

APPENDIX E – HYDROLOGY AND HYDRAULICS REPORT



HYDROLOGY AND HYDRAULICS REPORT
GRAND AVE FLEET GARAGE
1300 TO 1400 S. GRAND AVENUE
SANTA ANA, CALIFORNIA

by
Haley & Aldrich, Inc.
Tucson, Arizona

for
Chambers Group Inc.
Costa Mesa, California

File No. 0213742
December 2025

DRAFT





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December 19, 2025
File No. 0213742

Chambers Group Inc.
3151 Airway Ave, Suite F208
Costa Mesa, California 92626

Attention: Lisa Louie, Senior Project Manager

Subject: Hydrology and Hydraulics Report on Grand Ave Fleet Garage
1300 to 1400 S. Grand Avenue, Santa Ana, California

Dear Ms. Louie,

Haley & Aldrich, Inc. (Haley & Aldrich) is pleased to submit this preliminary draft Hydrology and Hydraulics Report for the proposed Orange County Fleet Facility located at 1300-1400 S. Grand Avenue in Santa Ana, California.

Please note that this report and the calculations herein are based on preliminary assumptions and conceptual site layouts. They are intended to provide an initial framework for stormwater compliance and design considerations. A future, updated version will be prepared once detailed survey data, finalized building footprints, and additional project information become available.

The analysis addresses pre- and post-development hydrologic conditions, identifies potential increases in runoff, and recommends mitigation measures such as underground detention and water quality best management practices (BMPs). Hydraulic design considerations for storm drain infrastructure are also summarized to maintain system performance under design storm conditions.

We appreciate the opportunity to support this project and look forward to collaborating on the next steps. Please contact us with any questions or comments.

Sincerely yours,
HALEY & ALDRICH, INC.

Christopher G. Langham, P.E., CFM
Technical Expert, Water Resources
Enclosures

To Be Determined

SIGNATURE PAGE FOR

**HYDROLOGY AND HYDRAULICS REPORT
GRAND AVE FLEET GARAGE
1400 S. GRAND AVENUE
SANTA ANA, CALIFORNIA**

**PREPARED FