0	28.800	8.28	1,817	18,035
105	76.7	28.500	8.19	1,804	19,839
110	80.3	27.700	7.96	1,770	21,609
115	84.0	26.400	7.59	1,703	23,312
120	87.6	24.700	7.10	1,609	24,921
125	91.3	22.700	6.53	1,492	26,414
130	94.9	20.600	5.92	1,363	27,777
135	98.6	18.400	5.29	1,228	29,005
140	102.2	16.600	4.77	1,102	30,107
145	105.9	14.700	4.23	986	31,092
150	109.5	13.200	3.80	878	31,971
155	113.2	11.900	3.42	790	32,761
160	116.8	10.900	3.13	718	33,479
165	120.5	10.200	2.93	664	34,143
170	124.1	9.600	2.76	623	34,767
175	127.8	9.000	2.59	586	35,352

Study Name:		TTM 20576 Proposed - Subarea A5			
Storm Return Interval:		100 Year			
Estimated Tc [Min] =		17			
Calculated Peak Flow [CFS]				8.31	
S-Graph Type				Valley: Undeveloped	
Lag [Min]				73	
Onsite Tributary Areas					
S-Graph Percent of Lag [%]	Time [Min]	Unit Hydrograph	Flow [CFS]	Interval Volume [CF]	Cumulative Volume [CF]
180	131.4	8.400	2.42	548	35,900
185	135.1	8.100	2.33	520	36,420
190	138.7	7.800	2.24	501	36,920
195	142.4	7.500	2.16	482	37,402
200	146.0	7.100	2.04	460	37,862
205	149.7	6.600	1.90	431	38,293
210	153.3	6.100	1.75	400	38,693
215	157.0	5.700	1.64	372	39,065
220	160.6	5.500	1.58	353	39,417
225	164.3	5.300	1.52	340	39,757
230	167.9	4.900	1.41	321	40,079
235	171.6	4.500	1.29	296	40,374
240	175.2	4.200	1.21	274	40,648
245	178.9	4.000	1.15	258	40,907
250	182.5	3.800	1.09	246	41,152
255	186.2	3.600	1.04	233	41,385
260	189.8	3.400	0.98	220	41,606
265	193.5	3.200	0.92	208	41,813
270	197.1	3.200	0.92	202	42,015
275	200.8	3.200	0.92	202	42,216
280	204.4	3.200	0.92	202	42,418
285	208.1	3.200	0.92	202	42,619
290	211.7	3.200	0.92	202	42,821
295	215.4	3.200	0.92	202	43,022
300	219.0	3.200	0.92	202	43,224
305	222.7	3.200	0.92	202	43,425
310	226.3	3.200	0.92	202	43,627
315	230.0	3.200	0.92	202	43,828
320	233.6	3.200	0.92	202	44,030
325	237.3	3.000	0.86	195	44,225
330	240.9	2.800	0.81	183	44,408
335	244.6	2.600	0.75	170	44,578
340	248.2	2.400	0.69	157	44,735
345	251.9	2.200	0.63	145	44,880
350	255.5	2.000	0.58	132	45,012
355	259.2	1.800	0.52	120	45,132

Study Name:		TTM 20576 Proposed - Subarea A5			
Storm Return Interval:		100 Year			
Estimated Tc [Min] =		17			
Calculated Peak Flow [CFS]				8.31	
S-Graph Type				Valley: Undeveloped	
Lag [Min]				73	
Onsite Tributary Areas					
S-Graph Percent of Lag [%]	Time [Min]	Unit Hydrograph	Flow [CFS]	Interval Volume [CF]	Cumulative Volume [CF]
360	262.8	1.600	0.46	107	45,239
365	266.5	1.600	0.46	101	45,340
370	270.1	1.600	0.46	101	45,441
375	273.8	1.600	0.46	101	45,541
380	277.4	1.600	0.46	101	45,642
385	281.1	1.600	0.46	101	45,743
390	284.7	1.600	0.46	101	45,844
395	288.4	1.600	0.46	101	45,944
400	292.0	1.600	0.46	101	46,045
405	295.7	1.580	0.45	100	46,145
410	299.3	1.560	0.45	99	46,244
415	303.0	1.540	0.44	98	46,342
420	306.6	1.520	0.44	96	46,438
425	310.3	1.500	0.43	95	46,533
430	313.9	1.480	0.43	94	46,627
435	317.6	1.460	0.42	93	46,720
440	321.2	1.440	0.41	91	46,811
445	324.9	1.440	0.41	91	46,902
450	328.5	1.440	0.41	91	46,992
455	332.2	1.440	0.41	91	47,083
460	335.8	1.440	0.41	91	47,174
465	339.5	1.440	0.41	91	47,264
470	343.1	1.440	0.41	91	47,355
475	346.8	1.440	0.41	91	47,446
480	350.4	1.440	0.41	91	47,536
485	354.1	1.440	0.41	91	47,627
490	357.7	1.440	0.41	91	47,718
495	361.4	1.440	0.41	91	47,808
500	365.0	1.440	0.41	91	47,899
505	368.7	1.360	0.39	88	47,987
510	372.3	1.280	0.37	83	48,070
515	376.0	1.200	0.35	78	48,148
520	379.6	1.120	0.32	73	48,221
525	383.3	1.040	0.30	68	48,289
530	386.9	0.960	0.28	63	48,352
535	390.6	0.880	0.25	58	48,410

Study Name:		TTM 20576 Proposed - Subarea A5			
Storm Return Interval:		100 Year			
Estimated Tc [Min] =		17			
Calculated Peak Flow [CFS]				8.31	
S-Graph Type				Valley: Undeveloped	
Lag [Min]				73	
Onsite Tributary Areas					
S-Graph Percent of Lag [%]	Time [Min]	Unit Hydrograph	Flow [CFS]	Interval Volume [CF]	Cumulative Volume [CF]
540	394.2	0.800	0.23	53	48,463
545	397.9	0.800	0.23	50	48,514
550	401.5	0.800	0.23	50	48,564
555	405.2	0.800	0.23	50	48,614
560	408.8	0.800	0.23	50	48,665
565	412.5	0.800	0.23	50	48,715
570	416.1	0.800	0.23	50	48,765
575	419.8	0.800	0.23	50	48,816
580	423.4	0.800	0.23	50	48,866
585	427.1	0.800	0.23	50	48,917
590	430.7	0.800	0.23	50	48,967
595	434.4	0.800	0.23	50	49,017
600	438.0	0.800	0.23	50	49,068
605	441.7	0.770	0.22	49	49,117
610	445.3	0.740	0.21	48	49,165
615	449.0	0.710	0.20	46	49,210
620	452.6	0.680	0.20	44	49,254
625	456.3	0.650	0.19	42	49,296
630	459.9	0.620	0.18	40	49,336
635	463.6	0.590	0.17	38	49,374
640	467.2	0.560	0.16	36	49,410
645	470.9	0.560	0.16	35	49,446
650	474.5	0.560	0.16	35	49,481
655	478.2	0.560	0.16	35	49,516
660	481.8	0.560	0.16	35	49,551
665	485.5	0.560	0.16	35	49,587
670	489.1	0.560	0.16	35	49,622
675	492.8	0.560	0.16	35	49,657
680	496.4	0.560	0.16	35	49,692
685	500.1	0.560	0.16	35	49,728
690	503.7	0.560	0.16	35	49,763
695	507.4	0.560	0.16	35	49,798
700	511.0	0.560	0.16	35	49,834
705	514.7	0.530	0.15	34	49,868
710	518.3	0.500	0.14	32	49,900
715	522.0	0.470	0.14	31	49,931

Study Name:		TTM 20576 Proposed - Subarea A5			
Storm Return Interval:		100 Year			
Estimated Tc [Min] =		17			
Calculated Peak Flow [CFS]				8.31	
S-Graph Type				Valley: Undeveloped	
Lag [Min]				73	
Onsite Tributary Areas					
S-Graph Percent of Lag [%]	Time [Min]	Unit Hydrograph	Flow [CFS]	Interval Volume [CF]	Cumulative Volume [CF]
720	525.6	0.440	0.13	29	49,959
725	529.3	0.410	0.12	27	49,986
730	532.9	0.380	0.11	25	50,011
735	536.6	0.350	0.10	23	50,034
740	540.2	0.320	0.09	21	50,055
745	543.9	0.320	0.09	20	50,075
750	547.5	0.320	0.09	20	50,095
755	551.2	0.320	0.09	20	50,116
760	554.8	0.320	0.09	20	50,136
765	558.5	0.320	0.09	20	50,156
770	562.1	0.320	0.09	20	50,176
775	565.8	0.320	0.09	20	50,196
780	569.4	0.320	0.09	20	50,216
785	573.1	0.320	0.09	20	50,237
790	576.7	0.320	0.09	20	50,257
795	580.4	0.320	0.09	20	50,277
800	584.0	0.320	0.09	20	50,297

Study Name:		TTM 20576 Proposed - Subarea A6			
Storm Return Interval:		100 Year			
Estimated Tc [Min] =		15			
Calculated Peak Flow [CFS]				9.46	
S-Graph Type				Valley: Undeveloped	
Lag [Min]				66	
Onsite Tributary Areas					
S-Graph Percent of Lag [%]	Time [Min]	Unit Hydrograph	Flow [CFS]	Interval Volume [CF]	Cumulative Volume [CF]
0	0.0	0.000	0.00	-	-
5	3.3	0.700	0.23	23	23
10	6.6	1.500	0.49	71	94
15	9.9	2.500	0.82	130	224
20	13.2	3.700	1.21	201	425
25	16.5	5.000	1.64	282	706
30	19.8	6.500	2.13	373	1,079
35	23.1	8.200	2.68	476	1,555
40	26.4	10.300	3.37	600	2,155
45	29.7	11.900	3.90	719	2,874
50	33.0	13.500	4.42	823	3,698
55	36.3	15.700	5.14	946	4,644
60	39.6	17.800	5.83	1,086	5,729
65	42.9	19.800	6.48	1,218	6,948
70	46.2	21.700	7.10	1,345	8,293
75	49.5	23.700	7.76	1,471	9,764
80	52.8	25.400	8.31	1,591	11,355
85	56.1	26.900	8.81	1,695	13,050
90	59.4	28.300	9.26	1,789	14,839
95	62.7	28.900	9.46	1,854	16,692
100	66.0	28.800	9.43	1,870	18,562
105	69.3	28.500	9.33	1,857	20,419
110	72.6	27.700	9.07	1,821	22,240
115	75.9	26.400	8.64	1,753	23,994
120	79.2	24.700	8.09	1,656	25,650
125	82.5	22.700	7.43	1,536	27,186
130	85.8	20.600	6.74	1,403	28,589
135	89.1	18.400	6.02	1,264	29,853
140	92.4	16.600	5.43	1,134	30,987
145	95.7	14.700	4.81	1,014	32,001
150	99.0	13.200	4.32	904	32,905
155	102.3	11.900	3.90	813	33,719
160	105.6	10.900	3.57	739	34,458
165	108.9	10.200	3.34	684	35,141
170	112.2	9.600	3.14	642	35,783
175	115.5	9.000	2.95	603	36,386

Study Name:		TTM 20576 Proposed - Subarea A6			
Storm Return Interval:		100 Year			
Estimated Tc [Min] =		15			
Calculated Peak Flow [CFS]				9.46	
S-Graph Type				Valley: Undeveloped	
Lag [Min]				66	
Onsite Tributary Areas					
S-Graph Percent of Lag [%]	Time [Min]	Unit Hydrograph	Flow [CFS]	Interval Volume [CF]	Cumulative Volume [CF]
180	118.8	8.400	2.75	564	36,950
185	122.1	8.100	2.65	535	37,484
190	125.4	7.800	2.55	515	38,000
195	128.7	7.500	2.46	496	38,495
200	132.0	7.100	2.32	473	38,968
205	135.3	6.600	2.16	444	39,412
210	138.6	6.100	2.00	412	39,824
215	141.9	5.700	1.87	382	40,206
220	145.2	5.500	1.80	363	40,569
225	148.5	5.300	1.73	350	40,919
230	151.8	4.900	1.60	331	41,250
235	155.1	4.500	1.47	305	41,555
240	158.4	4.200	1.37	282	41,836
245	161.7	4.000	1.31	266	42,102
250	165.0	3.800	1.24	253	42,355
255	168.3	3.600	1.18	240	42,595
260	171.6	3.400	1.11	227	42,822
265	174.9	3.200	1.05	214	43,035
270	178.2	3.200	1.05	207	43,243
275	181.5	3.200	1.05	207	43,450
280	184.8	3.200	1.05	207	43,658
285	188.1	3.200	1.05	207	43,865
290	191.4	3.200	1.05	207	44,072
295	194.7	3.200	1.05	207	44,280
300	198.0	3.200	1.05	207	44,487
305	201.3	3.200	1.05	207	44,695
310	204.6	3.200	1.05	207	44,902
315	207.9	3.200	1.05	207	45,109
320	211.2	3.200	1.05	207	45,317
325	214.5	3.000	0.98	201	45,518
330	217.8	2.800	0.92	188	45,706
335	221.1	2.600	0.85	175	45,881
340	224.4	2.400	0.79	162	46,043
345	227.7	2.200	0.72	149	46,192
350	231.0	2.000	0.65	136	46,328
355	234.3	1.800	0.59	123	46,451

Study Name:		TTM 20576 Proposed - Subarea A6			
Storm Return Interval:		100 Year			
Estimated Tc [Min] =		15			
Calculated Peak Flow [CFS]				9.46	
S-Graph Type				Valley: Undeveloped	
Lag [Min]				66	
Onsite Tributary Areas					
S-Graph Percent of Lag [%]	Time [Min]	Unit Hydrograph	Flow [CFS]	Interval Volume [CF]	Cumulative Volume [CF]
360	237.6	1.600	0.52	110	46,561
365	240.9	1.600	0.52	104	46,665
370	244.2	1.600	0.52	104	46,769
375	247.5	1.600	0.52	104	46,872
380	250.8	1.600	0.52	104	46,976
385	254.1	1.600	0.52	104	47,080
390	257.4	1.600	0.52	104	47,183
395	260.7	1.600	0.52	104	47,287
400	264.0	1.600	0.52	104	47,391
405	267.3	1.580	0.52	103	47,494
410	270.6	1.560	0.51	102	47,596
415	273.9	1.540	0.50	100	47,696
420	277.2	1.520	0.50	99	47,795
425	280.5	1.500	0.49	98	47,893
430	283.8	1.480	0.48	97	47,990
435	287.1	1.460	0.48	95	48,085
440	290.4	1.440	0.47	94	48,179
445	293.7	1.440	0.47	93	48,272
450	297.0	1.440	0.47	93	48,366
455	300.3	1.440	0.47	93	48,459
460	303.6	1.440	0.47	93	48,552
465	306.9	1.440	0.47	93	48,646
470	310.2	1.440	0.47	93	48,739
475	313.5	1.440	0.47	93	48,832
480	316.8	1.440	0.47	93	48,926
485	320.1	1.440	0.47	93	49,019
490	323.4	1.440	0.47	93	49,112
495	326.7	1.440	0.47	93	49,206
500	330.0	1.440	0.47	93	49,299
505	333.3	1.360	0.45	91	49,390
510	336.6	1.280	0.42	86	49,475
515	339.9	1.200	0.39	80	49,556
520	343.2	1.120	0.37	75	49,631
525	346.5	1.040	0.34	70	49,701
530	349.8	0.960	0.31	65	49,766
535	353.1	0.880	0.29	60	49,825

Study Name:		TTM 20576 Proposed - Subarea A6			
Storm Return Interval:		100 Year			
Estimated Tc [Min] =		15			
Calculated Peak Flow [CFS]				9.46	
S-Graph Type				Valley: Undeveloped	
Lag [Min]				66	
Onsite Tributary Areas					
S-Graph Percent of Lag [%]	Time [Min]	Unit Hydrograph	Flow [CFS]	Interval Volume [CF]	Cumulative Volume [CF]
540	356.4	0.800	0.26	54	49,880
545	359.7	0.800	0.26	52	49,932
550	363.0	0.800	0.26	52	49,983
555	366.3	0.800	0.26	52	50,035
560	369.6	0.800	0.26	52	50,087
565	372.9	0.800	0.26	52	50,139
570	376.2	0.800	0.26	52	50,191
575	379.5	0.800	0.26	52	50,243
580	382.8	0.800	0.26	52	50,294
585	386.1	0.800	0.26	52	50,346
590	389.4	0.800	0.26	52	50,398
595	392.7	0.800	0.26	52	50,450
600	396.0	0.800	0.26	52	50,502
605	399.3	0.770	0.25	51	50,553
610	402.6	0.740	0.24	49	50,602
615	405.9	0.710	0.23	47	50,649
620	409.2	0.680	0.22	45	50,694
625	412.5	0.650	0.21	43	50,737
630	415.8	0.620	0.20	41	50,778
635	419.1	0.590	0.19	39	50,817
640	422.4	0.560	0.18	37	50,854
645	425.7	0.560	0.18	36	50,891
650	429.0	0.560	0.18	36	50,927
655	432.3	0.560	0.18	36	50,963
660	435.6	0.560	0.18	36	51,000
665	438.9	0.560	0.18	36	51,036
670	442.2	0.560	0.18	36	51,072
675	445.5	0.560	0.18	36	51,109
680	448.8	0.560	0.18	36	51,145
685	452.1	0.560	0.18	36	51,181
690	455.4	0.560	0.18	36	51,217
695	458.7	0.560	0.18	36	51,254
700	462.0	0.560	0.18	36	51,290
705	465.3	0.530	0.17	35	51,325
710	468.6	0.500	0.16	33	51,359
715	471.9	0.470	0.15	31	51,390

Study Name:		TTM 20576 Proposed - Subarea A6			
Storm Return Interval:		100 Year			
Estimated Tc [Min] =		15			
Calculated Peak Flow [CFS]				9.46	
S-Graph Type				Valley: Undeveloped	
Lag [Min]				66	
Onsite Tributary Areas					
S-Graph Percent of Lag [%]	Time [Min]	Unit Hydrograph	Flow [CFS]	Interval Volume [CF]	Cumulative Volume [CF]
720	475.2	0.440	0.14	29	51,420
725	478.5	0.410	0.13	28	51,447
730	481.8	0.380	0.12	26	51,473
735	485.1	0.350	0.11	24	51,496
740	488.4	0.320	0.10	22	51,518
745	491.7	0.320	0.10	21	51,539
750	495.0	0.320	0.10	21	51,560
755	498.3	0.320	0.10	21	51,580
760	501.6	0.320	0.10	21	51,601
765	504.9	0.320	0.10	21	51,622
770	508.2	0.320	0.10	21	51,643
775	511.5	0.320	0.10	21	51,663
780	514.8	0.320	0.10	21	51,684
785	518.1	0.320	0.10	21	51,705
790	521.4	0.320	0.10	21	51,726
795	524.7	0.320	0.10	21	51,746
800	528.0	0.320	0.10	21	51,767

Study Name:		TTM 20576 Proposed - Subarea A7			
Storm Return Interval:		100 Year			
Estimated Tc [Min] =		16			
Calculated Peak Flow [CFS]				13.44	
S-Graph Type				Valley: Undeveloped	
Lag [Min]				70	
Onsite Tributary Areas					
S-Graph Percent of Lag [%]	Time [Min]	Unit Hydrograph	Flow [CFS]	Interval Volume [CF]	Cumulative Volume [CF]
0	0.0	0.000	0.00	-	-
5	3.5	0.700	0.33	34	34
10	7.0	1.500	0.70	107	142
15	10.5	2.500	1.16	195	337
20	14.0	3.700	1.72	303	640
25	17.5	5.000	2.33	425	1,065
30	21.0	6.500	3.02	562	1,626
35	24.5	8.200	3.81	718	2,344
40	28.0	10.300	4.79	903	3,247
45	31.5	11.900	5.53	1,084	4,331
50	35.0	13.500	6.28	1,240	5,572
55	38.5	15.700	7.30	1,426	6,997
60	42.0	17.800	8.28	1,636	8,633
65	45.5	19.800	9.21	1,836	10,469
70	49.0	21.700	10.09	2,026	12,496
75	52.5	23.700	11.02	2,217	14,713
80	56.0	25.400	11.81	2,398	17,110
85	59.5	26.900	12.51	2,554	19,664
90	63.0	28.300	13.16	2,695	22,359
95	66.5	28.900	13.44	2,793	25,153
100	70.0	28.800	13.39	2,818	27,970
105	73.5	28.500	13.25	2,798	30,768
110	77.0	27.700	12.88	2,744	33,512
115	80.5	26.400	12.28	2,642	36,154
120	84.0	24.700	11.49	2,495	38,649
125	87.5	22.700	10.56	2,315	40,964
130	91.0	20.600	9.58	2,114	43,078
135	94.5	18.400	8.56	1,904	44,983
140	98.0	16.600	7.72	1,709	46,692
145	101.5	14.700	6.84	1,528	48,220
150	105.0	13.200	6.14	1,362	49,582
155	108.5	11.900	5.53	1,226	50,808
160	112.0	10.900	5.07	1,113	51,921
165	115.5	10.200	4.74	1,030	52,952
170	119.0	9.600	4.46	967	53,919
175	122.5	9.000	4.19	908	54,827

Study Name:		TTM 20576 Proposed - Subarea A7			
Storm Return Interval:		100 Year			
Estimated Tc [Min] =		16			
Calculated Peak Flow [CFS]				13.44	
S-Graph Type				Valley: Undeveloped	
Lag [Min]				70	
Onsite Tributary Areas					
S-Graph Percent of Lag [%]	Time [Min]	Unit Hydrograph	Flow [CFS]	Interval Volume [CF]	Cumulative Volume [CF]
180	126.0	8.400	3.91	850	55,676
185	129.5	8.100	3.77	806	56,482
190	133.0	7.800	3.63	776	57,259
195	136.5	7.500	3.49	747	58,006
200	140.0	7.100	3.30	713	58,719
205	143.5	6.600	3.07	669	59,388
210	147.0	6.100	2.84	620	60,008
215	150.5	5.700	2.65	576	60,584
220	154.0	5.500	2.56	547	61,131
225	157.5	5.300	2.46	527	61,658
230	161.0	4.900	2.28	498	62,156
235	164.5	4.500	2.09	459	62,615
240	168.0	4.200	1.95	425	63,040
245	171.5	4.000	1.86	400	63,441
250	175.0	3.800	1.77	381	63,821
255	178.5	3.600	1.67	361	64,183
260	182.0	3.400	1.58	342	64,525
265	185.5	3.200	1.49	322	64,847
270	189.0	3.200	1.49	313	65,159
275	192.5	3.200	1.49	313	65,472
280	196.0	3.200	1.49	313	65,784
285	199.5	3.200	1.49	313	66,097
290	203.0	3.200	1.49	313	66,409
295	206.5	3.200	1.49	313	66,722
300	210.0	3.200	1.49	313	67,034
305	213.5	3.200	1.49	313	67,347
310	217.0	3.200	1.49	313	67,659
315	220.5	3.200	1.49	313	67,972
320	224.0	3.200	1.49	313	68,285
325	227.5	3.000	1.40	303	68,587
330	231.0	2.800	1.30	283	68,870
335	234.5	2.600	1.21	264	69,134
340	238.0	2.400	1.12	244	69,378
345	241.5	2.200	1.02	225	69,603
350	245.0	2.000	0.93	205	69,808
355	248.5	1.800	0.84	186	69,994

Study Name:		TTM 20576 Proposed - Subarea A7			
Storm Return Interval:		100 Year			
Estimated Tc [Min] =		16			
Calculated Peak Flow [CFS]				13.44	
S-Graph Type				Valley: Undeveloped	
Lag [Min]				70	
Onsite Tributary Areas					
S-Graph Percent of Lag [%]	Time [Min]	Unit Hydrograph	Flow [CFS]	Interval Volume [CF]	Cumulative Volume [CF]
360	252.0	1.600	0.74	166	70,160
365	255.5	1.600	0.74	156	70,316
370	259.0	1.600	0.74	156	70,472
375	262.5	1.600	0.74	156	70,628
380	266.0	1.600	0.74	156	70,785
385	269.5	1.600	0.74	156	70,941
390	273.0	1.600	0.74	156	71,097
395	276.5	1.600	0.74	156	71,253
400	280.0	1.600	0.74	156	71,410
405	283.5	1.580	0.73	155	71,565
410	287.0	1.560	0.73	153	71,718
415	290.5	1.540	0.72	151	71,870
420	294.0	1.520	0.71	149	72,019
425	297.5	1.500	0.70	147	72,167
430	301.0	1.480	0.69	146	72,312
435	304.5	1.460	0.68	144	72,456
440	308.0	1.440	0.67	142	72,597
445	311.5	1.440	0.67	141	72,738
450	315.0	1.440	0.67	141	72,878
455	318.5	1.440	0.67	141	73,019
460	322.0	1.440	0.67	141	73,160
465	325.5	1.440	0.67	141	73,300
470	329.0	1.440	0.67	141	73,441
475	332.5	1.440	0.67	141	73,582
480	336.0	1.440	0.67	141	73,722
485	339.5	1.440	0.67	141	73,863
490	343.0	1.440	0.67	141	74,004
495	346.5	1.440	0.67	141	74,144
500	350.0	1.440	0.67	141	74,285
505	353.5	1.360	0.63	137	74,422
510	357.0	1.280	0.60	129	74,550
515	360.5	1.200	0.56	121	74,672
520	364.0	1.120	0.52	113	74,785
525	367.5	1.040	0.48	105	74,890
530	371.0	0.960	0.45	98	74,988
535	374.5	0.880	0.41	90	75,078

Study Name:		TTM 20576 Proposed - Subarea A7			
Storm Return Interval:		100 Year			
Estimated Tc [Min] =		16			
Calculated Peak Flow [CFS]				13.44	
S-Graph Type				Valley: Undeveloped	
Lag [Min]				70	
Onsite Tributary Areas					
S-Graph Percent of Lag [%]	Time [Min]	Unit Hydrograph	Flow [CFS]	Interval Volume [CF]	Cumulative Volume [CF]
540	378.0	0.800	0.37	82	75,160
545	381.5	0.800	0.37	78	75,238
550	385.0	0.800	0.37	78	75,316
555	388.5	0.800	0.37	78	75,394
560	392.0	0.800	0.37	78	75,472
565	395.5	0.800	0.37	78	75,550
570	399.0	0.800	0.37	78	75,629
575	402.5	0.800	0.37	78	75,707
580	406.0	0.800	0.37	78	75,785
585	409.5	0.800	0.37	78	75,863
590	413.0	0.800	0.37	78	75,941
595	416.5	0.800	0.37	78	76,019
600	420.0	0.800	0.37	78	76,097
605	423.5	0.770	0.36	77	76,174
610	427.0	0.740	0.34	74	76,248
615	430.5	0.710	0.33	71	76,319
620	434.0	0.680	0.32	68	76,386
625	437.5	0.650	0.30	65	76,451
630	441.0	0.620	0.29	62	76,513
635	444.5	0.590	0.27	59	76,572
640	448.0	0.560	0.26	56	76,629
645	451.5	0.560	0.26	55	76,683
650	455.0	0.560	0.26	55	76,738
655	458.5	0.560	0.26	55	76,793
660	462.0	0.560	0.26	55	76,847
665	465.5	0.560	0.26	55	76,902
670	469.0	0.560	0.26	55	76,957
675	472.5	0.560	0.26	55	77,011
680	476.0	0.560	0.26	55	77,066
685	479.5	0.560	0.26	55	77,121
690	483.0	0.560	0.26	55	77,176
695	486.5	0.560	0.26	55	77,230
700	490.0	0.560	0.26	55	77,285
705	493.5	0.530	0.25	53	77,338
710	497.0	0.500	0.23	50	77,388
715	500.5	0.470	0.22	47	77,436

Study Name:		TTM 20576 Proposed - Subarea A7			
Storm Return Interval:		100 Year			
Estimated Tc [Min] =		16			
Calculated Peak Flow [CFS]				13.44	
S-Graph Type				Valley: Undeveloped	
Lag [Min]				70	
Onsite Tributary Areas					
S-Graph Percent of Lag [%]	Time [Min]	Unit Hydrograph	Flow [CFS]	Interval Volume [CF]	Cumulative Volume [CF]
720	504.0	0.440	0.20	44	77,480
725	507.5	0.410	0.19	42	77,522
730	511.0	0.380	0.18	39	77,560
735	514.5	0.350	0.16	36	77,596
740	518.0	0.320	0.15	33	77,629
745	521.5	0.320	0.15	31	77,660
750	525.0	0.320	0.15	31	77,691
755	528.5	0.320	0.15	31	77,722
760	532.0	0.320	0.15	31	77,754
765	535.5	0.320	0.15	31	77,785
770	539.0	0.320	0.15	31	77,816
775	542.5	0.320	0.15	31	77,847
780	546.0	0.320	0.15	31	77,879
785	549.5	0.320	0.15	31	77,910
790	553.0	0.320	0.15	31	77,941
795	556.5	0.320	0.15	31	77,972
800	560.0	0.320	0.15	31	78,004

Study Name:		TTM 20576 Proposed - Subarea A8			
Storm Return Interval:		100 Year			
Estimated Tc [Min] =		13			
Calculated Peak Flow [CFS]				19.27	
S-Graph Type				Valley: Undeveloped	
Lag [Min]				50	
Onsite Tributary Areas					
S-Graph Percent of Lag [%]	Time [Min]	Unit Hydrograph	Flow [CFS]	Interval Volume [CF]	Cumulative Volume [CF]
0	0.0	0.000	0.00	-	-
5	2.5	0.700	0.47	35	35
10	5.0	1.500	1.00	110	145
15	7.5	2.500	1.67	200	345
20	10.0	3.700	2.47	310	655
25	12.5	5.000	3.33	435	1,090
30	15.0	6.500	4.33	575	1,665
35	17.5	8.200	5.47	735	2,400
40	20.0	10.300	6.87	925	3,326
45	22.5	11.900	7.93	1,110	4,436
50	25.0	13.500	9.00	1,270	5,706
55	27.5	15.700	10.47	1,460	7,166
60	30.0	17.800	11.87	1,675	8,842
65	32.5	19.800	13.20	1,880	10,722
70	35.0	21.700	14.47	2,075	12,797
75	37.5	23.700	15.80	2,270	15,068
80	40.0	25.400	16.94	2,455	17,523
85	42.5	26.900	17.94	2,615	20,138
90	45.0	28.300	18.87	2,760	22,899
95	47.5	28.900	19.27	2,860	25,759
100	50.0	28.800	19.20	2,885	28,645
105	52.5	28.500	19.00	2,865	31,510
110	55.0	27.700	18.47	2,810	34,321
115	57.5	26.400	17.60	2,705	37,026
120	60.0	24.700	16.47	2,555	39,582
125	62.5	22.700	15.14	2,370	41,952
130	65.0	20.600	13.74	2,165	44,118
135	67.5	18.400	12.27	1,950	46,068
140	70.0	16.600	11.07	1,750	47,818
145	72.5	14.700	9.80	1,565	49,384
150	75.0	13.200	8.80	1,395	50,779
155	77.5	11.900	7.93	1,255	52,034
160	80.0	10.900	7.27	1,140	53,174
165	82.5	10.200	6.80	1,055	54,229
170	85.0	9.600	6.40	990	55,220
175	87.5	9.000	6.00	930	56,150

Study Name:		TTM 20576 Proposed - Subarea A8			
Storm Return Interval:		100 Year			
Estimated Tc [Min] =		13			
Calculated Peak Flow [CFS]				19.27	
S-Graph Type				Valley: Undeveloped	
Lag [Min]				50	
Onsite Tributary Areas					
S-Graph Percent of Lag [%]	Time [Min]	Unit Hydrograph	Flow [CFS]	Interval Volume [CF]	Cumulative Volume [CF]
180	90.0	8.400	5.60	870	57,020
185	92.5	8.100	5.40	825	57,845
190	95.0	7.800	5.20	795	58,640
195	97.5	7.500	5.00	765	59,405
200	100.0	7.100	4.73	730	60,135
205	102.5	6.600	4.40	685	60,821
210	105.0	6.100	4.07	635	61,456
215	107.5	5.700	3.80	590	62,046
220	110.0	5.500	3.67	560	62,606
225	112.5	5.300	3.53	540	63,146
230	115.0	4.900	3.27	510	63,656
235	117.5	4.500	3.00	470	64,126
240	120.0	4.200	2.80	435	64,561
245	122.5	4.000	2.67	410	64,971
250	125.0	3.800	2.53	390	65,361
255	127.5	3.600	2.40	370	65,731
260	130.0	3.400	2.27	350	66,081
265	132.5	3.200	2.13	330	66,411
270	135.0	3.200	2.13	320	66,732
275	137.5	3.200	2.13	320	67,052
280	140.0	3.200	2.13	320	67,372
285	142.5	3.200	2.13	320	67,692
290	145.0	3.200	2.13	320	68,012
295	147.5	3.200	2.13	320	68,332
300	150.0	3.200	2.13	320	68,652
305	152.5	3.200	2.13	320	68,972
310	155.0	3.200	2.13	320	69,292
315	157.5	3.200	2.13	320	69,612
320	160.0	3.200	2.13	320	69,932
325	162.5	3.000	2.00	310	70,242
330	165.0	2.800	1.87	290	70,532
335	167.5	2.600	1.73	270	70,802
340	170.0	2.400	1.60	250	71,052
345	172.5	2.200	1.47	230	71,282
350	175.0	2.000	1.33	210	71,492
355	177.5	1.800	1.20	190	71,682

Study Name:		TTM 20576 Proposed - Subarea A8			
Storm Return Interval:		100 Year			
Estimated Tc [Min] =		13			
Calculated Peak Flow [CFS]				19.27	
S-Graph Type				Valley: Undeveloped	
Lag [Min]				50	
Onsite Tributary Areas					
S-Graph Percent of Lag [%]	Time [Min]	Unit Hydrograph	Flow [CFS]	Interval Volume [CF]	Cumulative Volume [CF]
360	180.0	1.600	1.07	170	71,852
365	182.5	1.600	1.07	160	72,012
370	185.0	1.600	1.07	160	72,172
375	187.5	1.600	1.07	160	72,333
380	190.0	1.600	1.07	160	72,493
385	192.5	1.600	1.07	160	72,653
390	195.0	1.600	1.07	160	72,813
395	197.5	1.600	1.07	160	72,973
400	200.0	1.600	1.07	160	73,133
405	202.5	1.580	1.05	159	73,292
410	205.0	1.560	1.04	157	73,449
415	207.5	1.540	1.03	155	73,604
420	210.0	1.520	1.01	153	73,757
425	212.5	1.500	1.00	151	73,908
430	215.0	1.480	0.99	149	74,057
435	217.5	1.460	0.97	147	74,204
440	220.0	1.440	0.96	145	74,349
445	222.5	1.440	0.96	144	74,493
450	225.0	1.440	0.96	144	74,637
455	227.5	1.440	0.96	144	74,781
460	230.0	1.440	0.96	144	74,925
465	232.5	1.440	0.96	144	75,069
470	235.0	1.440	0.96	144	75,213
475	237.5	1.440	0.96	144	75,357
480	240.0	1.440	0.96	144	75,501
485	242.5	1.440	0.96	144	75,645
490	245.0	1.440	0.96	144	75,789
495	247.5	1.440	0.96	144	75,933
500	250.0	1.440	0.96	144	76,077
505	252.5	1.360	0.91	140	76,217
510	255.0	1.280	0.85	132	76,349
515	257.5	1.200	0.80	124	76,473
520	260.0	1.120	0.75	116	76,589
525	262.5	1.040	0.69	108	76,697
530	265.0	0.960	0.64	100	76,797
535	267.5	0.880	0.59	92	76,889

Study Name:		TTM 20576 Proposed - Subarea A8			
Storm Return Interval:		100 Year			
Estimated Tc [Min] =		13			
Calculated Peak Flow [CFS]				19.27	
S-Graph Type				Valley: Undeveloped	
Lag [Min]				50	
Onsite Tributary Areas					
S-Graph Percent of Lag [%]	Time [Min]	Unit Hydrograph	Flow [CFS]	Interval Volume [CF]	Cumulative Volume [CF]
540	270.0	0.800	0.53	84	76,973
545	272.5	0.800	0.53	80	77,053
550	275.0	0.800	0.53	80	77,133
555	277.5	0.800	0.53	80	77,213
560	280.0	0.800	0.53	80	77,293
565	282.5	0.800	0.53	80	77,373
570	285.0	0.800	0.53	80	77,453
575	287.5	0.800	0.53	80	77,533
580	290.0	0.800	0.53	80	77,613
585	292.5	0.800	0.53	80	77,693
590	295.0	0.800	0.53	80	77,773
595	297.5	0.800	0.53	80	77,853
600	300.0	0.800	0.53	80	77,933
605	302.5	0.770	0.51	79	78,012
610	305.0	0.740	0.49	76	78,088
615	307.5	0.710	0.47	73	78,160
620	310.0	0.680	0.45	70	78,230
625	312.5	0.650	0.43	67	78,296
630	315.0	0.620	0.41	64	78,360
635	317.5	0.590	0.39	61	78,420
640	320.0	0.560	0.37	58	78,478
645	322.5	0.560	0.37	56	78,534
650	325.0	0.560	0.37	56	78,590
655	327.5	0.560	0.37	56	78,646
660	330.0	0.560	0.37	56	78,702
665	332.5	0.560	0.37	56	78,758
670	335.0	0.560	0.37	56	78,814
675	337.5	0.560	0.37	56	78,870
680	340.0	0.560	0.37	56	78,926
685	342.5	0.560	0.37	56	78,982
690	345.0	0.560	0.37	56	79,038
695	347.5	0.560	0.37	56	79,094
700	350.0	0.560	0.37	56	79,150
705	352.5	0.530	0.35	55	79,204
710	355.0	0.500	0.33	52	79,256
715	357.5	0.470	0.31	49	79,304

Study Name:		TTM 20576 Proposed - Subarea A8			
Storm Return Interval:		100 Year			
Estimated Tc [Min] =		13			
Calculated Peak Flow [CFS]				19.27	
S-Graph Type				Valley: Undeveloped	
Lag [Min]				50	
Onsite Tributary Areas					
S-Graph Percent of Lag [%]	Time [Min]	Unit Hydrograph	Flow [CFS]	Interval Volume [CF]	Cumulative Volume [CF]
720	360.0	0.440	0.29	46	79,350
725	362.5	0.410	0.27	43	79,392
730	365.0	0.380	0.25	40	79,432
735	367.5	0.350	0.23	37	79,468
740	370.0	0.320	0.21	34	79,502
745	372.5	0.320	0.21	32	79,534
750	375.0	0.320	0.21	32	79,566
755	377.5	0.320	0.21	32	79,598
760	380.0	0.320	0.21	32	79,630
765	382.5	0.320	0.21	32	79,662
770	385.0	0.320	0.21	32	79,694
775	387.5	0.320	0.21	32	79,726
780	390.0	0.320	0.21	32	79,758
785	392.5	0.320	0.21	32	79,790
790	395.0	0.320	0.21	32	79,822
795	397.5	0.320	0.21	32	79,854
800	400.0	0.320	0.21	32	79,886

Study Name:		TTM 20576 Proposed - Subarea A9			
Storm Return Interval:		100 Year			
Estimated Tc [Min] =		13			
Calculated Peak Flow [CFS]				17.93	
S-Graph Type				Valley: Undeveloped	
Lag [Min]				59	
Onsite Tributary Areas					
S-Graph Percent of Lag [%]	Time [Min]	Unit Hydrograph	Flow [CFS]	Interval Volume [CF]	Cumulative Volume [CF]
0	0.0	0.000	0.00	-	-
5	3.0	0.700	0.43	38	38
10	5.9	1.500	0.93	121	159
15	8.9	2.500	1.55	220	379
20	11.8	3.700	2.30	340	719
25	14.8	5.000	3.10	478	1,197
30	17.7	6.500	4.03	631	1,828
35	20.7	8.200	5.09	807	2,636
40	23.6	10.300	6.39	1,016	3,651
45	26.6	11.900	7.38	1,219	4,870
50	29.5	13.500	8.38	1,395	6,265
55	32.5	15.700	9.74	1,603	7,868
60	35.4	17.800	11.04	1,839	9,708
65	38.4	19.800	12.28	2,064	11,772
70	41.3	21.700	13.46	2,279	14,051
75	44.3	23.700	14.70	2,493	16,543
80	47.2	25.400	15.76	2,696	19,239
85	50.2	26.900	16.69	2,872	22,111
90	53.1	28.300	17.56	3,031	25,142
95	56.1	28.900	17.93	3,141	28,282
100	59.0	28.800	17.87	3,168	31,451
105	62.0	28.500	17.68	3,146	34,597
110	64.9	27.700	17.19	3,086	37,683
115	67.9	26.400	16.38	2,970	40,653
120	70.8	24.700	15.32	2,806	43,459
125	73.8	22.700	14.08	2,603	46,061
130	76.7	20.600	12.78	2,377	48,439
135	79.7	18.400	11.42	2,141	50,580
140	82.6	16.600	10.30	1,922	52,502
145	85.6	14.700	9.12	1,719	54,220
150	88.5	13.200	8.19	1,532	55,752
155	91.5	11.900	7.38	1,378	57,130
160	94.4	10.900	6.76	1,252	58,382
165	97.4	10.200	6.33	1,159	59,541
170	100.3	9.600	5.96	1,087	60,628
175	103.3	9.000	5.58	1,021	61,649

Study Name:		TTM 20576 Proposed - Subarea A9			
Storm Return Interval:		100 Year			
Estimated Tc [Min] =		13			
Calculated Peak Flow [CFS]				17.93	
S-Graph Type				Valley: Undeveloped	
Lag [Min]				59	
Onsite Tributary Areas					
S-Graph Percent of Lag [%]	Time [Min]	Unit Hydrograph	Flow [CFS]	Interval Volume [CF]	Cumulative Volume [CF]
180	106.2	8.400	5.21	955	62,605
185	109.2	8.100	5.03	906	63,511
190	112.1	7.800	4.84	873	64,384
195	115.1	7.500	4.65	840	65,224
200	118.0	7.100	4.40	802	66,025
205	121.0	6.600	4.09	752	66,778
210	123.9	6.100	3.78	697	67,475
215	126.9	5.700	3.54	648	68,123
220	129.8	5.500	3.41	615	68,738
225	132.8	5.300	3.29	593	69,331
230	135.7	4.900	3.04	560	69,891
235	138.7	4.500	2.79	516	70,407
240	141.6	4.200	2.61	478	70,885
245	144.6	4.000	2.48	450	71,335
250	147.5	3.800	2.36	428	71,763
255	150.5	3.600	2.23	406	72,169
260	153.4	3.400	2.11	384	72,554
265	156.4	3.200	1.99	362	72,916
270	159.3	3.200	1.99	351	73,268
275	162.3	3.200	1.99	351	73,619
280	165.2	3.200	1.99	351	73,970
285	168.2	3.200	1.99	351	74,322
290	171.1	3.200	1.99	351	74,673
295	174.1	3.200	1.99	351	75,025
300	177.0	3.200	1.99	351	75,376
305	180.0	3.200	1.99	351	75,727
310	182.9	3.200	1.99	351	76,079
315	185.9	3.200	1.99	351	76,430
320	188.8	3.200	1.99	351	76,782
325	191.8	3.000	1.86	340	77,122
330	194.7	2.800	1.74	318	77,440
335	197.7	2.600	1.61	296	77,737
340	200.6	2.400	1.49	275	78,012
345	203.6	2.200	1.36	253	78,264
350	206.5	2.000	1.24	231	78,495
355	209.5	1.800	1.12	209	78,703

Study Name:		TTM 20576 Proposed - Subarea A9			
Storm Return Interval:		100 Year			
Estimated Tc [Min] =		13			
Calculated Peak Flow [CFS]				17.93	
S-Graph Type				Valley: Undeveloped	
Lag [Min]				59	
Onsite Tributary Areas					
S-Graph Percent of Lag [%]	Time [Min]	Unit Hydrograph	Flow [CFS]	Interval Volume [CF]	Cumulative Volume [CF]
360	212.4	1.600	0.99	187	78,890
365	215.4	1.600	0.99	176	79,066
370	218.3	1.600	0.99	176	79,241
375	221.3	1.600	0.99	176	79,417
380	224.2	1.600	0.99	176	79,593
385	227.2	1.600	0.99	176	79,769
390	230.1	1.600	0.99	176	79,944
395	233.1	1.600	0.99	176	80,120
400	236.0	1.600	0.99	176	80,296
405	239.0	1.580	0.98	175	80,470
410	241.9	1.560	0.97	172	80,643
415	244.9	1.540	0.96	170	80,813
420	247.8	1.520	0.94	168	80,981
425	250.8	1.500	0.93	166	81,147
430	253.7	1.480	0.92	164	81,310
435	256.7	1.460	0.91	161	81,472
440	259.6	1.440	0.89	159	81,631
445	262.6	1.440	0.89	158	81,789
450	265.5	1.440	0.89	158	81,947
455	268.5	1.440	0.89	158	82,105
460	271.4	1.440	0.89	158	82,263
465	274.4	1.440	0.89	158	82,422
470	277.3	1.440	0.89	158	82,580
475	280.3	1.440	0.89	158	82,738
480	283.2	1.440	0.89	158	82,896
485	286.2	1.440	0.89	158	83,054
490	289.1	1.440	0.89	158	83,212
495	292.1	1.440	0.89	158	83,370
500	295.0	1.440	0.89	158	83,529
505	298.0	1.360	0.84	154	83,682
510	300.9	1.280	0.79	145	83,827
515	303.9	1.200	0.74	136	83,963
520	306.8	1.120	0.69	127	84,091
525	309.8	1.040	0.65	119	84,209
530	312.7	0.960	0.60	110	84,319
535	315.7	0.880	0.55	101	84,420

Study Name:		TTM 20576 Proposed - Subarea A9			
Storm Return Interval:		100 Year			
Estimated Tc [Min] =		13			
Calculated Peak Flow [CFS]				17.93	
S-Graph Type				Valley: Undeveloped	
Lag [Min]				59	
Onsite Tributary Areas					
S-Graph Percent of Lag [%]	Time [Min]	Unit Hydrograph	Flow [CFS]	Interval Volume [CF]	Cumulative Volume [CF]
540	318.6	0.800	0.50	92	84,512
545	321.6	0.800	0.50	88	84,600
550	324.5	0.800	0.50	88	84,688
555	327.5	0.800	0.50	88	84,776
560	330.4	0.800	0.50	88	84,864
565	333.4	0.800	0.50	88	84,952
570	336.3	0.800	0.50	88	85,040
575	339.3	0.800	0.50	88	85,127
580	342.2	0.800	0.50	88	85,215
585	345.2	0.800	0.50	88	85,303
590	348.1	0.800	0.50	88	85,391
595	351.1	0.800	0.50	88	85,479
600	354.0	0.800	0.50	88	85,567
605	357.0	0.770	0.48	86	85,653
610	359.9	0.740	0.46	83	85,736
615	362.9	0.710	0.44	80	85,815
620	365.8	0.680	0.42	76	85,892
625	368.8	0.650	0.40	73	85,965
630	371.7	0.620	0.38	70	86,034
635	374.7	0.590	0.37	66	86,101
640	377.6	0.560	0.35	63	86,164
645	380.6	0.560	0.35	61	86,226
650	383.5	0.560	0.35	61	86,287
655	386.5	0.560	0.35	61	86,349
660	389.4	0.560	0.35	61	86,410
665	392.4	0.560	0.35	61	86,472
670	395.3	0.560	0.35	61	86,533
675	398.3	0.560	0.35	61	86,595
680	401.2	0.560	0.35	61	86,656
685	404.2	0.560	0.35	61	86,718
690	407.1	0.560	0.35	61	86,779
695	410.1	0.560	0.35	61	86,841
700	413.0	0.560	0.35	61	86,902
705	416.0	0.530	0.33	60	86,962
710	418.9	0.500	0.31	57	87,018
715	421.9	0.470	0.29	53	87,072

Study Name:		TTM 20576 Proposed - Subarea A9			
Storm Return Interval:		100 Year			
Estimated Tc [Min] =		13			
Calculated Peak Flow [CFS]				17.93	
S-Graph Type				Valley: Undeveloped	
Lag [Min]				59	
Onsite Tributary Areas					
S-Graph Percent of Lag [%]	Time [Min]	Unit Hydrograph	Flow [CFS]	Interval Volume [CF]	Cumulative Volume [CF]
720	424.8	0.440	0.27	50	87,122
725	427.8	0.410	0.25	47	87,168
730	430.7	0.380	0.24	43	87,212
735	433.7	0.350	0.22	40	87,252
740	436.6	0.320	0.20	37	87,289
745	439.6	0.320	0.20	35	87,324
750	442.5	0.320	0.20	35	87,359
755	445.5	0.320	0.20	35	87,394
760	448.4	0.320	0.20	35	87,429
765	451.4	0.320	0.20	35	87,464
770	454.3	0.320	0.20	35	87,499
775	457.3	0.320	0.20	35	87,535
780	460.2	0.320	0.20	35	87,570
785	463.2	0.320	0.20	35	87,605
790	466.1	0.320	0.20	35	87,640
795	469.1	0.320	0.20	35	87,675
800	472.0	0.320	0.20	35	87,710

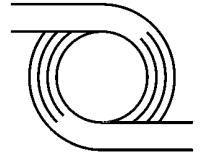
Study Name:		TTM 20576 Proposed - Subarea A10			
Storm Return Interval:		100 Year			
Estimated Tc [Min] =		15			
Calculated Peak Flow [CFS]				13.33	
S-Graph Type				Valley: Undeveloped	
Lag [Min]				66	
Onsite Tributary Areas					
S-Graph Percent of Lag [%]	Time [Min]	Unit Hydrograph	Flow [CFS]	Interval Volume [CF]	Cumulative Volume [CF]
0	0.0	0.000	0.00	-	-
5	3.3	0.700	0.32	32	32
10	6.6	1.500	0.69	100	132
15	9.9	2.500	1.15	183	315
20	13.2	3.700	1.71	283	598
25	16.5	5.000	2.31	397	995
30	19.8	6.500	3.00	525	1,521
35	23.1	8.200	3.78	671	2,192
40	26.4	10.300	4.75	845	3,037
45	29.7	11.900	5.49	1,014	4,050
50	33.0	13.500	6.23	1,160	5,210
55	36.3	15.700	7.24	1,333	6,544
60	39.6	17.800	8.21	1,530	8,073
65	42.9	19.800	9.13	1,717	9,790
70	46.2	21.700	10.01	1,895	11,685
75	49.5	23.700	10.93	2,073	13,758
80	52.8	25.400	11.72	2,242	16,000
85	56.1	26.900	12.41	2,388	18,389
90	59.4	28.300	13.05	2,521	20,909
95	62.7	28.900	13.33	2,612	23,521
100	66.0	28.800	13.28	2,635	26,156
105	69.3	28.500	13.15	2,617	28,772
110	72.6	27.700	12.78	2,566	31,339
115	75.9	26.400	12.18	2,470	33,809
120	79.2	24.700	11.39	2,333	36,143
125	82.5	22.700	10.47	2,164	38,307
130	85.8	20.600	9.50	1,977	40,284
135	89.1	18.400	8.49	1,781	42,065
140	92.4	16.600	7.66	1,598	43,663
145	95.7	14.700	6.78	1,429	45,093
150	99.0	13.200	6.09	1,274	46,367
155	102.3	11.900	5.49	1,146	47,513
160	105.6	10.900	5.03	1,041	48,554
165	108.9	10.200	4.70	963	49,517
170	112.2	9.600	4.43	904	50,421
175	115.5	9.000	4.15	849	51,271

Study Name:		TTM 20576 Proposed - Subarea A10			
Storm Return Interval:		100 Year			
Estimated Tc [Min] =		15			
Calculated Peak Flow [CFS]				13.33	
S-Graph Type				Valley: Undeveloped	
Lag [Min]				66	
Onsite Tributary Areas					
S-Graph Percent of Lag [%]	Time [Min]	Unit Hydrograph	Flow [CFS]	Interval Volume [CF]	Cumulative Volume [CF]
180	118.8	8.400	3.87	795	52,065
185	122.1	8.100	3.74	753	52,819
190	125.4	7.800	3.60	726	53,545
195	128.7	7.500	3.46	699	54,243
200	132.0	7.100	3.27	667	54,910
205	135.3	6.600	3.04	626	55,536
210	138.6	6.100	2.81	580	56,116
215	141.9	5.700	2.63	539	56,654
220	145.2	5.500	2.54	511	57,166
225	148.5	5.300	2.44	493	57,659
230	151.8	4.900	2.26	466	58,125
235	155.1	4.500	2.08	429	58,554
240	158.4	4.200	1.94	397	58,951
245	161.7	4.000	1.84	374	59,326
250	165.0	3.800	1.75	356	59,682
255	168.3	3.600	1.66	338	60,020
260	171.6	3.400	1.57	320	60,340
265	174.9	3.200	1.48	301	60,641
270	178.2	3.200	1.48	292	60,933
275	181.5	3.200	1.48	292	61,225
280	184.8	3.200	1.48	292	61,518
285	188.1	3.200	1.48	292	61,810
290	191.4	3.200	1.48	292	62,102
295	194.7	3.200	1.48	292	62,394
300	198.0	3.200	1.48	292	62,687
305	201.3	3.200	1.48	292	62,979
310	204.6	3.200	1.48	292	63,271
315	207.9	3.200	1.48	292	63,563
320	211.2	3.200	1.48	292	63,856
325	214.5	3.000	1.38	283	64,139
330	217.8	2.800	1.29	265	64,404
335	221.1	2.600	1.20	247	64,650
340	224.4	2.400	1.11	228	64,878
345	227.7	2.200	1.01	210	65,088
350	231.0	2.000	0.92	192	65,280
355	234.3	1.800	0.83	174	65,454

Study Name:		TTM 20576 Proposed - Subarea A10			
Storm Return Interval:		100 Year			
Estimated Tc [Min] =		15			
Calculated Peak Flow [CFS]				13.33	
S-Graph Type				Valley: Undeveloped	
Lag [Min]				66	
Onsite Tributary Areas					
S-Graph Percent of Lag [%]	Time [Min]	Unit Hydrograph	Flow [CFS]	Interval Volume [CF]	Cumulative Volume [CF]
360	237.6	1.600	0.74	155	65,609
365	240.9	1.600	0.74	146	65,755
370	244.2	1.600	0.74	146	65,901
375	247.5	1.600	0.74	146	66,047
380	250.8	1.600	0.74	146	66,194
385	254.1	1.600	0.74	146	66,340
390	257.4	1.600	0.74	146	66,486
395	260.7	1.600	0.74	146	66,632
400	264.0	1.600	0.74	146	66,778
405	267.3	1.580	0.73	145	66,923
410	270.6	1.560	0.72	143	67,067
415	273.9	1.540	0.71	142	67,208
420	277.2	1.520	0.70	140	67,348
425	280.5	1.500	0.69	138	67,486
430	283.8	1.480	0.68	136	67,622
435	287.1	1.460	0.67	134	67,756
440	290.4	1.440	0.66	132	67,889
445	293.7	1.440	0.66	132	68,020
450	297.0	1.440	0.66	132	68,152
455	300.3	1.440	0.66	132	68,283
460	303.6	1.440	0.66	132	68,415
465	306.9	1.440	0.66	132	68,546
470	310.2	1.440	0.66	132	68,678
475	313.5	1.440	0.66	132	68,809
480	316.8	1.440	0.66	132	68,941
485	320.1	1.440	0.66	132	69,072
490	323.4	1.440	0.66	132	69,204
495	326.7	1.440	0.66	132	69,335
500	330.0	1.440	0.66	132	69,467
505	333.3	1.360	0.63	128	69,595
510	336.6	1.280	0.59	121	69,715
515	339.9	1.200	0.55	113	69,828
520	343.2	1.120	0.52	106	69,934
525	346.5	1.040	0.48	99	70,033
530	349.8	0.960	0.44	91	70,124
535	353.1	0.880	0.41	84	70,208

Study Name:		TTM 20576 Proposed - Subarea A10			
Storm Return Interval:		100 Year			
Estimated Tc [Min] =		15			
Calculated Peak Flow [CFS]				13.33	
S-Graph Type				Valley: Undeveloped	
Lag [Min]				66	
Onsite Tributary Areas					
S-Graph Percent of Lag [%]	Time [Min]	Unit Hydrograph	Flow [CFS]	Interval Volume [CF]	Cumulative Volume [CF]
540	356.4	0.800	0.37	77	70,285
545	359.7	0.800	0.37	73	70,358
550	363.0	0.800	0.37	73	70,431
555	366.3	0.800	0.37	73	70,504
560	369.6	0.800	0.37	73	70,577
565	372.9	0.800	0.37	73	70,650
570	376.2	0.800	0.37	73	70,723
575	379.5	0.800	0.37	73	70,796
580	382.8	0.800	0.37	73	70,869
585	386.1	0.800	0.37	73	70,943
590	389.4	0.800	0.37	73	71,016
595	392.7	0.800	0.37	73	71,089
600	396.0	0.800	0.37	73	71,162
605	399.3	0.770	0.36	72	71,233
610	402.6	0.740	0.34	69	71,302
615	405.9	0.710	0.33	66	71,369
620	409.2	0.680	0.31	63	71,432
625	412.5	0.650	0.30	61	71,493
630	415.8	0.620	0.29	58	71,551
635	419.1	0.590	0.27	55	71,606
640	422.4	0.560	0.26	53	71,659
645	425.7	0.560	0.26	51	71,710
650	429.0	0.560	0.26	51	71,761
655	432.3	0.560	0.26	51	71,812
660	435.6	0.560	0.26	51	71,863
665	438.9	0.560	0.26	51	71,914
670	442.2	0.560	0.26	51	71,965
675	445.5	0.560	0.26	51	72,017
680	448.8	0.560	0.26	51	72,068
685	452.1	0.560	0.26	51	72,119
690	455.4	0.560	0.26	51	72,170
695	458.7	0.560	0.26	51	72,221
700	462.0	0.560	0.26	51	72,272
705	465.3	0.530	0.24	50	72,322
710	468.6	0.500	0.23	47	72,369
715	471.9	0.470	0.22	44	72,413

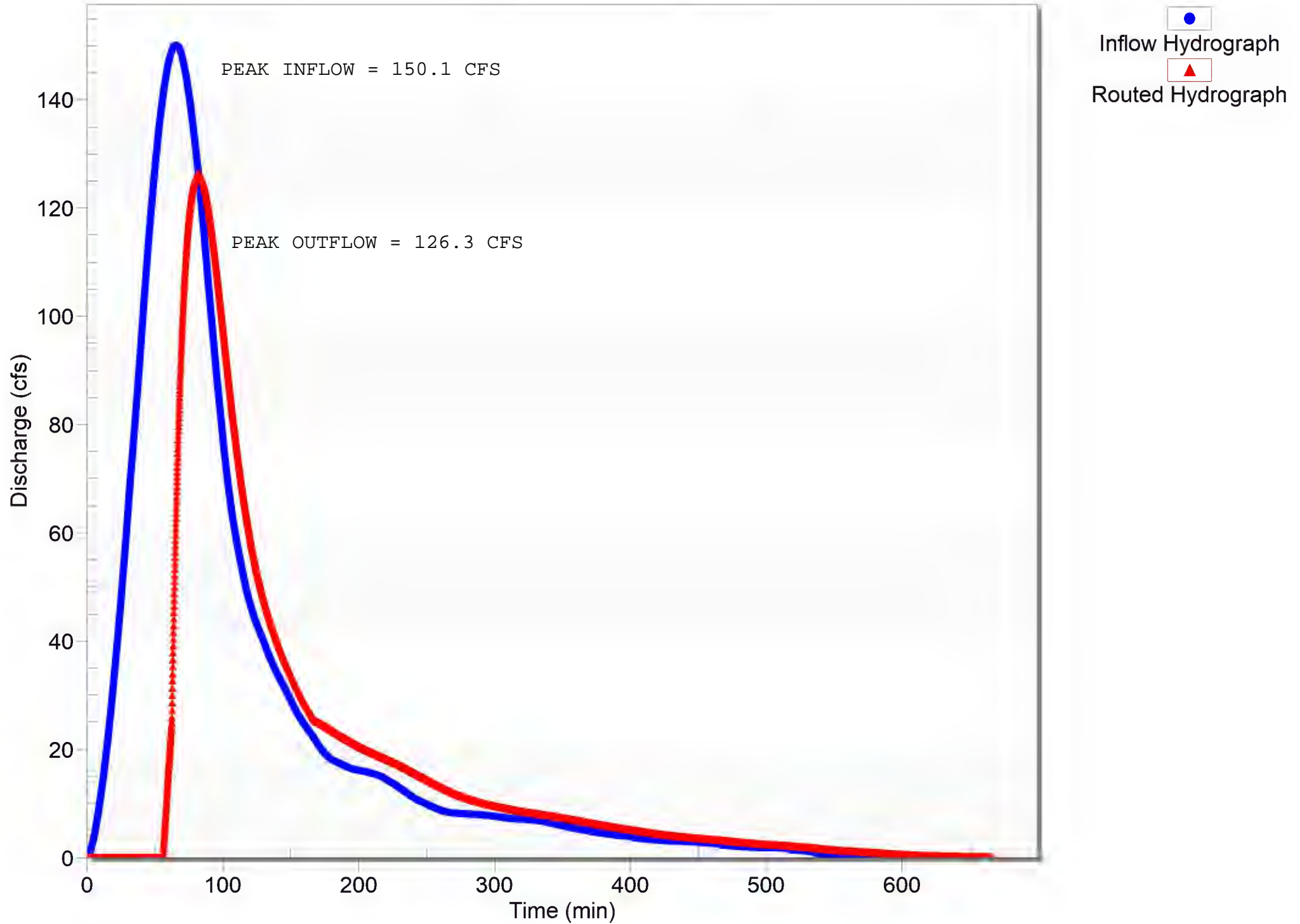
Study Name:		TTM 20576 Proposed - Subarea A10			
Storm Return Interval:		100 Year			
Estimated Tc [Min] =		15			
Calculated Peak Flow [CFS]				13.33	
S-Graph Type				Valley: Undeveloped	
Lag [Min]				66	
Onsite Tributary Areas					
S-Graph Percent of Lag [%]	Time [Min]	Unit Hydrograph	Flow [CFS]	Interval Volume [CF]	Cumulative Volume [CF]
720	475.2	0.440	0.20	42	72,455
725	478.5	0.410	0.19	39	72,494
730	481.8	0.380	0.18	36	72,530
735	485.1	0.350	0.16	33	72,563
740	488.4	0.320	0.15	31	72,594
745	491.7	0.320	0.15	29	72,623
750	495.0	0.320	0.15	29	72,652
755	498.3	0.320	0.15	29	72,681
760	501.6	0.320	0.15	29	72,711
765	504.9	0.320	0.15	29	72,740
770	508.2	0.320	0.15	29	72,769
775	511.5	0.320	0.15	29	72,798
780	514.8	0.320	0.15	29	72,828
785	518.1	0.320	0.15	29	72,857
790	521.4	0.320	0.15	29	72,886
795	524.7	0.320	0.15	29	72,915
800	528.0	0.320	0.15	29	72,944



Appendix C

TTM 20576

Detention Basin Hydrographs



TRAFFIC STUDY

TENTATIVE TRACT MAP 20576
PROPOSED SINGLE-FAMILY RESIDENTIAL DEVELOPMENT
CITY OF VICTORVILLE

Prepared for:
RODEO CREDIT ENTERPRISES, LLC

August 2023

Prepared by:



1800 30th Street, Suite 260
Bakersfield, California 93301

A handwritten signature in blue ink, appearing to read "Ian J. Parks", is written over a horizontal line.

Ian J. Parks, RCE 58155



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INTRODUCTION

The purpose of this study is to evaluate the potential traffic impacts of Tentative Tract Map 20576, a single-family residential development located in the northwest quadrant of Topaz Road and Mesa Street in the City of Victorville, California. A vicinity map is presented in Figure 1 and a location map is presented in Figure 2.

The study methodology is consistent with the City of Victorville *General Guidelines for Conducting Traffic Studies and Determination of Intersection Level of Service and Improvement Needs*, dated January 20, 2005, and the City of Victorville *Vehicle Miles Traveled (VMT) Analysis Guidelines*, adopted June 16, 2020. The scope of the study includes six intersections and was developed in coordination with Engineering Department staff at the City of Victorville.

Project Land Use and Site Access

The project site is situated on approximately 49 acres of land which is currently vacant and undeveloped. The property is zoned R-1T (Single Family Residential) and has a General Plan land use designation of Low Density Residential. The tentative tract map is provided in Figure 3.

The proposed development would include 246 single-family lots. Primary access to the project would be provided by way of Mesa Street and a future extension of Topaz Road south of Eucalyptus Street. It was assumed for the purposes of this study that project buildout would occur in the year 2030.

Existing Land Uses in Project Vicinity

Residential development exists immediately west of the project site and vacant land is located directly to the north, south and east. Residential land uses also lie further to the north and east. Commercial development is located primarily along Bear Valley Road approximately one mile north of the project site.

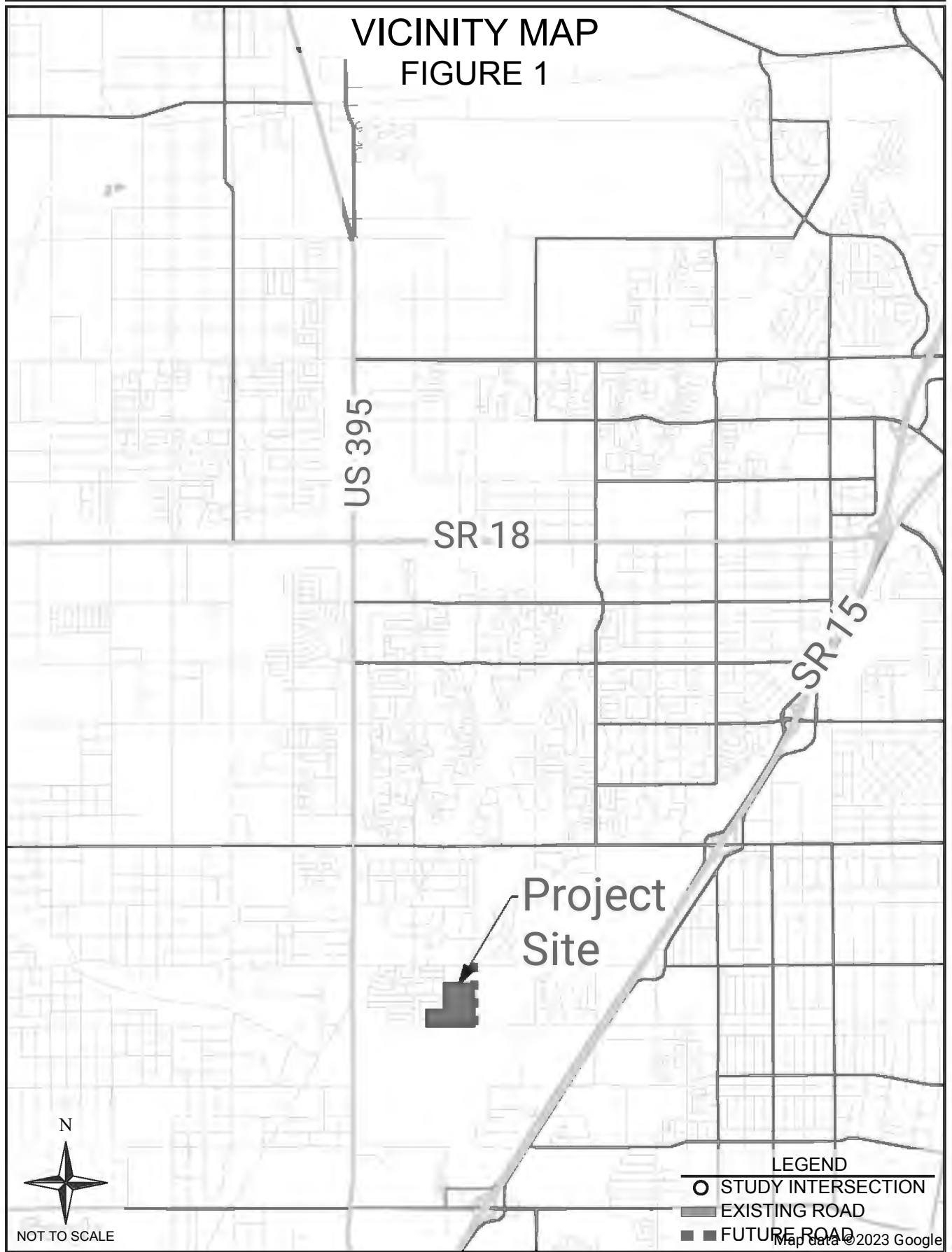
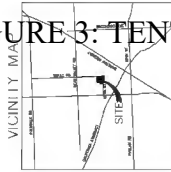




FIGURE 3: TENTATIVE TRACT MAP

TENTATIVE TRACT MAP

FIGURE 3



Parcel #	Area
A	144,538.57 (3.342)
B	28,753.97 (0.642)
C	79,848.97 (1.842)

Parcel #	Area
201	8,234.87
202	8,234.87
203	7,887.87
204	7,887.87
205	7,887.87
206	7,887.87
207	7,887.87
208	7,887.87
209	7,887.87
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Parcel #	Area
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TTM 16888

VICTORVILLE

D&D ENGINEERING, INC.
11111 LA SALLE AVE., SUITE 100
VICTORVILLE, CA 92380
Phone: 951.666.0000

DATE: 05/20/2024
BY: J. D. SCHULER
01 of 0

Roadway Descriptions

Amethyst Road is a major arterial that extends north from Sycamore Street. Within the study area it operates with four lanes and provides access to residential and commercial land uses.

Bear Valley Road is an east-west super arterial that intersects US Route 395 approximately 0.5 miles north of Sycamore Street and has an interchange connection to Interstate 15 approximately 3 miles east of US Route 395. It operates within the study area as a four-lane roadway with improvements adjacent to development and graded shoulders elsewhere. Bear Valley Road provides access primarily to residential and commercial land uses.

Eucalyptus Street is an east-west roadway that intersects US Route 395 approximately 1 mile south of Bear Valley Road. It is designated as a super arterial west of US Route 395 and east of Topaz Road, and as a major arterial between US Route 395 and Topaz Road. Eucalyptus Street operates in the project vicinity as a two-lane roadway in various stages of widening and improvement and provides access to residential land uses.

Mesa Linda Street is a collector that extends north from Meas Street approximately 0.5 miles east of US Route 395. It operates within the study area as a two-lane roadway providing access to residential land uses.

Sycamore Street is a collector that intersects US Route 395 approximately 0.5 miles south of Bear Valley Road. It exists within the study area as a two-lane roadway with improvements adjacent to development and graded shoulders elsewhere. Sycamore Street provides access to residential land uses.

Topaz Road is an arterial that extends north from Eucalyptus Street. Within the project vicinity, it exists as a two-lane roadway and provides access primarily to residential land uses. It is anticipated that a southerly extension of Topaz Road from Eucalyptus Street to Mesa Street would be completed as part of the project.

US Route 395 is a north-south highway that exists between State Route 14 and State Route 15. Within the study area, it exists as a four-lane roadway and provides access to residential land uses.

PROJECT TRIP GENERATION AND DESIGN HOUR VOLUMES

The project trip generation and design hour volumes shown in Table 1 were estimated using the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, 11th Edition (September 2021). Trip rate equations and directional splits for ITE Land Use Code 210 (Single-Family Detached Housing) were used to estimate project trips for weekday peak hour of adjacent street traffic based on information provided by the project applicant.

Table 1
Project Trip Generation

General Information			Daily Trips		AM Peak Hour Trips			PM Peak Hour Trips		
ITE Code	Development Type	Variable	ADT RATE	ADT	Rate	In % Split/ Trips	Out % Split/ Trips	Rate	In % Split/ Trips	Out % Split/ Trips
210	Single-Family detached Housing	246 Dwelling Units	eq	2310	eq	26% 44	74% 125	eq	63% 146	37% 86

PROJECT TRIP DISTRIBUTION AND ASSIGNMENT

The distribution of project peak hour trips is shown in Table 2 and represents the movement of traffic accessing the project site by direction. The project trip distribution was developed based on site location and travel patterns anticipated for the proposed land use.

Table 2
Project Trip Distribution

Direction	Percent
North	35
East	35
South	15
West	15

Project peak hour trips were assigned to the study intersections as shown in Figure 4. Project trip assignment was developed based on trip generation, trip distribution and likely travel routes for traffic accessing the project site.

EXISTING AND FUTURE TRAFFIC

Existing

Weekday peak hour turning movement counts were obtained at the existing study intersections in July 2023 (see Appendix for count data). Since the count data was collected outside of the regular academic school year, existing traffic volumes were estimated by adding peak hour trips generated by the elementary, middle and high schools located closest to the project site to the count data (see Appendix for school trip generation estimates). This methodology was reviewed and approved by the City Engineering Department.

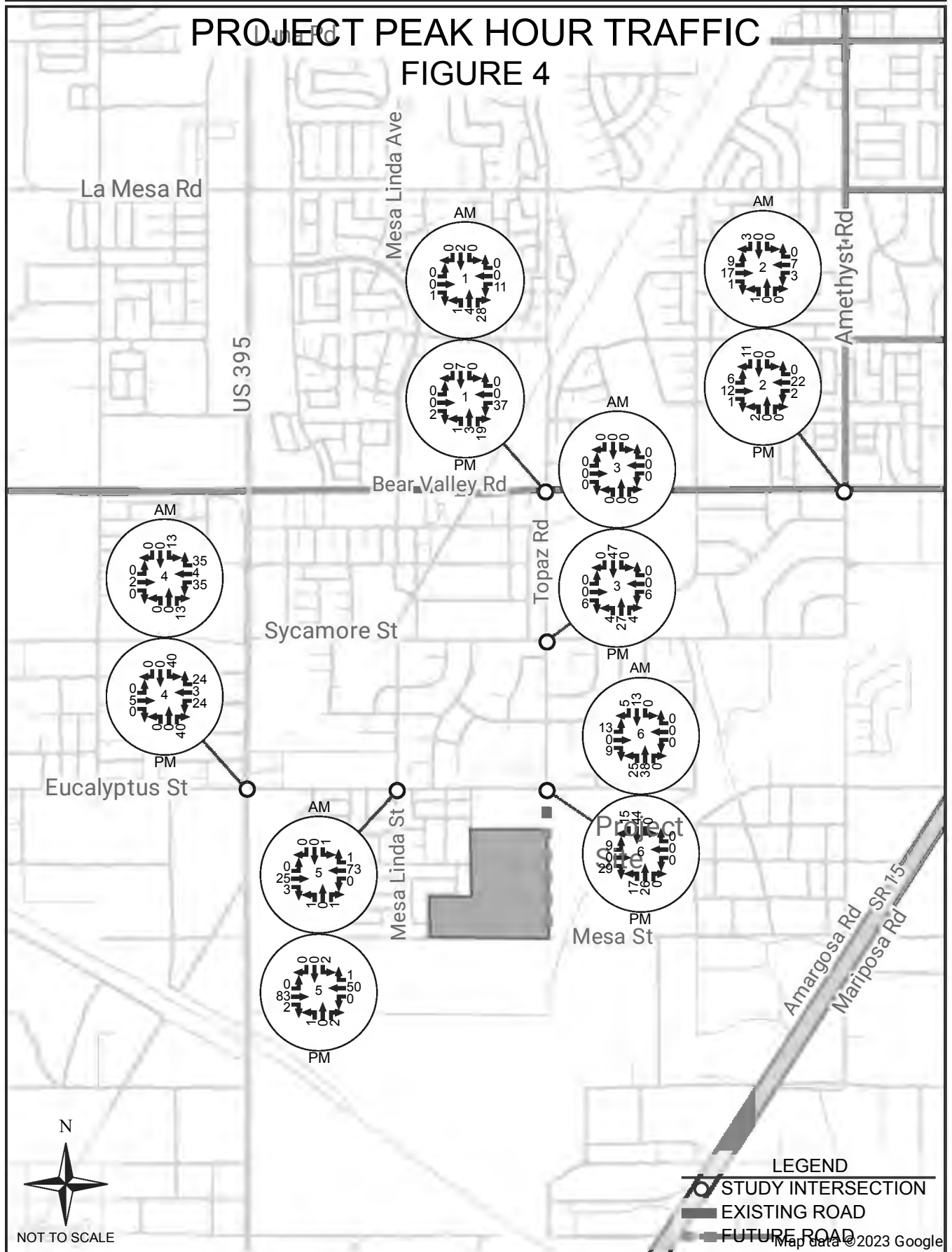
Existing peak hour volumes are shown in Figure 5. Existing plus project peak hour volumes are shown in Figure 6.

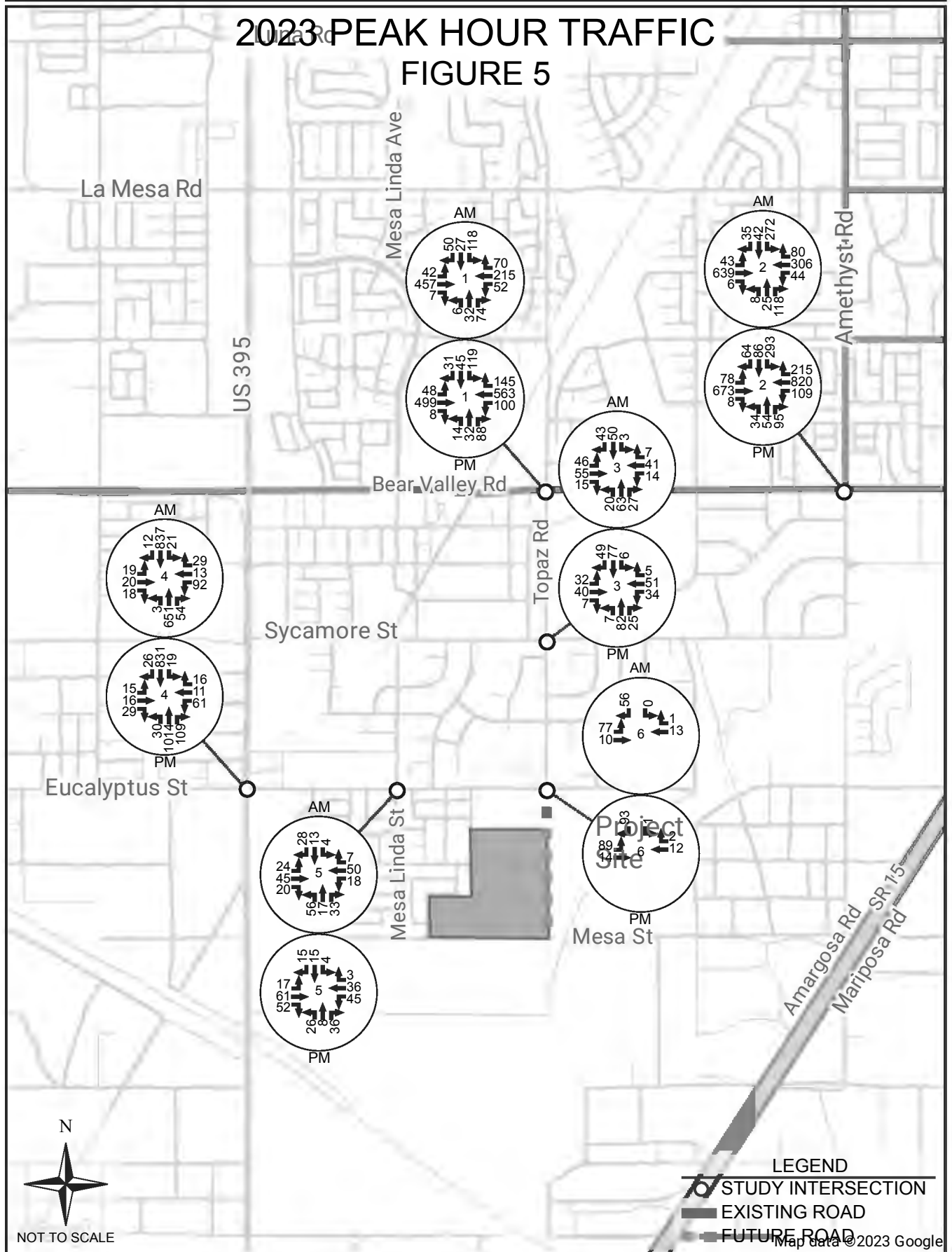
Future

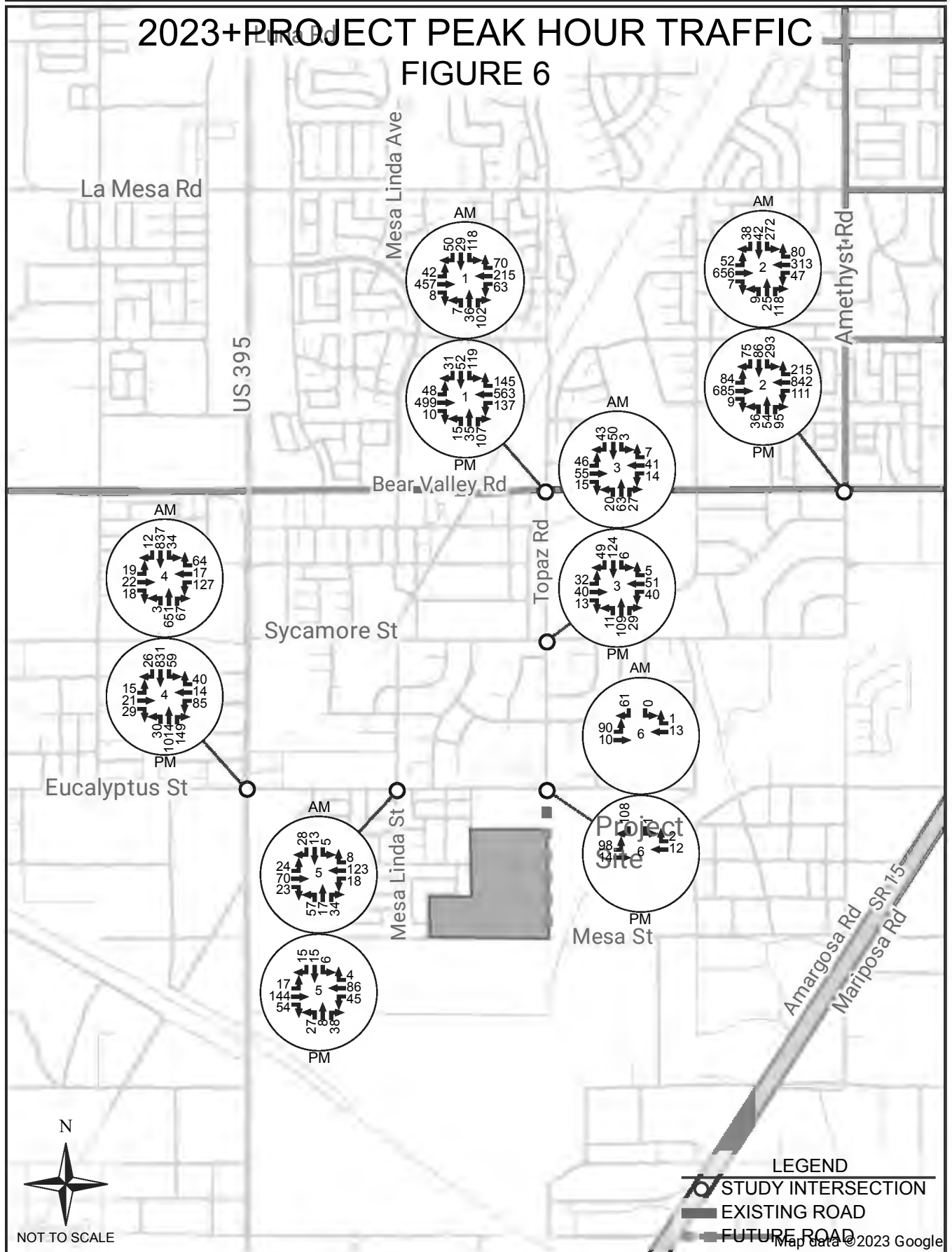
An average annual growth rate of three percent was provided by the City Engineering Department and applied to the existing peak hour volumes to estimate future peak hour volumes for the years 2030 and 2040.

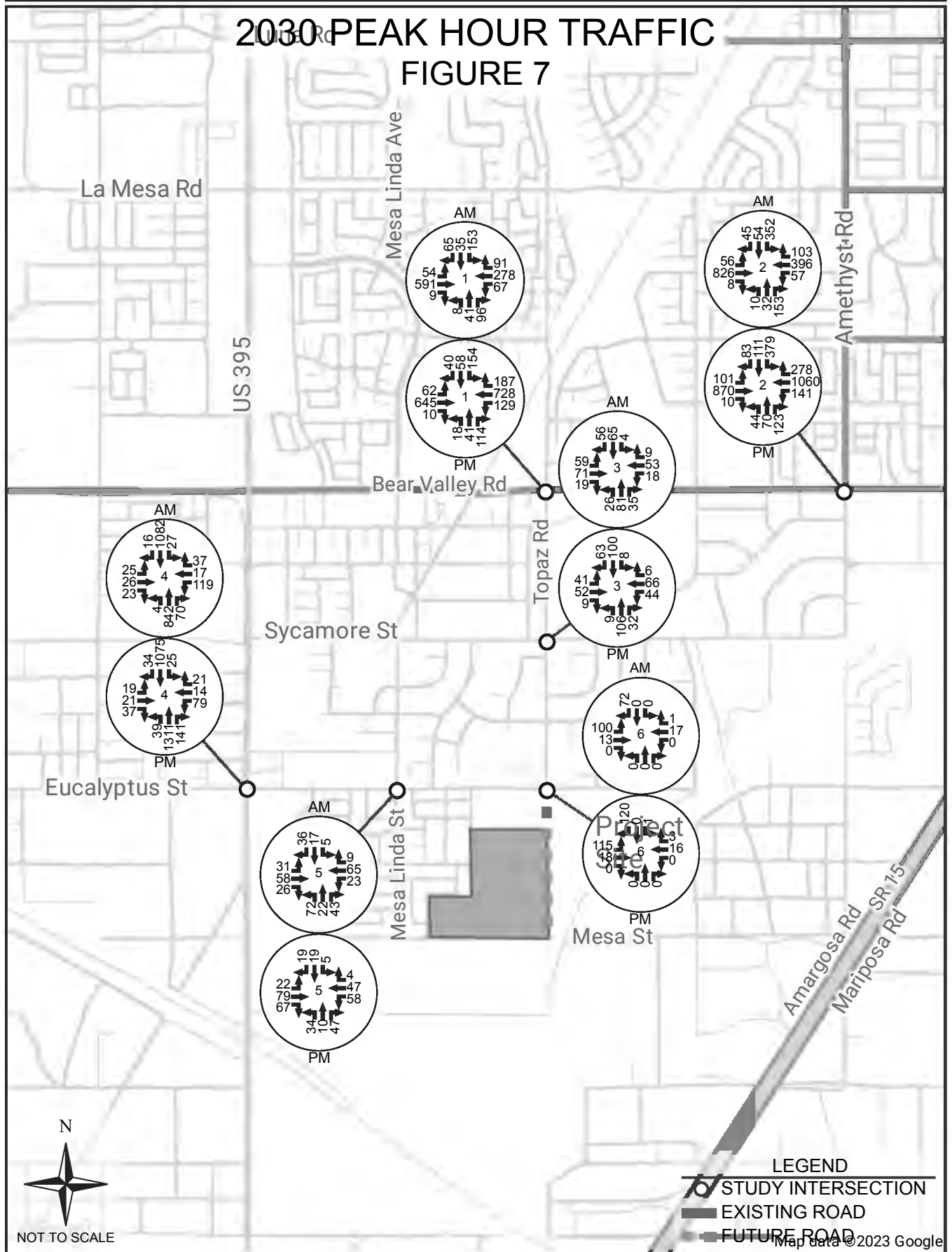
A public records request for approved and pending General Plan Amendment applications within a one-mile radius of the project was submitted to the City in order to identify future developments not accounted for in the San Bernardino Transportation Analysis Model (SBTAM). No such applications were found in the Activity Report Summary documents provided by the City Planning Division for calendar years 2018, 2019, 2020, 2021, 2022 and 2023 (January through March). Therefore, no adjustments were made to the annual growth projections for the years 2030 and 2040.

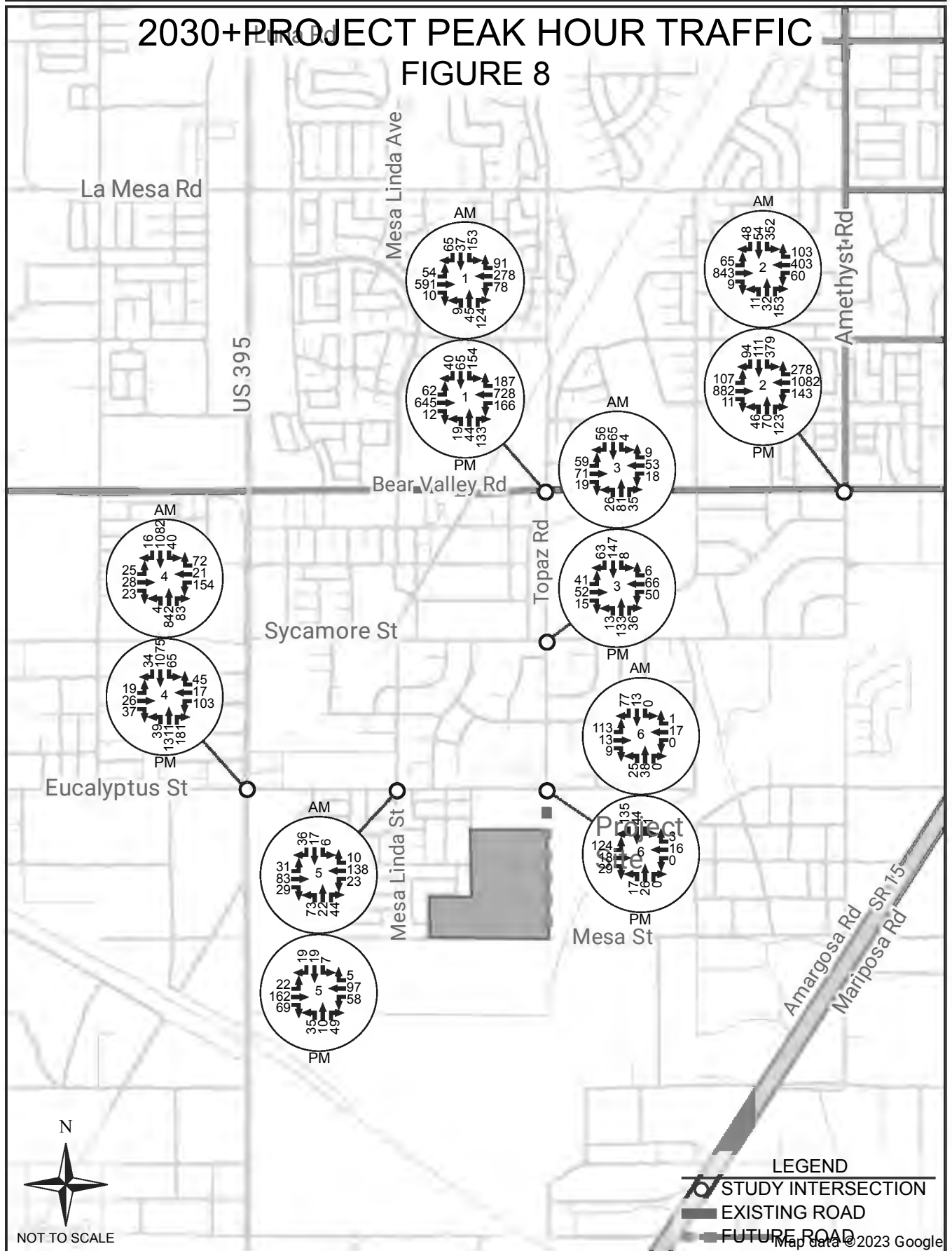
Future volumes for the year 2030, both without and with project traffic, are shown in Figures 7 and 8, respectively. The same for the year 2040 is shown in Figures 9 and 10, respectively.





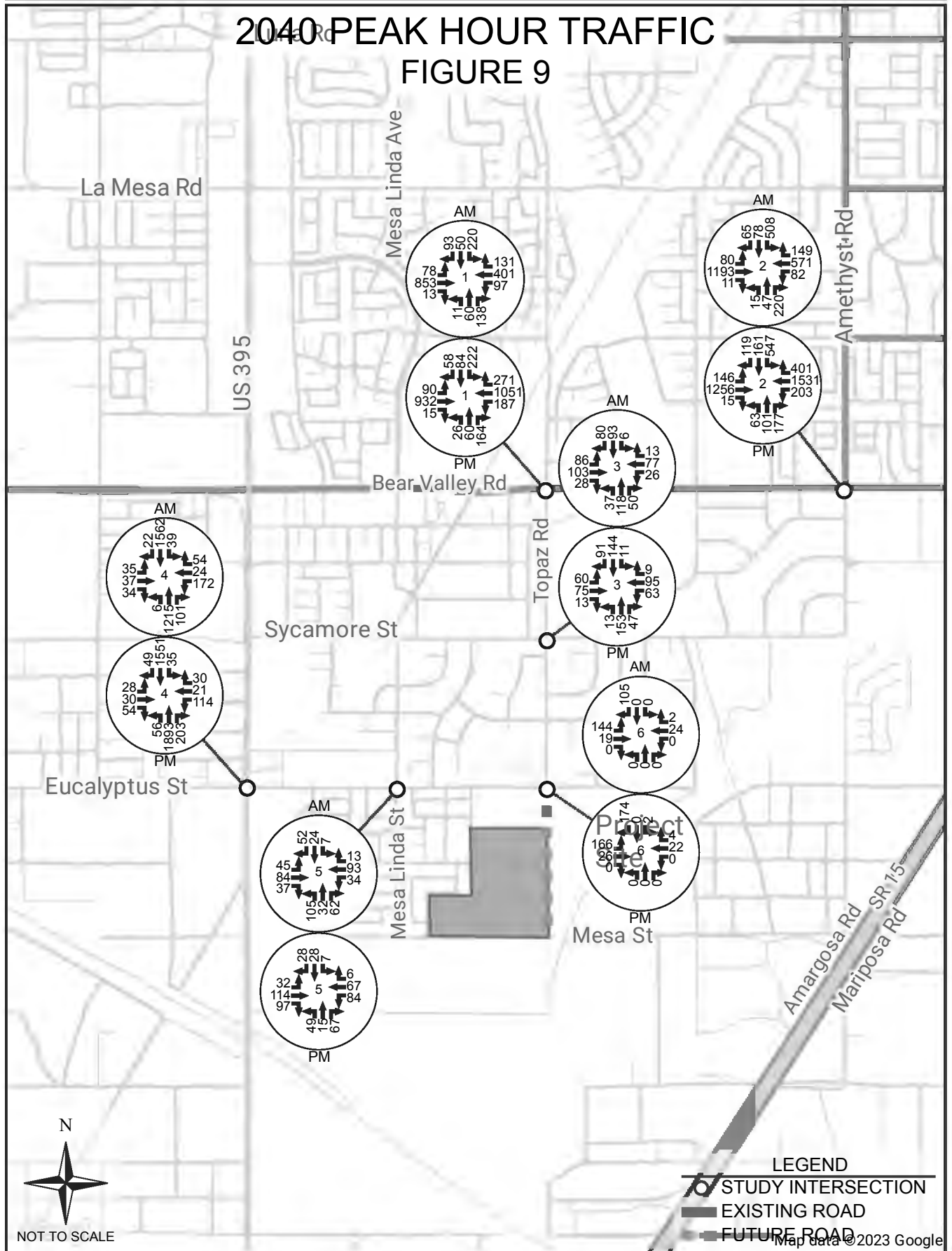






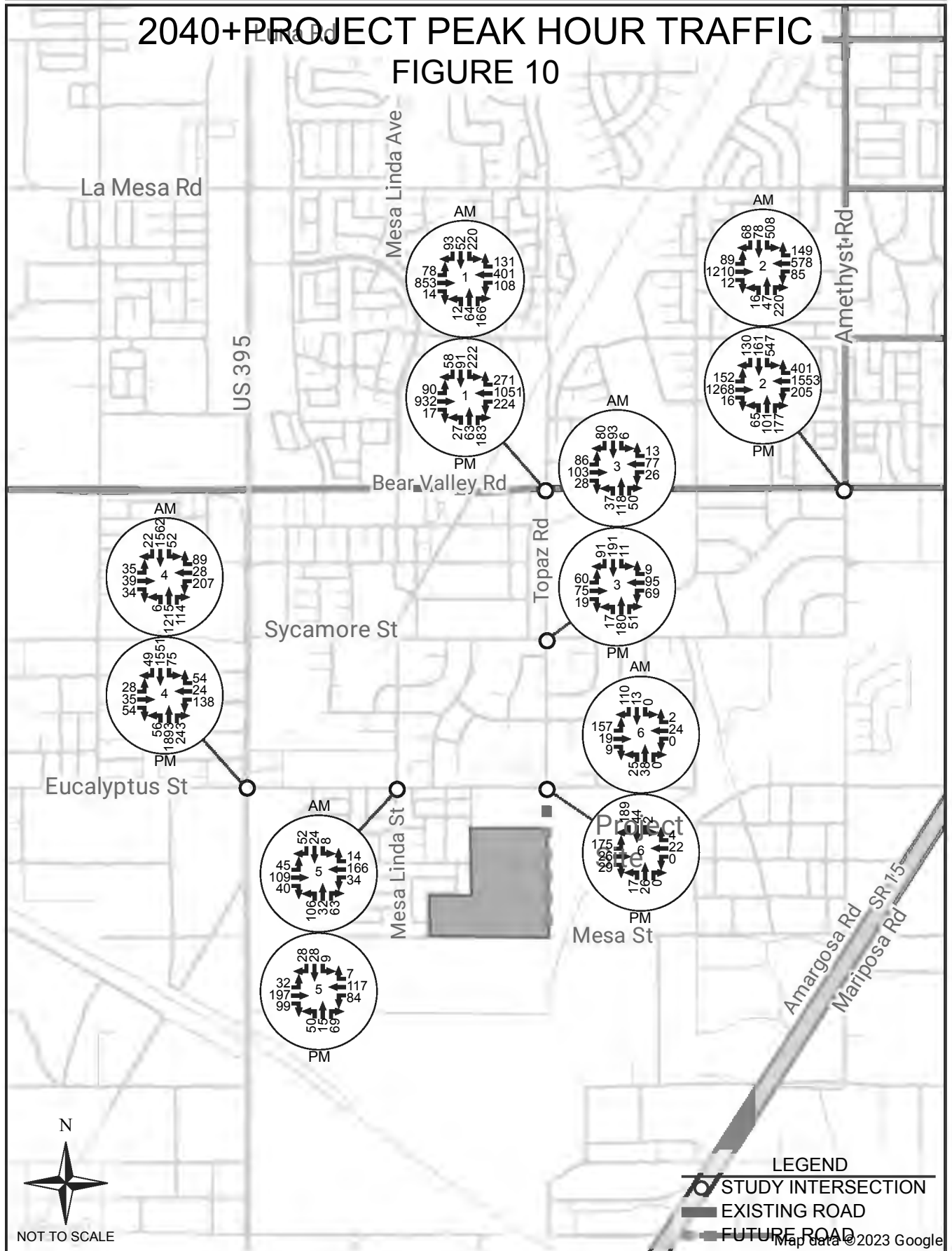
2040 PEAK HOUR TRAFFIC

FIGURE 9



2040+ PROJECT PEAK HOUR TRAFFIC

FIGURE 10



INTERSECTION ANALYSIS

A capacity analysis of the study intersections was conducted using Synchro 11 from Trafficware. This software utilizes the capacity analysis methodology in the Transportation Research Board's *Highway Capacity Manual 2010* (HCM 2010). The analysis was performed for each of the following traffic scenarios.

- Existing Year (2023)
- Existing Year (2023) + Project
- Opening Year (2030)
- Opening Year (2030) + Project
- Future Year (2040)
- Future Year (2040) + Project

Level of service (LOS) criteria for unsignalized and signalized intersections, as defined in HCM 2010, are presented in the tables below.

**Level of Service Criteria
Unsignalized Intersections**

Level of Service	Average Control Delay (sec/veh)	Expected Delay to Minor Street Traffic
A	≤ 10	Little or no delay
B	> 10 and ≤ 15	Short delays
C	> 15 and ≤ 25	Average delays
D	> 25 and ≤ 35	Long delays
E	> 35 and ≤ 50	Very long delays
F	> 50	Extreme delays

**Level of Service Criteria
Signalized Intersections**

Level of Service	Average Control Delay (sec/veh)	Volume-to-Capacity Ratio
A	≤ 10	< 0.60
B	> 10 and ≤ 20	0.61 - 0.70
C	> 20 and ≤ 35	0.71 - 0.80
D	> 35 and ≤ 55	0.81 - 0.90
E	> 55 and ≤ 80	0.91 - 1.00
F	> 80	> 1.00

As stated in the Circulation Element of the *City of Victorville General Plan 2030*, the City has set an intersection level of service goal of LOS D or better, except in certain high activity areas, as designated by the Planning Commission, where LOS E is acceptable. A minimum acceptable level of service threshold of LOS D was used for this study.

Peak hour level of service for the study intersections is presented in Tables 3a and 3b (see Appendix for Synchro output).

Table 3a
Intersection Level of Service
Weekday PM Peak Hour

#	Intersection	Control Type	2023	2023+ Project	2030	2030+ Project	2040	2040+ Project
1	Topaz Rd & Bear Valley Rd	Signal	C	C	C	D	D	D
2	Amethyst Rd & Bear Valley Rd	Signal	C	C	D	D	D	D
3	Topaz Rd & Sycamore St	AWSC	A	A	A	A	B	B
4	US 395 & Eucalyptus St	Signal	B	B	B	B	B	C
5	Mesa Linda St & Eucalyptus St	AWSC	A	A	A	A	A	A
6	Topaz Rd & Eucalyptus St	NB SB	- A	A A	- A	A B	- A	A B

Table 3b
Intersection Level of Service
Weekday AM Peak Hour

#	Intersection	Control Type	2023	2023+ Project	2030	2030+ Project	2040	2040+ Project
1	Topaz Rd & Bear Valley Rd	Signal	C	C	D	D	D	D
2	Amethyst Rd & Bear Valley Rd	Signal	C	C	D	D	D	D
3	Topaz Rd & Sycamore St	AWSC	A	A	A	A	B	B
4	US 395 & Eucalyptus St	Signal	B	B	B	B	C	C
5	Mesa Linda St & Eucalyptus St	AWSC	A	A	A	A	A	B
6	Topaz Rd & Eucalyptus St	NB SB	- A	A A	- A	A A	- A	A A

WARRANT ANALYSIS

All-way stop control and traffic signal warrant analyses were conducted using Synchro 9 from Trafficware (see Appendix for Synchro output).

All-Way Stop Control

The potential need for all-way stop control was analyzed for the intersection of Topaz Road/Mesa Street (#6). Stop control currently exists on Topaz Road only. As shown in Table 4a, warrant conditions are not met for any of the analysis scenarios.

Table 4a
All-Way Stop Control Warrant Analysis

#	Intersection	2023	2023+ Project	2030	2030+ Project	2040	2040+ Project
6	Topaz Rd at Eucalyptus St	NO	NO	NO	NO	NO	NO

Traffic Signal

Peak hour signal warrants were analyzed for all three unsignalized intersections in the study area. Peak hour signal warrants assess delay to traffic on minor street approaches when entering or crossing a major street. As shown in Tables 4b and 4c, warrant conditions are not met for any of the analysis scenarios.

Table 4b
Traffic Signal Warrant Analysis
Weekday PM Peak Hour

#	Intersection	2023			2023+Project			2030		
		Major Street Total Approach Vol	Minor Street High Approach Vol	Warrant Met	Major Street Total Approach Vol	Minor Street High Approach Vol	Warrant Met	Major Street Total Approach Vol	Minor Street High Approach Vol	Warrant Met
3	Topaz Rd at Sycamore St	246	90	NO	328	96	NO	439	152	NO
5	Mesa Linda St at Eucalyptus St	214	70	NO	350	73	NO	362	123	NO
6	Topaz Rd at Eucalyptus St	117	94	NO	196	141	NO	201	162	NO

#	Intersection	2030+Project			2040			2040+Project		
		Major Street Total Approach Vol	Minor Street High Approach Vol	Warrant Met	Major Street Total Approach Vol	Minor Street High Approach Vol	Warrant Met	Major Street Total Approach Vol	Minor Street High Approach Vol	Warrant Met
3	Topaz Rd at Sycamore St	531	173	NO	459	167	NO	541	173	NO
5	Mesa Linda St at Eucalyptus St	507	134	NO	400	131	NO	536	134	NO
6	Topaz Rd at Eucalyptus St	261	230	NO	218	176	NO	278	230	NO

Table 4c
Traffic Signal Warrant analysis
Weekday AM Peak Hour

#	Intersection	2023			2023+Project			2030		
		Major Street Total Approach Vol	Minor Street High Approach Vol	Warrant Met	Major Street Total Approach Vol	Minor Street High Approach Vol	Warrant Met	Major Street Total Approach Vol	Minor Street High Approach Vol	Warrant Met
3	Topaz Rd at Sycamore St	206	116	NO	206	116	NO	364	201	NO
5	Mesa Linda St at Eucalyptus St	164	106	NO	266	108	NO	292	187	NO
6	Topaz Rd at Eucalyptus St	101	56	NO	137	109	NO	172	95	NO

#	Intersection	2030+Project			2040			2040+Project		
		Major Street Total Approach Vol	Minor Street High Approach Vol	Warrant Met	Major Street Total Approach Vol	Minor Street High Approach Vol	Warrant Met	Major Street Total Approach Vol	Minor Street High Approach Vol	Warrant Met
3	Topaz Rd at Sycamore St	334	212	NO	384	217	NO	384	217	NO
5	Mesa Linda St at Eucalyptus St	372	188	NO	306	199	NO	408	201	NO
6	Topaz Rd at Eucalyptus St	192	113	NO	189	105	NO	211	123	NO

It is important to note that a signal warrant defines the minimum condition under which signalization of an intersection might be warranted. Meeting this threshold does not suggest traffic signals are required, but rather, that other traffic factors and conditions be considered to determine whether signals are truly justified.

It is also noted that signal warrants do not necessarily correlate with level of service. An intersection may satisfy a signal warrant condition and operate at or above an acceptable level of service or operate below an acceptable level of service and not meet signal warrant criteria.

VMT ANALYSIS

An analysis of project vehicle miles traveled (VMT) was conducted in accordance with the City of Victorville *Vehicle Miles Traveled (VMT) Analysis Guidelines*, adopted June 16, 2020. These VMT guidelines provide metrics consistent with SB 743 requirements for assessing and mitigating transportation impacts within the California Environmental Quality Act (CEQA).

Project Screening

Parameters defined in the VMT guidelines were entered into the San Bernardino County Transportation Authority (SBCTA) VMT screening tool, a web-based application that determines whether a project requires a detailed VMT analysis. These screening parameters, listed below, generated results indicating the project site is not located in a low VMT area (see Appendix for screening tool output). Therefore, a detailed VMT analysis is required.

- Analysis Methodology = Production-Attraction (PA)
- Metric = VMT per Service Population
- Baseline Year = 2023
- Significance Threshold = City General Plan Buildout VMT per Service Population

Detailed Analysis

The detailed analysis of project VMT was conducted by LSA Associates, Inc. (Riverside, California) using the Southern California Association of Governments (SCAG) travel demand model. The VMT analysis results are summarized in Tables 5a and 5b (see Appendix for VMT analysis memorandum).

**Table 5a
VMT Analysis
Project VMT**

VMT Metric	VMT		Significant Impact
	Project ¹	Threshold ²	
PA VMT per Service Population	25.8	26.3	NO

¹ Base year = 2016

² Significance threshold = City of Victorville General Plan Buildout VMT
Estimated using "NO Project" SBTAM 2040 model run

Table 5b
VMT Analysis
Project Impact on City VMT

VMT Metric	Citywide VMT ¹		Significant Impact
	Project	NO Project	
PA VMT per Service Population	13.9	14.0	NO

¹ Base year = 2016

As shown in the tables above, project VMT per service population (25.8) is less than the City's significance threshold (26.3), and the citywide VMT per service population is lower with the project (13.9) than without the project (14.0). Therefore, the project is not expected to result in a significant transportation impact under CEQA and mitigation would not be required.

REFERENCES

1. *City of Victorville General Plan 2030*, Resolution No. P-08-152 and P-08-153, September 24, 2008
2. *General Guidelines for Conducting Traffic Studies and Determination of Intersection Level of Service and Improvement Needs*, City of Victorville, dated January 20, 2005
3. *Highway Capacity Manual 2010*, Transportation Research Board
4. *Trip Generation Manual*, 11th Edition, Institute of Transportation Engineers (ITE), September 2021
5. *Vehicle Miles Traveled (VMT) Analysis Guidelines*, City of Victorville, Resolution 20-031, June 16, 2020

APPENDIX

Turning Movement Count Report AM

Location ID: 1
 North/South: Topaz Rd
 East/West: Bear Valley Rd

Date: 07/27/23
 City: Victorville, CA

	Southbound			Westbound			Northbound			Eastbound			
	1	2	3	4	5	6	7	8	9	10	11	12	Totals:
Movements:	R	T	L	R	T	L	R	T	L	R	T	L	
6:00	4	4	16	7	30	2	6	1	1	0	55	2	128
6:15	0	1	12	5	46	6	13	0	3	0	52	1	139
6:30	6	1	21	7	40	7	14	4	1	0	53	3	157
6:45	8	0	20	7	36	13	19	3	1	1	88	4	200
7:00	12	5	17	9	42	11	14	4	3	3	86	4	210
7:15	3	3	28	12	55	9	21	7	0	1	101	5	245
7:30	9	7	24	15	47	8	13	4	2	3	106	1	239
7:45	10	7	38	15	68	15	18	5	1	0	159	4	340

Total Volume:	52	28	176	77	364	71	118	28	12	8	700	24	1658
Approach %	20%	11%	69%	15%	71%	14%	75%	18%	8%	1%	96%	3%	

Peak Hr Begin:	7:00												
PHV	34	22	107	51	212	43	66	20	6	7	452	14	1034
PHF	0.741			0.781			0.821			0.725			

Turning Movement Count Report PM

Location ID: 1
 North/South: Topaz Rd
 East/West: Bear Valley Rd

Date: 07/27/23
 City: Victorville, CA

	Southbound			Westbound			Northbound			Eastbound			
	1	2	3	4	5	6	7	8	9	10	11	12	Totals:
Movements:	R	T	L	R	T	L	R	T	L	R	T	L	
16:00	7	10	40	35	121	27	31	5	3	1	118	14	412
16:15	8	10	24	36	159	19	20	5	6	1	138	10	436
16:30	6	14	24	42	128	29	19	8	3	1	119	9	402
16:45	4	9	27	28	154	23	15	11	2	5	123	9	410
17:00	12	15	31	33	149	30	21	4	4	9	130	7	445
17:15	11	24	28	34	127	26	26	4	5	2	128	11	426
17:30	6	16	35	30	134	34	19	10	2	5	145	10	446
17:45	7	22	24	45	137	34	18	9	1	5	126	8	436

Total Volume:	61	120	233	283	1109	222	169	56	26	29	1027	78	3413
Approach %	15%	29%	56%	18%	69%	14%	67%	22%	10%	3%	91%	7%	

Peak Hr Begin:	17:00												
PHV	36	77	118	142	547	124	84	27	12	21	529	36	1753
PHF	0.917			0.941			0.879			0.916			

Pedestrian/Bicycle Count Report

Location ID: 1
 North/South: Topaz Rd
 East/West: Bear Valley Rd

Date: 07/27/23
 City: Victorville, CA

Leg:	North		East		South		West	
Class:	Peds	Bicycle	Peds	Bicycle	Peds	Bicycle	Peds	Bicycle
6:00	0	0	0	0	0	0	0	0
6:15	0	0	0	0	0	0	0	0
6:30	0	0	0	0	0	0	1	0
6:45	0	0	0	0	0	0	0	0
7:00	0	0	0	0	0	0	0	0
7:15	0	0	0	0	0	0	0	0
7:30	0	0	0	0	1	0	0	0
7:45	0	0	0	0	0	0	0	0

Leg:	North		East		South		West	
Class:	Peds	Bicycle	Peds	Bicycle	Peds	Bicycle	Peds	Bicycle
16:00	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0

Turning Movement Count Report AM

Location ID: 2
 North/South: Amethyst Rd
 East/West: Bear Valley Rd

Date: 07/27/23
 City: Victorville, CA

	Southbound			Westbound			Northbound			Eastbound			Totals:
	1	2	3	4	5	6	7	8	9	10	11	12	
Movements:	R	T	L	R	T	L	R	T	L	R	T	L	
6:00	3	4	46	6	42	8	11	2	2	1	89	5	219
6:15	7	2	46	11	51	1	9	3	1	2	81	8	222
6:30	5	3	51	14	49	4	24	2	3	1	95	8	259
6:45	6	5	69	14	54	12	21	4	1	2	143	8	339
7:00	3	8	54	14	67	7	25	1	2	2	115	3	301
7:15	7	11	57	20	61	6	23	8	3	1	150	7	354
7:30	3	8	89	21	62	11	39	6	2	0	153	10	404
7:45	10	15	69	20	97	20	31	10	1	3	208	13	497

Total Volume:	44	56	481	120	483	69	183	36	15	12	1034	62	2595
Approach %	8%	10%	83%	18%	72%	10%	78%	15%	6%	1%	93%	6%	

Peak Hr Begin:	7:00												
PHV	23	42	269	75	287	44	118	25	8	6	626	33	1556
PHF	0.835			0.741			0.803			0.742			

Turning Movement Count Report PM

Location ID: 2
 North/South: Amethyst Rd
 East/West: Bear Valley Rd

Date: 07/27/23
 City: Victorville, CA

	Southbound			Westbound			Northbound			Eastbound			
	1	2	3	4	5	6	7	8	9	10	11	12	
Movements:	R	T	L	R	T	L	R	T	L	R	T	L	Totals:
16:00	17	24	67	43	194	25	29	10	7	4	174	18	612
16:15	13	31	80	60	216	23	16	13	8	0	172	16	648
16:30	13	13	79	57	201	32	33	17	8	2	166	17	638
16:45	18	18	66	54	205	29	17	14	11	2	156	24	614
17:00	12	23	49	64	213	30	37	12	10	1	155	32	638
17:15	17	29	64	51	191	32	37	18	8	0	156	23	626
17:30	13	27	83	60	190	34	40	14	6	2	166	29	664
17:45	15	26	61	45	226	31	30	14	7	0	155	18	628

Total Volume:	118	191	549	434	1636	236	239	112	65	11	1300	177	5068
Approach %	14%	22%	64%	19%	71%	10%	57%	27%	16%	1%	87%	12%	

Peak Hr Begin:	17:00												
PHV	57	105	257	220	820	127	144	58	31	3	632	102	2556
PHF	0.852			0.950			0.925			0.935			

Pedestrian/Bicycle Count Report

Location ID: 2
 North/South: Amethyst Rd
 East/West: Bear Valley Rd

Date: 07/27/23
 City: Victorville, CA

Leg:	North		East		South		West	
Class:	Peds	Bicycle	Peds	Bicycle	Peds	Bicycle	Peds	Bicycle
6:00	0	0	0	0	0	0	0	0
6:15	0	0	0	0	0	0	0	0
6:30	0	0	0	0	1	0	0	0
6:45	0	0	0	0	0	0	0	0
7:00	0	0	0	0	0	0	0	0
7:15	3	0	0	0	0	0	0	0
7:30	2	0	0	0	0	0	0	0
7:45	2	2	0	0	0	0	0	0

Leg:	North		East		South		West	
Class:	Peds	Bicycle	Peds	Bicycle	Peds	Bicycle	Peds	Bicycle
16:00	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0
16:30	0	1	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0
17:00	2	0	0	0	0	0	2	0
17:15	0	0	0	0	0	0	1	0
17:30	1	0	0	0	0	0	0	1
17:45	0	0	0	0	0	0	0	0

Turning Movement Count Report AM

Location ID: 3
 North/South: Topaz Rd
 East/West: Sycamore St

Date: 07/27/23
 City: Victorville, CA

	Southbound			Westbound			Northbound			Eastbound			
	1	2	3	4	5	6	7	8	9	10	11	12	Totals:
Movements:	R	T	L	R	T	L	R	T	L	R	T	L	
6:00	2	6	0	1	4	2	0	6	0	0	4	0	25
6:15	3	3	0	0	1	1	4	10	0	1	5	4	32
6:30	2	6	0	1	4	0	4	12	0	0	9	6	44
6:45	4	6	0	0	3	1	4	17	1	0	5	5	46
7:00	6	12	0	0	4	5	8	11	0	0	11	9	66
7:15	5	8	0	0	2	3	6	21	0	1	8	6	60
7:30	4	10	0	2	7	2	9	9	0	0	10	7	60
7:45	6	11	0	0	4	4	4	14	1	1	13	6	64

Total Volume:	32	62	0	4	29	18	39	100	2	3	65	43	397
Approach %	34%	66%	0%	8%	57%	35%	28%	71%	1%	3%	59%	39%	

Peak Hr Begin:	7:00												
PHV	21	41	0	2	17	14	27	55	1	2	42	28	250
PHF	0.861			0.750			0.769			0.900			

Turning Movement Count Report PM

Location ID: 3
 North/South: Topaz Rd
 East/West: Sycamore St

Date: 07/27/23
 City: Victorville, CA

	Southbound			Westbound			Northbound			Eastbound			Totals:
	1	2	3	4	5	6	7	8	9	10	11	12	
Movements:	R	T	L	R	T	L	R	T	L	R	T	L	
16:00	9	18	1	3	14	3	5	24	1	0	8	7	93
16:15	10	14	0	0	13	9	4	19	2	1	9	7	88
16:30	15	21	1	1	3	8	12	20	0	1	11	5	98
16:45	10	22	3	0	16	14	4	16	0	0	7	7	99
17:00	11	24	3	1	12	10	4	13	0	2	7	7	94
17:15	26	26	0	4	15	10	10	16	0	1	14	10	132
17:30	8	43	1	4	14	16	5	22	1	2	16	4	136
17:45	12	48	1	2	14	19	10	19	0	0	9	7	141

Total Volume:	101	216	10	15	101	89	54	149	4	7	81	54	881
Approach %	31%	66%	3%	7%	49%	43%	26%	72%	2%	5%	57%	38%	

Peak Hr Begin:	17:00												
PHV	57	141	5	11	55	55	29	70	1	5	46	28	503
PHF	0.832			0.864			0.862			0.790			

Pedestrian/Bicycle Count Report

Location ID: 3
 North/South: Topaz Rd
 East/West: Sycamore St

Date: 07/27/23
 City: Victorville, CA

Leg:	North		East		South		West	
Class:	Peds	Bicycle	Peds	Bicycle	Peds	Bicycle	Peds	Bicycle
6:00	0	0	0	0	0	0	0	0
6:15	0	0	0	0	0	0	0	0
6:30	0	0	0	0	0	0	1	0
6:45	0	0	1	0	0	0	0	0
7:00	0	0	1	0	0	0	0	0
7:15	0	0	0	0	0	0	0	0
7:30	0	0	0	0	0	0	0	0
7:45	0	0	0	0	0	0	0	0

Leg:	North		East		South		West	
Class:	Peds	Bicycle	Peds	Bicycle	Peds	Bicycle	Peds	Bicycle
16:00	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0

Turning Movement Count Report AM

Location ID: 4
 North/South: US 395
 East/West: Eucalyptus St

Date: 07/27/23
 City: Victorville, CA

	Southbound			Westbound			Northbound			Eastbound			
	1	2	3	4	5	6	7	8	9	10	11	12	Totals:
Movements:	R	T	L	R	T	L	R	T	L	R	T	L	
6:00	1	181	5	1	0	17	11	138	5	5	0	2	366
6:15	3	194	5	2	1	24	5	141	3	1	0	2	381
6:30	1	200	2	3	1	29	12	170	8	6	0	2	434
6:45	2	216	7	7	1	17	10	172	6	5	1	2	446
7:00	2	193	4	4	0	20	10	163	2	3	0	6	407
7:15	4	214	3	3	1	12	8	178	0	5	0	3	431
7:30	2	238	0	4	1	25	10	163	1	3	0	4	451
7:45	4	192	2	5	0	19	9	147	0	7	1	6	392

Total Volume:	19	1628	28	29	5	163	75	1272	25	35	2	27	3308
Approach %	1%	97%	2%	15%	3%	83%	5%	93%	2%	55%	3%	42%	

Peak Hr Begin:	6:45												
PHV	10	861	14	18	3	74	38	676	9	16	1	15	1735
PHF	0.922			0.792			0.961			0.889			

Turning Movement Count Report PM

Location ID: 4
 North/South: US 395
 East/West: Eucalyptus St

Date: 07/27/23
 City: Victorville, CA

	Southbound			Westbound			Northbound			Eastbound			
	1	2	3	4	5	6	7	8	9	10	11	12	Totals:
Movements:	R	T	L	R	T	L	R	T	L	R	T	L	
16:00	9	196	3	1	1	17	38	252	7	2	4	3	533
16:15	6	207	6	3	4	13	28	251	4	7	1	3	533
16:30	6	235	1	4	1	14	20	249	9	11	5	6	561
16:45	5	193	6	4	1	12	19	262	10	9	2	3	526
17:00	6	218	8	5	4	20	28	242	8	6	0	7	552
17:15	7	193	7	6	1	24	30	253	8	5	2	5	541
17:30	10	164	4	2	2	7	38	228	3	3	4	4	469
17:45	9	180	11	0	2	9	35	262	9	2	3	3	525

Total Volume:	58	1586	46	25	16	116	236	1999	58	45	21	34	4240
Approach %	3%	94%	3%	16%	10%	74%	10%	87%	3%	45%	21%	34%	

Peak Hr Begin:	16:30												
PHV	24	839	22	19	7	70	97	1006	35	31	9	21	2180
PHF	0.914			0.774			0.978			0.693			

Pedestrian/Bicycle Count Report

Location ID: 4
 North/South: US 395
 East/West: Eucalyptus St

Date: 07/27/23
 City: Victorville, CA

Leg:	North		East		South		West	
Class:	Peds	Bicycle	Peds	Bicycle	Peds	Bicycle	Peds	Bicycle
6:00	0	0	0	0	0	0	0	0
6:15	0	0	0	0	0	0	0	0
6:30	0	0	0	0	0	0	0	0
6:45	0	0	0	0	0	0	0	0
7:00	0	0	0	0	0	0	0	0
7:15	0	0	0	0	0	0	0	0
7:30	0	0	0	0	0	0	0	0
7:45	0	0	0	0	0	0	0	0

Leg:	North		East		South		West	
Class:	Peds	Bicycle	Peds	Bicycle	Peds	Bicycle	Peds	Bicycle
16:00	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	1	0
17:30	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0

Turning Movement Count Report AM

Location ID: 5
 North/South: Mesa Linda St
 East/West: Eucalyptus St

Date: 07/27/23
 City: Victorville, CA

	Southbound			Westbound			Northbound			Eastbound			
	1	2	3	4	5	6	7	8	9	10	11	12	Totals:
Movements:	R	T	L	R	T	L	R	T	L	R	T	L	
6:00	3	0	0	0	5	1	1	0	11	1	5	0	27
6:15	7	1	0	0	10	1	5	2	10	2	6	0	44
6:30	5	0	0	0	11	0	5	4	16	2	6	2	51
6:45	3	2	0	1	11	2	7	3	6	0	8	1	44
7:00	4	1	0	1	12	2	4	0	9	2	8	0	43
7:15	3	5	0	1	4	3	9	3	9	5	5	2	49
7:30	5	2	0	0	8	3	6	3	17	4	4	2	54
7:45	5	0	1	0	10	7	9	2	9	4	4	1	52

Total Volume:	35	11	1	3	71	19	46	17	87	20	46	8	364
Approach %	74%	23%	2%	3%	76%	20%	31%	11%	58%	27%	62%	11%	

Peak Hr Begin:	7:00												
PHV	17	8	1	2	34	15	28	8	44	15	21	5	198
PHF	0.813			0.750			0.769			0.854			

Turning Movement Count Report PM

Location ID: 5
 North/South: Mesa Linda St
 East/West: Eucalyptus St

Date: 07/27/23
 City: Victorville, CA

	Southbound			Westbound			Northbound			Eastbound			
	1	2	3	4	5	6	7	8	9	10	11	12	Totals:
Movements:	R	T	L	R	T	L	R	T	L	R	T	L	
16:00	2	2	1	1	7	9	10	2	7	10	19	4	74
16:15	3	6	1	0	9	9	2	1	6	17	14	4	72
16:30	2	2	0	0	8	10	14	2	5	10	13	5	71
16:45	4	3	1	1	6	16	9	1	5	13	10	0	69
17:00	5	2	0	1	8	9	6	0	8	14	13	2	68
17:15	5	4	1	1	16	15	11	2	10	16	22	5	108
17:30	2	5	0	2	3	15	11	2	5	14	20	8	87
17:45	1	6	0	1	5	7	12	6	3	20	27	4	92

Total Volume:	24	30	4	7	62	90	75	16	49	114	138	32	641
Approach %	41%	52%	7%	4%	39%	57%	54%	11%	35%	40%	49%	11%	

Peak Hr Begin:	17:00												
PHV	13	17	1	5	32	46	40	10	26	64	82	19	355
PHF	0.775			0.648			0.826			0.809			

Pedestrian/Bicycle Count Report

Location ID: 5
 North/South: Mesa Linda St
 East/West: Eucalyptus St

Date: 07/27/23
 City: Victorville, CA

Leg:	North		East		South		West	
Class:	Peds	Bicycle	Peds	Bicycle	Peds	Bicycle	Peds	Bicycle
6:00	0	0	0	0	0	0	0	0
6:15	0	0	0	0	0	0	0	0
6:30	0	0	0	0	0	0	0	0
6:45	0	0	0	0	0	0	0	0
7:00	0	0	0	0	0	0	0	0
7:15	0	0	0	0	0	0	0	0
7:30	0	0	0	0	0	0	0	0
7:45	0	0	0	0	0	0	0	0

Leg:	North		East		South		West	
Class:	Peds	Bicycle	Peds	Bicycle	Peds	Bicycle	Peds	Bicycle
16:00	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0

Turning Movement Count Report AM

Location ID: 6
 North/South: Topaz Rd
 East/West: Eucalyptus St

Date: 07/27/23
 City: Victorville, CA

	Southbound			Westbound			Northbound			Eastbound			Totals:
	1	2	3	4	5	6	7	8	9	10	11	12	
Movements:	R	T	L	R	T	L	R	T	L	R	T	L	
6:00	5	0	0	0	3	0	0	0	0	0	3	5	16
6:15	6	0	0	0	2	0	0	0	0	0	2	9	19
6:30	5	0	1	1	4	0	0	0	0	0	2	13	26
6:45	9	0	0	0	3	0	0	0	0	0	1	20	33
7:00	10	0	0	1	4	0	0	0	0	0	1	12	28
7:15	7	0	0	0	0	0	0	0	0	0	3	19	29
7:30	13	0	0	0	1	0	0	0	0	0	2	14	30
7:45	13	0	0	0	3	0	0	0	0	0	1	13	30

Total Volume:	68	0	1	2	20	0	0	0	0	0	15	105	211
Approach %	99%	0%	1%	9%	91%	0%	0%	0%	0%	0%	13%	88%	

Peak Hr Begin:	6:45												
PHV	39	0	0	1	8	0	0	0	0	0	7	65	120
PHF	0.750			0.450			0.000			0.818			

Turning Movement Count Report PM

Location ID: 6
 North/South: Topaz Rd
 East/West: Eucalyptus St

Date: 07/27/23
 City: Victorville, CA

	Southbound			Westbound			Northbound			Eastbound			
	1	2	3	4	5	6	7	8	9	10	11	12	Totals:
Movements:	R	T	L	R	T	L	R	T	L	R	T	L	
16:00	17	0	0	0	3	0	0	0	0	0	2	28	50
16:15	19	0	0	0	2	0	0	0	0	0	6	16	43
16:30	23	0	1	2	3	0	0	0	0	0	3	26	58
16:45	30	0	0	0	3	0	0	0	0	0	2	14	49
17:00	23	0	1	0	4	0	0	0	0	0	6	18	52
17:15	29	0	1	0	9	0	0	0	0	0	10	23	72
17:30	35	0	0	0	4	0	0	0	0	0	5	28	72
17:45	33	0	0	0	3	0	0	0	0	0	7	29	72

Total Volume:	209	0	3	2	31	0	0	0	0	0	41	182	468
Approach %	99%	0%	1%	6%	94%	0%	0%	0%	0%	0%	18%	82%	

Peak Hr Begin:	17:00												
PHV	120	0	2	0	20	0	0	0	0	0	28	98	268
PHF	0.871			0.556			0.000			0.875			

Pedestrian/Bicycle Count Report

Location ID: 6
 North/South: Topaz Rd
 East/West: Eucalyptus St

Date: 07/27/23
 City: Victorville, CA

Leg:	North		East		South		West	
Class:	Peds	Bicycle	Peds	Bicycle	Peds	Bicycle	Peds	Bicycle
6:00	0	0	0	0	0	0	0	0
6:15	0	0	0	0	0	0	0	0
6:30	0	0	0	0	0	0	1	0
6:45	1	0	0	0	0	0	0	0
7:00	1	0	0	0	0	0	0	0
7:15	0	0	0	0	0	0	0	0
7:30	0	0	0	0	0	0	0	0
7:45	1	0	0	0	0	0	0	0

Leg:	North		East		South		West	
Class:	Peds	Bicycle	Peds	Bicycle	Peds	Bicycle	Peds	Bicycle
16:00	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0

TRIP GENERATION
CITY OF VICTORVILLE - TTM 20576
PUBLIC SCHOOLS IN PROJECT VICINITY

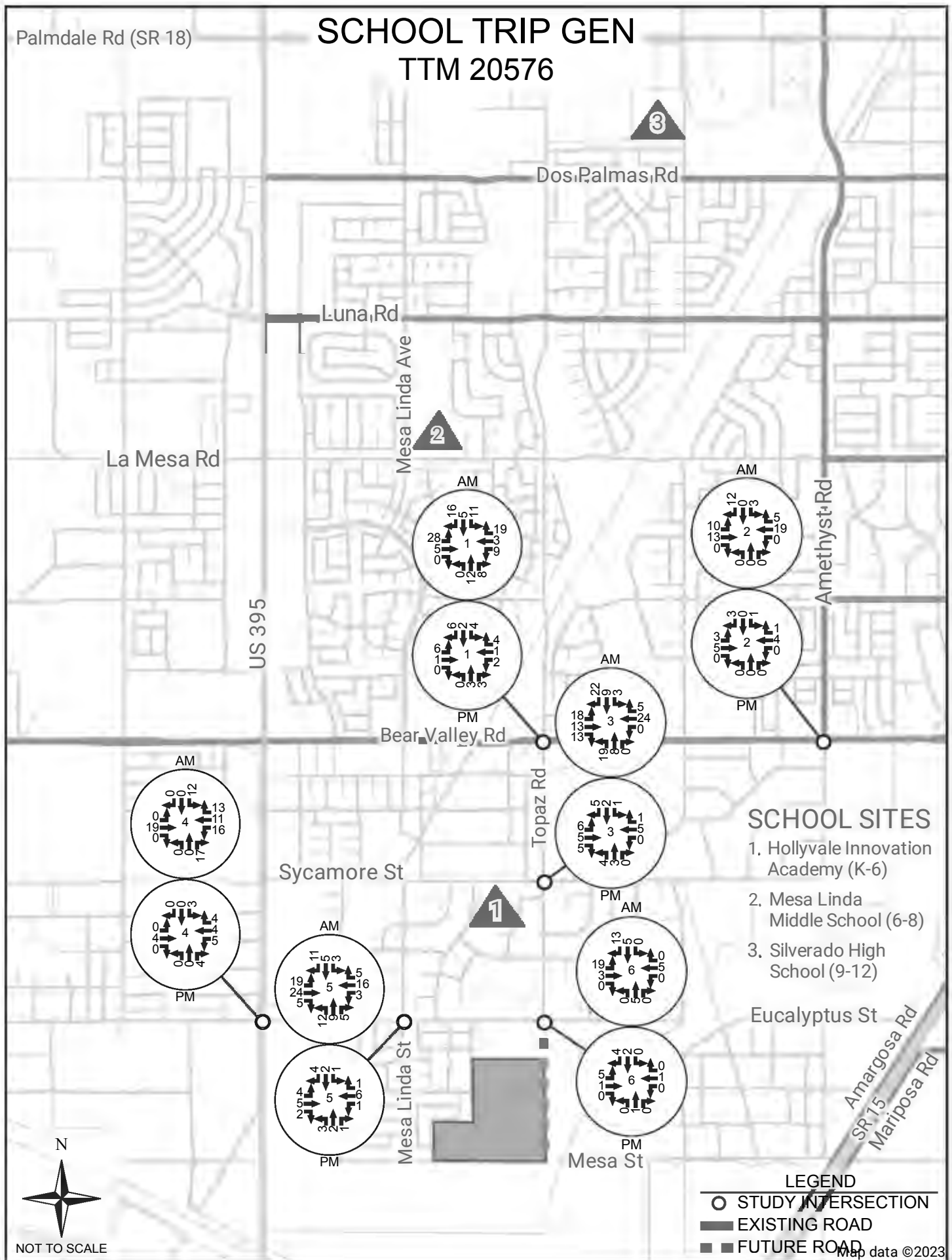
Land Use			Daily Trips		AM Peak Hour Trips			PM Peak Hour Trips		
ITE Code	Development Type	Variable	ADT Rate	ADT	Rate	IN Split Trips	OUT Split Trips	Rate	IN Split Trips	OUT Split Trips
520	Elementary School	334 Students	2.27	758	0.74	54% 133	46% 114	0.16	46% 25	54% 29
522	Middle School/Junior High School	886 Students	eq	1,869	0.67	54% 321	46% 273	0.15	48% 64	52% 69
525	High School	2,209 Students	1.94	4,285	eq	68% 660	32% 310	0.14	48% 148	52% 161

ITE *Trip General Manual* , 11th Edition (September 2021)

Palmdale Rd (SR 18)

SCHOOL TRIP GEN

TTM 20576



SCHOOL SITES

1. Hollyvale Innovation Academy (K-6)
2. Mesa Linda Middle School (6-8)
3. Silverado High School (9-12)

Eucalyptus St

Amargosa Rd
SR 15
Mariposa Rd

LEGEND

- STUDY INTERSECTION
- EXISTING ROAD
- FUTURE ROAD

Map data ©2023

Warrants Summary Report PM 2023

1: Topaz Rd and Eucalyptus St

Intersection Information

	Major Street	Minor Street
Street Name	Eucalyptus St	Topaz Rd
Direction	EB/WB	SB
Number of Lane:	1	1
Approach Speed	45	40

Warrant	Met?	Notes
Warrant 1, Eight-Hour Vehicular Volume		
	No	
Condition A or B Met?	No	0 Hours met (8 required)
Condition A and B Met?	No	0 Hours met (8 required)
Warrant 2, Four-Hour Vehicular Volume		
	No	0 Hours met (4 required)
Warrant 3, Peak Hour		
	No	
Condition A Met?	No	0 Hours met (1 required)
Condition B Met?	No	0 Hours met (1 required)
Warrant 4, Pedestrian Volume		
	No	
Condition A Met?	No	0 Hours met (4 required)
Condition B Met?	No	0 Hours met (1 required)
Warrant 5, School Crossing		
	No	

Warrant 6, Coordinated Signal System☐ No**Warrant 7, Crash Experience**☐ NoTraffic Volume Condi ☐ No 0 Hours met (8 required)Ped Condition? ☐ No 0 Hours met (8 required)**Warrant 8, Roadway Network**☐ No**Warrant 9, Intersection Near a Grade Crossing**☐ No**AWSC Warrant, Multiway Stop Application**☐ NoCondition A Met? ☐ NoCondition B Met? ☐ NoCondition C Met? ☐ No**BicycleWarrant**☐ No

0 Hours met (1 required)

Warrant 1: Eight-hour Vehicular Volume

1: 6th Ave and Quincy St

Intersection Information

Major Street Name: 6th Ave

Major Street Direction: EB/WB

Minor Street Direction: NB/SB

WARRANT 1 MET? No

Details:

Condition A Met? No 0 Hours met (8 required)

Condition B Met? No 0 Hours met (8 required)

Hour	Major Street Vehicles (Total of Both Approaches)	High Volume Minor Approach Vehicles	70% Standard Met? Cond. A OR Cond. B		56% Standard Met? Cond. A AND Cond. B	
			Condition A 70% Column	Condition B 70% Column	Condition A 56% Column	Condition B 56% Column
00:00 to 01:00	6	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	Volume >= 70% column (525)?	No	No		
	Volume >= 56% column (280)?	Volume >= 56% column (420)?	No	No		
Condition B	Volume >= 70% column (525)?	Volume >= 70% column (53)?	No	No		
	Volume >= 56% column (420)?	Volume >= 56% column (42)?	No	No		
00:15 to 01:15	7	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	Volume >= 70% column (525)?	No	No		
	Volume >= 56% column (280)?	Volume >= 56% column (420)?	No	No		
Condition B	Volume >= 70% column (525)?	Volume >= 70% column (53)?	No	No		
	Volume >= 56% column (420)?	Volume >= 56% column (42)?	No	No		
00:30 to 01:30	7	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	Volume >= 70% column (525)?	No	No		
	Volume >= 56% column (280)?	Volume >= 56% column (420)?	No	No		
Condition B	Volume >= 70% column (525)?	Volume >= 70% column (53)?	No	No		
	Volume >= 56% column (420)?	Volume >= 56% column (42)?	No	No		
00:45 to 01:45	6	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	Volume >= 70% column (525)?	No	No		
	Volume >= 56% column (280)?	Volume >= 56% column (420)?	No	No		
Condition B	Volume >= 70% column (525)?	Volume >= 70% column (53)?	No	No		
	Volume >= 56% column (420)?	Volume >= 56% column (42)?	No	No		

03:15 to 04:15		15	0	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

03:30 to 04:30		16	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

03:45 to 04:45		13	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

04:00 to 05:00		20	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

04:15 to 05:15		22	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

04:30 to 05:30		29	3	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

04:45 to 05:45		40	4	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

05:00 to 06:00		53	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

05:15 to 06:15		59	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

05:30 to 06:30		64	6	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

05:45 to 06:45		81	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

06:00 to 07:00		83	8	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

06:15 to 07:15		98	9	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

06:30 to 07:30		131	10	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

06:45 to 07:45		219		21		No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No					
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No					
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No					
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No					

07:00 to 08:00		326		42		No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No					
	Volume >= 56% column (280)?	Yes	Volume >= 56% column (420)?	No					
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No					
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	Yes					

07:15 to 08:15		337		45		No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No					
	Volume >= 56% column (280)?	Yes	Volume >= 56% column (420)?	No					
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No					
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	Yes					

07:30 to 08:30		322		44		No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No					
	Volume >= 56% column (280)?	Yes	Volume >= 56% column (420)?	No					
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No					
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	Yes					

07:45 to 08:45		233		31		No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No					
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No					
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No					
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No					

08:00 to 09:00		121		10		No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No					
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No					
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No					
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No					

08:15 to 09:15		105		6		No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No					
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No					
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No					
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No					

08:30 to 09:30		90	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

08:45 to 09:45		71	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

09:00 to 10:00		73	8	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

09:15 to 10:15		75	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

09:30 to 10:30		82	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

09:45 to 10:45		89	4	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

10:00 to 11:00		83	3	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

10:15 to 11:15	79	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

10:30 to 11:30	84	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

10:45 to 11:45	100	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

11:00 to 12:00	102	6	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

11:15 to 12:15	105	4	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

11:30 to 12:30	104	6	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

11:45 to 12:45	99	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

12:00 to 13:00		110	11	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

12:15 to 13:15		113	13	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

12:30 to 13:30		104	13	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

12:45 to 13:45		115	13	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

13:00 to 14:00		144	10	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

13:15 to 14:15		188	27	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

13:30 to 14:30		215	36	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

13:45 to 14:45	212	35	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

14:00 to 15:00	199	36	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

14:15 to 15:15	220	18	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

14:30 to 15:30	264	17	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

14:45 to 15:45	269	14	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

15:00 to 16:00	264	13	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

15:15 to 16:15	230	14	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

15:30 to 16:30	195	12	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

15:45 to 16:45	232	14	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

16:00 to 17:00	245	14	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

16:15 to 17:15	232	15	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

16:30 to 17:30	217	19	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

16:45 to 17:45	186	25	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

17:00 to 18:00	180	27	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

17:15 to 18:15		163		21		No	No	No	No
Condition A	Volume >= 70% column (350)?	No		Volume >= 70% column (525)?	No				
	Volume >= 56% column (280)?	No		Volume >= 56% column (420)?	No				
Condition B	Volume >= 70% column (525)?	No		Volume >= 70% column (53)?	No				
	Volume >= 56% column (420)?	No		Volume >= 56% column (42)?	No				

17:30 to 18:30		159		19		No	No	No	No
Condition A	Volume >= 70% column (350)?	No		Volume >= 70% column (525)?	No				
	Volume >= 56% column (280)?	No		Volume >= 56% column (420)?	No				
Condition B	Volume >= 70% column (525)?	No		Volume >= 70% column (53)?	No				
	Volume >= 56% column (420)?	No		Volume >= 56% column (42)?	No				

17:45 to 18:45		150		15		No	No	No	No
Condition A	Volume >= 70% column (350)?	No		Volume >= 70% column (525)?	No				
	Volume >= 56% column (280)?	No		Volume >= 56% column (420)?	No				
Condition B	Volume >= 70% column (525)?	No		Volume >= 70% column (53)?	No				
	Volume >= 56% column (420)?	No		Volume >= 56% column (42)?	No				

18:00 to 19:00		153		14		No	No	No	No
Condition A	Volume >= 70% column (350)?	No		Volume >= 70% column (525)?	No				
	Volume >= 56% column (280)?	No		Volume >= 56% column (420)?	No				
Condition B	Volume >= 70% column (525)?	No		Volume >= 70% column (53)?	No				
	Volume >= 56% column (420)?	No		Volume >= 56% column (42)?	No				

18:15 to 19:15		145		15		No	No	No	No
Condition A	Volume >= 70% column (350)?	No		Volume >= 70% column (525)?	No				
	Volume >= 56% column (280)?	No		Volume >= 56% column (420)?	No				
Condition B	Volume >= 70% column (525)?	No		Volume >= 70% column (53)?	No				
	Volume >= 56% column (420)?	No		Volume >= 56% column (42)?	No				

18:30 to 19:30		145		15		No	No	No	No
Condition A	Volume >= 70% column (350)?	No		Volume >= 70% column (525)?	No				
	Volume >= 56% column (280)?	No		Volume >= 56% column (420)?	No				
Condition B	Volume >= 70% column (525)?	No		Volume >= 70% column (53)?	No				
	Volume >= 56% column (420)?	No		Volume >= 56% column (42)?	No				

18:45 to 19:45		143		10		No	No	No	No
Condition A	Volume >= 70% column (350)?	No		Volume >= 70% column (525)?	No				
	Volume >= 56% column (280)?	No		Volume >= 56% column (420)?	No				
Condition B	Volume >= 70% column (525)?	No		Volume >= 70% column (53)?	No				
	Volume >= 56% column (420)?	No		Volume >= 56% column (42)?	No				

19:00 to 20:00		130	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

19:15 to 20:15		147	9	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

19:30 to 20:30		141	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

19:45 to 20:45		129	9	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

20:00 to 21:00		106	8	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

20:15 to 21:15		91	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

20:30 to 21:30		81	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

20:45 to 21:45		71	6	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

21:00 to 22:00		71	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

21:15 to 22:15		64	4	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

21:30 to 22:30		55	3	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

21:45 to 22:45		49	2	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

22:00 to 23:00		40	2	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

22:15 to 23:15		35	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

22:30 to 23:30		32	2	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

22:45 to 23:45		28	2	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

23:00 to 00:00		24	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

23:15 to 00:15		15	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

23:30 to 00:30		8	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

23:45 to 00:45		6	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

All-Way Stop Control Warrant: Multiway Stop Applications

1: 6th Ave and Quincy St

Intersection Information

Major Street Name: Eucalyptus St

Major Street Direction: EB/WB

Minor Street Direction: SB

AWSC WARRANT MET?

No

Details:

Condition A Met?	No	Qualifying Crashes	0
Condition B Met?	No	Major Street 85th %-tile Speed	0.00
Condition C Met?	No	Major Street Speed Limit	45
Notes: 0 Hours Met (8 Required)			

Hour	Traffic Volumes		Bicycle Volumes		Ped Volumes		Condition C		
	Major Street	Minor Street	East Bound Bicycle Volumes	North Bound Bicycle Volumes	East Bound Ped Volumes	North Bound Ped Volumes	Major Street	Minor Street	
							Veh Vol > 210	Avg(Veh + Ped + Bicycle) > 200	Delay > 30

Warrants Summary Report PM 2023+Project

1: Topaz Rd and Eucalyptus St

Intersection Information

	Major Street	Minor Street
Street Name	Eucalyptus St	Topaz Rd
Direction	EB/WB	NB/SB
Number of Lane:	1	1
Approach Speed	45	40

Warrant	Met?	Notes
Warrant 1, Eight-Hour Vehicular Volume		
	No	
Condition A or B Met?	No	0 Hours met (8 required)
Condition A and B Met?	No	0 Hours met (8 required)
Warrant 2, Four-Hour Vehicular Volume		
	No	0 Hours met (4 required)
Warrant 3, Peak Hour		
	No	
Condition A Met?	No	0 Hours met (1 required)
Condition B Met?	No	0 Hours met (1 required)
Warrant 4, Pedestrian Volume		
	No	
Condition A Met?	No	0 Hours met (4 required)
Condition B Met?	No	0 Hours met (1 required)
Warrant 5, School Crossing		
	No	

Warrant 6, Coordinated Signal System☐ No**Warrant 7, Crash Experience**☐ NoTraffic Volume Condi ☐ No 0 Hours met (8 required)Ped Condition? ☐ No 0 Hours met (8 required)**Warrant 8, Roadway Network**☐ No**Warrant 9, Intersection Near a Grade Crossing**☐ No**AWSC Warrant, Multiway Stop Application**☐ NoCondition A Met? ☐ NoCondition B Met? ☐ NoCondition C Met? ☐ No**BicycleWarrant**☐ No

0 Hours met (1 required)

Warrant 1: Eight-hour Vehicular Volume

1: 6th Ave and Quincy St

Intersection Information

Major Street Name: 6th Ave

Major Street Direction: EB/WB

Minor Street Direction: NB/SB

WARRANT 1 MET? **No**

Details:

Condition A Met? **No** 0 Hours met (8 required)

Condition B Met? **No** 0 Hours met (8 required)

Hour	Major Street Vehicles (Total of Both Approaches)	High Volume Minor Approach Vehicles	70% Standard Met? Cond. A OR Cond. B		56% Standard Met? Cond. A AND Cond. B	
			Condition A 70% Column	Condition B 70% Column	Condition A 56% Column	Condition B 56% Column
00:00 to 01:00	6	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		
00:15 to 01:15	7	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		
00:30 to 01:30	7	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		
00:45 to 01:45	6	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

03:15 to 04:15		15	0	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

03:30 to 04:30		16	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

03:45 to 04:45		13	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

04:00 to 05:00		20	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

04:15 to 05:15		22	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

04:30 to 05:30		29	3	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

04:45 to 05:45		40	4	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

05:00 to 06:00		53	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

05:15 to 06:15		59	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

05:30 to 06:30		64	6	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

05:45 to 06:45		81	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

06:00 to 07:00		83	8	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

06:15 to 07:15		98	9	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

06:30 to 07:30		131	10	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

06:45 to 07:45		219		21		No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No					
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No					
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No					
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No					

07:00 to 08:00		326		42		No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No					
	Volume >= 56% column (280)?	Yes	Volume >= 56% column (420)?	No					
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No					
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	Yes					

07:15 to 08:15		337		45		No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No					
	Volume >= 56% column (280)?	Yes	Volume >= 56% column (420)?	No					
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No					
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	Yes					

07:30 to 08:30		322		44		No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No					
	Volume >= 56% column (280)?	Yes	Volume >= 56% column (420)?	No					
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No					
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	Yes					

07:45 to 08:45		233		31		No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No					
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No					
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No					
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No					

08:00 to 09:00		121		10		No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No					
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No					
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No					
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No					

08:15 to 09:15		105		6		No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No					
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No					
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No					
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No					

08:30 to 09:30		90	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

08:45 to 09:45		71	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

09:00 to 10:00		73	8	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

09:15 to 10:15		75	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

09:30 to 10:30		82	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

09:45 to 10:45		89	4	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

10:00 to 11:00		83	3	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

10:15 to 11:15	79	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

10:30 to 11:30	84	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

10:45 to 11:45	100	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

11:00 to 12:00	102	6	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

11:15 to 12:15	105	4	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

11:30 to 12:30	104	6	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

11:45 to 12:45	99	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

12:00 to 13:00		110	11	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

12:15 to 13:15		113	13	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

12:30 to 13:30		104	13	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

12:45 to 13:45		115	13	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

13:00 to 14:00		144	10	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

13:15 to 14:15		188	27	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

13:30 to 14:30		215	36	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

13:45 to 14:45	212	35	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

14:00 to 15:00	199	36	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

14:15 to 15:15	220	18	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

14:30 to 15:30	264	17	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

14:45 to 15:45	269	14	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

15:00 to 16:00	264	13	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

15:15 to 16:15	230	14	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

15:30 to 16:30		195	12	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

15:45 to 16:45		232	14	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

16:00 to 17:00		245	14	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

16:15 to 17:15		232	15	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

16:30 to 17:30		217	19	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

16:45 to 17:45		186	25	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

17:00 to 18:00		180	27	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

17:15 to 18:15		163		21		No	No	No	No
Condition A	Volume >= 70% column (350)?	No		Volume >= 70% column (525)?	No				
	Volume >= 56% column (280)?	No		Volume >= 56% column (420)?	No				
Condition B	Volume >= 70% column (525)?	No		Volume >= 70% column (53)?	No				
	Volume >= 56% column (420)?	No		Volume >= 56% column (42)?	No				

17:30 to 18:30		159		19		No	No	No	No
Condition A	Volume >= 70% column (350)?	No		Volume >= 70% column (525)?	No				
	Volume >= 56% column (280)?	No		Volume >= 56% column (420)?	No				
Condition B	Volume >= 70% column (525)?	No		Volume >= 70% column (53)?	No				
	Volume >= 56% column (420)?	No		Volume >= 56% column (42)?	No				

17:45 to 18:45		150		15		No	No	No	No
Condition A	Volume >= 70% column (350)?	No		Volume >= 70% column (525)?	No				
	Volume >= 56% column (280)?	No		Volume >= 56% column (420)?	No				
Condition B	Volume >= 70% column (525)?	No		Volume >= 70% column (53)?	No				
	Volume >= 56% column (420)?	No		Volume >= 56% column (42)?	No				

18:00 to 19:00		153		14		No	No	No	No
Condition A	Volume >= 70% column (350)?	No		Volume >= 70% column (525)?	No				
	Volume >= 56% column (280)?	No		Volume >= 56% column (420)?	No				
Condition B	Volume >= 70% column (525)?	No		Volume >= 70% column (53)?	No				
	Volume >= 56% column (420)?	No		Volume >= 56% column (42)?	No				

18:15 to 19:15		145		15		No	No	No	No
Condition A	Volume >= 70% column (350)?	No		Volume >= 70% column (525)?	No				
	Volume >= 56% column (280)?	No		Volume >= 56% column (420)?	No				
Condition B	Volume >= 70% column (525)?	No		Volume >= 70% column (53)?	No				
	Volume >= 56% column (420)?	No		Volume >= 56% column (42)?	No				

18:30 to 19:30		145		15		No	No	No	No
Condition A	Volume >= 70% column (350)?	No		Volume >= 70% column (525)?	No				
	Volume >= 56% column (280)?	No		Volume >= 56% column (420)?	No				
Condition B	Volume >= 70% column (525)?	No		Volume >= 70% column (53)?	No				
	Volume >= 56% column (420)?	No		Volume >= 56% column (42)?	No				

18:45 to 19:45		143		10		No	No	No	No
Condition A	Volume >= 70% column (350)?	No		Volume >= 70% column (525)?	No				
	Volume >= 56% column (280)?	No		Volume >= 56% column (420)?	No				
Condition B	Volume >= 70% column (525)?	No		Volume >= 70% column (53)?	No				
	Volume >= 56% column (420)?	No		Volume >= 56% column (42)?	No				

19:00 to 20:00		130	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

19:15 to 20:15		147	9	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

19:30 to 20:30		141	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

19:45 to 20:45		129	9	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

20:00 to 21:00		106	8	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

20:15 to 21:15		91	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

20:30 to 21:30		81	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

20:45 to 21:45		71	6	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

21:00 to 22:00		71	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

21:15 to 22:15		64	4	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

21:30 to 22:30		55	3	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

21:45 to 22:45		49	2	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

22:00 to 23:00		40	2	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

22:15 to 23:15		35	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

22:30 to 23:30		32	2	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

22:45 to 23:45		28	2	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

23:00 to 00:00		24	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

23:15 to 00:15		15	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

23:30 to 00:30		8	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

23:45 to 00:45		6	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

All-Way Stop Control Warrant: Multiway Stop Applications

1: 6th Ave and Quincy St

Intersection Information

Major Street Name: Eucalyptus St

Major Street Direction: EB/WB

Minor Street Direction: SB

AWSC WARRANT MET?

No

Details:

Condition A Met?	No	Qualifying Crashes	0
Condition B Met?	No	Major Street 85th %-tile Speed	0.00
Condition C Met?	No	Major Street Speed Limit	45
Notes: 0 Hours Met (8 Required)			

Hour	Traffic Volumes		Bicycle Volumes		Ped Volumes		Condition C		
	Major Street	Minor Street	East Bound Bicycle Volumes	North Bound Bicycle Volumes	East Bound Ped Volumes	North Bound Ped Volumes	Major Street	Minor Street	
							Veh Vol > 210	Avg(Veh + Ped + Bicycle) > 200	Delay > 30

Warrants Summary Report PM 2030

1: Topaz Rd and Eucalyptus St

Intersection Information

	Major Street	Minor Street
Street Name	Eucalyptus St	Topaz Rd
Direction	EB/WB	SB
Number of Lane:	1	1
Approach Speed	45	40

Warrant	Met?	Notes
Warrant 1, Eight-Hour Vehicular Volume		
	No	
Condition A or B Met?	No	0 Hours met (8 required)
Condition A and B Met?	No	0 Hours met (8 required)
Warrant 2, Four-Hour Vehicular Volume		
	No	0 Hours met (4 required)
Warrant 3, Peak Hour		
	No	
Condition A Met?	No	0 Hours met (1 required)
Condition B Met?	No	0 Hours met (1 required)
Warrant 4, Pedestrian Volume		
	No	
Condition A Met?	No	0 Hours met (4 required)
Condition B Met?	No	0 Hours met (1 required)
Warrant 5, School Crossing		
	No	

Warrant 6, Coordinated Signal System☐ No**Warrant 7, Crash Experience**☐ NoTraffic Volume Condi ☐ No 0 Hours met (8 required)Ped Condition? ☐ No 0 Hours met (8 required)**Warrant 8, Roadway Network**☐ No**Warrant 9, Intersection Near a Grade Crossing**☐ No**AWSC Warrant, Multiway Stop Application**☐ NoCondition A Met? ☐ NoCondition B Met? ☐ NoCondition C Met? ☐ No**BicycleWarrant**☐ No

0 Hours met (1 required)

Warrant 1: Eight-hour Vehicular Volume

1: 6th Ave and Quincy St

Intersection Information

Major Street Name: 6th Ave

Major Street Direction: EB/WB

Minor Street Direction: NB/SB

WARRANT 1 MET? No

Details:

Condition A Met? No 0 Hours met (8 required)

Condition B Met? No 0 Hours met (8 required)

Hour	Major Street Vehicles (Total of Both Approaches)	High Volume Minor Approach Vehicles	70% Standard Met? Cond. A OR Cond. B		56% Standard Met? Cond. A AND Cond. B	
			Condition A 70% Column	Condition B 70% Column	Condition A 56% Column	Condition B 56% Column
00:00 to 01:00	6	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	Volume >= 70% column (525)?	No	No		
	Volume >= 56% column (280)?	Volume >= 56% column (420)?	No	No		
Condition B	Volume >= 70% column (525)?	Volume >= 70% column (53)?	No	No		
	Volume >= 56% column (420)?	Volume >= 56% column (42)?	No	No		
00:15 to 01:15	7	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	Volume >= 70% column (525)?	No	No		
	Volume >= 56% column (280)?	Volume >= 56% column (420)?	No	No		
Condition B	Volume >= 70% column (525)?	Volume >= 70% column (53)?	No	No		
	Volume >= 56% column (420)?	Volume >= 56% column (42)?	No	No		
00:30 to 01:30	7	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	Volume >= 70% column (525)?	No	No		
	Volume >= 56% column (280)?	Volume >= 56% column (420)?	No	No		
Condition B	Volume >= 70% column (525)?	Volume >= 70% column (53)?	No	No		
	Volume >= 56% column (420)?	Volume >= 56% column (42)?	No	No		
00:45 to 01:45	6	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	Volume >= 70% column (525)?	No	No		
	Volume >= 56% column (280)?	Volume >= 56% column (420)?	No	No		
Condition B	Volume >= 70% column (525)?	Volume >= 70% column (53)?	No	No		
	Volume >= 56% column (420)?	Volume >= 56% column (42)?	No	No		

03:15 to 04:15		15	0	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

03:30 to 04:30		16	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

03:45 to 04:45		13	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

04:00 to 05:00		20	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

04:15 to 05:15		22	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

04:30 to 05:30		29	3	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

04:45 to 05:45		40	4	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

05:00 to 06:00		53	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

05:15 to 06:15		59	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

05:30 to 06:30		64	6	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

05:45 to 06:45		81	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

06:00 to 07:00		83	8	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

06:15 to 07:15		98	9	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

06:30 to 07:30		131	10	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

06:45 to 07:45		219		21		No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No					
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No					
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No					
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No					

07:00 to 08:00		326		42		No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No					
	Volume >= 56% column (280)?	Yes	Volume >= 56% column (420)?	No					
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No					
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	Yes					

07:15 to 08:15		337		45		No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No					
	Volume >= 56% column (280)?	Yes	Volume >= 56% column (420)?	No					
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No					
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	Yes					

07:30 to 08:30		322		44		No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No					
	Volume >= 56% column (280)?	Yes	Volume >= 56% column (420)?	No					
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No					
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	Yes					

07:45 to 08:45		233		31		No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No					
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No					
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No					
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No					

08:00 to 09:00		121		10		No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No					
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No					
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No					
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No					

08:15 to 09:15		105		6		No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No					
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No					
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No					
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No					

08:30 to 09:30		90	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

08:45 to 09:45		71	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

09:00 to 10:00		73	8	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

09:15 to 10:15		75	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

09:30 to 10:30		82	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

09:45 to 10:45		89	4	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

10:00 to 11:00		83	3	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

10:15 to 11:15	79	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

10:30 to 11:30	84	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

10:45 to 11:45	100	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

11:00 to 12:00	102	6	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

11:15 to 12:15	105	4	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

11:30 to 12:30	104	6	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

11:45 to 12:45	99	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

12:00 to 13:00		110	11	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

12:15 to 13:15		113	13	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

12:30 to 13:30		104	13	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

12:45 to 13:45		115	13	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

13:00 to 14:00		144	10	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

13:15 to 14:15		188	27	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

13:30 to 14:30		215	36	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

13:45 to 14:45	212	35	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

14:00 to 15:00	199	36	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

14:15 to 15:15	220	18	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

14:30 to 15:30	264	17	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

14:45 to 15:45	269	14	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

15:00 to 16:00	264	13	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

15:15 to 16:15	230	14	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

15:30 to 16:30		195	12	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

15:45 to 16:45		232	14	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

16:00 to 17:00		245	14	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

16:15 to 17:15		232	15	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

16:30 to 17:30		217	19	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

16:45 to 17:45		186	25	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

17:00 to 18:00		180	27	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

17:15 to 18:15		163	21	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

17:30 to 18:30		159	19	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

17:45 to 18:45		150	15	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

18:00 to 19:00		153	14	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

18:15 to 19:15		145	15	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

18:30 to 19:30		145	15	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

18:45 to 19:45		143	10	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

19:00 to 20:00		130	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

19:15 to 20:15		147	9	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

19:30 to 20:30		141	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

19:45 to 20:45		129	9	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

20:00 to 21:00		106	8	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

20:15 to 21:15		91	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

20:30 to 21:30		81	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

20:45 to 21:45		71	6	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

21:00 to 22:00		71	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

21:15 to 22:15		64	4	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

21:30 to 22:30		55	3	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

21:45 to 22:45		49	2	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

22:00 to 23:00		40	2	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

22:15 to 23:15		35	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

22:30 to 23:30		32	2	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

22:45 to 23:45		28	2	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

23:00 to 00:00		24	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

23:15 to 00:15		15	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

23:30 to 00:30		8	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

23:45 to 00:45		6	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

All-Way Stop Control Warrant: Multiway Stop Applications

1: 6th Ave and Quincy St

Intersection Information

Major Street Name: Eucalyptus St

Major Street Direction: EB/WB

Minor Street Direction: SB

AWSC WARRANT MET?

No

Details:

Condition A Met?	No	Qualifying Crashes	0
Condition B Met?	No	Major Street 85th %-tile Speed	0.00
Condition C Met?	No	Major Street Speed Limit	45
Notes: 0 Hours Met (8 Required)			

Hour	Traffic Volumes		Bicycle Volumes		Ped Volumes		Condition C		
	Major Street	Minor Street	East Bound Bicycle Volumes	North Bound Bicycle Volumes	East Bound Ped Volumes	North Bound Ped Volumes	Major Street	Minor Street	
							Veh Vol > 210	Avg(Veh + Ped + Bicycle) > 200	Delay > 30

Warrants Summary Report PM 2030+Project

1: Topaz Rd and Eucalyptus St

Intersection Information

	Major Street	Minor Street
Street Name	Eucalyptus St	Topaz Rd
Direction	EB/WB	NB/SB
Number of Lane:	1	1
Approach Speed	45	40

Warrant	Met?	Notes
Warrant 1, Eight-Hour Vehicular Volume		
	No	
Condition A or B Met?	No	0 Hours met (8 required)
Condition A and B Met?	No	0 Hours met (8 required)
Warrant 2, Four-Hour Vehicular Volume		
	No	0 Hours met (4 required)
Warrant 3, Peak Hour		
	No	
Condition A Met?	No	0 Hours met (1 required)
Condition B Met?	No	0 Hours met (1 required)
Warrant 4, Pedestrian Volume		
	No	
Condition A Met?	No	0 Hours met (4 required)
Condition B Met?	No	0 Hours met (1 required)
Warrant 5, School Crossing		
	No	

Warrant 6, Coordinated Signal System☐ No**Warrant 7, Crash Experience**☐ NoTraffic Volume Condi ☐ No 0 Hours met (8 required)Ped Condition? ☐ No 0 Hours met (8 required)**Warrant 8, Roadway Network**☐ No**Warrant 9, Intersection Near a Grade Crossing**☐ No**AWSC Warrant, Multiway Stop Application**☐ NoCondition A Met? ☐ NoCondition B Met? ☐ NoCondition C Met? ☐ No**BicycleWarrant**☐ No

0 Hours met (1 required)

Warrant 1: Eight-hour Vehicular Volume

1: 6th Ave and Quincy St

Intersection Information

Major Street Name: 6th Ave

Major Street Direction: EB/WB

Minor Street Direction: NB/SB

WARRANT 1 MET? **No**

Details:

Condition A Met? **No** 0 Hours met (8 required)

Condition B Met? **No** 0 Hours met (8 required)

Hour	Major Street Vehicles (Total of Both Approaches)	High Volume Minor Approach Vehicles	70% Standard Met? Cond. A OR Cond. B		56% Standard Met? Cond. A AND Cond. B	
			Condition A 70% Column	Condition B 70% Column	Condition A 56% Column	Condition B 56% Column
00:00 to 01:00	6	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		
00:15 to 01:15	7	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		
00:30 to 01:30	7	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		
00:45 to 01:45	6	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

03:15 to 04:15		15	0	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

03:30 to 04:30		16	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

03:45 to 04:45		13	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

04:00 to 05:00		20	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

04:15 to 05:15		22	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

04:30 to 05:30		29	3	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

04:45 to 05:45		40	4	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

05:00 to 06:00		53	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

05:15 to 06:15		59	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

05:30 to 06:30		64	6	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

05:45 to 06:45		81	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

06:00 to 07:00		83	8	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

06:15 to 07:15		98	9	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

06:30 to 07:30		131	10	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

06:45 to 07:45		219	21	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

07:00 to 08:00		326	42	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	Yes	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	Yes			

07:15 to 08:15		337	45	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	Yes	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	Yes			

07:30 to 08:30		322	44	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	Yes	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	Yes			

07:45 to 08:45		233	31	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

08:00 to 09:00		121	10	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

08:15 to 09:15		105	6	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

08:30 to 09:30		90	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

08:45 to 09:45		71	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

09:00 to 10:00		73	8	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

09:15 to 10:15		75	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

09:30 to 10:30		82	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

09:45 to 10:45		89	4	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

10:00 to 11:00		83	3	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

10:15 to 11:15	79	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

10:30 to 11:30	84	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

10:45 to 11:45	100	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

11:00 to 12:00	102	6	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

11:15 to 12:15	105	4	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

11:30 to 12:30	104	6	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

11:45 to 12:45	99	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

12:00 to 13:00		110	11	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

12:15 to 13:15		113	13	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

12:30 to 13:30		104	13	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

12:45 to 13:45		115	13	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

13:00 to 14:00		144	10	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

13:15 to 14:15		188	27	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

13:30 to 14:30		215	36	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

13:45 to 14:45		212	35	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

14:00 to 15:00		199	36	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

14:15 to 15:15		220	18	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

14:30 to 15:30		264	17	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

14:45 to 15:45		269	14	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

15:00 to 16:00		264	13	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

15:15 to 16:15		230	14	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

15:30 to 16:30	195	12	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

15:45 to 16:45	232	14	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

16:00 to 17:00	245	14	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

16:15 to 17:15	232	15	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

16:30 to 17:30	217	19	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

16:45 to 17:45	186	25	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

17:00 to 18:00	180	27	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

17:15 to 18:15		163		21		No	No	No	No
Condition A	Volume >= 70% column (350)?	No		Volume >= 70% column (525)?	No				
	Volume >= 56% column (280)?	No		Volume >= 56% column (420)?	No				
Condition B	Volume >= 70% column (525)?	No		Volume >= 70% column (53)?	No				
	Volume >= 56% column (420)?	No		Volume >= 56% column (42)?	No				

17:30 to 18:30		159		19		No	No	No	No
Condition A	Volume >= 70% column (350)?	No		Volume >= 70% column (525)?	No				
	Volume >= 56% column (280)?	No		Volume >= 56% column (420)?	No				
Condition B	Volume >= 70% column (525)?	No		Volume >= 70% column (53)?	No				
	Volume >= 56% column (420)?	No		Volume >= 56% column (42)?	No				

17:45 to 18:45		150		15		No	No	No	No
Condition A	Volume >= 70% column (350)?	No		Volume >= 70% column (525)?	No				
	Volume >= 56% column (280)?	No		Volume >= 56% column (420)?	No				
Condition B	Volume >= 70% column (525)?	No		Volume >= 70% column (53)?	No				
	Volume >= 56% column (420)?	No		Volume >= 56% column (42)?	No				

18:00 to 19:00		153		14		No	No	No	No
Condition A	Volume >= 70% column (350)?	No		Volume >= 70% column (525)?	No				
	Volume >= 56% column (280)?	No		Volume >= 56% column (420)?	No				
Condition B	Volume >= 70% column (525)?	No		Volume >= 70% column (53)?	No				
	Volume >= 56% column (420)?	No		Volume >= 56% column (42)?	No				

18:15 to 19:15		145		15		No	No	No	No
Condition A	Volume >= 70% column (350)?	No		Volume >= 70% column (525)?	No				
	Volume >= 56% column (280)?	No		Volume >= 56% column (420)?	No				
Condition B	Volume >= 70% column (525)?	No		Volume >= 70% column (53)?	No				
	Volume >= 56% column (420)?	No		Volume >= 56% column (42)?	No				

18:30 to 19:30		145		15		No	No	No	No
Condition A	Volume >= 70% column (350)?	No		Volume >= 70% column (525)?	No				
	Volume >= 56% column (280)?	No		Volume >= 56% column (420)?	No				
Condition B	Volume >= 70% column (525)?	No		Volume >= 70% column (53)?	No				
	Volume >= 56% column (420)?	No		Volume >= 56% column (42)?	No				

18:45 to 19:45		143		10		No	No	No	No
Condition A	Volume >= 70% column (350)?	No		Volume >= 70% column (525)?	No				
	Volume >= 56% column (280)?	No		Volume >= 56% column (420)?	No				
Condition B	Volume >= 70% column (525)?	No		Volume >= 70% column (53)?	No				
	Volume >= 56% column (420)?	No		Volume >= 56% column (42)?	No				

19:00 to 20:00		130	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

19:15 to 20:15		147	9	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

19:30 to 20:30		141	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

19:45 to 20:45		129	9	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

20:00 to 21:00		106	8	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

20:15 to 21:15		91	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

20:30 to 21:30		81	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

20:45 to 21:45		71	6	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

21:00 to 22:00		71	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

21:15 to 22:15		64	4	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

21:30 to 22:30		55	3	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

21:45 to 22:45		49	2	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

22:00 to 23:00		40	2	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

22:15 to 23:15		35	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

22:30 to 23:30		32	2	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

22:45 to 23:45		28	2	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

23:00 to 00:00		24	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

23:15 to 00:15		15	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

23:30 to 00:30		8	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

23:45 to 00:45		6	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

All-Way Stop Control Warrant: Multiway Stop Applications

1: 6th Ave and Quincy St

Intersection Information

Major Street Name: Eucalyptus St

Major Street Direction: EB/WB

Minor Street Direction: SB

AWSC WARRANT MET?

No

Details:

Condition A Met?	No	Qualifying Crashes	0
Condition B Met?	No	Major Street 85th %-tile Speed	0.00
Condition C Met?	No	Major Street Speed Limit	45
Notes: 0 Hours Met (8 Required)			

Hour	Traffic Volumes		Bicycle Volumes		Ped Volumes		Condition C		
	Major Street	Minor Street	East Bound Bicycle Volumes	North Bound Bicycle Volumes	East Bound Ped Volumes	North Bound Ped Volumes	Major Street	Minor Street	
							Veh Vol > 210	Avg(Veh + Ped + Bicycle) > 200	Delay > 30

Warrants Summary Report PM 2040

1: Topaz Rd and Eucalyptus St

Intersection Information

	Major Street	Minor Street
Street Name	Eucalyptus St	Topaz Rd
Direction	EB/WB	SB
Number of Lane	1	1
Approach Speed	45	40

Warrant	Met?	Notes
Warrant 1, Eight-Hour Vehicular Volume		
	No	
Condition A or B Met?	No	0 Hours met (8 required)
Condition A and B Met?	No	0 Hours met (8 required)
Warrant 2, Four-Hour Vehicular Volume		
	No	0 Hours met (4 required)
Warrant 3, Peak Hour		
	No	
Condition A Met?	No	0 Hours met (1 required)
Condition B Met?	No	0 Hours met (1 required)
Warrant 4, Pedestrian Volume		
	No	
Condition A Met?	No	0 Hours met (4 required)
Condition B Met?	No	0 Hours met (1 required)
Warrant 5, School Crossing		
	No	

Warrant 6, Coordinated Signal System☐ No**Warrant 7, Crash Experience**☐ NoTraffic Volume Condi ☐ No 0 Hours met (8 required)Ped Condition? ☐ No 0 Hours met (8 required)**Warrant 8, Roadway Network**☐ No**Warrant 9, Intersection Near a Grade Crossing**☐ No**AWSC Warrant, Multiway Stop Application**☐ NoCondition A Met? ☐ NoCondition B Met? ☐ NoCondition C Met? ☐ No**BicycleWarrant**☐ No

0 Hours met (1 required)

Warrant 1: Eight-hour Vehicular Volume

1: 6th Ave and Quincy St

Intersection Information

Major Street Name: 6th Ave

Major Street Direction: EB/WB

Minor Street Direction: NB/SB

WARRANT 1 MET? **No**

Details:

Condition A Met? **No** 0 Hours met (8 required)

Condition B Met? **No** 0 Hours met (8 required)

Hour	Major Street Vehicles (Total of Both Approaches)	High Volume Minor Approach Vehicles	70% Standard Met? Cond. A OR Cond. B		56% Standard Met? Cond. A AND Cond. B	
			Condition A 70% Column	Condition B 70% Column	Condition A 56% Column	Condition B 56% Column
00:00 to 01:00	6	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		
00:15 to 01:15	7	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		
00:30 to 01:30	7	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		
00:45 to 01:45	6	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

03:15 to 04:15		15	0	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

03:30 to 04:30		16	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

03:45 to 04:45		13	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

04:00 to 05:00		20	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

04:15 to 05:15		22	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

04:30 to 05:30		29	3	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

04:45 to 05:45		40	4	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

05:00 to 06:00		53	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

05:15 to 06:15		59	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

05:30 to 06:30		64	6	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

05:45 to 06:45		81	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

06:00 to 07:00		83	8	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

06:15 to 07:15		98	9	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

06:30 to 07:30		131	10	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

06:45 to 07:45		219	21	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

07:00 to 08:00		326	42	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	Yes	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	Yes			

07:15 to 08:15		337	45	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	Yes	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	Yes			

07:30 to 08:30		322	44	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	Yes	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	Yes			

07:45 to 08:45		233	31	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

08:00 to 09:00		121	10	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

08:15 to 09:15		105	6	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

08:30 to 09:30		90	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

08:45 to 09:45		71	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

09:00 to 10:00		73	8	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

09:15 to 10:15		75	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

09:30 to 10:30		82	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

09:45 to 10:45		89	4	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

10:00 to 11:00		83	3	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

10:15 to 11:15	79	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

10:30 to 11:30	84	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

10:45 to 11:45	100	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

11:00 to 12:00	102	6	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

11:15 to 12:15	105	4	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

11:30 to 12:30	104	6	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

11:45 to 12:45	99	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

12:00 to 13:00		110	11	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

12:15 to 13:15		113	13	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

12:30 to 13:30		104	13	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

12:45 to 13:45		115	13	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

13:00 to 14:00		144	10	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

13:15 to 14:15		188	27	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

13:30 to 14:30		215	36	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

13:45 to 14:45	212	35	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

14:00 to 15:00	199	36	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

14:15 to 15:15	220	18	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

14:30 to 15:30	264	17	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

14:45 to 15:45	269	14	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

15:00 to 16:00	264	13	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

15:15 to 16:15	230	14	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

15:30 to 16:30		195	12	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

15:45 to 16:45		232	14	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

16:00 to 17:00		245	14	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

16:15 to 17:15		232	15	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

16:30 to 17:30		217	19	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

16:45 to 17:45		186	25	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

17:00 to 18:00		180	27	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

17:15 to 18:15		163		21		No	No	No	No
Condition A	Volume >= 70% column (350)?	No		Volume >= 70% column (525)?	No				
	Volume >= 56% column (280)?	No		Volume >= 56% column (420)?	No				
Condition B	Volume >= 70% column (525)?	No		Volume >= 70% column (53)?	No				
	Volume >= 56% column (420)?	No		Volume >= 56% column (42)?	No				

17:30 to 18:30		159		19		No	No	No	No
Condition A	Volume >= 70% column (350)?	No		Volume >= 70% column (525)?	No				
	Volume >= 56% column (280)?	No		Volume >= 56% column (420)?	No				
Condition B	Volume >= 70% column (525)?	No		Volume >= 70% column (53)?	No				
	Volume >= 56% column (420)?	No		Volume >= 56% column (42)?	No				

17:45 to 18:45		150		15		No	No	No	No
Condition A	Volume >= 70% column (350)?	No		Volume >= 70% column (525)?	No				
	Volume >= 56% column (280)?	No		Volume >= 56% column (420)?	No				
Condition B	Volume >= 70% column (525)?	No		Volume >= 70% column (53)?	No				
	Volume >= 56% column (420)?	No		Volume >= 56% column (42)?	No				

18:00 to 19:00		153		14		No	No	No	No
Condition A	Volume >= 70% column (350)?	No		Volume >= 70% column (525)?	No				
	Volume >= 56% column (280)?	No		Volume >= 56% column (420)?	No				
Condition B	Volume >= 70% column (525)?	No		Volume >= 70% column (53)?	No				
	Volume >= 56% column (420)?	No		Volume >= 56% column (42)?	No				

18:15 to 19:15		145		15		No	No	No	No
Condition A	Volume >= 70% column (350)?	No		Volume >= 70% column (525)?	No				
	Volume >= 56% column (280)?	No		Volume >= 56% column (420)?	No				
Condition B	Volume >= 70% column (525)?	No		Volume >= 70% column (53)?	No				
	Volume >= 56% column (420)?	No		Volume >= 56% column (42)?	No				

18:30 to 19:30		145		15		No	No	No	No
Condition A	Volume >= 70% column (350)?	No		Volume >= 70% column (525)?	No				
	Volume >= 56% column (280)?	No		Volume >= 56% column (420)?	No				
Condition B	Volume >= 70% column (525)?	No		Volume >= 70% column (53)?	No				
	Volume >= 56% column (420)?	No		Volume >= 56% column (42)?	No				

18:45 to 19:45		143		10		No	No	No	No
Condition A	Volume >= 70% column (350)?	No		Volume >= 70% column (525)?	No				
	Volume >= 56% column (280)?	No		Volume >= 56% column (420)?	No				
Condition B	Volume >= 70% column (525)?	No		Volume >= 70% column (53)?	No				
	Volume >= 56% column (420)?	No		Volume >= 56% column (42)?	No				

19:00 to 20:00		130	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

19:15 to 20:15		147	9	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

19:30 to 20:30		141	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

19:45 to 20:45		129	9	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

20:00 to 21:00		106	8	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

20:15 to 21:15		91	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

20:30 to 21:30		81	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

20:45 to 21:45		71	6	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

21:00 to 22:00		71	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

21:15 to 22:15		64	4	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

21:30 to 22:30		55	3	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

21:45 to 22:45		49	2	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

22:00 to 23:00		40	2	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

22:15 to 23:15		35	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

22:30 to 23:30		32	2	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

22:45 to 23:45		28	2	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

23:00 to 00:00		24	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

23:15 to 00:15		15	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

23:30 to 00:30		8	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

23:45 to 00:45		6	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

All-Way Stop Control Warrant: Multiway Stop Applications

1: 6th Ave and Quincy St

Intersection Information

Major Street Name: Eucalyptus St

Major Street Direction: EB/WB

Minor Street Direction: SB

AWSC WARRANT MET?

No

Details:

Condition A Met?	No	Qualifying Crashes	0
Condition B Met?	No	Major Street 85th %-tile Speed	0.00
Condition C Met?	No	Major Street Speed Limit	45
Notes: 0 Hours Met (8 Required)			

Hour	Traffic Volumes		Bicycle Volumes		Ped Volumes		Condition C		
	Major Street	Minor Street	East Bound Bicycle Volumes	North Bound Bicycle Volumes	East Bound Ped Volumes	North Bound Ped Volumes	Major Street	Minor Street	
							Veh Vol > 210	Avg(Veh + Ped + Bicycle) > 200	Delay > 30

Warrants Summary Report PM 2040+Project

1: Topaz Rd and Eucalyptus St

Intersection Information

	Major Street	Minor Street
Street Name	Eucalyptus St	Topaz Rd
Direction	EB/WB	NB/SB
Number of Lane	1	1
Approach Speed	45	40

Warrant	Met?	Notes
Warrant 1, Eight-Hour Vehicular Volume		
	No	
Condition A or B Met?	No	0 Hours met (8 required)
Condition A and B Met?	No	0 Hours met (8 required)
Warrant 2, Four-Hour Vehicular Volume		
	No	0 Hours met (4 required)
Warrant 3, Peak Hour		
	No	
Condition A Met?	No	0 Hours met (1 required)
Condition B Met?	No	0 Hours met (1 required)
Warrant 4, Pedestrian Volume		
	No	
Condition A Met?	No	0 Hours met (4 required)
Condition B Met?	No	0 Hours met (1 required)
Warrant 5, School Crossing		
	No	

Warrant 6, Coordinated Signal System☐ No**Warrant 7, Crash Experience**☐ NoTraffic Volume Condi ☐ No 0 Hours met (8 required)Ped Condition? ☐ No 0 Hours met (8 required)**Warrant 8, Roadway Network**☐ No**Warrant 9, Intersection Near a Grade Crossing**☐ No**AWSC Warrant, Multiway Stop Application**☐ NoCondition A Met? ☐ NoCondition B Met? ☐ NoCondition C Met? ☐ No**BicycleWarrant**☐ No

0 Hours met (1 required)

Warrant 1: Eight-hour Vehicular Volume

1: 6th Ave and Quincy St

Intersection Information

Major Street Name: 6th Ave

Major Street Direction: EB/WB

Minor Street Direction: NB/SB

WARRANT 1 MET? **No**

Details:

Condition A Met? **No** 0 Hours met (8 required)

Condition B Met? **No** 0 Hours met (8 required)

Hour	Major Street Vehicles (Total of Both Approaches)	High Volume Minor Approach Vehicles	70% Standard Met? Cond. A OR Cond. B		56% Standard Met? Cond. A AND Cond. B	
			Condition A 70% Column	Condition B 70% Column	Condition A 56% Column	Condition B 56% Column
00:00 to 01:00	6	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		
00:15 to 01:15	7	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		
00:30 to 01:30	7	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		
00:45 to 01:45	6	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

03:15 to 04:15		15	0	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

03:30 to 04:30		16	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

03:45 to 04:45		13	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

04:00 to 05:00		20	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

04:15 to 05:15		22	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

04:30 to 05:30		29	3	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

04:45 to 05:45		40	4	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

05:00 to 06:00		53	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

05:15 to 06:15		59	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

05:30 to 06:30		64	6	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

05:45 to 06:45		81	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

06:00 to 07:00		83	8	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

06:15 to 07:15		98	9	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

06:30 to 07:30		131	10	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

06:45 to 07:45		219		21		No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No					
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No					
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No					
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No					

07:00 to 08:00		326		42		No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No					
	Volume >= 56% column (280)?	Yes	Volume >= 56% column (420)?	No					
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No					
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	Yes					

07:15 to 08:15		337		45		No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No					
	Volume >= 56% column (280)?	Yes	Volume >= 56% column (420)?	No					
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No					
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	Yes					

07:30 to 08:30		322		44		No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No					
	Volume >= 56% column (280)?	Yes	Volume >= 56% column (420)?	No					
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No					
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	Yes					

07:45 to 08:45		233		31		No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No					
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No					
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No					
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No					

08:00 to 09:00		121		10		No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No					
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No					
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No					
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No					

08:15 to 09:15		105		6		No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No					
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No					
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No					
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No					

08:30 to 09:30		90	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

08:45 to 09:45		71	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

09:00 to 10:00		73	8	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

09:15 to 10:15		75	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

09:30 to 10:30		82	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

09:45 to 10:45		89	4	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

10:00 to 11:00		83	3	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

10:15 to 11:15	79	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

10:30 to 11:30	84	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

10:45 to 11:45	100	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

11:00 to 12:00	102	6	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

11:15 to 12:15	105	4	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

11:30 to 12:30	104	6	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

11:45 to 12:45	99	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

12:00 to 13:00		110	11	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

12:15 to 13:15		113	13	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

12:30 to 13:30		104	13	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

12:45 to 13:45		115	13	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

13:00 to 14:00		144	10	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

13:15 to 14:15		188	27	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

13:30 to 14:30		215	36	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

13:45 to 14:45	212	35	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

14:00 to 15:00	199	36	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

14:15 to 15:15	220	18	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

14:30 to 15:30	264	17	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

14:45 to 15:45	269	14	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

15:00 to 16:00	264	13	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

15:15 to 16:15	230	14	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

15:30 to 16:30	195	12	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

15:45 to 16:45	232	14	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

16:00 to 17:00	245	14	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

16:15 to 17:15	232	15	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

16:30 to 17:30	217	19	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

16:45 to 17:45	186	25	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

17:00 to 18:00	180	27	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

17:15 to 18:15	163	21	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

17:30 to 18:30	159	19	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

17:45 to 18:45	150	15	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

18:00 to 19:00	153	14	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

18:15 to 19:15	145	15	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

18:30 to 19:30	145	15	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

18:45 to 19:45	143	10	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

19:00 to 20:00		130	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

19:15 to 20:15		147	9	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

19:30 to 20:30		141	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

19:45 to 20:45		129	9	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

20:00 to 21:00		106	8	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

20:15 to 21:15		91	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

20:30 to 21:30		81	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

20:45 to 21:45		71	6	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

21:00 to 22:00		71	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

21:15 to 22:15		64	4	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

21:30 to 22:30		55	3	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

21:45 to 22:45		49	2	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

22:00 to 23:00		40	2	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

22:15 to 23:15		35	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

22:30 to 23:30		32	2	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

22:45 to 23:45		28	2	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

23:00 to 00:00		24	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

23:15 to 00:15		15	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

23:30 to 00:30		8	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

23:45 to 00:45		6	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

All-Way Stop Control Warrant: Multiway Stop Applications

1: 6th Ave and Quincy St

Intersection Information

Major Street Name: Eucalyptus St

Major Street Direction: EB/WB

Minor Street Direction: SB

AWSC WARRANT MET?

No

Details:

Condition A Met?	No	Qualifying Crashes	0
Condition B Met?	No	Major Street 85th %-tile Speed	0.00
Condition C Met?	No	Major Street Speed Limit	45
Notes: 0 Hours Met (8 Required)			

Hour	Traffic Volumes		Bicycle Volumes		Ped Volumes		Condition C		
	Major Street	Minor Street	East Bound Bicycle Volumes	North Bound Bicycle Volumes	East Bound Ped Volumes	North Bound Ped Volumes	Major Street	Minor Street	
							Veh Vol > 210	Avg(Veh + Ped + Bicycle) > 200	Delay > 30

Warrants Summary Report AM 2023

1: Topaz Rd and Eucalyptus St

Intersection Information

	Major Street	Minor Street
Street Name	Eucalyptus St	Topaz Rd
Direction	EB/WB	SB
Number of Lane:	1	1
Approach Speed	45	40

Warrant	Met?	Notes
Warrant 1, Eight-Hour Vehicular Volume		
	No	
Condition A or B Met?	No	0 Hours met (8 required)
Condition A and B Met?	No	0 Hours met (8 required)
Warrant 2, Four-Hour Vehicular Volume		
	No	0 Hours met (4 required)
Warrant 3, Peak Hour		
	No	
Condition A Met?	No	0 Hours met (1 required)
Condition B Met?	No	0 Hours met (1 required)
Warrant 4, Pedestrian Volume		
	No	
Condition A Met?	No	0 Hours met (4 required)
Condition B Met?	No	0 Hours met (1 required)
Warrant 5, School Crossing		
	No	

Warrant 6, Coordinated Signal System☐ No**Warrant 7, Crash Experience**☐ NoTraffic Volume Condi ☐ No 0 Hours met (8 required)Ped Condition? ☐ No 0 Hours met (8 required)**Warrant 8, Roadway Network**☐ No**Warrant 9, Intersection Near a Grade Crossing**☐ No**AWSC Warrant, Multiway Stop Application**☐ NoCondition A Met? ☐ NoCondition B Met? ☐ NoCondition C Met? ☐ No**BicycleWarrant**☐ No

0 Hours met (1 required)

Warrant 1: Eight-hour Vehicular Volume

1: 6th Ave and Quincy St

Intersection Information

Major Street Name: 6th Ave

Major Street Direction: EB/WB

Minor Street Direction: NB/SB

WARRANT 1 MET? **No**

Details:

Condition A Met? **No** 0 Hours met (8 required)

Condition B Met? **No** 0 Hours met (8 required)

Hour	Major Street Vehicles (Total of Both Approaches)	High Volume Minor Approach Vehicles	70% Standard Met? Cond. A OR Cond. B		56% Standard Met? Cond. A AND Cond. B	
			Condition A 70% Column	Condition B 70% Column	Condition A 56% Column	Condition B 56% Column
00:00 to 01:00	6	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		
00:15 to 01:15	7	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		
00:30 to 01:30	7	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		
00:45 to 01:45	6	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

03:15 to 04:15		15	0	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

03:30 to 04:30		16	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

03:45 to 04:45		13	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

04:00 to 05:00		20	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

04:15 to 05:15		22	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

04:30 to 05:30		29	3	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

04:45 to 05:45		40	4	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

05:00 to 06:00		53	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

05:15 to 06:15		59	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

05:30 to 06:30		64	6	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

05:45 to 06:45		81	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

06:00 to 07:00		83	8	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

06:15 to 07:15		98	9	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

06:30 to 07:30		131	10	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

06:45 to 07:45		219	21	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

07:00 to 08:00		326	42	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	Yes	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	Yes			

07:15 to 08:15		337	45	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	Yes	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	Yes			

07:30 to 08:30		322	44	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	Yes	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	Yes			

07:45 to 08:45		233	31	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

08:00 to 09:00		121	10	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

08:15 to 09:15		105	6	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

08:30 to 09:30		90	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

08:45 to 09:45		71	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

09:00 to 10:00		73	8	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

09:15 to 10:15		75	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

09:30 to 10:30		82	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

09:45 to 10:45		89	4	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

10:00 to 11:00		83	3	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

10:15 to 11:15	79	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

10:30 to 11:30	84	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

10:45 to 11:45	100	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

11:00 to 12:00	102	6	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

11:15 to 12:15	105	4	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

11:30 to 12:30	104	6	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

11:45 to 12:45	99	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

12:00 to 13:00		110	11	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

12:15 to 13:15		113	13	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

12:30 to 13:30		104	13	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

12:45 to 13:45		115	13	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

13:00 to 14:00		144	10	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

13:15 to 14:15		188	27	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

13:30 to 14:30		215	36	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

13:45 to 14:45	212	35	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

14:00 to 15:00	199	36	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

14:15 to 15:15	220	18	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

14:30 to 15:30	264	17	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

14:45 to 15:45	269	14	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

15:00 to 16:00	264	13	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

15:15 to 16:15	230	14	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

15:30 to 16:30		195	12	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

15:45 to 16:45		232	14	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

16:00 to 17:00		245	14	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

16:15 to 17:15		232	15	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

16:30 to 17:30		217	19	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

16:45 to 17:45		186	25	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

17:00 to 18:00		180	27	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

17:15 to 18:15	163	21	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

17:30 to 18:30	159	19	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

17:45 to 18:45	150	15	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

18:00 to 19:00	153	14	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

18:15 to 19:15	145	15	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

18:30 to 19:30	145	15	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

18:45 to 19:45	143	10	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

19:00 to 20:00		130	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

19:15 to 20:15		147	9	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

19:30 to 20:30		141	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

19:45 to 20:45		129	9	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

20:00 to 21:00		106	8	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

20:15 to 21:15		91	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

20:30 to 21:30		81	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

20:45 to 21:45		71	6	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

21:00 to 22:00		71	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

21:15 to 22:15		64	4	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

21:30 to 22:30		55	3	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

21:45 to 22:45		49	2	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

22:00 to 23:00		40	2	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

22:15 to 23:15		35	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

22:30 to 23:30		32	2	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

22:45 to 23:45		28	2	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

23:00 to 00:00		24	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

23:15 to 00:15		15	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

23:30 to 00:30		8	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

23:45 to 00:45		6	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

All-Way Stop Control Warrant: Multiway Stop Applications

1: 6th Ave and Quincy St

Intersection Information

Major Street Name: Eucalyptus St

Major Street Direction: EB/WB

Minor Street Direction: SB

AWSC WARRANT MET?

No

Details:

Condition A Met?	No	Qualifying Crashes	0
Condition B Met?	No	Major Street 85th %-tile Speed	0.00
Condition C Met?	No	Major Street Speed Limit	45
Notes: 0 Hours Met (8 Required)			

Hour	Traffic Volumes		Bicycle Volumes		Ped Volumes		Condition C		
	Major Street	Minor Street	East Bound Bicycle Volumes	North Bound Bicycle Volumes	East Bound Ped Volumes	North Bound Ped Volumes	Major Street	Minor Street	
							Veh Vol > 210	Avg(Veh + Ped + Bicycle) > 200	Delay > 30

Warrants Summary Report AM 2023+Project

1: Topaz Rd and Eucalyptus St

Intersection Information

	Major Street	Minor Street
Street Name	Eucalyptus St	Topaz Rd
Direction	EB/WB	NB/SB
Number of Lane:	1	1
Approach Speed	45	40

Warrant	Met?	Notes
Warrant 1, Eight-Hour Vehicular Volume		
	No	
Condition A or B Met?	No	0 Hours met (8 required)
Condition A and B Met?	No	0 Hours met (8 required)
Warrant 2, Four-Hour Vehicular Volume		
	No	0 Hours met (4 required)
Warrant 3, Peak Hour		
	No	
Condition A Met?	No	0 Hours met (1 required)
Condition B Met?	No	0 Hours met (1 required)
Warrant 4, Pedestrian Volume		
	No	
Condition A Met?	No	0 Hours met (4 required)
Condition B Met?	No	0 Hours met (1 required)
Warrant 5, School Crossing		
	No	

Warrant 6, Coordinated Signal System**Warrant 7, Crash Experience**Traffic Volume Condi 0 Hours met (8 required)Ped Condition? 0 Hours met (8 required)**Warrant 8, Roadway Network****Warrant 9, Intersection Near a Grade Crossing****AWSC Warrant, Multiway Stop Application**Condition A Met? Condition B Met? Condition C Met? **BicycleWarrant**

0 Hours met (1 required)

Warrant 1: Eight-hour Vehicular Volume

1: 6th Ave and Quincy St

Intersection Information

Major Street Name: 6th Ave

Major Street Direction: EB/WB

Minor Street Direction: NB/SB

WARRANT 1 MET? No

Details:

Condition A Met? No 0 Hours met (8 required)

Condition B Met? No 0 Hours met (8 required)

Hour	Major Street Vehicles (Total of Both Approaches)	High Volume Minor Approach Vehicles	70% Standard Met? Cond. A OR Cond. B		56% Standard Met? Cond. A AND Cond. B	
			Condition A 70% Column	Condition B 70% Column	Condition A 56% Column	Condition B 56% Column
00:00 to 01:00	6	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		
00:15 to 01:15	7	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		
00:30 to 01:30	7	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		
00:45 to 01:45	6	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

03:15 to 04:15		15	0	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

03:30 to 04:30		16	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

03:45 to 04:45		13	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

04:00 to 05:00		20	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

04:15 to 05:15		22	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

04:30 to 05:30		29	3	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

04:45 to 05:45		40	4	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

05:00 to 06:00		53	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

05:15 to 06:15		59	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

05:30 to 06:30		64	6	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

05:45 to 06:45		81	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

06:00 to 07:00		83	8	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

06:15 to 07:15		98	9	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

06:30 to 07:30		131	10	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

06:45 to 07:45		219		21		No	No	No	No
Condition A	Volume >= 70% column (350)?	No		Volume >= 70% column (525)?	No				
	Volume >= 56% column (280)?	No		Volume >= 56% column (420)?	No				
Condition B	Volume >= 70% column (525)?	No		Volume >= 70% column (53)?	No				
	Volume >= 56% column (420)?	No		Volume >= 56% column (42)?	No				

07:00 to 08:00		326		42		No	No	No	No
Condition A	Volume >= 70% column (350)?	No		Volume >= 70% column (525)?	No				
	Volume >= 56% column (280)?	Yes		Volume >= 56% column (420)?	No				
Condition B	Volume >= 70% column (525)?	No		Volume >= 70% column (53)?	No				
	Volume >= 56% column (420)?	No		Volume >= 56% column (42)?	Yes				

07:15 to 08:15		337		45		No	No	No	No
Condition A	Volume >= 70% column (350)?	No		Volume >= 70% column (525)?	No				
	Volume >= 56% column (280)?	Yes		Volume >= 56% column (420)?	No				
Condition B	Volume >= 70% column (525)?	No		Volume >= 70% column (53)?	No				
	Volume >= 56% column (420)?	No		Volume >= 56% column (42)?	Yes				

07:30 to 08:30		322		44		No	No	No	No
Condition A	Volume >= 70% column (350)?	No		Volume >= 70% column (525)?	No				
	Volume >= 56% column (280)?	Yes		Volume >= 56% column (420)?	No				
Condition B	Volume >= 70% column (525)?	No		Volume >= 70% column (53)?	No				
	Volume >= 56% column (420)?	No		Volume >= 56% column (42)?	Yes				

07:45 to 08:45		233		31		No	No	No	No
Condition A	Volume >= 70% column (350)?	No		Volume >= 70% column (525)?	No				
	Volume >= 56% column (280)?	No		Volume >= 56% column (420)?	No				
Condition B	Volume >= 70% column (525)?	No		Volume >= 70% column (53)?	No				
	Volume >= 56% column (420)?	No		Volume >= 56% column (42)?	No				

08:00 to 09:00		121		10		No	No	No	No
Condition A	Volume >= 70% column (350)?	No		Volume >= 70% column (525)?	No				
	Volume >= 56% column (280)?	No		Volume >= 56% column (420)?	No				
Condition B	Volume >= 70% column (525)?	No		Volume >= 70% column (53)?	No				
	Volume >= 56% column (420)?	No		Volume >= 56% column (42)?	No				

08:15 to 09:15		105		6		No	No	No	No
Condition A	Volume >= 70% column (350)?	No		Volume >= 70% column (525)?	No				
	Volume >= 56% column (280)?	No		Volume >= 56% column (420)?	No				
Condition B	Volume >= 70% column (525)?	No		Volume >= 70% column (53)?	No				
	Volume >= 56% column (420)?	No		Volume >= 56% column (42)?	No				

08:30 to 09:30		90	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

08:45 to 09:45		71	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

09:00 to 10:00		73	8	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

09:15 to 10:15		75	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

09:30 to 10:30		82	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

09:45 to 10:45		89	4	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

10:00 to 11:00		83	3	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

10:15 to 11:15	79	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

10:30 to 11:30	84	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

10:45 to 11:45	100	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

11:00 to 12:00	102	6	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

11:15 to 12:15	105	4	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

11:30 to 12:30	104	6	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

11:45 to 12:45	99	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

12:00 to 13:00		110	11	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

12:15 to 13:15		113	13	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

12:30 to 13:30		104	13	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

12:45 to 13:45		115	13	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

13:00 to 14:00		144	10	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

13:15 to 14:15		188	27	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

13:30 to 14:30		215	36	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

13:45 to 14:45	212	35	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

14:00 to 15:00	199	36	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

14:15 to 15:15	220	18	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

14:30 to 15:30	264	17	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

14:45 to 15:45	269	14	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

15:00 to 16:00	264	13	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

15:15 to 16:15	230	14	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

15:30 to 16:30		195	12	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

15:45 to 16:45		232	14	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

16:00 to 17:00		245	14	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

16:15 to 17:15		232	15	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

16:30 to 17:30		217	19	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

16:45 to 17:45		186	25	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

17:00 to 18:00		180	27	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

17:15 to 18:15		163	21	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

17:30 to 18:30		159	19	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

17:45 to 18:45		150	15	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

18:00 to 19:00		153	14	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

18:15 to 19:15		145	15	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

18:30 to 19:30		145	15	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

18:45 to 19:45		143	10	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

19:00 to 20:00		130	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

19:15 to 20:15		147	9	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

19:30 to 20:30		141	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

19:45 to 20:45		129	9	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

20:00 to 21:00		106	8	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

20:15 to 21:15		91	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

20:30 to 21:30		81	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

20:45 to 21:45		71	6	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

21:00 to 22:00		71	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

21:15 to 22:15		64	4	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

21:30 to 22:30		55	3	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

21:45 to 22:45		49	2	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

22:00 to 23:00		40	2	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

22:15 to 23:15		35	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

22:30 to 23:30		32	2	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

22:45 to 23:45		28	2	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

23:00 to 00:00		24	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

23:15 to 00:15		15	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

23:30 to 00:30		8	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

23:45 to 00:45		6	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

All-Way Stop Control Warrant: Multiway Stop Applications

1: 6th Ave and Quincy St

Intersection Information

Major Street Name: Eucalyptus St

Major Street Direction: EB/WB

Minor Street Direction: SB

AWSC WARRANT MET?

No

Details:

Condition A Met?	No	Qualifying Crashes	0
Condition B Met?	No	Major Street 85th %-tile Speed	0.00
Condition C Met?	No	Major Street Speed Limit	45
Notes: 0 Hours Met (8 Required)			

Hour	Traffic Volumes		Bicycle Volumes		Ped Volumes		Condition C		
	Major Street	Minor Street	East Bound Bicycle Volumes	North Bound Bicycle Volumes	East Bound Ped Volumes	North Bound Ped Volumes	Major Street	Minor Street	
							Veh Vol > 210	Avg(Veh + Ped + Bicycle) > 200	Delay > 30

Warrants Summary Report AM 2030

1: Topaz Rd and Eucalyptus St

Intersection Information

	Major Street	Minor Street
Street Name	Eucalyptus St	Topaz Rd
Direction	EB/WB	SB
Number of Lane:	1	1
Approach Speed	45	40

Warrant	Met?	Notes
Warrant 1, Eight-Hour Vehicular Volume		
	No	
Condition A or B Met?	No	0 Hours met (8 required)
Condition A and B Met?	No	0 Hours met (8 required)
Warrant 2, Four-Hour Vehicular Volume		
	No	0 Hours met (4 required)
Warrant 3, Peak Hour		
	No	
Condition A Met?	No	0 Hours met (1 required)
Condition B Met?	No	0 Hours met (1 required)
Warrant 4, Pedestrian Volume		
	No	
Condition A Met?	No	0 Hours met (4 required)
Condition B Met?	No	0 Hours met (1 required)
Warrant 5, School Crossing		
	No	

Warrant 6, Coordinated Signal System☐ No**Warrant 7, Crash Experience**☐ NoTraffic Volume Condi ☐ No 0 Hours met (8 required)Ped Condition? ☐ No 0 Hours met (8 required)**Warrant 8, Roadway Network**☐ No**Warrant 9, Intersection Near a Grade Crossing**☐ No**AWSC Warrant, Multiway Stop Application**☐ NoCondition A Met? ☐ NoCondition B Met? ☐ NoCondition C Met? ☐ No**BicycleWarrant**☐ No

0 Hours met (1 required)

Warrant 1: Eight-hour Vehicular Volume

1: 6th Ave and Quincy St

Intersection Information

Major Street Name: 6th Ave

Major Street Direction: EB/WB

Minor Street Direction: NB/SB

WARRANT 1 MET? No

Details:

Condition A Met? No 0 Hours met (8 required)

Condition B Met? No 0 Hours met (8 required)

Hour	Major Street Vehicles (Total of Both Approaches)	High Volume Minor Approach Vehicles	70% Standard Met? Cond. A OR Cond. B		56% Standard Met? Cond. A AND Cond. B	
			Condition A 70% Column	Condition B 70% Column	Condition A 56% Column	Condition B 56% Column
00:00 to 01:00	6	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	Volume >= 70% column (525)?	No	No		
	Volume >= 56% column (280)?	Volume >= 56% column (420)?	No	No		
Condition B	Volume >= 70% column (525)?	Volume >= 70% column (53)?	No	No		
	Volume >= 56% column (420)?	Volume >= 56% column (42)?	No	No		
00:15 to 01:15	7	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	Volume >= 70% column (525)?	No	No		
	Volume >= 56% column (280)?	Volume >= 56% column (420)?	No	No		
Condition B	Volume >= 70% column (525)?	Volume >= 70% column (53)?	No	No		
	Volume >= 56% column (420)?	Volume >= 56% column (42)?	No	No		
00:30 to 01:30	7	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	Volume >= 70% column (525)?	No	No		
	Volume >= 56% column (280)?	Volume >= 56% column (420)?	No	No		
Condition B	Volume >= 70% column (525)?	Volume >= 70% column (53)?	No	No		
	Volume >= 56% column (420)?	Volume >= 56% column (42)?	No	No		
00:45 to 01:45	6	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	Volume >= 70% column (525)?	No	No		
	Volume >= 56% column (280)?	Volume >= 56% column (420)?	No	No		
Condition B	Volume >= 70% column (525)?	Volume >= 70% column (53)?	No	No		
	Volume >= 56% column (420)?	Volume >= 56% column (42)?	No	No		

03:15 to 04:15		15	0	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

03:30 to 04:30		16	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

03:45 to 04:45		13	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

04:00 to 05:00		20	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

04:15 to 05:15		22	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

04:30 to 05:30		29	3	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

04:45 to 05:45		40	4	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

05:00 to 06:00		53	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

05:15 to 06:15		59	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

05:30 to 06:30		64	6	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

05:45 to 06:45		81	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

06:00 to 07:00		83	8	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

06:15 to 07:15		98	9	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

06:30 to 07:30		131	10	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

06:45 to 07:45		219		21		No	No	No	No
Condition A	Volume >= 70% column (350)?	No		Volume >= 70% column (525)?	No				
	Volume >= 56% column (280)?	No		Volume >= 56% column (420)?	No				
Condition B	Volume >= 70% column (525)?	No		Volume >= 70% column (53)?	No				
	Volume >= 56% column (420)?	No		Volume >= 56% column (42)?	No				

07:00 to 08:00		326		42		No	No	No	No
Condition A	Volume >= 70% column (350)?	No		Volume >= 70% column (525)?	No				
	Volume >= 56% column (280)?	Yes		Volume >= 56% column (420)?	No				
Condition B	Volume >= 70% column (525)?	No		Volume >= 70% column (53)?	No				
	Volume >= 56% column (420)?	No		Volume >= 56% column (42)?	Yes				

07:15 to 08:15		337		45		No	No	No	No
Condition A	Volume >= 70% column (350)?	No		Volume >= 70% column (525)?	No				
	Volume >= 56% column (280)?	Yes		Volume >= 56% column (420)?	No				
Condition B	Volume >= 70% column (525)?	No		Volume >= 70% column (53)?	No				
	Volume >= 56% column (420)?	No		Volume >= 56% column (42)?	Yes				

07:30 to 08:30		322		44		No	No	No	No
Condition A	Volume >= 70% column (350)?	No		Volume >= 70% column (525)?	No				
	Volume >= 56% column (280)?	Yes		Volume >= 56% column (420)?	No				
Condition B	Volume >= 70% column (525)?	No		Volume >= 70% column (53)?	No				
	Volume >= 56% column (420)?	No		Volume >= 56% column (42)?	Yes				

07:45 to 08:45		233		31		No	No	No	No
Condition A	Volume >= 70% column (350)?	No		Volume >= 70% column (525)?	No				
	Volume >= 56% column (280)?	No		Volume >= 56% column (420)?	No				
Condition B	Volume >= 70% column (525)?	No		Volume >= 70% column (53)?	No				
	Volume >= 56% column (420)?	No		Volume >= 56% column (42)?	No				

08:00 to 09:00		121		10		No	No	No	No
Condition A	Volume >= 70% column (350)?	No		Volume >= 70% column (525)?	No				
	Volume >= 56% column (280)?	No		Volume >= 56% column (420)?	No				
Condition B	Volume >= 70% column (525)?	No		Volume >= 70% column (53)?	No				
	Volume >= 56% column (420)?	No		Volume >= 56% column (42)?	No				

08:15 to 09:15		105		6		No	No	No	No
Condition A	Volume >= 70% column (350)?	No		Volume >= 70% column (525)?	No				
	Volume >= 56% column (280)?	No		Volume >= 56% column (420)?	No				
Condition B	Volume >= 70% column (525)?	No		Volume >= 70% column (53)?	No				
	Volume >= 56% column (420)?	No		Volume >= 56% column (42)?	No				

08:30 to 09:30		90	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

08:45 to 09:45		71	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

09:00 to 10:00		73	8	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

09:15 to 10:15		75	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

09:30 to 10:30		82	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

09:45 to 10:45		89	4	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

10:00 to 11:00		83	3	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

10:15 to 11:15	79	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

10:30 to 11:30	84	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

10:45 to 11:45	100	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

11:00 to 12:00	102	6	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

11:15 to 12:15	105	4	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

11:30 to 12:30	104	6	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

11:45 to 12:45	99	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

12:00 to 13:00		110	11	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

12:15 to 13:15		113	13	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

12:30 to 13:30		104	13	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

12:45 to 13:45		115	13	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

13:00 to 14:00		144	10	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

13:15 to 14:15		188	27	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

13:30 to 14:30		215	36	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

13:45 to 14:45		212	35	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

14:00 to 15:00		199	36	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

14:15 to 15:15		220	18	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

14:30 to 15:30		264	17	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

14:45 to 15:45		269	14	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

15:00 to 16:00		264	13	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

15:15 to 16:15		230	14	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

15:30 to 16:30		195	12	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

15:45 to 16:45		232	14	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

16:00 to 17:00		245	14	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

16:15 to 17:15		232	15	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

16:30 to 17:30		217	19	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

16:45 to 17:45		186	25	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

17:00 to 18:00		180	27	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

17:15 to 18:15		163	21	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

17:30 to 18:30		159	19	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

17:45 to 18:45		150	15	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

18:00 to 19:00		153	14	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

18:15 to 19:15		145	15	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

18:30 to 19:30		145	15	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

18:45 to 19:45		143	10	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

19:00 to 20:00		130	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

19:15 to 20:15		147	9	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

19:30 to 20:30		141	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

19:45 to 20:45		129	9	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

20:00 to 21:00		106	8	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

20:15 to 21:15		91	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

20:30 to 21:30		81	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

20:45 to 21:45		71	6	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

21:00 to 22:00		71	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

21:15 to 22:15		64	4	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

21:30 to 22:30		55	3	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

21:45 to 22:45		49	2	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

22:00 to 23:00		40	2	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

22:15 to 23:15		35	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

22:30 to 23:30		32	2	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

22:45 to 23:45		28	2	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

23:00 to 00:00		24	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

23:15 to 00:15		15	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

23:30 to 00:30		8	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

23:45 to 00:45		6	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

All-Way Stop Control Warrant: Multiway Stop Applications

1: 6th Ave and Quincy St

Intersection Information

Major Street Name: Eucalyptus St

Major Street Direction: EB/WB

Minor Street Direction: SB

AWSC WARRANT MET?

No

Details:

Condition A Met?	No	Qualifying Crashes	0
Condition B Met?	No	Major Street 85th %-tile Speed	0.00
Condition C Met?	No	Major Street Speed Limit	45
Notes: 0 Hours Met (8 Required)			

Hour	Traffic Volumes		Bicycle Volumes		Ped Volumes		Condition C		
	Major Street	Minor Street	East Bound Bicycle Volumes	North Bound Bicycle Volumes	East Bound Ped Volumes	North Bound Ped Volumes	Major Street	Minor Street	
							Veh Vol > 210	Avg(Veh + Ped + Bicycle) > 200	Delay > 30

Warrants Summary Report AM 2030+Project

1: Topaz Rd and Eucalyptus St

Intersection Information

	Major Street	Minor Street
Street Name	Eucalyptus St	Topaz Rd
Direction	EB/WB	NB/SB
Number of Lane	1	1
Approach Speed	45	40

Warrant	Met?	Notes
Warrant 1, Eight-Hour Vehicular Volume		
	No	
Condition A or B Met?	No	0 Hours met (8 required)
Condition A and B Met?	No	0 Hours met (8 required)
Warrant 2, Four-Hour Vehicular Volume		
	No	0 Hours met (4 required)
Warrant 3, Peak Hour		
	No	
Condition A Met?	No	0 Hours met (1 required)
Condition B Met?	No	0 Hours met (1 required)
Warrant 4, Pedestrian Volume		
	No	
Condition A Met?	No	0 Hours met (4 required)
Condition B Met?	No	0 Hours met (1 required)
Warrant 5, School Crossing		
	No	

Warrant 6, Coordinated Signal System☐ No**Warrant 7, Crash Experience**☐ NoTraffic Volume Condi ☐ No 0 Hours met (8 required)Ped Condition? ☐ No 0 Hours met (8 required)**Warrant 8, Roadway Network**☐ No**Warrant 9, Intersection Near a Grade Crossing**☐ No**AWSC Warrant, Multiway Stop Application**☐ NoCondition A Met? ☐ NoCondition B Met? ☐ NoCondition C Met? ☐ No**BicycleWarrant**☐ No

0 Hours met (1 required)

Warrant 1: Eight-hour Vehicular Volume

1: 6th Ave and Quincy St

Intersection Information

Major Street Name: 6th Ave

Major Street Direction: EB/WB

Minor Street Direction: NB/SB

WARRANT 1 MET? No

Details:

Condition A Met? No 0 Hours met (8 required)

Condition B Met? No 0 Hours met (8 required)

Hour	Major Street Vehicles (Total of Both Approaches)	High Volume Minor Approach Vehicles	70% Standard Met? Cond. A OR Cond. B		56% Standard Met? Cond. A AND Cond. B	
			Condition A 70% Column	Condition B 70% Column	Condition A 56% Column	Condition B 56% Column
00:00 to 01:00	6	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		
00:15 to 01:15	7	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		
00:30 to 01:30	7	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		
00:45 to 01:45	6	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

03:15 to 04:15		15	0	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

03:30 to 04:30		16	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

03:45 to 04:45		13	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

04:00 to 05:00		20	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

04:15 to 05:15		22	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

04:30 to 05:30		29	3	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

04:45 to 05:45		40	4	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

05:00 to 06:00		53	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

05:15 to 06:15		59	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

05:30 to 06:30		64	6	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

05:45 to 06:45		81	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

06:00 to 07:00		83	8	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

06:15 to 07:15		98	9	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

06:30 to 07:30		131	10	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

06:45 to 07:45		219	21	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

07:00 to 08:00		326	42	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	Yes	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	Yes			

07:15 to 08:15		337	45	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	Yes	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	Yes			

07:30 to 08:30		322	44	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	Yes	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	Yes			

07:45 to 08:45		233	31	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

08:00 to 09:00		121	10	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

08:15 to 09:15		105	6	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

08:30 to 09:30		90	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

08:45 to 09:45		71	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

09:00 to 10:00		73	8	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

09:15 to 10:15		75	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

09:30 to 10:30		82	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

09:45 to 10:45		89	4	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

10:00 to 11:00		83	3	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

10:15 to 11:15	79	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

10:30 to 11:30	84	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

10:45 to 11:45	100	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

11:00 to 12:00	102	6	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

11:15 to 12:15	105	4	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

11:30 to 12:30	104	6	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

11:45 to 12:45	99	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

12:00 to 13:00		110	11	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

12:15 to 13:15		113	13	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

12:30 to 13:30		104	13	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

12:45 to 13:45		115	13	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

13:00 to 14:00		144	10	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

13:15 to 14:15		188	27	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

13:30 to 14:30		215	36	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

13:45 to 14:45		212	35	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

14:00 to 15:00		199	36	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

14:15 to 15:15		220	18	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

14:30 to 15:30		264	17	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

14:45 to 15:45		269	14	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

15:00 to 16:00		264	13	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

15:15 to 16:15		230	14	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

15:30 to 16:30		195	12	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

15:45 to 16:45		232	14	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

16:00 to 17:00		245	14	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

16:15 to 17:15		232	15	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

16:30 to 17:30		217	19	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

16:45 to 17:45		186	25	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

17:00 to 18:00		180	27	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

17:15 to 18:15		163		21		No	No	No	No
Condition A	Volume >= 70% column (350)?	No		Volume >= 70% column (525)?	No				
	Volume >= 56% column (280)?	No		Volume >= 56% column (420)?	No				
Condition B	Volume >= 70% column (525)?	No		Volume >= 70% column (53)?	No				
	Volume >= 56% column (420)?	No		Volume >= 56% column (42)?	No				

17:30 to 18:30		159		19		No	No	No	No
Condition A	Volume >= 70% column (350)?	No		Volume >= 70% column (525)?	No				
	Volume >= 56% column (280)?	No		Volume >= 56% column (420)?	No				
Condition B	Volume >= 70% column (525)?	No		Volume >= 70% column (53)?	No				
	Volume >= 56% column (420)?	No		Volume >= 56% column (42)?	No				

17:45 to 18:45		150		15		No	No	No	No
Condition A	Volume >= 70% column (350)?	No		Volume >= 70% column (525)?	No				
	Volume >= 56% column (280)?	No		Volume >= 56% column (420)?	No				
Condition B	Volume >= 70% column (525)?	No		Volume >= 70% column (53)?	No				
	Volume >= 56% column (420)?	No		Volume >= 56% column (42)?	No				

18:00 to 19:00		153		14		No	No	No	No
Condition A	Volume >= 70% column (350)?	No		Volume >= 70% column (525)?	No				
	Volume >= 56% column (280)?	No		Volume >= 56% column (420)?	No				
Condition B	Volume >= 70% column (525)?	No		Volume >= 70% column (53)?	No				
	Volume >= 56% column (420)?	No		Volume >= 56% column (42)?	No				

18:15 to 19:15		145		15		No	No	No	No
Condition A	Volume >= 70% column (350)?	No		Volume >= 70% column (525)?	No				
	Volume >= 56% column (280)?	No		Volume >= 56% column (420)?	No				
Condition B	Volume >= 70% column (525)?	No		Volume >= 70% column (53)?	No				
	Volume >= 56% column (420)?	No		Volume >= 56% column (42)?	No				

18:30 to 19:30		145		15		No	No	No	No
Condition A	Volume >= 70% column (350)?	No		Volume >= 70% column (525)?	No				
	Volume >= 56% column (280)?	No		Volume >= 56% column (420)?	No				
Condition B	Volume >= 70% column (525)?	No		Volume >= 70% column (53)?	No				
	Volume >= 56% column (420)?	No		Volume >= 56% column (42)?	No				

18:45 to 19:45		143		10		No	No	No	No
Condition A	Volume >= 70% column (350)?	No		Volume >= 70% column (525)?	No				
	Volume >= 56% column (280)?	No		Volume >= 56% column (420)?	No				
Condition B	Volume >= 70% column (525)?	No		Volume >= 70% column (53)?	No				
	Volume >= 56% column (420)?	No		Volume >= 56% column (42)?	No				

19:00 to 20:00		130	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

19:15 to 20:15		147	9	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

19:30 to 20:30		141	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

19:45 to 20:45		129	9	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

20:00 to 21:00		106	8	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

20:15 to 21:15		91	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

20:30 to 21:30		81	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

20:45 to 21:45		71	6	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

21:00 to 22:00		71	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

21:15 to 22:15		64	4	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

21:30 to 22:30		55	3	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

21:45 to 22:45		49	2	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

22:00 to 23:00		40	2	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

22:15 to 23:15		35	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

22:30 to 23:30		32	2	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

22:45 to 23:45		28	2	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

23:00 to 00:00		24	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

23:15 to 00:15		15	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

23:30 to 00:30		8	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

23:45 to 00:45		6	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

All-Way Stop Control Warrant: Multiway Stop Applications

1: 6th Ave and Quincy St

Intersection Information

Major Street Name: Eucalyptus St

Major Street Direction: EB/WB

Minor Street Direction: SB

AWSC WARRANT MET?

No

Details:

Condition A Met?	No	Qualifying Crashes	0
Condition B Met?	No	Major Street 85th %-tile Speed	0.00
Condition C Met?	No	Major Street Speed Limit	45
Notes: 0 Hours Met (8 Required)			

Hour	Traffic Volumes		Bicycle Volumes		Ped Volumes		Condition C		
	Major Street	Minor Street	East Bound Bicycle Volumes	North Bound Bicycle Volumes	East Bound Ped Volumes	North Bound Ped Volumes	Major Street	Minor Street	
							Veh Vol > 210	Avg(Veh + Ped + Bicycle) > 200	Delay > 30

Warrants Summary Report AM 2040

1: Topaz Rd and Eucalyptus St

Intersection Information

	Major Street	Minor Street
Street Name	Eucalyptus St	Topaz Rd
Direction	EB/WB	NB/SB
Number of Lane:	1	1
Approach Speed	45	40

Warrant	Met?	Notes
Warrant 1, Eight-Hour Vehicular Volume		
	No	
Condition A or B Met?	No	0 Hours met (8 required)
Condition A and B Met?	No	0 Hours met (8 required)
Warrant 2, Four-Hour Vehicular Volume		
	No	0 Hours met (4 required)
Warrant 3, Peak Hour		
	No	
Condition A Met?	No	0 Hours met (1 required)
Condition B Met?	No	0 Hours met (1 required)
Warrant 4, Pedestrian Volume		
	No	
Condition A Met?	No	0 Hours met (4 required)
Condition B Met?	No	0 Hours met (1 required)
Warrant 5, School Crossing		
	No	

Warrant 6, Coordinated Signal System☐ No**Warrant 7, Crash Experience**☐ NoTraffic Volume Condi ☐ No 0 Hours met (8 required)Ped Condition? ☐ No 0 Hours met (8 required)**Warrant 8, Roadway Network**☐ No**Warrant 9, Intersection Near a Grade Crossing**☐ No**AWSC Warrant, Multiway Stop Application**☐ NoCondition A Met? ☐ NoCondition B Met? ☐ NoCondition C Met? ☐ No**BicycleWarrant**☐ No

0 Hours met (1 required)

Warrant 1: Eight-hour Vehicular Volume

1: 6th Ave and Quincy St

Intersection Information

Major Street Name: 6th Ave

Major Street Direction: EB/WB

Minor Street Direction: NB/SB

WARRANT 1 MET? **No**

Details:

Condition A Met? **No** 0 Hours met (8 required)

Condition B Met? **No** 0 Hours met (8 required)

Hour	Major Street Vehicles (Total of Both Approaches)	High Volume Minor Approach Vehicles	70% Standard Met? Cond. A OR Cond. B		56% Standard Met? Cond. A AND Cond. B	
			Condition A 70% Column	Condition B 70% Column	Condition A 56% Column	Condition B 56% Column
00:00 to 01:00	6	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		
00:15 to 01:15	7	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		
00:30 to 01:30	7	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		
00:45 to 01:45	6	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

03:15 to 04:15		15	0	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

03:30 to 04:30		16	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

03:45 to 04:45		13	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

04:00 to 05:00		20	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

04:15 to 05:15		22	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

04:30 to 05:30		29	3	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

04:45 to 05:45		40	4	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

05:00 to 06:00		53	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

05:15 to 06:15		59	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

05:30 to 06:30		64	6	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

05:45 to 06:45		81	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

06:00 to 07:00		83	8	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

06:15 to 07:15		98	9	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

06:30 to 07:30		131	10	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

06:45 to 07:45		219	21	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

07:00 to 08:00		326	42	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	Yes	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	Yes			

07:15 to 08:15		337	45	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	Yes	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	Yes			

07:30 to 08:30		322	44	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	Yes	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	Yes			

07:45 to 08:45		233	31	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

08:00 to 09:00		121	10	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

08:15 to 09:15		105	6	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

08:30 to 09:30		90	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

08:45 to 09:45		71	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

09:00 to 10:00		73	8	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

09:15 to 10:15		75	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

09:30 to 10:30		82	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

09:45 to 10:45		89	4	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

10:00 to 11:00		83	3	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

10:15 to 11:15	79	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

10:30 to 11:30	84	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

10:45 to 11:45	100	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

11:00 to 12:00	102	6	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

11:15 to 12:15	105	4	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

11:30 to 12:30	104	6	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

11:45 to 12:45	99	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

12:00 to 13:00		110	11	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

12:15 to 13:15		113	13	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

12:30 to 13:30		104	13	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

12:45 to 13:45		115	13	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

13:00 to 14:00		144	10	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

13:15 to 14:15		188	27	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

13:30 to 14:30		215	36	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

13:45 to 14:45	212	35	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

14:00 to 15:00	199	36	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

14:15 to 15:15	220	18	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

14:30 to 15:30	264	17	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

14:45 to 15:45	269	14	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

15:00 to 16:00	264	13	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

15:15 to 16:15	230	14	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

15:30 to 16:30		195	12	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

15:45 to 16:45		232	14	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

16:00 to 17:00		245	14	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

16:15 to 17:15		232	15	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

16:30 to 17:30		217	19	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

16:45 to 17:45		186	25	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

17:00 to 18:00		180	27	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

17:15 to 18:15		163		21		No	No	No	No
Condition A	Volume >= 70% column (350)?	No		Volume >= 70% column (525)?	No				
	Volume >= 56% column (280)?	No		Volume >= 56% column (420)?	No				
Condition B	Volume >= 70% column (525)?	No		Volume >= 70% column (53)?	No				
	Volume >= 56% column (420)?	No		Volume >= 56% column (42)?	No				

17:30 to 18:30		159		19		No	No	No	No
Condition A	Volume >= 70% column (350)?	No		Volume >= 70% column (525)?	No				
	Volume >= 56% column (280)?	No		Volume >= 56% column (420)?	No				
Condition B	Volume >= 70% column (525)?	No		Volume >= 70% column (53)?	No				
	Volume >= 56% column (420)?	No		Volume >= 56% column (42)?	No				

17:45 to 18:45		150		15		No	No	No	No
Condition A	Volume >= 70% column (350)?	No		Volume >= 70% column (525)?	No				
	Volume >= 56% column (280)?	No		Volume >= 56% column (420)?	No				
Condition B	Volume >= 70% column (525)?	No		Volume >= 70% column (53)?	No				
	Volume >= 56% column (420)?	No		Volume >= 56% column (42)?	No				

18:00 to 19:00		153		14		No	No	No	No
Condition A	Volume >= 70% column (350)?	No		Volume >= 70% column (525)?	No				
	Volume >= 56% column (280)?	No		Volume >= 56% column (420)?	No				
Condition B	Volume >= 70% column (525)?	No		Volume >= 70% column (53)?	No				
	Volume >= 56% column (420)?	No		Volume >= 56% column (42)?	No				

18:15 to 19:15		145		15		No	No	No	No
Condition A	Volume >= 70% column (350)?	No		Volume >= 70% column (525)?	No				
	Volume >= 56% column (280)?	No		Volume >= 56% column (420)?	No				
Condition B	Volume >= 70% column (525)?	No		Volume >= 70% column (53)?	No				
	Volume >= 56% column (420)?	No		Volume >= 56% column (42)?	No				

18:30 to 19:30		145		15		No	No	No	No
Condition A	Volume >= 70% column (350)?	No		Volume >= 70% column (525)?	No				
	Volume >= 56% column (280)?	No		Volume >= 56% column (420)?	No				
Condition B	Volume >= 70% column (525)?	No		Volume >= 70% column (53)?	No				
	Volume >= 56% column (420)?	No		Volume >= 56% column (42)?	No				

18:45 to 19:45		143		10		No	No	No	No
Condition A	Volume >= 70% column (350)?	No		Volume >= 70% column (525)?	No				
	Volume >= 56% column (280)?	No		Volume >= 56% column (420)?	No				
Condition B	Volume >= 70% column (525)?	No		Volume >= 70% column (53)?	No				
	Volume >= 56% column (420)?	No		Volume >= 56% column (42)?	No				

19:00 to 20:00		130	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

19:15 to 20:15		147	9	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

19:30 to 20:30		141	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

19:45 to 20:45		129	9	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

20:00 to 21:00		106	8	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

20:15 to 21:15		91	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

20:30 to 21:30		81	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

20:45 to 21:45		71	6	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

21:00 to 22:00		71	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

21:15 to 22:15		64	4	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

21:30 to 22:30		55	3	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

21:45 to 22:45		49	2	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

22:00 to 23:00		40	2	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

22:15 to 23:15		35	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

22:30 to 23:30		32	2	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

22:45 to 23:45		28	2	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

23:00 to 00:00		24	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

23:15 to 00:15		15	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

23:30 to 00:30		8	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

23:45 to 00:45		6	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

All-Way Stop Control Warrant: Multiway Stop Applications

1: 6th Ave and Quincy St

Intersection Information

Major Street Name: Eucalyptus St

Major Street Direction: EB/WB

Minor Street Direction: SB

AWSC WARRANT MET?

No

Details:

Condition A Met?	No	Qualifying Crashes	0
Condition B Met?	No	Major Street 85th %-tile Speed	0.00
Condition C Met?	No	Major Street Speed Limit	45
Notes: 0 Hours Met (8 Required)			

Hour	Traffic Volumes		Bicycle Volumes		Ped Volumes		Condition C		
	Major Street	Minor Street	East Bound Bicycle Volumes	North Bound Bicycle Volumes	East Bound Ped Volumes	North Bound Ped Volumes	Major Street	Minor Street	
							Veh Vol > 210	Avg(Veh + Ped + Bicycle) > 200	Delay > 30

Warrants Summary Report AM 2040+Project

1: Topaz Rd and Eucalyptus St

Intersection Information

	Major Street	Minor Street
Street Name	Eucalyptus St	Topaz Rd
Direction	EB/WB	NB/SB
Number of Lane:	1	1
Approach Speed	45	40

Warrant	Met?	Notes
Warrant 1, Eight-Hour Vehicular Volume		
	No	
Condition A or B Met?	No	0 Hours met (8 required)
Condition A and B Met?	No	0 Hours met (8 required)
Warrant 2, Four-Hour Vehicular Volume		
	No	0 Hours met (4 required)
Warrant 3, Peak Hour		
	No	
Condition A Met?	No	0 Hours met (1 required)
Condition B Met?	No	0 Hours met (1 required)
Warrant 4, Pedestrian Volume		
	No	
Condition A Met?	No	0 Hours met (4 required)
Condition B Met?	No	0 Hours met (1 required)
Warrant 5, School Crossing		
	No	

Warrant 6, Coordinated Signal System☐ No**Warrant 7, Crash Experience**☐ NoTraffic Volume Condi ☐ No 0 Hours met (8 required)Ped Condition? ☐ No 0 Hours met (8 required)**Warrant 8, Roadway Network**☐ No**Warrant 9, Intersection Near a Grade Crossing**☐ No**AWSC Warrant, Multiway Stop Application**☐ NoCondition A Met? ☐ NoCondition B Met? ☐ NoCondition C Met? ☐ No**BicycleWarrant**☐ No

0 Hours met (1 required)

Warrant 1: Eight-hour Vehicular Volume

1: 6th Ave and Quincy St

Intersection Information

Major Street Name: 6th Ave

Major Street Direction: EB/WB

Minor Street Direction: NB/SB

WARRANT 1 MET? **No**

Details:

Condition A Met? **No** 0 Hours met (8 required)

Condition B Met? **No** 0 Hours met (8 required)

Hour	Major Street Vehicles (Total of Both Approaches)	High Volume Minor Approach Vehicles	70% Standard Met? Cond. A OR Cond. B		56% Standard Met? Cond. A AND Cond. B	
			Condition A 70% Column	Condition B 70% Column	Condition A 56% Column	Condition B 56% Column
00:00 to 01:00	6	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		
00:15 to 01:15	7	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		
00:30 to 01:30	7	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		
00:45 to 01:45	6	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

03:15 to 04:15		15	0	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

03:30 to 04:30		16	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

03:45 to 04:45		13	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

04:00 to 05:00		20	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

04:15 to 05:15		22	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

04:30 to 05:30		29	3	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

04:45 to 05:45		40	4	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

05:00 to 06:00		53	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

05:15 to 06:15		59	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

05:30 to 06:30		64	6	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

05:45 to 06:45		81	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

06:00 to 07:00		83	8	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

06:15 to 07:15		98	9	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

06:30 to 07:30		131	10	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

06:45 to 07:45		219		21		No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No					
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No					
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No					
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No					

07:00 to 08:00		326		42		No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No					
	Volume >= 56% column (280)?	Yes	Volume >= 56% column (420)?	No					
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No					
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	Yes					

07:15 to 08:15		337		45		No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No					
	Volume >= 56% column (280)?	Yes	Volume >= 56% column (420)?	No					
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No					
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	Yes					

07:30 to 08:30		322		44		No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No					
	Volume >= 56% column (280)?	Yes	Volume >= 56% column (420)?	No					
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No					
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	Yes					

07:45 to 08:45		233		31		No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No					
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No					
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No					
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No					

08:00 to 09:00		121		10		No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No					
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No					
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No					
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No					

08:15 to 09:15		105		6		No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No					
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No					
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No					
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No					

08:30 to 09:30		90	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

08:45 to 09:45		71	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

09:00 to 10:00		73	8	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

09:15 to 10:15		75	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

09:30 to 10:30		82	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

09:45 to 10:45		89	4	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

10:00 to 11:00		83	3	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

10:15 to 11:15	79	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

10:30 to 11:30	84	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

10:45 to 11:45	100	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

11:00 to 12:00	102	6	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

11:15 to 12:15	105	4	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

11:30 to 12:30	104	6	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

11:45 to 12:45	99	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

12:00 to 13:00		110	11	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

12:15 to 13:15		113	13	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

12:30 to 13:30		104	13	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

12:45 to 13:45		115	13	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

13:00 to 14:00		144	10	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

13:15 to 14:15		188	27	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

13:30 to 14:30		215	36	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

13:45 to 14:45		212	35	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

14:00 to 15:00		199	36	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

14:15 to 15:15		220	18	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

14:30 to 15:30		264	17	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

14:45 to 15:45		269	14	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

15:00 to 16:00		264	13	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

15:15 to 16:15		230	14	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

15:30 to 16:30		195	12	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

15:45 to 16:45		232	14	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

16:00 to 17:00		245	14	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

16:15 to 17:15		232	15	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

16:30 to 17:30		217	19	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

16:45 to 17:45		186	25	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

17:00 to 18:00		180	27	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

17:15 to 18:15	163	21	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

17:30 to 18:30	159	19	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

17:45 to 18:45	150	15	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

18:00 to 19:00	153	14	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

18:15 to 19:15	145	15	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

18:30 to 19:30	145	15	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

18:45 to 19:45	143	10	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No		
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No		
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No		
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No		

19:00 to 20:00		130	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

19:15 to 20:15		147	9	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

19:30 to 20:30		141	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

19:45 to 20:45		129	9	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

20:00 to 21:00		106	8	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

20:15 to 21:15		91	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

20:30 to 21:30		81	7	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

20:45 to 21:45		71	6	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

21:00 to 22:00		71	5	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

21:15 to 22:15		64	4	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

21:30 to 22:30		55	3	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

21:45 to 22:45		49	2	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

22:00 to 23:00		40	2	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

22:15 to 23:15		35	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

22:30 to 23:30		32	2	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

22:45 to 23:45		28	2	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

23:00 to 00:00		24	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

23:15 to 00:15		15	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

23:30 to 00:30		8	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

23:45 to 00:45		6	1	No	No	No	No
Condition A	Volume >= 70% column (350)?	No	Volume >= 70% column (525)?	No			
	Volume >= 56% column (280)?	No	Volume >= 56% column (420)?	No			
Condition B	Volume >= 70% column (525)?	No	Volume >= 70% column (53)?	No			
	Volume >= 56% column (420)?	No	Volume >= 56% column (42)?	No			

All-Way Stop Control Warrant: Multiway Stop Applications

1: 6th Ave and Quincy St

Intersection Information

Major Street Name: Eucalyptus St

Major Street Direction: EB/WB

Minor Street Direction: SB

AWSC WARRANT MET?

No



























Details:

Condition A Met?	No	Qualifying Crashes	0
Condition B Met?	No	Major Street 85th %-tile Speed	0.00
Condition C Met?	No	Major Street Speed Limit	45
Notes: 0 Hours Met (8 Required)			

Hour	Traffic Volumes		Bicycle Volumes		Ped Volumes		Condition C		
	Major Street	Minor Street	East Bound Bicycle Volumes	North Bound Bicycle Volumes	East Bound Ped Volumes	North Bound Ped Volumes	Major Street	Minor Street	
							Veh Vol > 210	Avg(Veh + Ped + Bicycle) > 200	Delay > 30

HCM 6th Signalized Intersection Capacity Analysis
1: Topaz Rd & Bear Valley Rd

PM 2023
08/14/2023

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 						 	
Traffic Volume (veh/h)	48	499	8	100	563	145	14	32	88	119	45	31
Future Volume (veh/h)	48	499	8	100	563	145	14	32	88	119	45	31
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, 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	
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1723	1870	1723	1723	1870	1723	1723	1870	1723	1723	1870	1723
Adj Flow Rate, veh/h	52	542	9	109	612	158	15	35	96	129	49	34
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	99	986	405	534	1518	391	254	204	159	190	132	103
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
Prop Arrive On Green	0.06	0.28	0.28	0.33	0.54	0.52	0.15	0.11	0.11	0.12	0.07	0.07
Unsig. Movement Delay												
Ln Grp Delay, s/veh	46.7	30.9	24.5	22.8	13.4	13.7	33.6	38.0	43.1	44.3	43.0	28.0
Ln Grp LOS	D	C	C	C	B	B	C	D	D	D	D	C
Approach Vol, veh/h		603			879			146			212	
Approach Delay, s/veh		32.1			14.7			40.9			41.4	
Approach LOS		C			B			D			D	
Timer:		1	2	3	4	5	6	7	8			
Assigned Phs		2	1	4	3	6	5	7	8			
Case No		3.0	2.0	3.0	2.0	3.0	2.0	2.0	4.0			
Phs Duration (G+Y+Rc), s		14.2	14.8	29.8	34.3	10.6	18.4	9.6	54.5			
Change Period (Y+Rc), s		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0			
Max Green (Gmax), s		22.2	12.0	23.8	11.0	30.2	4.0	5.0	29.8			
Max Allow Headway (MAH), s		4.2	4.1	4.0	4.1	4.1	4.1	4.1	4.1			
Max Q Clear (g_c+l1), s		7.8	9.0	14.1	6.5	4.3	2.7	4.9	14.1			
Green Ext Time (g_e), s		0.3	0.1	1.7	0.1	0.2	0.0	0.0	2.6			
Prob of Phs Call (p_c)		1.00	0.96	1.00	0.94	1.00	0.32	0.74	1.00			
Prob of Max Out (p_x)		0.00	1.00	0.00	0.66	0.00	1.00	1.00	0.00			
Left-Turn Movement Data												
Assigned Mvmt			1		3			5	7			
Mvmt Sat Flow, veh/h			1641		1641			1641	1641			
Through Movement Data												
Assigned Mvmt		2		4		6			8			
Mvmt Sat Flow, veh/h		1870		3554		1870			2797			
Right-Turn Movement Data												
Assigned Mvmt		12		14		16			18			
Mvmt Sat Flow, veh/h		1460		1460		1460			721			
Left Lane Group Data												
Assigned Mvmt		0	1	0	3	0	5	7	0			
Lane Assignment		L (Prot)		L (Prot)		L (Prot)		L (Prot)				

HCM 6th Signalized Intersection Capacity Analysis
1: Topaz Rd & Bear Valley Rd

PM 2023
08/14/2023

Lanes in Grp	0	1	0	1	0	1	1	0
Grp Vol (v), veh/h	0	129	0	109	0	15	52	0
Grp Sat Flow (s), veh/h/ln	0	1641	0	1641	0	1641	1641	0
Q Serve Time (g_s), s	0.0	7.0	0.0	4.5	0.0	0.7	2.9	0.0
Cycle Q Clear Time (g_c), s	0.0	7.0	0.0	4.5	0.0	0.7	2.9	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00
Lane Grp Cap (c), veh/h	0	190	0	534	0	254	99	0
V/C Ratio (X)	0.00	0.68	0.00	0.20	0.00	0.06	0.53	0.00
Avail Cap (c_a), veh/h	0	247	0	534	0	254	123	0
Upstream Filter (I)	0.00	1.00	0.00	0.76	0.00	1.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	39.4	0.0	22.7	0.0	33.5	42.4	0.0
Incr Delay (d2), s/veh	0.0	4.8	0.0	0.1	0.0	0.1	4.3	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	44.3	0.0	22.8	0.0	33.6	46.7	0.0
1st-Term Q (Q1), veh/ln	0.0	2.6	0.0	1.6	0.0	0.3	1.1	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.3	0.0	0.0	0.0	0.0	0.1	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	2.9	0.0	1.6	0.0	0.3	1.2	0.0
%ile Storage Ratio (RQ%)	0.00	0.73	0.00	0.20	0.00	0.05	0.20	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	2	0	4	0	6	0	0	8
Lane Assignment	T		T		T			T
Lanes in Grp	1	0	2	0	1	0	0	1
Grp Vol (v), veh/h	35	0	542	0	49	0	0	388
Grp Sat Flow (s), veh/h/ln	1870	0	1777	0	1870	0	0	1777
Q Serve Time (g_s), s	1.6	0.0	12.1	0.0	2.3	0.0	0.0	11.9
Cycle Q Clear Time (g_c), s	1.6	0.0	12.1	0.0	2.3	0.0	0.0	11.9
Lane Grp Cap (c), veh/h	204	0	986	0	132	0	0	964
V/C Ratio (X)	0.17	0.00	0.55	0.00	0.37	0.00	0.00	0.40
Avail Cap (c_a), veh/h	487	0	986	0	648	0	0	964
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.76
Uniform Delay (d1), s/veh	37.6	0.0	28.6	0.0	41.3	0.0	0.0	12.4
Incr Delay (d2), s/veh	0.4	0.0	2.2	0.0	1.7	0.0	0.0	1.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	38.0	0.0	30.9	0.0	43.0	0.0	0.0	13.4
1st-Term Q (Q1), veh/ln	0.7	0.0	4.7	0.0	1.0	0.0	0.0	3.9
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.3	0.0	0.1	0.0	0.0	0.3

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1: Topaz Rd & Bear Valley Rd

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3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.7	0.0	5.0	0.0	1.1	0.0	0.0	4.1
%ile Storage Ratio (RQ%)	0.01	0.00	0.05	0.00	0.02	0.00	0.00	0.02
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	12	0	14	0	16	0	0	18
Lane Assignment	R		R		R			T+R
Lanes in Grp	1	0	1	0	1	0	0	1
Grp Vol (v), veh/h	96	0	9	0	34	0	0	382
Grp Sat Flow (s), veh/h/ln	1460	0	1460	0	1460	0	0	1741
Q Serve Time (g_s), s	5.8	0.0	0.4	0.0	1.6	0.0	0.0	12.1
Cycle Q Clear Time (g_c), s	5.8	0.0	0.4	0.0	1.6	0.0	0.0	12.1
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.41
Lane Grp Cap (c), veh/h	159	0	405	0	103	0	0	945
V/C Ratio (X)	0.60	0.00	0.02	0.00	0.33	0.00	0.00	0.40
Avail Cap (c_a), veh/h	380	0	405	0	505	0	0	945
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.76
Uniform Delay (d1), s/veh	39.5	0.0	24.4	0.0	26.1	0.0	0.0	12.7
Incr Delay (d2), s/veh	3.6	0.0	0.1	0.0	1.9	0.0	0.0	1.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	43.1	0.0	24.5	0.0	28.0	0.0	0.0	13.7
1st-Term Q (Q1), veh/ln	2.0	0.0	0.1	0.0	0.7	0.0	0.0	3.9
2nd-Term Q (Q2), veh/ln	0.2	0.0	0.0	0.0	0.1	0.0	0.0	0.3
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	2.1	0.0	0.1	0.0	0.7	0.0	0.0	4.2
%ile Storage Ratio (RQ%)	0.36	0.00	0.00	0.00	0.19	0.00	0.00	0.02
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0























Intersection Summary

HCM 6th Ctrl Delay	25.6
HCM 6th LOS	C

HCM 6th Signalized Intersection Capacity Analysis

2: Amethyst Rd & Bear Valley Rd

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	78	673	8	109	820	215	34	54	95	293	86	64
Future Volume (veh/h)	78	673	8	109	820	215	34	54	95	293	86	64
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, 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			
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1654	1870	1723	1723	1870	1723	1723	1870	1723	1723	1870	1723
Adj Flow Rate, veh/h	85	732	9	118	891	234	37	59	103	318	93	70
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	427	1667	685	176	1085	446	79	195	174	465	201	152
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
Prop Arrive On Green	0.27	0.47	0.47	0.11	0.31	0.31	0.05	0.11	0.09	0.14	0.20	0.18
Unsig. Movement Delay												
Ln Grp Delay, s/veh	26.3	17.3	13.2	49.2	36.9	14.3	47.3	39.0	43.6	39.7	0.0	33.9
Ln Grp LOS	C	B	B	D	D	B	D	D	D	D	A	C
Approach Vol, veh/h	826				1243				199			
Approach Delay, s/veh	18.2				33.9				42.9			
Approach LOS	B				C				D			
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	8	7				
Case No	2.0	4.0	2.0	3.0	2.0	4.0	3.0	2.0				
Phs Duration (G+Y+Rc), s	17.2	14.2	14.0	47.6	8.5	22.9	32.4	29.2				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green (Gmax), s	16.0	20.6	8.0	24.4	4.0	32.6	26.4	6.0				
Max Allow Headway (MAH), s	4.1	4.2	4.1	4.0	4.1	4.1	4.1	4.1				
Max Q Clear (g_c+I1), s	10.6	7.8	8.4	14.8	4.0	9.7	23.6	5.9				
Green Ext Time (g_e), s	0.6	0.4	0.0	2.3	0.0	0.5	1.4	0.0				
Prob of Phs Call (p_c)	1.00	1.00	0.95	1.00	0.62	1.00	1.00	0.89				
Prob of Max Out (p_x)	0.45	0.00	1.00	0.00	1.00	0.00	0.00	1.00				
Left-Turn Movement Data												
Assigned Mvmt	1		3		5			7				
Mvmt Sat Flow, veh/h	3281		1641		1641			1575				
Through Movement Data												
Assigned Mvmt		2		4		6	8					
Mvmt Sat Flow, veh/h		1777		3554		991	3554					
Right-Turn Movement Data												
Assigned Mvmt		12		14		16	18					
Mvmt Sat Flow, veh/h		1585		1460		746	1460					
Left Lane Group Data												
Assigned Mvmt	1	0	3	0	5	0	0	7				
Lane Assignment	L (Prot)		L (Prot)		L (Prot)			L (Prot)				

HCM 6th Signalized Intersection Capacity Analysis

2: Amethyst Rd & Bear Valley Rd

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Lanes in Grp	2	0	1	0	1	0	0	1
Grp Vol (v), veh/h	318	0	118	0	37	0	0	85
Grp Sat Flow (s), veh/h/ln	1641	0	1641	0	1641	0	0	1575
Q Serve Time (g_s), s	8.6	0.0	6.4	0.0	2.0	0.0	0.0	3.9
Cycle Q Clear Time (g_c), s	8.6	0.0	6.4	0.0	2.0	0.0	0.0	3.9
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00
Lane Grp Cap (c), veh/h	465	0	176	0	79	0	0	427
V/C Ratio (X)	0.68	0.00	0.67	0.00	0.47	0.00	0.00	0.20
Avail Cap (c_a), veh/h	635	0	176	0	106	0	0	427
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.95
Uniform Delay (d1), s/veh	37.9	0.0	39.9	0.0	43.1	0.0	0.0	26.1
Incr Delay (d2), s/veh	1.8	0.0	9.3	0.0	4.2	0.0	0.0	0.2
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	39.7	0.0	49.2	0.0	47.3	0.0	0.0	26.3
1st-Term Q (Q1), veh/ln	3.2	0.0	2.4	0.0	0.8	0.0	0.0	1.3
2nd-Term Q (Q2), veh/ln	0.1	0.0	0.5	0.0	0.1	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	3.3	0.0	2.9	0.0	0.9	0.0	0.0	1.4
%ile Storage Ratio (RQ%)	0.56	0.00	0.73	0.00	0.32	0.00	0.00	0.11
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	0	6	8	0
Lane Assignment		T		T			T	
Lanes in Grp	0	1	0	2	0	0	2	0
Grp Vol (v), veh/h	0	59	0	732	0	0	891	0
Grp Sat Flow (s), veh/h/ln	0	1777	0	1777	0	0	1777	0
Q Serve Time (g_s), s	0.0	2.8	0.0	12.8	0.0	0.0	21.6	0.0
Cycle Q Clear Time (g_c), s	0.0	2.8	0.0	12.8	0.0	0.0	21.6	0.0
Lane Grp Cap (c), veh/h	0	195	0	1667	0	0	1085	0
V/C Ratio (X)	0.00	0.30	0.00	0.44	0.00	0.00	0.82	0.00
Avail Cap (c_a), veh/h	0	432	0	1667	0	0	1085	0
Upstream Filter (I)	0.00	1.00	0.00	0.95	0.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	38.1	0.0	16.5	0.0	0.0	29.9	0.0
Incr Delay (d2), s/veh	0.0	0.9	0.0	0.8	0.0	0.0	7.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	39.0	0.0	17.3	0.0	0.0	36.9	0.0
1st-Term Q (Q1), veh/ln	0.0	1.2	0.0	4.5	0.0	0.0	8.3	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.2	0.0	0.0	1.1	0.0

HCM 6th Signalized Intersection Capacity Analysis

2: Amethyst Rd & Bear Valley Rd

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3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	1.2	0.0	4.7	0.0	0.0	9.3	0.0
%ile Storage Ratio (RQ%)	0.00	0.01	0.00	0.02	0.00	0.00	0.04	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	16	18	0
Lane Assignment	T+R		R		T+R		R	
Lanes in Grp	0	1	0	1	0	1	1	0
Grp Vol (v), veh/h	0	103	0	9	0	163	234	0
Grp Sat Flow (s), veh/h/ln	0	1585	0	1460	0	1736	1460	0
Q Serve Time (g_s), s	0.0	5.8	0.0	0.3	0.0	7.7	7.5	0.0
Cycle Q Clear Time (g_c), s	0.0	5.8	0.0	0.3	0.0	7.7	7.5	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	1.00	0.00	1.00	0.00	0.43	1.00	0.00
Lane Grp Cap (c), veh/h	0	174	0	685	0	353	446	0
V/C Ratio (X)	0.00	0.59	0.00	0.01	0.00	0.46	0.52	0.00
Avail Cap (c_a), veh/h	0	385	0	685	0	646	446	0
Upstream Filter (I)	0.00	1.00	0.00	0.95	0.00	1.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	40.4	0.0	13.2	0.0	33.0	10.0	0.0
Incr Delay (d2), s/veh	0.0	3.2	0.0	0.0	0.0	0.9	4.4	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	43.6	0.0	13.2	0.0	33.9	14.3	0.0
1st-Term Q (Q1), veh/ln	0.0	2.1	0.0	0.1	0.0	3.0	3.6	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.2	0.0	0.0	0.0	0.1	0.5	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	2.3	0.0	0.1	0.0	3.1	4.1	0.0
%ile Storage Ratio (RQ%)	0.00	0.02	0.00	0.01	0.00	0.05	0.52	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary









HCM 6th Ctrl Delay	30.5
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

Intersection

Intersection Delay, s/veh
Intersection LOS A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	32	40	7	34	51	5	7	82	25	6	77	49
Future Vol, veh/h	32	40	7	34	51	5	7	82	25	6	77	49
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	35	43	8	37	55	5	8	89	27	7	84	53
Number of Lanes	1	1	0	1	1	0	0	1	0	0	1	0























Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	8.5	8.6	8.3	8.3
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	6%	100%	0%	100%	0%	5%
Vol Thru, %	72%	0%	85%	0%	91%	58%
Vol Right, %	22%	0%	15%	0%	9%	37%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	114	32	47	34	56	132
LT Vol	7	32	0	34	0	6
Through Vol	82	0	40	0	51	77
RT Vol	25	0	7	0	5	49
Lane Flow Rate	124	35	51	37	61	143
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.153	0.056	0.073	0.059	0.087	0.173
Departure Headway (Hd)	4.453	5.745	5.136	5.732	5.165	4.341
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	805	623	697	625	693	826
Service Time	2.48	3.48	2.872	3.467	2.9	2.365
HCM Lane V/C Ratio	0.154	0.056	0.073	0.059	0.088	0.173
HCM Control Delay	8.3	8.8	8.3	8.8	8.4	8.3
HCM Lane LOS	A	A	A	A	A	A
HCM 95th-tile Q	0.5	0.2	0.2	0.2	0.3	0.6

HCM 6th Signalized Intersection Capacity Analysis

4: SR 395 & Eucalyptus St

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	16	29	61	11	16	30	1014	109	19	831	26
Future Volume (veh/h)	15	16	29	61	11	16	30	1014	109	19	831	26
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, 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			
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1723	1870	1723	1723	1870	1723	1723	1870	1723	1723	1870	1723
Adj Flow Rate, veh/h	16	17	32	66	12	17	33	1102	118	21	903	28
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	229	180	140	142	239	187	112	1592	654	97	1560	641
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
Prop Arrive On Green	0.05	0.10	0.10	0.09	0.13	0.13	0.07	0.45	0.45	0.06	0.44	0.44
Unsig. Movement Delay												
Ln Grp Delay, s/veh	23.3	21.5	10.4	24.8	19.8	9.0	24.3	11.9	8.7	24.2	11.2	8.3
Ln Grp LOS	C	C	B	C	B	A	C	B	A	C	B	A
Approach Vol, veh/h	65				95				1253			
Approach Delay, s/veh	16.5				21.3				11.9			
Approach LOS	B				C				B			
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	2		1	4	3	5	6	7	8			
Case No	3.0		2.0	3.0	2.0	2.0	3.0	1.2	3.0			
Phs Duration (G+Y+Rc), s	27.1		7.0	9.0	8.5	7.5	26.6	6.8	10.6			
Change Period (Y+Rc), s	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0			
Max Green (Gmax), s	52.5		4.0	30.5	8.0	4.0	52.5	4.0	34.5			
Max Allow Headway (MAH), s	4.0		4.1	4.2	4.1	4.1	4.0	4.1	4.2			
Max Q Clear (g_c+l1), s	14.8		2.6	2.7	4.0	3.0	11.9	2.5	2.4			
Green Ext Time (g_e), s	6.3		0.0	0.1	0.0	0.0	4.5	0.0	0.1			
Prob of Phs Call (p_c)	1.00		0.26	0.74	0.61	0.38	1.00	0.20	0.87			
Prob of Max Out (p_x)	0.00		1.00	0.00	1.00	1.00	0.00	1.00	0.00			
Left-Turn Movement Data												
Assigned Mvmt			1		3	5		7				
Mvmt Sat Flow, veh/h			1641		1641	1641		1641				
Through Movement Data												
Assigned Mvmt	2			4			6		8			
Mvmt Sat Flow, veh/h	3554			1870			3554		1870			
Right-Turn Movement Data												
Assigned Mvmt	12			14			16		18			
Mvmt Sat Flow, veh/h	1460			1460			1460		1460			
Left Lane Group Data												
Assigned Mvmt	0		1	0	3	5	0	7	0			
Lane Assignment	L (Prot)			L (Prot)	L (Prot)		L (Pr/Pm)					

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Lanes in Grp	0	1	0	1	1	0	1	0
Grp Vol (v), veh/h	0	21	0	66	33	0	16	0
Grp Sat Flow (s), veh/h/ln	0	1641	0	1641	1641	0	1641	0
Q Serve Time (g_s), s	0.0	0.6	0.0	2.0	1.0	0.0	0.5	0.0
Cycle Q Clear Time (g_c), s	0.0	0.6	0.0	2.0	1.0	0.0	0.5	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	1272	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	0	97	0	142	112	0	229	0
V/C Ratio (X)	0.00	0.22	0.00	0.47	0.30	0.00	0.07	0.00
Avail Cap (c_a), veh/h	0	191	0	318	191	0	331	0
Upstream Filter (I)	0.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	23.1	0.0	22.4	22.8	0.0	23.1	0.0
Incr Delay (d2), s/veh	0.0	1.1	0.0	2.4	1.5	0.0	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
Control Delay (d), s/veh	0.0	24.2	0.0	24.8	24.3	0.0	23.3	0.0
1st-Term Q (Q1), veh/ln	0.0	0.2	0.0	0.6	0.3	0.0	0.2	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	0.2	0.0	0.7	0.4	0.0	0.2	0.0
%ile Storage Ratio (RQ%)	0.00	0.01	0.00	0.06	0.02	0.00	0.04	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	2	0	4	0	0	6	0	8
Lane Assignment	T		T			T		T
Lanes in Grp	2	0	1	0	0	2	0	1
Grp Vol (v), veh/h	1102	0	17	0	0	903	0	12
Grp Sat Flow (s), veh/h/ln	1777	0	1870	0	0	1777	0	1870
Q Serve Time (g_s), s	12.8	0.0	0.4	0.0	0.0	9.9	0.0	0.3
Cycle Q Clear Time (g_c), s	12.8	0.0	0.4	0.0	0.0	9.9	0.0	0.3
Lane Grp Cap (c), veh/h	1592	0	180	0	0	1560	0	239
V/C Ratio (X)	0.69	0.00	0.09	0.00	0.00	0.58	0.00	0.05
Avail Cap (c_a), veh/h	3757	0	1179	0	0	3757	0	1324
Upstream Filter (I)	1.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	11.4	0.0	21.2	0.0	0.0	10.9	0.0	19.7
Incr Delay (d2), s/veh	0.5	0.0	0.2	0.0	0.0	0.3	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
Control Delay (d), s/veh	11.9	0.0	21.5	0.0	0.0	11.2	0.0	19.8
1st-Term Q (Q1), veh/ln	3.1	0.0	0.2	0.0	0.0	2.4	0.0	0.1
2nd-Term Q (Q2), veh/ln	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0

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3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	3.2	0.0	0.2	0.0	0.0	2.5	0.0	0.1
%ile Storage Ratio (RQ%)	0.06	0.00	0.00	0.00	0.00	0.02	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	12	0	14	0	0	16	0	18
Lane Assignment	R		R			R		R
Lanes in Grp	1	0	1	0	0	1	0	1
Grp Vol (v), veh/h	118	0	32	0	0	28	0	17
Grp Sat Flow (s), veh/h/ln	1460	0	1460	0	0	1460	0	1460
Q Serve Time (g_s), s	2.5	0.0	0.7	0.0	0.0	0.6	0.0	0.4
Cycle Q Clear Time (g_c), s	2.5	0.0	0.7	0.0	0.0	0.6	0.0	0.4
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	1.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	654	0	140	0	0	641	0	187
V/C Ratio (X)	0.18	0.00	0.23	0.00	0.00	0.04	0.00	0.09
Avail Cap (c_a), veh/h	1543	0	920	0	0	1543	0	1034
Upstream Filter (I)	1.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	8.5	0.0	9.6	0.0	0.0	8.3	0.0	8.8
Incr Delay (d2), s/veh	0.1	0.0	0.8	0.0	0.0	0.0	0.0	0.2
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	8.7	0.0	10.4	0.0	0.0	8.3	0.0	9.0
1st-Term Q (Q1), veh/ln	0.5	0.0	0.3	0.0	0.0	0.1	0.0	0.1
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.5	0.0	0.3	0.0	0.0	0.1	0.0	0.2
%ile Storage Ratio (RQ%)	0.04	0.00	0.32	0.00	0.00	0.01	0.00	0.16
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 6th Ctrl Delay	12.2
HCM 6th LOS	B

Intersection

Intersection Delay, s/veh
Intersection LOS A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		←	↑	↑	↑			↑			↑	
Traffic Vol, veh/h	17	61	52	45	36	3	26	8	36	4	15	15
Future Vol, veh/h	17	61	52	45	36	3	26	8	36	4	15	15
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	18	66	57	49	39	3	28	9	39	4	16	16
Number of Lanes	0	1	1	1	1	0	0	1	0	0	1	0






Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	7.9	8.2	7.7	7.5
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	37%	22%	0%	100%	0%	12%
Vol Thru, %	11%	78%	0%	0%	92%	44%
Vol Right, %	51%	0%	100%	0%	8%	44%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	70	78	52	45	39	34
LT Vol	26	17	0	45	0	4
Through Vol	8	61	0	0	36	15
RT Vol	36	0	52	0	3	15
Lane Flow Rate	76	85	57	49	42	37
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.091	0.115	0.064	0.074	0.057	0.044
Departure Headway (Hd)	4.292	4.993	4.081	5.417	4.861	4.33
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	838	722	862	665	741	830
Service Time	2.3	2.693	1.881	3.117	2.561	2.339
HCM Lane V/C Ratio	0.091	0.118	0.066	0.074	0.057	0.045
HCM Control Delay	7.7	8.3	7.2	8.5	7.9	7.5
HCM Lane LOS	A	A	A	A	A	A
HCM 95th-tile Q	0.3	0.4	0.2	0.2	0.2	0.1

Intersection

Int Delay, s/veh 7

Movement

	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	89	14	12	2	1	93
Future Vol, veh/h	89	14	12	2	1	93
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	50	-	-	-	0	-
Veh in Median Storage, #	0	0	-	0	-	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	97	15	13	2	1	101

Major/Minor

	Major1	Major2	Minor2
Conflicting Flow All	15	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.12	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.218	-	-
Pot Cap-1 Maneuver	1603	-	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1603	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach

	EB	WB	SB
HCM Control Delay, s	6.4	0	8.8
HCM LOS			A























Minor Lane/Major Mvmt

	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1603	-	-	-	1061
HCM Lane V/C Ratio	0.06	-	-	-	0.096
HCM Control Delay (s)	7.4	-	-	-	8.8
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0.2	-	-	-	0.3

HCM 6th Signalized Intersection Capacity Analysis

1: Topaz Rd & Bear Valley Rd

PM 2023+Project
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	48	499	10	137	563	145	15	35	107	119	52	31
Future Volume (veh/h)	48	499	10	137	563	145	15	35	107	119	52	31
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, 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			
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1723	1870	1723	1723	1870	1723	1723	1870	1723	1723	1870	1723
Adj Flow Rate, veh/h	52	542	11	149	612	158	16	38	116	129	57	34
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	99	986	405	511	1479	381	269	230	179	190	140	109
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
Prop Arrive On Green	0.06	0.28	0.28	0.31	0.53	0.51	0.16	0.12	0.12	0.12	0.07	0.07
Unsig. Movement Delay												
Ln Grp Delay, s/veh	46.7	30.9	24.6	24.4	14.1	14.5	32.9	36.9	42.7	44.3	43.0	27.4
Ln Grp LOS	D	C	C	C	B	B	C	D	D	D	D	C
Approach Vol, veh/h	605				919				170			
Approach Delay, s/veh	32.1				15.9				40.5			
Approach LOS	C				B				D			
Timer:	1		2		3		4		5		6	
Assigned Phs	2		1		4		3		6		5	
Case No	3.0		2.0		3.0		2.0		3.0		2.0	
Phs Duration (G+Y+Rc), s	15.4		14.8		29.8		33.0		11.0		19.3	
Change Period (Y+Rc), s	6.0		6.0		6.0		6.0		6.0		6.0	
Max Green (Gmax), s	22.2		12.0		23.8		11.0		30.2		4.0	
Max Allow Headway (MAH), s	4.3		4.1		4.0		4.1		4.1		4.1	
Max Q Clear (g_c+l1), s	9.0		9.0		14.1		8.4		4.7		2.8	
Green Ext Time (g_e), s	0.4		0.1		1.7		0.1		0.3		0.0	
Prob of Phs Call (p_c)	1.00		0.96		1.00		0.98		1.00		0.34	
Prob of Max Out (p_x)	0.00		1.00		0.00		1.00		0.00		1.00	
Left-Turn Movement Data												
Assigned Mvmt			1				3				5	
Mvmt Sat Flow, veh/h			1641				1641				1641	
Through Movement Data												
Assigned Mvmt	2				4				6			
Mvmt Sat Flow, veh/h	1870				3554				1870			
Right-Turn Movement Data												
Assigned Mvmt	12				14				16			
Mvmt Sat Flow, veh/h	1460				1460				1460			
Left Lane Group Data												
Assigned Mvmt	0		1		0		3		0		5	
Lane Assignment	L (Prot)				L (Prot)				L (Prot)		L (Prot)	

HCM 6th Signalized Intersection Capacity Analysis

1: Topaz Rd & Bear Valley Rd

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Lanes in Grp	0	1	0	1	0	1	1	0
Grp Vol (v), veh/h	0	129	0	149	0	16	52	0
Grp Sat Flow (s), veh/h/ln	0	1641	0	1641	0	1641	1641	0
Q Serve Time (g_s), s	0.0	7.0	0.0	6.4	0.0	0.8	2.9	0.0
Cycle Q Clear Time (g_c), s	0.0	7.0	0.0	6.4	0.0	0.8	2.9	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00
Lane Grp Cap (c), veh/h	0	190	0	511	0	269	99	0
V/C Ratio (X)	0.00	0.68	0.00	0.29	0.00	0.06	0.53	0.00
Avail Cap (c_a), veh/h	0	247	0	511	0	269	123	0
Upstream Filter (I)	0.00	1.00	0.00	0.70	0.00	1.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	39.4	0.0	24.2	0.0	32.8	42.4	0.0
Incr Delay (d2), s/veh	0.0	4.8	0.0	0.2	0.0	0.1	4.3	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	44.3	0.0	24.4	0.0	32.9	46.7	0.0
1st-Term Q (Q1), veh/ln	0.0	2.6	0.0	2.3	0.0	0.3	1.1	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.3	0.0	0.0	0.0	0.0	0.1	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	2.9	0.0	2.3	0.0	0.3	1.2	0.0
%ile Storage Ratio (RQ%)	0.00	0.73	0.00	0.29	0.00	0.05	0.20	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	2	0	4	0	6	0	0	8
Lane Assignment	T		T		T			T
Lanes in Grp	1	0	2	0	1	0	0	1
Grp Vol (v), veh/h	38	0	542	0	57	0	0	388
Grp Sat Flow (s), veh/h/ln	1870	0	1777	0	1870	0	0	1777
Q Serve Time (g_s), s	1.7	0.0	12.1	0.0	2.7	0.0	0.0	12.3
Cycle Q Clear Time (g_c), s	1.7	0.0	12.1	0.0	2.7	0.0	0.0	12.3
Lane Grp Cap (c), veh/h	230	0	986	0	140	0	0	940
V/C Ratio (X)	0.17	0.00	0.55	0.00	0.41	0.00	0.00	0.41
Avail Cap (c_a), veh/h	487	0	986	0	648	0	0	940
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.70
Uniform Delay (d1), s/veh	36.5	0.0	28.6	0.0	41.1	0.0	0.0	13.2
Incr Delay (d2), s/veh	0.3	0.0	2.2	0.0	1.9	0.0	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
Control Delay (d), s/veh	36.9	0.0	30.9	0.0	43.0	0.0	0.0	14.1
1st-Term Q (Q1), veh/ln	0.7	0.0	4.7	0.0	1.2	0.0	0.0	4.1
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.3	0.0	0.1	0.0	0.0	0.2

HCM 6th Signalized Intersection Capacity Analysis

1: Topaz Rd & Bear Valley Rd

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3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.7	0.0	5.0	0.0	1.2	0.0	0.0	4.3
%ile Storage Ratio (RQ%)	0.01	0.00	0.05	0.00	0.02	0.00	0.00	0.02
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	12	0	14	0	16	0	0	18
Lane Assignment	R		R		R			T+R
Lanes in Grp	1	0	1	0	1	0	0	1
Grp Vol (v), veh/h	116	0	11	0	34	0	0	382
Grp Sat Flow (s), veh/h/ln	1460	0	1460	0	1460	0	0	1741
Q Serve Time (g_s), s	7.0	0.0	0.5	0.0	1.6	0.0	0.0	12.5
Cycle Q Clear Time (g_c), s	7.0	0.0	0.5	0.0	1.6	0.0	0.0	12.5
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.41
Lane Grp Cap (c), veh/h	179	0	405	0	109	0	0	921
V/C Ratio (X)	0.65	0.00	0.03	0.00	0.31	0.00	0.00	0.41
Avail Cap (c_a), veh/h	380	0	405	0	505	0	0	921
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.70
Uniform Delay (d1), s/veh	38.9	0.0	24.5	0.0	25.8	0.0	0.0	13.5
Incr Delay (d2), s/veh	3.9	0.0	0.1	0.0	1.6	0.0	0.0	1.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	42.7	0.0	24.6	0.0	27.4	0.0	0.0	14.5
1st-Term Q (Q1), veh/ln	2.3	0.0	0.2	0.0	0.7	0.0	0.0	4.1
2nd-Term Q (Q2), veh/ln	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.2
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	2.5	0.0	0.2	0.0	0.7	0.0	0.0	4.3
%ile Storage Ratio (RQ%)	0.43	0.00	0.00	0.00	0.19	0.00	0.00	0.02
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0























Intersection Summary

HCM 6th Ctrl Delay	26.2
HCM 6th LOS	C

HCM 6th Signalized Intersection Capacity Analysis

2: Amethyst Rd & Bear Valley Rd

PM 2023+Project
08/14/2023

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	84	685	9	111	842	215	36	54	95	293	86	75
Future Volume (veh/h)	84	685	9	111	842	215	36	54	95	293	86	75
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, 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			
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1654	1870	1723	1723	1870	1723	1723	1870	1723	1723	1870	1723
Adj Flow Rate, veh/h	91	745	10	121	915	234	39	59	103	318	93	82
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	427	1667	685	176	1085	446	82	195	174	465	185	163
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
Prop Arrive On Green	0.27	0.47	0.47	0.11	0.31	0.31	0.05	0.11	0.09	0.14	0.20	0.18
Unsig. Movement Delay												
Ln Grp Delay, s/veh	26.5	17.4	13.2	50.5	38.2	14.3	47.3	39.0	43.6	39.7	0.0	34.6
Ln Grp LOS	C	B	B	D	D	B	D	D	D	D	A	C
Approach Vol, veh/h	846				1270				201		493	
Approach Delay, s/veh	18.3				35.0				42.9		37.9	
Approach LOS	B				C				D		D	
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	8	7				
Case No	2.0	4.0	2.0	3.0	2.0	4.0	3.0	2.0				
Phs Duration (G+Y+Rc), s	17.2	14.2	14.0	47.6	8.6	22.8	32.4	29.2				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green (Gmax), s	16.0	20.6	8.0	24.4	4.0	32.6	26.4	6.0				
Max Allow Headway (MAH), s	4.1	4.2	4.1	4.0	4.1	4.2	4.1	4.1				
Max Q Clear (g_c+l1), s	10.6	7.8	8.6	15.1	4.2	10.4	24.4	6.2				
Green Ext Time (g_e), s	0.6	0.4	0.0	2.3	0.0	0.6	1.1	0.0				
Prob of Phs Call (p_c)	1.00	1.00	0.96	1.00	0.63	1.00	1.00	0.90				
Prob of Max Out (p_x)	0.45	0.00	1.00	0.00	1.00	0.00	0.00	1.00				
Left-Turn Movement Data												
Assigned Mvmt	1		3		5			7				
Mvmt Sat Flow, veh/h	3281		1641		1641			1575				
Through Movement Data												
Assigned Mvmt		2		4		6	8					
Mvmt Sat Flow, veh/h		1777		3554		917	3554					
Right-Turn Movement Data												
Assigned Mvmt		12		14		16	18					
Mvmt Sat Flow, veh/h		1585		1460		808	1460					
Left Lane Group Data												
Assigned Mvmt	1	0	3	0	5	0	0	7				
Lane Assignment	L (Prot)		L (Prot)		L (Prot)			L (Prot)				

HCM 6th Signalized Intersection Capacity Analysis 2: Amethyst Rd & Bear Valley Rd

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Lanes in Grp	2	0	1	0	1	0	0	1
Grp Vol (v), veh/h	318	0	121	0	39	0	0	91
Grp Sat Flow (s), veh/h/ln	1641	0	1641	0	1641	0	0	1575
Q Serve Time (g_s), s	8.6	0.0	6.6	0.0	2.2	0.0	0.0	4.2
Cycle Q Clear Time (g_c), s	8.6	0.0	6.6	0.0	2.2	0.0	0.0	4.2
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00
Lane Grp Cap (c), veh/h	465	0	176	0	82	0	0	427
V/C Ratio (X)	0.68	0.00	0.69	0.00	0.48	0.00	0.00	0.21
Avail Cap (c_a), veh/h	635	0	176	0	106	0	0	427
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.94
Uniform Delay (d1), s/veh	37.9	0.0	40.0	0.0	43.0	0.0	0.0	26.2
Incr Delay (d2), s/veh	1.8	0.0	10.5	0.0	4.3	0.0	0.0	0.2
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	39.7	0.0	50.5	0.0	47.3	0.0	0.0	26.5
1st-Term Q (Q1), veh/ln	3.2	0.0	2.5	0.0	0.8	0.0	0.0	1.4
2nd-Term Q (Q2), veh/ln	0.1	0.0	0.5	0.0	0.1	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	3.3	0.0	3.0	0.0	0.9	0.0	0.0	1.5
%ile Storage Ratio (RQ%)	0.56	0.00	0.76	0.00	0.33	0.00	0.00	0.12
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	0	6	8	0
Lane Assignment		T		T			T	
Lanes in Grp	0	1	0	2	0	0	2	0
Grp Vol (v), veh/h	0	59	0	745	0	0	915	0
Grp Sat Flow (s), veh/h/ln	0	1777	0	1777	0	0	1777	0
Q Serve Time (g_s), s	0.0	2.8	0.0	13.1	0.0	0.0	22.4	0.0
Cycle Q Clear Time (g_c), s	0.0	2.8	0.0	13.1	0.0	0.0	22.4	0.0
Lane Grp Cap (c), veh/h	0	195	0	1667	0	0	1085	0
V/C Ratio (X)	0.00	0.30	0.00	0.45	0.00	0.00	0.84	0.00
Avail Cap (c_a), veh/h	0	432	0	1667	0	0	1085	0
Upstream Filter (I)	0.00	1.00	0.00	0.94	0.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	38.1	0.0	16.6	0.0	0.0	30.2	0.0
Incr Delay (d2), s/veh	0.0	0.9	0.0	0.8	0.0	0.0	8.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	39.0	0.0	17.4	0.0	0.0	38.2	0.0
1st-Term Q (Q1), veh/ln	0.0	1.2	0.0	4.6	0.0	0.0	8.6	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.2	0.0	0.0	1.2	0.0

HCM 6th Signalized Intersection Capacity Analysis 2: Amethyst Rd & Bear Valley Rd

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3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	1.2	0.0	4.8	0.0	0.0	9.8	0.0
%ile Storage Ratio (RQ%)	0.00	0.01	0.00	0.02	0.00	0.00	0.04	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	16	18	0
Lane Assignment	T+R		R		T+R		R	
Lanes in Grp	0	1	0	1	0	1	1	0
Grp Vol (v), veh/h	0	103	0	10	0	175	234	0
Grp Sat Flow (s), veh/h/ln	0	1585	0	1460	0	1725	1460	0
Q Serve Time (g_s), s	0.0	5.8	0.0	0.3	0.0	8.4	7.5	0.0
Cycle Q Clear Time (g_c), s	0.0	5.8	0.0	0.3	0.0	8.4	7.5	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	1.00	0.00	1.00	0.00	0.47	1.00	0.00
Lane Grp Cap (c), veh/h	0	174	0	685	0	348	446	0
V/C Ratio (X)	0.00	0.59	0.00	0.01	0.00	0.50	0.52	0.00
Avail Cap (c_a), veh/h	0	385	0	685	0	642	446	0
Upstream Filter (I)	0.00	1.00	0.00	0.94	0.00	1.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	40.4	0.0	13.2	0.0	33.4	10.0	0.0
Incr Delay (d2), s/veh	0.0	3.2	0.0	0.0	0.0	1.1	4.4	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	43.6	0.0	13.2	0.0	34.6	14.3	0.0
1st-Term Q (Q1), veh/ln	0.0	2.1	0.0	0.1	0.0	3.3	3.6	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.2	0.0	0.0	0.0	0.1	0.5	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	2.3	0.0	0.1	0.0	3.4	4.1	0.0
%ile Storage Ratio (RQ%)	0.00	0.02	0.00	0.01	0.00	0.05	0.52	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary







HCM 6th Ctrl Delay	31.1
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

Intersection

Intersection Delay, s/veh
Intersection LOS A























Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	32	40	13	40	51	5	11	109	29	6	124	49
Future Vol, veh/h	32	40	13	40	51	5	11	109	29	6	124	49
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	35	43	14	43	55	5	12	118	32	7	135	53
Number of Lanes	1	1	0	1	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	8.8	8.9	8.8	9
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	7%	100%	0%	100%	0%	3%
Vol Thru, %	73%	0%	75%	0%	91%	69%
Vol Right, %	19%	0%	25%	0%	9%	27%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	149	32	53	40	56	179
LT Vol	11	32	0	40	0	6
Through Vol	109	0	40	0	51	124
RT Vol	29	0	13	0	5	49
Lane Flow Rate	162	35	58	43	61	195
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.206	0.058	0.085	0.072	0.091	0.243
Departure Headway (Hd)	4.582	5.98	5.302	5.963	5.395	4.492
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	781	597	673	599	661	798
Service Time	2.622	3.737	3.059	3.72	3.152	2.529
HCM Lane V/C Ratio	0.207	0.059	0.086	0.072	0.092	0.244
HCM Control Delay	8.8	9.1	8.6	9.2	8.7	9
HCM Lane LOS	A	A	A	A	A	A
HCM 95th-tile Q	0.8	0.2	0.3	0.2	0.3	1

HCM 6th Signalized Intersection Capacity Analysis 4: SR 395 & Eucalyptus St

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	21	29	85	14	40	30	1014	149	59	831	26
Future Volume (veh/h)	15	21	29	85	14	40	30	1014	149	59	831	26
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, 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		
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1723	1870	1723	1723	1870	1723	1723	1870	1723	1723	1870	1723
Adj Flow Rate, veh/h	16	23	32	92	15	43	33	1102	162	64	903	28
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	210	180	141	170	279	218	104	1556	639	133	1619	665
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
Prop Arrive On Green	0.05	0.10	0.10	0.10	0.15	0.15	0.06	0.44	0.44	0.08	0.46	0.46
Unsig. Movement Delay												
Ln Grp Delay, s/veh	25.5	23.9	12.3	26.9	20.9	9.6	27.2	13.6	10.3	27.7	11.6	8.6
Ln Grp LOS	C	C	B	C	C	A	C	B	B	C	B	A
Approach Vol, veh/h	71			150			1297			995		
Approach Delay, s/veh	19.0			21.3			13.6			12.6		
Approach LOS	B			C			B			B		
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	2	1	4	3	5	6	7	8				
Case No	3.0	2.0	3.0	2.0	2.0	3.0	1.2	3.0				
Phs Duration (G+Y+Rc), s	28.9	8.6	9.5	9.9	7.6	29.9	6.9	12.5				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green (Gmax), s	52.5	4.0	30.5	8.0	4.0	52.5	4.0	34.5				
Max Allow Headway (MAH), s	4.0	4.1	4.2	4.1	4.1	4.0	4.1	4.2				
Max Q Clear (g_c+l1), s	16.4	4.1	2.8	5.0	3.1	12.6	2.5	3.0				
Green Ext Time (g_e), s	6.5	0.0	0.1	0.1	0.0	4.5	0.0	0.2				
Prob of Phs Call (p_c)	1.00	0.64	0.87	0.77	0.41	1.00	0.22	0.96				
Prob of Max Out (p_x)	0.01	1.00	0.00	1.00	1.00	0.00	1.00	0.00				
Left-Turn Movement Data												
Assigned Mvmt	1			3			5			7		
Mvmt Sat Flow, veh/h	1641			1641			1641			1641		
Through Movement Data												
Assigned Mvmt	2			4			6			8		
Mvmt Sat Flow, veh/h	3554			1870			3554			1870		
Right-Turn Movement Data												
Assigned Mvmt	12			14			16			18		
Mvmt Sat Flow, veh/h	1460			1460			1460			1460		
Left Lane Group Data												
Assigned Mvmt	0	1	0	3	5	0	7	0				
Lane Assignment	L (Prot)			L (Prot)L (Prot)			L (Pr/Pm)					

HCM 6th Signalized Intersection Capacity Analysis

4: SR 395 & Eucalyptus St

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Lanes in Grp	0	1	0	1	1	0	1	0
Grp Vol (v), veh/h	0	64	0	92	33	0	16	0
Grp Sat Flow (s), veh/h/ln	0	1641	0	1641	1641	0	1641	0
Q Serve Time (g_s), s	0.0	2.1	0.0	3.0	1.1	0.0	0.5	0.0
Cycle Q Clear Time (g_c), s	0.0	2.1	0.0	3.0	1.1	0.0	0.5	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	1239	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	0	133	0	170	104	0	210	0
V/C Ratio (X)	0.00	0.48	0.00	0.54	0.32	0.00	0.08	0.00
Avail Cap (c_a), veh/h	0	173	0	288	173	0	299	0
Upstream Filter (I)	0.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	25.0	0.0	24.2	25.5	0.0	25.3	0.0
Incr Delay (d2), s/veh	0.0	2.7	0.0	2.7	1.7	0.0	0.2	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	27.7	0.0	26.9	27.2	0.0	25.5	0.0
1st-Term Q (Q1), veh/ln	0.0	0.7	0.0	1.0	0.4	0.0	0.2	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	0.8	0.0	1.1	0.4	0.0	0.2	0.0
%ile Storage Ratio (RQ%)	0.00	0.05	0.00	0.09	0.03	0.00	0.05	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	2	0	4	0	0	6	0	8
Lane Assignment	T		T			T		T
Lanes in Grp	2	0	1	0	0	2	0	1
Grp Vol (v), veh/h	1102	0	23	0	0	903	0	15
Grp Sat Flow (s), veh/h/ln	1777	0	1870	0	0	1777	0	1870
Q Serve Time (g_s), s	14.4	0.0	0.6	0.0	0.0	10.6	0.0	0.4
Cycle Q Clear Time (g_c), s	14.4	0.0	0.6	0.0	0.0	10.6	0.0	0.4
Lane Grp Cap (c), veh/h	1556	0	180	0	0	1619	0	279
V/C Ratio (X)	0.71	0.00	0.13	0.00	0.00	0.56	0.00	0.05
Avail Cap (c_a), veh/h	3402	0	1068	0	0	3402	0	1199
Upstream Filter (I)	1.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	13.0	0.0	23.5	0.0	0.0	11.3	0.0	20.8
Incr Delay (d2), s/veh	0.6	0.0	0.3	0.0	0.0	0.3	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
Control Delay (d), s/veh	13.6	0.0	23.9	0.0	0.0	11.6	0.0	20.9
1st-Term Q (Q1), veh/ln	3.9	0.0	0.2	0.0	0.0	2.8	0.0	0.1
2nd-Term Q (Q2), veh/ln	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0

HCM 6th Signalized Intersection Capacity Analysis 4: SR 395 & Eucalyptus St

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3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	4.0	0.0	0.3	0.0	0.0	2.9	0.0	0.1
%ile Storage Ratio (RQ%)	0.08	0.00	0.00	0.00	0.00	0.03	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	12	0	14	0	0	16	0	18
Lane Assignment	R		R			R		R
Lanes in Grp	1	0	1	0	0	1	0	1
Grp Vol (v), veh/h	162	0	32	0	0	28	0	43
Grp Sat Flow (s), veh/h/ln	1460	0	1460	0	0	1460	0	1460
Q Serve Time (g_s), s	4.0	0.0	0.8	0.0	0.0	0.6	0.0	1.0
Cycle Q Clear Time (g_c), s	4.0	0.0	0.8	0.0	0.0	0.6	0.0	1.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	1.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	639	0	141	0	0	665	0	218
V/C Ratio (X)	0.25	0.00	0.23	0.00	0.00	0.04	0.00	0.20
Avail Cap (c_a), veh/h	1397	0	833	0	0	1397	0	936
Upstream Filter (I)	1.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	10.1	0.0	11.5	0.0	0.0	8.6	0.0	9.2
Incr Delay (d2), s/veh	0.2	0.0	0.8	0.0	0.0	0.0	0.0	0.4
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	10.3	0.0	12.3	0.0	0.0	8.6	0.0	9.6
1st-Term Q (Q1), veh/ln	0.9	0.0	0.3	0.0	0.0	0.1	0.0	0.4
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.9	0.0	0.4	0.0	0.0	0.1	0.0	0.4
%ile Storage Ratio (RQ%)	0.08	0.00	0.37	0.00	0.00	0.01	0.00	0.45
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 6th Ctrl Delay	13.8
HCM 6th LOS	B

Intersection

Intersection Delay, s/veh
Intersection LOS A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		←	↑	↑	↑			↑			↑	
Traffic Vol, veh/h	17	144	54	45	86	4	27	8	38	6	15	15
Future Vol, veh/h	17	144	54	45	86	4	27	8	38	6	15	15
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	18	157	59	49	93	4	29	9	41	7	16	16
Number of Lanes	0	1	1	1	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach	WB	SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	8.8	8.6	8.2	8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	37%	11%	0%	100%	0%	17%
Vol Thru, %	11%	89%	0%	0%	96%	42%
Vol Right, %	52%	0%	100%	0%	4%	42%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	73	161	54	45	90	36
LT Vol	27	17	0	45	0	6
Through Vol	8	144	0	0	86	15
RT Vol	38	0	54	0	4	15
Lane Flow Rate	79	175	59	49	98	39
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.102	0.243	0.069	0.075	0.135	0.051
Departure Headway (Hd)	4.637	5.004	4.248	5.518	4.985	4.712
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	774	719	844	650	720	760
Service Time	2.661	2.726	1.973	2.243	2.709	2.74
HCM Lane V/C Ratio	0.102	0.243	0.07	0.075	0.136	0.051
HCM Control Delay	8.2	9.3	7.3	8.7	8.5	8
HCM Lane LOS	A	A	A	A	A	A
HCM 95th-tile Q	0.3	0.9	0.2	0.2	0.5	0.2

Intersection

Int Delay, s/veh 7.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
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Lane Configurations												
Traffic Vol, veh/h	98	14	0	0	12	2	0	0	0	1	0	108
Future Vol, veh/h	98	14	0	0	12	2	0	0	0	1	0	108
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	50	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	-	-	0	-	-	0	-	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	107	15	0	0	13	2	0	0	0	1	0	117



























Major/Minor	Major1		Major2		Minor1		Minor2					
Conflicting Flow All	15	0	0	15	0	0	302	244	15	243	243	14
Stage 1	-	-	-	-	-	-	229	229	-	14	14	-
Stage 2	-	-	-	-	-	-	73	15	-	229	229	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1603	-	-	1603	-	-	650	658	1065	711	659	1066
Stage 1	-	-	-	-	-	-	774	715	-	1006	884	-
Stage 2	-	-	-	-	-	-	937	883	-	774	715	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1603	-	-	1603	-	-	549	614	1065	675	615	1066
Mov Cap-2 Maneuver	-	-	-	-	-	-	549	614	-	675	615	-
Stage 1	-	-	-	-	-	-	722	667	-	939	884	-
Stage 2	-	-	-	-	-	-	834	883	-	722	667	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	5.5	0	0	8.8
HCM LOS			A	A

Minor Lane/Major Mvm	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1603	-	-	1603	-	-	1060
HCM Lane V/C Ratio	-	0.066	-	-	-	-	-	0.112
HCM Control Delay (s)	0	7.4	-	-	0	-	-	8.8
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	-	0.2	-	-	0	-	-	0.4

HCM 6th Signalized Intersection Capacity Analysis
1: Topaz Rd & Bear Valley Rd

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 						 	
Traffic Volume (veh/h)	62	645	10	129	728	187	18	41	114	154	58	40
Future Volume (veh/h)	62	645	10	129	728	187	18	41	114	154	58	40
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, 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	
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1723	1870	1723	1723	1870	1723	1723	1870	1723	1723	1870	1723
Adj Flow Rate, veh/h	67	701	11	140	791	203	20	45	124	167	63	43
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	246	1333	547	396	1306	335	298	220	171	218	128	100
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
Prop Arrive On Green	0.15	0.38	0.38	0.24	0.47	0.45	0.18	0.12	0.12	0.13	0.07	0.07
Unsig. Movement Delay												
Ln Grp Delay, s/veh	45.8	30.7	23.7	38.0	25.7	26.1	40.8	48.3	57.1	60.0	56.8	56.6
Ln Grp LOS	D	C	C	D	C	C	D	D	E	E	E	E
Approach Vol, veh/h		779			1134			189			273	
Approach Delay, s/veh		31.9			27.4			53.3			58.7	
Approach LOS		C			C			D			E	
Timer:		1	2	3	4	5	6	7	8			
Assigned Phs		2	1	4	3	6	5	8	7			
Case No		3.0	2.0	3.0	2.0	3.0	2.0	4.0	2.0			
Phs Duration (G+Y+Rc), s		18.1	19.9	49.0	33.0	12.2	25.8	60.0	22.0			
Change Period (Y+Rc), s		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0			
Max Green (Gmax), s		18.0	18.0	43.0	17.0	32.0	4.0	54.0	6.0			
Max Allow Headway (MAH), s		4.2	4.1	4.0	4.1	4.1	4.1	4.1	4.1			
Max Q Clear (g_c+l1), s		11.8	13.8	20.4	10.5	5.9	3.2	27.4	6.3			
Green Ext Time (g_e), s		0.3	0.2	3.0	0.2	0.3	0.0	4.1	0.0			
Prob of Phs Call (p_c)		1.00	1.00	1.00	0.99	1.00	0.49	1.00	0.89			
Prob of Max Out (p_x)		0.24	0.91	0.00	0.13	0.00	1.00	0.00	1.00			
Left-Turn Movement Data												
Assigned Mvmt			1		3		5		7			
Mvmt Sat Flow, veh/h			1641		1641		1641		1641			
Through Movement Data												
Assigned Mvmt		2		4		6		8				
Mvmt Sat Flow, veh/h		1870		3554		1870		2799				
Right-Turn Movement Data												
Assigned Mvmt		12		14		16		18				
Mvmt Sat Flow, veh/h		1460		1460		1460		718				
Left Lane Group Data												
Assigned Mvmt		0	1	0	3	0	5	0	7			
Lane Assignment		L (Prot)		L (Prot)		L (Prot)		L (Prot)				

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Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	167	0	140	0	20	0	67
Grp Sat Flow (s), veh/h/ln	0	1641	0	1641	0	1641	0	1641
Q Serve Time (g_s), s	0.0	11.8	0.0	8.5	0.0	1.2	0.0	4.3
Cycle Q Clear Time (g_c), s	0.0	11.8	0.0	8.5	0.0	1.2	0.0	4.3
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	218	0	396	0	298	0	246
V/C Ratio (X)	0.00	0.77	0.00	0.35	0.00	0.07	0.00	0.27
Avail Cap (c_a), veh/h	0	273	0	396	0	298	0	246
Upstream Filter (I)	0.00	1.00	0.00	0.57	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	50.2	0.0	37.7	0.0	40.7	0.0	45.2
Incr Delay (d2), s/veh	0.0	9.7	0.0	0.3	0.0	0.1	0.0	0.6
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	60.0	0.0	38.0	0.0	40.8	0.0	45.8
1st-Term Q (Q1), veh/ln	0.0	4.6	0.0	3.3	0.0	0.5	0.0	1.7
2nd-Term Q (Q2), veh/ln	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	5.2	0.0	3.3	0.0	0.5	0.0	1.7
%ile Storage Ratio (RQ%)	0.00	1.32	0.00	0.42	0.00	0.08	0.00	0.29
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	2	0	4	0	6	0	8	0
Lane Assignment	T		T		T		T	
Lanes in Grp	1	0	2	0	1	0	1	0
Grp Vol (v), veh/h	45	0	701	0	63	0	502	0
Grp Sat Flow (s), veh/h/ln	1870	0	1777	0	1870	0	1777	0
Q Serve Time (g_s), s	2.6	0.0	18.4	0.0	3.9	0.0	25.2	0.0
Cycle Q Clear Time (g_c), s	2.6	0.0	18.4	0.0	3.9	0.0	25.2	0.0
Lane Grp Cap (c), veh/h	220	0	1333	0	128	0	829	0
V/C Ratio (X)	0.20	0.00	0.53	0.00	0.49	0.00	0.61	0.00
Avail Cap (c_a), veh/h	312	0	1333	0	530	0	829	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	0.57	0.00
Uniform Delay (d1), s/veh	47.9	0.0	29.2	0.0	53.9	0.0	23.8	0.0
Incr Delay (d2), s/veh	0.5	0.0	1.5	0.0	2.9	0.0	1.9	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	48.3	0.0	30.7	0.0	56.8	0.0	25.7	0.0
1st-Term Q (Q1), veh/ln	1.2	0.0	7.3	0.0	1.8	0.0	9.6	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.3	0.0	0.1	0.0	0.4	0.0

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3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	1.2	0.0	7.6	0.0	1.9	0.0	10.1	0.0
%ile Storage Ratio (RQ%)	0.01	0.00	0.07	0.00	0.03	0.00	0.05	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	12	0	14	0	16	0	18	0
Lane Assignment	R		R		R		T+R	
Lanes in Grp	1	0	1	0	1	0	1	0
Grp Vol (v), veh/h	124	0	11	0	43	0	492	0
Grp Sat Flow (s), veh/h/ln	1460	0	1460	0	1460	0	1741	0
Q Serve Time (g_s), s	9.8	0.0	0.6	0.0	3.4	0.0	25.4	0.0
Cycle Q Clear Time (g_c), s	9.8	0.0	0.6	0.0	3.4	0.0	25.4	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	1.00	0.00	1.00	0.00	1.00	0.00	0.41	0.00
Lane Grp Cap (c), veh/h	171	0	547	0	100	0	812	0
V/C Ratio (X)	0.72	0.00	0.02	0.00	0.43	0.00	0.61	0.00
Avail Cap (c_a), veh/h	243	0	547	0	414	0	812	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	0.57	0.00
Uniform Delay (d1), s/veh	51.1	0.0	23.6	0.0	53.7	0.0	24.1	0.0
Incr Delay (d2), s/veh	6.0	0.0	0.1	0.0	2.9	0.0	1.9	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	57.1	0.0	23.7	0.0	56.6	0.0	26.1	0.0
1st-Term Q (Q1), veh/ln	3.4	0.0	0.2	0.0	1.2	0.0	9.6	0.0
2nd-Term Q (Q2), veh/ln	0.3	0.0	0.0	0.0	0.1	0.0	0.4	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	3.7	0.0	0.2	0.0	1.3	0.0	10.0	0.0
%ile Storage Ratio (RQ%)	0.63	0.00	0.00	0.00	0.32	0.00	0.05	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0























Intersection Summary

HCM 6th Ctrl Delay	34.5
HCM 6th LOS	C

HCM 6th Signalized Intersection Capacity Analysis

2: Amethyst Rd & Bear Valley Rd

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	101	870	10	141	1060	278	44	70	123	379	111	83
Future Volume (veh/h)	101	870	10	141	1060	278	44	70	123	379	111	83
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, 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	
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1654	1870	1723	1723	1870	1723	1723	1870	1723	1723	1870	1723
Adj Flow Rate, veh/h	110	946	11	153	1152	302	48	76	134	412	121	90
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	156	1658	681	202	1743	716	200	210	187	522	155	115
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
Prop Arrive On Green	0.10	0.47	0.47	0.12	0.49	0.49	0.12	0.12	0.10	0.16	0.16	0.14
Unsig. Movement Delay												
Ln Grp Delay, s/veh	62.5	24.6	5.9	65.7	25.0	6.6	48.3	49.8	57.2	54.6	0.0	54.0
Ln Grp LOS	E	C	A	E	C	A	D	D	E	D	A	D
Approach Vol, veh/h	1067				1607			258			623	
Approach Delay, s/veh	28.3				25.4			53.4			54.4	
Approach LOS	C				C			D			D	
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	2		1	3	4	6	5	7	8			
Case No	4.0		2.0	2.0	3.0	4.0	2.0	2.0	3.0			
Phs Duration (G+Y+Rc), s	18.2		23.1	18.8	60.0	22.7	18.6	15.9	62.8			
Change Period (Y+Rc), s	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0			
Max Green (Gmax), s	18.0		20.0	13.0	45.0	34.0	4.0	11.0	47.0			
Max Allow Headway (MAH), s	4.2		4.1	4.1	4.0	4.1	4.1	4.1	4.1			
Max Q Clear (g_c+l1), s	11.8		16.5	12.8	25.2	16.0	5.2	10.1	31.3			
Green Ext Time (g_e), s	0.4		0.6	0.0	4.2	0.6	0.0	0.0	6.1			
Prob of Phs Call (p_c)	1.00		1.00	0.99	1.00	1.00	0.80	0.97	1.00			
Prob of Max Out (p_x)	0.27		1.00	1.00	0.00	0.00	1.00	1.00	0.00			
Left-Turn Movement Data												
Assigned Mvmt			1	3			5	7				
Mvmt Sat Flow, veh/h			3281	1641			1641	1575				
Through Movement Data												
Assigned Mvmt	2				4	6			8			
Mvmt Sat Flow, veh/h	1777				3554	996			3554			
Right-Turn Movement Data												
Assigned Mvmt	12				14	16			18			
Mvmt Sat Flow, veh/h	1585				1460	741			1460			
Left Lane Group Data												
Assigned Mvmt	0		1	3	0	0	5	7	0			
Lane Assignment			L (Prot)L (Prot)				L (Prot)L (Prot)					

HCM 6th Signalized Intersection Capacity Analysis

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Lanes in Grp	0	2	1	0	0	1	1	0
Grp Vol (v), veh/h	0	412	153	0	0	48	110	0
Grp Sat Flow (s), veh/h/ln	0	1641	1641	0	0	1641	1575	0
Q Serve Time (g_s), s	0.0	14.5	10.8	0.0	0.0	3.2	8.1	0.0
Cycle Q Clear Time (g_c), s	0.0	14.5	10.8	0.0	0.0	3.2	8.1	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
Lane Grp Cap (c), veh/h	0	522	202	0	0	200	156	0
V/C Ratio (X)	0.00	0.79	0.76	0.00	0.00	0.24	0.71	0.00
Avail Cap (c_a), veh/h	0	602	205	0	0	200	171	0
Upstream Filter (I)	0.00	1.00	1.00	0.00	0.00	1.00	0.89	0.00
Uniform Delay (d1), s/veh	0.0	48.5	50.9	0.0	0.0	47.7	52.4	0.0
Incr Delay (d2), s/veh	0.0	6.1	14.8	0.0	0.0	0.6	10.1	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	54.6	65.7	0.0	0.0	48.3	62.5	0.0
1st-Term Q (Q1), veh/ln	0.0	5.7	4.3	0.0	0.0	1.3	3.1	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.4	0.8	0.0	0.0	0.0	0.4	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	6.1	5.1	0.0	0.0	1.3	3.5	0.0
%ile Storage Ratio (RQ%)	0.00	1.03	1.29	0.00	0.00	0.47	0.30	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Middle Lane Group Data

Assigned Mvmt	2	0	0	4	6	0	0	8
Lane Assignment	T			T				T
Lanes in Grp	1	0	0	2	0	0	0	2
Grp Vol (v), veh/h	76	0	0	946	0	0	0	1152
Grp Sat Flow (s), veh/h/ln	1777	0	0	1777	0	0	0	1777
Q Serve Time (g_s), s	4.7	0.0	0.0	23.2	0.0	0.0	0.0	29.3
Cycle Q Clear Time (g_c), s	4.7	0.0	0.0	23.2	0.0	0.0	0.0	29.3
Lane Grp Cap (c), veh/h	210	0	0	1658	0	0	0	1743
V/C Ratio (X)	0.36	0.00	0.00	0.57	0.00	0.00	0.00	0.66
Avail Cap (c_a), veh/h	296	0	0	1658	0	0	0	1743
Upstream Filter (I)	1.00	0.00	0.00	0.89	0.00	0.00	0.00	1.00
Uniform Delay (d1), s/veh	48.7	0.0	0.0	23.3	0.0	0.0	0.0	23.1
Incr Delay (d2), s/veh	1.0	0.0	0.0	1.3	0.0	0.0	0.0	2.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	49.8	0.0	0.0	24.6	0.0	0.0	0.0	25.0
1st-Term Q (Q1), veh/ln	2.0	0.0	0.0	8.9	0.0	0.0	0.0	11.1
2nd-Term Q (Q2), veh/ln	0.1	0.0	0.0	0.3	0.0	0.0	0.0	0.5

HCM 6th Signalized Intersection Capacity Analysis

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3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	2.1	0.0	0.0	9.2	0.0	0.0	0.0	11.6
%ile Storage Ratio (RQ%)	0.02	0.00	0.00	0.04	0.00	0.00	0.00	0.05
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	12	0	0	14	16	0	0	18
Lane Assignment	T+R			R	T+R			R
Lanes in Grp	1	0	0	1	1	0	0	1
Grp Vol (v), veh/h	134	0	0	11	211	0	0	302
Grp Sat Flow (s), veh/h/ln	1585	0	0	1460	1737	0	0	1460
Q Serve Time (g_s), s	9.8	0.0	0.0	0.3	14.0	0.0	0.0	7.8
Cycle Q Clear Time (g_c), s	9.8	0.0	0.0	0.3	14.0	0.0	0.0	7.8
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	1.00	0.00	0.00	1.00	0.43	0.00	0.00	1.00
Lane Grp Cap (c), veh/h	187	0	0	681	270	0	0	716
V/C Ratio (X)	0.72	0.00	0.00	0.02	0.78	0.00	0.00	0.42
Avail Cap (c_a), veh/h	264	0	0	681	521	0	0	716
Upstream Filter (I)	1.00	0.00	0.00	0.89	1.00	0.00	0.00	1.00
Uniform Delay (d1), s/veh	52.0	0.0	0.0	5.9	49.1	0.0	0.0	4.7
Incr Delay (d2), s/veh	5.3	0.0	0.0	0.0	4.9	0.0	0.0	1.8
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	57.2	0.0	0.0	5.9	54.0	0.0	0.0	6.6
1st-Term Q (Q1), veh/ln	3.8	0.0	0.0	0.2	5.9	0.0	0.0	4.3
2nd-Term Q (Q2), veh/ln	0.3	0.0	0.0	0.0	0.4	0.0	0.0	0.4
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	4.1	0.0	0.0	0.2	6.2	0.0	0.0	4.6
%ile Storage Ratio (RQ%)	0.04	0.00	0.00	0.01	0.09	0.00	0.00	0.59
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 6th Ctrl Delay	33.4
HCM 6th LOS	C







Notes

User approved volume balancing among the lanes for turning movement.

Intersection

Intersection Delay, s/veh

Intersection LOS A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	41	52	9	44	66	6	9	106	32	8	100	63
Future Vol, veh/h	41	52	9	44	66	6	9	106	32	8	100	63
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	45	57	10	48	72	7	10	115	35	9	109	68
Number of Lanes	1	1	0	1	1	0	0	1	0	0	1	0























Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	8.9	9	8.9	9
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	6%	100%	0%	100%	0%	5%
Vol Thru, %	72%	0%	85%	0%	92%	58%
Vol Right, %	22%	0%	15%	0%	8%	37%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	147	41	61	44	72	171
LT Vol	9	41	0	44	0	8
Through Vol	106	0	52	0	66	100
RT Vol	32	0	9	0	6	63
Lane Flow Rate	160	45	66	48	78	186
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.207	0.074	0.099	0.079	0.117	0.235
Departure Headway (Hd)	4.666	5.986	5.377	5.966	5.403	4.546
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	767	595	662	597	660	788
Service Time	2.711	3.752	3.142	3.732	3.168	2.588
HCM Lane V/C Ratio	0.209	0.076	0.1	0.08	0.118	0.236
HCM Control Delay	8.9	9.2	8.7	9.2	8.9	9
HCM Lane LOS	A	A	A	A	A	A
HCM 95th-tile Q	0.8	0.2	0.3	0.3	0.4	0.9

HCM 6th Signalized Intersection Capacity Analysis

4: SR 395 & Eucalyptus St

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	19	21	37	79	14	21	39	1311	141	25	1075	34
Future Volume (veh/h)	19	21	37	79	14	21	39	1311	141	25	1075	34
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, 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		
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1723	1870	1723	1723	1870	1723	1723	1870	1723	1723	1870	1723
Adj Flow Rate, veh/h	21	23	40	86	15	23	42	1425	153	27	1168	37
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	299	159	124	155	242	189	232	1854	762	89	1545	635
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
Prop Arrive On Green	0.05	0.09	0.09	0.09	0.13	0.13	0.14	0.52	0.52	0.05	0.43	0.43
Unsig. Movement Delay												
Ln Grp Delay, s/veh	24.9	28.1	13.2	31.4	25.1	13.6	25.1	13.2	1.6	31.6	16.3	3.7
Ln Grp LOS	C	C	B	C	C	B	C	B	A	C	B	A
Approach Vol, veh/h	84			124			1620			1232		
Approach Delay, s/veh	20.2			27.3			12.4			16.3		
Approach LOS	C			C			B			B		
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	2		1	3	4	6	5	7	8			
Case No	3.0		2.0	2.0	3.0	3.0	2.0	1.1	3.0			
Phs Duration (G+Y+Rc), s	38.1		7.6	10.2	9.6	32.4	13.2	7.3	12.5			
Change Period (Y+Rc), s	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0			
Max Green (Gmax), s	56.5		4.0	5.0	30.5	56.5	4.0	4.0	31.5			
Max Allow Headway (MAH), s	4.0		4.1	4.1	4.2	4.0	4.1	4.1	4.2			
Max Q Clear (g_c+l1), s	22.9		3.0	5.3	3.1	20.1	3.5	2.7	2.7			
Green Ext Time (g_e), s	9.2		0.0	0.0	0.2	6.3	0.0	0.0	0.1			
Prob of Phs Call (p_c)	1.00		0.39	0.79	0.89	1.00	0.53	0.32	0.97			
Prob of Max Out (p_x)	0.04		1.00	1.00	0.00	0.00	1.00	1.00	0.00			
Left-Turn Movement Data												
Assigned Mvmt			1	3			5	7				
Mvmt Sat Flow, veh/h			1641	1641			1641	1641				
Through Movement Data												
Assigned Mvmt	2				4	6			8			
Mvmt Sat Flow, veh/h	3554				1870	3554			1870			
Right-Turn Movement Data												
Assigned Mvmt	12				14	16			18			
Mvmt Sat Flow, veh/h	1460				1460	1460			1460			
Left Lane Group Data												
Assigned Mvmt	0		1	3	0	0	5	7	0			
Lane Assignment			L (Prot)	L (Prot)			L (Prot)	(Pr/Pm)				

HCM 6th Signalized Intersection Capacity Analysis

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Lanes in Grp	0	1	1	0	0	1	1	0
Grp Vol (v), veh/h	0	27	86	0	0	42	21	0
Grp Sat Flow (s), veh/h/ln	0	1641	1641	0	0	1641	1641	0
Q Serve Time (g_s), s	0.0	1.0	3.3	0.0	0.0	1.5	0.7	0.0
Cycle Q Clear Time (g_c), s	0.0	1.0	3.3	0.0	0.0	1.5	0.7	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	1262	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	5.6	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	5.6	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
Lane Grp Cap (c), veh/h	0	89	155	0	0	232	299	0
V/C Ratio (X)	0.00	0.30	0.56	0.00	0.00	0.18	0.07	0.00
Avail Cap (c_a), veh/h	0	151	176	0	0	232	368	0
Upstream Filter (I)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	29.7	28.3	0.0	0.0	24.7	24.8	0.0
Incr Delay (d2), s/veh	0.0	1.9	3.1	0.0	0.0	0.4	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
Control Delay (d), s/veh	0.0	31.6	31.4	0.0	0.0	25.1	24.9	0.0
1st-Term Q (Q1), veh/ln	0.0	0.4	1.1	0.0	0.0	0.5	0.2	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	0.4	1.3	0.0	0.0	0.5	0.3	0.0
%ile Storage Ratio (RQ%)	0.00	0.03	0.11	0.00	0.00	0.03	0.07	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	2	0	0	4	6	0	0	8
Lane Assignment	T			T	T			T
Lanes in Grp	2	0	0	1	2	0	0	1
Grp Vol (v), veh/h	1425	0	0	23	1168	0	0	15
Grp Sat Flow (s), veh/h/ln	1777	0	0	1870	1777	0	0	1870
Q Serve Time (g_s), s	20.9	0.0	0.0	0.7	18.1	0.0	0.0	0.5
Cycle Q Clear Time (g_c), s	20.9	0.0	0.0	0.7	18.1	0.0	0.0	0.5
Lane Grp Cap (c), veh/h	1854	0	0	159	1545	0	0	242
V/C Ratio (X)	0.77	0.00	0.00	0.14	0.76	0.00	0.00	0.06
Avail Cap (c_a), veh/h	3179	0	0	929	3179	0	0	958
Upstream Filter (I)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d1), s/veh	12.5	0.0	0.0	27.7	15.6	0.0	0.0	25.0
Incr Delay (d2), s/veh	0.7	0.0	0.0	0.4	0.8	0.0	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
Control Delay (d), s/veh	13.2	0.0	0.0	28.1	16.3	0.0	0.0	25.1
1st-Term Q (Q1), veh/ln	5.6	0.0	0.0	0.3	5.4	0.0	0.0	0.2
2nd-Term Q (Q2), veh/ln	0.2	0.0	0.0	0.0	0.2	0.0	0.0	0.0

HCM 6th Signalized Intersection Capacity Analysis

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3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	5.7	0.0	0.0	0.3	5.6	0.0	0.0	0.2
%ile Storage Ratio (RQ%)	0.11	0.00	0.00	0.00	0.06	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	12	0	0	14	16	0	0	18
Lane Assignment	R			R	R			R
Lanes in Grp	1	0	0	1	1	0	0	1
Grp Vol (v), veh/h	153	0	0	40	37	0	0	23
Grp Sat Flow (s), veh/h/ln	1460	0	0	1460	1460	0	0	1460
Q Serve Time (g_s), s	1.5	0.0	0.0	1.1	0.6	0.0	0.0	0.7
Cycle Q Clear Time (g_c), s	1.5	0.0	0.0	1.1	0.6	0.0	0.0	0.7
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
Lane Grp Cap (c), veh/h	762	0	0	124	635	0	0	189
V/C Ratio (X)	0.20	0.00	0.00	0.32	0.06	0.00	0.00	0.12
Avail Cap (c_a), veh/h	1306	0	0	725	1306	0	0	748
Upstream Filter (I)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d1), s/veh	1.5	0.0	0.0	11.7	3.7	0.0	0.0	13.3
Incr Delay (d2), s/veh	0.1	0.0	0.0	1.5	0.0	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
Control Delay (d), s/veh	1.6	0.0	0.0	13.2	3.7	0.0	0.0	13.6
1st-Term Q (Q1), veh/ln	0.7	0.0	0.0	0.5	0.2	0.0	0.0	0.3
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.7	0.0	0.0	0.6	0.2	0.0	0.0	0.3
%ile Storage Ratio (RQ%)	0.06	0.00	0.00	0.57	0.02	0.00	0.00	0.29
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 6th Ctrl Delay	14.8
HCM 6th LOS	B

Intersection

Intersection Delay, s/veh

Intersection LOS A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		←	←	←	←			←			←	←
Traffic Vol, veh/h	22	79	67	58	47	4	34	10	47	5	19	19
Future Vol, veh/h	22	79	67	58	47	4	34	10	47	5	19	19
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	24	86	73	63	51	4	37	11	51	5	21	21
Number of Lanes	0	1	1	1	1	0	0	1	0	0	1	0






Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach	WB	SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	8.2	8.5	8.1	7.8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	37%	22%	0%	100%	0%	12%
Vol Thru, %	11%	78%	0%	0%	92%	44%
Vol Right, %	52%	0%	100%	0%	8%	44%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	91	101	67	58	51	43
LT Vol	34	22	0	58	0	5
Through Vol	10	79	0	0	47	19
RT Vol	47	0	67	0	4	19
Lane Flow Rate	99	110	73	63	55	47
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.123	0.155	0.087	0.097	0.077	0.059
Departure Headway (Hd)	4.468	5.092	4.279	5.53	4.972	4.524
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	803	705	838	649	721	792
Service Time	2.491	2.818	2.005	3.258	2.7	2.552
HCM Lane V/C Ratio	0.123	0.156	0.087	0.097	0.076	0.059
HCM Control Delay	8.1	8.8	7.4	8.9	8.1	7.8
HCM Lane LOS	A	A	A	A	A	A
HCM 95th-tile Q	0.4	0.5	0.3	0.3	0.2	0.2

Intersection

Int Delay, s/veh 7.1

Movement

	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	115	18	16	3	1	120
Future Vol, veh/h	115	18	16	3	1	120
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	50	-	-	-	0	-
Veh in Median Storage, #	0	0	-	0	-	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	125	20	17	3	1	130

Major/Minor

	Major1	Major2	Minor2
Conflicting Flow All	20	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.12	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.218	-	-
Pot Cap-1 Maneuver	1596	-	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1596	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach

























	EB	WB	SB
HCM Control Delay, s	4	0	8.9
HCM LOS			A

Minor Lane/Major Mvmt

	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1596	-	-	-	1053
HCM Lane V/C Ratio	0.078	-	-	-	0.125
HCM Control Delay (s)	7.4	-	-	-	8.9
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0.3	-	-	-	0.4

HCM 6th Signalized Intersection Capacity Analysis
1: Topaz Rd & Bear Valley Rd

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	62	645	12	166	728	187	19	44	133	154	65	40
Future Volume (veh/h)	62	645	12	166	728	187	19	44	133	154	65	40
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, 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	
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1723	1870	1723	1723	1870	1723	1723	1870	1723	1723	1870	1723
Adj Flow Rate, veh/h	67	701	13	180	791	203	21	48	145	167	71	43
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	315	1722	708	231	1213	311	276	202	158	218	136	106
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
Prop Arrive On Green	0.19	0.48	0.48	0.14	0.43	0.42	0.17	0.11	0.11	0.13	0.07	0.07
Unsig. Movement Delay												
Ln Grp Delay, s/veh	41.1	20.6	3.7	54.8	29.1	29.6	42.2	49.6	55.3	58.8	56.7	55.6
Ln Grp LOS	D	C	A	D	C	C	D	D	E	E	E	E
Approach Vol, veh/h		781			1174			214			281	
Approach Delay, s/veh		22.1			33.3			52.7			57.8	
Approach LOS		C			C			D			E	
Timer:		1	2	3	4	5	6	7	8			
Assigned Phs		2	1	3	4	6	5	8	7			
Case No		3.0	2.0	2.0	3.0	3.0	2.0	4.0	2.0			
Phs Duration (G+Y+Rc), s		17.0	20.0	20.9	62.2	12.7	24.2	56.0	27.1			
Change Period (Y+Rc), s		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0			
Max Green (Gmax), s		18.0	19.0	20.0	39.0	33.0	4.0	50.0	9.0			
Max Allow Headway (MAH), s		4.2	4.1	4.1	4.0	4.1	4.1	4.1	4.1			
Max Q Clear (g_c+l1), s		10.6	13.8	14.7	17.2	6.4	3.3	28.9	6.1			
Green Ext Time (g_e), s		0.4	0.2	0.2	3.0	0.3	0.0	3.9	0.0			
Prob of Phs Call (p_c)		1.00	1.00	1.00	1.00	1.00	0.50	1.00	0.89			
Prob of Max Out (p_x)		0.12	0.42	0.41	0.00	0.00	1.00	0.00	1.00			
Left-Turn Movement Data												
Assigned Mvmt			1	3			5		7			
Mvmt Sat Flow, veh/h			1641	1641			1641		1641			
Through Movement Data												
Assigned Mvmt		2			4	6		8				
Mvmt Sat Flow, veh/h		1870			3554	1870		2799				
Right-Turn Movement Data												
Assigned Mvmt		12			14	16		18				
Mvmt Sat Flow, veh/h		1460			1460	1460		718				
Left Lane Group Data												
Assigned Mvmt		0	1	3	0	0	5	0	7			
Lane Assignment		L (Prot)	L (Prot)				L (Prot)		L (Prot)			

HCM 6th Signalized Intersection Capacity Analysis

1: Topaz Rd & Bear Valley Rd

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Lanes in Grp	0	1	1	0	0	1	0	1
Grp Vol (v), veh/h	0	167	180	0	0	21	0	67
Grp Sat Flow (s), veh/h/ln	0	1641	1641	0	0	1641	0	1641
Q Serve Time (g_s), s	0.0	11.8	12.7	0.0	0.0	1.3	0.0	4.1
Cycle Q Clear Time (g_c), s	0.0	11.8	12.7	0.0	0.0	1.3	0.0	4.1
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	218	231	0	0	276	0	315
V/C Ratio (X)	0.00	0.77	0.78	0.00	0.00	0.08	0.00	0.21
Avail Cap (c_a), veh/h	0	287	301	0	0	276	0	315
Upstream Filter (I)	0.00	1.00	0.53	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	50.2	49.7	0.0	0.0	42.0	0.0	40.8
Incr Delay (d2), s/veh	0.0	8.6	5.1	0.0	0.0	0.1	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
Control Delay (d), s/veh	0.0	58.8	54.8	0.0	0.0	42.2	0.0	41.1
1st-Term Q (Q1), veh/ln	0.0	4.6	5.0	0.0	0.0	0.5	0.0	1.6
2nd-Term Q (Q2), veh/ln	0.0	0.5	0.3	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	5.1	5.3	0.0	0.0	0.5	0.0	1.6
%ile Storage Ratio (RQ%)	0.00	1.31	0.67	0.00	0.00	0.09	0.00	0.28
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	2	0	0	4	6	0	8	0
Lane Assignment	T			T	T		T	
Lanes in Grp	1	0	0	2	1	0	1	0
Grp Vol (v), veh/h	48	0	0	701	71	0	502	0
Grp Sat Flow (s), veh/h/ln	1870	0	0	1777	1870	0	1777	0
Q Serve Time (g_s), s	2.8	0.0	0.0	15.2	4.4	0.0	26.8	0.0
Cycle Q Clear Time (g_c), s	2.8	0.0	0.0	15.2	4.4	0.0	26.8	0.0
Lane Grp Cap (c), veh/h	202	0	0	1722	136	0	770	0
V/C Ratio (X)	0.24	0.00	0.00	0.41	0.52	0.00	0.65	0.00
Avail Cap (c_a), veh/h	312	0	0	1722	546	0	770	0
Upstream Filter (I)	1.00	0.00	0.00	1.00	1.00	0.00	0.53	0.00
Uniform Delay (d1), s/veh	49.0	0.0	0.0	19.9	53.6	0.0	26.9	0.0
Incr Delay (d2), s/veh	0.6	0.0	0.0	0.7	3.1	0.0	2.3	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	49.6	0.0	0.0	20.6	56.7	0.0	29.1	0.0
1st-Term Q (Q1), veh/ln	1.3	0.0	0.0	5.7	2.0	0.0	10.4	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.2	0.1	0.0	0.5	0.0

HCM 6th Signalized Intersection Capacity Analysis

1: Topaz Rd & Bear Valley Rd

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3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	0.00	1.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	1.3	0.0	0.0	5.9	2.1	0.0	10.9	0.0
%ile Storage Ratio (RQ%)	0.01	0.00	0.00	0.06	0.03	0.00	0.05	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	12	0	0	14	16	0	18	0
Lane Assignment	R			R	R		T+R	
Lanes in Grp	1	0	0	1	1	0	1	0
Grp Vol (v), veh/h	145	0	0	13	43	0	492	0
Grp Sat Flow (s), veh/h/ln	1460	0	0	1460	1460	0	1741	0
Q Serve Time (g_s), s	8.6	0.0	0.0	0.3	3.4	0.0	26.9	0.0
Cycle Q Clear Time (g_c), s	8.6	0.0	0.0	0.3	3.4	0.0	26.9	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	1.00	0.00	0.00	1.00	1.00	0.00	0.41	0.00
Lane Grp Cap (c), veh/h	158	0	0	708	106	0	754	0
V/C Ratio (X)	0.92	0.00	0.00	0.02	0.40	0.00	0.65	0.00
Avail Cap (c_a), veh/h	243	0	0	708	426	0	754	0
Upstream Filter (I)	1.00	0.00	0.00	1.00	1.00	0.00	0.53	0.00
Uniform Delay (d1), s/veh	28.2	0.0	0.0	3.7	53.2	0.0	27.2	0.0
Incr Delay (d2), s/veh	27.1	0.0	0.0	0.0	2.5	0.0	2.3	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	55.3	0.0	0.0	3.7	55.6	0.0	29.6	0.0
1st-Term Q (Q1), veh/ln	4.0	0.0	0.0	0.2	1.2	0.0	10.3	0.0
2nd-Term Q (Q2), veh/ln	1.2	0.0	0.0	0.0	0.1	0.0	0.5	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	0.00	1.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	5.2	0.0	0.0	0.2	1.3	0.0	10.8	0.0
%ile Storage Ratio (RQ%)	0.88	0.00	0.00	0.00	0.32	0.00	0.05	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0























Intersection Summary

HCM 6th Ctrl Delay	34.2
HCM 6th LOS	C

HCM 6th Signalized Intersection Capacity Analysis

2: Amethyst Rd & Bear Valley Rd

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	107	882	11	143	1082	278	46	70	123	379	111	94
Future Volume (veh/h)	107	882	11	143	1082	278	46	70	123	379	111	94
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, 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			
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1654	1870	1723	1723	1870	1723	1723	1870	1723	1723	1870	1723
Adj Flow Rate, veh/h	116	959	12	155	1176	302	50	76	134	412	121	102
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	162	1653	679	204	1728	710	187	210	187	522	153	129
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
Prop Arrive On Green	0.10	0.47	0.47	0.12	0.49	0.49	0.11	0.12	0.10	0.16	0.16	0.15
Unsig. Movement Delay												
Ln Grp Delay, s/veh	61.7	24.8	6.3	66.1	25.9	6.8	49.3	49.8	57.2	54.6	0.0	53.6
Ln Grp LOS	E	C	A	E	C	A	D	D	E	D	A	D
Approach Vol, veh/h	1087				1633				260			
Approach Delay, s/veh	28.5				26.1				53.5			
Approach LOS	C				C				D			
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	2		1	3	4	6	5	7	8			
Case No	4.0		2.0	2.0	3.0	4.0	2.0	2.0	3.0			
Phs Duration (G+Y+Rc), s	18.2		23.1	18.9	59.8	23.6	17.7	16.4	62.3			
Change Period (Y+Rc), s	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0			
Max Green (Gmax), s	18.0		20.0	13.0	45.0	34.0	4.0	12.0	46.0			
Max Allow Headway (MAH), s	4.2		4.1	4.1	4.0	4.1	4.1	4.1	4.1			
Max Q Clear (g_c+l1), s	11.8		16.5	13.0	25.7	16.9	5.3	10.6	32.5			
Green Ext Time (g_e), s	0.4		0.6	0.0	4.2	0.7	0.0	0.0	5.8			
Prob of Phs Call (p_c)	1.00		1.00	0.99	1.00	1.00	0.81	0.98	1.00			
Prob of Max Out (p_x)	0.27		1.00	1.00	0.00	0.00	1.00	1.00	0.00			
Left-Turn Movement Data												
Assigned Mvmt			1	3			5	7				
Mvmt Sat Flow, veh/h			3281	1641			1641	1575				
Through Movement Data												
Assigned Mvmt	2				4	6			8			
Mvmt Sat Flow, veh/h	1777				3554	938			3554			
Right-Turn Movement Data												
Assigned Mvmt	12				14	16			18			
Mvmt Sat Flow, veh/h	1585				1460	790			1460			
Left Lane Group Data												
Assigned Mvmt	0		1	3	0	0	5	7	0			
Lane Assignment			L (Prot)	L (Prot)			L (Prot)	L (Prot)				

HCM 6th Signalized Intersection Capacity Analysis

2: Amethyst Rd & Bear Valley Rd

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Lanes in Grp	0	2	1	0	0	1	1	0
Grp Vol (v), veh/h	0	412	155	0	0	50	116	0
Grp Sat Flow (s), veh/h/ln	0	1641	1641	0	0	1641	1575	0
Q Serve Time (g_s), s	0.0	14.5	11.0	0.0	0.0	3.3	8.6	0.0
Cycle Q Clear Time (g_c), s	0.0	14.5	11.0	0.0	0.0	3.3	8.6	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
Lane Grp Cap (c), veh/h	0	522	204	0	0	187	162	0
V/C Ratio (X)	0.00	0.79	0.76	0.00	0.00	0.27	0.71	0.00
Avail Cap (c_a), veh/h	0	602	205	0	0	187	184	0
Upstream Filter (I)	0.00	1.00	1.00	0.00	0.00	1.00	0.88	0.00
Uniform Delay (d1), s/veh	0.0	48.5	50.8	0.0	0.0	48.6	52.1	0.0
Incr Delay (d2), s/veh	0.0	6.1	15.2	0.0	0.0	0.8	9.6	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	54.6	66.1	0.0	0.0	49.3	61.7	0.0
1st-Term Q (Q1), veh/ln	0.0	5.7	4.3	0.0	0.0	1.3	3.2	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.4	0.9	0.0	0.0	0.0	0.4	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	6.1	5.2	0.0	0.0	1.4	3.7	0.0
%ile Storage Ratio (RQ%)	0.00	1.03	1.31	0.00	0.00	0.49	0.31	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	2	0	0	4	6	0	0	8
Lane Assignment	T			T				T
Lanes in Grp	1	0	0	2	0	0	0	2
Grp Vol (v), veh/h	76	0	0	959	0	0	0	1176
Grp Sat Flow (s), veh/h/ln	1777	0	0	1777	0	0	0	1777
Q Serve Time (g_s), s	4.7	0.0	0.0	23.7	0.0	0.0	0.0	30.5
Cycle Q Clear Time (g_c), s	4.7	0.0	0.0	23.7	0.0	0.0	0.0	30.5
Lane Grp Cap (c), veh/h	210	0	0	1653	0	0	0	1728
V/C Ratio (X)	0.36	0.00	0.00	0.58	0.00	0.00	0.00	0.68
Avail Cap (c_a), veh/h	296	0	0	1653	0	0	0	1728
Upstream Filter (I)	1.00	0.00	0.00	0.88	0.00	0.00	0.00	1.00
Uniform Delay (d1), s/veh	48.7	0.0	0.0	23.5	0.0	0.0	0.0	23.7
Incr Delay (d2), s/veh	1.0	0.0	0.0	1.3	0.0	0.0	0.0	2.2
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	49.8	0.0	0.0	24.8	0.0	0.0	0.0	25.9
1st-Term Q (Q1), veh/ln	2.0	0.0	0.0	9.1	0.0	0.0	0.0	11.5
2nd-Term Q (Q2), veh/ln	0.1	0.0	0.0	0.3	0.0	0.0	0.0	0.5

HCM 6th Signalized Intersection Capacity Analysis 2: Amethyst Rd & Bear Valley Rd

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3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	2.1	0.0	0.0	9.4	0.0	0.0	0.0	12.0
%ile Storage Ratio (RQ%)	0.02	0.00	0.00	0.05	0.00	0.00	0.00	0.05
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	12	0	0	14	16	0	0	18
Lane Assignment	T+R			R	T+R			R
Lanes in Grp	1	0	0	1	1	0	0	1
Grp Vol (v), veh/h	134	0	0	12	223	0	0	302
Grp Sat Flow (s), veh/h/ln	1585	0	0	1460	1728	0	0	1460
Q Serve Time (g_s), s	9.8	0.0	0.0	0.3	14.9	0.0	0.0	8.0
Cycle Q Clear Time (g_c), s	9.8	0.0	0.0	0.3	14.9	0.0	0.0	8.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	1.00	0.00	0.00	1.00	0.46	0.00	0.00	1.00
Lane Grp Cap (c), veh/h	187	0	0	679	282	0	0	710
V/C Ratio (X)	0.72	0.00	0.00	0.02	0.79	0.00	0.00	0.43
Avail Cap (c_a), veh/h	264	0	0	679	518	0	0	710
Upstream Filter (I)	1.00	0.00	0.00	0.88	1.00	0.00	0.00	1.00
Uniform Delay (d1), s/veh	52.0	0.0	0.0	6.2	48.7	0.0	0.0	4.9
Incr Delay (d2), s/veh	5.3	0.0	0.0	0.0	4.9	0.0	0.0	1.9
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	57.2	0.0	0.0	6.3	53.6	0.0	0.0	6.8
1st-Term Q (Q1), veh/ln	3.8	0.0	0.0	0.2	6.2	0.0	0.0	4.3
2nd-Term Q (Q2), veh/ln	0.3	0.0	0.0	0.0	0.4	0.0	0.0	0.4
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	4.1	0.0	0.0	0.2	6.6	0.0	0.0	4.7
%ile Storage Ratio (RQ%)	0.04	0.00	0.00	0.01	0.10	0.00	0.00	0.59
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary







HCM 6th Ctrl Delay	33.8
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

Intersection

Intersection Delay, s/veh
Intersection LOS A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	41	52	15	50	66	6	13	133	36	8	147	63
Future Vol, veh/h	41	52	15	50	66	6	13	133	36	8	147	63
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	45	57	16	54	72	7	14	145	39	9	160	68
Number of Lanes	1	1	0	1	1	0	0	1	0	0	1	0























Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	9.3	9.4	9.6	9.9
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	7%	100%	0%	100%	0%	4%
Vol Thru, %	73%	0%	78%	0%	92%	67%
Vol Right, %	20%	0%	22%	0%	8%	29%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	182	41	67	50	72	218
LT Vol	13	41	0	50	0	8
Through Vol	133	0	52	0	66	147
RT Vol	36	0	15	0	6	63
Lane Flow Rate	198	45	73	54	78	237
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.264	0.077	0.113	0.094	0.123	0.309
Departure Headway (Hd)	4.802	6.233	5.568	6.215	5.645	4.697
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	742	570	636	572	628	761
Service Time	2.869	4.029	3.363	4.003	3.438	2.76
HCM Lane V/C Ratio	0.267	0.079	0.115	0.094	0.124	0.311
HCM Control Delay	9.6	9.6	9.1	9.7	9.2	9.9
HCM Lane LOS	A	A	A	A	A	A
HCM 95th-tile Q	1.1	0.2	0.4	0.3	0.4	1.3

HCM 6th Signalized Intersection Capacity Analysis

4: SR 395 & Eucalyptus St

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	19	26	37	103	17	45	39	1311	181	65	1075	34
Future Volume (veh/h)	19	26	37	103	17	45	39	1311	181	65	1075	34
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, 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		
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1723	1870	1723	1723	1870	1723	1723	1870	1723	1723	1870	1723
Adj Flow Rate, veh/h	21	28	40	112	18	49	42	1425	197	71	1168	37
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	280	153	120	162	249	194	276	1825	750	132	1514	622
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
Prop Arrive On Green	0.05	0.08	0.08	0.10	0.13	0.13	0.17	0.51	0.51	0.08	0.43	0.43
Unsig. Movement Delay												
Ln Grp Delay, s/veh	27.4	31.0	13.9	42.9	27.1	14.7	25.5	14.8	2.2	35.0	18.3	4.7
Ln Grp LOS	C	C	B	D	C	B	C	B	A	C	B	A
Approach Vol, veh/h	89			179			1664			1276		
Approach Delay, s/veh	22.5			33.6			13.6			18.8		
Approach LOS	C			C			B			B		
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	2	1	3	4	6	5	7	8				
Case No	3.0	2.0	2.0	3.0	3.0	2.0	1.1	3.0				
Phs Duration (G+Y+Rc), s	40.5	9.7	11.0	9.8	34.2	15.9	7.4	13.5				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green (Gmax), s	56.5	4.0	5.0	30.5	56.5	4.0	4.0	31.5				
Max Allow Headway (MAH), s	4.0	4.1	4.1	4.2	4.0	4.1	4.1	4.2				
Max Q Clear (g_c+l1), s	25.1	5.0	6.7	3.2	22.0	3.6	2.8	3.5				
Green Ext Time (g_e), s	9.3	0.0	0.0	0.2	6.3	0.0	0.0	0.2				
Prob of Phs Call (p_c)	1.00	0.75	0.89	0.95	1.00	0.56	0.34	0.99				
Prob of Max Out (p_x)	0.06	1.00	1.00	0.00	0.01	1.00	1.00	0.00				
Left-Turn Movement Data												
Assigned Mvmt	1		3	5		7						
Mvmt Sat Flow, veh/h	1641		1641	1641		1641						
Through Movement Data												
Assigned Mvmt	2		4		6	8						
Mvmt Sat Flow, veh/h	3554		1870		3554	1870						
Right-Turn Movement Data												
Assigned Mvmt	12		14		16	18						
Mvmt Sat Flow, veh/h	1460		1460		1460	1460						
Left Lane Group Data												
Assigned Mvmt	0		1	3	0	0	5	7	0			
Lane Assignment	L (Prot)		L (Prot)		L (Prot)		L (Pr/Pm)					

HCM 6th Signalized Intersection Capacity Analysis 4: SR 395 & Eucalyptus St

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Lanes in Grp	0	1	1	0	0	1	1	0
Grp Vol (v), veh/h	0	71	112	0	0	42	21	0
Grp Sat Flow (s), veh/h/ln	0	1641	1641	0	0	1641	1641	0
Q Serve Time (g_s), s	0.0	3.0	4.7	0.0	0.0	1.6	0.8	0.0
Cycle Q Clear Time (g_c), s	0.0	3.0	4.7	0.0	0.0	1.6	0.8	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	1229	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	5.8	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	5.8	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
Lane Grp Cap (c), veh/h	0	132	162	0	0	276	280	0
V/C Ratio (X)	0.00	0.54	0.69	0.00	0.00	0.15	0.08	0.00
Avail Cap (c_a), veh/h	0	139	162	0	0	276	341	0
Upstream Filter (I)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	31.4	31.0	0.0	0.0	25.2	27.3	0.0
Incr Delay (d2), s/veh	0.0	3.6	12.0	0.0	0.0	0.3	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
Control Delay (d), s/veh	0.0	35.0	42.9	0.0	0.0	25.5	27.4	0.0
1st-Term Q (Q1), veh/ln	0.0	1.0	1.7	0.0	0.0	0.5	0.3	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.1	0.5	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	1.2	2.2	0.0	0.0	0.6	0.3	0.0
%ile Storage Ratio (RQ%)	0.00	0.07	0.19	0.00	0.00	0.04	0.07	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	2	0	0	4	6	0	0	8
Lane Assignment	T			T	T			T
Lanes in Grp	2	0	0	1	2	0	0	1
Grp Vol (v), veh/h	1425	0	0	28	1168	0	0	18
Grp Sat Flow (s), veh/h/ln	1777	0	0	1870	1777	0	0	1870
Q Serve Time (g_s), s	23.1	0.0	0.0	1.0	20.0	0.0	0.0	0.6
Cycle Q Clear Time (g_c), s	23.1	0.0	0.0	1.0	20.0	0.0	0.0	0.6
Lane Grp Cap (c), veh/h	1825	0	0	153	1514	0	0	249
V/C Ratio (X)	0.78	0.00	0.00	0.18	0.77	0.00	0.00	0.07
Avail Cap (c_a), veh/h	2927	0	0	856	2927	0	0	882
Upstream Filter (I)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d1), s/veh	14.0	0.0	0.0	30.4	17.4	0.0	0.0	26.9
Incr Delay (d2), s/veh	0.8	0.0	0.0	0.6	0.9	0.0	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
Control Delay (d), s/veh	14.8	0.0	0.0	31.0	18.3	0.0	0.0	27.1
1st-Term Q (Q1), veh/ln	6.6	0.0	0.0	0.4	6.4	0.0	0.0	0.2
2nd-Term Q (Q2), veh/ln	0.2	0.0	0.0	0.0	0.2	0.0	0.0	0.0

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3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	6.8	0.0	0.0	0.4	6.5	0.0	0.0	0.2
%ile Storage Ratio (RQ%)	0.13	0.00	0.00	0.01	0.06	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	12	0	0	14	16	0	0	18
Lane Assignment	R			R	R			R
Lanes in Grp	1	0	0	1	1	0	0	1
Grp Vol (v), veh/h	197	0	0	40	37	0	0	49
Grp Sat Flow (s), veh/h/ln	1460	0	0	1460	1460	0	0	1460
Q Serve Time (g_s), s	2.4	0.0	0.0	1.2	0.7	0.0	0.0	1.5
Cycle Q Clear Time (g_c), s	2.4	0.0	0.0	1.2	0.7	0.0	0.0	1.5
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
Lane Grp Cap (c), veh/h	750	0	0	120	622	0	0	194
V/C Ratio (X)	0.26	0.00	0.00	0.33	0.06	0.00	0.00	0.25
Avail Cap (c_a), veh/h	1203	0	0	668	1203	0	0	689
Upstream Filter (I)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d1), s/veh	2.0	0.0	0.0	12.3	4.7	0.0	0.0	14.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	1.6	0.0	0.0	0.0	0.7
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	2.2	0.0	0.0	13.9	4.7	0.0	0.0	14.7
1st-Term Q (Q1), veh/ln	1.1	0.0	0.0	0.6	0.3	0.0	0.0	0.7
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	1.1	0.0	0.0	0.6	0.3	0.0	0.0	0.7
%ile Storage Ratio (RQ%)	0.10	0.00	0.00	0.64	0.02	0.00	0.00	0.70
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 6th Ctrl Delay	17.0
HCM 6th LOS	B

Intersection

Intersection Delay, s/veh
Intersection LOS A






Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		←	↑	↑	↑			↑			↑	
Traffic Vol, veh/h	22	162	69	58	97	5	35	10	49	7	19	19
Future Vol, veh/h	22	162	69	58	97	5	35	10	49	7	19	19
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	24	176	75	63	105	5	38	11	53	8	21	21
Number of Lanes	0	1	1	1	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	9.2	8.9	8.6	8.3
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	37%	12%	0%	100%	0%	16%
Vol Thru, %	11%	88%	0%	0%	95%	42%
Vol Right, %	52%	0%	100%	0%	5%	42%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	94	184	69	58	102	45
LT Vol	35	22	0	58	0	7
Through Vol	10	162	0	0	97	19
RT Vol	49	0	69	0	5	19
Lane Flow Rate	102	200	75	63	111	49
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.137	0.285	0.091	0.099	0.158	0.067
Departure Headway (Hd)	4.81	5.13	4.366	5.653	5.115	4.902
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	744	700	818	632	700	728
Service Time	2.852	2.872	2.108	3.42	2.862	2.951
HCM Lane V/C Ratio	0.137	0.286	0.092	0.1	0.159	0.067
HCM Control Delay	8.6	9.9	7.5	9	8.8	8.3
HCM Lane LOS	A	A	A	A	A	A
HCM 95th-tile Q	0.5	1.2	0.3	0.3	0.6	0.2

Intersection

Int Delay, s/veh 8.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	124	18	29	0	16	3	17	26	0	1	44	135
Future Vol, veh/h	124	18	29	0	16	3	17	26	0	1	44	135
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	50	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	0	-	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	135	20	32	0	17	3	18	28	0	1	48	147























Major/Minor	Major1		Major2		Minor1		Minor2					
Conflicting Flow All	20	0	0	52	0	0	422	326	36	339	341	19
Stage 1	-	-	-	-	-	-	306	306	-	19	19	-
Stage 2	-	-	-	-	-	-	116	20	-	320	322	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1596	-	-	1554	-	-	542	592	1037	615	581	1059
Stage 1	-	-	-	-	-	-	704	662	-	1000	880	-
Stage 2	-	-	-	-	-	-	889	879	-	692	651	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1596	-	-	1554	-	-	407	542	1037	553	532	1059
Mov Cap-2 Maneuver	-	-	-	-	-	-	407	542	-	553	532	-
Stage 1	-	-	-	-	-	-	644	606	-	915	880	-
Stage 2	-	-	-	-	-	-	724	879	-	604	596	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	4	0	13.3	10.5
HCM LOS			B	B

Minor Lane/Major Mvm	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	479	1596	-	-	1554	-	-	849
HCM Lane V/C Ratio	0.098	0.084	-	-	-	-	-	0.23
HCM Control Delay (s)	13.3	7.5	-	-	0	-	-	10.5
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.3	0.3	-	-	0	-	-	0.9

HCM 6th Signalized Intersection Capacity Analysis
1: Topaz Rd & Bear Valley Rd

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	90	932	15	187	1051	271	26	60	164	222	84	58
Future Volume (veh/h)	90	932	15	187	1051	271	26	60	164	222	84	58
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, 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	
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	2461	2461	2461	2461	2461	2461	2461	2461	2461	2461	2461	2461
Adj Flow Rate, veh/h	98	1013	16	203	1142	295	28	65	178	241	91	63
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	141	2194	979	289	1963	502	393	263	223	330	197	167
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
Prop Arrive On Green	0.06	0.47	0.47	0.12	0.53	0.51	0.17	0.11	0.11	0.14	0.08	0.08
Unsig. Movement Delay												
Ln Grp Delay, s/veh	60.1	18.7	3.0	42.7	16.0	16.4	35.1	41.5	29.6	46.5	45.6	29.6
Ln Grp LOS	E	B	A	D	B	B	D	D	C	D	D	C
Approach Vol, veh/h	1127				1640				271			
Approach Delay, s/veh	22.1				19.5				33.0			
Approach LOS	C				B				C			
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	2		1	3	4	6	5	7	8			
Case No	3.0	2.0	2.0	3.0	3.0	2.0	2.0	4.0				
Phs Duration (G+Y+Rc), s	14.7	18.1	16.3	50.9	12.0	20.8	10.0	57.2				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green (Gmax), s	19.2	15.0	11.0	30.8	30.2	4.0	4.0	37.8				
Max Allow Headway (MAH), s	4.2	4.1	4.1	4.0	4.1	4.1	4.1	4.0				
Max Q Clear (g_c+I1), s	8.1	11.8	10.3	16.7	5.5	3.0	6.1	23.5				
Green Ext Time (g_e), s	0.6	0.2	0.0	4.1	0.5	0.0	0.0	5.6				
Prob of Phs Call (p_c)	1.00	1.00	1.00	1.00	1.00	0.54	0.93	1.00				
Prob of Max Out (p_x)	0.01	1.00	1.00	0.00	0.00	1.00	1.00	0.00				
Left-Turn Movement Data												
Assigned Mvmt			1	3			5	7				
Mvmt Sat Flow, veh/h			2344	2344			2344	2344				
Through Movement Data												
Assigned Mvmt	2				4	6			8			
Mvmt Sat Flow, veh/h	2461				4676	2461			3686			
Right-Turn Movement Data												
Assigned Mvmt	12				14	16			18			
Mvmt Sat Flow, veh/h	2086				2086	2086			943			
Left Lane Group Data												
Assigned Mvmt	0		1	3	0	0	5	7	0			
Lane Assignment			L (Prot)	L (Prot)			L (Prot)	L (Prot)				

HCM 6th Signalized Intersection Capacity Analysis
1: Topaz Rd & Bear Valley Rd

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Lanes in Grp	0	1	1	0	0	1	1	0
Grp Vol (v), veh/h	0	241	203	0	0	28	98	0
Grp Sat Flow (s), veh/h/ln	0	2344	2344	0	0	2344	2344	0
Q Serve Time (g_s), s	0.0	9.8	8.3	0.0	0.0	1.0	4.1	0.0
Cycle Q Clear Time (g_c), s	0.0	9.8	8.3	0.0	0.0	1.0	4.1	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
Lane Grp Cap (c), veh/h	0	330	289	0	0	393	141	0
V/C Ratio (X)	0.00	0.73	0.70	0.00	0.00	0.07	0.70	0.00
Avail Cap (c_a), veh/h	0	398	305	0	0	393	141	0
Upstream Filter (I)	0.00	1.00	0.09	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	41.1	42.1	0.0	0.0	35.1	46.1	0.0
Incr Delay (d2), s/veh	0.0	5.4	0.6	0.0	0.0	0.1	14.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	46.5	42.7	0.0	0.0	35.1	60.1	0.0
1st-Term Q (Q1), veh/ln	0.0	5.3	4.5	0.0	0.0	0.5	2.3	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.5	0.1	0.0	0.0	0.0	0.5	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	5.8	4.6	0.0	0.0	0.6	2.8	0.0
%ile Storage Ratio (RQ%)	0.00	1.48	0.58	0.00	0.00	0.09	0.48	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	2	0	0	4	6	0	0	8
Lane Assignment	T			T	T			T
Lanes in Grp	1	0	0	2	1	0	0	1
Grp Vol (v), veh/h	65	0	0	1013	91	0	0	720
Grp Sat Flow (s), veh/h/ln	2461	0	0	2338	2461	0	0	2338
Q Serve Time (g_s), s	2.4	0.0	0.0	14.7	3.5	0.0	0.0	20.8
Cycle Q Clear Time (g_c), s	2.4	0.0	0.0	14.7	3.5	0.0	0.0	20.8
Lane Grp Cap (c), veh/h	263	0	0	2194	197	0	0	1245
V/C Ratio (X)	0.25	0.00	0.00	0.46	0.46	0.00	0.00	0.58
Avail Cap (c_a), veh/h	522	0	0	2194	792	0	0	1245
Upstream Filter (I)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	0.09
Uniform Delay (d1), s/veh	41.0	0.0	0.0	18.0	43.9	0.0	0.0	15.8
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.7	1.7	0.0	0.0	0.2
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	41.5	0.0	0.0	18.7	45.6	0.0	0.0	16.0
1st-Term Q (Q1), veh/ln	1.4	0.0	0.0	7.0	2.0	0.0	0.0	9.4
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.1

HCM 6th Signalized Intersection Capacity Analysis
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3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	1.4	0.0	0.0	7.2	2.1	0.0	0.0	9.4
%ile Storage Ratio (RQ%)	0.01	0.00	0.00	0.07	0.03	0.00	0.00	0.05
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	12	0	0	14	16	0	0	18
Lane Assignment	R			R	R			T+R
Lanes in Grp	1	0	0	1	1	0	0	1
Grp Vol (v), veh/h	178	0	0	16	63	0	0	717
Grp Sat Flow (s), veh/h/ln	2086	0	0	2086	2086	0	0	2291
Q Serve Time (g_s), s	6.1	0.0	0.0	0.2	2.3	0.0	0.0	21.5
Cycle Q Clear Time (g_c), s	6.1	0.0	0.0	0.2	2.3	0.0	0.0	21.5
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	0.41
Lane Grp Cap (c), veh/h	223	0	0	979	167	0	0	1220
V/C Ratio (X)	0.80	0.00	0.00	0.02	0.38	0.00	0.00	0.59
Avail Cap (c_a), veh/h	442	0	0	979	672	0	0	1220
Upstream Filter (I)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	0.09
Uniform Delay (d1), s/veh	23.1	0.0	0.0	3.0	28.2	0.0	0.0	16.2
Incr Delay (d2), s/veh	6.5	0.0	0.0	0.0	1.4	0.0	0.0	0.2
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	29.6	0.0	0.0	3.0	29.6	0.0	0.0	16.4
1st-Term Q (Q1), veh/ln	3.9	0.0	0.0	0.2	1.4	0.0	0.0	9.6
2nd-Term Q (Q2), veh/ln	0.4	0.0	0.0	0.0	0.1	0.0	0.0	0.1
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	4.3	0.0	0.0	0.2	1.5	0.0	0.0	9.7
%ile Storage Ratio (RQ%)	0.73	0.00	0.00	0.00	0.37	0.00	0.00	0.05
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0























Intersection Summary

HCM 6th Ctrl Delay	24.2
HCM 6th LOS	C

HCM 6th Signalized Intersection Capacity Analysis

2: Amethyst Rd & Bear Valley Rd

PM 2040
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	146	1256	15	203	1531	401	63	101	177	547	161	119
Future Volume (veh/h)	146	1256	15	203	1531	401	63	101	177	547	161	119
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, 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			
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	2363	2461	2461	2461	2461	2461	2461	2461	2461	2461	2461	2461
Adj Flow Rate, veh/h	159	1365	16	221	1664	436	68	110	192	595	175	129
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	206	2126	948	292	2279	1017	278	296	264	754	222	164
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
Prop Arrive On Green	0.09	0.45	0.45	0.12	0.49	0.49	0.12	0.13	0.11	0.16	0.17	0.15
Unsig. Movement Delay												
Ln Grp Delay, s/veh	63.5	26.1	6.5	61.6	26.6	6.1	48.5	48.8	56.6	53.2	0.0	51.8
Ln Grp LOS	E	C	A	E	C	A	D	D	E	D	A	D
Approach Vol, veh/h	1540				2321				370			
Approach Delay, s/veh	29.8				26.1				52.8			
Approach LOS	C				C				D			
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	2	1	3	4	6	5	7	8				
Case No	4.0	2.0	2.0	3.0	4.0	2.0	2.0	3.0				
Phs Duration (G+Y+Rc), s	19.2	23.3	18.9	58.6	24.3	18.2	15.0	62.5				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green (Gmax), s	18.0	19.0	13.0	46.0	33.0	4.0	9.0	50.0				
Max Allow Headway (MAH), s	4.2	4.1	4.1	4.0	4.1	4.1	4.1	4.0				
Max Q Clear (g_c+l1), s	12.7	16.6	12.9	29.0	17.3	5.2	10.3	36.0				
Green Ext Time (g_e), s	0.5	0.7	0.0	6.3	0.9	0.0	0.0	8.7				
Prob of Phs Call (p_c)	1.00	1.00	1.00	1.00	1.00	1.00	0.90	1.00	1.00			
Prob of Max Out (p_x)	0.53	1.00	1.00	0.00	0.00	1.00	1.00	0.00				
Left-Turn Movement Data												
Assigned Mvmt			1	3			5	7				
Mvmt Sat Flow, veh/h			4688	2344			2344	2250				
Through Movement Data												
Assigned Mvmt	2			4			6			8		
Mvmt Sat Flow, veh/h	2338			4676			1316			4676		
Right-Turn Movement Data												
Assigned Mvmt	12			14			16			18		
Mvmt Sat Flow, veh/h	2086			2086			970			2086		
Left Lane Group Data												
Assigned Mvmt	0		1	3	0		5		7	0		
Lane Assignment			L (Prot)L (Prot)				L (Prot)L (Prot)					

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Lanes in Grp	0	2	1	0	0	1	1	0
Grp Vol (v), veh/h	0	595	221	0	0	68	159	0
Grp Sat Flow (s), veh/h/ln	0	2344	2344	0	0	2344	2250	0
Q Serve Time (g_s), s	0.0	14.6	10.9	0.0	0.0	3.2	8.3	0.0
Cycle Q Clear Time (g_c), s	0.0	14.6	10.9	0.0	0.0	3.2	8.3	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
Lane Grp Cap (c), veh/h	0	754	292	0	0	278	206	0
V/C Ratio (X)	0.00	0.79	0.76	0.00	0.00	0.24	0.77	0.00
Avail Cap (c_a), veh/h	0	820	293	0	0	278	206	0
Upstream Filter (I)	0.00	1.00	1.00	0.00	0.00	1.00	0.60	0.00
Uniform Delay (d1), s/veh	0.0	48.4	50.8	0.0	0.0	48.0	53.3	0.0
Incr Delay (d2), s/veh	0.0	4.8	10.8	0.0	0.0	0.5	10.3	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	53.2	61.6	0.0	0.0	48.5	63.5	0.0
1st-Term Q (Q1), veh/ln	0.0	8.2	6.1	0.0	0.0	1.8	4.5	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.5	0.9	0.0	0.0	0.0	0.6	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	8.7	7.0	0.0	0.0	1.8	5.1	0.0
%ile Storage Ratio (RQ%)	0.00	1.47	1.78	0.00	0.00	0.66	0.43	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Middle Lane Group Data

Assigned Mvmt	2	0	0	4	6	0	0	8
Lane Assignment	T			T				T
Lanes in Grp	1	0	0	2	0	0	0	2
Grp Vol (v), veh/h	110	0	0	1365	0	0	0	1664
Grp Sat Flow (s), veh/h/ln	2338	0	0	2338	0	0	0	2338
Q Serve Time (g_s), s	5.2	0.0	0.0	27.0	0.0	0.0	0.0	34.0
Cycle Q Clear Time (g_c), s	5.2	0.0	0.0	27.0	0.0	0.0	0.0	34.0
Lane Grp Cap (c), veh/h	296	0	0	2126	0	0	0	2279
V/C Ratio (X)	0.37	0.00	0.00	0.64	0.00	0.00	0.00	0.73
Avail Cap (c_a), veh/h	390	0	0	2126	0	0	0	2279
Upstream Filter (I)	1.00	0.00	0.00	0.60	0.00	0.00	0.00	1.00
Uniform Delay (d1), s/veh	48.0	0.0	0.0	25.2	0.0	0.0	0.0	24.5
Incr Delay (d2), s/veh	0.8	0.0	0.0	0.9	0.0	0.0	0.0	2.1
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	48.8	0.0	0.0	26.1	0.0	0.0	0.0	26.6
1st-Term Q (Q1), veh/ln	2.9	0.0	0.0	13.7	0.0	0.0	0.0	16.9
2nd-Term Q (Q2), veh/ln	0.1	0.0	0.0	0.3	0.0	0.0	0.0	0.7

HCM 6th Signalized Intersection Capacity Analysis

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3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	3.0	0.0	0.0	13.9	0.0	0.0	0.0	17.6
%ile Storage Ratio (RQ%)	0.03	0.00	0.00	0.07	0.00	0.00	0.00	0.07
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	12	0	0	14	16	0	0	18
Lane Assignment	T+R			R	T+R			R
Lanes in Grp	1	0	0	1	1	0	0	1
Grp Vol (v), veh/h	192	0	0	16	304	0	0	436
Grp Sat Flow (s), veh/h/ln	2086	0	0	2086	2286	0	0	2086
Q Serve Time (g_s), s	10.7	0.0	0.0	0.3	15.3	0.0	0.0	8.0
Cycle Q Clear Time (g_c), s	10.7	0.0	0.0	0.3	15.3	0.0	0.0	8.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	1.00	0.00	0.00	1.00	0.42	0.00	0.00	1.00
Lane Grp Cap (c), veh/h	264	0	0	948	386	0	0	1017
V/C Ratio (X)	0.73	0.00	0.00	0.02	0.79	0.00	0.00	0.43
Avail Cap (c_a), veh/h	348	0	0	948	667	0	0	1017
Upstream Filter (I)	1.00	0.00	0.00	0.60	1.00	0.00	0.00	1.00
Uniform Delay (d1), s/veh	51.4	0.0	0.0	6.5	48.2	0.0	0.0	4.8
Incr Delay (d2), s/veh	5.2	0.0	0.0	0.0	3.6	0.0	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
Control Delay (d), s/veh	56.6	0.0	0.0	6.5	51.8	0.0	0.0	6.1
1st-Term Q (Q1), veh/ln	5.4	0.0	0.0	0.2	8.4	0.0	0.0	6.2
2nd-Term Q (Q2), veh/ln	0.4	0.0	0.0	0.0	0.4	0.0	0.0	0.4
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	5.8	0.0	0.0	0.2	8.8	0.0	0.0	6.6
%ile Storage Ratio (RQ%)	0.05	0.00	0.00	0.02	0.13	0.00	0.00	0.83
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary







HCM 6th Ctrl Delay	33.8
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

Intersection

Intersection Delay, s/veh
Intersection LOS B























Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	60	75	13	63	95	9	13	153	47	11	144	91
Future Vol, veh/h	60	75	13	63	95	9	13	153	47	11	144	91
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	65	82	14	68	103	10	14	166	51	12	157	99
Number of Lanes	1	1	0	1	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	10.1	10.2	10.9	11.2
HCM LOS	B	B	B	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	6%	100%	0%	100%	0%	4%
Vol Thru, %	72%	0%	85%	0%	91%	59%
Vol Right, %	22%	0%	15%	0%	9%	37%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	213	60	88	63	104	246
LT Vol	13	60	0	63	0	11
Through Vol	153	0	75	0	95	144
RT Vol	47	0	13	0	9	91
Lane Flow Rate	232	65	96	68	113	267
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.336	0.121	0.161	0.126	0.190	0.378
Departure Headway (Hd)	5.229	6.665	6.051	6.63	6.06	5.087
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	688	538	593	541	592	706
Service Time	3.265	4.403	3.789	4.368	3.798	3.123
HCM Lane V/C Ratio	0.337	0.121	0.162	0.126	0.191	0.378
HCM Control Delay	10.9	10.3	10	10.3	10.2	11.2
HCM Lane LOS	B	B	A	B	B	B
HCM 95th-tile Q	1.5	0.4	0.6	0.4	0.7	1.8

HCM 6th Signalized Intersection Capacity Analysis
4: SR 395 & Eucalyptus St

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	28	30	54	114	21	30	56	1893	203	35	1551	49
Future Volume (veh/h)	28	30	54	114	21	30	56	1893	203	35	1551	49
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, 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		
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	2461	2461	2461	2461	2461	2461	2461	2461	2461	2461	2461	2461
Adj Flow Rate, veh/h	30	33	59	124	23	33	61	2058	221	38	1686	53
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	310	185	157	208	281	238	354	2706	1207	127	2253	1005
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
Prop Arrive On Green	0.05	0.08	0.08	0.09	0.11	0.11	0.15	0.58	0.58	0.05	0.48	0.48
Unsig. Movement Delay												
Ln Grp Delay, s/veh	30.7	34.6	17.1	39.0	31.3	18.7	29.4	13.2	1.5	37.1	17.0	4.1
Ln Grp LOS	C	C	B	D	C	B	C	B	A	D	B	A
Approach Vol, veh/h	122			180			2340			1777		
Approach Delay, s/veh	25.2			34.3			12.6			17.1		
Approach LOS	C			C			B			B		
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	2	1	3	4	6	5	7	8				
Case No	3.0	2.0	2.0	3.0	3.0	2.0	1.1	3.0				
Phs Duration (G+Y+Rc), s	49.6	8.3	11.0	9.9	41.9	15.9	7.9	13.0				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green (Gmax), s	56.5	4.0	5.0	30.5	56.5	4.0	4.0	31.5				
Max Allow Headway (MAH), s	4.0	4.1	4.1	4.2	4.0	4.1	4.1	4.1				
Max Q Clear (g_c+l1), s	28.1	3.2	6.0	3.4	25.0	3.8	2.9	2.9				
Green Ext Time (g_e), s	15.5	0.0	0.0	0.3	10.9	0.0	0.0	0.1				
Prob of Phs Call (p_c)	1.00	0.56	0.93	0.98	1.00	0.74	0.48	1.00				
Prob of Max Out (p_x)	0.34	1.00	1.00	0.00	0.09	1.00	1.00	0.00				
Left-Turn Movement Data												
Assigned Mvmt	1		3				5	7				
Mvmt Sat Flow, veh/h	2344		2344				2344	2344				
Through Movement Data												
Assigned Mvmt	2			4		6	8					
Mvmt Sat Flow, veh/h	4676			2461		4676	2461					
Right-Turn Movement Data												
Assigned Mvmt	12			14		16	18					
Mvmt Sat Flow, veh/h	2086			2086		2086	2086					
Left Lane Group Data												
Assigned Mvmt	0		1	3	0	0	5	7	0			
Lane Assignment	L (Prot)		L (Prot)				L (Prot)	(Pr/Pm)				

HCM 6th Signalized Intersection Capacity Analysis

4: SR 395 & Eucalyptus St

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Lanes in Grp	0	1	1	0	0	1	1	0
Grp Vol (v), veh/h	0	38	124	0	0	61	30	0
Grp Sat Flow (s), veh/h/ln	0	2344	2344	0	0	2344	2344	0
Q Serve Time (g_s), s	0.0	1.2	4.0	0.0	0.0	1.8	0.9	0.0
Cycle Q Clear Time (g_c), s	0.0	1.2	4.0	0.0	0.0	1.8	0.9	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	1348	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	5.9	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	5.9	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
Lane Grp Cap (c), veh/h	0	127	208	0	0	354	310	0
V/C Ratio (X)	0.00	0.30	0.60	0.00	0.00	0.17	0.10	0.00
Avail Cap (c_a), veh/h	0	179	208	0	0	354	371	0
Upstream Filter (I)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	35.8	34.5	0.0	0.0	29.1	30.5	0.0
Incr Delay (d2), s/veh	0.0	1.3	4.5	0.0	0.0	0.2	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
Control Delay (d), s/veh	0.0	37.1	39.0	0.0	0.0	29.4	30.7	0.0
1st-Term Q (Q1), veh/ln	0.0	0.6	2.1	0.0	0.0	0.9	0.5	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	0.7	2.3	0.0	0.0	0.9	0.5	0.0
%ile Storage Ratio (RQ%)	0.00	0.04	0.20	0.00	0.00	0.06	0.12	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	2	0	0	4	6	0	0	8
Lane Assignment	T			T	T			T
Lanes in Grp	2	0	0	1	2	0	0	1
Grp Vol (v), veh/h	2058	0	0	33	1686	0	0	23
Grp Sat Flow (s), veh/h/ln	2338	0	0	2461	2338	0	0	2461
Q Serve Time (g_s), s	26.1	0.0	0.0	1.0	23.0	0.0	0.0	0.7
Cycle Q Clear Time (g_c), s	26.1	0.0	0.0	1.0	23.0	0.0	0.0	0.7
Lane Grp Cap (c), veh/h	2706	0	0	185	2253	0	0	281
V/C Ratio (X)	0.76	0.00	0.00	0.18	0.75	0.00	0.00	0.08
Avail Cap (c_a), veh/h	3474	0	0	1016	3474	0	0	1047
Upstream Filter (I)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d1), s/veh	12.5	0.0	0.0	34.1	16.5	0.0	0.0	31.2
Incr Delay (d2), s/veh	0.8	0.0	0.0	0.5	0.5	0.0	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
Control Delay (d), s/veh	13.2	0.0	0.0	34.6	17.0	0.0	0.0	31.3
1st-Term Q (Q1), veh/ln	9.5	0.0	0.0	0.5	9.7	0.0	0.0	0.4
2nd-Term Q (Q2), veh/ln	0.3	0.0	0.0	0.0	0.2	0.0	0.0	0.0

HCM 6th Signalized Intersection Capacity Analysis 4: SR 395 & Eucalyptus St

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3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	9.8	0.0	0.0	0.6	9.8	0.0	0.0	0.4
%ile Storage Ratio (RQ%)	0.19	0.00	0.00	0.01	0.10	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	12	0	0	14	16	0	0	18
Lane Assignment	R			R	R			R
Lanes in Grp	1	0	0	1	1	0	0	1
Grp Vol (v), veh/h	221	0	0	59	53	0	0	33
Grp Sat Flow (s), veh/h/ln	2086	0	0	2086	2086	0	0	2086
Q Serve Time (g_s), s	1.7	0.0	0.0	1.4	0.6	0.0	0.0	0.9
Cycle Q Clear Time (g_c), s	1.7	0.0	0.0	1.4	0.6	0.0	0.0	0.9
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
Lane Grp Cap (c), veh/h	1207	0	0	157	1005	0	0	238
V/C Ratio (X)	0.18	0.00	0.00	0.38	0.05	0.00	0.00	0.14
Avail Cap (c_a), veh/h	1550	0	0	861	1550	0	0	887
Upstream Filter (I)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d1), s/veh	1.4	0.0	0.0	15.6	4.0	0.0	0.0	18.5
Incr Delay (d2), s/veh	0.1	0.0	0.0	1.5	0.0	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
Control Delay (d), s/veh	1.5	0.0	0.0	17.1	4.1	0.0	0.0	18.7
1st-Term Q (Q1), veh/ln	1.1	0.0	0.0	1.0	0.4	0.0	0.0	0.5
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	1.2	0.0	0.0	1.0	0.4	0.0	0.0	0.5
%ile Storage Ratio (RQ%)	0.10	0.00	0.00	1.05	0.03	0.00	0.00	0.54
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 6th Ctrl Delay	15.6
HCM 6th LOS	B

Intersection

Intersection Delay, s/veh
Intersection LOS A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		←	↑	↑	↑			↑			↑	
Traffic Vol, veh/h	32	114	97	84	67	6	49	15	67	7	28	28
Future Vol, veh/h	32	114	97	84	67	6	49	15	67	7	28	28
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	35	124	105	91	73	7	53	16	73	8	30	30
Number of Lanes	0	1	1	1	1	0	0	1	0	0	1	0






Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	9	9.2	9	8.5
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	37%	22%	0%	100%	0%	11%
Vol Thru, %	11%	78%	0%	0%	92%	44%
Vol Right, %	51%	0%	100%	0%	8%	44%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	131	146	97	84	73	63
LT Vol	49	32	0	84	0	7
Through Vol	15	114	0	0	67	28
RT Vol	67	0	97	0	6	28
Lane Flow Rate	142	159	105	91	79	68
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.191	0.235	0.132	0.147	0.116	0.093
Departure Headway (Hd)	4.821	5.339	4.524	5.808	5.246	4.913
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	740	670	788	614	680	724
Service Time	2.872	3.094	2.278	3.568	3.005	2.975
HCM Lane V/C Ratio	0.192	0.237	0.133	0.148	0.116	0.094
HCM Control Delay	9	9.7	8	9.6	8.7	8.5
HCM Lane LOS	A	A	A	A	A	A
HCM 95th-tile Q	0.7	0.9	0.5	0.5	0.4	0.3

Intersection

Int Delay, s/veh 7.3

Movement

	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	166	26	22	4	2	174
Future Vol, veh/h	166	26	22	4	2	174
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	50	-	-	-	0	-
Veh in Median Storage, #	0	0	-	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	180	28	24	4	2	189

Major/Minor

	Major1	Major2	Minor2
Conflicting Flow All	28	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.12	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.218	-	-
Pot Cap-1 Maneuver	1585	-	-
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1585	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach




























	EB	WB	SB
HCM Control Delay, s	5.5	0	9.3
HCM LOS			A

Minor Lane/Major Mvmt

	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1585	-	-	-	1038
HCM Lane V/C Ratio	0.114	-	-	-	0.184
HCM Control Delay (s)	7.6	-	-	-	9.3
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0.4	-	-	-	0.7

HCM 6th Signalized Intersection Capacity Analysis
1: Topaz Rd & Bear Valley Rd

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 						 	
Traffic Volume (veh/h)	90	932	17	224	1051	271	27	63	183	222	91	58
Future Volume (veh/h)	90	932	17	224	1051	271	27	63	183	222	91	58
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, 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	
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	2461	2461	2461	2461	2461	2461	2461	2461	2461	2461	2461	2461
Adj Flow Rate, veh/h	98	1013	18	243	1142	295	29	68	199	241	99	63
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	320	1753	782	535	1720	440	439	317	268	316	188	159
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
Prop Arrive On Green	0.14	0.38	0.38	0.23	0.47	0.45	0.19	0.13	0.13	0.13	0.08	0.08
Unsig. Movement Delay												
Ln Grp Delay, s/veh	47.2	31.3	23.7	39.9	25.0	25.5	40.2	47.2	56.4	56.9	55.6	54.4
Ln Grp LOS	D	C	C	D	C	C	D	D	E	E	E	D
Approach Vol, veh/h		1129			1680			296			403	
Approach Delay, s/veh		32.6			27.4			52.7			56.2	
Approach LOS		C			C			D			E	
Timer:		1	2	3	4	5	6	7	8			
Assigned Phs		2	1	4	3	6	5	8	7			
Case No		3.0	2.0	3.0	2.0	3.0	2.0	4.0	2.0			
Phs Duration (G+Y+Rc), s		19.4	20.2	49.0	31.4	13.1	26.5	60.0	20.4			
Change Period (Y+Rc), s		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0			
Max Green (Gmax), s		18.0	18.0	43.0	17.0	32.0	4.0	54.0	6.0			
Max Allow Headway (MAH), s		4.2	4.1	4.0	4.1	4.1	4.1	4.0	4.1			
Max Q Clear (g_c+l1), s		13.0	13.9	22.7	12.7	6.6	3.2	31.3	6.5			
Green Ext Time (g_e), s		0.4	0.3	4.6	0.3	0.5	0.0	6.6	0.0			
Prob of Phs Call (p_c)		1.00	1.00	1.00	1.00	1.00	0.62	1.00	0.96			
Prob of Max Out (p_x)		0.63	0.98	0.00	0.87	0.00	1.00	0.00	1.00			
Left-Turn Movement Data												
Assigned Mvmt			1		3		5		7			
Mvmt Sat Flow, veh/h			2344		2344		2344		2344			
Through Movement Data												
Assigned Mvmt		2		4		6		8				
Mvmt Sat Flow, veh/h		2461		4676		2461		3686				
Right-Turn Movement Data												
Assigned Mvmt		12		14		16		18				
Mvmt Sat Flow, veh/h		2086		2086		2086		943				
Left Lane Group Data												
Assigned Mvmt		0	1	0	3	0	5	0	7			
Lane Assignment		L (Prot)		L (Prot)		L (Prot)		L (Prot)				

HCM 6th Signalized Intersection Capacity Analysis

1: Topaz Rd & Bear Valley Rd

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Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	241	0	243	0	29	0	98
Grp Sat Flow (s), veh/h/ln	0	2344	0	2344	0	2344	0	2344
Q Serve Time (g_s), s	0.0	11.9	0.0	10.7	0.0	1.2	0.0	4.5
Cycle Q Clear Time (g_c), s	0.0	11.9	0.0	10.7	0.0	1.2	0.0	4.5
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	316	0	535	0	439	0	320
V/C Ratio (X)	0.00	0.76	0.00	0.45	0.00	0.07	0.00	0.31
Avail Cap (c_a), veh/h	0	391	0	535	0	439	0	320
Upstream Filter (I)	0.00	1.00	0.00	0.09	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	50.0	0.0	39.9	0.0	40.1	0.0	46.7
Incr Delay (d2), s/veh	0.0	6.8	0.0	0.1	0.0	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
Control Delay (d), s/veh	0.0	56.9	0.0	39.9	0.0	40.2	0.0	47.2
1st-Term Q (Q1), veh/ln	0.0	6.7	0.0	5.9	0.0	0.7	0.0	2.5
2nd-Term Q (Q2), veh/ln	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	7.3	0.0	5.9	0.0	0.7	0.0	2.6
%ile Storage Ratio (RQ%)	0.00	1.85	0.00	0.75	0.00	0.12	0.00	0.44
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	2	0	4	0	6	0	8	0
Lane Assignment	T		T		T		T	
Lanes in Grp	1	0	2	0	1	0	1	0
Grp Vol (v), veh/h	68	0	1013	0	99	0	720	0
Grp Sat Flow (s), veh/h/ln	2461	0	2338	0	2461	0	2338	0
Q Serve Time (g_s), s	3.0	0.0	20.7	0.0	4.6	0.0	28.5	0.0
Cycle Q Clear Time (g_c), s	3.0	0.0	20.7	0.0	4.6	0.0	28.5	0.0
Lane Grp Cap (c), veh/h	317	0	1753	0	188	0	1091	0
V/C Ratio (X)	0.21	0.00	0.58	0.00	0.53	0.00	0.66	0.00
Avail Cap (c_a), veh/h	410	0	1753	0	697	0	1091	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	0.09	0.00
Uniform Delay (d1), s/veh	46.8	0.0	29.9	0.0	53.3	0.0	24.7	0.0
Incr Delay (d2), s/veh	0.3	0.0	1.4	0.0	2.3	0.0	0.3	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	47.2	0.0	31.3	0.0	55.6	0.0	25.0	0.0
1st-Term Q (Q1), veh/ln	1.8	0.0	10.9	0.0	2.8	0.0	14.3	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.3	0.0	0.1	0.0	0.1	0.0

HCM 6th Signalized Intersection Capacity Analysis

1: Topaz Rd & Bear Valley Rd

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3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	1.8	0.0	11.2	0.0	2.9	0.0	14.4	0.0
%ile Storage Ratio (RQ%)	0.02	0.00	0.11	0.00	0.04	0.00	0.07	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	12	0	14	0	16	0	18	0
Lane Assignment	R		R		R		T+R	
Lanes in Grp	1	0	1	0	1	0	1	0
Grp Vol (v), veh/h	199	0	18	0	63	0	717	0
Grp Sat Flow (s), veh/h/ln	2086	0	2086	0	2086	0	2291	0
Q Serve Time (g_s), s	11.0	0.0	0.7	0.0	3.5	0.0	29.3	0.0
Cycle Q Clear Time (g_c), s	11.0	0.0	0.7	0.0	3.5	0.0	29.3	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	1.00	0.00	1.00	0.00	1.00	0.00	0.41	0.00
Lane Grp Cap (c), veh/h	268	0	782	0	159	0	1069	0
V/C Ratio (X)	0.74	0.00	0.02	0.00	0.40	0.00	0.67	0.00
Avail Cap (c_a), veh/h	348	0	782	0	591	0	1069	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	0.09	0.00
Uniform Delay (d1), s/veh	50.4	0.0	23.6	0.0	52.8	0.0	25.2	0.0
Incr Delay (d2), s/veh	6.0	0.0	0.1	0.0	1.6	0.0	0.3	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	56.4	0.0	23.7	0.0	54.4	0.0	25.5	0.0
1st-Term Q (Q1), veh/ln	5.5	0.0	0.3	0.0	1.7	0.0	14.6	0.0
2nd-Term Q (Q2), veh/ln	0.4	0.0	0.0	0.0	0.1	0.0	0.1	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	6.0	0.0	0.3	0.0	1.8	0.0	14.7	0.0
%ile Storage Ratio (RQ%)	1.01	0.00	0.00	0.00	0.46	0.00	0.07	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0























Intersection Summary

HCM 6th Ctrl Delay	34.5
HCM 6th LOS	C

HCM 6th Signalized Intersection Capacity Analysis

2: Amethyst Rd & Bear Valley Rd

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	152	1268	16	205	1553	401	65	101	177	547	161	130
Future Volume (veh/h)	152	1268	16	205	1553	401	65	101	177	547	161	130
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, 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			
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	2363	2461	2461	2461	2461	2461	2461	2461	2461	2461	2461	2461
Adj Flow Rate, veh/h	165	1378	17	223	1688	436	71	110	192	595	175	141
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	188	2163	965	273	2318	1034	264	296	264	754	220	178
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
Prop Arrive On Green	0.08	0.46	0.46	0.12	0.50	0.50	0.11	0.13	0.11	0.16	0.17	0.16
Unsig. Movement Delay												
Ln Grp Delay, s/veh	80.3	25.6	6.4	68.9	25.9	5.8	49.2	48.8	56.6	53.2	0.0	51.5
Ln Grp LOS	F	C	A	E	C	A	D	D	E	D	A	D
Approach Vol, veh/h	1560				2347				373			
Approach Delay, s/veh	31.1				26.2				52.9			
Approach LOS	C				C				D			
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	2		1	3	4	6	5	7	8			
Case No	4.0		2.0	2.0	3.0	4.0	2.0	2.0	3.0			
Phs Duration (G+Y+Rc), s	19.2		23.3	18.0	59.5	25.0	17.5	14.0	63.5			
Change Period (Y+Rc), s	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0			
Max Green (Gmax), s	18.0		19.0	12.0	47.0	33.0	4.0	8.0	51.0			
Max Allow Headway (MAH), s	4.2		4.1	4.1	4.0	4.1	4.1	4.1	4.0			
Max Q Clear (g_c+l1), s	12.7		16.6	13.1	29.0	18.0	5.3	10.7	36.2			
Green Ext Time (g_e), s	0.5		0.7	0.0	6.6	1.0	0.0	0.0	9.1			
Prob of Phs Call (p_c)	1.00		1.00	1.00	1.00	1.00	0.91	1.00	1.00			
Prob of Max Out (p_x)	0.53		1.00	1.00	0.00	0.00	1.00	1.00	0.00			
Left-Turn Movement Data												
Assigned Mvmt			1	3			5	7				
Mvmt Sat Flow, veh/h			4688	2344			2344	2250				
Through Movement Data												
Assigned Mvmt	2				4	6			8			
Mvmt Sat Flow, veh/h	2338				4676	1262			4676			
Right-Turn Movement Data												
Assigned Mvmt	12				14	16			18			
Mvmt Sat Flow, veh/h	2086				2086	1016			2086			
Left Lane Group Data												
Assigned Mvmt	0		1	3	0	0	5	7	0			
Lane Assignment			L (Prot)	L (Prot)			L (Prot)	L (Prot)				

HCM 6th Signalized Intersection Capacity Analysis

2: Amethyst Rd & Bear Valley Rd

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Lanes in Grp	0	2	1	0	0	1	1	0
Grp Vol (v), veh/h	0	595	223	0	0	71	165	0
Grp Sat Flow (s), veh/h/ln	0	2344	2344	0	0	2344	2250	0
Q Serve Time (g_s), s	0.0	14.6	11.1	0.0	0.0	3.3	8.7	0.0
Cycle Q Clear Time (g_c), s	0.0	14.6	11.1	0.0	0.0	3.3	8.7	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
Lane Grp Cap (c), veh/h	0	754	273	0	0	264	188	0
V/C Ratio (X)	0.00	0.79	0.82	0.00	0.00	0.27	0.88	0.00
Avail Cap (c_a), veh/h	0	820	273	0	0	264	188	0
Upstream Filter (I)	0.00	1.00	1.00	0.00	0.00	1.00	0.67	0.00
Uniform Delay (d1), s/veh	0.0	48.4	51.7	0.0	0.0	48.7	54.4	0.0
Incr Delay (d2), s/veh	0.0	4.8	17.1	0.0	0.0	0.5	25.9	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	53.2	68.9	0.0	0.0	49.2	80.3	0.0
1st-Term Q (Q1), veh/ln	0.0	8.2	6.3	0.0	0.0	1.9	4.7	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.5	1.3	0.0	0.0	0.0	1.3	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	8.7	7.6	0.0	0.0	1.9	6.1	0.0
%ile Storage Ratio (RQ%)	0.00	1.47	1.92	0.00	0.00	0.69	0.51	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	2	0	0	4	6	0	0	8
Lane Assignment	T			T				T
Lanes in Grp	1	0	0	2	0	0	0	2
Grp Vol (v), veh/h	110	0	0	1378	0	0	0	1688
Grp Sat Flow (s), veh/h/ln	2338	0	0	2338	0	0	0	2338
Q Serve Time (g_s), s	5.2	0.0	0.0	27.0	0.0	0.0	0.0	34.2
Cycle Q Clear Time (g_c), s	5.2	0.0	0.0	27.0	0.0	0.0	0.0	34.2
Lane Grp Cap (c), veh/h	296	0	0	2163	0	0	0	2318
V/C Ratio (X)	0.37	0.00	0.00	0.64	0.00	0.00	0.00	0.73
Avail Cap (c_a), veh/h	390	0	0	2163	0	0	0	2318
Upstream Filter (I)	1.00	0.00	0.00	0.67	0.00	0.00	0.00	1.00
Uniform Delay (d1), s/veh	48.0	0.0	0.0	24.6	0.0	0.0	0.0	23.9
Incr Delay (d2), s/veh	0.8	0.0	0.0	1.0	0.0	0.0	0.0	2.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	48.8	0.0	0.0	25.6	0.0	0.0	0.0	25.9
1st-Term Q (Q1), veh/ln	2.9	0.0	0.0	13.6	0.0	0.0	0.0	17.0
2nd-Term Q (Q2), veh/ln	0.1	0.0	0.0	0.3	0.0	0.0	0.0	0.7

HCM 6th Signalized Intersection Capacity Analysis 2: Amethyst Rd & Bear Valley Rd

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3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	3.0	0.0	0.0	13.9	0.0	0.0	0.0	17.6
%ile Storage Ratio (RQ%)	0.03	0.00	0.00	0.07	0.00	0.00	0.00	0.07
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	12	0	0	14	16	0	0	18
Lane Assignment	T+R			R	T+R			R
Lanes in Grp	1	0	0	1	1	0	0	1
Grp Vol (v), veh/h	192	0	0	17	316	0	0	436
Grp Sat Flow (s), veh/h/ln	2086	0	0	2086	2278	0	0	2086
Q Serve Time (g_s), s	10.7	0.0	0.0	0.3	16.0	0.0	0.0	7.7
Cycle Q Clear Time (g_c), s	10.7	0.0	0.0	0.3	16.0	0.0	0.0	7.7
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	1.00	0.00	0.00	1.00	0.45	0.00	0.00	1.00
Lane Grp Cap (c), veh/h	264	0	0	965	398	0	0	1034
V/C Ratio (X)	0.73	0.00	0.00	0.02	0.79	0.00	0.00	0.42
Avail Cap (c_a), veh/h	348	0	0	965	664	0	0	1034
Upstream Filter (I)	1.00	0.00	0.00	0.67	1.00	0.00	0.00	1.00
Uniform Delay (d1), s/veh	51.4	0.0	0.0	6.4	47.9	0.0	0.0	4.5
Incr Delay (d2), s/veh	5.2	0.0	0.0	0.0	3.6	0.0	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
Control Delay (d), s/veh	56.6	0.0	0.0	6.4	51.5	0.0	0.0	5.8
1st-Term Q (Q1), veh/ln	5.4	0.0	0.0	0.2	8.7	0.0	0.0	6.1
2nd-Term Q (Q2), veh/ln	0.4	0.0	0.0	0.0	0.4	0.0	0.0	0.4
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	5.8	0.0	0.0	0.2	9.1	0.0	0.0	6.4
%ile Storage Ratio (RQ%)	0.05	0.00	0.00	0.02	0.13	0.00	0.00	0.82
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary







HCM 6th Ctrl Delay	34.3
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

Intersection

Intersection Delay, s/veh
Intersection LOS B























Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	60	75	19	69	95	9	17	180	51	11	191	91
Future Vol, veh/h	60	75	19	69	95	9	17	180	51	11	191	91
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	65	82	21	75	103	10	18	196	55	12	208	99
Number of Lanes	1	1	0	1	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	10.6	10.8	12.2	12.9
HCM LOS	B	B	B	B

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	7%	100%	0%	100%	0%	4%
Vol Thru, %	73%	0%	80%	0%	91%	65%
Vol Right, %	21%	0%	20%	0%	9%	31%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	248	60	94	69	104	293
LT Vol	17	60	0	69	0	11
Through Vol	180	0	75	0	95	191
RT Vol	51	0	19	0	9	91
Lane Flow Rate	270	65	102	75	113	318
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.406	0.126	0.180	0.145	0.20	0.467
Departure Headway (Hd)	5.42	6.98	26.32	7.94	36.37	5.27
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	663	512	565	515	562	682
Service Time	3.47	24.74	34.08	4.74	4.12	3.33
HCM Lane V/C Ratio	0.407	0.127	0.181	0.146	0.201	0.466
HCM Control Delay	12.2	10.8	10.5	10.9	10.7	12.9
HCM Lane LOS	B	B	B	B	B	B
HCM 95th-tile Q	2	0.4	0.7	0.5	0.7	2.5

HCM 6th Signalized Intersection Capacity Analysis
4: SR 395 & Eucalyptus St

PM 2040+Project
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	28	35	54	138	24	54	56	1893	243	75	1551	49
Future Volume (veh/h)	28	35	54	138	24	54	56	1893	243	75	1551	49
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, 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		
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	2461	2461	2461	2461	2461	2461	2461	2461	2461	2461	2461	2461
Adj Flow Rate, veh/h	30	38	59	150	26	59	61	2058	264	82	1686	53
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	298	180	152	201	271	229	397	2676	1194	172	2227	993
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
Prop Arrive On Green	0.05	0.07	0.07	0.09	0.11	0.11	0.17	0.57	0.57	0.07	0.48	0.48
Unsig. Movement Delay												
Ln Grp Delay, s/veh	32.1	36.3	17.3	50.8	32.9	19.5	29.1	14.2	1.9	38.4	18.1	4.5
Ln Grp LOS	C	D	B	D	C	B	C	B	A	D	B	A
Approach Vol, veh/h	127			235			2383			1821		
Approach Delay, s/veh	26.5			41.0			13.2			18.6		
Approach LOS	C			D			B			B		
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	2	1	3	4	6	5	7	8				
Case No	3.0	2.0	2.0	3.0	3.0	2.0	1.1	3.0				
Phs Duration (G+Y+Rc), s	50.8	10.0	11.0	10.0	43.0	17.9	8.0	13.0				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green (Gmax), s	56.5	4.0	5.0	30.5	56.5	4.0	4.0	31.5				
Max Allow Headway (MAH), s	4.0	4.1	4.1	4.2	4.0	4.1	4.1	4.2				
Max Q Clear (g_c+l1), s	29.5	4.7	7.1	3.5	26.1	3.8	2.9	3.6				
Green Ext Time (g_e), s	15.3	0.0	0.0	0.3	10.8	0.0	0.0	0.2				
Prob of Phs Call (p_c)	1.00	0.84	0.97	0.99	1.00	0.75	0.49	1.00				
Prob of Max Out (p_x)	0.38	1.00	1.00	0.00	0.10	1.00	1.00	0.00				
Left-Turn Movement Data												
Assigned Mvmt	1		3	5			7					
Mvmt Sat Flow, veh/h	2344		2344	2344			2344					
Through Movement Data												
Assigned Mvmt	2			4		6	8					
Mvmt Sat Flow, veh/h	4676			2461		4676	2461					
Right-Turn Movement Data												
Assigned Mvmt	12			14		16	18					
Mvmt Sat Flow, veh/h	2086			2086		2086	2086					
Left Lane Group Data												
Assigned Mvmt	0		1	3	0	0	5	7	0			
Lane Assignment			L (Prot)	L (Prot)	L (Prdt)			(Pr/Pm)				

HCM 6th Signalized Intersection Capacity Analysis

4: SR 395 & Eucalyptus St

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Lanes in Grp	0	1	1	0	0	1	1	0
Grp Vol (v), veh/h	0	82	150	0	0	61	30	0
Grp Sat Flow (s), veh/h/ln	0	2344	2344	0	0	2344	2344	0
Q Serve Time (g_s), s	0.0	2.7	5.1	0.0	0.0	1.8	0.9	0.0
Cycle Q Clear Time (g_c), s	0.0	2.7	5.1	0.0	0.0	1.8	0.9	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	1313	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	6.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	6.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
Lane Grp Cap (c), veh/h	0	172	201	0	0	397	298	0
V/C Ratio (X)	0.00	0.48	0.75	0.00	0.00	0.15	0.10	0.00
Avail Cap (c_a), veh/h	0	172	201	0	0	397	356	0
Upstream Filter (I)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	36.4	36.5	0.0	0.0	29.0	32.0	0.0
Incr Delay (d2), s/veh	0.0	2.0	14.3	0.0	0.0	0.2	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
Control Delay (d), s/veh	0.0	38.4	50.8	0.0	0.0	29.1	32.1	0.0
1st-Term Q (Q1), veh/ln	0.0	1.4	2.7	0.0	0.0	0.9	0.5	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.1	0.8	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	1.5	3.5	0.0	0.0	0.9	0.5	0.0
%ile Storage Ratio (RQ%)	0.00	0.10	0.29	0.00	0.00	0.06	0.13	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	2	0	0	4	6	0	0	8
Lane Assignment	T			T	T			T
Lanes in Grp	2	0	0	1	2	0	0	1
Grp Vol (v), veh/h	2058	0	0	38	1686	0	0	26
Grp Sat Flow (s), veh/h/ln	2338	0	0	2461	2338	0	0	2461
Q Serve Time (g_s), s	27.5	0.0	0.0	1.2	24.1	0.0	0.0	0.8
Cycle Q Clear Time (g_c), s	27.5	0.0	0.0	1.2	24.1	0.0	0.0	0.8
Lane Grp Cap (c), veh/h	2677	0	0	180	2227	0	0	271
V/C Ratio (X)	0.77	0.00	0.00	0.21	0.76	0.00	0.00	0.10
Avail Cap (c_a), veh/h	3345	0	0	978	3345	0	0	1008
Upstream Filter (I)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d1), s/veh	13.4	0.0	0.0	35.7	17.5	0.0	0.0	32.7
Incr Delay (d2), s/veh	0.9	0.0	0.0	0.6	0.6	0.0	0.0	0.2
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	14.2	0.0	0.0	36.3	18.1	0.0	0.0	32.9
1st-Term Q (Q1), veh/ln	10.5	0.0	0.0	0.7	10.4	0.0	0.0	0.4
2nd-Term Q (Q2), veh/ln	0.3	0.0	0.0	0.0	0.2	0.0	0.0	0.0

HCM 6th Signalized Intersection Capacity Analysis

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3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	10.8	0.0	0.0	0.7	10.6	0.0	0.0	0.4
%ile Storage Ratio (RQ%)	0.21	0.00	0.00	0.01	0.10	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	12	0	0	14	16	0	0	18
Lane Assignment	R			R	R			R
Lanes in Grp	1	0	0	1	1	0	0	1
Grp Vol (v), veh/h	264	0	0	59	53	0	0	59
Grp Sat Flow (s), veh/h/ln	2086	0	0	2086	2086	0	0	2086
Q Serve Time (g_s), s	2.3	0.0	0.0	1.5	0.7	0.0	0.0	1.6
Cycle Q Clear Time (g_c), s	2.3	0.0	0.0	1.5	0.7	0.0	0.0	1.6
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
Lane Grp Cap (c), veh/h	1194	0	0	152	993	0	0	229
V/C Ratio (X)	0.22	0.00	0.00	0.39	0.05	0.00	0.00	0.26
Avail Cap (c_a), veh/h	1492	0	0	829	1492	0	0	854
Upstream Filter (I)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d1), s/veh	1.8	0.0	0.0	15.7	4.5	0.0	0.0	18.9
Incr Delay (d2), s/veh	0.1	0.0	0.0	1.6	0.0	0.0	0.0	0.6
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	1.9	0.0	0.0	17.3	4.5	0.0	0.0	19.5
1st-Term Q (Q1), veh/ln	1.5	0.0	0.0	1.0	0.4	0.0	0.0	1.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	1.5	0.0	0.0	1.1	0.4	0.0	0.0	1.0
%ile Storage Ratio (RQ%)	0.13	0.00	0.00	1.11	0.04	0.00	0.00	1.03
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 6th Ctrl Delay	17.2
HCM 6th LOS	B






Intersection

Intersection Delay, s/veh
Intersection LOS A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		←	↑	↑	↑	↑		↑			↑	↑
Traffic Vol, veh/h	32	197	99	84	117	7	50	15	69	9	28	28
Future Vol, veh/h	32	197	99	84	117	7	50	15	69	9	28	28
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	35	214	108	91	127	8	54	16	75	10	30	30
Number of Lanes	0	1	1	1	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	10.4	9.7	9.6	9
HCM LOS	B	A	A	A

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	37%	14%	0%	100%	0%	14%
Vol Thru, %	11%	86%	0%	0%	94%	43%
Vol Right, %	51%	0%	100%	0%	6%	43%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	134	229	99	84	124	65
LT Vol	50	32	0	84	0	9
Through Vol	15	197	0	0	117	28
RT Vol	69	0	99	0	7	28
Lane Flow Rate	146	249	108	91	135	71
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.209	0.374	0.138	0.151	0.203	0.104
Departure Headway (Hd)	5.16	5.404	4.628	5.953	5.409	5.289
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	689	660	766	597	656	669
Service Time	3.243	3.186	2.409	3.744	3.199	3.387
HCM Lane V/C Ratio	0.212	0.377	0.141	0.152	0.206	0.106
HCM Control Delay	9.6	11.4	8.2	9.8	9.6	9
HCM Lane LOS	A	B	A	A	A	A
HCM 95th-tile Q	0.8	1.7	0.5	0.5	0.8	0.3

Intersection												
Int Delay, s/veh	8.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	175	26	29	0	22	4	17	26	0	2	44	189
Future Vol, veh/h	175	26	29	0	22	4	17	26	0	2	44	189
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	50	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	0	-	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	190	28	32	0	24	4	18	28	0	2	48	205



























Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	28	0	0	60	0	0	577	452	44	464	466	26
Stage 1	-	-	-	-	-	-	424	424	-	26	26	-
Stage 2	-	-	-	-	-	-	153	28	-	438	440	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1585	-	-	1544	-	-	428	503	1026	508	494	1050
Stage 1	-	-	-	-	-	-	608	587	-	992	874	-
Stage 2	-	-	-	-	-	-	849	872	-	597	578	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1585	-	-	1544	-	-	287	443	1026	439	435	1050
Mov Cap-2 Maneuver	-	-	-	-	-	-	287	443	-	439	435	-
Stage 1	-	-	-	-	-	-	535	517	-	873	874	-
Stage 2	-	-	-	-	-	-	646	872	-	497	509	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	8	0	16.3	11.3
HCM LOS			C	B

Minor Lane/Major Mvm	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	365	1585	-	-	1544	-	-	823
HCM Lane V/C Ratio	0.128	0.12	-	-	-	-	-	0.31
HCM Control Delay (s)	16.3	7.6	-	-	0	-	-	11.3
HCM Lane LOS	C	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.4	0.4	-	-	0	-	-	1.3

HCM 6th Signalized Intersection Capacity Analysis
1: Topaz Rd & Bear Valley Rd

AM 2023
08/14/2023

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 						 	
Traffic Volume (veh/h)	42	457	7	52	215	70	6	32	74	118	27	50
Future Volume (veh/h)	42	457	7	52	215	70	6	32	74	118	27	50
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, 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	
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1723	1870	1723	1723	1870	1723	1723	1870	1723	1723	1870	1723
Adj Flow Rate, veh/h	46	497	8	57	234	76	7	35	80	128	29	54
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	91	986	405	553	1484	470	229	184	144	189	138	108
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
Prop Arrive On Green	0.06	0.28	0.28	0.34	0.56	0.54	0.14	0.10	0.10	0.12	0.07	0.07
Unsig. Movement Delay												
Ln Grp Delay, s/veh	47.0	30.1	24.5	21.3	10.2	10.6	34.6	39.0	43.4	44.2	41.2	30.1
Ln Grp LOS	D	C	C	C	B	B	C	D	D	D	D	C
Approach Vol, veh/h		551			367			122			211	
Approach Delay, s/veh		31.4			12.1			41.6			40.2	
Approach LOS		C			B			D			D	
Timer:		1	2	3	4	5	6	7	8			
Assigned Phs		2	1	4	3	6	5	7	8			
Case No		3.0	2.0	3.0	2.0	3.0	2.0	2.0	4.0			
Phs Duration (G+Y+Rc), s		13.1	14.7	29.8	35.3	10.9	17.0	9.2	56.0			
Change Period (Y+Rc), s		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0			
Max Green (Gmax), s		22.2	12.0	23.8	11.0	30.2	4.0	5.0	29.8			
Max Allow Headway (MAH), s		4.2	4.1	4.0	4.1	4.2	4.1	4.1	4.1			
Max Q Clear (g_c+l1), s		6.9	9.0	12.9	4.2	4.6	2.3	4.5	6.2			
Green Ext Time (g_e), s		0.3	0.1	1.6	0.1	0.2	0.0	0.0	1.0			
Prob of Phs Call (p_c)		1.00	0.96	1.00	0.77	1.00	0.17	0.70	1.00			
Prob of Max Out (p_x)		0.00	1.00	0.00	0.04	0.00	1.00	1.00	0.00			
Left-Turn Movement Data												
Assigned Mvmt			1		3			5	7			
Mvmt Sat Flow, veh/h			1641		1641			1641	1641			
Through Movement Data												
Assigned Mvmt		2		4		6			8			
Mvmt Sat Flow, veh/h		1870		3554		1870			2655			
Right-Turn Movement Data												
Assigned Mvmt		12		14		16			18			
Mvmt Sat Flow, veh/h		1460		1460		1460			841			
Left Lane Group Data												
Assigned Mvmt		0	1	0	3	0	5	7	0			
Lane Assignment		L (Prot)		L (Prot)		L (Prot)	L (Prot)					

HCM 6th Signalized Intersection Capacity Analysis

1: Topaz Rd & Bear Valley Rd

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Lanes in Grp	0	1	0	1	0	1	1	0
Grp Vol (v), veh/h	0	128	0	57	0	7	46	0
Grp Sat Flow (s), veh/h/ln	0	1641	0	1641	0	1641	1641	0
Q Serve Time (g_s), s	0.0	7.0	0.0	2.2	0.0	0.3	2.5	0.0
Cycle Q Clear Time (g_c), s	0.0	7.0	0.0	2.2	0.0	0.3	2.5	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00
Lane Grp Cap (c), veh/h	0	189	0	553	0	229	91	0
V/C Ratio (X)	0.00	0.68	0.00	0.10	0.00	0.03	0.51	0.00
Avail Cap (c_a), veh/h	0	247	0	553	0	229	123	0
Upstream Filter (I)	0.00	1.00	0.00	0.98	0.00	1.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	39.5	0.0	21.2	0.0	34.6	42.7	0.0
Incr Delay (d2), s/veh	0.0	4.7	0.0	0.1	0.0	0.1	4.3	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	44.2	0.0	21.3	0.0	34.6	47.0	0.0
1st-Term Q (Q1), veh/ln	0.0	2.6	0.0	0.8	0.0	0.1	1.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.2	0.0	0.0	0.0	0.0	0.1	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	2.9	0.0	0.8	0.0	0.1	1.1	0.0
%ile Storage Ratio (RQ%)	0.00	0.73	0.00	0.10	0.00	0.02	0.18	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	2	0	4	0	6	0	0	8
Lane Assignment	T		T		T			T
Lanes in Grp	1	0	2	0	1	0	0	1
Grp Vol (v), veh/h	35	0	497	0	29	0	0	155
Grp Sat Flow (s), veh/h/ln	1870	0	1777	0	1870	0	0	1777
Q Serve Time (g_s), s	1.6	0.0	10.9	0.0	1.4	0.0	0.0	3.9
Cycle Q Clear Time (g_c), s	1.6	0.0	10.9	0.0	1.4	0.0	0.0	3.9
Lane Grp Cap (c), veh/h	184	0	986	0	138	0	0	993
V/C Ratio (X)	0.19	0.00	0.50	0.00	0.21	0.00	0.00	0.16
Avail Cap (c_a), veh/h	487	0	986	0	648	0	0	993
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.98
Uniform Delay (d1), s/veh	38.5	0.0	28.2	0.0	40.5	0.0	0.0	9.9
Incr Delay (d2), s/veh	0.5	0.0	1.8	0.0	0.7	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
Control Delay (d), s/veh	39.0	0.0	30.1	0.0	41.2	0.0	0.0	10.2
1st-Term Q (Q1), veh/ln	0.7	0.0	4.2	0.0	0.6	0.0	0.0	1.3
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.1

HCM 6th Signalized Intersection Capacity Analysis

1: Topaz Rd & Bear Valley Rd

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3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.7	0.0	4.5	0.0	0.6	0.0	0.0	1.3
%ile Storage Ratio (RQ%)	0.01	0.00	0.04	0.00	0.01	0.00	0.00	0.01
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	12	0	14	0	16	0	0	18
Lane Assignment	R		R		R			T+R
Lanes in Grp	1	0	1	0	1	0	0	1
Grp Vol (v), veh/h	80	0	8	0	54	0	0	155
Grp Sat Flow (s), veh/h/ln	1460	0	1460	0	1460	0	0	1719
Q Serve Time (g_s), s	4.9	0.0	0.4	0.0	2.6	0.0	0.0	4.2
Cycle Q Clear Time (g_c), s	4.9	0.0	0.4	0.0	2.6	0.0	0.0	4.2
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.49
Lane Grp Cap (c), veh/h	144	0	405	0	108	0	0	961
V/C Ratio (X)	0.56	0.00	0.02	0.00	0.50	0.00	0.00	0.16
Avail Cap (c_a), veh/h	380	0	405	0	505	0	0	961
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.98
Uniform Delay (d1), s/veh	40.0	0.0	24.4	0.0	26.5	0.0	0.0	10.2
Incr Delay (d2), s/veh	3.4	0.0	0.1	0.0	3.5	0.0	0.0	0.4
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	43.4	0.0	24.5	0.0	30.1	0.0	0.0	10.6
1st-Term Q (Q1), veh/ln	1.6	0.0	0.1	0.0	1.1	0.0	0.0	1.3
2nd-Term Q (Q2), veh/ln	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.1
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	1.8	0.0	0.1	0.0	1.2	0.0	0.0	1.4
%ile Storage Ratio (RQ%)	0.30	0.00	0.00	0.00	0.31	0.00	0.00	0.01
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0























Intersection Summary

HCM 6th Ctrl Delay	28.2
HCM 6th LOS	C

HCM 6th Signalized Intersection Capacity Analysis

2: Amethyst Rd & Bear Valley Rd

AM 2023
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	43	639	6	44	306	80	8	25	118	272	42	35
Future Volume (veh/h)	43	639	6	44	306	80	8	25	118	272	42	35
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, 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	
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1654	1870	1723	1723	1870	1723	1723	1870	1723	1723	1870	1723
Adj Flow Rate, veh/h	47	695	7	48	333	87	9	27	128	296	46	38
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	414	1816	746	94	1085	446	50	221	197	444	217	179
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
Prop Arrive On Green	0.26	0.51	0.51	0.06	0.31	0.31	0.03	0.12	0.10	0.14	0.23	0.21
Unsig. Movement Delay												
Ln Grp Delay, s/veh	26.2	14.4	11.2	46.9	25.5	10.1	45.7	36.4	43.3	40.0	0.0	29.7
Ln Grp LOS	C	B	B	D	C	B	D	D	D	D	A	C
Approach Vol, veh/h	749				468				164			
Approach Delay, s/veh	15.1				24.8				42.3			
Approach LOS	B				C				D			
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	8	7				
Case No	2.0	4.0	2.0	3.0	2.0	4.0	3.0	2.0				
Phs Duration (G+Y+Rc), s	16.6	15.6	9.3	51.5	6.8	25.3	32.4	28.4				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green (Gmax), s	16.0	20.6	8.0	24.4	4.0	32.6	26.4	6.0				
Max Allow Headway (MAH), s	4.1	4.3	4.1	4.0	4.1	4.1	4.1	4.1				
Max Q Clear (g_c+l1), s	10.0	9.2	4.6	13.1	2.5	5.7	8.7	4.1				
Green Ext Time (g_e), s	0.6	0.4	0.0	2.4	0.0	0.2	1.5	0.0				
Prob of Phs Call (p_c)	1.00	1.00	0.71	1.00	0.21	1.00	1.00	0.70				
Prob of Max Out (p_x)	0.30	0.00	1.00	0.00	1.00	0.00	0.00	1.00				
Left-Turn Movement Data												
Assigned Mvmt	1		3		5			7				
Mvmt Sat Flow, veh/h	3281		1641		1641			1575				
Through Movement Data												
Assigned Mvmt		2		4		6	8					
Mvmt Sat Flow, veh/h		1777		3554		947	3554					
Right-Turn Movement Data												
Assigned Mvmt		12		14		16	18					
Mvmt Sat Flow, veh/h		1585		1460		782	1460					
Left Lane Group Data												
Assigned Mvmt	1	0	3	0	5	0	0	7				
Lane Assignment	L (Prot)		L (Prot)		L (Prot)			L (Prot)				

HCM 6th Signalized Intersection Capacity Analysis

2: Amethyst Rd & Bear Valley Rd

AM 2023
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Lanes in Grp	2	0	1	0	1	0	0	1
Grp Vol (v), veh/h	296	0	48	0	9	0	0	47
Grp Sat Flow (s), veh/h/ln	1641	0	1641	0	1641	0	0	1575
Q Serve Time (g_s), s	8.0	0.0	2.6	0.0	0.5	0.0	0.0	2.1
Cycle Q Clear Time (g_c), s	8.0	0.0	2.6	0.0	0.5	0.0	0.0	2.1
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00
Lane Grp Cap (c), veh/h	444	0	94	0	50	0	0	414
V/C Ratio (X)	0.67	0.00	0.51	0.00	0.18	0.00	0.00	0.11
Avail Cap (c_a), veh/h	635	0	176	0	106	0	0	414
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.96
Uniform Delay (d1), s/veh	38.2	0.0	42.6	0.0	44.0	0.0	0.0	26.0
Incr Delay (d2), s/veh	1.7	0.0	4.3	0.0	1.7	0.0	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
Control Delay (d), s/veh	40.0	0.0	46.9	0.0	45.7	0.0	0.0	26.2
1st-Term Q (Q1), veh/ln	3.0	0.0	1.0	0.0	0.2	0.0	0.0	0.7
2nd-Term Q (Q2), veh/ln	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	3.1	0.0	1.1	0.0	0.2	0.0	0.0	0.7
%ile Storage Ratio (RQ%)	0.52	0.00	0.28	0.00	0.08	0.00	0.00	0.06
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	0	6	8	0
Lane Assignment		T		T			T	
Lanes in Grp	0	1	0	2	0	0	2	0
Grp Vol (v), veh/h	0	27	0	695	0	0	333	0
Grp Sat Flow (s), veh/h/ln	0	1777	0	1777	0	0	1777	0
Q Serve Time (g_s), s	0.0	1.3	0.0	11.1	0.0	0.0	6.7	0.0
Cycle Q Clear Time (g_c), s	0.0	1.3	0.0	11.1	0.0	0.0	6.7	0.0
Lane Grp Cap (c), veh/h	0	221	0	1816	0	0	1085	0
V/C Ratio (X)	0.00	0.12	0.00	0.38	0.00	0.00	0.31	0.00
Avail Cap (c_a), veh/h	0	432	0	1816	0	0	1085	0
Upstream Filter (I)	0.00	1.00	0.00	0.96	0.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	36.2	0.0	13.8	0.0	0.0	24.8	0.0
Incr Delay (d2), s/veh	0.0	0.2	0.0	0.6	0.0	0.0	0.7	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	36.4	0.0	14.4	0.0	0.0	25.5	0.0
1st-Term Q (Q1), veh/ln	0.0	0.5	0.0	3.7	0.0	0.0	2.6	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0

HCM 6th Signalized Intersection Capacity Analysis

2: Amethyst Rd & Bear Valley Rd

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3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	0.5	0.0	3.9	0.0	0.0	2.7	0.0
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.02	0.00	0.00	0.01	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	16	18	0
Lane Assignment	T+R		R		T+R		R	
Lanes in Grp	0	1	0	1	0	1	1	0
Grp Vol (v), veh/h	0	128	0	7	0	84	87	0
Grp Sat Flow (s), veh/h/ln	0	1585	0	1460	0	1730	1460	0
Q Serve Time (g_s), s	0.0	7.2	0.0	0.2	0.0	3.7	2.5	0.0
Cycle Q Clear Time (g_c), s	0.0	7.2	0.0	0.2	0.0	3.7	2.5	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	1.00	0.00	1.00	0.00	0.45	1.00	0.00
Lane Grp Cap (c), veh/h	0	197	0	746	0	397	446	0
V/C Ratio (X)	0.00	0.65	0.00	0.01	0.00	0.21	0.20	0.00
Avail Cap (c_a), veh/h	0	385	0	746	0	643	446	0
Upstream Filter (I)	0.00	1.00	0.00	0.96	0.00	1.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	39.8	0.0	11.2	0.0	29.4	9.2	0.0
Incr Delay (d2), s/veh	0.0	3.6	0.0	0.0	0.0	0.3	1.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	43.3	0.0	11.2	0.0	29.7	10.1	0.0
1st-Term Q (Q1), veh/ln	0.0	2.7	0.0	0.1	0.0	1.4	1.2	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.2	0.0	0.0	0.0	0.0	0.1	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	2.9	0.0	0.1	0.0	1.5	1.4	0.0
%ile Storage Ratio (RQ%)	0.00	0.03	0.00	0.01	0.00	0.02	0.17	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary







HCM 6th Ctrl Delay	25.1
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

Intersection

Intersection Delay, s/veh
Intersection LOS A























Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	46	55	15	14	41	7	20	63	27	3	50	43
Future Vol, veh/h	46	55	15	14	41	7	20	63	27	3	50	43
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	50	60	16	15	45	8	22	68	29	3	54	47
Number of Lanes	1	1	0	1	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach Right	WB	SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	8.5	8.3	8.2	7.9
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	18%	100%	0%	100%	0%	3%
Vol Thru, %	57%	0%	79%	0%	85%	52%
Vol Right, %	25%	0%	21%	0%	15%	45%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	110	46	70	14	48	96
LT Vol	20	46	0	14	0	3
Through Vol	63	0	55	0	41	50
RT Vol	27	0	15	0	7	43
Lane Flow Rate	120	50	76	15	52	104
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.147	0.078	0.105	0.024	0.073	0.125
Departure Headway (Hd)	4.429	5.606	4.952	5.668	5.062	4.298
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	811	640	724	632	707	835
Service Time	2.45	3.336	2.682	3.42	2.794	2.32
HCM Lane V/C Ratio	0.148	0.078	0.105	0.024	0.074	0.125
HCM Control Delay	8.2	8.8	8.3	8.5	8.2	7.9
HCM Lane LOS	A	A	A	A	A	A
HCM 95th-tile Q	0.5	0.3	0.4	0.1	0.2	0.4

HCM 6th Signalized Intersection Capacity Analysis
4: SR 395 & Eucalyptus St

AM 2023
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	19	20	18	92	13	29	3	651	54	21	837	12
Future Volume (veh/h)	19	20	18	92	13	29	3	651	54	21	837	12
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, 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		
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1723	1870	1723	1723	1870	1723	1723	1870	1723	1723	1870	1723
Adj Flow Rate, veh/h	21	22	20	100	14	32	3	708	59	23	910	13
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	257	201	157	191	301	235	75	1160	477	179	1385	569
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
Prop Arrive On Green	0.06	0.11	0.11	0.12	0.16	0.16	0.05	0.33	0.33	0.11	0.39	0.39
Unsig. Movement Delay												
Ln Grp Delay, s/veh	20.9	19.2	8.7	21.7	16.7	5.7	21.6	13.8	11.2	19.2	12.3	8.8
Ln Grp LOS	C	B	A	C	B	A	C	B	B	B	B	A
Approach Vol, veh/h	63			146			770			946		
Approach Delay, s/veh	16.4			17.7			13.7			12.4		
Approach LOS	B			B			B			B		
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	2		1	4	3	5	6	7	8			
Case No	3.0		2.0	3.0	2.0	2.0	3.0	1.2	3.0			
Phs Duration (G+Y+Rc), s	19.3		9.1	9.0	9.5	6.2	22.3	7.0	11.5			
Change Period (Y+Rc), s	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0			
Max Green (Gmax), s	52.5		4.0	30.5	8.0	4.0	52.5	4.0	34.5			
Max Allow Headway (MAH), s	4.0		4.1	4.2	4.1	4.1	4.0	4.1	4.2			
Max Q Clear (g_c+l1), s	9.9		2.6	2.5	4.7	2.1	11.9	2.6	2.5			
Green Ext Time (g_e), s	3.5		0.0	0.1	0.1	0.0	4.4	0.0	0.1			
Prob of Phs Call (p_c)	1.00		0.26	0.76	0.73	0.04	1.00	0.24	0.91			
Prob of Max Out (p_x)	0.00		1.00	0.00	1.00	1.00	0.00	1.00	0.00			
Left-Turn Movement Data												
Assigned Mvmt			1		3	5		7				
Mvmt Sat Flow, veh/h			1641		1641	1641		1641				
Through Movement Data												
Assigned Mvmt	2			4			6		8			
Mvmt Sat Flow, veh/h	3554			1870			3554		1870			
Right-Turn Movement Data												
Assigned Mvmt	12			14			16		18			
Mvmt Sat Flow, veh/h	1460			1460			1460		1460			
Left Lane Group Data												
Assigned Mvmt	0		1	0	3	5	0	7	0			
Lane Assignment	L (Prot)			L (Prot)	L (Prot)	L (Prot)	L (Pr/Pm)					

HCM 6th Signalized Intersection Capacity Analysis

4: SR 395 & Eucalyptus St

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Lanes in Grp	0	1	0	1	1	0	1	0
Grp Vol (v), veh/h	0	23	0	100	3	0	21	0
Grp Sat Flow (s), veh/h/ln	0	1641	0	1641	1641	0	1641	0
Q Serve Time (g_s), s	0.0	0.6	0.0	2.7	0.1	0.0	0.6	0.0
Cycle Q Clear Time (g_c), s	0.0	0.6	0.0	2.7	0.1	0.0	0.6	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	1252	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	0	179	0	191	75	0	257	0
V/C Ratio (X)	0.00	0.13	0.00	0.52	0.04	0.00	0.08	0.00
Avail Cap (c_a), veh/h	0	210	0	349	210	0	363	0
Upstream Filter (I)	0.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	18.9	0.0	19.5	21.4	0.0	20.8	0.0
Incr Delay (d2), s/veh	0.0	0.3	0.0	2.2	0.2	0.0	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
Control Delay (d), s/veh	0.0	19.2	0.0	21.7	21.6	0.0	20.9	0.0
1st-Term Q (Q1), veh/ln	0.0	0.2	0.0	0.8	0.0	0.0	0.2	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	0.2	0.0	0.9	0.0	0.0	0.2	0.0
%ile Storage Ratio (RQ%)	0.00	0.01	0.00	0.08	0.00	0.00	0.05	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	2	0	4	0	0	6	0	8
Lane Assignment	T		T			T		T
Lanes in Grp	2	0	1	0	0	2	0	1
Grp Vol (v), veh/h	708	0	22	0	0	910	0	14
Grp Sat Flow (s), veh/h/ln	1777	0	1870	0	0	1777	0	1870
Q Serve Time (g_s), s	7.9	0.0	0.5	0.0	0.0	9.9	0.0	0.3
Cycle Q Clear Time (g_c), s	7.9	0.0	0.5	0.0	0.0	9.9	0.0	0.3
Lane Grp Cap (c), veh/h	1160	0	201	0	0	1385	0	301
V/C Ratio (X)	0.61	0.00	0.11	0.00	0.00	0.66	0.00	0.05
Avail Cap (c_a), veh/h	4125	0	1295	0	0	4125	0	1454
Upstream Filter (I)	1.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	13.3	0.0	18.9	0.0	0.0	11.8	0.0	16.7
Incr Delay (d2), s/veh	0.5	0.0	0.2	0.0	0.0	0.5	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
Control Delay (d), s/veh	13.8	0.0	19.2	0.0	0.0	12.3	0.0	16.7
1st-Term Q (Q1), veh/ln	2.1	0.0	0.2	0.0	0.0	2.4	0.0	0.1
2nd-Term Q (Q2), veh/ln	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0

HCM 6th Signalized Intersection Capacity Analysis

4: SR 395 & Eucalyptus St

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3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	2.2	0.0	0.2	0.0	0.0	2.5	0.0	0.1
%ile Storage Ratio (RQ%)	0.04	0.00	0.00	0.00	0.00	0.02	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	12	0	14	0	0	16	0	18
Lane Assignment	R		R			R		R
Lanes in Grp	1	0	1	0	0	1	0	1
Grp Vol (v), veh/h	59	0	20	0	0	13	0	32
Grp Sat Flow (s), veh/h/ln	1460	0	1460	0	0	1460	0	1460
Q Serve Time (g_s), s	1.3	0.0	0.4	0.0	0.0	0.3	0.0	0.5
Cycle Q Clear Time (g_c), s	1.3	0.0	0.4	0.0	0.0	0.3	0.0	0.5
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	1.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	477	0	157	0	0	569	0	235
V/C Ratio (X)	0.12	0.00	0.13	0.00	0.00	0.02	0.00	0.14
Avail Cap (c_a), veh/h	1695	0	1011	0	0	1695	0	1135
Upstream Filter (I)	1.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	11.1	0.0	8.3	0.0	0.0	8.8	0.0	5.4
Incr Delay (d2), s/veh	0.1	0.0	0.4	0.0	0.0	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
Control Delay (d), s/veh	11.2	0.0	8.7	0.0	0.0	8.8	0.0	5.7
1st-Term Q (Q1), veh/ln	0.3	0.0	0.2	0.0	0.0	0.1	0.0	0.2
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.3	0.0	0.2	0.0	0.0	0.1	0.0	0.2
%ile Storage Ratio (RQ%)	0.03	0.00	0.17	0.00	0.00	0.00	0.00	0.24
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 6th Ctrl Delay	13.4
HCM 6th LOS	B

Intersection

Intersection Delay, s/veh

Intersection LOS A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
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Lane Configurations

Traffic Vol, veh/h	24	45	20	18	50	7	56	17	33	4	13	28
Future Vol, veh/h	24	45	20	18	50	7	56	17	33	4	13	28
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	26	49	22	20	54	8	61	18	36	4	14	30
Number of Lanes	0	1	1	1	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
----------	----	----	----	----




Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	8.2	8.2	8.1	7.4
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
------	-------	-------	-------	-------	-------	-------

Vol Left, %	53%	35%	0%	100%	0%	9%
Vol Thru, %	16%	65%	0%	0%	88%	29%
Vol Right, %	31%	0%	100%	0%	12%	62%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	106	69	20	18	57	45
LT Vol	56	24	0	18	0	4
Through Vol	17	45	0	0	50	13
RT Vol	33	0	20	0	7	28
Lane Flow Rate	115	75	22	20	62	49
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.139	0.107	0.026	0.03	0.084	0.056
Departure Headway (Hd)	4.347	5.152	4.274	5.492	4.904	4.148
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	827	698	840	654	733	865
Service Time	2.359	2.868	1.99	3.209	2.62	2.163
HCM Lane V/C Ratio	0.139	0.107	0.026	0.031	0.085	0.057
HCM Control Delay	8.1	8.5	7.1	8.4	8.1	7.4
HCM Lane LOS	A	A	A	A	A	A
HCM 95th-tile Q	0.5	0.4	0.1	0.1	0.3	0.2

Intersection

Intersection Delay, s/veh
Intersection LOS A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	77	10	13	1	0	56
Future Vol, veh/h	77	10	13	1	0	56
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	84	11	14	1	0	61
Number of Lanes	1	1	1	0	0	0























Approach	EB	WB
Opposing Approach WB		EB
Opposing Lanes	1	2
Conflicting Approach Left		
Conflicting Lanes Left	0	0
Conflicting Approach Right		
Conflicting Lanes Right	0	0
HCM Control Delay	5	5
HCM LOS	A	A

Lane	EBLn1	EBLn2	WBLn1
Vol Left, %	100%	0%	0%
Vol Thru, %	0%	100%	93%
Vol Right, %	0%	0%	7%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	77	10	14
LT Vol	77	0	0
Through Vol	0	10	13
RT Vol	0	0	1
Lane Flow Rate	84	11	15
Geometry Grp	0	0	0
Degree of Util (X)	0	0	0
Departure Headway (Hd)	0	0	0
Convergence, Y/N	Yes	Yes	Yes
Cap	0	0	0
Service Time	0	0	0
HCM Lane V/C Ratio	0	0	0
HCM Control Delay	5	5	5
HCM Lane LOS	N	N	N
HCM 95th-tile Q	0	0	0

HCM 6th Signalized Intersection Capacity Analysis

1: Topaz Rd & Bear Valley Rd

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	42	457	8	63	215	70	7	36	102	118	29	50
Future Volume (veh/h)	42	457	8	63	215	70	7	36	102	118	29	50
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, 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	
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1723	1870	1723	1723	1870	1723	1723	1870	1723	1723	1870	1723
Adj Flow Rate, veh/h	46	497	9	68	234	76	8	39	111	128	32	54
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	91	986	405	518	1428	452	264	224	175	189	139	108
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
Prop Arrive On Green	0.06	0.28	0.28	0.32	0.54	0.52	0.16	0.12	0.12	0.12	0.07	0.07
Unsig. Movement Delay												
Ln Grp Delay, s/veh	47.0	30.1	24.5	22.8	11.2	11.6	33.0	37.2	42.8	44.2	41.4	30.1
Ln Grp LOS	D	C	C	C	B	B	C	D	D	D	D	C
Approach Vol, veh/h	552				378				158			
Approach Delay, s/veh	31.4				13.5				40.9			
Approach LOS	C				B				D			
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	2		1	4	3	6	5	7	8			
Case No	3.0		2.0	3.0	2.0	3.0	2.0	2.0	4.0			
Phs Duration (G+Y+Rc), s	15.1		14.7	29.8	33.4	10.9	18.9	9.2	54.0			
Change Period (Y+Rc), s	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0			
Max Green (Gmax), s	22.2		12.0	23.8	11.0	30.2	4.0	5.0	29.8			
Max Allow Headway (MAH), s	4.2		4.1	4.0	4.1	4.2	4.1	4.1	4.1			
Max Q Clear (g_c+l1), s	8.7		9.0	12.9	4.8	4.6	2.4	4.5	6.4			
Green Ext Time (g_e), s	0.4		0.1	1.6	0.1	0.2	0.0	0.0	1.0			
Prob of Phs Call (p_c)	1.00		0.96	1.00	0.83	1.00	0.19	0.70	1.00			
Prob of Max Out (p_x)	0.00		1.00	0.00	0.09	0.00	1.00	1.00	0.00			
Left-Turn Movement Data												
Assigned Mvmt	1				3		5		7			
Mvmt Sat Flow, veh/h	1641				1641		1641		1641			
Through Movement Data												
Assigned Mvmt	2			4		6			8			
Mvmt Sat Flow, veh/h	1870			3554		1870			2655			
Right-Turn Movement Data												
Assigned Mvmt	12			14		16			18			
Mvmt Sat Flow, veh/h	1460			1460		1460			841			
Left Lane Group Data												
Assigned Mvmt	0		1	0	3	0	5	7	0			
Lane Assignment	L (Prot)			L (Prot)			L (Prot)		L (Prot)			

HCM 6th Signalized Intersection Capacity Analysis

1: Topaz Rd & Bear Valley Rd

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Lanes in Grp	0	1	0	1	0	1	1	0
Grp Vol (v), veh/h	0	128	0	68	0	8	46	0
Grp Sat Flow (s), veh/h/ln	0	1641	0	1641	0	1641	1641	0
Q Serve Time (g_s), s	0.0	7.0	0.0	2.8	0.0	0.4	2.5	0.0
Cycle Q Clear Time (g_c), s	0.0	7.0	0.0	2.8	0.0	0.4	2.5	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00
Lane Grp Cap (c), veh/h	0	189	0	518	0	264	91	0
V/C Ratio (X)	0.00	0.68	0.00	0.13	0.00	0.03	0.51	0.00
Avail Cap (c_a), veh/h	0	247	0	518	0	264	123	0
Upstream Filter (I)	0.00	1.00	0.00	0.98	0.00	1.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	39.5	0.0	22.7	0.0	32.9	42.7	0.0
Incr Delay (d2), s/veh	0.0	4.7	0.0	0.1	0.0	0.0	4.3	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	44.2	0.0	22.8	0.0	33.0	47.0	0.0
1st-Term Q (Q1), veh/ln	0.0	2.6	0.0	1.0	0.0	0.1	1.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.2	0.0	0.0	0.0	0.0	0.1	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	2.9	0.0	1.0	0.0	0.1	1.1	0.0
%ile Storage Ratio (RQ%)	0.00	0.73	0.00	0.13	0.00	0.02	0.18	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	2	0	4	0	6	0	0	8
Lane Assignment	T		T		T			T
Lanes in Grp	1	0	2	0	1	0	0	1
Grp Vol (v), veh/h	39	0	497	0	32	0	0	155
Grp Sat Flow (s), veh/h/ln	1870	0	1777	0	1870	0	0	1777
Q Serve Time (g_s), s	1.7	0.0	10.9	0.0	1.5	0.0	0.0	4.1
Cycle Q Clear Time (g_c), s	1.7	0.0	10.9	0.0	1.5	0.0	0.0	4.1
Lane Grp Cap (c), veh/h	224	0	986	0	139	0	0	955
V/C Ratio (X)	0.17	0.00	0.50	0.00	0.23	0.00	0.00	0.16
Avail Cap (c_a), veh/h	487	0	986	0	648	0	0	955
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.98
Uniform Delay (d1), s/veh	36.8	0.0	28.2	0.0	40.6	0.0	0.0	10.9
Incr Delay (d2), s/veh	0.4	0.0	1.8	0.0	0.8	0.0	0.0	0.4
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	37.2	0.0	30.1	0.0	41.4	0.0	0.0	11.2
1st-Term Q (Q1), veh/ln	0.7	0.0	4.2	0.0	0.6	0.0	0.0	1.3
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.1

HCM 6th Signalized Intersection Capacity Analysis

1: Topaz Rd & Bear Valley Rd

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3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.8	0.0	4.5	0.0	0.7	0.0	0.0	1.4
%ile Storage Ratio (RQ%)	0.01	0.00	0.04	0.00	0.01	0.00	0.00	0.01
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	12	0	14	0	16	0	0	18
Lane Assignment	R		R		R			T+R
Lanes in Grp	1	0	1	0	1	0	0	1
Grp Vol (v), veh/h	111	0	9	0	54	0	0	155
Grp Sat Flow (s), veh/h/ln	1460	0	1460	0	1460	0	0	1719
Q Serve Time (g_s), s	6.7	0.0	0.4	0.0	2.6	0.0	0.0	4.4
Cycle Q Clear Time (g_c), s	6.7	0.0	0.4	0.0	2.6	0.0	0.0	4.4
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.49
Lane Grp Cap (c), veh/h	175	0	405	0	108	0	0	924
V/C Ratio (X)	0.64	0.00	0.02	0.00	0.50	0.00	0.00	0.17
Avail Cap (c_a), veh/h	380	0	405	0	505	0	0	924
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.98
Uniform Delay (d1), s/veh	39.0	0.0	24.4	0.0	26.5	0.0	0.0	11.2
Incr Delay (d2), s/veh	3.8	0.0	0.1	0.0	3.5	0.0	0.0	0.4
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	42.8	0.0	24.5	0.0	30.1	0.0	0.0	11.6
1st-Term Q (Q1), veh/ln	2.2	0.0	0.1	0.0	1.1	0.0	0.0	1.4
2nd-Term Q (Q2), veh/ln	0.2	0.0	0.0	0.0	0.1	0.0	0.0	0.1
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	2.4	0.0	0.1	0.0	1.2	0.0	0.0	1.5
%ile Storage Ratio (RQ%)	0.41	0.00	0.00	0.00	0.31	0.00	0.00	0.01
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0























Intersection Summary

HCM 6th Ctrl Delay	28.8
HCM 6th LOS	C

HCM 6th Signalized Intersection Capacity Analysis

2: Amethyst Rd & Bear Valley Rd

AM 2023+Project
08/14/2023

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	52	656	7	47	313	80	9	25	118	272	42	38
Future Volume (veh/h)	52	656	7	47	313	80	9	25	118	272	42	38
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, 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	
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1654	1870	1723	1723	1870	1723	1723	1870	1723	1723	1870	1723
Adj Flow Rate, veh/h	57	713	8	51	340	87	10	27	128	296	46	41
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	414	1808	743	98	1085	446	51	221	197	444	208	186
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
Prop Arrive On Green	0.26	0.51	0.51	0.06	0.31	0.31	0.03	0.12	0.10	0.14	0.23	0.21
Unsig. Movement Delay												
Ln Grp Delay, s/veh	26.4	14.7	11.3	46.7	25.6	10.1	45.7	36.4	43.3	40.0	0.0	29.8
Ln Grp LOS	C	B	B	D	C	B	D	D	D	D	A	C
Approach Vol, veh/h	778			478			165			383		
Approach Delay, s/veh	15.5			25.0			42.3			37.7		
Approach LOS	B			C			D			D		
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	8	7				
Case No	2.0	4.0	2.0	3.0	2.0	4.0	3.0	2.0				
Phs Duration (G+Y+Rc), s	16.6	15.6	9.5	51.3	6.9	25.2	32.4	28.4				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green (Gmax), s	16.0	20.6	8.0	24.4	4.0	32.6	26.4	6.0				
Max Allow Headway (MAH), s	4.1	4.3	4.1	4.0	4.1	4.2	4.1	4.1				
Max Q Clear (g_c+l1), s	10.0	9.2	4.8	13.5	2.6	5.9	8.8	4.6				
Green Ext Time (g_e), s	0.6	0.4	0.0	2.4	0.0	0.2	1.5	0.0				
Prob of Phs Call (p_c)	1.00	1.00	0.73	1.00	0.23	1.00	1.00	0.77				
Prob of Max Out (p_x)	0.30	0.00	1.00	0.00	1.00	0.00	0.00	1.00				
Left-Turn Movement Data												
Assigned Mvmt	1		3		5			7				
Mvmt Sat Flow, veh/h	3281		1641		1641			1575				
Through Movement Data												
Assigned Mvmt		2		4		6	8					
Mvmt Sat Flow, veh/h		1777		3554		912	3554					
Right-Turn Movement Data												
Assigned Mvmt		12		14		16	18					
Mvmt Sat Flow, veh/h		1585		1460		813	1460					
Left Lane Group Data												
Assigned Mvmt	1	0	3	0	5	0	0	7				
Lane Assignment	L (Prot)		L (Prot)		L (Prot)			L (Prot)				

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Lanes in Grp	2	0	1	0	1	0	0	1
Grp Vol (v), veh/h	296	0	51	0	10	0	0	57
Grp Sat Flow (s), veh/h/ln	1641	0	1641	0	1641	0	0	1575
Q Serve Time (g_s), s	8.0	0.0	2.8	0.0	0.6	0.0	0.0	2.6
Cycle Q Clear Time (g_c), s	8.0	0.0	2.8	0.0	0.6	0.0	0.0	2.6
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00
Lane Grp Cap (c), veh/h	444	0	98	0	51	0	0	414
V/C Ratio (X)	0.67	0.00	0.52	0.00	0.19	0.00	0.00	0.14
Avail Cap (c_a), veh/h	635	0	176	0	106	0	0	414
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.95
Uniform Delay (d1), s/veh	38.2	0.0	42.4	0.0	43.9	0.0	0.0	26.2
Incr Delay (d2), s/veh	1.7	0.0	4.3	0.0	1.8	0.0	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
Control Delay (d), s/veh	40.0	0.0	46.7	0.0	45.7	0.0	0.0	26.4
1st-Term Q (Q1), veh/ln	3.0	0.0	1.1	0.0	0.2	0.0	0.0	0.9
2nd-Term Q (Q2), veh/ln	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	3.1	0.0	1.2	0.0	0.2	0.0	0.0	0.9
%ile Storage Ratio (RQ%)	0.52	0.00	0.30	0.00	0.09	0.00	0.00	0.08
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	0	2	0	4	0	6	8	0
Lane Assignment		T		T			T	
Lanes in Grp	0	1	0	2	0	0	2	0
Grp Vol (v), veh/h	0	27	0	713	0	0	340	0
Grp Sat Flow (s), veh/h/ln	0	1777	0	1777	0	0	1777	0
Q Serve Time (g_s), s	0.0	1.3	0.0	11.5	0.0	0.0	6.8	0.0
Cycle Q Clear Time (g_c), s	0.0	1.3	0.0	11.5	0.0	0.0	6.8	0.0
Lane Grp Cap (c), veh/h	0	221	0	1808	0	0	1085	0
V/C Ratio (X)	0.00	0.12	0.00	0.39	0.00	0.00	0.31	0.00
Avail Cap (c_a), veh/h	0	432	0	1808	0	0	1085	0
Upstream Filter (I)	0.00	1.00	0.00	0.95	0.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	36.2	0.0	14.0	0.0	0.0	24.8	0.0
Incr Delay (d2), s/veh	0.0	0.2	0.0	0.6	0.0	0.0	0.8	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	36.4	0.0	14.7	0.0	0.0	25.6	0.0
1st-Term Q (Q1), veh/ln	0.0	0.5	0.0	3.9	0.0	0.0	2.6	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.2	0.0	0.0	0.1	0.0

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3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	0.5	0.0	4.0	0.0	0.0	2.7	0.0
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.02	0.00	0.00	0.01	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	16	18	0
Lane Assignment	T+R		R		T+R		R	
Lanes in Grp	0	1	0	1	0	1	1	0
Grp Vol (v), veh/h	0	128	0	8	0	87	87	0
Grp Sat Flow (s), veh/h/ln	0	1585	0	1460	0	1724	1460	0
Q Serve Time (g_s), s	0.0	7.2	0.0	0.3	0.0	3.9	2.5	0.0
Cycle Q Clear Time (g_c), s	0.0	7.2	0.0	0.3	0.0	3.9	2.5	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	1.00	0.00	1.00	0.00	0.47	1.00	0.00
Lane Grp Cap (c), veh/h	0	197	0	743	0	394	446	0
V/C Ratio (X)	0.00	0.65	0.00	0.01	0.00	0.22	0.20	0.00
Avail Cap (c_a), veh/h	0	385	0	743	0	641	446	0
Upstream Filter (I)	0.00	1.00	0.00	0.95	0.00	1.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	39.8	0.0	11.3	0.0	29.6	9.2	0.0
Incr Delay (d2), s/veh	0.0	3.6	0.0	0.0	0.0	0.3	1.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	43.3	0.0	11.3	0.0	29.8	10.1	0.0
1st-Term Q (Q1), veh/ln	0.0	2.7	0.0	0.1	0.0	1.5	1.2	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.2	0.0	0.0	0.0	0.0	0.1	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	2.9	0.0	0.1	0.0	1.5	1.4	0.0
%ile Storage Ratio (RQ%)	0.00	0.03	0.00	0.01	0.00	0.02	0.17	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary







HCM 6th Ctrl Delay	25.2
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

Intersection

Intersection Delay, s/veh
Intersection LOS A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	46	55	15	14	41	7	20	63	27	3	50	43
Future Vol, veh/h	46	55	15	14	41	7	20	63	27	3	50	43
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	50	60	16	15	45	8	22	68	29	3	54	47
Number of Lanes	1	1	0	1	1	0	0	1	0	0	1	0























Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	8.5	8.3	8.2	7.9
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	18%	100%	0%	100%	0%	3%
Vol Thru, %	57%	0%	79%	0%	85%	52%
Vol Right, %	25%	0%	21%	0%	15%	45%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	110	46	70	14	48	96
LT Vol	20	46	0	14	0	3
Through Vol	63	0	55	0	41	50
RT Vol	27	0	15	0	7	43
Lane Flow Rate	120	50	76	15	52	104
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.147	0.078	0.105	0.024	0.073	0.125
Departure Headway (Hd)	4.429	5.606	4.952	5.668	5.062	4.298
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	811	640	724	632	707	835
Service Time	2.45	3.336	2.682	3.42	2.794	2.32
HCM Lane V/C Ratio	0.148	0.078	0.105	0.024	0.074	0.125
HCM Control Delay	8.2	8.8	8.3	8.5	8.2	7.9
HCM Lane LOS	A	A	A	A	A	A
HCM 95th-tile Q	0.5	0.3	0.4	0.1	0.2	0.4

HCM 6th Signalized Intersection Capacity Analysis

4: SR 395 & Eucalyptus St

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	19	22	18	127	17	64	3	651	67	34	837	12
Future Volume (veh/h)	19	22	18	127	17	64	3	651	67	34	837	12
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, 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		
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1723	1870	1723	1723	1870	1723	1723	1870	1723	1723	1870	1723
Adj Flow Rate, veh/h	21	24	20	138	18	70	3	708	73	37	910	13
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	244	207	162	234	361	282	71	1138	467	173	1357	558
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
Prop Arrive On Green	0.06	0.11	0.11	0.14	0.19	0.19	0.04	0.32	0.32	0.11	0.38	0.38
Unsig. Movement Delay												
Ln Grp Delay, s/veh	21.9	20.2	9.6	22.3	16.4	6.0	23.1	14.9	12.3	21.0	13.4	9.6
Ln Grp LOS	C	C	A	C	B	A	C	B	B	C	B	A
Approach Vol, veh/h	65			226			784			960		
Approach Delay, s/veh	17.5			16.8			14.7			13.6		
Approach LOS	B			B			B			B		
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	2	1	4	3	5	6	7	8				
Case No	3.0	2.0	3.0	2.0	2.0	3.0	1.2	3.0				
Phs Duration (G+Y+Rc), s	19.9	9.2	9.5	11.1	6.2	23.0	7.0	13.6				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green (Gmax), s	52.5	4.0	30.5	8.0	4.0	52.5	4.0	34.5				
Max Allow Headway (MAH), s	4.0	4.1	4.1	4.1	4.1	4.0	4.1	4.3				
Max Q Clear (g_c+l1), s	10.4	3.0	2.6	5.9	2.1	12.6	2.6	3.2				
Green Ext Time (g_e), s	3.5	0.0	0.1	0.1	0.0	4.4	0.0	0.3				
Prob of Phs Call (p_c)	1.00	0.40	0.88	0.85	0.04	1.00	0.25	0.98				
Prob of Max Out (p_x)	0.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00				
Left-Turn Movement Data												
Assigned Mvmt	1			3			5			7		
Mvmt Sat Flow, veh/h	1641			1641			1641			1641		
Through Movement Data												
Assigned Mvmt	2			4			6			8		
Mvmt Sat Flow, veh/h	3554			1870			3554			1870		
Right-Turn Movement Data												
Assigned Mvmt	12			14			16			18		
Mvmt Sat Flow, veh/h	1460			1460			1460			1460		
Left Lane Group Data												
Assigned Mvmt	0	1	0	3	5	0	7	0				
Lane Assignment	L (Prot)			L (Prot)L (Prot)			L (Pr/Pm)					

HCM 6th Signalized Intersection Capacity Analysis

4: SR 395 & Eucalyptus St

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Lanes in Grp	0	1	0	1	1	0	1	0
Grp Vol (v), veh/h	0	37	0	138	3	0	21	0
Grp Sat Flow (s), veh/h/ln	0	1641	0	1641	1641	0	1641	0
Q Serve Time (g_s), s	0.0	1.0	0.0	3.9	0.1	0.0	0.6	0.0
Cycle Q Clear Time (g_c), s	0.0	1.0	0.0	3.9	0.1	0.0	0.6	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	1206	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	0	173	0	234	71	0	244	0
V/C Ratio (X)	0.00	0.21	0.00	0.59	0.04	0.00	0.09	0.00
Avail Cap (c_a), veh/h	0	198	0	329	198	0	342	0
Upstream Filter (I)	0.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	20.4	0.0	20.0	22.8	0.0	21.8	0.0
Incr Delay (d2), s/veh	0.0	0.6	0.0	2.4	0.2	0.0	0.2	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	21.0	0.0	22.3	23.1	0.0	21.9	0.0
1st-Term Q (Q1), veh/ln	0.0	0.3	0.0	1.2	0.0	0.0	0.2	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	0.3	0.0	1.3	0.0	0.0	0.2	0.0
%ile Storage Ratio (RQ%)	0.00	0.02	0.00	0.11	0.00	0.00	0.05	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	2	0	4	0	0	6	0	8
Lane Assignment	T		T			T		T
Lanes in Grp	2	0	1	0	0	2	0	1
Grp Vol (v), veh/h	708	0	24	0	0	910	0	18
Grp Sat Flow (s), veh/h/ln	1777	0	1870	0	0	1777	0	1870
Q Serve Time (g_s), s	8.4	0.0	0.6	0.0	0.0	10.6	0.0	0.4
Cycle Q Clear Time (g_c), s	8.4	0.0	0.6	0.0	0.0	10.6	0.0	0.4
Lane Grp Cap (c), veh/h	1138	0	207	0	0	1357	0	361
V/C Ratio (X)	0.62	0.00	0.12	0.00	0.00	0.67	0.00	0.05
Avail Cap (c_a), veh/h	3888	0	1220	0	0	3888	0	1371
Upstream Filter (I)	1.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	14.4	0.0	19.9	0.0	0.0	12.8	0.0	16.4
Incr Delay (d2), s/veh	0.6	0.0	0.2	0.0	0.0	0.6	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
Control Delay (d), s/veh	14.9	0.0	20.2	0.0	0.0	13.4	0.0	16.4
1st-Term Q (Q1), veh/ln	2.4	0.0	0.2	0.0	0.0	2.8	0.0	0.1
2nd-Term Q (Q2), veh/ln	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0

HCM 6th Signalized Intersection Capacity Analysis 4: SR 395 & Eucalyptus St

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3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	2.5	0.0	0.2	0.0	0.0	2.9	0.0	0.1
%ile Storage Ratio (RQ%)	0.05	0.00	0.00	0.00	0.00	0.03	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	12	0	14	0	0	16	0	18
Lane Assignment	R		R			R		R
Lanes in Grp	1	0	1	0	0	1	0	1
Grp Vol (v), veh/h	73	0	20	0	0	13	0	70
Grp Sat Flow (s), veh/h/ln	1460	0	1460	0	0	1460	0	1460
Q Serve Time (g_s), s	1.8	0.0	0.4	0.0	0.0	0.3	0.0	1.2
Cycle Q Clear Time (g_c), s	1.8	0.0	0.4	0.0	0.0	0.3	0.0	1.2
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	1.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	467	0	162	0	0	558	0	282
V/C Ratio (X)	0.16	0.00	0.12	0.00	0.00	0.02	0.00	0.25
Avail Cap (c_a), veh/h	1597	0	953	0	0	1597	0	1070
Upstream Filter (I)	1.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	12.1	0.0	9.2	0.0	0.0	9.6	0.0	5.6
Incr Delay (d2), s/veh	0.2	0.0	0.3	0.0	0.0	0.0	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
Control Delay (d), s/veh	12.3	0.0	9.6	0.0	0.0	9.6	0.0	6.0
1st-Term Q (Q1), veh/ln	0.4	0.0	0.2	0.0	0.0	0.1	0.0	0.5
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.4	0.0	0.2	0.0	0.0	0.1	0.0	0.5
%ile Storage Ratio (RQ%)	0.04	0.00	0.18	0.00	0.00	0.01	0.00	0.55
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 6th Ctrl Delay	14.5
HCM 6th LOS	B

Intersection

Intersection Delay, s/veh
Intersection LOS A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		←	↑	↑	↑	↑		↑			↑	
Traffic Vol, veh/h	24	70	23	18	123	8	57	17	34	5	13	28
Future Vol, veh/h	24	70	23	18	123	8	57	17	34	5	13	28
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	26	76	25	20	134	9	62	18	37	5	14	30
Number of Lanes	0	1	1	1	1	0	0	1	0	0	1	0







Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach	WB	SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	8.5	8.9	8.5	7.8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	53%	26%	0%	100%	0%	11%
Vol Thru, %	16%	74%	0%	0%	94%	28%
Vol Right, %	31%	0%	100%	0%	6%	61%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	108	94	23	18	131	46
LT Vol	57	24	0	18	0	5
Through Vol	17	70	0	0	123	13
RT Vol	34	0	23	0	8	28
Lane Flow Rate	117	102	25	20	142	50
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.151	0.148	0.03	0.03	0.198	0.062
Departure Headway (Hd)	4.621	5.205	4.373	5.546		5.447
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	776	689	818	646	718	805
Service Time	2.648	2.937	2.104	3.277	2.731	2.48
HCM Lane V/C Ratio	0.151	0.148	0.031	0.031	0.198	0.062
HCM Control Delay	8.5	8.8	7.2	8.4	9	7.8
HCM Lane LOS	A	A	A	A	A	A
HCM 95th-tile Q	0.5	0.5	0.1	0.1	0.7	0.2

Intersection

Int Delay, s/veh 6.8

Movement EBL EBT EBR WBL WBT WBR NBL NBT NBR SBL SBT SBR

Lane Configurations												
Traffic Vol, veh/h	90	10	0	0	13	1	0	0	0	0	0	61
Future Vol, veh/h	90	10	0	0	13	1	0	0	0	0	0	61
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	50	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	0	-	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	98	11	0	0	14	1	0	0	0	0	0	66

Major/Minor	Major1		Major2		Minor1		Minor2					
Conflicting Flow All	15	0	0	11	0	0	255	222	11	222	222	15
Stage 1	-	-	-	-	-	-	207	207	-	15	15	-
Stage 2	-	-	-	-	-	-	48	15	-	207	207	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1603	-	-	1608	-	-	698	677	1070	734	677	1065
Stage 1	-	-	-	-	-	-	795	731	-	1005	883	-
Stage 2	-	-	-	-	-	-	965	883	-	795	731	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1603	-	-	1608	-	-	624	636	1070	700	636	1065
Mov Cap-2 Maneuver	-	-	-	-	-	-	624	636	-	700	636	-
Stage 1	-	-	-	-	-	-	747	686	-	944	883	-
Stage 2	-	-	-	-	-	-	905	883	-	746	686	-























Approach	EB	WB	NB	SB
HCM Control Delay, s	6.7	0	0	8.6
HCM LOS			A	A

Minor Lane/Major Mvm	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1603	-	-	1608	-	-	1065
HCM Lane V/C Ratio	-	0.061	-	-	-	-	-	0.062
HCM Control Delay (s)	0	7.4	-	-	0	-	-	8.6
HCM Lane LOS	A	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	-	0.2	-	-	0	-	-	0.2

HCM 6th Signalized Intersection Capacity Analysis

1: Topaz Rd & Bear Valley Rd

AM 2030
08/14/2023

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	54	591	9	67	278	91	8	41	96	153	35	65
Future Volume (veh/h)	54	591	9	67	278	91	8	41	96	153	35	65
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, 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	
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1723	1870	1723	1723	1870	1723	1723	1870	1723	1723	1870	1723
Adj Flow Rate, veh/h	59	642	10	73	302	99	9	45	104	166	38	71
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	269	1333	547	419	1234	397	252	195	152	217	155	121
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
Prop Arrive On Green	0.16	0.38	0.38	0.26	0.47	0.45	0.15	0.10	0.10	0.13	0.08	0.08
Unsig. Movement Delay												
Ln Grp Delay, s/veh	43.9	29.9	23.7	35.0	19.9	20.4	43.3	49.9	57.2	59.8	52.3	57.5
Ln Grp LOS	D	C	C	D	B	C	D	D	E	E	D	E
Approach Vol, veh/h	711				474				158			
Approach Delay, s/veh	30.9				22.4				54.3			
Approach LOS	C				C				D			
Timer:	1		2	3	4	5	6	7	8			
Assigned Phs	2		1	4	3	6	5	8	7			
Case No	3.0		2.0	3.0	2.0	3.0	2.0	4.0	2.0			
Phs Duration (G+Y+Rc), s	16.5		19.9	49.0	34.6	14.0	22.4	60.0	23.6			
Change Period (Y+Rc), s	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0			
Max Green (Gmax), s	18.0		18.0	43.0	17.0	32.0	4.0	54.0	6.0			
Max Allow Headway (MAH), s	4.2		4.1	4.0	4.1	4.2	4.1	4.1	4.1			
Max Q Clear (g_c+l1), s	10.2		13.7	18.5	6.2	7.6	2.6	10.5	5.7			
Green Ext Time (g_e), s	0.3		0.2	2.7	0.1	0.3	0.0	1.4	0.0			
Prob of Phs Call (p_c)	1.00		1.00	1.00	0.91	1.00	0.26	1.00	0.86			
Prob of Max Out (p_x)	0.06		0.86	0.00	0.00	0.00	1.00	0.00	1.00			
Left-Turn Movement Data												
Assigned Mvmt	1				3				7			
Mvmt Sat Flow, veh/h	1641				1641				1641			
Through Movement Data												
Assigned Mvmt	2		4				6				8	
Mvmt Sat Flow, veh/h	1870		3554				1870				2644	
Right-Turn Movement Data												
Assigned Mvmt	12		14				16				18	
Mvmt Sat Flow, veh/h	1460		1460				1460				850	
Left Lane Group Data												
Assigned Mvmt	0		1	0	3	0	5	0	7			
Lane Assignment	L (Prot)		L (Prot)				L (Prot)				L (Prot)	

HCM 6th Signalized Intersection Capacity Analysis

1: Topaz Rd & Bear Valley Rd

AM 2030
08/14/2023

Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	166	0	73	0	9	0	59
Grp Sat Flow (s), veh/h/ln	0	1641	0	1641	0	1641	0	1641
Q Serve Time (g_s), s	0.0	11.7	0.0	4.2	0.0	0.6	0.0	3.7
Cycle Q Clear Time (g_c), s	0.0	11.7	0.0	4.2	0.0	0.6	0.0	3.7
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	217	0	419	0	252	0	269
V/C Ratio (X)	0.00	0.77	0.00	0.17	0.00	0.04	0.00	0.22
Avail Cap (c_a), veh/h	0	273	0	419	0	252	0	269
Upstream Filter (I)	0.00	1.00	0.00	0.98	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	50.3	0.0	34.8	0.0	43.2	0.0	43.5
Incr Delay (d2), s/veh	0.0	9.6	0.0	0.2	0.0	0.1	0.0	0.4
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	59.8	0.0	35.0	0.0	43.3	0.0	43.9
1st-Term Q (Q1), veh/ln	0.0	4.6	0.0	1.6	0.0	0.2	0.0	1.5
2nd-Term Q (Q2), veh/ln	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	5.2	0.0	1.6	0.0	0.2	0.0	1.5
%ile Storage Ratio (RQ%)	0.00	1.32	0.00	0.20	0.00	0.04	0.00	0.25
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	2	0	4	0	6	0	8	0
Lane Assignment	T		T		T		T	
Lanes in Grp	1	0	2	0	1	0	1	0
Grp Vol (v), veh/h	45	0	642	0	38	0	201	0
Grp Sat Flow (s), veh/h/ln	1870	0	1777	0	1870	0	1777	0
Q Serve Time (g_s), s	2.7	0.0	16.5	0.0	2.3	0.0	8.2	0.0
Cycle Q Clear Time (g_c), s	2.7	0.0	16.5	0.0	2.3	0.0	8.2	0.0
Lane Grp Cap (c), veh/h	195	0	1333	0	155	0	829	0
V/C Ratio (X)	0.23	0.00	0.48	0.00	0.24	0.00	0.24	0.00
Avail Cap (c_a), veh/h	312	0	1333	0	530	0	829	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	0.98	0.00
Uniform Delay (d1), s/veh	49.3	0.0	28.6	0.0	51.5	0.0	19.2	0.0
Incr Delay (d2), s/veh	0.6	0.0	1.2	0.0	0.8	0.0	0.7	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	49.9	0.0	29.9	0.0	52.3	0.0	19.9	0.0
1st-Term Q (Q1), veh/ln	1.2	0.0	6.6	0.0	1.0	0.0	3.1	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.2	0.0	0.0	0.0	0.2	0.0

HCM 6th Signalized Intersection Capacity Analysis
1: Topaz Rd & Bear Valley Rd

AM 2030
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3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	1.2	0.0	6.8	0.0	1.1	0.0	3.3	0.0
%ile Storage Ratio (RQ%)	0.01	0.00	0.07	0.00	0.02	0.00	0.02	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data























Assigned Mvmt	12	0	14	0	16	0	18	0
Lane Assignment	R		R		R		T+R	
Lanes in Grp	1	0	1	0	1	0	1	0
Grp Vol (v), veh/h	104	0	10	0	71	0	200	0
Grp Sat Flow (s), veh/h/ln	1460	0	1460	0	1460	0	1717	0
Q Serve Time (g_s), s	8.2	0.0	0.5	0.0	5.6	0.0	8.5	0.0
Cycle Q Clear Time (g_c), s	8.2	0.0	0.5	0.0	5.6	0.0	8.5	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	1.00	0.00	1.00	0.00	1.00	0.00	0.50	0.00
Lane Grp Cap (c), veh/h	152	0	547	0	121	0	801	0
V/C Ratio (X)	0.68	0.00	0.02	0.00	0.59	0.00	0.25	0.00
Avail Cap (c_a), veh/h	243	0	547	0	414	0	801	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	0.98	0.00
Uniform Delay (d1), s/veh	51.8	0.0	23.6	0.0	53.0	0.0	19.6	0.0
Incr Delay (d2), s/veh	5.3	0.0	0.1	0.0	4.4	0.0	0.7	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	57.2	0.0	23.7	0.0	57.5	0.0	20.4	0.0
1st-Term Q (Q1), veh/ln	2.9	0.0	0.2	0.0	2.0	0.0	3.2	0.0
2nd-Term Q (Q2), veh/ln	0.2	0.0	0.0	0.0	0.1	0.0	0.2	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	3.1	0.0	0.2	0.0	2.1	0.0	3.3	0.0
%ile Storage Ratio (RQ%)	0.53	0.00	0.00	0.00	0.54	0.00	0.02	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 6th Ctrl Delay	35.4
HCM 6th LOS	D

HCM 6th Signalized Intersection Capacity Analysis
2: Amethyst Rd & Bear Valley Rd

AM 2030
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	56	826	8	57	396	103	10	32	153	352	54	45
Future Volume (veh/h)	56	826	8	57	396	103	10	32	153	352	54	45
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, 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	
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1654	1870	1723	1723	1870	1723	1723	1870	1723	1723	1870	1723
Adj Flow Rate, veh/h	61	898	9	62	430	112	11	35	166	383	59	49
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	101	1820	748	104	1817	747	319	243	217	507	91	76
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
Prop Arrive On Green	0.06	0.51	0.51	0.06	0.51	0.51	0.19	0.14	0.12	0.15	0.10	0.08
Unsig. Movement Delay												
Ln Grp Delay, s/veh	59.9	20.0	2.3	60.0	16.6	4.0	39.2	45.9	61.2	51.2	0.0	56.8
Ln Grp LOS	E	B	A	E	B	A	D	D	E	D	A	E
Approach Vol, veh/h	968			604			212			491		
Approach Delay, s/veh	22.3			18.7			57.6			52.5		
Approach LOS	C			B			E			D		
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	2	1	3	4	6	5	7	8				
Case No	4.0	2.0	2.0	3.0	4.0	2.0	2.0	3.0				
Phs Duration (G+Y+Rc), s	20.4	22.5	11.6	65.4	15.6	27.4	11.7	65.4				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green (Gmax), s	18.0	25.0	8.0	45.0	39.0	4.0	10.0	43.0				
Max Allow Headway (MAH), s	4.3	4.1	4.1	4.0	4.1	4.1	4.1	4.1				
Max Q Clear (g_c+l1), s	14.2	15.4	6.4	21.8	9.2	2.7	6.5	10.1				
Green Ext Time (g_e), s	0.2	1.1	0.0	4.1	0.3	0.0	0.0	2.2				
Prob of Phs Call (p_c)	1.00	1.00	0.87	1.00	1.00	0.31	0.87	1.00				
Prob of Max Out (p_x)	1.00	0.06	1.00	0.00	0.00	1.00	1.00	0.00				
Left-Turn Movement Data												
Assigned Mvmt	1		3	5		7						
Mvmt Sat Flow, veh/h	3281		1641	1641		1575						
Through Movement Data												
Assigned Mvmt	2		4		6	8						
Mvmt Sat Flow, veh/h	1777		3554		945	3554						
Right-Turn Movement Data												
Assigned Mvmt	12		14		16	18						
Mvmt Sat Flow, veh/h	1585		1460		785	1460						
Left Lane Group Data												
Assigned Mvmt	0		1	3	0	0	5	7	0			
Lane Assignment	L (Prot)		L (Prot)		L (Prot)		L (Prot)		L (Prot)			

HCM 6th Signalized Intersection Capacity Analysis

2: Amethyst Rd & Bear Valley Rd

AM 2030
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Lanes in Grp	0	2	1	0	0	1	1	0
Grp Vol (v), veh/h	0	383	62	0	0	11	61	0
Grp Sat Flow (s), veh/h/ln	0	1641	1641	0	0	1641	1575	0
Q Serve Time (g_s), s	0.0	13.4	4.4	0.0	0.0	0.7	4.5	0.0
Cycle Q Clear Time (g_c), s	0.0	13.4	4.4	0.0	0.0	0.7	4.5	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
Lane Grp Cap (c), veh/h	0	507	104	0	0	319	101	0
V/C Ratio (X)	0.00	0.76	0.60	0.00	0.00	0.03	0.60	0.00
Avail Cap (c_a), veh/h	0	738	137	0	0	319	158	0
Upstream Filter (I)	0.00	1.00	1.00	0.00	0.00	1.00	0.92	0.00
Uniform Delay (d1), s/veh	0.0	48.6	54.7	0.0	0.0	39.2	54.7	0.0
Incr Delay (d2), s/veh	0.0	2.6	5.3	0.0	0.0	0.0	5.2	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	51.2	60.0	0.0	0.0	39.2	59.9	0.0
1st-Term Q (Q1), veh/ln	0.0	5.2	1.8	0.0	0.0	0.3	1.7	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.2	0.2	0.0	0.0	0.0	0.1	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	5.4	1.9	0.0	0.0	0.3	1.9	0.0
%ile Storage Ratio (RQ%)	0.00	0.92	0.48	0.00	0.00	0.09	0.16	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	2	0	0	4	6	0	0	8
Lane Assignment	T			T				T
Lanes in Grp	1	0	0	2	0	0	0	2
Grp Vol (v), veh/h	35	0	0	898	0	0	0	430
Grp Sat Flow (s), veh/h/ln	1777	0	0	1777	0	0	0	1777
Q Serve Time (g_s), s	2.1	0.0	0.0	19.8	0.0	0.0	0.0	8.1
Cycle Q Clear Time (g_c), s	2.1	0.0	0.0	19.8	0.0	0.0	0.0	8.1
Lane Grp Cap (c), veh/h	243	0	0	1820	0	0	0	1817
V/C Ratio (X)	0.14	0.00	0.00	0.49	0.00	0.00	0.00	0.24
Avail Cap (c_a), veh/h	296	0	0	1820	0	0	0	1817
Upstream Filter (I)	1.00	0.00	0.00	0.92	0.00	0.00	0.00	1.00
Uniform Delay (d1), s/veh	45.6	0.0	0.0	19.1	0.0	0.0	0.0	16.3
Incr Delay (d2), s/veh	0.3	0.0	0.0	0.9	0.0	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
Control Delay (d), s/veh	45.9	0.0	0.0	20.0	0.0	0.0	0.0	16.6
1st-Term Q (Q1), veh/ln	0.9	0.0	0.0	7.4	0.0	0.0	0.0	3.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.1

HCM 6th Signalized Intersection Capacity Analysis

2: Amethyst Rd & Bear Valley Rd

AM 2030
08/14/2023

3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.9	0.0	0.0	7.6	0.0	0.0	0.0	3.1
%ile Storage Ratio (RQ%)	0.01	0.00	0.00	0.04	0.00	0.00	0.00	0.01
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	12	0	0	14	16	0	0	18
Lane Assignment	T+R			R	T+R			R
Lanes in Grp	1	0	0	1	1	0	0	1
Grp Vol (v), veh/h	166	0	0	9	108	0	0	112
Grp Sat Flow (s), veh/h/ln	1585	0	0	1460	1729	0	0	1460
Q Serve Time (g_s), s	12.2	0.0	0.0	0.1	7.2	0.0	0.0	2.3
Cycle Q Clear Time (g_c), s	12.2	0.0	0.0	0.1	7.2	0.0	0.0	2.3
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	1.00	0.00	0.00	1.00	0.45	0.00	0.00	1.00
Lane Grp Cap (c), veh/h	217	0	0	748	167	0	0	747
V/C Ratio (X)	0.77	0.00	0.00	0.01	0.65	0.00	0.00	0.15
Avail Cap (c_a), veh/h	264	0	0	748	591	0	0	747
Upstream Filter (I)	1.00	0.00	0.00	0.92	1.00	0.00	0.00	1.00
Uniform Delay (d1), s/veh	50.9	0.0	0.0	2.3	52.7	0.0	0.0	3.6
Incr Delay (d2), s/veh	10.3	0.0	0.0	0.0	4.2	0.0	0.0	0.4
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	61.2	0.0	0.0	2.3	56.8	0.0	0.0	4.0
1st-Term Q (Q1), veh/ln	4.7	0.0	0.0	0.1	3.0	0.0	0.0	1.4
2nd-Term Q (Q2), veh/ln	0.6	0.0	0.0	0.0	0.2	0.0	0.0	0.1
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	5.3	0.0	0.0	0.1	3.2	0.0	0.0	1.5
%ile Storage Ratio (RQ%)	0.05	0.00	0.00	0.01	0.05	0.00	0.00	0.19
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary







HCM 6th Ctrl Delay	31.2
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

Intersection

Intersection Delay, s/veh
Intersection LOS A























Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	59	71	19	18	53	9	26	81	35	4	65	56
Future Vol, veh/h	59	71	19	18	53	9	26	81	35	4	65	56
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	64	77	21	20	58	10	28	88	38	4	71	61
Number of Lanes	1	1	0	1	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach	WB	SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	8.9	8.6	8.8	8.5
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	18%	100%	0%	100%	0%	3%
Vol Thru, %	57%	0%	79%	0%	85%	52%
Vol Right, %	25%	0%	21%	0%	15%	45%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	142	59	90	18	62	125
LT Vol	26	59	0	18	0	4
Through Vol	81	0	71	0	53	65
RT Vol	35	0	19	0	9	56
Lane Flow Rate	154	64	98	20	67	136
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.198	0.103	0.14	0.032	0.099	0.17
Departure Headway (Hd)	4.622	5.801	5.148	5.889	5.282	4.498
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	775	616	694	606	676	795
Service Time	2.66	3.55	2.89	3.64	3.03	2.53
HCM Lane V/C Ratio	0.199	0.104	0.141	0.033	0.099	0.171
HCM Control Delay	8.8	9.2	8.7	8.8	8.6	8.5
HCM Lane LOS	A	A	A	A	A	A
HCM 95th-tile Q	0.7	0.3	0.5	0.1	0.3	0.6

HCM 6th Signalized Intersection Capacity Analysis
4: SR 395 & Eucalyptus St

AM 2030
08/14/2023

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	26	23	119	17	37	4	842	70	27	1082	16
Future Volume (veh/h)	25	26	23	119	17	37	4	842	70	27	1082	16
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, 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	
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1723	1870	1723	1723	1870	1723	1723	1870	1723	1723	1870	1723
Adj Flow Rate, veh/h	27	28	25	129	18	40	4	915	76	29	1176	17
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	348	184	144	204	304	237	65	1327	545	197	1612	662
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
Prop Arrive On Green	0.06	0.10	0.10	0.12	0.16	0.16	0.04	0.37	0.37	0.12	0.45	0.45
Unsig. Movement Delay												
Ln Grp Delay, s/veh	20.4	23.6	12.6	29.7	20.0	7.7	26.4	15.5	2.6	22.5	13.2	2.1
Ln Grp LOS	C	C	B	C	C	A	C	B	A	C	B	A
Approach Vol, veh/h	80			187			995			1222		
Approach Delay, s/veh	19.1			24.0			14.6			13.3		
Approach LOS	B			C			B			B		
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	2	1	3	4	6	5	7	8				
Case No	3.0	2.0	2.0	3.0	3.0	2.0	1.1	3.0				
Phs Duration (G+Y+Rc), s	25.0	10.8	11.0	9.5	29.5	6.2	7.4	13.2				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green (Gmax), s	56.5	4.0	5.0	30.5	56.5	4.0	4.0	31.5				
Max Allow Headway (MAH), s	4.0	4.1	4.1	4.2	4.0	4.1	4.1	4.2				
Max Q Clear (g_c+l1), s	14.2	2.9	6.2	2.8	17.2	2.1	2.8	2.8				
Green Ext Time (g_e), s	4.8	0.0	0.0	0.1	6.3	0.0	0.0	0.2				
Prob of Phs Call (p_c)	1.00	0.36	0.87	0.88	1.00	0.06	0.34	0.98				
Prob of Max Out (p_x)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00				
Left-Turn Movement Data												
Assigned Mvmt	1		3	5		7						
Mvmt Sat Flow, veh/h	1641		1641	1641		1641						
Through Movement Data												
Assigned Mvmt	2		4		6	8						
Mvmt Sat Flow, veh/h	3554		1870		3554	1870						
Right-Turn Movement Data												
Assigned Mvmt	12		14		16	18						
Mvmt Sat Flow, veh/h	1460		1460		1460	1460						
Left Lane Group Data												
Assigned Mvmt	0	1	3	0	0	5	7	0				
Lane Assignment	L (Prot)		L (Prot)	L (Prot)		(Pr/Pm)						

HCM 6th Signalized Intersection Capacity Analysis

4: SR 395 & Eucalyptus St

AM 2030
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Lanes in Grp	0	1	1	0	0	1	1	0
Grp Vol (v), veh/h	0	29	129	0	0	4	27	0
Grp Sat Flow (s), veh/h/ln	0	1641	1641	0	0	1641	1641	0
Q Serve Time (g_s), s	0.0	0.9	4.2	0.0	0.0	0.1	0.8	0.0
Cycle Q Clear Time (g_c), s	0.0	0.9	4.2	0.0	0.0	0.1	0.8	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	1239	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	5.5	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	5.5	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
Lane Grp Cap (c), veh/h	0	197	204	0	0	65	348	0
V/C Ratio (X)	0.00	0.15	0.63	0.00	0.00	0.06	0.08	0.00
Avail Cap (c_a), veh/h	0	197	204	0	0	175	424	0
Upstream Filter (I)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	22.2	23.4	0.0	0.0	26.0	20.3	0.0
Incr Delay (d2), s/veh	0.0	0.3	6.2	0.0	0.0	0.4	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
Control Delay (d), s/veh	0.0	22.5	29.7	0.0	0.0	26.4	20.4	0.0
1st-Term Q (Q1), veh/ln	0.0	0.3	1.4	0.0	0.0	0.0	0.3	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	0.3	1.7	0.0	0.0	0.1	0.3	0.0
%ile Storage Ratio (RQ%)	0.00	0.02	0.14	0.00	0.00	0.00	0.07	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	2	0	0	4	6	0	0	8
Lane Assignment	T			T	T			T
Lanes in Grp	2	0	0	1	2	0	0	1
Grp Vol (v), veh/h	915	0	0	28	1176	0	0	18
Grp Sat Flow (s), veh/h/ln	1777	0	0	1870	1777	0	0	1870
Q Serve Time (g_s), s	12.2	0.0	0.0	0.8	15.2	0.0	0.0	0.5
Cycle Q Clear Time (g_c), s	12.2	0.0	0.0	0.8	15.2	0.0	0.0	0.5
Lane Grp Cap (c), veh/h	1327	0	0	184	1612	0	0	304
V/C Ratio (X)	0.69	0.00	0.00	0.15	0.73	0.00	0.00	0.06
Avail Cap (c_a), veh/h	3691	0	0	1079	3691	0	0	1112
Upstream Filter (I)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d1), s/veh	14.9	0.0	0.0	23.2	12.6	0.0	0.0	19.9
Incr Delay (d2), s/veh	0.6	0.0	0.0	0.4	0.6	0.0	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
Control Delay (d), s/veh	15.5	0.0	0.0	23.6	13.2	0.0	0.0	20.0
1st-Term Q (Q1), veh/ln	3.6	0.0	0.0	0.3	4.0	0.0	0.0	0.2
2nd-Term Q (Q2), veh/ln	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0

HCM 6th Signalized Intersection Capacity Analysis 4: SR 395 & Eucalyptus St

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3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	3.7	0.0	0.0	0.3	4.1	0.0	0.0	0.2
%ile Storage Ratio (RQ%)	0.07	0.00	0.00	0.00	0.04	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	12	0	0	14	16	0	0	18
Lane Assignment	R			R	R			R
Lanes in Grp	1	0	0	1	1	0	0	1
Grp Vol (v), veh/h	76	0	0	25	17	0	0	40
Grp Sat Flow (s), veh/h/ln	1460	0	0	1460	1460	0	0	1460
Q Serve Time (g_s), s	0.9	0.0	0.0	0.6	0.2	0.0	0.0	0.8
Cycle Q Clear Time (g_c), s	0.9	0.0	0.0	0.6	0.2	0.0	0.0	0.8
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
Lane Grp Cap (c), veh/h	545	0	0	144	662	0	0	237
V/C Ratio (X)	0.14	0.00	0.00	0.17	0.03	0.00	0.00	0.17
Avail Cap (c_a), veh/h	1516	0	0	842	1516	0	0	868
Upstream Filter (I)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d1), s/veh	2.5	0.0	0.0	12.1	2.1	0.0	0.0	7.4
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.6	0.0	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
Control Delay (d), s/veh	2.6	0.0	0.0	12.6	2.1	0.0	0.0	7.7
1st-Term Q (Q1), veh/ln	0.4	0.0	0.0	0.3	0.1	0.0	0.0	0.4
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.5	0.0	0.0	0.3	0.1	0.0	0.0	0.4
%ile Storage Ratio (RQ%)	0.04	0.00	0.00	0.28	0.01	0.00	0.00	0.39
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 6th Ctrl Delay	14.8
HCM 6th LOS	B

Intersection

Intersection Delay, s/veh
Intersection LOS A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		←	↑	↑	↑			↑			↑	
Traffic Vol, veh/h	31	58	26	23	65	9	72	22	43	5	17	36
Future Vol, veh/h	31	58	26	23	65	9	72	22	43	5	17	36
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	34	63	28	25	71	10	78	24	47	5	18	39
Number of Lanes	0	1	1	1	1	0	0	1	0	0	1	0

























Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach	WB	SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	8.5	8.4	8.6	7.7
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	53%	35%	0%	100%	0%	9%
Vol Thru, %	16%	65%	0%	0%	88%	29%
Vol Right, %	31%	0%	100%	0%	12%	62%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	137	89	26	23	74	58
LT Vol	72	31	0	23	0	5
Through Vol	22	58	0	0	65	17
RT Vol	43	0	26	0	9	36
Lane Flow Rate	149	97	28	25	80	63
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.186	0.142	0.035	0.039	0.113	0.076
Departure Headway (Hd)	4.498	5.299	4.419	5.644	5.055	4.33
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	798	677	809	635	709	827
Service Time	2.522	3.031	2.151	3.377	2.788	2.359
HCM Lane V/C Ratio	0.187	0.143	0.035	0.039	0.113	0.076
HCM Control Delay	8.6	8.9	7.3	8.6	8.4	7.7
HCM Lane LOS	A	A	A	A	A	A
HCM 95th-tile Q	0.7	0.5	0.1	0.1	0.4	0.2

HCM 6th Signalized Intersection Capacity Analysis

1: Topaz Rd & Bear Valley Rd

AM 2030+Project
08/14/2023

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	54	591	10	78	278	91	9	45	124	153	37	65
Future Volume (veh/h)	54	591	10	78	278	91	9	45	124	153	37	65
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, 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	
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1723	1870	1723	1723	1870	1723	1723	1870	1723	1723	1870	1723
Adj Flow Rate, veh/h	59	642	11	85	302	99	10	49	135	166	40	71
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	235	1333	547	385	1234	397	285	233	182	217	155	121
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
Prop Arrive On Green	0.14	0.38	0.38	0.23	0.47	0.45	0.17	0.12	0.12	0.13	0.08	0.08
Unsig. Movement Delay												
Ln Grp Delay, s/veh	46.2	29.9	23.7	37.3	19.9	20.4	41.3	47.6	58.7	59.8	52.4	57.5
Ln Grp LOS	D	C	C	D	B	C	D	D	E	E	D	E
Approach Vol, veh/h		712			486			194			277	
Approach Delay, s/veh		31.1			23.1			55.0			58.2	
Approach LOS		C			C			D			E	
Timer:		1	2	3	4	5	6	7	8			
Assigned Phs		2	1	4	3	6	5	8	7			
Case No		3.0	2.0	3.0	2.0	3.0	2.0	4.0	2.0			
Phs Duration (G+Y+Rc), s		19.0	19.9	49.0	32.2	14.0	24.9	60.0	21.2			
Change Period (Y+Rc), s		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0			
Max Green (Gmax), s		18.0	18.0	43.0	17.0	32.0	4.0	54.0	6.0			
Max Allow Headway (MAH), s		4.2	4.1	4.0	4.1	4.2	4.1	4.1	4.1			
Max Q Clear (g_c+l1), s		12.7	13.7	18.5	7.0	7.6	2.6	10.5	5.8			
Green Ext Time (g_e), s		0.3	0.2	2.8	0.1	0.3	0.0	1.4	0.0			
Prob of Phs Call (p_c)		1.00	1.00	1.00	0.94	1.00	0.28	1.00	0.86			
Prob of Max Out (p_x)		0.47	0.86	0.00	0.00	0.00	1.00	0.00	1.00			
Left-Turn Movement Data												
Assigned Mvmt			1		3		5		7			
Mvmt Sat Flow, veh/h			1641		1641		1641		1641			
Through Movement Data												
Assigned Mvmt		2		4		6		8				
Mvmt Sat Flow, veh/h		1870		3554		1870		2644				
Right-Turn Movement Data												
Assigned Mvmt		12		14		16		18				
Mvmt Sat Flow, veh/h		1460		1460		1460		850				
Left Lane Group Data												
Assigned Mvmt		0	1	0	3	0	5	0	7			
Lane Assignment		L (Prot)		L (Prot)		L (Prot)		L (Prot)				

HCM 6th Signalized Intersection Capacity Analysis

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Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	166	0	85	0	10	0	59
Grp Sat Flow (s), veh/h/ln	0	1641	0	1641	0	1641	0	1641
Q Serve Time (g_s), s	0.0	11.7	0.0	5.0	0.0	0.6	0.0	3.8
Cycle Q Clear Time (g_c), s	0.0	11.7	0.0	5.0	0.0	0.6	0.0	3.8
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	217	0	385	0	285	0	235
V/C Ratio (X)	0.00	0.77	0.00	0.22	0.00	0.04	0.00	0.25
Avail Cap (c_a), veh/h	0	273	0	385	0	285	0	235
Upstream Filter (I)	0.00	1.00	0.00	0.97	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	50.3	0.0	37.0	0.0	41.2	0.0	45.7
Incr Delay (d2), s/veh	0.0	9.6	0.0	0.3	0.0	0.0	0.0	0.6
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	59.8	0.0	37.3	0.0	41.3	0.0	46.2
1st-Term Q (Q1), veh/ln	0.0	4.6	0.0	1.9	0.0	0.2	0.0	1.5
2nd-Term Q (Q2), veh/ln	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	5.2	0.0	2.0	0.0	0.2	0.0	1.5
%ile Storage Ratio (RQ%)	0.00	1.32	0.00	0.25	0.00	0.04	0.00	0.26
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	2	0	4	0	6	0	8	0
Lane Assignment	T		T		T		T	
Lanes in Grp	1	0	2	0	1	0	1	0
Grp Vol (v), veh/h	49	0	642	0	40	0	201	0
Grp Sat Flow (s), veh/h/ln	1870	0	1777	0	1870	0	1777	0
Q Serve Time (g_s), s	2.8	0.0	16.5	0.0	2.4	0.0	8.2	0.0
Cycle Q Clear Time (g_c), s	2.8	0.0	16.5	0.0	2.4	0.0	8.2	0.0
Lane Grp Cap (c), veh/h	233	0	1333	0	155	0	829	0
V/C Ratio (X)	0.21	0.00	0.48	0.00	0.26	0.00	0.24	0.00
Avail Cap (c_a), veh/h	312	0	1333	0	530	0	829	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	0.97	0.00
Uniform Delay (d1), s/veh	47.2	0.0	28.6	0.0	51.6	0.0	19.2	0.0
Incr Delay (d2), s/veh	0.4	0.0	1.2	0.0	0.9	0.0	0.7	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	47.6	0.0	29.9	0.0	52.4	0.0	19.9	0.0
1st-Term Q (Q1), veh/ln	1.3	0.0	6.6	0.0	1.1	0.0	3.1	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.2	0.0	0.0	0.0	0.2	0.0

HCM 6th Signalized Intersection Capacity Analysis

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3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	1.3	0.0	6.8	0.0	1.1	0.0	3.3	0.0
%ile Storage Ratio (RQ%)	0.01	0.00	0.07	0.00	0.02	0.00	0.02	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data























Assigned Mvmt	12	0	14	0	16	0	18	0
Lane Assignment	R		R		R		T+R	
Lanes in Grp	1	0	1	0	1	0	1	0
Grp Vol (v), veh/h	135	0	11	0	71	0	200	0
Grp Sat Flow (s), veh/h/ln	1460	0	1460	0	1460	0	1717	0
Q Serve Time (g_s), s	10.7	0.0	0.6	0.0	5.6	0.0	8.5	0.0
Cycle Q Clear Time (g_c), s	10.7	0.0	0.6	0.0	5.6	0.0	8.5	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	1.00	0.00	1.00	0.00	1.00	0.00	0.50	0.00
Lane Grp Cap (c), veh/h	182	0	547	0	121	0	801	0
V/C Ratio (X)	0.74	0.00	0.02	0.00	0.59	0.00	0.25	0.00
Avail Cap (c_a), veh/h	243	0	547	0	414	0	801	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	0.97	0.00
Uniform Delay (d1), s/veh	50.6	0.0	23.6	0.0	53.0	0.0	19.6	0.0
Incr Delay (d2), s/veh	8.0	0.0	0.1	0.0	4.4	0.0	0.7	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	58.7	0.0	23.7	0.0	57.5	0.0	20.4	0.0
1st-Term Q (Q1), veh/ln	3.7	0.0	0.2	0.0	2.0	0.0	3.2	0.0
2nd-Term Q (Q2), veh/ln	0.4	0.0	0.0	0.0	0.1	0.0	0.2	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	4.1	0.0	0.2	0.0	2.1	0.0	3.3	0.0
%ile Storage Ratio (RQ%)	0.70	0.00	0.00	0.00	0.54	0.00	0.02	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 6th Ctrl Delay	36.1
HCM 6th LOS	D

HCM 6th Signalized Intersection Capacity Analysis
2: Amethyst Rd & Bear Valley Rd

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	843	9	60	403	103	11	32	153	352	54	48
Future Volume (veh/h)	65	843	9	60	403	103	11	32	153	352	54	48
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, 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			
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1654	1870	1723	1723	1870	1723	1723	1870	1723	1723	1870	1723
Adj Flow Rate, veh/h	71	916	10	65	438	112	12	35	166	383	59	52
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	113	1812	744	108	1790	735	316	243	217	507	90	80
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
Prop Arrive On Green	0.07	0.51	0.51	0.07	0.50	0.50	0.19	0.14	0.12	0.15	0.10	0.08
Unsig. Movement Delay												
Ln Grp Delay, s/veh	59.3	20.3	2.4	59.9	17.2	4.2	39.4	45.9	61.2	51.2	0.0	56.8
Ln Grp LOS	E	C	A	E	B	A	D	D	E	D	A	E
Approach Vol, veh/h	997				615				213			
Approach Delay, s/veh	22.9				19.3				57.5			
Approach LOS	C				B				E			
Timer:	1		2	3	4	5	6	7	8			
Assigned Phs	2		1	3	4	6	5	7	8			
Case No	4.0		2.0	2.0	3.0	4.0	2.0	2.0	3.0			
Phs Duration (G+Y+Rc), s	20.4		22.5	11.9	65.2	15.8	27.1	12.6	64.5			
Change Period (Y+Rc), s	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0			
Max Green (Gmax), s	18.0		25.0	8.0	45.0	39.0	4.0	10.0	43.0			
Max Allow Headway (MAH), s	4.3		4.1	4.1	4.0	4.2	4.1	4.1	4.1			
Max Q Clear (g_c+l1), s	14.2		15.4	6.6	22.4	9.5	2.7	7.3	10.4			
Green Ext Time (g_e), s	0.2		1.1	0.0	4.2	0.3	0.0	0.0	2.3			
Prob of Phs Call (p_c)	1.00		1.00	0.89	1.00	1.00	0.33	0.91	1.00			
Prob of Max Out (p_x)	1.00		0.06	1.00	0.00	0.00	1.00	1.00	0.00			
Left-Turn Movement Data												
Assigned Mvmt			1	3			5	7				
Mvmt Sat Flow, veh/h			3281	1641			1641	1575				
Through Movement Data												
Assigned Mvmt	2				4	6			8			
Mvmt Sat Flow, veh/h	1777				3554	917			3554			
Right-Turn Movement Data												
Assigned Mvmt	12				14	16			18			
Mvmt Sat Flow, veh/h	1585				1460	808			1460			
Left Lane Group Data												
Assigned Mvmt	0		1	3	0	0	5	7	0			
Lane Assignment			L (Prot)L (Prot)				L (Prot)L (Prot)					

HCM 6th Signalized Intersection Capacity Analysis

2: Amethyst Rd & Bear Valley Rd

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Lanes in Grp	0	2	1	0	0	1	1	0
Grp Vol (v), veh/h	0	383	65	0	0	12	71	0
Grp Sat Flow (s), veh/h/ln	0	1641	1641	0	0	1641	1575	0
Q Serve Time (g_s), s	0.0	13.4	4.6	0.0	0.0	0.7	5.3	0.0
Cycle Q Clear Time (g_c), s	0.0	13.4	4.6	0.0	0.0	0.7	5.3	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
Lane Grp Cap (c), veh/h	0	507	108	0	0	316	113	0
V/C Ratio (X)	0.00	0.76	0.60	0.00	0.00	0.04	0.63	0.00
Avail Cap (c_a), veh/h	0	738	137	0	0	316	158	0
Upstream Filter (I)	0.00	1.00	1.00	0.00	0.00	1.00	0.91	0.00
Uniform Delay (d1), s/veh	0.0	48.6	54.5	0.0	0.0	39.4	54.1	0.0
Incr Delay (d2), s/veh	0.0	2.6	5.3	0.0	0.0	0.0	5.1	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	51.2	59.9	0.0	0.0	39.4	59.3	0.0
1st-Term Q (Q1), veh/ln	0.0	5.2	1.8	0.0	0.0	0.3	2.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.2	0.2	0.0	0.0	0.0	0.2	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	5.4	2.0	0.0	0.0	0.3	2.2	0.0
%ile Storage Ratio (RQ%)	0.00	0.92	0.51	0.00	0.00	0.10	0.18	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	2	0	0	4	6	0	0	8
Lane Assignment	T			T				T
Lanes in Grp	1	0	0	2	0	0	0	2
Grp Vol (v), veh/h	35	0	0	916	0	0	0	438
Grp Sat Flow (s), veh/h/ln	1777	0	0	1777	0	0	0	1777
Q Serve Time (g_s), s	2.1	0.0	0.0	20.4	0.0	0.0	0.0	8.4
Cycle Q Clear Time (g_c), s	2.1	0.0	0.0	20.4	0.0	0.0	0.0	8.4
Lane Grp Cap (c), veh/h	243	0	0	1812	0	0	0	1790
V/C Ratio (X)	0.14	0.00	0.00	0.51	0.00	0.00	0.00	0.24
Avail Cap (c_a), veh/h	296	0	0	1812	0	0	0	1790
Upstream Filter (I)	1.00	0.00	0.00	0.91	0.00	0.00	0.00	1.00
Uniform Delay (d1), s/veh	45.6	0.0	0.0	19.4	0.0	0.0	0.0	16.9
Incr Delay (d2), s/veh	0.3	0.0	0.0	0.9	0.0	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
Control Delay (d), s/veh	45.9	0.0	0.0	20.3	0.0	0.0	0.0	17.2
1st-Term Q (Q1), veh/ln	0.9	0.0	0.0	7.6	0.0	0.0	0.0	3.1
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.1

HCM 6th Signalized Intersection Capacity Analysis 2: Amethyst Rd & Bear Valley Rd

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3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.9	0.0	0.0	7.8	0.0	0.0	0.0	3.2
%ile Storage Ratio (RQ%)	0.01	0.00	0.00	0.04	0.00	0.00	0.00	0.01
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	12	0	0	14	16	0	0	18
Lane Assignment	T+R			R	T+R			R
Lanes in Grp	1	0	0	1	1	0	0	1
Grp Vol (v), veh/h	166	0	0	10	111	0	0	112
Grp Sat Flow (s), veh/h/ln	1585	0	0	1460	1725	0	0	1460
Q Serve Time (g_s), s	12.2	0.0	0.0	0.2	7.5	0.0	0.0	2.4
Cycle Q Clear Time (g_c), s	12.2	0.0	0.0	0.2	7.5	0.0	0.0	2.4
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	1.00	0.00	0.00	1.00	0.47	0.00	0.00	1.00
Lane Grp Cap (c), veh/h	217	0	0	744	170	0	0	735
V/C Ratio (X)	0.77	0.00	0.00	0.01	0.65	0.00	0.00	0.15
Avail Cap (c_a), veh/h	264	0	0	744	589	0	0	735
Upstream Filter (I)	1.00	0.00	0.00	0.91	1.00	0.00	0.00	1.00
Uniform Delay (d1), s/veh	50.9	0.0	0.0	2.4	52.6	0.0	0.0	3.8
Incr Delay (d2), s/veh	10.3	0.0	0.0	0.0	4.2	0.0	0.0	0.4
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	61.2	0.0	0.0	2.4	56.8	0.0	0.0	4.2
1st-Term Q (Q1), veh/ln	4.7	0.0	0.0	0.1	3.1	0.0	0.0	1.4
2nd-Term Q (Q2), veh/ln	0.6	0.0	0.0	0.0	0.2	0.0	0.0	0.1
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	5.3	0.0	0.0	0.1	3.3	0.0	0.0	1.5
%ile Storage Ratio (RQ%)	0.05	0.00	0.00	0.01	0.05	0.00	0.00	0.19
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary







HCM 6th Ctrl Delay	31.4
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

Intersection

Intersection Delay, s/veh
Intersection LOS A























Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	59	71	19	18	53	9	26	81	35	4	65	56
Future Vol, veh/h	59	71	19	18	53	9	26	81	35	4	65	56
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	64	77	21	20	58	10	28	88	38	4	71	61
Number of Lanes	1	1	0	1	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	8.9	8.6	8.8	8.5
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	18%	100%	0%	100%	0%	3%
Vol Thru, %	57%	0%	79%	0%	85%	52%
Vol Right, %	25%	0%	21%	0%	15%	45%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	142	59	90	18	62	125
LT Vol	26	59	0	18	0	4
Through Vol	81	0	71	0	53	65
RT Vol	35	0	19	0	9	56
Lane Flow Rate	154	64	98	20	67	136
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.198	0.103	0.14	0.032	0.099	0.17
Departure Headway (Hd)	4.622	5.801	5.148	5.889	5.282	4.498
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	775	616	694	606	676	795
Service Time	2.66	3.551	2.898	3.643	3.036	2.537
HCM Lane V/C Ratio	0.199	0.104	0.141	0.033	0.099	0.171
HCM Control Delay	8.8	9.2	8.7	8.8	8.6	8.5
HCM Lane LOS	A	A	A	A	A	A
HCM 95th-tile Q	0.7	0.3	0.5	0.1	0.3	0.6

HCM 6th Signalized Intersection Capacity Analysis 4: SR 395 & Eucalyptus St

AM 2030+Project
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	28	23	154	21	72	4	842	83	40	1082	16
Future Volume (veh/h)	25	28	23	154	21	72	4	842	83	40	1082	16
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, 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		
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1723	1870	1723	1723	1870	1723	1723	1870	1723	1723	1870	1723
Adj Flow Rate, veh/h	27	30	25	167	23	78	4	915	90	43	1176	17
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	346	191	149	203	310	242	65	1328	545	195	1609	661
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
Prop Arrive On Green	0.06	0.10	0.10	0.12	0.17	0.17	0.04	0.37	0.37	0.12	0.45	0.45
Unsig. Movement Delay												
Ln Grp Delay, s/veh	20.3	23.6	12.6	47.5	20.1	8.4	26.6	15.6	2.7	23.2	13.3	2.2
Ln Grp LOS	C	C	B	D	C	A	C	B	A	C	B	A
Approach Vol, veh/h	82			268			1009			1236		
Approach Delay, s/veh	19.2			33.8			14.5			13.5		
Approach LOS	B			C			B			B		
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	2	1	3	4	6	5	7	8				
Case No	3.0	2.0	2.0	3.0	3.0	2.0	1.1	3.0				
Phs Duration (G+Y+Rc), s	25.2	10.7	11.0	9.8	29.7	6.2	7.4	13.4				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green (Gmax), s	56.5	4.0	5.0	30.5	56.5	4.0	4.0	31.5				
Max Allow Headway (MAH), s	4.0	4.1	4.1	4.1	4.0	4.1	4.1	4.3				
Max Q Clear (g_c+l1), s	14.3	3.3	7.6	2.8	17.3	2.1	2.8	3.6				
Green Ext Time (g_e), s	4.9	0.0	0.0	0.1	6.3	0.0	0.0	0.3				
Prob of Phs Call (p_c)	1.00	0.49	0.93	0.94	1.00	0.06	0.35	0.99				
Prob of Max Out (p_x)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00				
Left-Turn Movement Data												
Assigned Mvmt			1	3			5	7				
Mvmt Sat Flow, veh/h			1641	1641			1641	1641				
Through Movement Data												
Assigned Mvmt	2				4	6			8			
Mvmt Sat Flow, veh/h	3554				1870	3554			1870			
Right-Turn Movement Data												
Assigned Mvmt	12				14	16			18			
Mvmt Sat Flow, veh/h	1460				1460	1460			1460			
Left Lane Group Data												
Assigned Mvmt	0		1	3	0	0	5	7	0			
Lane Assignment	L (Prot)		L (Prot)				L (Prdt)	(Pr/Pm)				

Baseline

Synchro 9 Report

HCM 6th Signalized Intersection Capacity Analysis 4: SR 395 & Eucalyptus St

AM 2030+Project
08/14/2023

Lanes in Grp	0	1	1	0	0	1	1	0
Grp Vol (v), veh/h	0	43	167	0	0	4	27	0
Grp Sat Flow (s), veh/h/ln	0	1641	1641	0	0	1641	1641	0
Q Serve Time (g_s), s	0.0	1.3	5.6	0.0	0.0	0.1	0.8	0.0
Cycle Q Clear Time (g_c), s	0.0	1.3	5.6	0.0	0.0	0.1	0.8	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	1192	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	5.8	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	5.8	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
Lane Grp Cap (c), veh/h	0	195	203	0	0	65	346	0
V/C Ratio (X)	0.00	0.22	0.82	0.00	0.00	0.06	0.08	0.00
Avail Cap (c_a), veh/h	0	195	203	0	0	174	422	0
Upstream Filter (I)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	22.6	24.2	0.0	0.0	26.2	20.3	0.0
Incr Delay (d2), s/veh	0.0	0.6	23.3	0.0	0.0	0.4	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
Control Delay (d), s/veh	0.0	23.2	47.5	0.0	0.0	26.6	20.3	0.0
1st-Term Q (Q1), veh/ln	0.0	0.4	1.8	0.0	0.0	0.0	0.3	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	0.5	3.1	0.0	0.0	0.1	0.3	0.0
%ile Storage Ratio (RQ%)	0.00	0.03	0.27	0.00	0.00	0.00	0.07	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	2	0	0	4	6	0	0	8
Lane Assignment	T			T	T			T
Lanes in Grp	2	0	0	1	2	0	0	1
Grp Vol (v), veh/h	915	0	0	30	1176	0	0	23
Grp Sat Flow (s), veh/h/ln	1777	0	0	1870	1777	0	0	1870
Q Serve Time (g_s), s	12.3	0.0	0.0	0.8	15.3	0.0	0.0	0.6
Cycle Q Clear Time (g_c), s	12.3	0.0	0.0	0.8	15.3	0.0	0.0	0.6
Lane Grp Cap (c), veh/h	1328	0	0	191	1609	0	0	310
V/C Ratio (X)	0.69	0.00	0.00	0.16	0.73	0.00	0.00	0.07
Avail Cap (c_a), veh/h	3668	0	0	1072	3668	0	0	1105
Upstream Filter (I)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d1), s/veh	15.0	0.0	0.0	23.2	12.7	0.0	0.0	20.0
Incr Delay (d2), s/veh	0.6	0.0	0.0	0.4	0.7	0.0	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
Control Delay (d), s/veh	15.6	0.0	0.0	23.6	13.3	0.0	0.0	20.1
1st-Term Q (Q1), veh/ln	3.6	0.0	0.0	0.3	4.1	0.0	0.0	0.2
2nd-Term Q (Q2), veh/ln	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0

HCM 6th Signalized Intersection Capacity Analysis 4: SR 395 & Eucalyptus St

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3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	3.7	0.0	0.0	0.3	4.2	0.0	0.0	0.2
%ile Storage Ratio (RQ%)	0.07	0.00	0.00	0.00	0.04	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	12	0	0	14	16	0	0	18
Lane Assignment	R			R	R			R
Lanes in Grp	1	0	0	1	1	0	0	1
Grp Vol (v), veh/h	90	0	0	25	17	0	0	78
Grp Sat Flow (s), veh/h/ln	1460	0	0	1460	1460	0	0	1460
Q Serve Time (g_s), s	1.1	0.0	0.0	0.6	0.2	0.0	0.0	1.6
Cycle Q Clear Time (g_c), s	1.1	0.0	0.0	0.6	0.2	0.0	0.0	1.6
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
Lane Grp Cap (c), veh/h	545	0	0	149	661	0	0	242
V/C Ratio (X)	0.17	0.00	0.00	0.17	0.03	0.00	0.00	0.32
Avail Cap (c_a), veh/h	1507	0	0	837	1507	0	0	863
Upstream Filter (I)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d1), s/veh	2.6	0.0	0.0	12.1	2.2	0.0	0.0	7.6
Incr Delay (d2), s/veh	0.1	0.0	0.0	0.5	0.0	0.0	0.0	0.8
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	2.7	0.0	0.0	12.6	2.2	0.0	0.0	8.4
1st-Term Q (Q1), veh/ln	0.5	0.0	0.0	0.3	0.1	0.0	0.0	0.7
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.5	0.0	0.0	0.3	0.1	0.0	0.0	0.8
%ile Storage Ratio (RQ%)	0.05	0.00	0.00	0.28	0.01	0.00	0.00	0.79
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 6th Ctrl Delay	16.2
HCM 6th LOS	B

Intersection

Intersection Delay, s/veh
Intersection LOS A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		←	↑	↑	↑	↑		↑			↑	↑
Traffic Vol, veh/h	31	83	29	23	138	10	73	22	44	6	17	36
Future Vol, veh/h	31	83	29	23	138	10	73	22	44	6	17	36
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	34	90	32	25	150	11	79	24	48	7	18	39
Number of Lanes	0	1	1	1	1	0	0	1	0	0	1	0






Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	8.9	9.4	9	8.1
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	53%	27%	0%	100%	0%	10%
Vol Thru, %	16%	73%	0%	0%	93%	29%
Vol Right, %	32%	0%	100%	0%	7%	61%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	139	114	29	23	148	59
LT Vol	73	31	0	23	0	6
Through Vol	22	83	0	0	138	17
RT Vol	44	0	29	0	10	36
Lane Flow Rate	151	124	32	25	161	64
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.20	0.185	0.04	0.04	0.23	0.083
Departure Headway (Hd)	4.777	5.373	4.531	5.707	5.156	4.636
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	749	665	786	626	693	769
Service Time	2.82	3.123	2.281	3.456	2.905	2.687
HCM Lane V/C Ratio	0.202	0.186	0.041	0.04	0.232	0.083
HCM Control Delay	9	9.3	7.5	8.7	9.5	8.1
HCM Lane LOS	A	A	A	A	A	A
HCM 95th-tile Q	0.7	0.7	0.1	0.1	0.9	0.3

Intersection

Int Delay, s/veh 8

Movement EBL EBT EBR WBL WBT WBR NBL NBT NBR SBL SBT SBR

Lane Configurations												
Traffic Vol, veh/h	113	13	9	0	17	1	25	38	0	0	13	77
Future Vol, veh/h	113	13	9	0	17	1	25	38	0	0	13	77
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	50	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	0	-	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	123	14	10	0	18	1	27	41	0	0	14	84

Major/Minor Major1 Major2 Minor1 Minor2

Conflicting Flow All	19	0	0	24	0	0	333	284	19	305	289	19
Stage 1	-	-	-	-	-	-	265	265	-	19	19	-
Stage 2	-	-	-	-	-	-	68	19	-	286	270	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	597	-	-	1591	-	-	620	625	1059	647	621	1059
Stage 1	-	-	-	-	-	-	740	689	-	1000	880	-
Stage 2	-	-	-	-	-	-	942	880	-	721	686	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	597	-	-	1591	-	-	528	577	1059	576	573	1059
Mov Cap-2 Maneuver	-	-	-	-	-	-	528	577	-	576	573	-
Stage 1	-	-	-	-	-	-	683	636	-	923	880	-
Stage 2	-	-	-	-	-	-	854	880	-	622	633	-

Approach EB WB NB SB























HCM Control Delay, s	12.2	0	12.4	9.3
HCM LOS	B		B	A

Minor Lane/Major MvmNBLn1 EBL EBT EBR WBL WBT WBR SBLn1

Capacity (veh/h)	557	1597	-	-	1591	-	-	943
HCM Lane V/C Ratio	0.123	0.077	-	-	-	-	-	0.104
HCM Control Delay (s)	12.4	7.4	-	-	0	-	-	9.3
HCM Lane LOS	B	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.4	0.2	-	-	0	-	-	0.3

HCM 6th Signalized Intersection Capacity Analysis
1: Topaz Rd & Bear Valley Rd

AM 2040
08/14/2023

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	78	853	13	97	401	131	11	60	138	220	50	93
Future Volume (veh/h)	78	853	13	97	401	131	11	60	138	220	50	93
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, 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			
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1723	1870	1723	1723	1870	1723	1723	1870	1723	1723	1870	1723
Adj Flow Rate, veh/h	85	927	14	105	436	142	12	65	150	239	54	101
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	162	1333	547	312	1233	398	324	252	197	273	194	152
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
Prop Arrive On Green	0.10	0.38	0.38	0.19	0.47	0.45	0.20	0.13	0.13	0.17	0.10	0.10
Unsig. Movement Delay												
Ln Grp Delay, s/veh	54.5	34.7	23.8	42.6	21.5	22.0	39.0	47.1	60.8	74.1	50.4	56.7
Ln Grp LOS	D	C	C	D	C	C	D	D	E	E	D	E
Approach Vol, veh/h	1026				683				227			
Approach Delay, s/veh	36.2				24.9				55.7			
Approach LOS	D				C				E			
Timer:	1		2	3	4	5	6	7	8			
Assigned Phs	2		1	4	3	6	5	8	7			
Case No	3.0		2.0	3.0	2.0	3.0	2.0	4.0	2.0			
Phs Duration (G+Y+Rc), s	20.2		24.0	49.0	26.8	16.5	27.7	60.0	15.8			
Change Period (Y+Rc), s	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0			
Max Green (Gmax), s	18.0		18.0	43.0	17.0	32.0	4.0	54.0	6.0			
Max Allow Headway (MAH), s	4.2		4.1	4.0	4.1	4.2	4.1	4.1	4.1			
Max Q Clear (g_c+I1), s	13.9		19.1	28.5	8.6	10.0	2.7	14.9	7.9			
Green Ext Time (g_e), s	0.3		0.0	3.7	0.2	0.5	0.0	2.2	0.0			
Prob of Phs Call (p_c)	1.00		1.00	1.00	0.97	1.00	0.33	1.00	0.94			
Prob of Max Out (p_x)	1.00		1.00	0.00	0.02	0.00	1.00	0.00	1.00			
Left-Turn Movement Data												
Assigned Mvmt			1		3		5		7			
Mvmt Sat Flow, veh/h			1641		1641		1641		1641			
Through Movement Data												
Assigned Mvmt	2			4		6		8				
Mvmt Sat Flow, veh/h	1870			3554		1870		2641				
Right-Turn Movement Data												
Assigned Mvmt	12			14		16		18				
Mvmt Sat Flow, veh/h	1460			1460		1460		852				
Left Lane Group Data												
Assigned Mvmt	0		1	0	3	0	5	0	7			
Lane Assignment	L (Prot)			L (Prot)		L (Prot)		L (Prot)				

HCM 6th Signalized Intersection Capacity Analysis

1: Topaz Rd & Bear Valley Rd

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Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	239	0	105	0	12	0	85
Grp Sat Flow (s), veh/h/ln	0	1641	0	1641	0	1641	0	1641
Q Serve Time (g_s), s	0.0	17.1	0.0	6.6	0.0	0.7	0.0	5.9
Cycle Q Clear Time (g_c), s	0.0	17.1	0.0	6.6	0.0	0.7	0.0	5.9
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	273	0	312	0	324	0	162
V/C Ratio (X)	0.00	0.87	0.00	0.34	0.00	0.04	0.00	0.53
Avail Cap (c_a), veh/h	0	273	0	312	0	324	0	162
Upstream Filter (I)	0.00	1.00	0.00	0.92	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	48.8	0.0	42.0	0.0	38.9	0.0	51.4
Incr Delay (d2), s/veh	0.0	25.3	0.0	0.6	0.0	0.0	0.0	3.1
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	74.1	0.0	42.6	0.0	39.0	0.0	54.5
1st-Term Q (Q1), veh/ln	0.0	6.6	0.0	2.6	0.0	0.3	0.0	2.3
2nd-Term Q (Q2), veh/ln	0.0	1.9	0.0	0.1	0.0	0.0	0.0	0.1
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	8.6	0.0	2.6	0.0	0.3	0.0	2.5
%ile Storage Ratio (RQ%)	0.00	2.18	0.00	0.33	0.00	0.05	0.00	0.42
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	2	0	4	0	6	0	8	0
Lane Assignment	T		T		T		T	
Lanes in Grp	1	0	2	0	1	0	1	0
Grp Vol (v), veh/h	65	0	927	0	54	0	292	0
Grp Sat Flow (s), veh/h/ln	1870	0	1777	0	1870	0	1777	0
Q Serve Time (g_s), s	3.7	0.0	26.5	0.0	3.2	0.0	12.6	0.0
Cycle Q Clear Time (g_c), s	3.7	0.0	26.5	0.0	3.2	0.0	12.6	0.0
Lane Grp Cap (c), veh/h	252	0	1333	0	194	0	829	0
V/C Ratio (X)	0.26	0.00	0.70	0.00	0.28	0.00	0.35	0.00
Avail Cap (c_a), veh/h	312	0	1333	0	530	0	829	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	0.92	0.00
Uniform Delay (d1), s/veh	46.5	0.0	31.7	0.0	49.6	0.0	20.4	0.0
Incr Delay (d2), s/veh	0.5	0.0	3.0	0.0	0.8	0.0	1.1	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	47.1	0.0	34.7	0.0	50.4	0.0	21.5	0.0
1st-Term Q (Q1), veh/ln	1.7	0.0	10.5	0.0	1.4	0.0	4.8	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.6	0.0	0.0	0.0	0.2	0.0

HCM 6th Signalized Intersection Capacity Analysis

1: Topaz Rd & Bear Valley Rd

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3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	1.7	0.0	11.1	0.0	1.5	0.0	5.1	0.0
%ile Storage Ratio (RQ%)	0.02	0.00	0.11	0.00	0.02	0.00	0.02	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	12	0	14	0	16	0	18	0
Lane Assignment	R		R		R		T+R	
Lanes in Grp	1	0	1	0	1	0	1	0
Grp Vol (v), veh/h	150	0	14	0	101	0	286	0
Grp Sat Flow (s), veh/h/ln	1460	0	1460	0	1460	0	1717	0
Q Serve Time (g_s), s	11.9	0.0	0.7	0.0	8.0	0.0	12.9	0.0
Cycle Q Clear Time (g_c), s	11.9	0.0	0.7	0.0	8.0	0.0	12.9	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	1.00	0.00	1.00	0.00	1.00	0.00	0.50	0.00
Lane Grp Cap (c), veh/h	197	0	547	0	152	0	801	0
V/C Ratio (X)	0.76	0.00	0.03	0.00	0.67	0.00	0.36	0.00
Avail Cap (c_a), veh/h	243	0	547	0	414	0	801	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	0.92	0.00
Uniform Delay (d1), s/veh	50.1	0.0	23.7	0.0	51.8	0.0	20.8	0.0
Incr Delay (d2), s/veh	10.7	0.0	0.1	0.0	4.9	0.0	1.1	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	60.8	0.0	23.8	0.0	56.7	0.0	22.0	0.0
1st-Term Q (Q1), veh/ln	4.2	0.0	0.2	0.0	2.8	0.0	4.8	0.0
2nd-Term Q (Q2), veh/ln	0.6	0.0	0.0	0.0	0.2	0.0	0.3	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	4.7	0.0	0.3	0.0	3.0	0.0	5.1	0.0
%ile Storage Ratio (RQ%)	0.80	0.00	0.00	0.00	0.77	0.00	0.02	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0























Intersection Summary

HCM 6th Ctrl Delay	39.9
HCM 6th LOS	D

HCM 6th Signalized Intersection Capacity Analysis

2: Amethyst Rd & Bear Valley Rd

AM 2040
08/14/2023

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	1193	11	82	571	149	15	47	220	508	78	65
Future Volume (veh/h)	80	1193	11	82	571	149	15	47	220	508	78	65
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, 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			
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1654	1870	1723	1723	1870	1723	1723	1870	1723	1723	1870	1723
Adj Flow Rate, veh/h	87	1297	12	89	621	162	16	51	239	552	85	71
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	144	1421	584	205	1540	633	357	296	264	574	117	98
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
Prop Arrive On Green	0.09	0.40	0.40	0.12	0.43	0.43	0.22	0.17	0.15	0.17	0.12	0.11
Unsig. Movement Delay												
Ln Grp Delay, s/veh	57.5	42.1	21.8	50.0	24.1	22.6	37.2	43.2	81.7	77.1	0.0	55.6
Ln Grp LOS	E	D	C	D	C	C	D	D	F	E	A	E
Approach Vol, veh/h	1396				872				306			
Approach Delay, s/veh	42.9				26.5				73.0			
Approach LOS	D				C				E			
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	2		1	4	3	6	5	8	7			
Case No	4.0		2.0	3.0	2.0	4.0	2.0	3.0	2.0			
Phs Duration (G+Y+Rc), s	24.0		25.0	52.0	19.0	18.9	30.1	56.0	15.0			
Change Period (Y+Rc), s	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0			
Max Green (Gmax), s	18.0		19.0	46.0	13.0	33.0	4.0	50.0	9.0			
Max Allow Headway (MAH), s	4.3		4.1	4.0	4.1	4.1	4.1	4.1	4.1			
Max Q Clear (g_c+I1), s	19.8		22.0	43.4	8.0	12.5	2.9	16.4	8.4			
Green Ext Time (g_e), s	0.0		0.0	1.6	0.1	0.5	0.0	3.4	0.0			
Prob of Phs Call (p_c)	1.00		1.00	1.00	0.95	1.00	0.41	1.00	0.94			
Prob of Max Out (p_x)	1.00		1.00	0.00	0.40	0.00	1.00	0.00	1.00			
Left-Turn Movement Data												
Assigned Mvmt	1			3			5			7		
Mvmt Sat Flow, veh/h	3281			1641			1641			1575		
Through Movement Data												
Assigned Mvmt	2		4		6		8					
Mvmt Sat Flow, veh/h	1777		3554		942		3554					
Right-Turn Movement Data												
Assigned Mvmt	12			14			16			18		
Mvmt Sat Flow, veh/h	1585			1460			787			1460		
Left Lane Group Data												
Assigned Mvmt	0		1	0	3	0	5	0	7			
Lane Assignment	L (Prot)			L (Prot)		L (Prot)		L (Prot)				

HCM 6th Signalized Intersection Capacity Analysis

2: Amethyst Rd & Bear Valley Rd

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Lanes in Grp	0	2	0	1	0	1	0	1
Grp Vol (v), veh/h	0	552	0	89	0	16	0	87
Grp Sat Flow (s), veh/h/ln	0	1641	0	1641	0	1641	0	1575
Q Serve Time (g_s), s	0.0	20.0	0.0	6.0	0.0	0.9	0.0	6.4
Cycle Q Clear Time (g_c), s	0.0	20.0	0.0	6.0	0.0	0.9	0.0	6.4
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	574	0	205	0	357	0	144
V/C Ratio (X)	0.00	0.96	0.00	0.43	0.00	0.04	0.00	0.60
Avail Cap (c_a), veh/h	0	574	0	205	0	357	0	144
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	0.74
Uniform Delay (d1), s/veh	0.0	49.1	0.0	48.6	0.0	37.1	0.0	52.4
Incr Delay (d2), s/veh	0.0	28.0	0.0	1.4	0.0	0.1	0.0	5.1
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	77.1	0.0	50.0	0.0	37.2	0.0	57.5
1st-Term Q (Q1), veh/ln	0.0	7.8	0.0	2.4	0.0	0.4	0.0	2.4
2nd-Term Q (Q2), veh/ln	0.0	2.2	0.0	0.1	0.0	0.0	0.0	0.2
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	10.0	0.0	2.4	0.0	0.4	0.0	2.6
%ile Storage Ratio (RQ%)	0.00	1.70	0.00	0.62	0.00	0.13	0.00	0.22
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	2	0	4	0	6	0	8	0
Lane Assignment	T		T				T	
Lanes in Grp	1	0	2	0	0	0	2	0
Grp Vol (v), veh/h	51	0	1297	0	0	0	621	0
Grp Sat Flow (s), veh/h/ln	1777	0	1777	0	0	0	1777	0
Q Serve Time (g_s), s	3.0	0.0	41.4	0.0	0.0	0.0	14.4	0.0
Cycle Q Clear Time (g_c), s	3.0	0.0	41.4	0.0	0.0	0.0	14.4	0.0
Lane Grp Cap (c), veh/h	296	0	1421	0	0	0	1540	0
V/C Ratio (X)	0.17	0.00	0.91	0.00	0.00	0.00	0.40	0.00
Avail Cap (c_a), veh/h	296	0	1421	0	0	0	1540	0
Upstream Filter (I)	1.00	0.00	0.74	0.00	0.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	42.9	0.0	34.0	0.0	0.0	0.0	23.3	0.0
Incr Delay (d2), s/veh	0.3	0.0	8.1	0.0	0.0	0.0	0.8	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	43.2	0.0	42.1	0.0	0.0	0.0	24.1	0.0
1st-Term Q (Q1), veh/ln	1.2	0.0	16.3	0.0	0.0	0.0	5.6	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	1.6	0.0	0.0	0.0	0.2	0.0

HCM 6th Signalized Intersection Capacity Analysis

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3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	1.3	0.0	17.9	0.0	0.0	0.0	5.8	0.0
%ile Storage Ratio (RQ%)	0.01	0.00	0.09	0.00	0.00	0.00	0.02	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	12	0	14	0	16	0	18	0
Lane Assignment	T+R		R		T+R		R	
Lanes in Grp	1	0	1	0	1	0	1	0
Grp Vol (v), veh/h	239	0	12	0	156	0	162	0
Grp Sat Flow (s), veh/h/ln	1585	0	1460	0	1729	0	1460	0
Q Serve Time (g_s), s	17.8	0.0	0.6	0.0	10.5	0.0	8.5	0.0
Cycle Q Clear Time (g_c), s	17.8	0.0	0.6	0.0	10.5	0.0	8.5	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	1.00	0.00	1.00	0.00	0.46	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	264	0	584	0	215	0	633	0
V/C Ratio (X)	0.90	0.00	0.02	0.00	0.73	0.00	0.26	0.00
Avail Cap (c_a), veh/h	264	0	584	0	504	0	633	0
Upstream Filter (I)	1.00	0.00	0.74	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	50.1	0.0	21.8	0.0	51.0	0.0	21.7	0.0
Incr Delay (d2), s/veh	31.7	0.0	0.0	0.0	4.6	0.0	1.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	81.7	0.0	21.8	0.0	55.6	0.0	22.6	0.0
1st-Term Q (Q1), veh/ln	6.8	0.0	0.2	0.0	4.4	0.0	2.7	0.0
2nd-Term Q (Q2), veh/ln	2.3	0.0	0.0	0.0	0.3	0.0	0.2	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	9.2	0.0	0.2	0.0	4.6	0.0	2.9	0.0
%ile Storage Ratio (RQ%)	0.08	0.00	0.02	0.00	0.07	0.00	0.37	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary








HCM 6th Ctrl Delay	47.7
HCM 6th LOS	D

Notes

User approved volume balancing among the lanes for turning movement.

Intersection

Intersection Delay, s/veh
Intersection LOS B























Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	86	103	28	26	77	13	37	118	50	6	93	80
Future Vol, veh/h	86	103	28	26	77	13	37	118	50	6	93	80
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	93	112	30	28	84	14	40	128	54	7	101	87
Number of Lanes	1	1	0	1	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	10.1	9.7	10.5	9.9
HCM LOS	B	A	B	A

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	18%	100%	0%	100%	0%	3%
Vol Thru, %	58%	0%	79%	0%	86%	52%
Vol Right, %	24%	0%	21%	0%	14%	45%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	205	86	131	26	90	179
LT Vol	37	86	0	26	0	6
Through Vol	118	0	103	0	77	93
RT Vol	50	0	28	0	13	80
Lane Flow Rate	223	93	142	28	98	195
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.319	0.164	0.224	0.051	0.16	0.273
Departure Headway (Hd)	5.146	6.327	5.669	6.49	5.879	5.046
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	702	567	634	552	609	716
Service Time	3.154	4.061	3.403	4.228	3.617	3.055
HCM Lane V/C Ratio	0.318	0.164	0.224	0.051	0.161	0.272
HCM Control Delay	10.5	10.3	10	9.6	9.7	9.9
HCM Lane LOS	B	B	A	A	A	A
HCM 95th-tile Q	1.4	0.6	0.9	0.2	0.6	1.1

HCM 6th Signalized Intersection Capacity Analysis
4: SR 395 & Eucalyptus St

AM 2040
08/14/2023

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	37	34	172	24	54	6	1215	101	39	1562	22
Future Volume (veh/h)	35	37	34	172	24	54	6	1215	101	39	1562	22
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, 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		
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1723	1870	1723	1723	1870	1723	1723	1870	1723	1723	1870	1723
Adj Flow Rate, veh/h	38	40	37	187	26	59	7	1321	110	42	1698	24
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	285	149	116	154	220	172	56	1676	689	229	2051	842
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
Prop Arrive On Green	0.06	0.08	0.08	0.09	0.12	0.12	0.03	0.47	0.47	0.14	0.58	0.58
Unsig. Movement Delay												
Ln Grp Delay, s/veh	28.7	33.1	21.6	174.2	29.6	14.3	35.9	17.4	3.1	28.7	14.3	1.6
Ln Grp LOS	C	C	C	F	C	B	D	B	A	C	B	A
Approach Vol, veh/h	115			272			1438			1764		
Approach Delay, s/veh	27.9			125.7			16.4			14.5		
Approach LOS	C			F			B			B		
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	2	1	3	4	6	5	7	8				
Case No	3.0	2.0	2.0	3.0	3.0	2.0	1.1	3.0				
Phs Duration (G+Y+Rc), s	39.1	14.4	11.0	9.9	46.9	6.5	8.2	12.8				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green (Gmax), s	56.5	4.0	5.0	30.5	56.5	4.0	4.0	31.5				
Max Allow Headway (MAH), s	4.0	4.1	4.1	4.2	4.0	4.1	4.1	4.2				
Max Q Clear (g_c+l1), s	25.3	3.7	9.0	3.5	30.8	2.3	3.5	3.8				
Green Ext Time (g_e), s	7.8	0.0	0.0	0.2	10.1	0.0	0.0	0.3				
Prob of Phs Call (p_c)	1.00	0.58	0.98	0.98	1.00	0.13	0.54	1.00				
Prob of Max Out (p_x)	0.03	1.00	1.00	0.00	0.15	1.00	1.00	0.00				
Left-Turn Movement Data												
Assigned Mvmt			1	3			5	7				
Mvmt Sat Flow, veh/h			1641	1641			1641	1641				
Through Movement Data												
Assigned Mvmt	2				4	6			8			
Mvmt Sat Flow, veh/h	3554				1870	3554			1870			
Right-Turn Movement Data												
Assigned Mvmt	12				14	16			18			
Mvmt Sat Flow, veh/h	1460				1460	1460			1460			
Left Lane Group Data												
Assigned Mvmt	0		1	3	0	0	5	7	0			
Lane Assignment	L (Prot)		L (Prot)		L (Prot)		Pr/Pm					

HCM 6th Signalized Intersection Capacity Analysis

4: SR 395 & Eucalyptus St

AM 2040
08/14/2023

Lanes in Grp	0	1	1	0	0	1	1	0
Grp Vol (v), veh/h	0	42	187	0	0	7	38	0
Grp Sat Flow (s), veh/h/ln	0	1641	1641	0	0	1641	1641	0
Q Serve Time (g_s), s	0.0	1.7	7.0	0.0	0.0	0.3	1.5	0.0
Cycle Q Clear Time (g_c), s	0.0	1.7	7.0	0.0	0.0	0.3	1.5	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	1209	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	5.9	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	5.9	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
Lane Grp Cap (c), veh/h	0	229	154	0	0	56	285	0
V/C Ratio (X)	0.00	0.18	1.21	0.00	0.00	0.13	0.13	0.00
Avail Cap (c_a), veh/h	0	229	154	0	0	132	325	0
Upstream Filter (I)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	28.3	33.7	0.0	0.0	34.9	28.4	0.0
Incr Delay (d2), s/veh	0.0	0.4	140.5	0.0	0.0	1.0	0.2	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	28.7	174.2	0.0	0.0	35.9	28.7	0.0
1st-Term Q (Q1), veh/ln	0.0	0.6	2.5	0.0	0.0	0.1	0.5	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	6.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	0.6	8.5	0.0	0.0	0.1	0.6	0.0
%ile Storage Ratio (RQ%)	0.00	0.04	0.72	0.00	0.00	0.01	0.14	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	8.2	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	2	0	0	4	6	0	0	8
Lane Assignment	T			T	T			T
Lanes in Grp	2	0	0	1	2	0	0	1
Grp Vol (v), veh/h	1321	0	0	40	1698	0	0	26
Grp Sat Flow (s), veh/h/ln	1777	0	0	1870	1777	0	0	1870
Q Serve Time (g_s), s	23.3	0.0	0.0	1.5	28.8	0.0	0.0	0.9
Cycle Q Clear Time (g_c), s	23.3	0.0	0.0	1.5	28.8	0.0	0.0	0.9
Lane Grp Cap (c), veh/h	1676	0	0	149	2051	0	0	220
V/C Ratio (X)	0.79	0.00	0.00	0.27	0.83	0.00	0.00	0.12
Avail Cap (c_a), veh/h	2794	0	0	817	2794	0	0	842
Upstream Filter (I)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d1), s/veh	16.5	0.0	0.0	32.2	12.7	0.0	0.0	29.4
Incr Delay (d2), s/veh	0.9	0.0	0.0	1.0	1.6	0.0	0.0	0.2
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	17.4	0.0	0.0	33.1	14.3	0.0	0.0	29.6
1st-Term Q (Q1), veh/ln	7.3	0.0	0.0	0.6	7.7	0.0	0.0	0.4
2nd-Term Q (Q2), veh/ln	0.2	0.0	0.0	0.0	0.5	0.0	0.0	0.0

HCM 6th Signalized Intersection Capacity Analysis

4: SR 395 & Eucalyptus St

AM 2040
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3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	7.5	0.0	0.0	0.7	8.1	0.0	0.0	0.4
%ile Storage Ratio (RQ%)	0.15	0.00	0.00	0.01	0.08	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	12	0	0	14	16	0	0	18
Lane Assignment	R			R	R			R
Lanes in Grp	1	0	0	1	1	0	0	1
Grp Vol (v), veh/h	110	0	0	37	24	0	0	59
Grp Sat Flow (s), veh/h/ln	1460	0	0	1460	1460	0	0	1460
Q Serve Time (g_s), s	1.7	0.0	0.0	1.4	0.3	0.0	0.0	1.8
Cycle Q Clear Time (g_c), s	1.7	0.0	0.0	1.4	0.3	0.0	0.0	1.8
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
Lane Grp Cap (c), veh/h	689	0	0	116	842	0	0	172
V/C Ratio (X)	0.16	0.00	0.00	0.32	0.03	0.00	0.00	0.34
Avail Cap (c_a), veh/h	1148	0	0	638	1148	0	0	657
Upstream Filter (I)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d1), s/veh	3.0	0.0	0.0	20.1	1.6	0.0	0.0	13.1
Incr Delay (d2), s/veh	0.1	0.0	0.0	1.5	0.0	0.0	0.0	1.2
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	3.1	0.0	0.0	21.6	1.6	0.0	0.0	14.3
1st-Term Q (Q1), veh/ln	0.8	0.0	0.0	0.6	0.1	0.0	0.0	0.9
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.8	0.0	0.0	0.6	0.1	0.0	0.0	0.9
%ile Storage Ratio (RQ%)	0.07	0.00	0.00	0.63	0.01	0.00	0.00	0.93
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 6th Ctrl Delay	24.1
HCM 6th LOS	C

Intersection

Intersection Delay, s/veh
Intersection LOS A




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		←	←	←	←			←			←	←
Traffic Vol, veh/h	45	84	37	34	93	13	105	32	62	7	24	52
Future Vol, veh/h	45	84	37	34	93	13	105	32	62	7	24	52
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	49	91	40	37	101	14	114	35	67	8	26	57
Number of Lanes	0	1	1	1	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach	WB	SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	9.5	9.3	9.8	8.4
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	53%	35%	0%	100%	0%	8%
Vol Thru, %	16%	65%	0%	0%	88%	29%
Vol Right, %	31%	0%	100%	0%	12%	63%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	199	129	37	34	106	83
LT Vol	105	45	0	34	0	7
Through Vol	32	84	0	0	93	24
RT Vol	62	0	37	0	13	52
Lane Flow Rate	216	140	40	37	115	90
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.289	0.219	0.053	0.061	0.172	0.118
Departure Headway (Hd)	4.816	5.619	4.736	5.978	5.386	4.712
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	742	635	750	595	661	754
Service Time	2.871	3.392	5.063	3.751	3.159	2.781
HCM Lane V/C Ratio	0.291	0.220	0.053	0.062	0.174	0.119
HCM Control Delay	9.8	10	7.8	9.1	9.3	8.4
HCM Lane LOS	A	A	A	A	A	A
HCM 95th-tile Q	1.2	0.8	0.2	0.2	0.6	0.4

Intersection

Intersection Delay, s/veh
Intersection LOS A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	144	19	24	2	0	105
Future Vol, veh/h	144	19	24	2	0	105
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	157	21	26	2	0	114
Number of Lanes	1	1	1	0	0	0























Approach	EB	WB
Opposing Approach WB		EB
Opposing Lanes	1	2
Conflicting Approach Left		
Conflicting Lanes Left	0	0
Conflicting Approach Right		
Conflicting Lanes Right	0	0
HCM Control Delay	5	5
HCM LOS	A	A

Lane	EBLn1	EBLn2	WBLn1
Vol Left, %	100%	0%	0%
Vol Thru, %	0%	100%	92%
Vol Right, %	0%	0%	8%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	144	19	26
LT Vol	144	0	0
Through Vol	0	19	24
RT Vol	0	0	2
Lane Flow Rate	157	21	28
Geometry Grp	0	0	0
Degree of Util (X)	0	0	0
Departure Headway (Hd)	0	0	0
Convergence, Y/N	Yes	Yes	Yes
Cap	0	0	0
Service Time	0	0	0
HCM Lane V/C Ratio	0	0	0
HCM Control Delay	5	5	5
HCM Lane LOS	N	N	N
HCM 95th-tile Q	0	0	0

HCM 6th Signalized Intersection Capacity Analysis

1: Topaz Rd & Bear Valley Rd

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	78	853	14	108	401	131	12	64	166	220	52	93
Future Volume (veh/h)	78	853	14	108	401	131	12	64	166	220	52	93
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, 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			
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1723	1870	1723	1723	1870	1723	1723	1870	1723	1723	1870	1723
Adj Flow Rate, veh/h	85	927	15	117	436	142	13	70	180	239	57	101
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	131	1333	547	281	1233	398	355	287	224	273	195	152
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
Prop Arrive On Green	0.08	0.38	0.38	0.17	0.47	0.45	0.22	0.15	0.15	0.17	0.10	0.10
Unsig. Movement Delay												
Ln Grp Delay, s/veh	64.4	34.7	23.8	45.3	21.5	22.0	37.2	45.1	65.3	74.1	50.5	56.7
Ln Grp LOS	E	C	C	D	C	C	D	D	E	E	D	E
Approach Vol, veh/h	1027				695				263			
Approach Delay, s/veh	37.0				25.7				58.5			
Approach LOS	D				C				E			
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	2	1	4	3	6	5	8	7				
Case No	3.0	2.0	3.0	2.0	3.0	2.0	4.0	2.0				
Phs Duration (G+Y+Rc), s	22.4	24.0	49.0	24.6	16.5	30.0	60.0	13.6				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green (Gmax), s	18.0	18.0	43.0	17.0	32.0	4.0	54.0	6.0				
Max Allow Headway (MAH), s	4.2	4.1	4.0	4.1	4.2	4.1	4.1	4.1				
Max Q Clear (g_c+l1), s	16.3	19.1	28.5	9.6	10.0	2.8	14.9	8.0				
Green Ext Time (g_e), s	0.2	0.0	3.7	0.2	0.5	0.0	2.2	0.0				
Prob of Phs Call (p_c)	1.00	1.00	1.00	0.98	1.00	0.35	1.00	0.94				
Prob of Max Out (p_x)	1.00	1.00	0.00	0.05	0.00	1.00	0.00	1.00				
Left-Turn Movement Data												
Assigned Mvmt	1		3		5		7					
Mvmt Sat Flow, veh/h	1641		1641		1641		1641					
Through Movement Data												
Assigned Mvmt	2		4		6		8					
Mvmt Sat Flow, veh/h	1870		3554		1870		2641					
Right-Turn Movement Data												
Assigned Mvmt	12		14		16		18					
Mvmt Sat Flow, veh/h	1460		1460		1460		852					
Left Lane Group Data												
Assigned Mvmt	0		1		0		3		0		7	
Lane Assignment	L (Prot)		L (Prot)		L (Prot)		L (Prot)		L (Prot)			

HCM 6th Signalized Intersection Capacity Analysis

1: Topaz Rd & Bear Valley Rd

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Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	239	0	117	0	13	0	85
Grp Sat Flow (s), veh/h/ln	0	1641	0	1641	0	1641	0	1641
Q Serve Time (g_s), s	0.0	17.1	0.0	7.6	0.0	0.8	0.0	6.0
Cycle Q Clear Time (g_c), s	0.0	17.1	0.0	7.6	0.0	0.8	0.0	6.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	273	0	281	0	355	0	131
V/C Ratio (X)	0.00	0.87	0.00	0.42	0.00	0.04	0.00	0.65
Avail Cap (c_a), veh/h	0	273	0	281	0	355	0	131
Upstream Filter (I)	0.00	1.00	0.00	0.92	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	48.8	0.0	44.4	0.0	37.1	0.0	53.6
Incr Delay (d2), s/veh	0.0	25.3	0.0	0.9	0.0	0.0	0.0	10.8
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	74.1	0.0	45.3	0.0	37.2	0.0	64.4
1st-Term Q (Q1), veh/ln	0.0	6.6	0.0	3.0	0.0	0.3	0.0	2.4
2nd-Term Q (Q2), veh/ln	0.0	1.9	0.0	0.1	0.0	0.0	0.0	0.4
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	8.6	0.0	3.0	0.0	0.3	0.0	2.8
%ile Storage Ratio (RQ%)	0.00	2.18	0.00	0.39	0.00	0.05	0.00	0.47
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	2	0	4	0	6	0	8	0
Lane Assignment	T		T		T		T	
Lanes in Grp	1	0	2	0	1	0	1	0
Grp Vol (v), veh/h	70	0	927	0	57	0	292	0
Grp Sat Flow (s), veh/h/ln	1870	0	1777	0	1870	0	1777	0
Q Serve Time (g_s), s	3.9	0.0	26.5	0.0	3.4	0.0	12.6	0.0
Cycle Q Clear Time (g_c), s	3.9	0.0	26.5	0.0	3.4	0.0	12.6	0.0
Lane Grp Cap (c), veh/h	287	0	1333	0	195	0	829	0
V/C Ratio (X)	0.24	0.00	0.70	0.00	0.29	0.00	0.35	0.00
Avail Cap (c_a), veh/h	312	0	1333	0	530	0	829	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	0.92	0.00
Uniform Delay (d1), s/veh	44.6	0.0	31.7	0.0	49.7	0.0	20.4	0.0
Incr Delay (d2), s/veh	0.4	0.0	3.0	0.0	0.8	0.0	1.1	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	45.1	0.0	34.7	0.0	50.5	0.0	21.5	0.0
1st-Term Q (Q1), veh/ln	1.8	0.0	10.5	0.0	1.5	0.0	4.8	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.6	0.0	0.0	0.0	0.2	0.0

HCM 6th Signalized Intersection Capacity Analysis

1: Topaz Rd & Bear Valley Rd

AM 2040+Project
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3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	1.8	0.0	11.1	0.0	1.6	0.0	5.1	0.0
%ile Storage Ratio (RQ%)	0.02	0.00	0.11	0.00	0.02	0.00	0.02	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	12	0	14	0	16	0	18	0
Lane Assignment	R		R		R		T+R	
Lanes in Grp	1	0	1	0	1	0	1	0
Grp Vol (v), veh/h	180	0	15	0	101	0	286	0
Grp Sat Flow (s), veh/h/ln	1460	0	1460	0	1460	0	1717	0
Q Serve Time (g_s), s	14.3	0.0	0.8	0.0	8.0	0.0	12.9	0.0
Cycle Q Clear Time (g_c), s	14.3	0.0	0.8	0.0	8.0	0.0	12.9	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	1.00	0.00	1.00	0.00	1.00	0.00	0.50	0.00
Lane Grp Cap (c), veh/h	224	0	547	0	152	0	801	0
V/C Ratio (X)	0.80	0.00	0.03	0.00	0.66	0.00	0.36	0.00
Avail Cap (c_a), veh/h	243	0	547	0	414	0	801	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	0.92	0.00
Uniform Delay (d1), s/veh	49.0	0.0	23.7	0.0	51.7	0.0	20.8	0.0
Incr Delay (d2), s/veh	16.3	0.0	0.1	0.0	4.9	0.0	1.1	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	65.3	0.0	23.8	0.0	56.7	0.0	22.0	0.0
1st-Term Q (Q1), veh/ln	5.0	0.0	0.3	0.0	2.8	0.0	4.8	0.0
2nd-Term Q (Q2), veh/ln	1.0	0.0	0.0	0.0	0.2	0.0	0.3	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	6.0	0.0	0.3	0.0	3.0	0.0	5.1	0.0
%ile Storage Ratio (RQ%)	1.01	0.00	0.00	0.00	0.77	0.00	0.02	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0























Intersection Summary

HCM 6th Ctrl Delay	41.0
HCM 6th LOS	D

HCM 6th Signalized Intersection Capacity Analysis

2: Amethyst Rd & Bear Valley Rd

AM 2040+Project
08/14/2023

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	89	1210	12	85	578	149	16	47	220	508	78	68
Future Volume (veh/h)	89	1210	12	85	578	149	16	47	220	508	78	68
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, 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			
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1654	1870	1723	1723	1870	1723	1723	1870	1723	1723	1870	1723
Adj Flow Rate, veh/h	97	1315	13	92	628	162	17	51	239	552	85	74
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	144	1421	584	205	1540	633	353	296	264	574	116	101
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
Prop Arrive On Green	0.09	0.40	0.40	0.12	0.43	0.43	0.22	0.17	0.15	0.17	0.13	0.11
Unsig. Movement Delay												
Ln Grp Delay, s/veh	61.3	43.3	21.8	50.2	24.2	22.6	37.4	43.2	81.7	77.1	0.0	55.6
Ln Grp LOS	E	D	C	D	C	C	D	D	F	E	A	E
Approach Vol, veh/h	1425				882				307			
Approach Delay, s/veh	44.3				26.6				72.9			
Approach LOS	D				C				E			
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	2	1	4	3	6	5	8	7				
Case No	4.0	2.0	3.0	2.0	4.0	2.0	3.0	2.0				
Phs Duration (G+Y+Rc), s	24.0	25.0	52.0	19.0	19.1	29.9	56.0	15.0				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green (Gmax), s	18.0	19.0	46.0	13.0	33.0	4.0	50.0	9.0				
Max Allow Headway (MAH), s	4.3	4.1	4.0	4.1	4.2	4.1	4.1	4.1				
Max Q Clear (g_c+I1), s	19.8	22.0	44.3	8.2	12.7	3.0	16.6	9.2				
Green Ext Time (g_e), s	0.0	0.0	1.1	0.1	0.5	0.0	3.5	0.0				
Prob of Phs Call (p_c)	1.00	1.00	1.00	0.95	1.00	0.43	1.00	0.96				
Prob of Max Out (p_x)	1.00	1.00	0.00	0.51	0.00	1.00	0.00	1.00				
Left-Turn Movement Data												
Assigned Mvmt	1		3		5		7					
Mvmt Sat Flow, veh/h	3281		1641		1641		1575					
Through Movement Data												
Assigned Mvmt	2		4		6		8					
Mvmt Sat Flow, veh/h	1777		3554		923		3554					
Right-Turn Movement Data												
Assigned Mvmt	12		14		16		18					
Mvmt Sat Flow, veh/h	1585		1460		803		1460					
Left Lane Group Data												
Assigned Mvmt	0		1		0		3		0		7	
Lane Assignment	L (Prot)		L (Prot)		L (Prot)		L (Prot)		L (Prot)			

Baseline

Synchro 9 Report

HCM 6th Signalized Intersection Capacity Analysis 2: Amethyst Rd & Bear Valley Rd

AM 2040+Project
08/14/2023

Lanes in Grp	0	2	0	1	0	1	0	1
Grp Vol (v), veh/h	0	552	0	92	0	17	0	97
Grp Sat Flow (s), veh/h/ln	0	1641	0	1641	0	1641	0	1575
Q Serve Time (g_s), s	0.0	20.0	0.0	6.2	0.0	1.0	0.0	7.2
Cycle Q Clear Time (g_c), s	0.0	20.0	0.0	6.2	0.0	1.0	0.0	7.2
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	574	0	205	0	353	0	144
V/C Ratio (X)	0.00	0.96	0.00	0.45	0.00	0.05	0.00	0.67
Avail Cap (c_a), veh/h	0	574	0	205	0	353	0	144
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	0.73
Uniform Delay (d1), s/veh	0.0	49.1	0.0	48.7	0.0	37.3	0.0	52.8
Incr Delay (d2), s/veh	0.0	28.0	0.0	1.5	0.0	0.1	0.0	8.6
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	77.1	0.0	50.2	0.0	37.4	0.0	61.3
1st-Term Q (Q1), veh/ln	0.0	7.8	0.0	2.5	0.0	0.4	0.0	2.7
2nd-Term Q (Q2), veh/ln	0.0	2.2	0.0	0.1	0.0	0.0	0.0	0.3
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	10.0	0.0	2.5	0.0	0.4	0.0	3.1
%ile Storage Ratio (RQ%)	0.00	1.70	0.00	0.64	0.00	0.14	0.00	0.26
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	2	0	4	0	6	0	8	0
Lane Assignment	T		T				T	
Lanes in Grp	1	0	2	0	0	0	2	0
Grp Vol (v), veh/h	51	0	1315	0	0	0	628	0
Grp Sat Flow (s), veh/h/ln	1777	0	1777	0	0	0	1777	0
Q Serve Time (g_s), s	3.0	0.0	42.3	0.0	0.0	0.0	14.6	0.0
Cycle Q Clear Time (g_c), s	3.0	0.0	42.3	0.0	0.0	0.0	14.6	0.0
Lane Grp Cap (c), veh/h	296	0	1421	0	0	0	1540	0
V/C Ratio (X)	0.17	0.00	0.93	0.00	0.00	0.00	0.41	0.00
Avail Cap (c_a), veh/h	296	0	1421	0	0	0	1540	0
Upstream Filter (I)	1.00	0.00	0.73	0.00	0.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	42.9	0.0	34.3	0.0	0.0	0.0	23.4	0.0
Incr Delay (d2), s/veh	0.3	0.0	9.0	0.0	0.0	0.0	0.8	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	43.2	0.0	43.3	0.0	0.0	0.0	24.2	0.0
1st-Term Q (Q1), veh/ln	1.2	0.0	16.7	0.0	0.0	0.0	5.7	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	1.8	0.0	0.0	0.0	0.2	0.0

HCM 6th Signalized Intersection Capacity Analysis 2: Amethyst Rd & Bear Valley Rd

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3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	1.3	0.0	18.5	0.0	0.0	0.0	5.8	0.0
%ile Storage Ratio (RQ%)	0.01	0.00	0.09	0.00	0.00	0.00	0.02	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	12	0	14	0	16	0	18	0
Lane Assignment	T+R		R		T+R		R	
Lanes in Grp	1	0	1	0	1	0	1	0
Grp Vol (v), veh/h	239	0	13	0	159	0	162	0
Grp Sat Flow (s), veh/h/ln	1585	0	1460	0	1726	0	1460	0
Q Serve Time (g_s), s	17.8	0.0	0.6	0.0	10.7	0.0	8.5	0.0
Cycle Q Clear Time (g_c), s	17.8	0.0	0.6	0.0	10.7	0.0	8.5	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	1.00	0.00	1.00	0.00	0.47	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	264	0	584	0	218	0	633	0
V/C Ratio (X)	0.90	0.00	0.02	0.00	0.73	0.00	0.26	0.00
Avail Cap (c_a), veh/h	264	0	584	0	503	0	633	0
Upstream Filter (I)	1.00	0.00	0.73	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	50.1	0.0	21.8	0.0	50.9	0.0	21.7	0.0
Incr Delay (d2), s/veh	31.7	0.0	0.1	0.0	4.6	0.0	1.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	81.7	0.0	21.8	0.0	55.6	0.0	22.6	0.0
1st-Term Q (Q1), veh/ln	6.8	0.0	0.2	0.0	4.4	0.0	2.7	0.0
2nd-Term Q (Q2), veh/ln	2.3	0.0	0.0	0.0	0.3	0.0	0.2	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	9.2	0.0	0.2	0.0	4.7	0.0	2.9	0.0
%ile Storage Ratio (RQ%)	0.08	0.00	0.02	0.00	0.07	0.00	0.37	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary








HCM 6th Ctrl Delay	48.2
HCM 6th LOS	D

Notes

User approved volume balancing among the lanes for turning movement.

Intersection

Intersection Delay, s/veh
Intersection LOS B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	86	103	28	26	77	13	37	118	50	6	93	80
Future Vol, veh/h	86	103	28	26	77	13	37	118	50	6	93	80
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	93	112	30	28	84	14	40	128	54	7	101	87
Number of Lanes	1	1	0	1	1	0	0	1	0	0	1	0























Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	2
Conflicting Approach	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	2
HCM Control Delay	10.1	9.7	10.5	9.9
HCM LOS	B	A	B	A

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	18%	100%	0%	100%	0%	3%
Vol Thru, %	58%	0%	79%	0%	86%	52%
Vol Right, %	24%	0%	21%	0%	14%	45%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	205	86	131	26	90	179
LT Vol	37	86	0	26	0	6
Through Vol	118	0	103	0	77	93
RT Vol	50	0	28	0	13	80
Lane Flow Rate	223	93	142	28	98	195
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.319	0.164	0.224	0.051	0.16	0.273
Departure Headway (Hd)	5.146	6.327	5.669	6.49	5.879	5.046
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	702	567	634	552	609	716
Service Time	3.154	4.061	3.403	4.228	3.617	3.055
HCM Lane V/C Ratio	0.318	0.164	0.224	0.051	0.161	0.272
HCM Control Delay	10.5	10.3	10	9.6	9.7	9.9
HCM Lane LOS	B	B	A	A	A	A
HCM 95th-tile Q	1.4	0.6	0.9	0.2	0.6	1.1

HCM 6th Signalized Intersection Capacity Analysis

4: SR 395 & Eucalyptus St

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	39	34	207	28	89	6	1215	114	52	1562	22
Future Volume (veh/h)	35	39	34	207	28	89	6	1215	114	52	1562	22
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, 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		
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1723	1870	1723	1723	1870	1723	1723	1870	1723	1723	1870	1723
Adj Flow Rate, veh/h	38	42	37	225	30	97	7	1321	124	57	1698	24
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	282	150	117	154	221	172	56	1679	690	227	2050	842
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
Prop Arrive On Green	0.06	0.08	0.08	0.09	0.12	0.12	0.03	0.47	0.47	0.14	0.58	0.58
Unsig. Movement Delay												
Ln Grp Delay, s/veh	28.7	33.2	21.6	272.5	29.7	16.4	35.9	17.4	3.1	29.2	14.4	1.6
Ln Grp LOS	C	C	C	F	C	B	D	B	A	C	B	A
Approach Vol, veh/h	117			352			1452			1779		
Approach Delay, s/veh	28.1			181.2			16.2			14.7		
Approach LOS	C			F			B			B		
Timer:	1	2	3	4	5	6	7	8				
Assigned Phs	2	1	3	4	6	5	7	8				
Case No	3.0	2.0	2.0	3.0	3.0	2.0	1.1	3.0				
Phs Duration (G+Y+Rc), s	39.2	14.3	11.0	10.0	47.0	6.5	8.2	12.8				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green (Gmax), s	56.5	4.0	5.0	30.5	56.5	4.0	4.0	31.5				
Max Allow Headway (MAH), s	4.0	4.1	4.1	4.2	4.0	4.1	4.1	4.3				
Max Q Clear (g_c+l1), s	25.3	4.3	9.0	3.6	30.8	2.3	3.5	5.1				
Green Ext Time (g_e), s	7.9	0.0	0.0	0.2	10.1	0.0	0.0	0.4				
Prob of Phs Call (p_c)	1.00	0.69	0.99	0.99	1.00	0.13	0.54	1.00				
Prob of Max Out (p_x)	0.03	1.00	1.00	0.00	0.15	1.00	1.00	0.00				
Left-Turn Movement Data												
Assigned Mvmt			1	3			5	7				
Mvmt Sat Flow, veh/h			1641	1641			1641	1641				
Through Movement Data												
Assigned Mvmt	2				4	6			8			
Mvmt Sat Flow, veh/h	3554				1870	3554			1870			
Right-Turn Movement Data												
Assigned Mvmt	12				14	16			18			
Mvmt Sat Flow, veh/h	1460				1460	1460			1460			
Left Lane Group Data												
Assigned Mvmt	0		1	3	0	0	5	7	0			
Lane Assignment			L (Prot)L (Prot)				L (Prdt)(Pr/Pm)					

HCM 6th Signalized Intersection Capacity Analysis

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Lanes in Grp	0	1	1	0	0	1	1	0
Grp Vol (v), veh/h	0	57	225	0	0	7	38	0
Grp Sat Flow (s), veh/h/ln	0	1641	1641	0	0	1641	1641	0
Q Serve Time (g_s), s	0.0	2.3	7.0	0.0	0.0	0.3	1.5	0.0
Cycle Q Clear Time (g_c), s	0.0	2.3	7.0	0.0	0.0	0.3	1.5	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	0	0	0	0	1164	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	6.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	6.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
Lane Grp Cap (c), veh/h	0	227	154	0	0	56	282	0
V/C Ratio (X)	0.00	0.25	1.46	0.00	0.00	0.13	0.13	0.00
Avail Cap (c_a), veh/h	0	227	154	0	0	132	322	0
Upstream Filter (I)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	28.6	33.7	0.0	0.0	34.9	28.4	0.0
Incr Delay (d2), s/veh	0.0	0.6	238.8	0.0	0.0	1.0	0.2	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	29.2	272.5	0.0	0.0	35.9	28.7	0.0
1st-Term Q (Q1), veh/ln	0.0	0.8	2.5	0.0	0.0	0.1	0.5	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	10.2	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	0.8	12.7	0.0	0.0	0.1	0.6	0.0
%ile Storage Ratio (RQ%)	0.00	0.05	1.08	0.00	0.00	0.01	0.14	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	17.7	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	2	0	0	4	6	0	0	8
Lane Assignment	T			T	T			T
Lanes in Grp	2	0	0	1	2	0	0	1
Grp Vol (v), veh/h	1321	0	0	42	1698	0	0	30
Grp Sat Flow (s), veh/h/ln	1777	0	0	1870	1777	0	0	1870
Q Serve Time (g_s), s	23.3	0.0	0.0	1.6	28.8	0.0	0.0	1.1
Cycle Q Clear Time (g_c), s	23.3	0.0	0.0	1.6	28.8	0.0	0.0	1.1
Lane Grp Cap (c), veh/h	1679	0	0	150	2050	0	0	221
V/C Ratio (X)	0.79	0.00	0.00	0.28	0.83	0.00	0.00	0.14
Avail Cap (c_a), veh/h	2791	0	0	816	2791	0	0	841
Upstream Filter (I)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d1), s/veh	16.5	0.0	0.0	32.2	12.8	0.0	0.0	29.4
Incr Delay (d2), s/veh	0.8	0.0	0.0	1.0	1.6	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
Control Delay (d), s/veh	17.4	0.0	0.0	33.2	14.4	0.0	0.0	29.7
1st-Term Q (Q1), veh/ln	7.3	0.0	0.0	0.6	7.7	0.0	0.0	0.4
2nd-Term Q (Q2), veh/ln	0.2	0.0	0.0	0.0	0.5	0.0	0.0	0.0

HCM 6th Signalized Intersection Capacity Analysis 4: SR 395 & Eucalyptus St

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3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	7.5	0.0	0.0	0.7	8.2	0.0	0.0	0.5
%ile Storage Ratio (RQ%)	0.15	0.00	0.00	0.01	0.08	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data

Assigned Mvmt	12	0	0	14	16	0	0	18
Lane Assignment	R			R	R			R
Lanes in Grp	1	0	0	1	1	0	0	1
Grp Vol (v), veh/h	124	0	0	37	24	0	0	97
Grp Sat Flow (s), veh/h/ln	1460	0	0	1460	1460	0	0	1460
Q Serve Time (g_s), s	1.9	0.0	0.0	1.4	0.3	0.0	0.0	3.1
Cycle Q Clear Time (g_c), s	1.9	0.0	0.0	1.4	0.3	0.0	0.0	3.1
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
Lane Grp Cap (c), veh/h	690	0	0	117	842	0	0	172
V/C Ratio (X)	0.18	0.00	0.00	0.32	0.03	0.00	0.00	0.56
Avail Cap (c_a), veh/h	1147	0	0	637	1147	0	0	657
Upstream Filter (I)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d1), s/veh	3.0	0.0	0.0	20.1	1.6	0.0	0.0	13.5
Incr Delay (d2), s/veh	0.1	0.0	0.0	1.5	0.0	0.0	0.0	2.9
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	3.1	0.0	0.0	21.6	1.6	0.0	0.0	16.4
1st-Term Q (Q1), veh/ln	0.9	0.0	0.0	0.6	0.1	0.0	0.0	1.4
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.9	0.0	0.0	0.6	0.1	0.0	0.0	1.6
%ile Storage Ratio (RQ%)	0.08	0.00	0.00	0.62	0.01	0.00	0.00	1.60
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 6th Ctrl Delay	31.6
HCM 6th LOS	C

Intersection

Intersection Delay, s/veh

Intersection LOS B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		←	←	←	←			←			←	←
Traffic Vol, veh/h	45	109	40	34	166	14	106	32	63	8	24	52
Future Vol, veh/h	45	109	40	34	166	14	106	32	63	8	24	52
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	49	118	43	37	180	15	115	35	68	9	26	57
Number of Lanes	0	1	1	1	1	0	0	1	0	0	1	0






Approach	EB	WB	NB	SB
Opposing Approach WB		EB	SB	NB
Opposing Lanes	2	2	1	1
Conflicting Approach SBL		NB	EB	WB
Conflicting Lanes Left 1		1	2	2
Conflicting Approach NBL		SB	WB	EB
Conflicting Lanes Right 1		1	2	2
HCM Control Delay 10.1		10.6	10.6	8.9
HCM LOS	B	B	B	A

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	53%	29%	0%	100%	0%	10%
Vol Thru, %	16%	71%	0%	0%	92%	29%
Vol Right, %	31%	0%	100%	0%	8%	62%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	201	154	40	34	180	84
LT Vol	106	45	0	34	0	8
Through Vol	32	109	0	0	166	24
RT Vol	63	0	40	0	14	52
Lane Flow Rate	218	167	43	37	196	91
Geometry Grp	2	7	7	7	7	2
Degree of Util (X)	0.316	0.271	0.06	0.063	0.304	0.13
Departure Headway (Hd)	5.212	5.834	4.977	6.161	5.6	5.142
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	695	618	721	583	644	698
Service Time	3.212	3.556	2.699	3.883	3.322	3.17
HCM Lane V/C Ratio	0.314	0.27	0.06	0.063	0.304	0.13
HCM Control Delay	10.6	10.7	8	9.3	10.8	8.9
HCM Lane LOS	B	B	A	A	B	A
HCM 95th-tile Q	1.4	1.1	0.2	0.2	1.3	0.4

Intersection

Intersection Delay, s/veh

Intersection LOS A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	157	19	9	0	24	2	25	38	0	0	13	110
Future Vol, veh/h	157	19	9	0	24	2	25	38	0	0	13	110
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	171	21	10	0	26	2	27	41	0	0	14	120
Number of Lanes	1	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	1	1
Conflicting Approach	SB	NB	EB	WB
Conflicting Lanes Left	1	1	2	1
Conflicting Approach	WB	SB	WB	EB
Conflicting Lanes Right	1	1	1	2
HCM Control Delay	9.8	7.9	8.3	7.9
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	EBLn2	WBLn1	SBLn1
Vol Left, %	40%	100%	0%	0%	0%
Vol Thru, %	60%	0%	68%	92%	11%
Vol Right, %	0%	0%	32%	8%	89%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	63	157	28	26	123
LT Vol	25	157	0	0	0
Through Vol	38	0	19	24	13
RT Vol	0	0	9	2	110
Lane Flow Rate	68	171	30	28	134
Geometry Grp	2	7	7	5	2
Degree of Util (X)	0.091	0.262	0.041	0.037	0.152
Departure Headway (Hd)	4.769	5.532	4.804	4.697	4.094
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	752	654	750	761	877
Service Time	2.795	3.232	2.504	2.734	2.115
HCM Lane V/C Ratio	0.09	0.261	0.04	0.037	0.153
HCM Control Delay	8.3	10.2	7.7	7.9	7.9
HCM Lane LOS	A	B	A	A	A
HCM 95th-tile Q	0.3	1	0.1	0.1	0.5

Intersection 1
Topaz Rd & Bear Valley Rd

Intersection 2

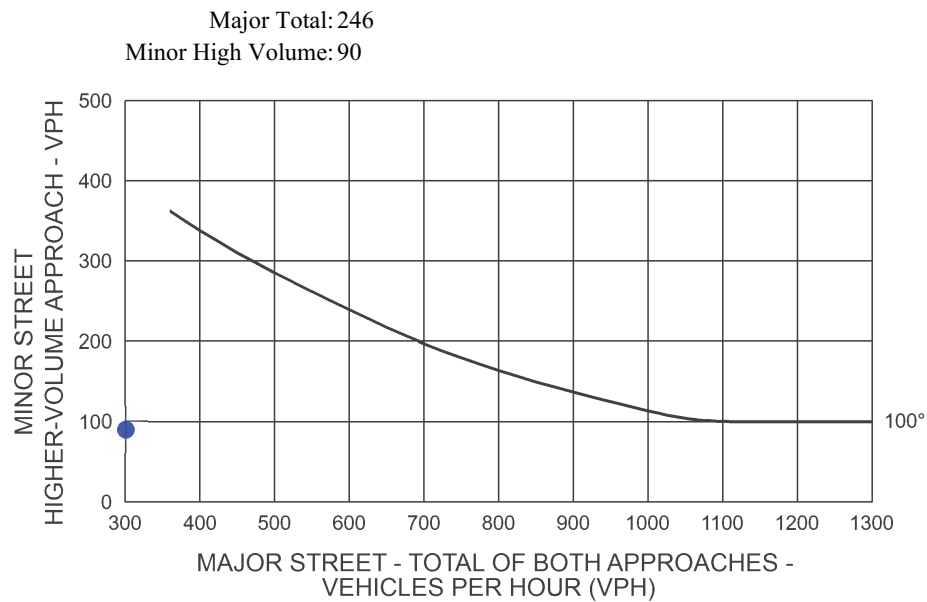
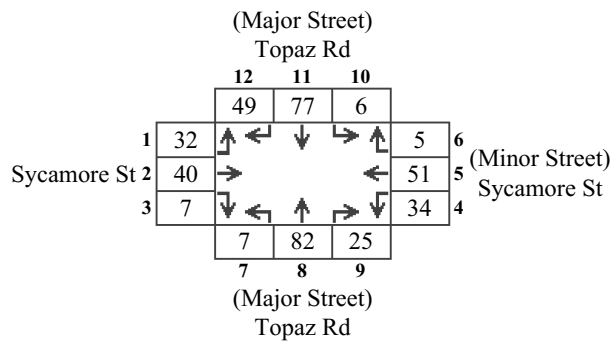
Amethyst Rd & Bear Valley Rd

Intersection 3 Topaz Rd & Sycamore St

Rural Peak Hour Signal Warrant

Intersection Does Not Meet Signal Warrant

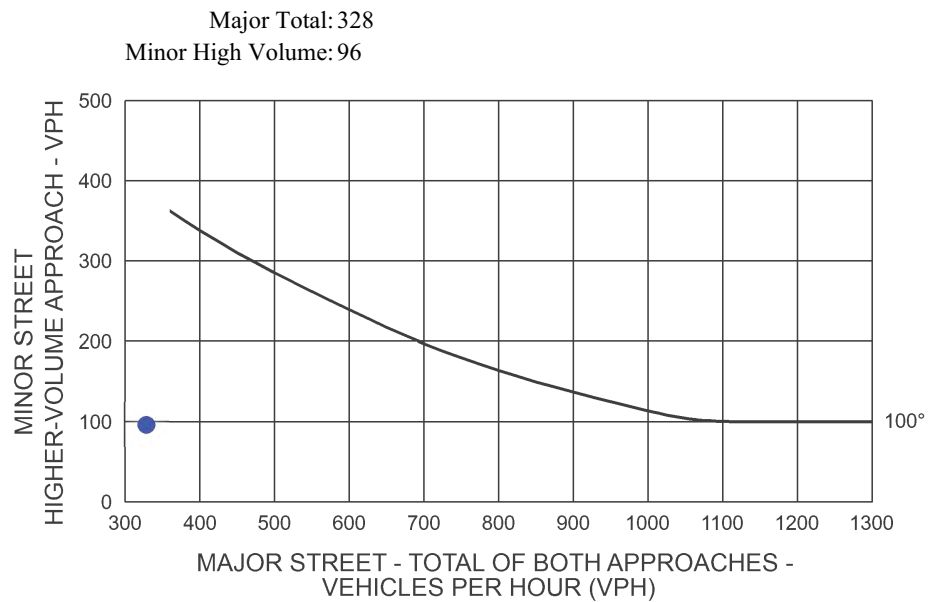
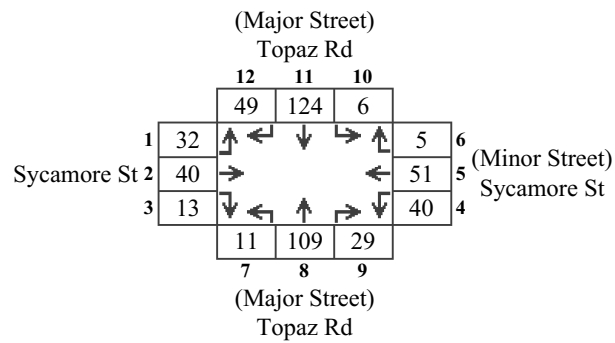
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Rural Peak Hour Signal Warrant

Intersection Does Not Meet Signal Warrant

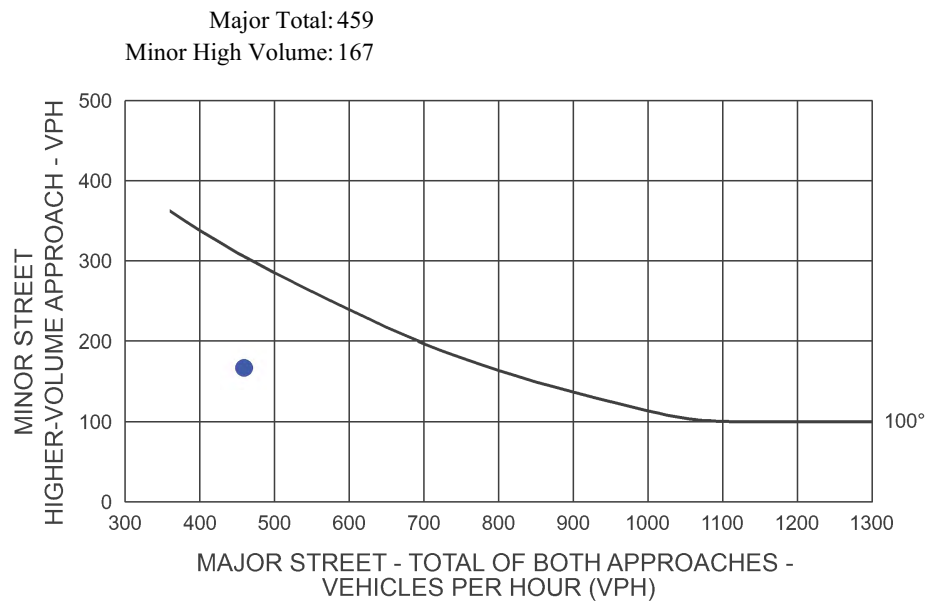
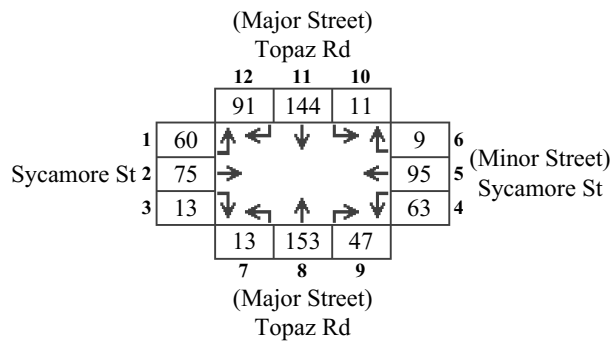
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Rural Peak Hour Signal Warrant

Intersection Does Not Meet Signal Warrant

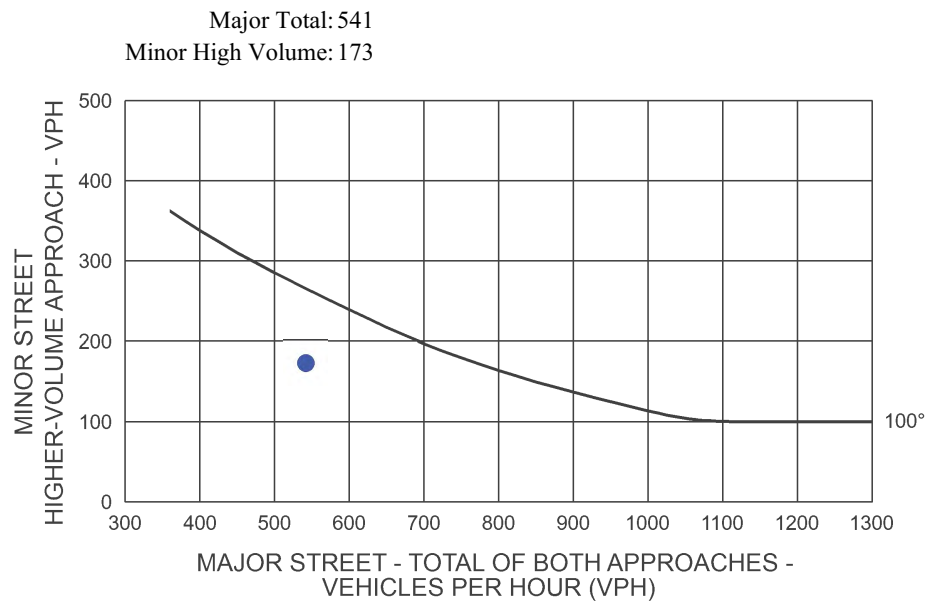
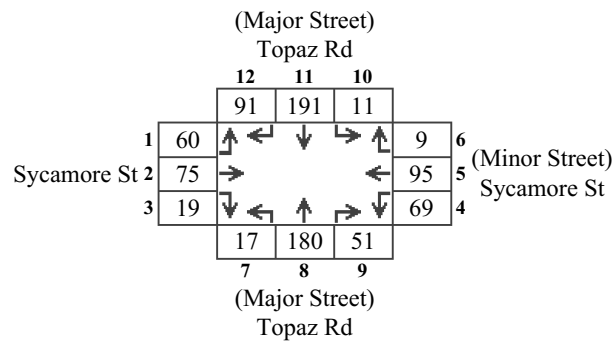
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Rural Peak Hour Signal Warrant

Intersection Does Not Meet Signal Warrant

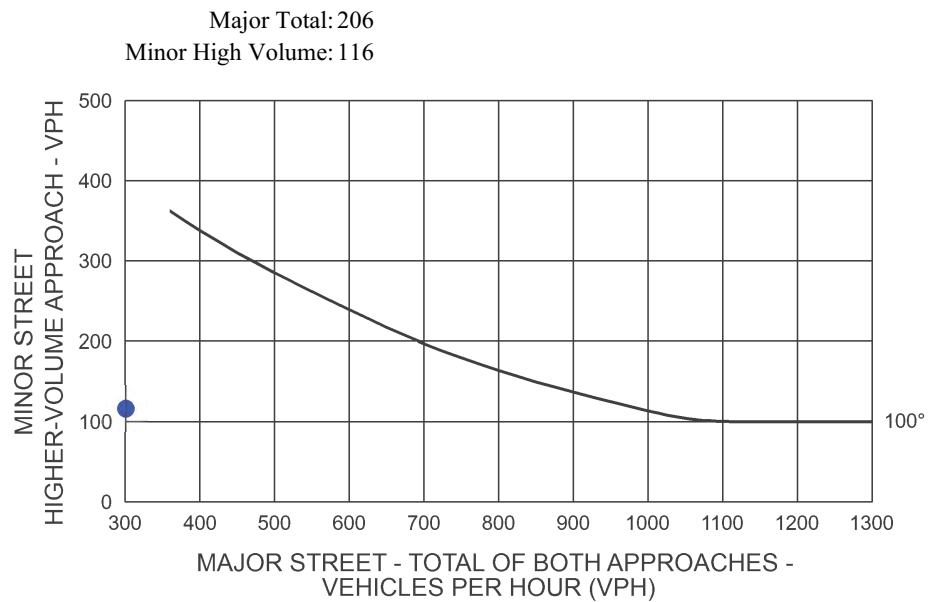
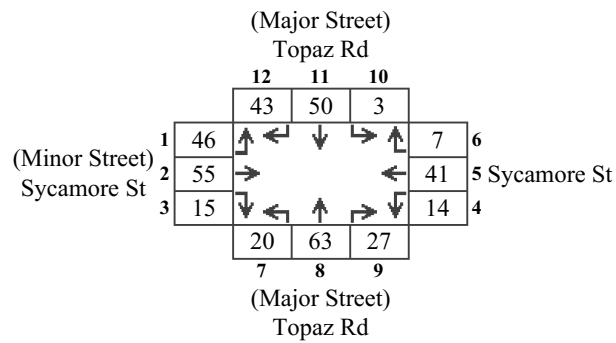
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Rural Peak Hour Signal Warrant

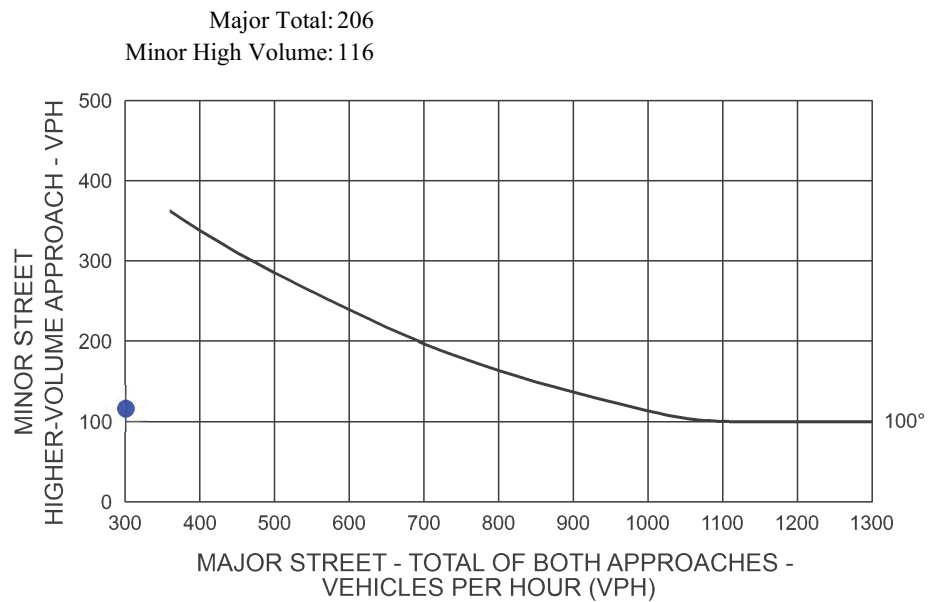
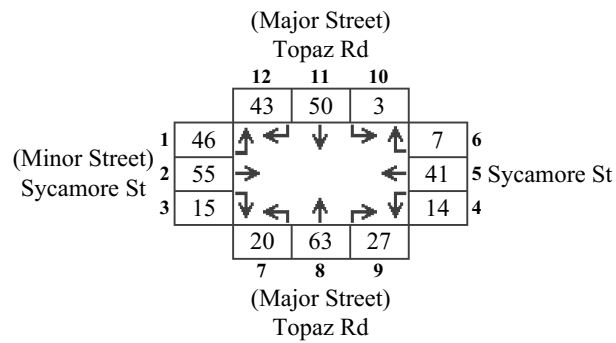
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Scenario: AM Existing
Intersection #: 3



Rural Peak Hour Signal Warrant Intersection Does Not Meet Signal Warrant

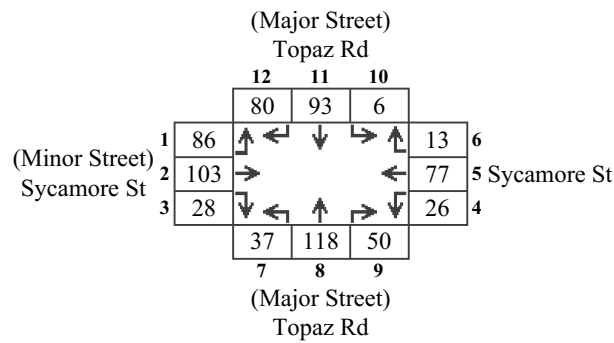
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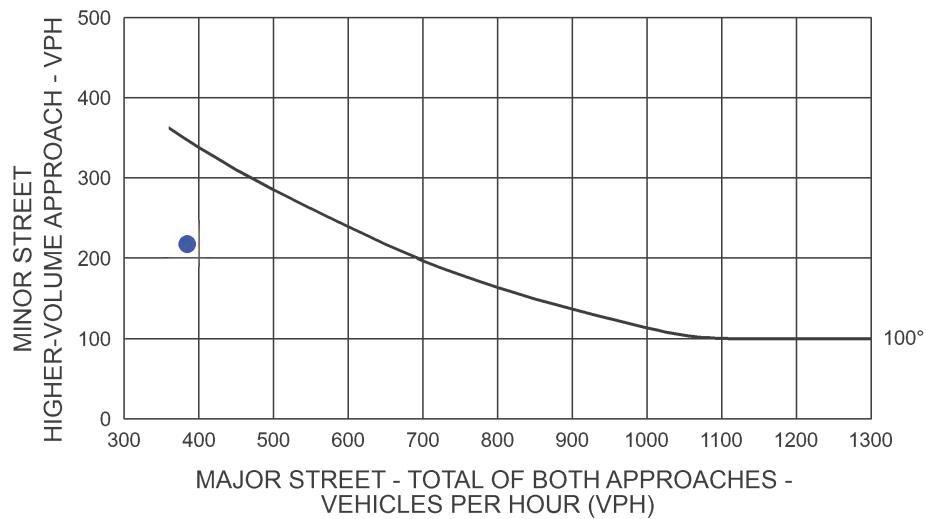
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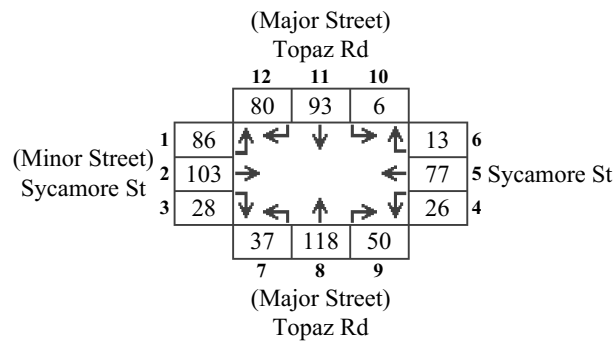
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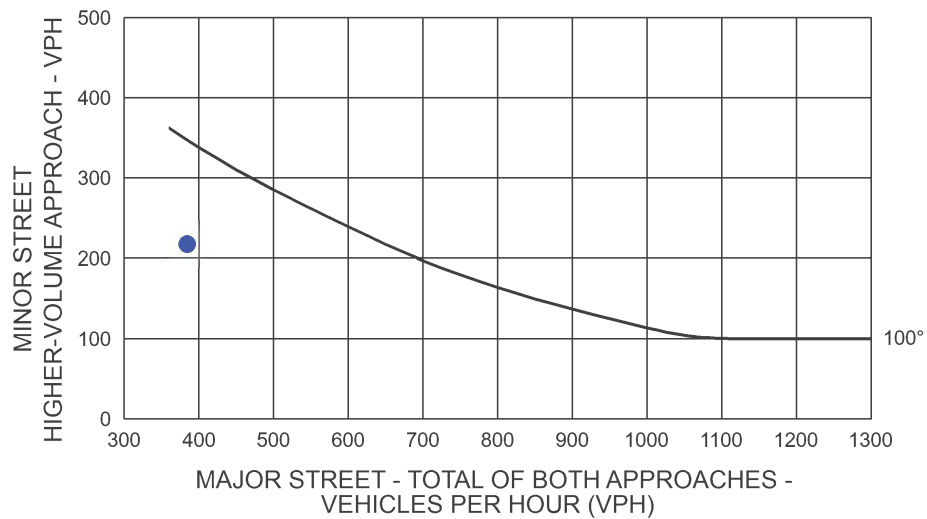
Rural Peak Hour Signal Warrant

Intersection Does Not Meet Signal Warrant

Scenario: AM Future+Project
Intersection #: 3



Major Total: 384
Minor High Volume: 217

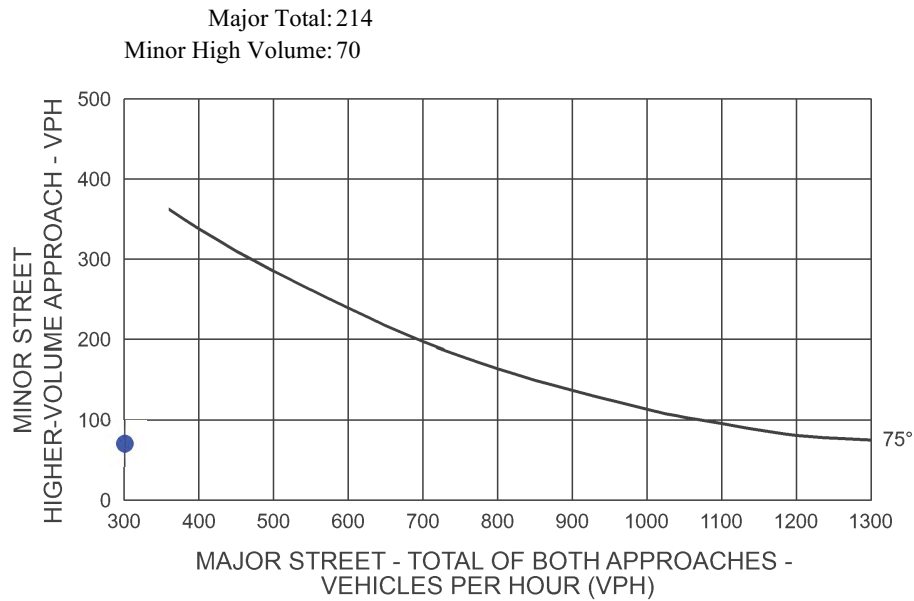
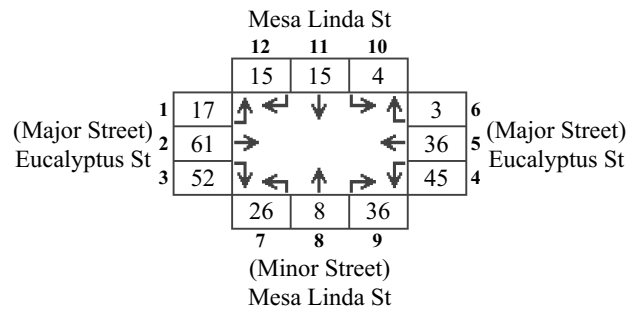


Intersection 4
SR 395 & Eucalyptus St

Intersection 5
Mesa Linda St & Eucalyptus St

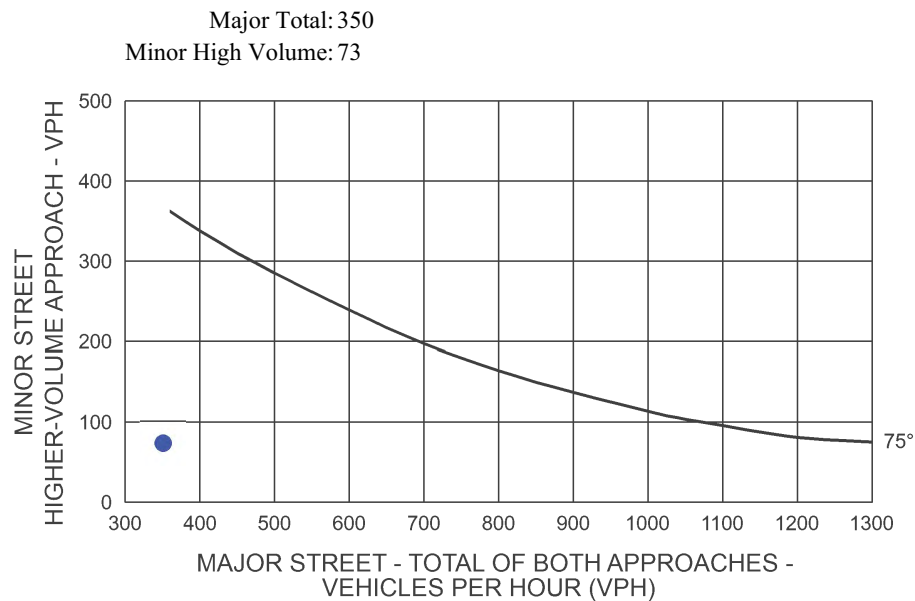
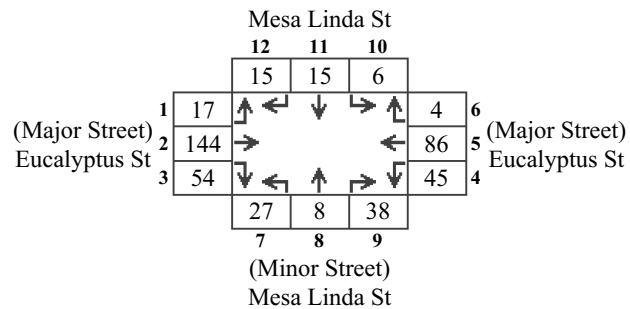
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Scenario: PM Existing
Intersection #: 5



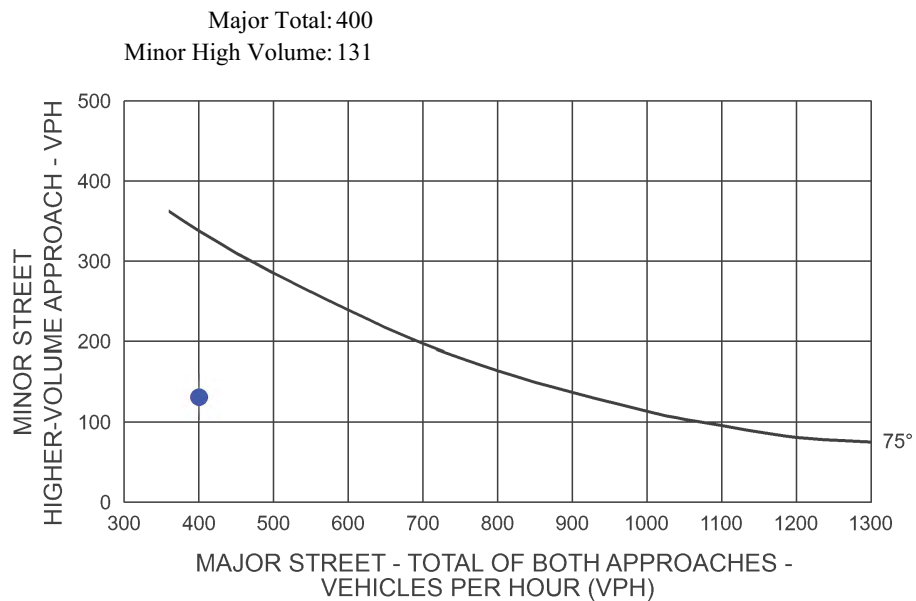
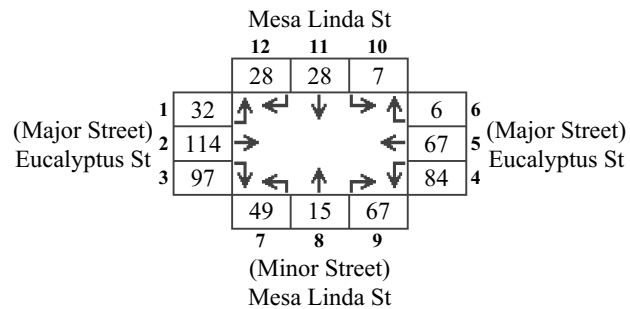
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Scenario: PM Existing+Project
Intersection #:5



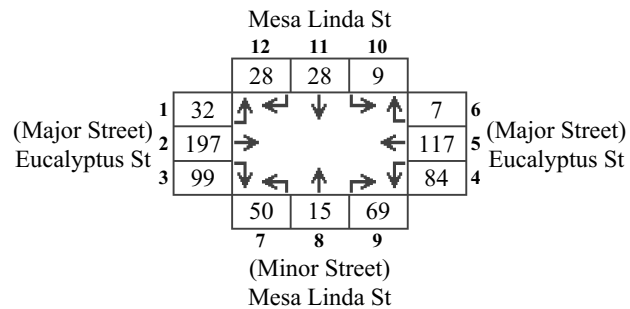
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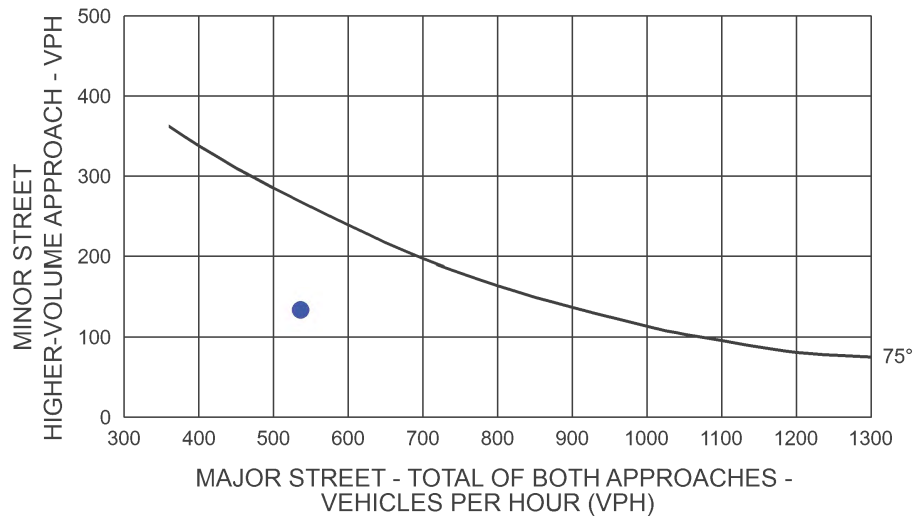


Rural Peak Hour Signal Warrant Intersection Does Not Meet Signal Warrant

Scenario: PM Future+Project
Intersection #: 5

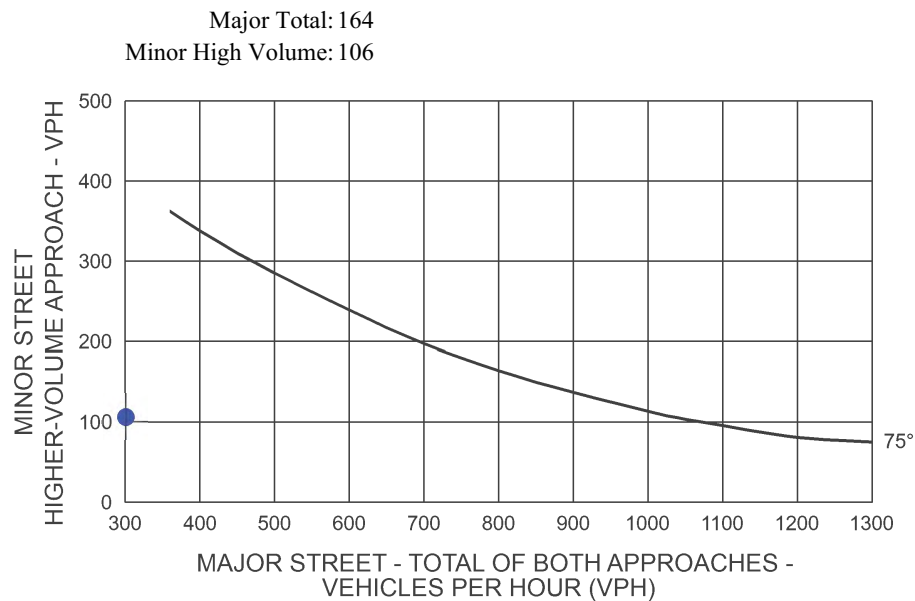
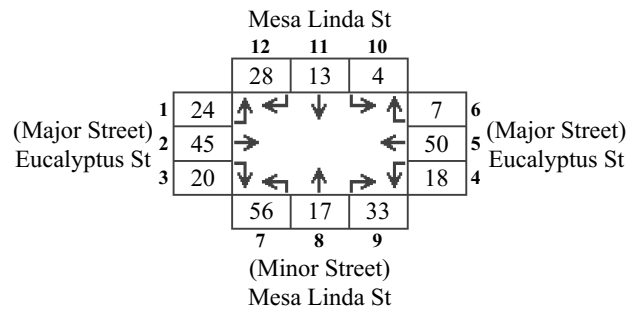


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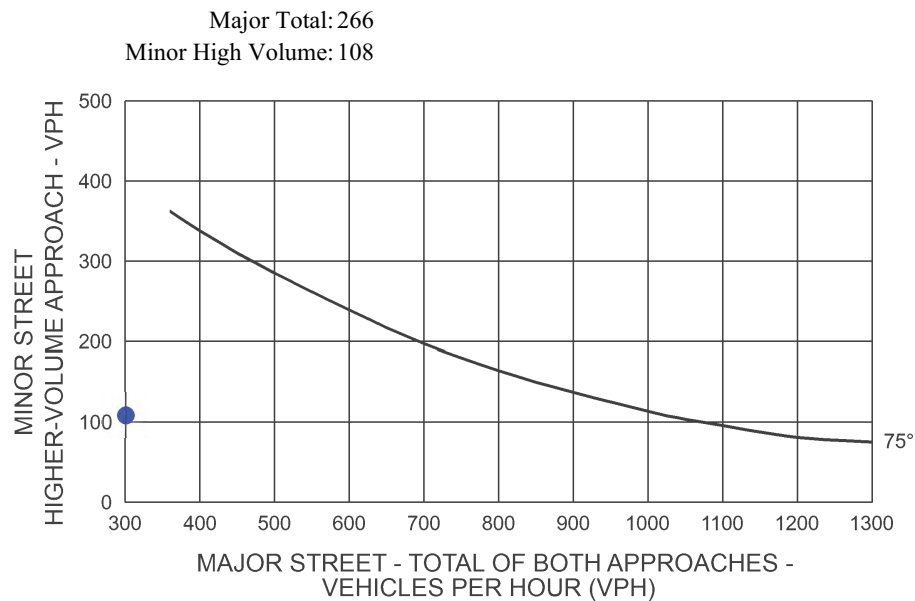
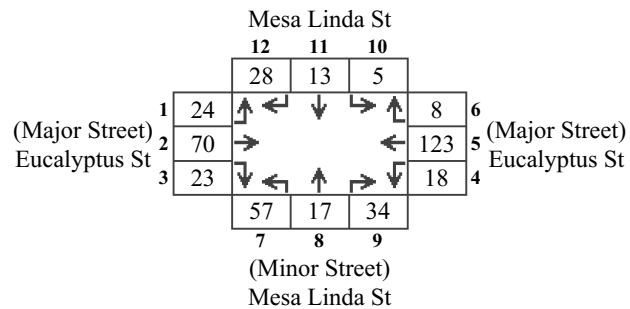
Rural Peak Hour Signal Warrant Intersection Does Not Meet Signal Warrant

Scenario: AM Existing
Intersection #: 5



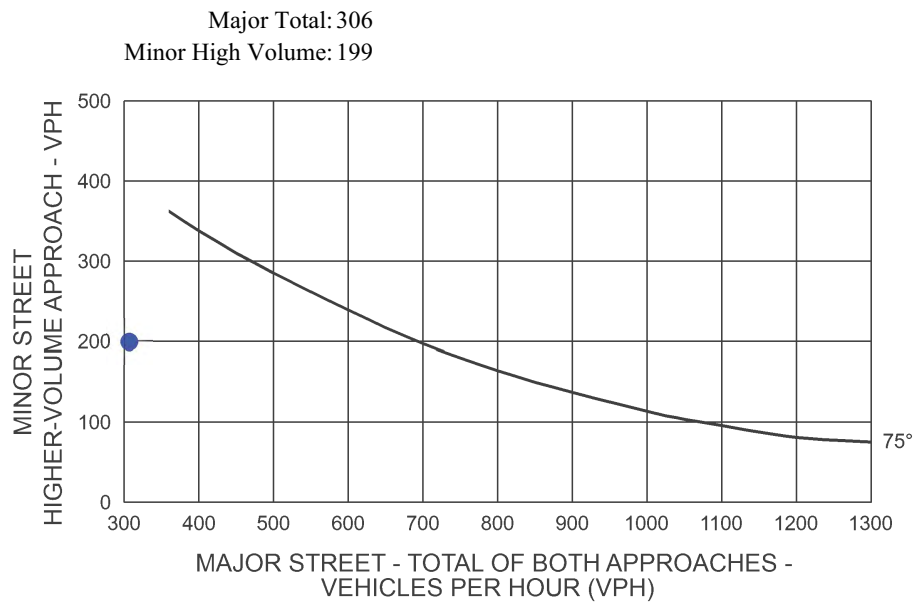
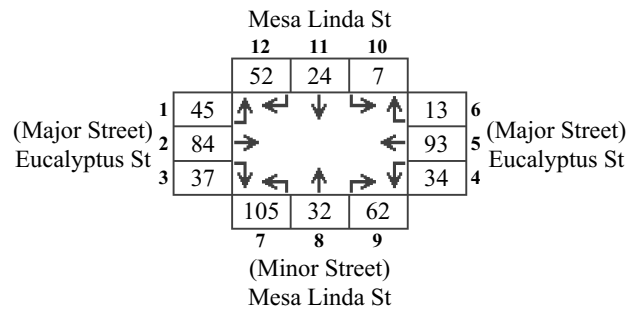
Rural Peak Hour Signal Warrant Intersection Does Not Meet Signal Warrant

Scenario: AM Existing+Project
Intersection #: 5



Rural Peak Hour Signal Warrant Intersection Does Not Meet Signal Warrant

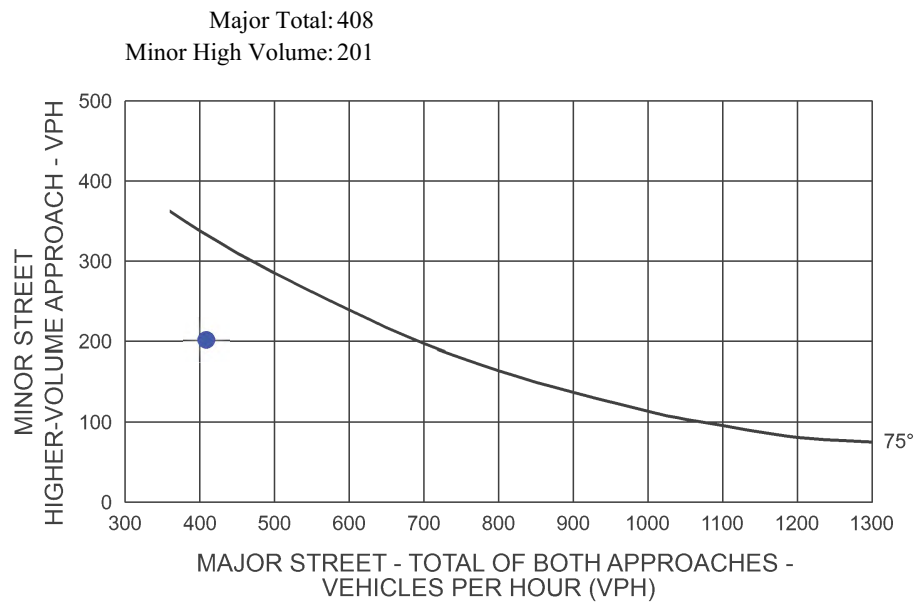
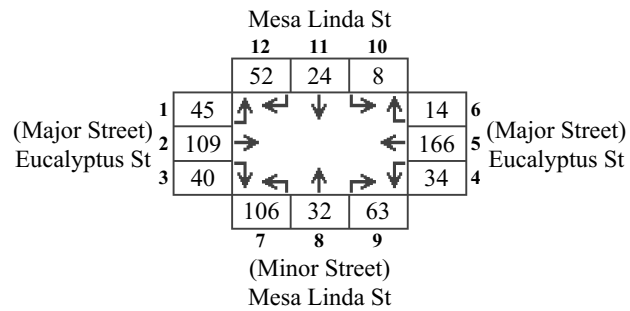
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Rural Peak Hour Signal Warrant

Intersection Does Not Meet Signal Warrant

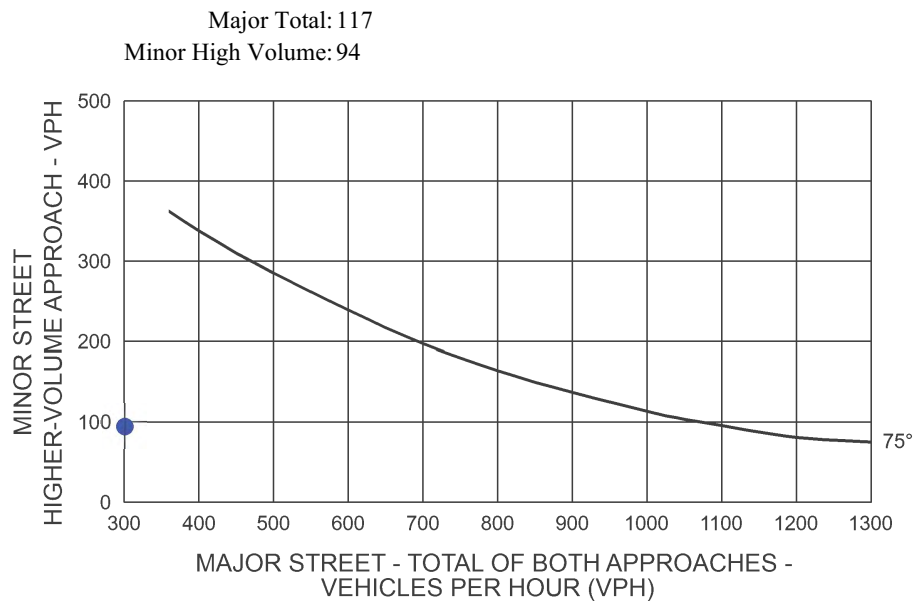
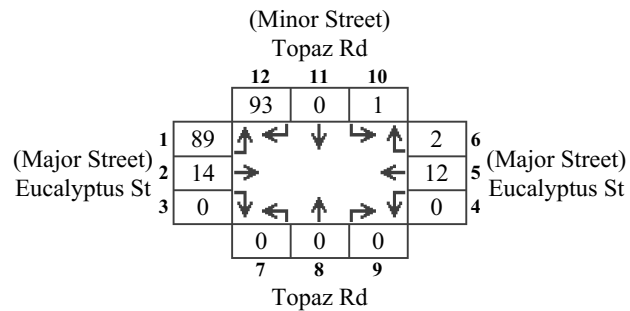
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Intersection 6 Topaz Rd & Eucalyptus St

Rural Peak Hour Signal Warrant Intersection Does Not Meet Signal Warrant

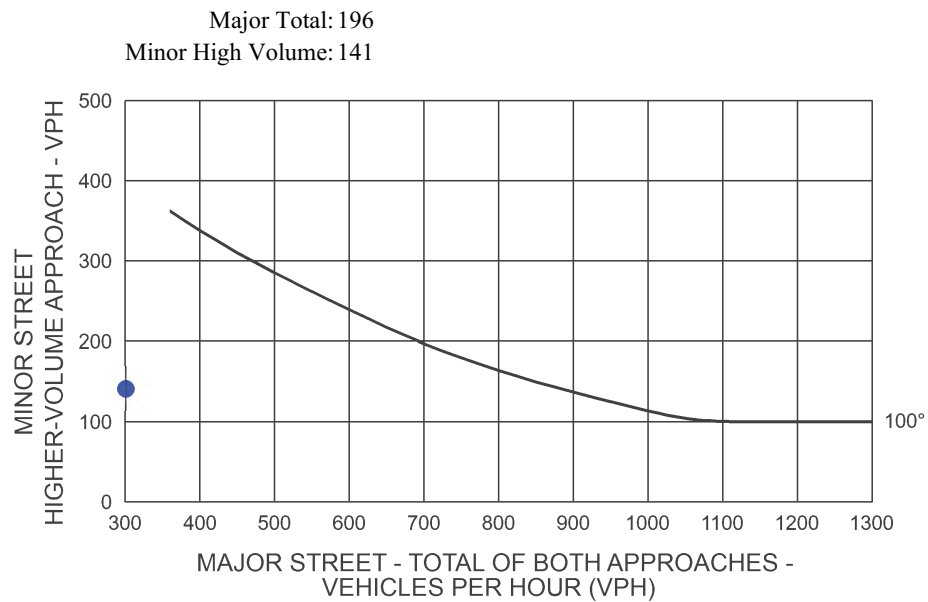
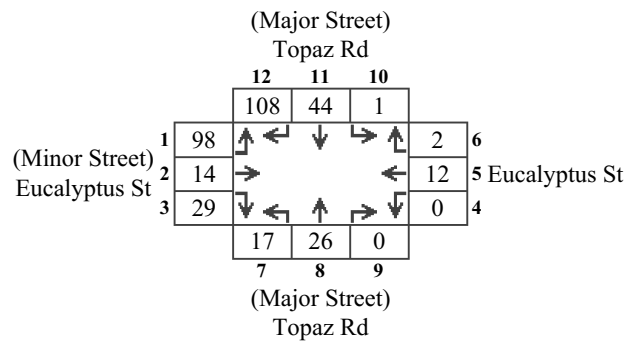
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Intersection #: 6



Rural Peak Hour Signal Warrant

Intersection Does Not Meet Signal Warrant

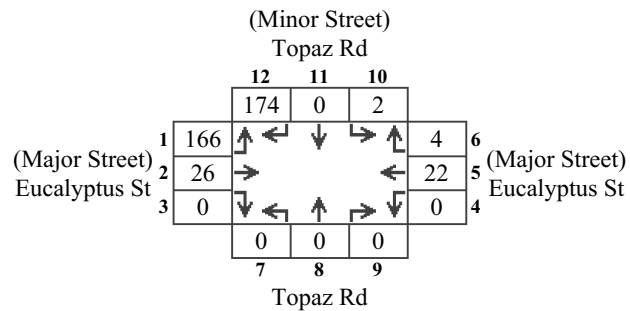
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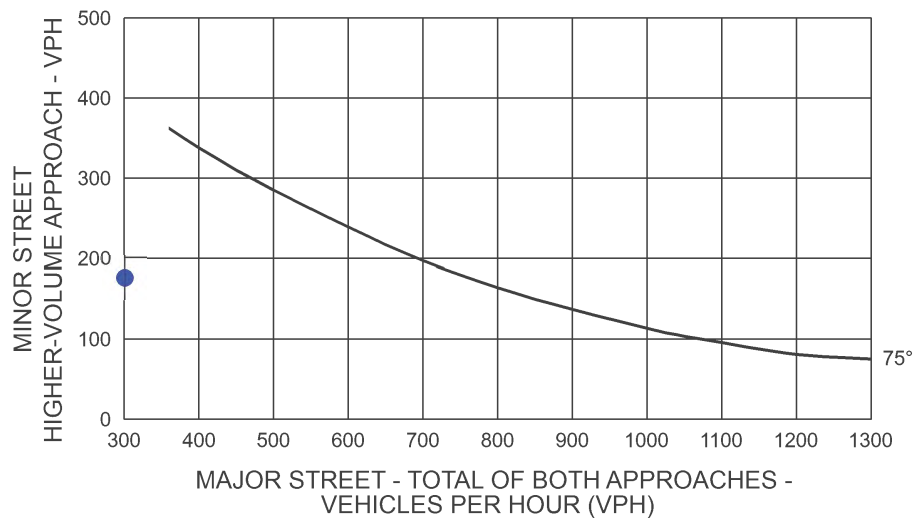
Rural Peak Hour Signal Warrant

Intersection Does Not Meet Signal Warrant

Scenario: PM Future
Intersection #: 6



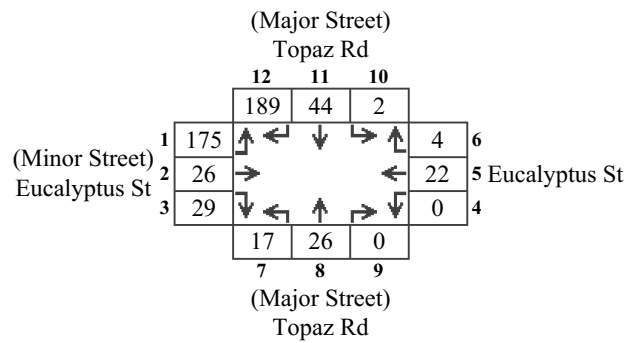
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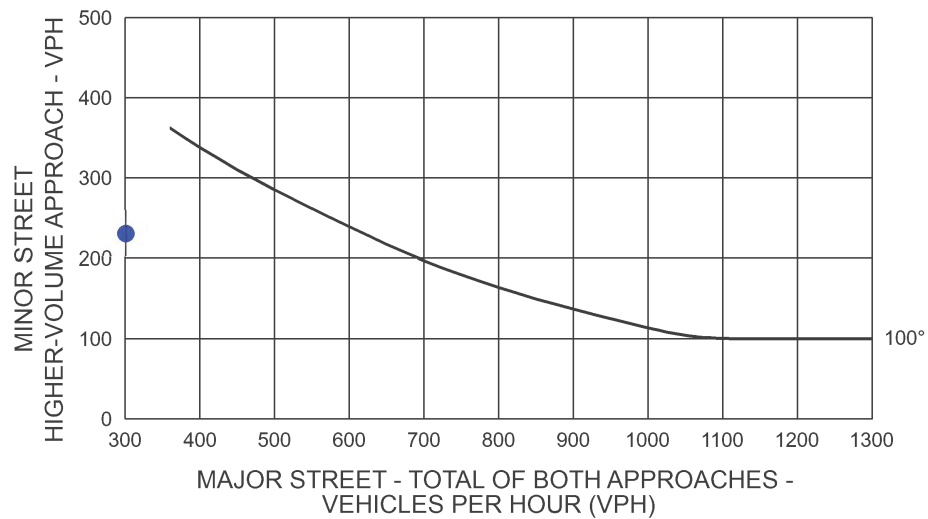
Rural Peak Hour Signal Warrant

Intersection Does Not Meet Signal Warrant

Scenario: PM Future+Project
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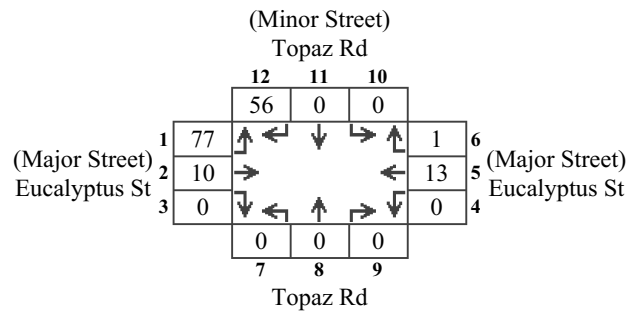


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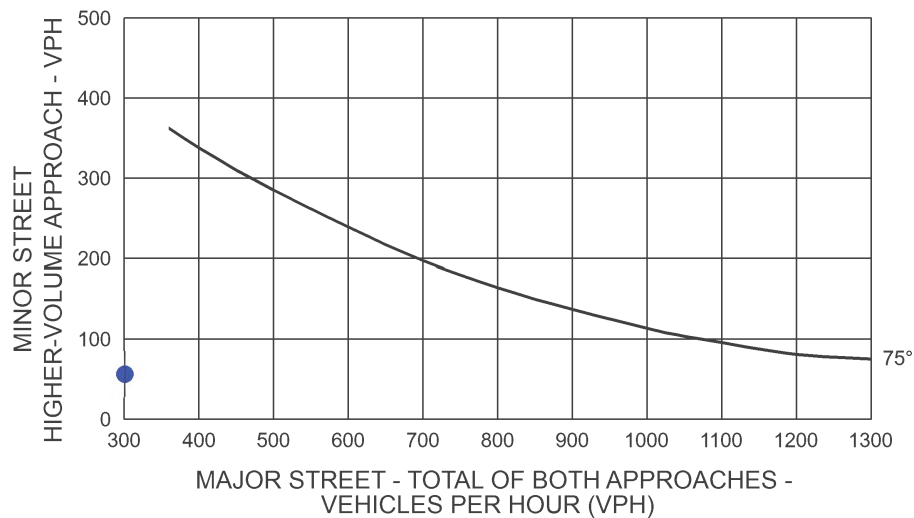


Rural Peak Hour Signal Warrant Intersection Does Not Meet Signal Warrant

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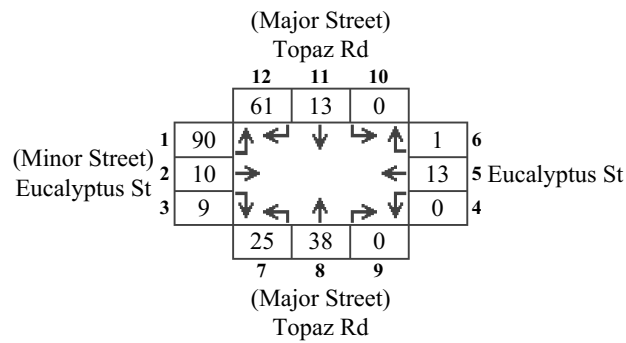
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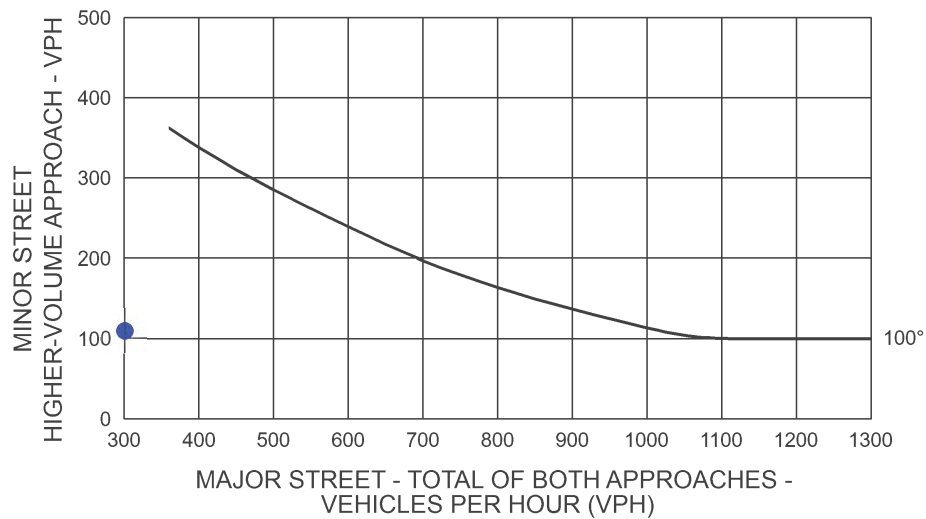
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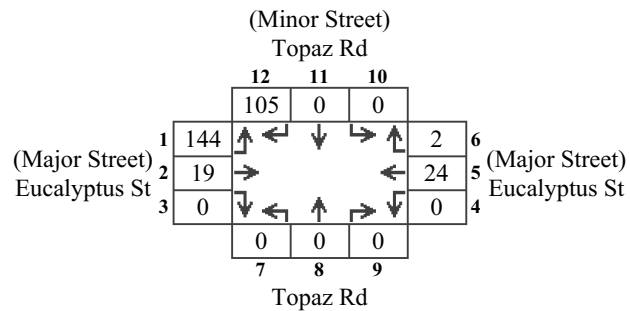


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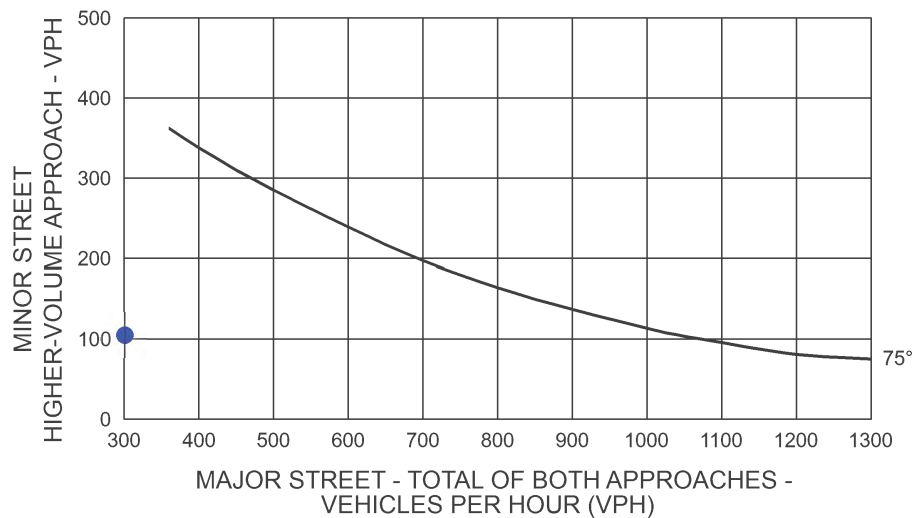


Rural Peak Hour Signal Warrant Intersection Does Not Meet Signal Warrant

Scenario: AM Future
Intersection #: 6



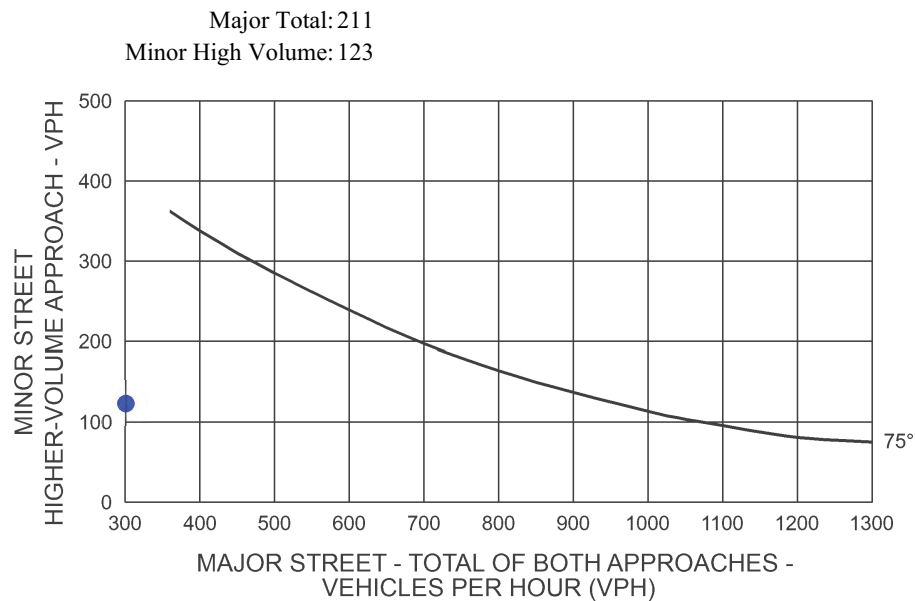
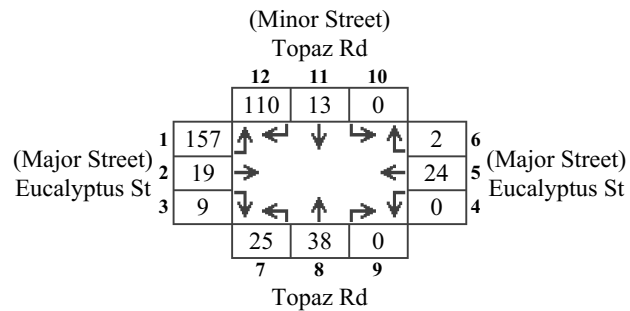
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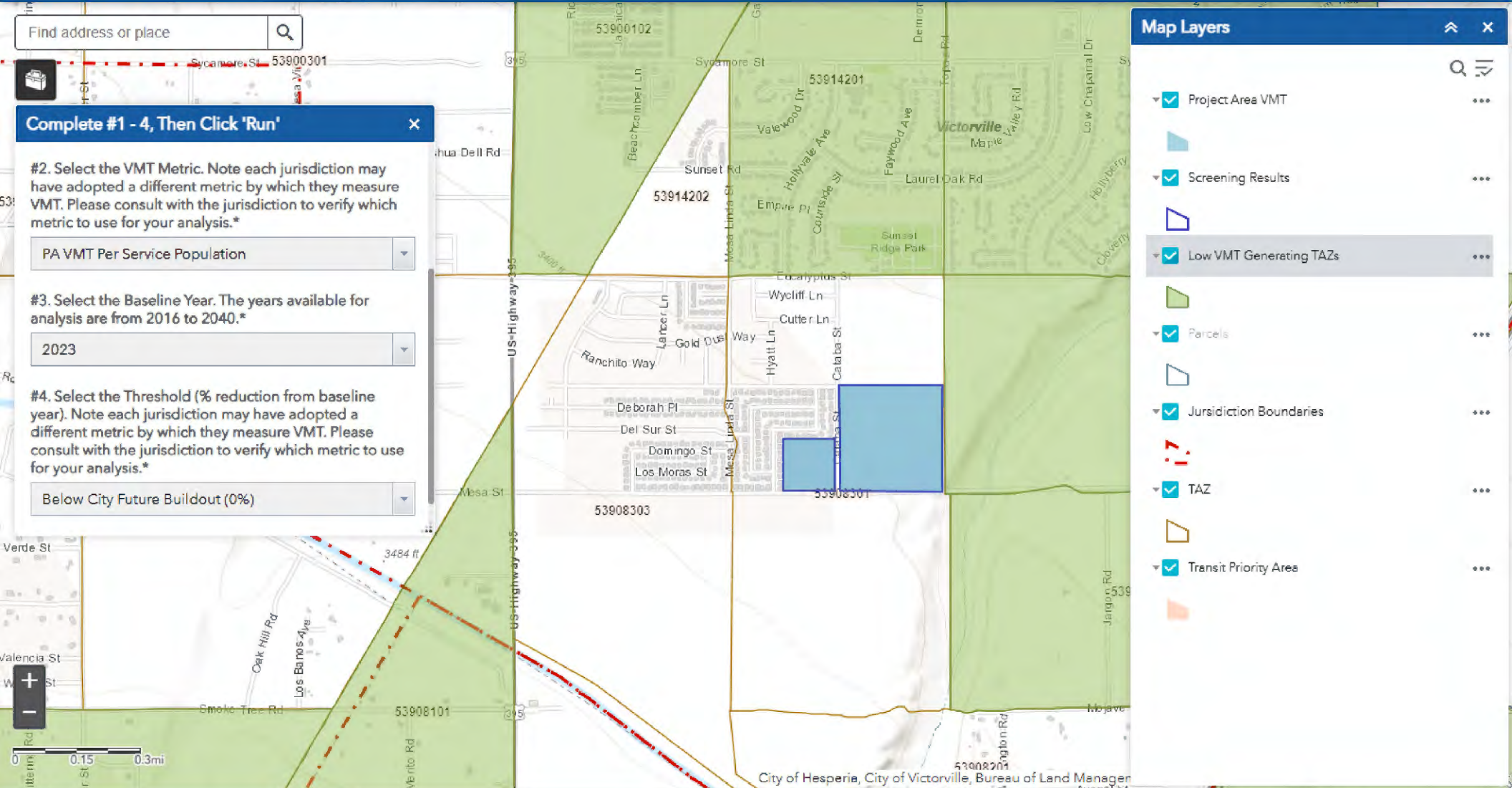


Rural Peak Hour Signal Warrant

Intersection Does Not Meet Signal Warrant

Scenario: AM Future+Project
Intersection #: 6





MEMORANDUM

DATE: August 07, 2023

To: Linda J Hakimi, P.E.

FROM: Ambarish Mukherjee, P.E., AICP

SUBJECT: TTM 20576 Residential Project Vehicle Miles Traveled Analysis Memorandum

LSA has prepared this Vehicle Miles Traveled (VMT) Analysis Memorandum (Memo) for the proposed TTM 20576 Residential development (project) located at the northwest corner of Topaz Road and Mesa Street in the City of Victorville (City). The project proposes to develop 246 single family dwelling units.

BACKGROUND

On December 28, 2018, the California Office of Administrative Law cleared the revised California Environmental Quality Act (CEQA) guidelines for use. Among the changes to the guidelines was removal of vehicle delay and level of service from consideration under CEQA. With the adopted guidelines, transportation impacts are to be evaluated based on a project generated VMT.

The City adopted its VMT guidelines (guidelines) through Resolution No. 20-031 "A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF VICTORVILLE CITY COUNCIL ADOPTING LOCAL GUIDELINES FOR VEHICLE MILES TRAVELED(VMT) THRESHOLDS OF SIGNIFICANCE FOR PURPOSES OF ANALYZING TRANSPORTATION IMPACTS UNDER 'THE CALIFORNIA ENVIRONMENTAL QUALITYACT(CEQA)", June 23, 2020. The resolution contains the VMT analysis methodologies for non-screened development. Additionally, the City recommended using the screening criterion from the guidelines to determine whether a project could be screened out from a detailed VMT analysis.

Project Screening Determination

The guidelines provide multiple screening criteria for land use projects based on project trip generation and project land use type. The project was compared with the screening criteria established guidelines to check if the project can be screened out. Following is a brief description about the project in relation with the project screening criteria:

- **Daily Vehicle Trip thresholds:** The guidelines established 1,285 or less weekday daily trips as the screening threshold. Therefore, if the project trip generation is less than 1,285 daily trips based on the Institute of Transportation Engineers (ITE) Trip Generation Manual, latest edition, the project can be screened out of a detailed VMT analysis. Based on ITE trip generation manual 11th edition, the project generates 2,320 daily trips (ITE LU 210) which is greater than 1,285 and therefore the project cannot be screened out using this criteria.

- **Land Use Types:** The guidelines identify land uses/land use types that can be screened out of a detailed VMT analysis. The project land use doesn't meet any screening criteria under this category. Therefore, the project cannot be screened out of a detailed VMT analysis.

As such, the project could not be screened out of VMT analysis. Therefore, a detailed VMT analysis was conducted to assess the project's VMT impact.

Detailed VMT Analysis Methodology

The detailed VMT analysis was conducted using the San Bernardino Traffic Analysis Model (SBTAM). Additionally, as recommended in the city's guidelines, VMT per service population (population + employment) metric was used for this analysis. As included in the guidelines, project generated VMT impact needs to be evaluated by comparing project generated VMT per service population with the City's General Plan Buildout VMT per service population. The guidelines recommend use of Production/Attraction (PA) VMT per service population for projects with single land use type and use of Origin/Destination (OD) VMT per service population for projects with mixed land use types. The project consists of single land use type (residential) and therefore PA VMT per service population was used to estimate project VMT impact. The City's General Plan Buildout scenario VMT per service population was estimated using LSA's "no project" model run using the same methodology as the project VMT per service population.

Project's effect on VMT needs to be determined by comparing the citywide VMT per service population for baseline plus project scenario with corresponding no project scenario metric. The following is a detailed description of the VMT analysis:

Project Traffic Analysis Zone Update

The first step in preparation of this analysis was to update the traffic analysis zone (TAZ) in the model that includes the project area. Since, SBTAM does not allow addition of new TAZs, non-project related land use for the project location TAZ was moved to an adjacent TAZ and the project land use was added in this TAZ. The project TAZ was utilized to calculate project specific VMT per service population. Project land uses were converted into model socioeconomic data for inclusion in the travel model TAZ.

Model Runs and Project VMT Estimation

Model runs were conducted for this updated with project model scenarios after incorporating the project land use as described above. Project VMT was estimated from SBTAM model runs using production-attraction trip matrices and by multiplying them with the final assignment skim matrices. The extracted project VMT was divided by the estimated project service population to develop the project VMT per service population.

VMT Analysis

Project VMT Impact

Table A summarizes the project and city's threshold VMT per service population for the base year. As shown in Table A, the project's VMT per service population is 1.9 percent lower than the city's

threshold. Therefore, based on the guidelines, the project will not have a significant VMT impact for the base year.

Detailed VMT calculation for the project is included in Appendix A.

Table A: Base Year Project and Threshold VMT per Service Population

VMT Metric	2016 TTM 20576 (Project)	City of Victorville General Plan Buildout (Threshold) *	Difference	% Difference
PA VMT per service population	25.8	26.3	-0.5	-1.9%

* Estimated using "No project" SBTAM base year (2040) model runs

Project's Effect on VMT

Table B summarizes the base year no project and with project citywide roadway VMT per service population. As shown in Table B, the with project citywide roadway VMT per service population is 0.7 percent lower than the no project metric. As such, the project's effect on VMT for the base year is less than significant.

Detailed VMT calculation for the project is included in Appendix A.

Table B: Base Year (2016) Citywide Roadway VMT per Service Population

2016	With Project	No Project	Difference	% Difference
City of Victorville	13.9	14.0	-0.1	-0.7%

Conclusion

Based on the VMT analysis as shown in above tables A and B, the project doesn't constitute a significant impact for both "project generated VMT" and "project's effect on VMT."

ATTACHMENTS

Appendix A: VMT Calculation Worksheet



Appendix A - VMT Calculation Worksheet

TTM 20576, City of Victorville - VMT Analysis

Project generated VMT

	2016 TTM 20576 (Project)	City of Victorville General Plan Buildout (Threshold) *
Population	1,087	174,718
Employment	-	50,493
Service Population	1,087	225,211
PA VMT	28,083	5,931,988
PA VMT per service population	25.8	26.3

* Estimated using "No project" SBTAM base year (2040) model run

Project's effect on VMT (roadway VMT) - Within City of Victorville

2016	With Project	Without Project
Roadway VMT	2,260,258	2,260,039
Service population	162,042	160,955
VMT per service population	13.9	14.0

PRELIMINARY GEOTECHNICAL ENGINEERING REPORT

**Prepared For
Rodeo Credit Enterprises, LLC**

**Tentative Tract 20576
Vicinity of Cataba Street and Mesa Street, Victorville
San Bernardino County, California
APN 3136-441-01, 02 & 3136-411-04, 05**

**Job No.: 24-108
March 28, 2024**



**BRUIN GEOTECHNICAL SERVICES, INC.
44732 Yucca Avenue
Lancaster, California 93534
www.bruingsi.net**



**SOIL AND MATERIAL
TESTING AND INSPECTIONS**

March 28, 2024

Job No.: 24-108

Mr. Tim Roofian
Rodeo Credit Enterprises, LLC
26415 Carl Boyer Drive, Suite 220
Santa Clarita, CA 91350

Subject: Preliminary Geotechnical Engineering Report for TTM 20576 – Tentative Tract 20576 in the Vicinity of Cataba Street and Mesa Street, Victorville, San Bernardino County, California, APN 3136-441-01, 02 & 3136-411-04, 05

Dear Mr. Roofian:

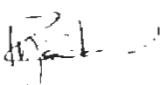
Presented herewith in is our Geotechnical Engineering Report for the subject project. Our work was performed in accordance with the scope of work outlined in our original proposal dated January 23, 2024.

This report presents the results of our field investigation, laboratory testing, along with our engineering judgment, opinions, conclusions, and recommendations pertaining to the proposed development.

It has been a pleasure to be of service to you on this project. Should you have any questions regarding the contents of this report, or should you require additional information, please contact the undersigned at (661) 273-9078.

Respectfully submitted,

BRUIN GEOTECHNICAL SERVICES, INC.


Ryan D. Duke, P.E.
RDD/mes



BRUIN GEOTECHNICAL SERVICES, INC.

44732 Yucca Avenue
Tel (661) 273-9078

Lancaster, California 93534
www.bruingsi.net



SOIL AND MATERIAL TESTING AND INSPECTIONS

March 28, 2024

Job No.: 24-108

EXECUTIVE SUMMARY

There appear to be no significant geotechnical constraints on-site that cannot be mitigated by our recommendations, the proposed planning, design, and utilization of sound construction practices.

Based on our geotechnical investigation of the subject site, the information obtained from our subsurface exploration, and review of available reports and literature, it is our professional opinion that the proposed development is feasible at the site provided that the geotechnical engineering recommendations contained in this report are implemented in the design and construction of the project.

The following key elements should be noted from this investigation:

- The subject site is located within the seismically active Southern California area. As such, the proposed development shall be designed in accordance with seismic considerations specified in the 2022 California Building Code (CBC) and the County requirements.
- The Limitations and Uniformity of Conditions Section should be read for an understanding of the report limitations.

This Executive Summary should be used in conjunction with the entire report for design and/or construction purposes. It should be recognized that specific details were not included or fully developed in this summary, and the report must be read in its entirety for a complete interpretation of the items contained herein.

BRUIN GEOTECHNICAL SERVICES, INC.

44732 Yucca Avenue
Tel (661) 273-9078

Lancaster, California 93534
www.bruingsi.net

SUMMARY OF PRELIMINARY RECOMMENDATIONS

DESIGN ITEM	RECOMMENDATIONS
<u>REMEDIAL GRADING</u>	
Structure Over-Excavation	60" below existing or finish grade, whichever is lower
Scarification	12" compacted at 90%
Horizontal Limits	5 feet beyond foundation perimeter
Traffic Pavement Concrete (Driveway)	Scarify 12" compacted to 95%
Exterior Non-Traffic Bearing Concrete Flatwork	Scarify 12" compacted to 90%
Native Soil Shrinkage	8-13%
<u>PERIMETER (CONTINUOUS) FOUNDATION DESIGN VALUES</u>	
Allowable Net Bearing Capacity	1,500 psf
Width	Minimum 15 inches
Embedment (Single-Story)	Minimum 24 inches below lowest adjacent soil elevation
Reinforcement	Minimum four No. 4 bars, two top and two bottom
<u>ISOLATED (COLUMN/PIER) FOUNDATION DESIGN VALUES</u>	
Allowable Net Bearing Capacity	1,800 psf
Width	Minimum 24 inches square
Embedment (Single-Story)	Minimum 24 inches below lowest adjacent soil elevation
Reinforcement	No. 4 mat, one top and one bottom
<u>LATERAL LOAD RESISTANCE</u>	
Allowable Passive Pressure	300 psf per foot
Coefficient of Friction	0.32
<u>SOIL EXPANSION</u>	
Expansion Index	0
Classification	Very Low
<u>LATERAL EARTH PRESSURES</u>	
Active (Well-Drained Soil)	38 psf
At Rest (Restrained Wall)	60 psf
<u>CORROSION AND CHEMICAL ATTACK</u>	
Soil Resistivity	9,000 ohm-cm
Sulfate Attack Potential	0.0106% (Negligible)
<u>INTERIOR SLAB-ON-GRADE</u>	
Thickness	Minimum 4" thick over 36" of compacted soil
Reinforcement	No. 4 bars, 16" on-center both ways
Vapor Barrier	Min. 15 mil.

BRUIN GEOTECHNICAL SERVICES, INC.

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GEOTECHNICAL ENGINEERING REPORT

TABLE OF CONTENTS

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3.0	PROPOSED GRADING AND CONSTRUCTION.....	2
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PRELIMINARY GEOTECHNICAL ENGINEERING REPORT
TENTATIVE TRACT MAP 20576
65.5 - ACRE RESIDENTIAL SUBDIVISION
VICINITY OF CATABA STREET AND MESA STREET, VICTORVILLE
SAN BERNARDINO COUNTY, CALIFORNIA
APN 3136-441-01, 02 & 3136-411-04, 05

1.0 INTRODUCTION

This report presents the results of our preliminary geotechnical investigation performed by Bruin Geotechnical Services, Inc. for the proposed residential development at the subject site based on discussions and preliminary site plans provided by the client. This report is specific to the proposed development.

The purpose of this investigation was to evaluate the on-site subsurface soil conditions relative to geotechnical engineering characteristics and to provide preliminary geotechnical recommendations relative to proposed residential development.

The scope of the authorized geotechnical investigation included the following tasks:

- Performing a site reconnaissance
- Conducting a limited field subsurface exploration through soil borings and sampling
- Laboratory testing program of selected soil samples
- Performing engineering analyses of the data
- Preparing this preliminary Geotechnical Engineering Report

This study also includes a review of published and unpublished literature and geotechnical maps with respect to active and potentially active faults located in proximity to the site which may have impact on the seismic design of the proposed structure.

2.0 SITE LOCATION AND DESCRIPTION

The subject site, herein after referred to as Site, is located at the vicinity of Cataba Street and Mesa Street, in the city of Victorville, San Bernardino County, California. The irregular-shaped parcel consists of approximately 65.5 acres total. The site is located in a developed residential area with single family residences in the parcels to the west, vacant land to the north, east, and south.

At the time of our investigation, the subject site was vacant. The site vegetation consisted low annual weeds and shrubs. The topography of the site is relatively flat with an approximate one (1) percent slope down toward the northeast. The elevation of the Site is approximately 3,400 feet above mean sea level. The aforementioned site description is

intended to be illustrative and is specifically not intended for use as a legal description of the Site.

Access to the Site is from either Mesa Street or Cataba Street, both of which are a paved roads.

The general location of the subject site is shown on Figure 1.

3.0 PROPOSED GRADING AND CONSTRUCTION

Based on our review of the preliminary site plans and discussions, Bruin GSI understands that Tentative Tract 20576 will be subdivided into 253 lots, with 242 residential lots, 4 open space lots, 6 Landscape Maintenance Assessment District (LMAD) lots, and one lot for a proposed retention basin. The structures are anticipated to be one or two-story single-family residences. We anticipate typical wood- or light gauge steel stud framing, with stucco and other light material finishes with conventional concrete continuous and isolated foundations and slab-on-grade floors. No basements are planned. We anticipate maximum structural loads of 1,800 pounds per lineal foot and 50 kips for isolated foundations.

Exterior improvements are anticipated to include paved streets, underground utilities, concrete flatwork (sidewalks, driveways, etc.), and landscape and hardscape areas. It is anticipated that the drainage will consist of sloped surfaces to drainage swales to curbs and gutters flowing to an approved area. The proposed structures will be connected to a public sewer system and existing utilities lines from the street.

No grading plans were available at the writing of this report. However, due to the relatively flat topography, it appears the proposed earthwork will consist of conventional cut and fill methods to grade the Site, with anticipated maximum slope heights of approximately one to three (1-3) feet to achieve design grades.

4.0 GEOTECHNICAL INVESTIGATION

The geotechnical investigation included a field subsurface exploration program and a laboratory testing program on soil samples collected. These programs were performed in accordance with our proposal for Preliminary Geotechnical Engineering Report dated January 23, 2024. The scope of work did not include environmental assessment or investigation for the presence or absence of hazardous substances or toxic materials in structures, soil, surface water, groundwater, or air, below or around the site. The field subsurface exploration and laboratory testing programs are described below.

4.1 Field Exploration Program

A site reconnaissance was made by our representative prior to instigating the field exploration program. The Site was observed, and boundaries roughly located for purposes of underground utility locating. As required by law, Bruin GSI contacted Underground Service Alert (one-call notification service) to attain underground utility marking and clearance, a minimum of 72 hours prior to performing the field subsurface investigation.

The field exploration program was initiated on February 22, 2024, under the technical supervision of our engineer. A total of eight (8) exploratory borings were drilled using a CME 75 drill rig with eight (8) inch hollow stem auger in accordance with generally accepted geotechnical exploration procedures (ASTM D 1452). The borings were advanced to maximum depths of fifty (50) feet below ground surface (bgs). The approximate locations of the borings within the area of the proposed construction were determined by sighting and pacing from existing site improvements, such as streets, and should be only considered accurate to the degree implied by the method used. The borings locations are shown on Figure 2.

Soil samples were obtained at various depth intervals, consisting of relatively undisturbed brass ring samples (Modified California split-spoon sampler) and Standard Penetration Test (SPT) samples driven by a 140-pound hammer falling 30 inches. After seating of the sampler, the number of blows required to drive the sampler one foot was recorded in six (6) inch increments, in general accordance with procedures presented in ASTM D 1586.

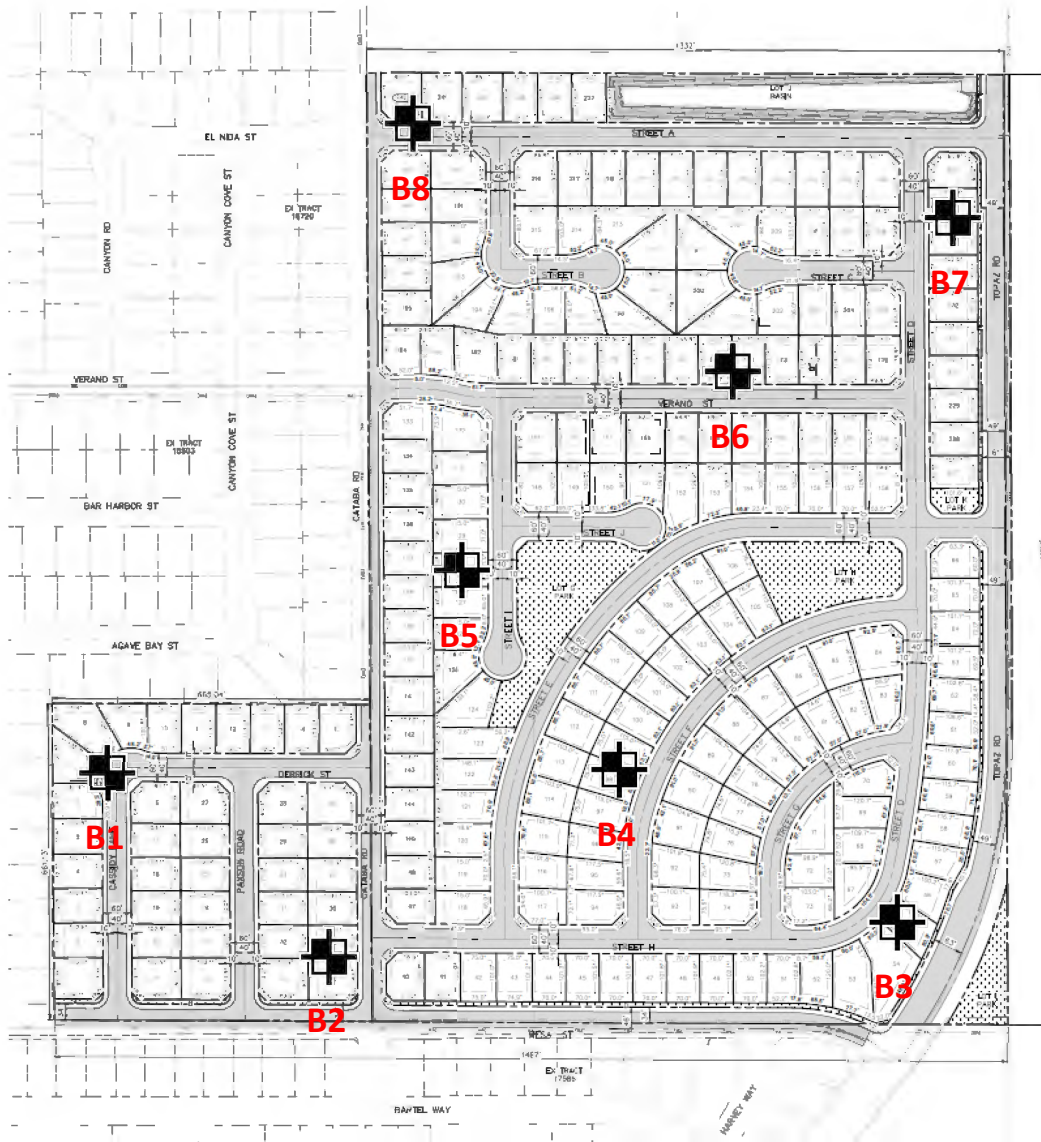
Bulk samples were also collected at various depths from auger cuttings during drilling and represent a mixture of soils within the noted depths. The soil samples were returned to the laboratory for analysis and testing.

Final boring logs presented in Appendix A are Bruin GSI's interpretation of the field logs prepared by our representative during drilling, as well as laboratory test results. The stratification lines represent approximate boundaries between soil types. The actual soil transitions may be gradual.

4.2 Site and Subsurface Conditions

Native alluvial materials were encountered within all our exploratory borings. The soil strata encountered consisted of interbedded layers of silty sand (SM) poorly graded sands (SP) and occasional sandy silt (ML). The native materials were noted to be dry to moist, and loose to dense. For more detailed descriptions of the subsurface materials refer to the boring logs in Appendix A.

N.T.S.



B1

= Denotes Approximate Boring Location



Project:

Proposed 70 - Acre Residential Subdivision
Vicinity of Cataba Street and Mesa Street, Victorville
San Bernardino County, California
APN 3136-441-01, 02 & 3136-411-04, 05

Job Number:

24-108

Figure 2

4.3 Groundwater Conditions

Groundwater was not encountered in any of our exploratory trenches, at least to the maximum depth explored (50 feet bgs). Bruin GSI reviewed available reports and electronic data bases to assess historic water level conditions in the vicinity of the Site. Sources reviewed included the historically highest groundwater contours prepared by State of California Department of Water Resources SGMA electronic database, historically highest groundwater levels in the immediate site vicinity indicate that groundwater level at the site are over 50 feet bgs. Based on this information, groundwater is not a design factor for this project.

4.4 Laboratory Testing

The field boring logs and soil samples were reviewed to assess which samples would be analyzed further. The selected soil samples collected during drilling activities at the Site were then tested in the laboratory to assist in evaluating engineering properties of subsurface materials deemed within structural influence.

The soil samples were classified in accordance with the Unified Soils Classification System and a testing program was established. The samples were tested to determine the following:

- In-situ moisture and dry unit weight determinations were determined in accordance with ASTM D 2937.
- Relative strength characteristics were estimated from results of direct shear tests (ASTM D 3080) performed on bulk soil samples remolded to approximately 90% of the maximum dry density as determined by ASTM D 1557 test method.
- Consolidation potential was determined on select soil samples in accordance with ASTM D 2435.
- Soil chemical analysis on a soil sample from the site was performed by Anaheim Test Lab, which included pH, resistivity, soluble sulfates and soluble chlorides as well as other chemical contents.

The following additional tests were performed:

- | | |
|---|-------------|
| • Identification of soils | ASTM D 2488 |
| • Expansion Index | ASTM D 4829 |
| • Maximum density – Optimum moisture | ASTM D 1557 |
| • Material Finer than the No. 200 Sieve | ASTM D 1140 |
| • Sand Equivalent Value | ASTM D 2419 |

Pertinent tabular and graphic test results are presented in Appendix B.

4.5 Soil Engineering Properties

Physical tests were performed on the bulk and relatively undisturbed samples to characterize the engineering properties of the native soils.

Moisture content and dry unit weight determinations were performed on samples to evaluate the in-situ unit weights of the different materials. Moisture contents were generally two to eight (2-8) percent. In-place dry densities ranged generally 97 pounds per cubic foot (pcf) to 124 pcf. Moisture content and dry unit weight results are shown on the excavation logs in Appendix A.

The expansion index tests (ASTM D 4829) indicate that the surficial soils are within the "very low" expansion category.

Consolidation test results reveal that some samples tested in the upper four to seven feet (4-7) feet of soil has a slight to moderate potential to hydro-consolidate.

5.0 REGIONAL GEOLOGY AND SEISMIC HAZARDS

The project site is located in the City of Victorville.

The Mojave River Watershed is divided into five sub-basins based on hydrologic features (see Fig. 1.) The USGS Report 95-4189 identified these sub-basins as: (1) Headwaters - tributaries above the Mojave Forks Dam; (2) Upper Basin - Mojave Forks Dam to the Lower Narrows at Victorville; (3) Middle Basin - Lower Narrows to the Waterman Fault at Barstow; (4) Lower Basin - Waterman Fault to Afton Canyon; and (5) Tailwater - Afton Canyon to Silver Lake. The sub-basins include an aquifer system consisting of two interconnected aquifers - floodplain aquifer and regional aquifer. The floodplain aquifer is composed of sand and gravel, which is as much as 250 feet thick, and generally follows the surface expression of the Mojave River. The regional aquifer, which is composed of sand, silt and clay, generally underlies and surrounds the floodplain aquifer.

No known active faults have been mapped across the subject site. The potential hazards due to active fault ground rupture are considered minimal. According to current publications by the State of California, the project site is not located within the Alquist-Priolo special studies zone.

5.1 CBC Design Parameters

The following coefficients have been estimated in accordance with the requirements of the 2022 CBC, utilizing the Structural Engineers Association of California and California's Office of Statewide Health Planning and Development Seismic Design Maps Application:

<https://seismicmaps.org/>

The following seismic parameters are provided, based on the approximate latitude and longitude at the southwest corner of the subject site:

Latitude	34.44944264°	
Longitude	-117.38432069°	
Spectral Response Acceleration, Short Period) - S_s	1.427g	0.2(sec)
Spectral Response Acceleration at 1 sec. - S_1	0.553g	1.0(sec)
Mapped Spectral Response, Short period - S_{DS}	1.141g	0.2(sec)
Mapped Spectral Response at 1 sec. - S_{D1}	*	1.0(sec)
Site Coefficient – F_A	1.2	
Site Coefficient – F_v	*	
Site Modified Spectral Acceleration, Short period - S_{MS}	1.712g	
Site Modified Spectral Acceleration, Short period - S_{M1}	*	

Site Classification (2022 CBC, further defined in ASCE7-16 Chapter 20) = D Stiff Soil

* The actual method of seismic design should be determined by the Structural Engineer in accordance with Section 11.4.8 Site-Specific Ground Motion Procedures of the ASCE 7-16. Refer to Appendix C for the Design Maps Summary Report provided by the Structural Engineers Association of California and California's Office of Statewide Health Planning and Development website.

The actual method of seismic design should be determined by the Structural Engineer.

5.2 Liquefaction Potential

Liquefaction is a seismic phenomenon in which loose, saturated, granular (non-cohesive) soils react as a fluid when subject to high-intensity ground shaking. Research and historical data indicate loose granular soils with a specific range of

grain size distribution, saturated by a relatively shallow groundwater table are most susceptible to liquefaction.

The effects of liquefaction on level ground include settlement, sand boils and bearing capacity failures below structures.

In view of the relatively firm silty sand and sandy silt encountered in the borings, relative densities, and depth to static groundwater (over 100 feet), it is Bruin GSI's opinion that the potential for on-site liquefaction or seismically induced dynamic settlement should be negligible. Based on our review of the Seismic Hazards Map, the Site is not located in an area requiring a liquefaction analysis.

6.2.1 Other Liquefaction Associated Hazards

Potential hazards associated with liquefaction include lateral spreading and slow slides, foundation bearing failure, and ground surface settlement. Considering the upper native soils are not likely to liquefy, these hazards are not considered to be design factors for this project.

5.3 Other Secondary Seismic Hazards

Seismic hazards relative to earthquakes include landslides, ground lurching, tsunamis, seiches and seismic-induced settlement. As site topography is relatively flat, hazards from landslides are considered negligible. Ground lurching is generally associated with fault rupture and liquefaction. As these hazards are considered unlikely, it is Bruin GSI's opinion that the potential for ground lurching is low. Tsunami hazards are considered nonexistent due to the site location.

5.4 Soil Settlement

Differential soil settlement occurs when supporting soils are not uniform in density or classification and seismic shaking causes one type of soil to settle more than the other. When unaccounted for in design, such settlement can result in damage to structures, pavement and subsurface utilities. Soils with potential for hydro-consolidation can also cause differential settlement under loading conditions and the induction of moisture.

Re-compaction of the upper site soils is intended to remedy most potentials of settlement due to structures supported on native soils with non-uniform densities, soil classifications and hydro-consolidation.

Settlement of structures founded on compacted fill will be relatively small, less than one (1) inch. Differential settlement is anticipated to be on the order of 50% of the

total settlement in a thirty (30) foot span. Most settlement should take place during construction.

5.5 Erosion

The subject site drainage occurs by minor sheet flow and erosion could occur. Appropriate analysis, grading and drainage design and site maintenance should minimize the sheet flow erosion potential.

6.0 111 STATEMENT

Based on the typical construction and grading assumptions stated in this report, and provided additional subsurface investigation and analysis is performed to verify site conditions, subsequent to compliance with the finalized recommendations provided in a design-level report, it is our opinion the proposed structures will be safe from hazards associated with faulting, landslides, slippage, and settlement. The proposed development will not adversely impact the existing geologic stability of adjacent sites.

Bruin GSI shall be allowed the opportunity to review grading and structural plans as well as perform additional subsurface investigation and laboratory testing in order to substantiate this statement.

7.0 EFFECT OF PROPOSED GRADING ON ADJACENT PROPERTIES

Based on the construction and grading assumptions stated in this report, it is our opinion that the proposed grading and construction will not adversely affect the stability of adjoining properties provided that grading and construction are performed in compliance with the recommendations presented herein.

8.0 OPINIONS AND CONCLUSIONS

Based upon the results of our investigation, the proposed development is considered feasible from a geotechnical standpoint provided final recommendations presented in a design-level Geotechnical report are incorporated into the design and construction. If changes in the design of the structure are made or variations of changed conditions are encountered during construction, Bruin GSI should be contacted to evaluate their effects on these recommendations.

The upper four to seven (4-7) feet of soil were found to be non-uniform with some areas of the site soils subject to hydro-consolidation. Based on the laboratory testing and subsurface data obtained, it is Bruin GSI's opinion that the upper site soils will not provide a uniform soil support system without remediation through re-compaction. In order to

provide a more uniform soil support system and minimize the potential for differential settlement, the proposed structures should be supported by a re-compacted fill mat.

9.0 GEOTECHNICAL RECOMMENDATIONS

The following preliminary geotechnical engineering recommendations for the proposed development are based on observations from the limited field investigation program and the laboratory test results and our experience with sites of similar conditions. The following preliminary recommendations are provided for the purpose of assuring the feasibility of the proposed residential subdivision and for budgeting purposes only.

Additional subsurface investigation, soil sampling, laboratory testing and analysis shall be performed to provide a design-level Geotechnical report and either finalize or modify the recommendations provided herein as deemed appropriate.

The local Department of Building and Safety should be contacted prior to the start of construction to assure the project is properly permitted and inspected during construction. Any grading performed at the site shall be in compliance with the recommendations provided in a Final Design Level-Report, the local building code and the Earthwork and Grading Specifications for Rough Grading presented in Appendix D.

It is stipulated, upon completion of a design-level report, that field observations and testing during rough-grading operations should be provided by Bruin GSI so a decision can be formed regarding the adequacy of the site preparation, the acceptability of fill materials, and the extent to which the earthwork construction and the degree of compaction comply with the project geotechnical specifications. **Any work related to grading performed without the full knowledge of, and under the supervision of the Geotechnical Consultant, may render the recommendations of the report invalid.**

9.1 Earthwork

Prior to any grading, the site should be cleared and grubbed of all vegetation. All pavements, vegetation, trash, debris and abandoned underground utilities shall be removed from the area to be graded and should not be incorporated into engineered fill.

Any depressions resulting from removals during grubbing process (trees etc.) shall be observed by the Geotechnical Consultant. Depressions requiring backfill within structural areas will require placement of engineered fill, observed, and tested by the Geotechnical Consultant.

It is our professional opinion that the grading of the site can be performed with conventional earth-moving equipment.

9.2 Remedial Grading for Building Pads

To provide a more uniform bearing for the proposed structure foundations, slab-on-grade, and structural retaining walls and, subsequent to clearing and grubbing of the area to be graded, the existing native soils will require over-excavation and recompaction from forty eight to seventy two (48-72) inches below existing grade or finish grade, whichever is lower. The excavation shall extend a minimum of five (5) feet beyond the limits of the proposed foundations, where obtainable. The bottom of the excavation shall be a level elevation.

The Geotechnical Consultant shall inspect the resulting surfaces prior to scarification and fill placement. A minimum of thirty six (36) inches of compacted fill is required beneath the proposed foundations.

Subsequent to approval of the resulting surface by the Geotechnical Consultant, the resulting soil surface shall be scarified (ripped) an additional twelve (12) inches, properly moisture conditioned or aerated to near optimum moisture content, and mechanically compacted with heavy compaction equipment to 90% relative compaction as determined by ASTM D 1557 test method. **Compaction shall be verified by testing.**

9.3 Remedial Grading for Flexible (Asphalt-Concrete) and Rigid (PCC) Pavement

Subsequent to clearing and grubbing the area to be graded, the existing native soils shall be excavated twelve (12) inches below existing grade or finish grade, whichever is lower. The exposed surface shall be scarified (ripped) an additional six (6) inches. The excavation shall extend a minimum of three (3) feet beyond the limits of the proposed pavement, where obtainable. The Geotechnical Consultant shall inspect the resulting surfaces prior to fill placement.

Subsequent to approval of the resulting surface by the Geotechnical Consultant, the resulting soil surface shall be properly moisture conditioned or aerated to near optimum moisture content, and mechanically compacted with heavy compaction equipment to 90% relative compaction (95% relative compaction beneath proposed PCC pavement in the upper twelve inches) as determined by ASTM D 1557 test method. **Compaction shall be verified by testing.**

9.4 Remedial Grading and Exterior Non-Traffic Bearing Concrete Flatwork (Sidewalks, Patios, Walkways, etc.)

Subsequent to clearing and grubbing the area to be graded, the existing native soils shall be scarified (ripped) six (6) inches below existing grade or finish grade, whichever is lower. The scarification shall extend a minimum of two (2) feet beyond the limits of the proposed flatwork, were obtainable. The Geotechnical Consultant shall inspect the resulting surfaces prior to fill placement.

Subsequent to approval of the resulting surface by the Geotechnical Consultant, the resulting soil surface shall be properly moisture conditioned or aerated to near optimum moisture content, and mechanically compacted with mechanical compaction equipment to 90% relative compaction as determined by ASTM D 1557 test method. **Compaction shall be verified by testing.**

9.5 Fill Placement and Compaction Requirements

The excavated native soils may be used as engineered fill to backfill the excavation. Materials for engineered fill should be free of organic material, debris, and other deleterious substances, and should not contain rocks greater than eight (8) inches in maximum dimension.

All native soil shall be moisture conditioned or air dried as necessary to achieve near optimum moisture condition, placed in lifts (eight to ten inches, measured loose) and then compacted in place by mechanical compaction equipment to a minimum relative compaction of 90% as determined in accordance with Test Method ASTM D 1557.

All import soil fill (meeting the requirements of Section 10.8) should be placed in eight-inch-thick maximum lifts measured loose, moisture conditioned or air dried as necessary to near optimum moisture condition, and then compacted in place to a minimum relative compaction of 90% as determined in accordance with Test Method ASTM D 1557. **A representative of the project consultant should be present on-site during grading operations to verify proper placement and compaction of all fill, as well as to verify compliance with the other geotechnical recommendations presented herein.**

9.6 Native Soil Shrinkage

A shrinkage factor of the upper site soils is estimated at ten to fifteen (10-15) percent. This estimate is based on the limited data collected from the subsurface exploration and laboratory test data with an average degree of compaction of 92% and may vary depending on contractor methods.

During compaction, an additional one-half of an inch (1/2") subsidence of the underlying soil is estimated. Losses from site clearing and grubbing operations may effect quantity calculations and should be taken into account. Actual shrinkage of the soil may vary.

We recommend monitoring the rough grading excavations by survey with comparison to grading contractor earthwork yardage estimates to determine a closer estimate of actual shrinkage so adjustments (if necessary) may be made during grading.

9.7 Fill Slope Construction and Stability

Provided all material is properly compacted as recommended, fill slopes may be constructed at a 2:1 (horizontal to vertical) gradient or flatter. Permanent cut slopes may be constructed at 2:1 or flatter. Fill slopes constructed as recommended at a slope ratio not exceeding 2:1 (horizontal: vertical), are expected to be both grossly and surficially stable and are expected to remain so under normal conditions.

Proper drainage should be planned so water is not allowed to flow over the tops of slopes. The slopes should be planted as soon as possible to minimize erosion and maintenance.

If slopes are planned steeper than 2:1, the Geotechnical Consultant shall be notified for slope stability determinations.

9.8 Imported Soils

If imported soils are required to complete the planned grading, these soils shall be free of organic matter and deleterious substances, meeting the following criteria:

- 100% passing a 2-inch sieve
- 60% to 100% passing the #4 sieve
- no more than 20% passing a #200 sieve
- expansion index less than 20
- liquid limit less than 35
- plasticity index less than 12
- R-value greater than 40
- Low corrosion potential
 - Soluble Sulfates less than 1,500 ppm
 - Soluble Chlorides less than 150 ppm
 - Minimum Resistivity greater than 8,000 ohm-cm

Prospective import soils should be observed, tested and pre-approved by this firm prior to importing the soils to the site. Final approval of the import soil will be given once the material is on site either in place or adequate quantities to finish the grading.

9.9 Grading Observations and Testing

The grading of the site shall be observed and tested by the Geotechnical Consultant to verify compliance with the recommendations. Any grading performed without full knowledge of the Geotechnical Consultant may render the recommendations of this report invalid.

10.0 POST-GRADING AND DESIGN CONSIDERATIONS

10.1 Pad Drainage

A surface drainage system consisting of a combination of sloped concrete flatwork, swales and sheet flow gradients in landscape areas, and roof gutters and downspouts should be designed for the site. The roof gutters and downspouts should also be tied directly into the proposed area drain system. Drainage from structures should be designed at minimum 5% gradient to approved areas. The purpose of this drainage system will be to reduce water infiltration into the subgrade soils and to direct surface waters away from building foundations, walls and slope areas.

Concrete flatwork surfaces and paved sloped surfaces should be inclined at a minimum gradient of 2% away from the building foundations and similar structures. A minimum twelve-inch-high berm should be maintained along the top of the descending slope to prevent any water from flowing over the slope.

The owner is advised that all irrigation and drainage devices should be properly maintained throughout the lifetime of the development.

10.2 Foundation Design Recommendations

The proposed structure shall be constructed on a conventional concrete foundation system. Provided the recommendations in this report are incorporated into site development, foundation for load bearing walls and interior columns constructed on compacted certified fill may be designed as follows:

10.2.1 Allowable Bearing Capacity

Continuous Foundations Design Values: An allowable “net” bearing capacity of 1,500 psf. can be utilized for dead and sustained live loads. This value includes a minimum safety factor of three (3) and may be increased by one-third ($1/3$) for total loads, including seismic forces.

Continuous foundations for single and two-story structures should be embedded a minimum of fifteen (15) inches and twenty-four (24) inches below lowest adjacent soil elevation, respectively, and be a minimum of fifteen (15) inches in width. Reinforcement shall consist of a minimum of two No. 4 bars, one top and one bottom. Actual depth, width, and reinforcement requirements for continuous foundations will be dependent on the Expansion Index of the bearing soils, applicable sections of the governing building code and requirements of the structural engineer.

The allowable bearing capacity for continuous foundations may be increased by 200 psf. for each additional six inches of foundation depth and 200 psf. for each additional one foot of foundation width. The allowable bearing capacity should not exceed 2,000 psf. for continuous foundations to keep estimated settlements within allowable limits.

Isolated Pad (Column or Pier) Foundations Design Values: An allowable “net” bearing capacity of 1,800 psf can be utilized for dead and sustained live loads. This value includes a minimum safety factor of three (3) and may be increased by one-third ($1/3$) for total loads, including seismic forces.

Isolated foundations should be a minimum of twenty-four (24) inches square and embedded a minimum of twenty-four (24) inches below lowest adjacent soil elevation. Actual depth, width, and reinforcement requirements for isolated foundations will be dependent on the Expansion Index of the bearing soil, applicable sections of the governing building code and requirements of the structural engineer.

The allowable bearing capacity for continuous foundations may be increased by 150 psf for each additional six (6) inches of foundation depth and 150 psf for each additional one foot of foundation width. The allowable bearing capacity should not exceed 2,500 psf for isolated foundations to keep estimated settlements within allowable limits.

10.2.2 Lateral Load Resistance

Lateral load resistance for the spread footings will be developed by passive soil pressure against sides of footings below grade and by friction acting at the base of the concrete footings bearing on compacted fill. An allowable passive pressure of $300 Z$ PSF, where Z = Depth (in feet) below finish grade. In passive pressure calculations, the upper one (1) foot of soil should be subtracted from the depth, " Z ", unless confined by pavement or slab. An appropriate safety factor should be used for design calculations.

Friction along the foundation base may provide resistance to lateral loading. The coefficient of friction was estimated to be 0.32 for site soils compacted to 90% of the maximum dry density as determined by ASTM D 1557 test method and may be used for dead load forces and includes a reduction factor of one-third ($1/3$).

For design of building foundations, passive resistance may be combined with frictional resistance provided that a one-third ($1/3$) reduction in the coefficient of friction is used.

10.2.3 Footing Reinforcement

Reinforcement for concrete footings should be designed by the structural engineer based on the anticipated loading conditions and expansion index of the supporting soil. Preliminary expansion index for the native soil is categorized as "very low" as determined by ASTM D 4829. Footings should be reinforced with a minimum of two (2) No. 4 bars, one (1) top and one (1) bottom.

10.2.4 Footing Observations

All footing trenches should be observed by a representative of the project geotechnical consultant to verify that they have been excavated into competent soils prior to placement of forms, reinforcement, or concrete. The excavations should be trimmed neat, level, and square. All loose, sloughed or moisture-softened soils and/or any construction debris should be removed prior to placing of concrete. **Excavated soils derived from footing and/or utility trenches should not be placed in building slab-on-grade areas or exterior concrete flatwork areas unless the soils are compacted to at least 90 percent of maximum dry density.**

10.2.5 Foundation Setbacks

Footings of structures (including retaining walls) located above a slope having a total height of ten (10) feet or less should have a minimum setback of five (5) feet, measured from the outside edge of the footing bottom along a horizontal line to the face of the slope. For footings above slopes having a total height greater than ten (10) feet, the setback should be, at minimum, equal to one third of the total height of the slope but need not exceed forty (40) feet. Refer to CBC Section 1804.

10.3 RETAINING WALLS AND STRUCTURES BELOW GRADE

The project may include shallow retaining walls or walls below grade (i.e., loading docks, light standards, flagpoles, or similar structures supporting soil materials. These walls are anticipated to be shallow (i.e., approximately 10 feet or less in height). Design lateral earth pressures, backfill criteria, and drainage recommendations for walls below grade are presented.

10.3.1 Lateral Earth Pressures

	Driving Earth Pressure*	Resisting Earth Pressure*
Well-Drained Soil	38	300***
Well-Drained Soil (2:1 Backfill)	60	
At-Rest (Restrained Wall)	55**	

*Equivalent fluid pressure (PSF) per foot of soil height

**For design purposes, a wall is considered restrained if it prevented from movement greater than $0.002H$ (H = height of wall in feet) at the top of the wall.

***The upper one foot of soil should be subtracted from the depth, "Z", unless confined by pavement or slab. This is an ultimate value.

Note: The pressures recommended above are based on the assumption that the backfill will be compacted to 90% of the maximum dry density. The use of select may lower the recommended driving earth pressure. The revisiting pressure

provided is an ultimate value. An appropriate factor of safety is recommended.

Friction acting along the base of the foundation may provide resistance to lateral loading. The coefficient of friction is estimated to be 0.32 for native soils compacted to 90% of the maximum dry density, and may be used with dead loads. This value may be increased by one-third ($1/3$) for total loads, including seismic forces. Frictional and passive resistance may be combined without reduction.

The above values are for retaining walls that have been supplied with a proper sub-drain system. All walls should be designed to support any adjacent structural surcharge loads imposed by other nearby walls, footings or vehicular traffic within a distance approximately equal to the height of the wall.

Retaining walls over six (6) feet in height may need to be designed for a seismic load force that is applied to the static forces when the seismic shaking occurs. The geotechnical consultant should be contacted for retaining walls over six (6) feet in height.

10.3.2 Wall Backfill

Backfill behind shallow retaining walls or walls below grade should consist of non-expansive granular materials. Wall backfill should not contain organic material, rubble, debris, and rocks or cemented fragments larger than three (3) inches in greatest dimension. In the case where no shoring was used, the granular backfill should extend outward from the base of the wall to ground surface at a 1:1 (horizontal: vertical) slope. The geotechnical consultant should be allowed the opportunity to sample and test and comment about the adequacy of the proposed imported backfill material once adequate quantities to complete the project are on site.

Backfill should be placed in lifts not exceeding eight to ten (8 – 10) inches in thickness measured loose, moisture conditioned to above optimum moisture content and mechanically compacted with hand-operated equipment to minimum 90% of the maximum dry density as determined by ASTM D 1557. Walls below grade that are not free to deflect should be properly braced prior to placement and compaction of backfill. **Compaction should be verified by testing.**

10.3.3 Drainage and Waterproofing

It is recommended that waterproofing be provided behind the retaining walls to help reduce efflorescent formation.

Walls designed for drained earth pressures shall have adequate drainage provided behind the walls. Sub-drains or weep holes at the base of the walls shall be incorporated into design. Wall back-drains shall be designed by a registered Civil Engineer.

11.0 CORROSION AND CHEMICAL ATTACK

Soluble sulfate, pH, resistivity and chloride concentration test results are presented in Appendix B. The Resistivity (CTM 643) test results on a bulk soil sample from the site indicated that on-site soils are **moderately corrosive** when in contact with ferrous material (9,000 ohm-cm). Corrosion test results also indicate that the surficial soils at the site have a sulfate attack potential of 0.0106% by weight on concrete (Exposure Category S1).

Based on the preliminary chemical analysis performed on a sample of the native soil, foundation concrete shall consist of Type II cement with a minimum compressive strength of 2,500 psi and maximum water-cement ratio of 0.50 as indicated in the ACI 318 Table 19.3.2.1.

A higher compressive strength may be required by the structural engineer. Additional soil chemical analysis during grading is recommended. The minimum concrete compressive strength should be determined by the structural engineer.

The chemical test results should be distributed to the project design team for their interpretations pertaining to the corrosivity or reactivity of the construction materials (ferrous metals, and piping).

Additional soil samples shall be obtained and analyzed for corrosion and included in the design-level report.

12.0 EXCAVATIONS

It is Bruin GSI's opinion that standard construction techniques should be sufficient for site excavations. All excavations should be made in accordance with applicable regulations, including CAL/OSHA for and OSHA type "C" soil. Project safety is the contractor's responsibility and the owner. Bruin GSI will not be responsible for project safety.

The attention of contractors, particularly the underground contractors, should be drawn to the State of California Construction Safety Orders for "Excavations, Trenches, and Earthwork." Trenches or excavations greater than five (5) feet in depth should be shored or sloped back in accordance with OSHA Regulations prior to entry.

Open excavations, un-shored or un-surcharged (above the groundwater level) may be cut vertically to a maximum depth of no more than five (5) feet. Excavations higher than five (5) feet should be sloped back at a minimum 1.5:1 (horizontal to vertical) slope or flatter or shored. Sloughing will occur if the soil is dry or dries out while open. No excavation should be made within a 1:1 line projected outward from the toe of any existing foundation or structure.

No heavy equipment or other surcharge loads (i.e., excavation spoils) should be allowed within the top of slope a distance equal to the depth of the excavation, both measured from the top of the excavation.

Soil backfill around foundations or behind walls below grade should be placed in lifts not exceeding eight to ten inches, measured loose, moisture conditioned to near optimum moisture content and uniformly mechanically compacted to minimum 90% relative compaction as determined by ASTM D 1557 test method. Flooding or jetting is not recommended.

13.0 UTILITY TRENCHES AND BACKFILL

Standard construction techniques should be sufficient for site utility trench excavations. Utility trenches often settle even when backfill is placed under optimum conditions.

Trench backfill shall be moisture conditioned to near optimum moisture content, placed in lifts not exceeding eight to ten inches, measured loose, and uniformly compacted to minimum 90% of the maximum dry density with mechanical compaction equipment. **No flooding or jetting is recommended.**

Backfill of public utilities within road right-of-ways or on the subject site should be placed in strict conformance with the requirements of the governing agency. As a minimum it is recommended that utility trench backfill should be moisture conditioned to near optimum moisture content, placed in lifts not exceeding eight to ten (8-10) inches, measured loose, (depending on means of compaction) and uniformly compacted to minimum 90% of the maximum dry density with mechanical compaction equipment. If aggregate base is used for backfill material, it should be moisture conditioned to near optimum moisture content, placed in eight to ten inch lifts, measured loose, and uniformly compacted to minimum 95% of the maximum dry density using mechanical compaction equipment. **Compaction should be verified by testing.**

For purposes of this section of the report, “bedding” is defined as material placed in a trench up to one (1) foot above a utility pipe, and “backfill” is all material placed in the trench above the bedding. Unless concrete bedding is required around utility pipes, free-draining sand should be used as bedding. Sand proposed for use as bedding should be tested in our laboratory to verify its suitability and measure its compaction characteristics. **Sand bedding should be compacted by mechanical means to achieve at least 90% relative compaction based on ASTM D 1557.**

Backfill operations should be observed and tested by the Geotechnical Consultant to monitor compliance with these recommendations.

Where utility trenches enter the footprint of the building, trenches should be backfilled through their entire depths with on-site fill materials, sand-cement slurry, or concrete rather than with any sand or gravel shading. This “Plug” of less- or non-permeable materials will mitigate the potential for water to migrate through the backfilled trenches from outside of the building to the areas beneath the foundations and floor slabs.

The backfill soil should be moisture conditioned to near optimum moisture content, placed in lifts not exceeding eight to ten inches (8-10), measured loose, (depending on means of compaction) and uniformly compacted to minimum 90% of the maximum dry density with mechanical compaction equipment.

14.0 INTERIOR CONCRETE SLAB-ON-GRADE

It should be understood that as a manufactured product, concrete will crack even under ideal conditions. It is our experience that shrinkage is more pronounced in the Mojave Desert due to environmental conditions (high winds, daily extreme temperature differences and low humidity). Appropriate mix designs, placement procedures and concrete curing methods should be planned and implemented during construction in order to reduce the occurrence and magnitude of concrete shrinkage cracking.

Interior slab-on-grade construction should be supported by compacted soil, prepared as recommended in the “Remedial Grading for Proposed Building Pad(s)” Section of this report.

14.1 Vapor Barrier and Water Proofing

It is recommended that a vapor retarded/waterproofing be placed below the concrete slab on grade. Vapor/moisture transmission through slabs does occur and can impact various components of the structure.

Vapor retarded/waterproofing designing and inspection of installation is not the responsibility of the geotechnical engineer (most often the responsibility of the architect). Bruin Geotechnical Services, Inc. does not practice in the field of water and moisture vapor transmission evaluation/mitigation. Therefore, we recommend that a qualified person/firm be engaged/consulted to evaluate the general and specific water and moisture vapor transmission paths and any impact on the proposed development. This person/firm should provide recommendations for mitigation of potential adverse impact of water and moisture vapor transmission on various components of the structure as deemed necessary. The actual waterproofing design shall be provided by the architect, structural engineer, or contractor with experience in waterproofing.

In order to promote good building practices and alert the rest of the design/construction team of the appropriate standards and expect recommendations pertaining to vapor barriers/retarders, engineers (especially those aware of the issues surrounding blow-slab moisture protection and its effect on the success of their projects) should consider recommending and citing specific performance characteristics. The following paragraph includes criteria from the latest standards and expert recommendations and should be considered for use in your firm's own recommendations:

Vapor barrier shall consist of a minimum 15 mil extruded polyolefin plastic (no recycled content of woven materials permitted). Permeance as tested before and after mandatory conditions (ASTM E 17455 Section 7.1 and Sub-Paragraph 7.1.1-7.1.5): less than 0.01 perms [grains/(ft²-hr-inHg)] and comply with the ASTM E1745 Class A requirements. Install vapor barrier according to ASTM E1643, including proper perimeter seal. Basis of design: Stego Wrap Vapor Barrier 15 mil and Stego Crete Claw Tape (perimeter seal tape). Approved Alternatives: Vaporguard by Reef Industries, Sundance 15 mil Vapor Barrier by Sundance Inc.

14.2 Thickness and Joint Spacing

Concrete slab-on-grade should be at least four (4) inches thick and provided with frequent construction joints or expansion joints. The slab-on-grade should have a minimum compressive strength of 2,500 psi at 28 days. More stringent requirements may be required by the structural engineer.

14.3 Reinforcement

Reinforcement of the slab-on-grade is contingent on the structural engineer's recommendations and the Expansion Index of the supporting soil. As a minimum, reinforcement should consist of No. 4 bars spaced sixteen (16) inches on center, both ways. The reinforcement should be positioned near the middle of the slabs by

means of concrete chairs or brick. Additional reinforcement may be required by the structural engineer.

14.4 Subgrade Preparation

As further measure to minimize cracking of concrete flatwork, the subgrade soils and all utility line trenches below concrete slab-on-grade areas should first be compacted to a minimum relative compaction of **90%** and then thoroughly moistened to achieve a moisture content that is near optimum moisture content. **A representative of the project geotechnical consultant should observe and verify the density and moisture content of the soils, and the depth or moisture penetration prior to pouring concrete.**

15.0 EXTERIOR CONCRETE FLATWORK (PATIOS, WALKWAYS, SIDEWALKS, etc.)

It should be understood that as a manufactured product, concrete will crack even under ideal conditions. It is our experience that shrinkage is more pronounced in the Mojave Desert due to environmental conditions (high winds, daily extreme temperature differences and low humidity). Appropriate mix designs, placement procedures and concrete curing methods should be planned and implemented during construction in order to reduce the occurrence and magnitude of concrete shrinkage cracking.

Exterior slab-on-grade construction should be supported by compacted soil, prepared as recommended in the "Remedial Grading and Exterior Non-Traffic Bearing Concrete" Section of this report. At locations where slabs cross trenches, observation and testing of trench backfill should be performed to confirm uniformity of conditions.

15.1 Thickness and Joint Spacing

To reduce the potential of unsightly cracking, concrete sidewalks, patio-type slabs should be at least four (4) inches thick and provided with frequent construction joints or expansion joints, especially at area of re-entrant corners, to help control cracking. Exterior perimeter slabs should be designed relatively independent of the foundation stems (free-floating) to help cracking due to settlement and/or expansion.

15.2 Reinforcement

Reinforcement of the exterior slab-on-grade is contingent on the structural engineer's recommendations and the Expansion Index of the supporting soil. As a minimum, reinforcement should consist of No. 3 bars spaced twenty-four (24) inches on center, both ways. The reinforcement should be positioned near the

middle of the slabs by means of concrete chairs or brick. Additional reinforcement may be required by the structural engineer.

15.3 Subgrade Preparation

As further measure to minimize cracking of concrete flatwork, the subgrade soils below concrete flatwork areas should first be compacted to a minimum relative compaction of 90% and then thoroughly moistened to achieve a moisture content that is near optimum moisture content. Pre-wetting of the soils to a depth of six (6) inches a maximum of 24-hours prior to concrete placement will promote uniform curing of the concrete and minimize the development of shrinkage cracks. **A representative of the project geotechnical consultant should observe and verify the density and moisture content of the soils, and the depth or moisture penetration a maximum of 24-hours prior to pouring concrete.**

16.0 RIGID (PCC) PAVEMENT

It should be understood that as a manufactured product, concrete will crack even under ideal conditions. It is our experience that shrinkage is more pronounced in the Mojave Desert due to environmental conditions (high winds, daily extreme temperature differences and low humidity). Appropriate mix designs, placement procedures and concrete curing methods should be planned and implemented during construction in order to reduce the occurrence and magnitude of concrete shrinkage cracking.

Exterior slab-on-grade construction should be supported by compacted soil, prepared as recommended in "Remedial Grading for Flexible (Asphalt-Concrete) and Rigid PCC Pavement" section of this report. At locations where slabs cross trenches, observation and testing of trench backfill should be performed to confirm uniformity of conditions.

16.1 Thickness and Joint Spacing

To reduce the potential of unsightly cracking, rigid concrete pavement should be at least four inches thick and provided with frequent construction joints or expansion joints, especially at area of re-entrant corners, to help control cracking. Perimeter pavement should be designed relatively independent of the foundation stems (free-floating) to help cracking due to settlement and/or expansion.

16.2 Reinforcement

Reinforcement of the exterior pavement is contingent on the structural engineer's recommendations and the Expansion Index of the supporting soil. As a minimum, reinforcement should consist of No. 3 bars spaced twenty-four (24) inches on

center, both ways. The reinforcement should be positioned near the middle of the slabs by means of concrete chairs or brick. Additional reinforcement may be required by the structural engineer.

16.3 Subgrade Preparation

As further measure to minimize cracking of concrete flatwork, the upper twelve inches of subgrade soils below concrete flatwork areas should first be compacted to a minimum relative compaction of **95%** and then thoroughly moistened to achieve a moisture content that is near optimum moisture content. Pre-wetting of the soils to a depth of six (6) inches a maximum of 24-hours prior to concrete placement will promote uniform curing of the concrete and minimize the development of shrinkage cracks. **A representative of the project geotechnical consultant should observe and verify the density and moisture content of the soils, and the depth or moisture penetration a maximum of 24-hours prior to pouring concrete.**

17.0 PRELIMINARY FLEXIBLE PAVEMENT DESIGN

Asphalt-concrete pavements shall be designed per the Caltrans Highway Design Manual based on R-Value and Traffic Index. An R-value of the native soil of 51 was utilized for the preliminary structural pavement section. During grading as soils are mixed, soil samples should be obtained and tested for R-Value determination.

For pavement design, the preliminary flexible pavement layer thickness is as follows:

RECOMMENDED ASPHALT PAVEMENT SECTION LAYER THICKNESS

Pavement Material	Recommended Thickness (TI = 5.0) Residential
Asphalt Concrete	3.5"
Class II Aggregate Base	5.0"
Compacted Subgrade	18"

Pavement Material	Recommended Thickness (TI = 9.0) Secondary Arterial
Asphalt Concrete	6.0"
Class II Aggregate Base	9.0"
Compacted Subgrade	18"

Pavement Material	Recommended Thickness (TI = 10.0) Major Arterial
Asphalt Concrete	6.0"
Class II Aggregate Base	10.0"
Compacted Subgrade	18"

Asphalt concrete should conform to Sections 203 and 302 of the latest edition of the Standard Specifications for Public Works Construction ("Greenbook").

Class II aggregate base should conform to Section 26 of the Caltrans Standard Specifications, latest edition. The aggregate base and sub-base material should be compacted to at least 95 percent of the maximum dry density as determined by ASTM Method D 1557.

18.0 CONSTRUCTION CONSIDERATIONS

Based on our field exploration program, earthwork can be performed with conventional construction equipment.

18.1 Temporary Dewatering

Groundwater was not encountered in any of our borings to the maximum depth of our explorations. Based on the anticipated excavation depths, the need for temporary dewatering is considered low.

18.2 Construction Slopes

Excavations during construction should be conducted so that slope failure and excessive ground movement will not occur. The short-term stability of excavation depends on many factors, including slope angle, engineering characteristics of the subsoils, height of the excavation and length of time the excavation remains unsupported and exposed to equipment vibrations, rainfall, and desiccation.

Where spacing permits, and providing that adjacent facilities are adequately supported, open excavations may be considered. In general, unsupported slopes for temporary construction excavations should not be expected to stand at an inclination steeper than 1:1 (horizontal: vertical). The temporary excavation side walls may be cut vertically to a height of three (3) feet and then laid back at a 1:1 slope ratio above a height of three (3) feet.

Surcharge loads (equipment, spoil piles, etc.) should be kept away from the top of temporary excavations a horizontal distance equal to the depth of excavation.

Surface drainage should be controlled along the top of temporary excavations to preclude wetting of the soils and erosion of the excavation faces. Even with the implementation of the above recommendations, sloughing of the surface of the temporary excavations may still occur, and workmen should be adequately protected from such sloughing.

18.3 Temporary Shoring

If shoring is considered, Bruin GSI should be notified in order to provide appropriate design parameters.

19.0 ADDITIONAL SERVICES

Project plans and specifications should be reviewed prior to preparing a design-level report. This report is based on the assumption that an additional subsurface investigation will be performed along with client consultation during preliminary design and construction phases to provide a design-level report.

Retaining Bruin GSI as the geotechnical consultant to provide additional services from preliminary design through project completion will assure continuity of services.

Additional services include:

- Design-Level Geotechnical Report
- Consultation during design stages of the project.
- Review, stamp, and signature of the grading and building plans.
- Observation and testing during rough grading, fine grading and trench backfill as well as placement of engineered fill.
- Consultation as required during construction.

Cost estimates can be prepared if requested. Please contact our office.

20.0 LIMITATIONS AND UNIFORMITY OF CONDITIONS

This report is based on the development plans provided to our office. The preliminary conclusions and recommendations in this report may not be considered valid unless additional investigation is performed, and the conclusions of this report are verified or modified by the Geotechnical Consultant.

The subsurface conditions and characteristics described herein have been projected from individual borings or test pits placed across the subject property. Actual variations in the subsurface conditions and characteristics may occur.

If conditions encountered during construction differ from those described in this report, this office should be notified so as to consider the necessity for modifications. No responsibility for construction compliance with the design concepts, specifications, or recommendations is assumed a design-level report is prepared and unless on-site construction review is performed during the course of construction, which pertains to the specific recommendations contained herein.

It is recommended that Bruin GSI be provided the opportunity for a general review of final design and specifications in order that earthwork and foundation recommendations may be properly interpreted and implemented in the design specifications. If Bruin GSI is not accorded the privilege of making this recommended review, Bruin GSI can assume no responsibility for misinterpretation of the recommendations contained in this report.

This report has been prepared in accordance with generally accepted practice and standards in this community at this time. No warranties, either expressed or implied, are made as to the professional advice provided under the terms of the agreement and included in this report. This report has been prepared for the exclusive use of RCE and their authorized agents. Unauthorized reproduction of any portion of this report without expressed written permission is prohibited.

If parties other than Bruin GSI are engaged to provide construction geotechnical services, they must be notified that they will be required to assume complete responsibility for the geotechnical phase of the project by concurring with the findings and recommendations in this report or providing alternate recommendations.

Additional subsurface investigation shall be performed to prepare a design-level report

21.0 CLOSURE

The conclusions, recommendations, and opinions presented herein are: (1) based upon our evaluation and interpretations of the limited data obtained from our field and laboratory programs; (2) based upon an interpolation of soil conditions between and beyond the borings; (3) are subject to confirmation of the actual conditions encountered during construction; and, (4) are based upon the assumption that sufficient observation and testing will be provided during the grading, infrastructure installation and building phases of site development.

APPENDIX A

Boring Logs and Classification Key



Date(s) drilled	2/22/2024	LOG OF BORING 1 Page 1 of 1
Drilling Contractor	GP Drilling	
Drilling Method	Hollow Stem Auger	
Drill Rig Type	CME 75	Logged By: BW
Drill Bit Size/Type	8"	Checked By: MS
Sampling Method(s)	CSS/Bulk	Total Depth of Borehole 20' bgs
Client: Rodeo Credit Enterprises, LLC	Groundwater None Encountered	Boring Location: See Figure 2
Project Number: 24-108	Borehole Backfill Native/ Cuttings	Notes:
Project Location: Victorville	Hammer Data 140#, 30" drop	

Depth	Sample	USCS	Graphic Log	Material Description	Penetration Resistance (Blows/6")	Dry Unit Weight pcf	Water Content %
5'		SM		Yellowish brown silty fine to medium sand w/ coarse sand & occ. #4-1/2" gravel Dense, slightly moist	9-19	114.6	2.6
		SM		Light yellowish brown silty fine to coarse sand w/ occ. #4 gravel Dense, slightly moist	13-37	112.3	2.8
		SM		Dark yellowish brown silty fine to medium sand w/ occ.coarse sand to 3/4" gravel Dense, slightly moist	50-5"	110.9	4.5
10'		SM		Light reddish brown fine to medium sand w/ occ. coarse sand to 3/8" gravel Dense, slightly moist	12-16		
		SM		Light reddish brown fine to medium sand w/ occ. coarse sand to 3/8" gravel (cemented) Dense, slightly moist	50-4"	Dist.	3.8
15'		SP		Light brown slightly fine to coarse sand w/ occ. #4-3/8" gravel (slightly cemented) Dense, slightly moist	22-35	DIST	2.9
20'		SM		Reddish brown slightly silty fine to medium sand w/ occ. coarse sand to 3/4" gravel Medium dense, slightly moist	50-4"	Dist.	4.5
25'				Boring terminated @ 20' bgs No groundwater No caving			
30'							



Date(s) drilled	2/22/2024	LOG OF BORING 2 Page 1 of 1	
Drilling Contractor	GP Drilling		
Drilling Method	Hollow Stem Auger		
Drill Rig Type	CME 75	Logged By:	BW
Drill Bit Size/Type	8"	Checked By:	MS
Sampling Method(s)	SPT	Total Depth of Borehole	15' bgs
Client: Rodeo Credit Enterprises, LLC	Groundwater	None Encountered	Boring Location: See Figure 2
Project Number: 24-108	Borehole Backfill	Native/ Cuttings	Notes:
Project Location: Victorville	Hammer Data	140#, 30" drop	

Depth	Sample	USCS	Graphic Log	Material Description	Penetration Resistance (Blows/6")	Dry Unit Weight pcf	Water Content %
5'		SM		Brown slightly silty fine to coarse sand w/ occ. #4-3/8" gravel Medium dense, slightly moist	1-4-16		5.4
		SM		Yellowish brown silty fine to medium sand w/ occ. coarse sand to #4 gravel Dense, slightly moist	15-25-28		2.7
		SM		Light brown silty fine to coarse sand w/ occ. #4 gravel Dense, slightly moist	16-21-25		4.0
10'		SM		Yellowish brown silty fine to medium sand w/ occ. coarse sand to 3/8" gravel Medium dense, slightly moist	17-18-20		4.8
		SM		Yellowish brown silty fine to coarse sand w/ occ. #4-1/2" gravel Medium dense, slightly moist	8-13-14		3.6
15'		SP		Yellowish brown slightly silty fine to coarse sand w/ occ. #4-1" gravel Medium dense, slightly moist	7-11-11		3.8
20'				Boring terminated @ 15' bgs No groundwater No caving			
25'							
30'							



Date(s) drilled	2/22/2024	LOG OF BORING 3 Page 1 of 2	
Drilling Contractor	GP Drilling		
Drilling Method	Hollow Stem Auger		
Drill Rig Type	CME 75	Logged By:	BW
Drill Bit Size/Type	8"	Checked By:	MS
Sampling Method(s)	CSS	Total Depth of Borehole	50' bgs
Client:	Rodeo Credit Enterprises, LLC	Groundwater	None Encountered
Project Number:	24-108	Borehole Backfill	Native/ Cuttings
Project Location:	Victorville	Hammer Data	140#, 30" drop
		Boring Location:	See Figure 2
		Notes:	

Depth	Sample	USCS	Graphic Log	Material Description	Penetration Resistance (Blows/6")	Dry Unit Weight pcf	Water Content %
4'		SM		Dark brown silty fine to medium sand w/ occ. coarse sand to 1/2" gravel Dense, moist	4-4	116.2	8.0
8'		SM		Dark yellowish brown silty fine to coarse sand Dense, slightly moist	8-9	110.4	2.9
13'		SM		Dark yellowish brown silty fine to medium sand w/ coarse sand & occ. #4-2" gravel Medium dense, slightly moist	13-17	DIST	2.7
17'		SP		Light brown slightly silty fine to coarse sand w/ occ. #4-1" gravel Medium dense, slightly moist	17-17	118.7	3.1
19'		SP		Dark reddish brown silty medium to coarse sand w/ occ. #4 gravel Medium dense, slightly moist	13-19	N/A	-
24'		SP		Dark yellowish brown slightly silty fine to coarse sand w/ occ. #4-1" gravel Dense, slightly moist	14-26	DIST	2.0
28'		SP		Dark yellowish brown slightly silty fine to coarse sand w/ occ. #4-1" gravel Dense, slightly moist	50-4"		
32'		SM		Light reddish brown slightly silty fine to medium sand w/ occ. coarse sand to 1/2" gravel Dense, slightly moist	20-34	DIST	2.8
36'		SM		Light reddish brown slightly silty fine to medium sand w/ occ. coarse sand to 1/2" gravel Medium dense, slightly moist	13-17		2.3



Date(s) drilled	2/22/2024	LOG OF BORING 3 Page 2 of 2	
Drilling Contractor	GP Drilling		
Drilling Method	Hollow Stem Auger		
Drill Rig Type	CME 75	Logged By:	BW
Drill Bit Size/Type	8"	Checked By:	MS
Sampling Method(s)	CSS	Total Depth of Borehole	50' bgs
Client: Rodeo Credit Enterprises, LLC	Groundwater	None Encountered	Boring Location: See Figure 2
Project Number: 24-108	Borehole Backfill	Native/ Cuttings	Notes:
Project Location: Victorville	Hammer Data	140#, 30" drop	

Depth	Sample	USCS	Graphic Log	Material Description	Penetration Resistance (Blows/6")	Dry Unit Weight pcf	Water Content %
35'		SM		Light yellowish brown silty fine to coarse sand w/ occ. #4-3/8" gravel Dense, slightly moist	50-5"	113.6	2.3
40'		SP		Light yellowish brown fine to coarse sand w/ occ. #4-3/8" Medium dense, slightly moist	21-32	109.3	2.1
45'		SP		Light greyish brown slightly silty fine to coarse sand w/ occ. #4-1/2" gravel Dense, slightly moist	17-33	112.3	1.7
50'		ML		Light yellowish brown fine sandy silt w/ occ. medium sand Soft, slightly moist	16-22	97.1	5.2
55'				Boring terminated @ 50' bgs No groundwater No caving			
60'							



Date(s) drilled	2/22/2024	LOG OF BORING 4 Page 1 of 1
Drilling Contractor	GP Drilling	
Drilling Method	Hollow Stem Auger	
Drill Rig Type	CME 75	Logged By: BW
Drill Bit Size/Type	8"	Checked By: MS
Sampling Method(s)	CSS	Total Depth of Borehole 15' bgs

Client: Rodeo Credit Enterprises, LLC	Groundwater None Encountered	Boring Location: See Figure 2
Project Number: 24-108	Borehole Backfill Native/ Cuttings	Notes:
Project Location: Victorville	Hammer Data 140#, 30" drop	

Depth	Sample	USCS	Graphic Log	Material Description	Penetration Resistance (Blows/6")	Dry Unit Weight pcf	Water Content %
5'		SM		Brown silty fine to coarse sand w/ #4-3/8" gravel Dense, slightly moist	19-34	114.5	4.9
		SM		Yellowish brown silty fine to coarse sand w/ occ. #4 gravel Dense, moist	50-6"	114.5	7.2
10'		SP		Light reddish brown slightly silty fine to medium sand w/ coarse sand & occ. #4-3/8" gravel Dense, slightly moist	21-22	114.6	3.6
		SP		Reddish brown slightly silty fine to coarse sand w/ occ. #4-1/2" gravel Dense, dry	16-22	111.3	2.4
		SP/SM		Dark reddish brown fine to medium sand w/ occ. coarse sand to #4 gravel Dense, slightly moist	15-22	111.2	3.0
15'		SP/SM		Light brown fine to medium sand w/ occ. coarse sand to 3/8" gravel Medium dense, slightly moist	50-6"	103.8	4.2
20'				Boring terminated @ 15' bgs No groundwater No caving			
25'							
30'							



Date(s) drilled	2/22/2024	LOG OF BORING 5 Page 1 of 1
Drilling Contractor	GP Drilling	
Drilling Method	Hollow Stem Auger	
Drill Rig Type	CME 75	Logged By: BW
Drill Bit Size/Type	8"	Checked By: MS
Sampling Method(s)	CSS	Total Depth of Borehole 20' bgs

Client: Rodeo Credit Enterprises, LLC	Groundwater None Encountered	Boring Location: See Figure 2
Project Number: 24-108	Borehole Backfill Native/ Cuttings	Notes:
Project Location: Victorville	Hammer Data 140#, 30" drop	

Depth	Sample	USCS	Graphic Log	Material Description	Penetration Resistance (Blows/6")	Dry Unit Weight pcf	Water Content %
5'		SM		Dark brown silty fine to coarse sand Dense, moist	5-6	115.8	8.3
		SM		Yellowish brown silty fine to coarse sand w/ occ. #4-3/8" gravel Dense, slightly moist	15-18	113.8	3.8
		SM		Dark yellowish brown silty fine to coarse sand Dense, slightly moist	18-21	113.8	3.7
		SM		Dark yellowish brown silty fine to coarse sand Medium dense, slightly moist	18-25	118.2	5.8
10'		SM		Yellowish brown silty fine to coarse sand w/ occ. #4 gravel Dense, slightly moist	17-26	N/A	
15'		SP		Light yellowish brown silty fine to coarse sand w/ occ. #4-1/2" gravel Dense, dry	18-19	112.6	1.9
20'		SP		Light yellowish brown fine to coarse sand w/ occ. #4-1/2" gravel Medium dense, dry	27-29	103.8	2.2
25'				Boring terminated @ 20' bgs No groundwater No caving			
30'							



Date(s) drilled	2/22/2024	LOG OF BORING 6 Page 1 of 1
Drilling Contractor	GP Drilling	
Drilling Method	Hollow Stem Auger	
Drill Rig Type	CME 75	Logged By: BW
Drill Bit Size/Type	8"	Checked By: MS
Sampling Method(s)	SPT/Bulk	Total Depth of Borehole 20' bgs

Client: Rodeo Credit Enterprises, LLC	Groundwater None Encountered	Boring Location: See Figure 2
Project Number: 24-108	Borehole Backfill Native/ Cuttings	Notes:
Project Location: Victorville	Hammer Data 140#, 30" drop	

Depth	Sample	USCS	Graphic Log	Material Description	Penetration Resistance (Blows/6")	Dry Unit Weight pcf	Water Content %
5'		SM		Brown silty fine to medium sand w/ coarse sand & occ. #4 gravel Medium dense, moist	3-6-11		7.6
		SM		Brown silty fine to coarse sand w/ occ. #4 gravel Dense, slightly moist	17-29-29		4.4
		SM		Yellowish brown slightly silty fine to coarse sand w/ occ. #4-1" gravel Medium dense, slightly moist	8-8-9		4.2
		SM		Brown silty fine to medium sand w/ coarse sand Medium dense, slightly moist	7-7-8		4.4
10'		SM		Light brown silty fine to coarse sand w/ occ. #4 gravel Medium dense, slightly moist	11-11-16		
		SP		Light brown slightly silty fine to medium sand w/ coarse sand & occ. #4-3/8" gravel Desne, slightly moist	15-20-22		4.0
15'		SP		Reddish brown slightly silty fine to coarse sand w/ occ. #4-1/2" gravel Dense, slightly moist	13-25-19		4.2
20'		SP		Light yellowish brown medium to coarse sand w/ occ. #4-3/8" gravel Dense, dry	9-15-27		2.1
25'				Boring terminated @ 20' bgs No groundwater No caving			
30'							



Date(s) drilled	2/22/2024	LOG OF BORING 7 Page 1 of 1
Drilling Contractor	GP Drilling	
Drilling Method	Hollow Stem Auger	
Drill Rig Type	CME 75	Logged By: BW
Drill Bit Size/Type	8"	Checked By: MS
Sampling Method(s)	CSS	Total Depth of Borehole 20' bgs

Client: Rodeo Credit Enterprises, LLC	Groundwater None Encountered	Boring Location: See Figure 2
Project Number: 24-108	Borehole Backfill Native/ Cuttings	Notes:
Project Location: Victorville	Hammer Data 140#, 30" drop	

Depth	Sample	USCS	Graphic Log	Material Description	Penetration Resistance (Blows/6")	Dry Unit Weight pcf	Water Content %
5'		SM		Yellowish brown fine to coarse sand w/ occ. #4-1/2" gravel Dense, slightly moist	19-34	117.3	2.6
		SM		Yellowish brown silty fine to coarse sand w/ occ. #4-3/8" gravel Dense, slightly moist	11-14	112.1	4.2
10'		SP		Reddish brown slightly silty fine to coarse sand w/ occ. #4-1/2" gravel Dense, slightly moist	15-21	111.8	3.5
		SP		Yellowish brown slightly silty fine to coarse sand w/ occ. #4-3/8" gravel Dense, slightly moist	13-17	110.3	3.5
15'		SM		Light brown silty fine to coarse sand w/ occ. #4-1" gravel Dense, slightly moist	50-6"	110.0	4.2
20'		SP		Yellowish brown fine to coarse sand w/ #4-12/" gravel Medium dense, slightly moist	25-29	107.2	2.8
25'				Boring terminated @ 15' bgs No groundwater No caving			
30'							

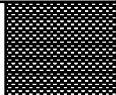

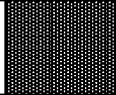
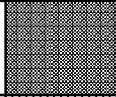
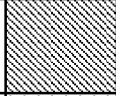
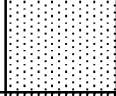
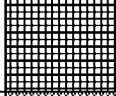
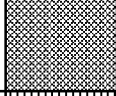
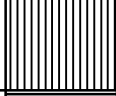

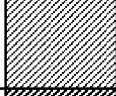


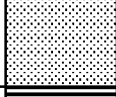
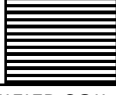


Date(s) drilled	2/22/2024	LOG OF BORING 8 Page 1 of 1	
Drilling Contractor	GP Drilling		
Drilling Method	Hollow Stem Auger		
Drill Rig Type	CME 75	Logged By:	BW
Drill Bit Size/Type	8"	Checked By:	MS
Sampling Method(s)	CSS	Total Depth of Borehole	15' bgs
Client: Rodeo Credit Enterprises, LLC	Groundwater	None Encountered	Boring Location: See Figure 2
Project Number: 24-108	Borehole Backfill	Native/ Cuttings	Notes:
Project Location: Victorville	Hammer Data	140#, 30" drop	

Depth	Sample	USCS	Graphic Log	Material Description	Penetration Resistance (Blows/6")	Dry Unit Weight pcf	Water Content %
5'		SM		Dark brown silty fine to coarse sand w/ #4-1/2" gravel Very dense, moist	8-19	125.9	7.8
		SM		Yellowish brown silty fine to coarse sand w/ occ. #4 gravel Dense, slightly moist	30-36	118.6	2.9
		SM		Yellowish brown silty fine to medium sand w/ coarse sand (cemented) Dense, slightly moist	29-35	110.9	5.4
		SM		Yellowish brown silty fine to medium sand w/ occ. coarse sand to #4 gravel Medium dense, slightly moist	31-33	109.1	3.5
10'		SM		Yellowish brown silty fine to medium sand w/ coarse sand & occ. #4 Medium dense, slightly moist	14-17	107.8	3.1
		SM		Light reddish brown slightly silty fine to coarse sand w/ #4-1/2" gravel Very dense, slightly moist	25-41	126.0	4.9
15'		SP/SM		Light brown slightly silty fine to coarse sand w/ occ. #4-3/8" gravel and treaces of clay Very dense, slightly moist	26-27	124.3	5.3
20'				Boring terminated @ 15' bgs No groundwater No caving			
25'							
30'							





BRUIN GEOTECHNICAL SERVICES, INC.

GEOTECHNICAL REPORTS | MATERIAL TESTING | CONSTRUCTION INSPECTION

SOIL CLASSIFICATION KEY					
MAJOR DIVISIONS			SYMBOL		TYPICAL NAMES
Coarse Grained Soils 50% or more larger than #200 sieve	Gravels More than half coarse-fraction is larger than No. 4 sieve size	Clean gravels with little or no fines	GW		Well graded gravels, gravel-sand mixtures
			GP		Poorly graded gravels, gravel-sand mixtures
		Gravel with over 12% fines	GM		Silty gravels, poorly graded gravel-sand-silt mixtures
			GC		Clayey gravels, poorly graded gravel-sand-clay mixtures
	Sands More than half coarse-fraction is smaller than No. 4 sieve size	Clean sands with little or no fines	SW		Well graded sands, gravelly sands
			SP		Poorly graded sands, gravelly sands
		Sands with over 12% fines	SM		Silty sands, poorly graded sand-silt mixtures
			SC		Clayey sands, poorly graded sand-clay mixtures
Fine Grained Soils 50% or more smaller than #200 sieve	Silts and Clays Liquid limit less than 50		ML		Inorganic silts, rock flour, clayey silts
			CL		Inorganic clays of low to medium plasticity, sandy clays, silty clays
			OL		Organic clays and organic silty clays of low plasticity
	Silts and Clays Liquid limit greater than 50		MH		Inorganic silts, micaceous or diatomaceous fine sandy/silty soils, elastic silts
			CH		Inorganic clays with high plasticity, fat clays
			OH		Organic clays of medium to high plasticity, organic silts
Highly Organic Soils			Pt		Peat and other highly organic soils
CLASSIFICATION SYSTEM BASED ON THE UNIFIED SOIL CLASSIFICATION SYSTEM					

Boring Log Key

Sheet 2 of 2

Depth	Sample	USCS	Graphic Log	Material Description	Penetration Resistance (Blows/6")	Dry Unit Weight pcf	Water Content %
1	2	3	4	5	6	7	8
COLUMN DESCRIPTIONS							
1	Depth in feet below the ground surface			5	Description of the material encountered. May include consistency, moisture, color, and other descriptors		
2	Sampling Method see "symbols" below			6	Number of blows to advance driven sampler one foot (or distance shown) beyond seating interval		
3	USCS symbol			7	Dry weight per unit volume of soil sample measured in laboratory units in pounds per cubic foot		
4	Graphic depiction of the subsurface material			8	Water content of the sample expressed as a percentage of the dry weight of the sample		
ABBREVIATIONS							
DIST = Disturbed Sample N/A = Not Analyzed N/R = No Recovery CHEM = Chemical Test							
SAMPLING METHOD SYMBOLS							
 California Split Spoon (CSS)  Standard Penetration Test (SPT)  Bulk Sample  Grab Sample							
GENERAL NOTES							
1. Soil classifications are based on the Unified Soil Classification System. Descriptions and stratum lines are interpretive, and actual lithologic changes may be gradual. Field descriptions may have been modified to reflect results of lab tests. 2. Descriptions on these logs apply only at the specific boring locations and at the time the borings were advanced. They are not warranted to be representative of subsurface conditions at other locations or times.							

APPENDIX B

Laboratory Test Data

SUMMARY OF LABORATORY TEST RESULTS

SIEVE ANALYSIS

Percent passing individual sieves

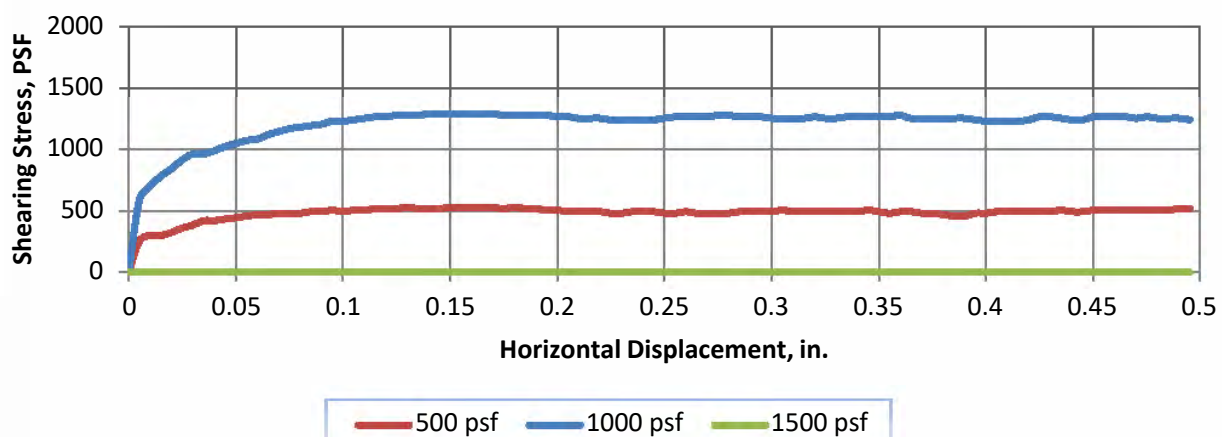
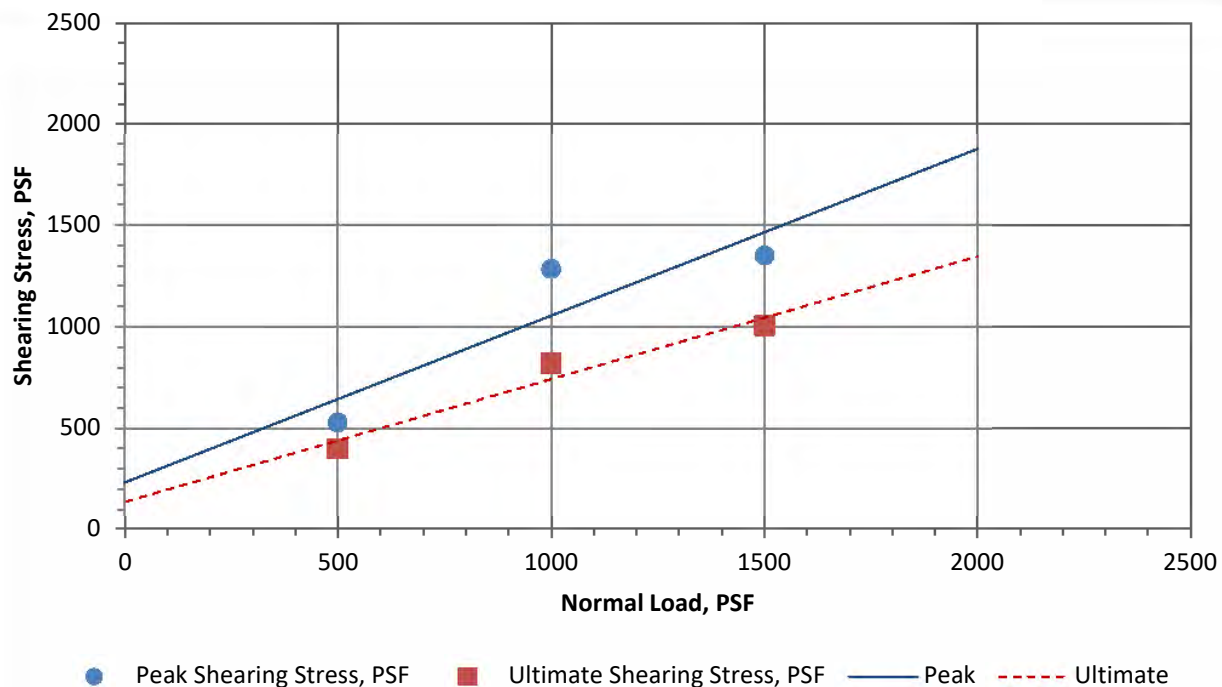
Sample I.D.	1/2"	3/8"	#4	#10	#40	#100	#200
B1@2		100	98	90	56	35	26
B1@6		100	99	94	66	47	37
B1@12		100	99	94	62	38	27
B1@20		100	98	90	49	25	19
B2@3		100	97	90	60	39	29
B2@8			100	97	75	53	38
B2@15	97	94	88	74	33	16	12
B3@1	99	98	95	89	55	42	26
B3@9	96	92	88	77	38	14	9
B3@15	96	94	84	67	26	10	6
B3@25	97	97	94	85	49	24	16
B3@35		100	99	93	58	35	24
B3@50				100	97	85	63
B4@6		100	97	87	36	16	12
B4@10		100	98	91	47	18	12
B5@15	96	944	90	75	25	10	7

SAND EQUIVALENT

Sample I.D.	Sand Equivalent
B2@5	15
B3@6	30

EXPANSION INDEX

Sample I.D.	Expansion Index	Classification
B1@0-5'	0	Non-Expansive



Sample Description: (SM) - Dark yellowish brown silty fine to coarse sand

DIRECT SHEAR DATA (ASTM D-3080)

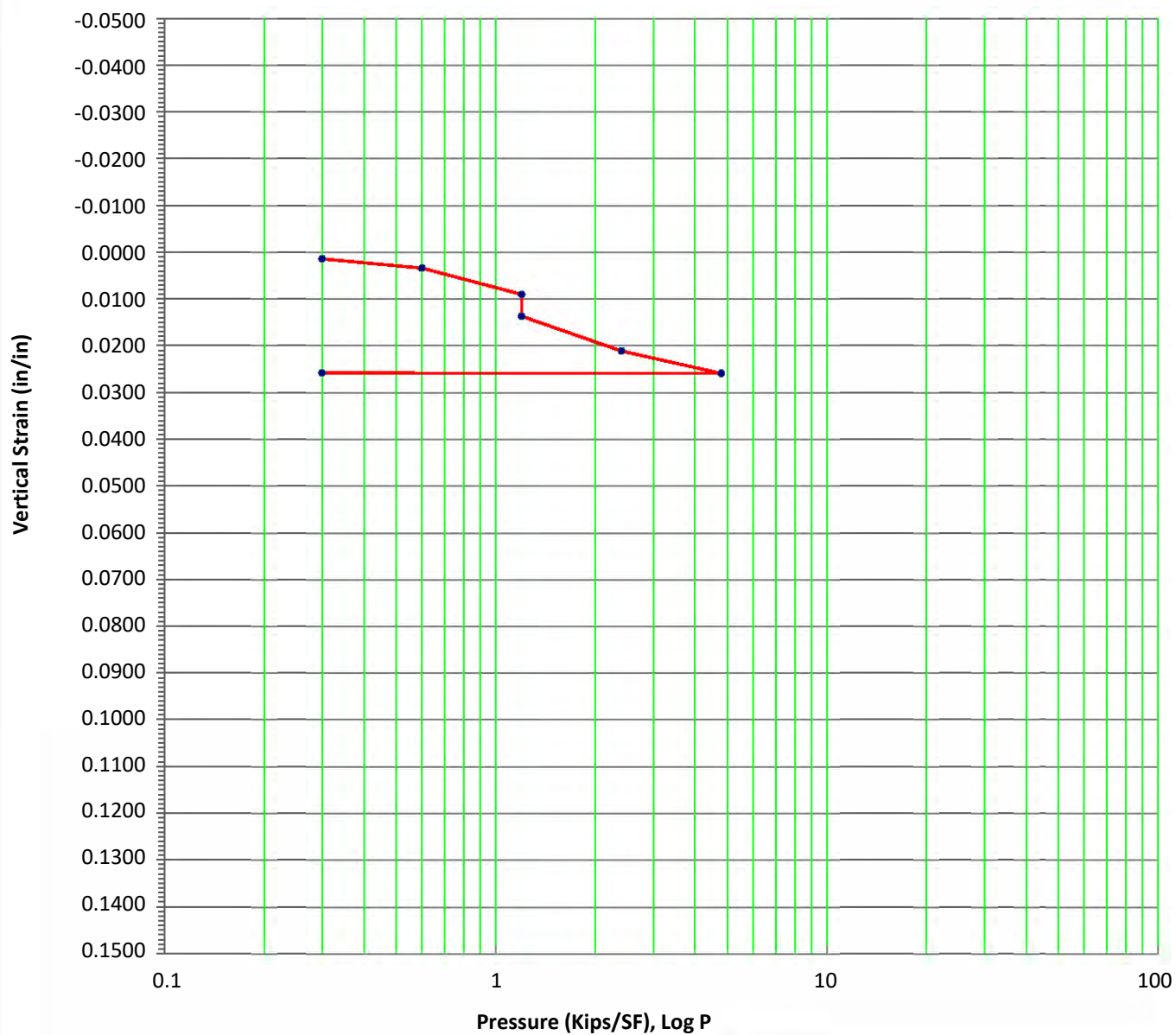
Sample ID	Symbol	Depth, feet	Dry Density, PCF	Average deg. of saturation
B3	●	3'	110	59
			Peak	Ultimate
Angle of friction, (degrees)			39	31
Cohesive Strength (PSF)			232	137

Direct Shear Test

RCE



J.N. 24-108



Sample location: B3@9'
 Material: SM/SP
 Initial Dry Density: 118.7 PCF
 Moisture Content: 3.1 %
 % Hydroconsolidation: 0.5 %

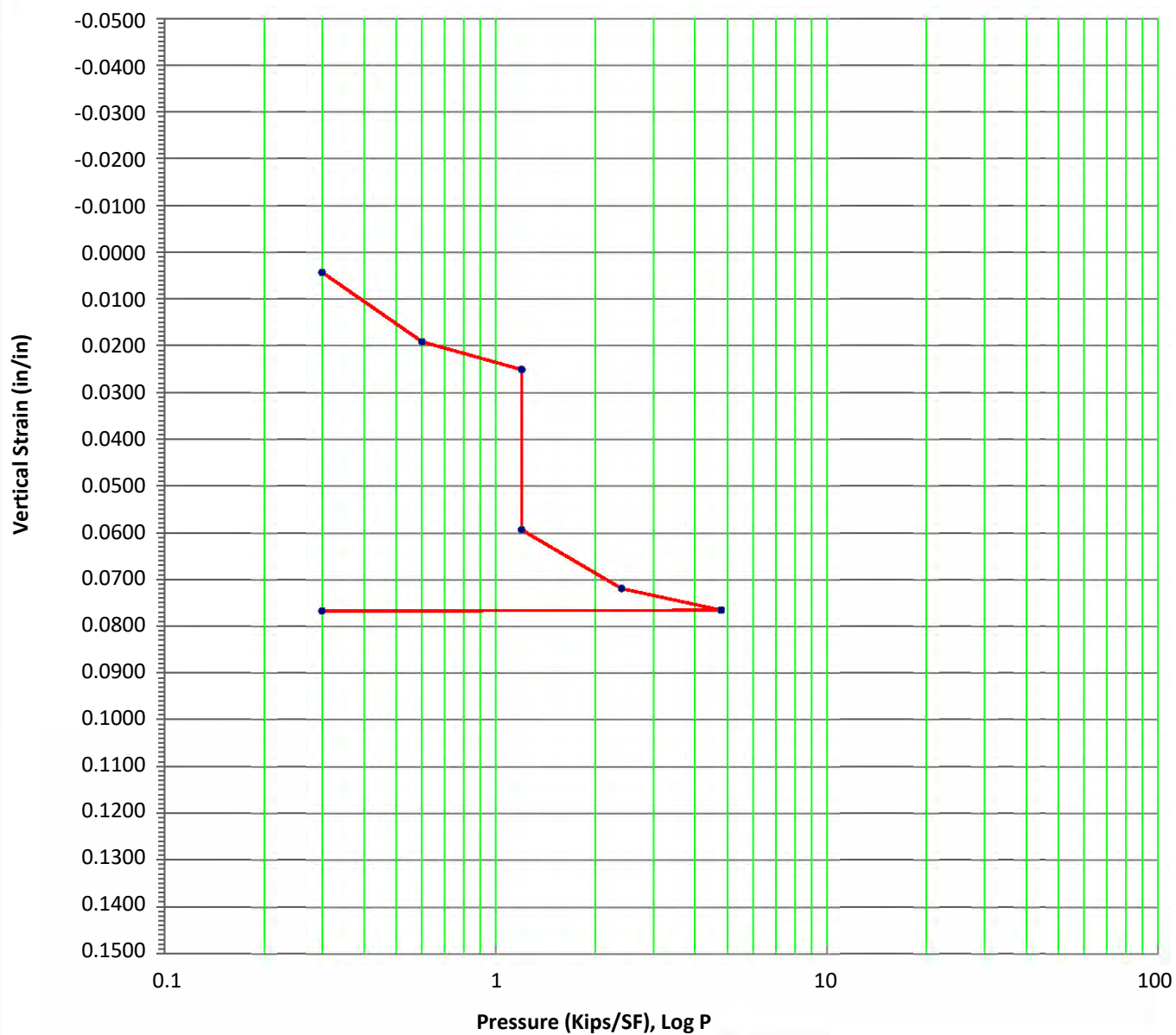
Test Method: ASTM D-2435

Consolidation Test

RCE



J.N. 24-108



Sample location: B4@4'
 Material: SM
 Initial Dry Density: 114.5 PCF
 Moisture Content: 7.2 %
 % Hydroconsolidation: 3.4 %

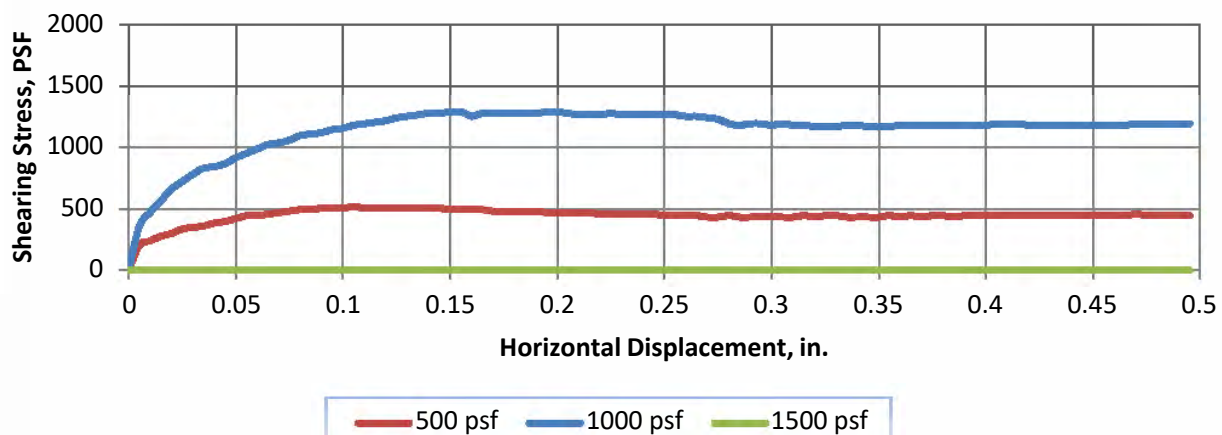
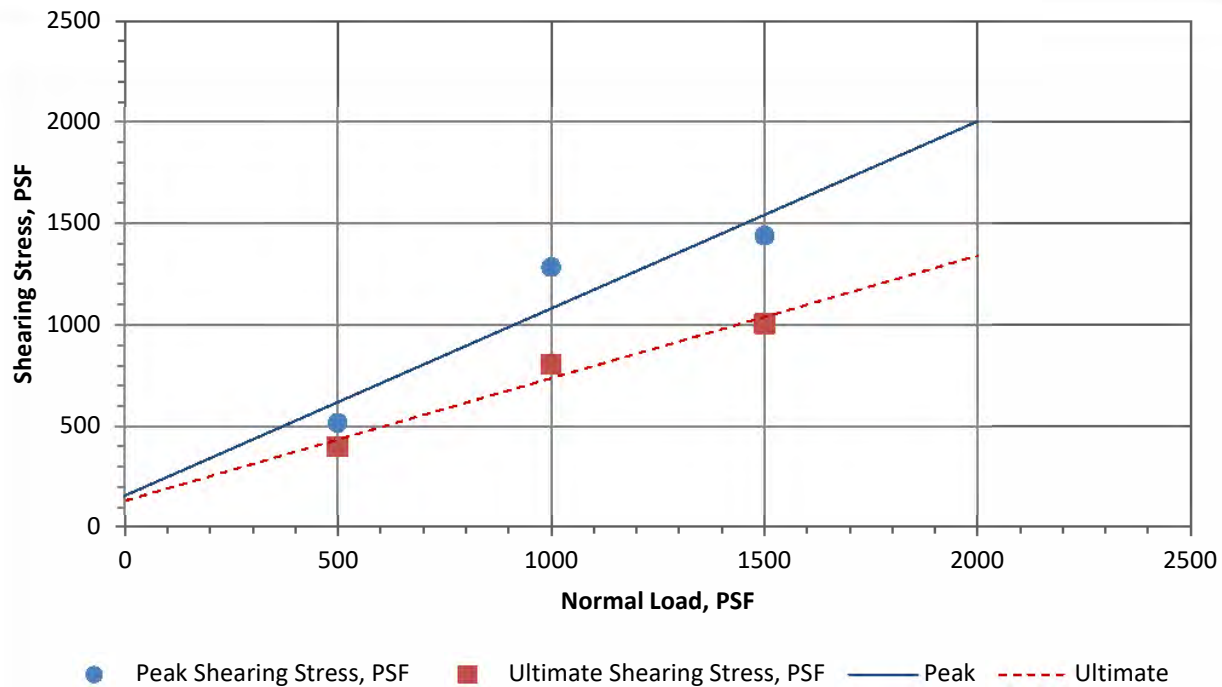
Test Method: ASTM D-2435

Consolidation Test

RCE



J.N. 24-108



Sample Description: (SM) - Dark yellowish brown silty fine to coarse sand

DIRECT SHEAR DATA (ASTM D-3080)

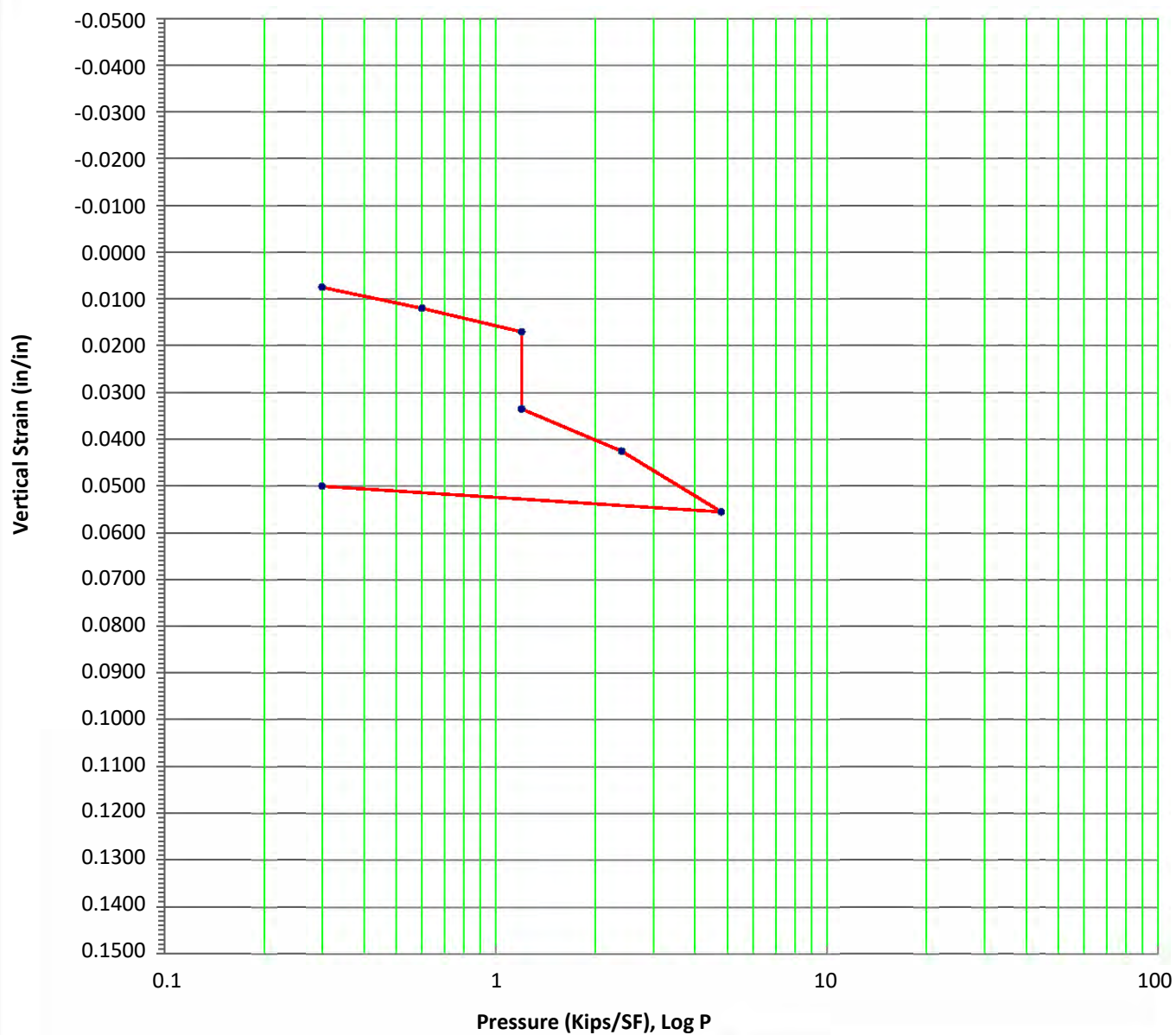
Sample ID	Symbol	Depth, feet	Dry Density, PCF	Average deg. of saturation
B5	●	5'	114	64
			Peak	Ultimate
Angle of friction, (degrees)			43	31
Cohesive Strength (PSF)			156	131

Direct Shear Test

RCE



J.N. 24-108



Sample location: B5@7'
 Material: SM
 Initial Dry Density: 118.2 PCF
 Moisture Content: 5.8 %
 % Hydroconsolidation: 1.7 %

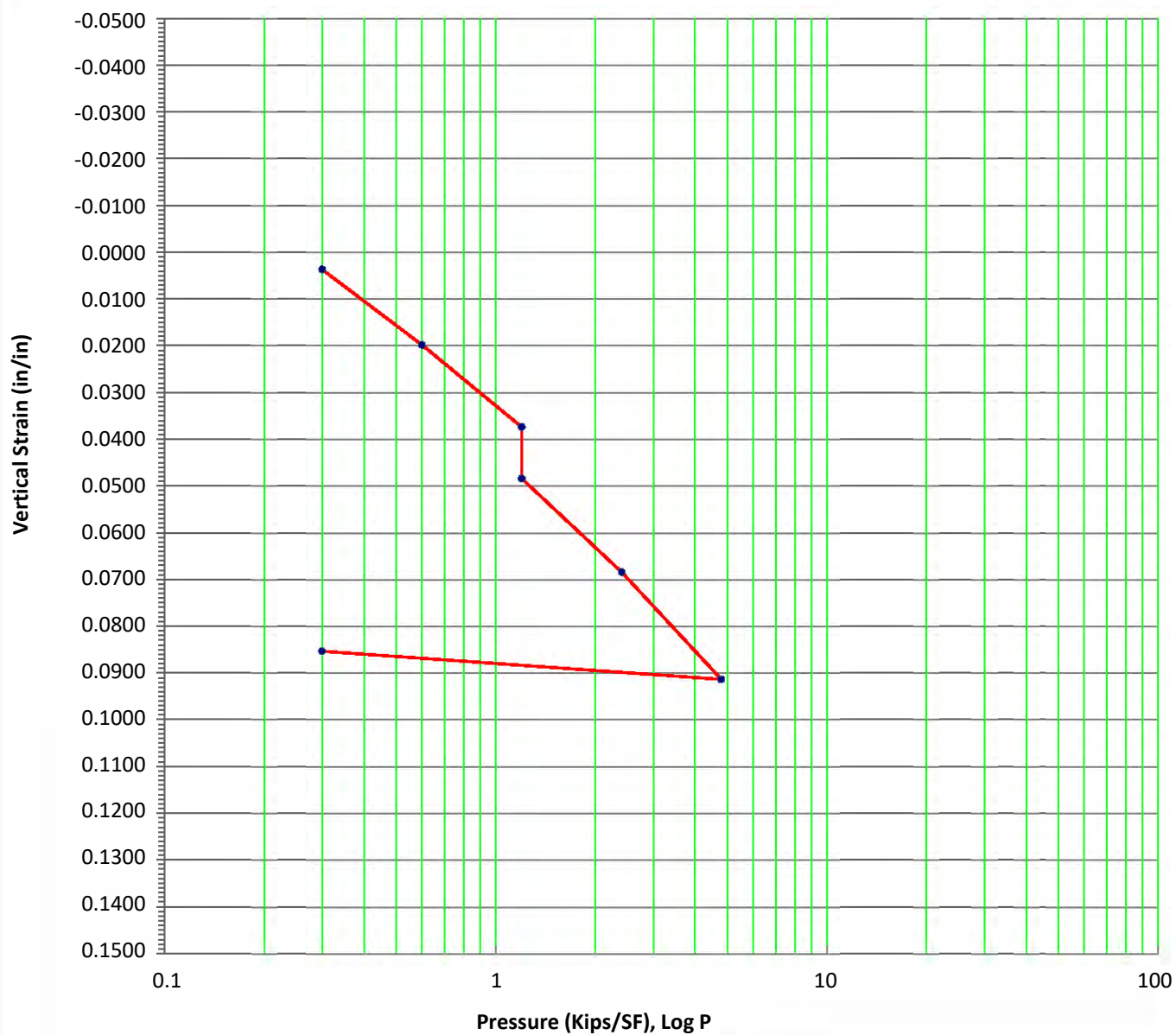
Test Method: ASTM D-2435

Consolidation Test

RCE



J.N. 24-108



Sample location: B7@4'
 Material: SM
 Initial Dry Density: 112.1 PCF
 Moisture Content: 4.2 %
 % Hydroconsolidation: 1.1 %

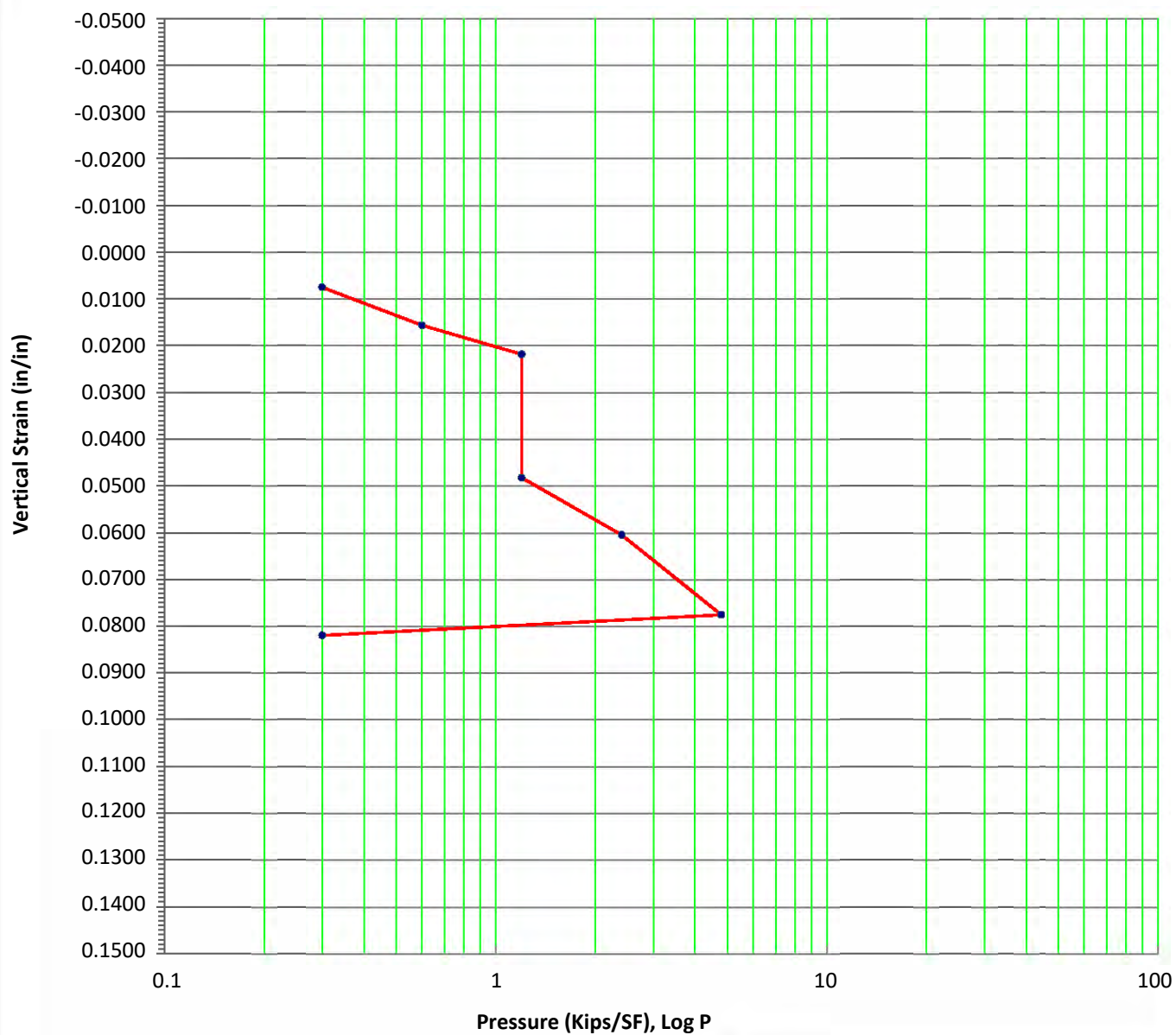
Test Method: ASTM D-2435

Consolidation Test

RCE



J.N. 24-108



Sample location: B8@3'
 Material: SM
 Initial Dry Density: 118.6 PCF
 Moisture Content: 2.9 %
 % Hydroconsolidation: 2.6 %

Test Method: ASTM D-2435

Consolidation Test

RCE



J.N. 24-108

ANAHEIM TEST LAB, INC

196 Technology Drive, Unit D
Irvine, CA 92618
Phone (949) 336-6544

TO:

Bruin Geotechnical Services, Inc.
44732 Yucca Avenue
Lancaster, CA 93534

DATE: 3/12/2024

P.O. NO.: Transmittal

LAB NO.: C-7748

SPECIFICATION: CA 301

MATERIAL: Brown, Clayey Sand

Project No.: 24-108
Project: RCE - Mesa
APN 3136-441-01, 02 & 3136-411-04, 05, Victorville, CA
Boring ID: B6 @ 0-5'

ANALYTICAL REPORT

"R" VALUE

BY EXUDATION

BY EXPANSION

51

N/A

RESPECTFULLY SUBMITTED



WES BRIDGER LAB MANAGER

"R" VALUE CA 301

Client: Bruin Geotechnical Services, Inc.

ATL No.: C 7748

Date: 3/12/2024

Client Reference No.: 24-108

Sample: B6 @ 0-5'

Soil Type: Brown, Clayey Sand

TEST SPECIMEN		A	B	C	D
Compactor Air Pressure	psi	150	100	250	
Initial Moisture Content	%	4.2	4.2	4.2	
Moisture at Compaction	%	8.5	9.4	8.1	
Briquette Height	in.	2.44	2.51	2.48	
Dry Density	pcf	131.5	129.3	132.3	
EXUDATION PRESSURE	psi	417	289	721	
EXPANSION PRESSURE	psf	22	0	65	
Ph at 1000 pounds	psi	25	27	22	
Ph at 2000 pounds	psi	50	57	40	
Displacement	turns	4.29	4.52	3.98	
"R" Value		56	50	65	
CORRECTED "R" VALUE		56	50	65	

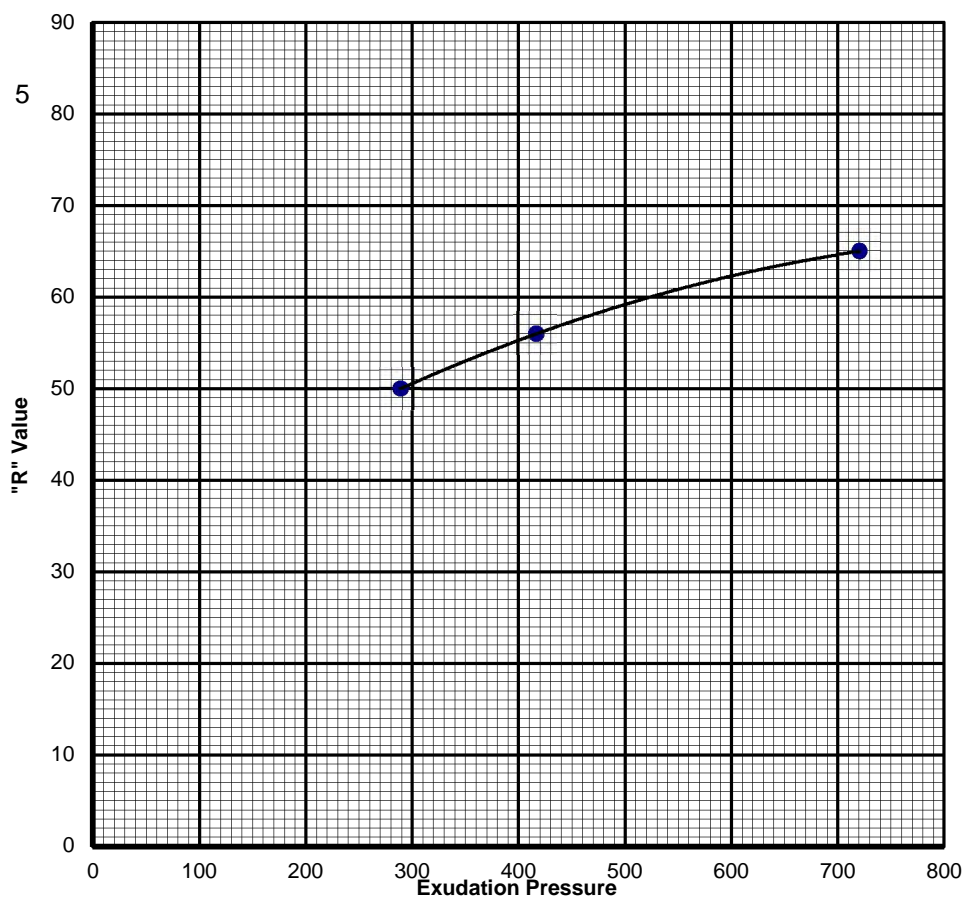
Final "R" Value

BY EXUDATION:
@ 300 psi

51

BY EXPANSION:
TI = 5.0

N/A



ANAHEIM TEST LAB, INC

196 Technology Drive, Unit D
Irvine, CA 92618
Phone (949) 336-6544

Bruin Geotechnical Services, Inc.
44732 Yucca Avenue
Lancaster, CA 93534

DATE: 3/12/2024

P.O. NO.: Transmittal

LAB NO.: C-7748

SPECIFICATION: CTM-643/417/422

MATERIAL: Soil

Project No.: 24-108
Project: RCE - Mesa
APN 3136-441-01, 02 & 3136-411-04, 05, Victorville, CA
Boring ID: B1 @ 0-5'

ANALYTICAL REPORT

CORROSION SERIES SUMMARY OF DATA

pH	MIN. RESISTIVITY per CT. 643 ohm-cm	SOLUBLE SULFATES per CT. 417 (% by weight)	SOLUBLE CHLORIDES per CT. 422 ppm
7.9	9,000	0.0106%	14

RESPECTFULLY SUBMITTED



WES BRIDGER, LAB MANAGER

Bruin Geotechnical Services, Inc.

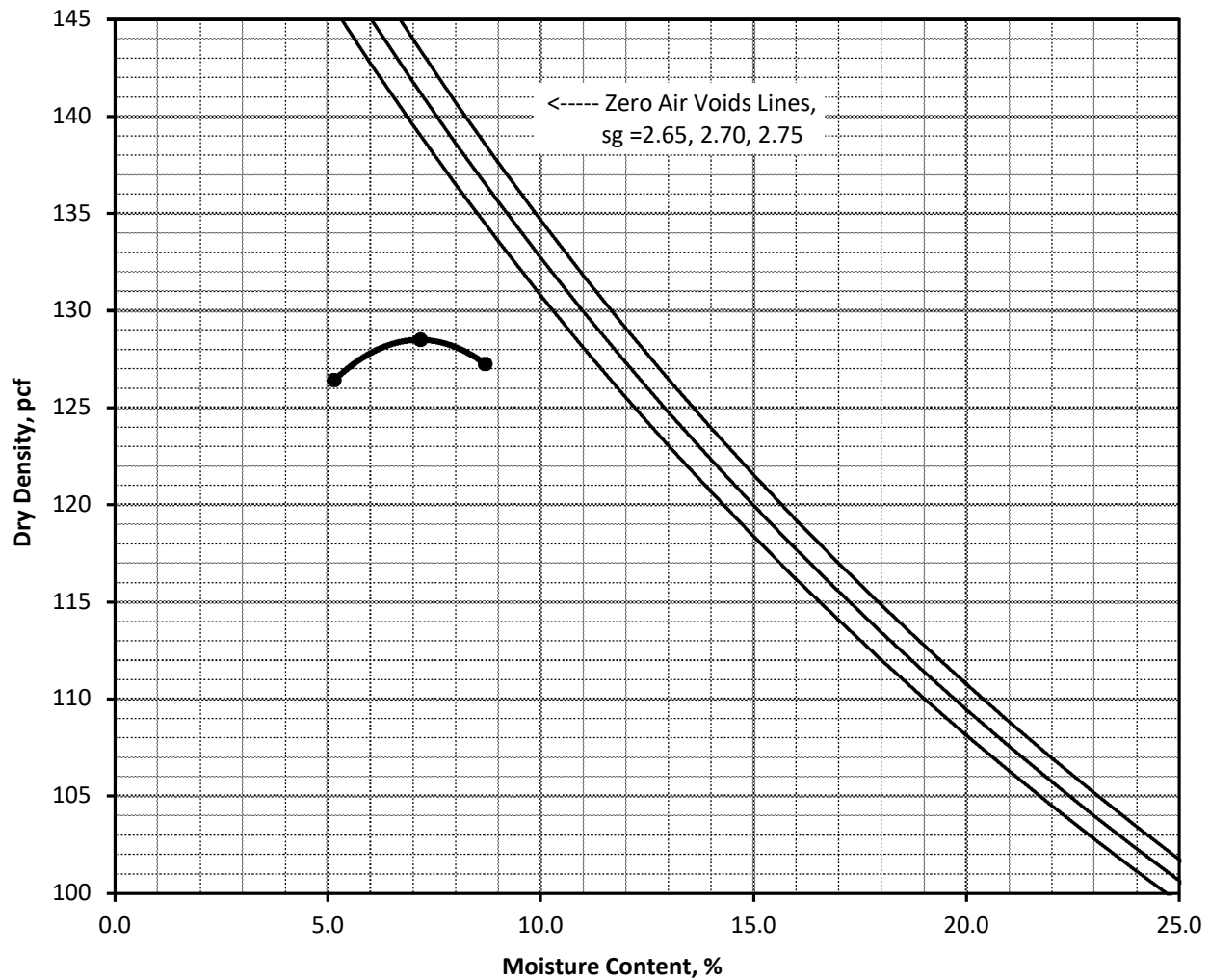
44732 Yucca Avenue
Lancaster, CA 93534
661-273-9078

Maximum Density/Optimum Moisture Proctor ASTM D698/D1557

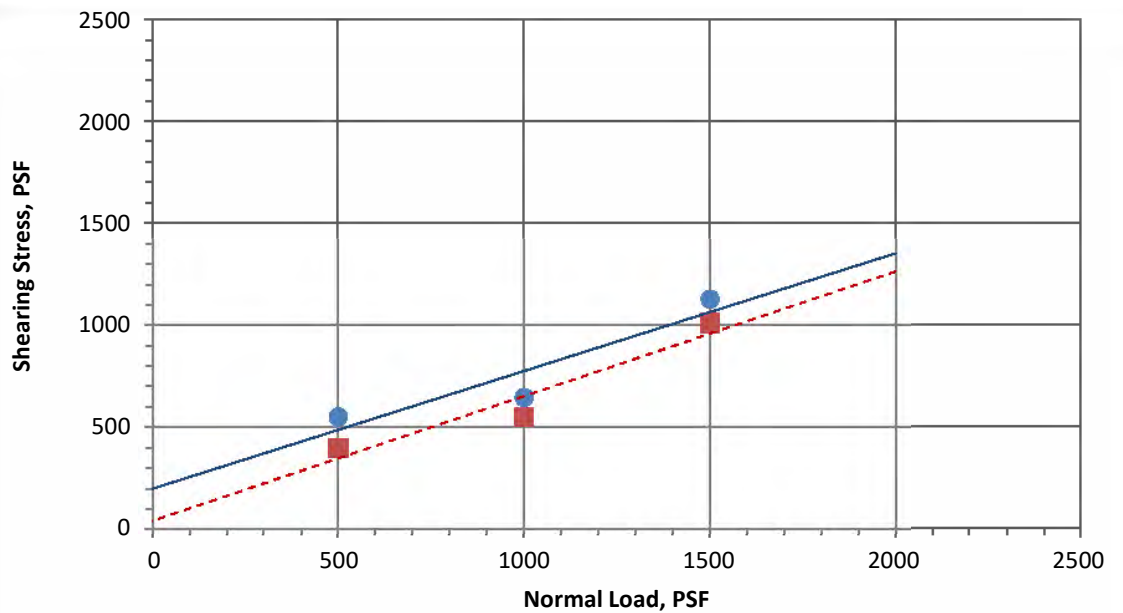
Job Number: 24-108
Client: RCE - Mesa
Sample ID: Bulk Sample 0-5' BGS
Sample Location: B1
Description: (SM) Brown silty fine to medium sand w/ coarse sand & occ. #4-3/8" gravel

ASTM D 1557 A
Rammer Type: 10#

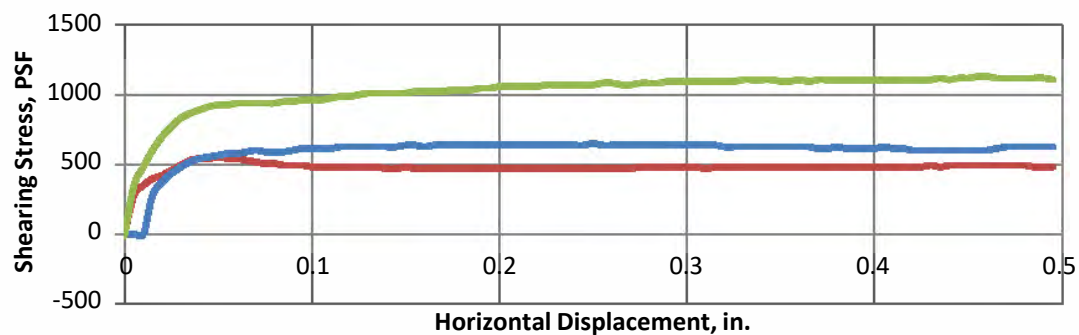
Maximum Density: **128.2**
Optimum Moisture: **7.1**



---- Zero Air Voids Line, Specific Gravity: 2.7 (assumed)



● Peak Shearing Stress, PSF ■ Ultimate Shearing Stress, PSF — Peak - - - Ultimate



— 500 psf — 1000 psf — 1500 psf

Sample Description: (SM) - Brown silty fine to medium sand w/ coarse sand and occ. #4-3/8" gravel

DIRECT SHEAR DATA (ASTM D-3080)

Sample ID	Symbol	Depth, feet	Dry Density, PCF	Average deg. of saturation
B1	●	0-5'	113	86

* Sample remolded to 90% relative compaction as determined by ASTM D-1557 Test Method

	Peak	Ultimate
Angle of friction, (degrees)	30	31
Cohesive Strength (PSF)	200	43

Direct Shear Test

RCE - Mesa



24-108

APPENDIX C

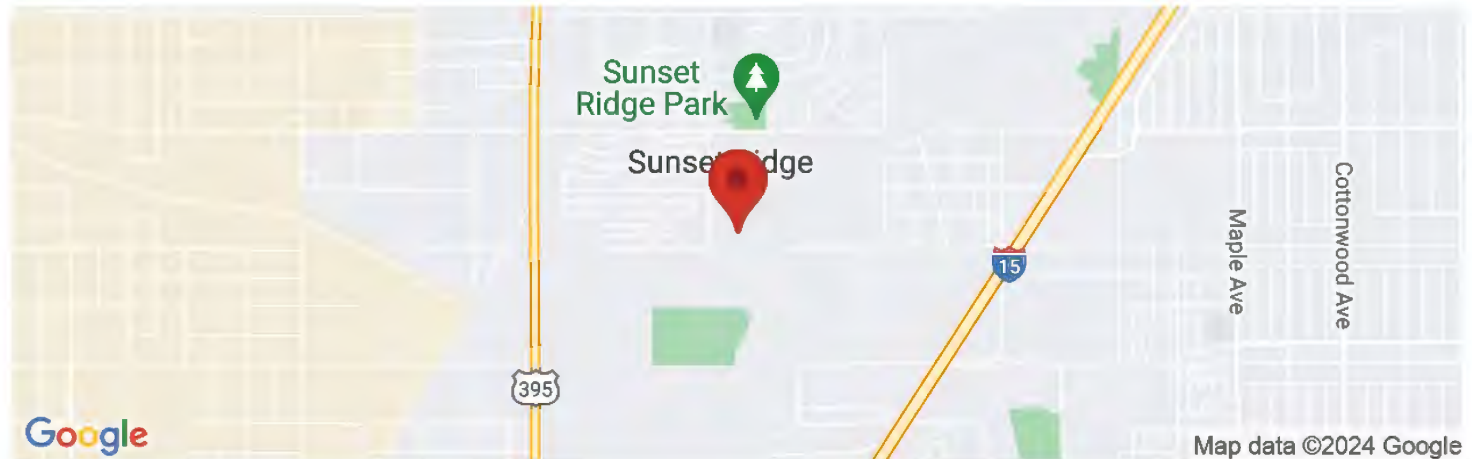
USGS Seismic Design Summary Report

USGS web services were down for some period of time and as a result this tool wasn't operational, resulting in *timeout error*.
USGS web services are now operational so this tool should work as expected.



24-108 RCE

Latitude, Longitude: 34.44944264, -117.38432069



Date	4/1/2024, 12:10:57 PM
Design Code Reference Document	ASCE7-16
Risk Category	II
Site Class	D - Default (See Section 11.4.3)

Type	Value	Description
S_S	1.427	MCE_R ground motion. (for 0.2 second period)
S_1	0.553	MCE_R ground motion. (for 1.0s period)
S_{MS}	1.712	Site-modified spectral acceleration value
S_{M1}	null -See Section 11.4.8	Site-modified spectral acceleration value
S_{DS}	1.141	Numeric seismic design value at 0.2 second SA
S_{D1}	null -See Section 11.4.8	Numeric seismic design value at 1.0 second SA

Type	Value	Description
SDC	null -See Section 11.4.8	Seismic design category
F_a	1.2	Site amplification factor at 0.2 second
F_v	null -See Section 11.4.8	Site amplification factor at 1.0 second
PGA	0.5	MCE_G peak ground acceleration
F_{PGA}	1.2	Site amplification factor at PGA
PGA_M	0.6	Site modified peak ground acceleration
T_L	12	Long-period transition period in seconds
SsRT	1.427	Probabilistic risk-targeted ground motion. (0.2 second)
SsUH	1.539	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
SsD	1.5	Factored deterministic acceleration value. (0.2 second)
S1RT	0.553	Probabilistic risk-targeted ground motion. (1.0 second)
S1UH	0.61	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S1D	0.6	Factored deterministic acceleration value. (1.0 second)
PGAd	0.5	Factored deterministic acceleration value. (Peak Ground Acceleration)
PGA_{UH}	0.611	Uniform-hazard (2% probability of exceedance in 50 years) Peak Ground Acceleration
C_{RS}	0.927	Mapped value of the risk coefficient at short periods
C_{R1}	0.906	Mapped value of the risk coefficient at a period of 1 s
C_v	1.385	Vertical coefficient

DISCLAIMER

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APPENDIX D

General Earthwork and Grading Guidelines

Earthwork and Grading Specifications for Rough Grading

1.0 General

1.1 Intent: These General Earthwork and Grading Specifications are for the grading and earthwork shown on the approved grading plan(s) and/or indicated in the geotechnical report(s). These Specifications are a part of the recommendations contained in the geotechnical report(s). In case of conflict, the specific recommendations in the geotechnical report shall supersede these more general Specifications. Observations of the earthwork by the project Geotechnical Consultant during the course of grading may result in new or revised recommendations that could supersede these specifications or the recommendations in the geotechnical report(s).

1.2 The Geotechnical Consultant of Record: Prior to commencement of work, the owner shall employ a qualified Geotechnical Consultant of Record (Geotechnical Consultant). The Geotechnical Consultant shall be responsible for reviewing the approved geotechnical report(s) and accepting the adequacy of the preliminary geotechnical findings, conclusions, and recommendations prior to the commencement of the grading.

Prior to commencement of grading, the Geotechnical Consultant shall review the “work plan” prepared by the Earthwork Contractor (Contractor) and schedule sufficient personnel to perform the appropriate level of observations, mapping, and compaction testing.

During the grading and earthwork operations, the Geotechnical Consultant shall observe, map, and document the subsurface exposures to verify the geotechnical design assumptions. If the observed conditions are found to be significantly different than the interpreted assumptions during the design phase, the Geotechnical Consultant shall inform the owner, recommend appropriate changes in design to accommodate the observed conditions, and notify the review agency where required.

The Geotechnical Consultant shall observe the moisture-conditioning and processing of the subgrade and fill materials and perform relative compaction testing of fill to confirm that the attained level of compaction is being accomplished as specified. The Geotechnical Consultant shall provide the test results to the owner and the Contractor on a routine and frequent basis.

1.3 The Earthwork Contractor: The Earthwork Contractor (Contractor) shall be qualified, experienced, and knowledgeable in earthwork logistics, preparation and processing of ground to receive fill, moisture-conditioning and processing of fill, and compacting fill. The Contractor shall review and accept plans, geotechnical report(s), and these Specifications prior to commencement of grading. The Contractor shall be solely responsible for performing the grading in accordance with the project plans and specifications. The Contractor shall prepare and submit to the owner and the Geotechnical Consultant a work plan that indicates the sequence of earthwork grading, the number of “equipment” of work and the estimated quantities of daily earthwork contemplated for the site prior to commencement of

grading. The Contractor shall inform the owner and the Geotechnical Consultant of changes in work schedules and updates to the work plan at least 24 hours in advance of such changes so that appropriate personnel will be available for observation and testing. The Contractor shall not assume that the Geotechnical Consultant is aware of all grading operations.

The Contractor shall have the sole responsibility to provide adequate equipment and methods to accomplish the earthwork in accordance with the applicable grading codes and agency ordinances, these Specifications, and the recommendations in the approved geotechnical report(s) and grading plan(s). If, in the opinion of the Geotechnical Consultants, unsatisfactory conditions, such as unsuitable soil, improper moisture-condition, inadequate compaction, insufficient buttress key size, adverse weather, etc., are resulting in a quality of work less than required in the specifications, the Geotechnical Consultant shall reject the work and may recommend to the owner that construction be stopped until the conditions are rectified. It is the contractor's sole responsibility to provide proper fill compaction.

2.0 Preparation of Areas to be Filled

- 2.1 Clearing and Grubbing:** Vegetation, such as brush, grass, roots, and other deleterious material shall be sufficiently removed and properly disposed of in a method acceptable to the owner, governing agencies, and the Geotechnical Consultant.

The Geotechnical Consultant shall evaluate the extent of these removals depending on specific site conditions. Earth fill material shall not contain more than 1 percent of organic materials (by volume). No fill lift shall contain more than 10 percent of organic matter. Nesting of the organic materials shall not be allowed.

If potentially hazardous materials are encountered, the Contractor shall stop work in the affected area, and a hazardous material specialist shall be informed immediately for proper evaluation and handling of these materials prior to continuing to work in that area.

As presently defined by the State of California, most refined petroleum products (gasoline, diesel fuel, motor oil, grease, coolant, etc.) have chemical constituents that are considered to be hazardous waste. As such, the indiscriminant dumping or spillage of these fluids onto the ground may constitute a misdemeanor, punishable by fines and/or imprisonment, and shall not be allowed. The contractor is responsible for all hazardous waste relating to his work. The Geotechnical Consultant does not have expertise in this area. If hazardous waste is a concern, then the Client should acquire the services of a qualified environmental assessor.

- 2.2 Processing:** Existing ground that has been declared satisfactory for support of fill by the Geotechnical Consultant shall be scarified to a minimum depth of 6 inches. Existing ground that is not satisfactory shall be overexcavated as specified in the following section. Scarification shall continue until soils are broken down and free from oversize material and the working surface is reasonably uniform, flat, and free from uneven features that would inhibit uniform compaction.

- 2.3 **Overexcavation:** In addition to removals and overexcavations recommended in the approved geotechnical report(s) and the grading plan, soft, loose, dry, saturated, spongy, organic-rich, highly fractured or otherwise unsuitable ground shall be overexcavated to competent ground as evaluated by the Geotechnical Consultant during grading.
- 2.4 **Benching:** Where fills are to be placed on ground with slopes steeper than 5:1 (horizontal to vertical units), the ground shall be stepped or benched. The lowest bench or key shall be a minimum of 15 feet wide and at least 2 feet deep, into competent material as evaluated by the Geotechnical Consultant. Other benches shall be excavated a minimum height of 4 feet into competent material or as otherwise recommended by the Geotechnical Consultant. Fill placed on ground sloping flatter than 5:1 shall also be benched or otherwise overexcavated to provide a flat subgrade for the fill.
- 2.5 **Evaluation/Acceptance of Fill Areas:** All areas to receive fill, including removal and processed areas, key bottoms, and benches, shall be observed, mapped, elevations recorded, and/or tested prior to being accepted by the Geotechnical Consultant as suitable to receive fill. The Contractor shall obtain a written acceptance from the Geotechnical Consultant prior to fill placement. A licensed surveyor shall provide the survey control for determining elevations of processed areas, keys, and benches.

3.0 **Fill Material**

- 3.1 **General:** Material to be used as fill shall be essentially free of organic matter and other deleterious substances evaluated and accepted by the Geotechnical Consultant prior to placement. Soils of poor quality, such as those with unacceptable gradation, high expansion potential, or low strength shall be placed in areas acceptable to the Geotechnical Consultant or mixed with other soils to achieve satisfactory fill material.
- 3.2 **Oversize:** Oversize material defined as rock, or other irreducible material with a maximum dimension greater than 8 inches, shall not be buried or placed in fill unless location, materials, and placement methods are specifically accepted by the Geotechnical Consultant. Placement operations shall be such that nesting of oversized material does not occur and such that oversize material is completely surrounded by compacted or densified fill. Oversize material shall not be placed within 10 vertical feet of finish grade or within 2 feet of future utilities or underground construction.
- 3.3 **Import:** If importing of fill material is required for grading, proposed import material shall meet the requirements of the geotechnical report(s). The potential import source shall be given to the Geotechnical Consultant at least 48 hours (2 working days) before importing begins so the suitability can be determined and appropriate tests performed.

4.0 **Fill Placement and Compaction**

- 4.1 **Fill Layers:** Approved fill material shall be placed in areas prepared to receive fill in near-horizontal layers not exceeding 8 inches in loose thickness. The Geotechnical Consultant may accept thicker layers if testing indicates that grading procedures can adequately compact the thicker layers. Each layer shall be spread evenly and mixed thoroughly to attain relative uniformity of material and moisture throughout.
- 4.2 **Fill Moisture Conditioning:** Fill soils shall be watered, dried back, blended, and/or mixed, as necessary to attain relatively uniform moisture content within 2% of optimum. Maximum density and optimum soil moisture content tests shall be performed in accordance with the American Society of Testing and Materials (ASTM Test Method D1557-91).
- 4.3 **Compaction of Fill:** After each layer has been moisture-conditioned, mixed, and evenly spread, it shall be uniformly compacted to not less than 90 percent of maximum dry density (ASTM Test Method D1557-91). Compaction equipment shall be adequately sized and be either specifically designed for soil compaction or of proven reliability to efficiently achieve the specified level of compaction with uniformity.
- 4.4 **Compaction of Fill Slopes:** In addition to normal compaction procedures specified above, compaction of slopes, shall be accomplished by backrolling of slopes with sheepfoot rollers at increments of 3 to 4 feet in fill elevation, or by other methods producing satisfactory results acceptable to the Geotechnical Consultant. Upon completion of grading, relative compaction of the fill, out to the slope face, shall be at least 90 percent of maximum density per ASTM Test Method D1557-91.
- 4.5 **Compaction Testing:** Field tests for moisture content and relative compaction of the fill soils shall be performed by the Geotechnical Consultant. Location and frequency of tests shall be at the Consultant's discretion based on field conditions encountered. Compaction test locations will not necessarily be selected on a random basis. Test locations shall be selected to verify adequacy of compaction levels in areas that are judged to be prone to inadequate compaction (such as close to slope faces and at the fill/bedrock benches).
- 4.6 **Frequency of Compaction Testing:** Tests shall be taken at intervals not exceeding 2 feet in vertical rise and/or 1,000 cubic yards of compacted fill soils embankment. In addition, as a guideline, at least one test shall be taken on slope faces for each 5,000 square feet of slope face and/or each 10 feet of vertical height of slope. The Contractor shall assure that fill construction is such that the testing schedule can be accomplished by the Geotechnical Consultant. The Contractor shall stop or slow down the earthwork construction if these minimum standards are not met.
- 4.7 **Compaction Test Locations:** The Geotechnical Consultant shall document the approximate elevation and horizontal coordinates of each test location. The Contractor shall coordinate with the project surveyor to assure that sufficient grade stakes are established so that the Geotechnical Consultant can determine the test locations with sufficient accuracy. At a minimum, two grade stakes within a horizontal distance of 100 feet and vertically less than 5 feet apart from potential test locations shall be provided.

5.0 Subdrain Installation

Subdrain systems shall be installed in accordance with the approved geotechnical report(s), the grading plan, and the Standard Details. The Geotechnical Consultant may recommend additional subdrains and/or changes in subdrain extent, location, grade, or material depending on conditions encountered during grading. All subdrains shall be surveyed by a land survey/civil engineer for line and grade after installation and prior to burial. Sufficient time should be allowed by the Contractor for these surveys.

6.0 Excavation

Excavations, as well as over-excavation for remedial purposes, shall be evaluated by the Geotechnical Consultant during grading. Remedial removal depths shown on geotechnical plans are estimates only. The actual extent of removal shall be determined by the Geotechnical Consultant based on the field evaluation of exposed conditions during grading. Where fill-over-cut slopes are to be graded, the cut portion of the slope shall be made, evaluated, and accepted by the Geotechnical Consultant prior to placement of materials for construction of the fill portion of the slope, unless otherwise recommended by the Geotechnical Consultant.

7.0 Trench Backfills

- 7.1** The Contractor shall follow all OSHA and Cal/OSHA requirements for safety of trench excavations.
- 7.2** All bedding and backfill of utility trenches shall be done in accordance with the applicable provisions of Standard Specifications of Public Works Construction. Bedding Material shall have a Sand Equivalent greater than 30 (SE>30). The bedding shall be placed to 1 foot over the top of the conduit and densified by jetting. Backfill shall be placed and densified to a minimum of 90 percent of maximum from 1 foot above the top of the conduit to the surface.
- 7.3** The jetting of the bedding around the conduits shall be observed by the Geotechnical Consultant.
- 7.4** The Geotechnical Consultant shall test the trench backfill for relative compaction. At least one test should be made for every 300 feet of trench and 2 feet of fill.
- 7.5** Lift thickness of trench backfill shall not exceed those allowed in the Standard Specifications of Public Works Construction unless the Contractor can demonstrate to the Geotechnical Consultant that the fill lift can be compacted to the minimum relative compaction by his alternative equipment and method.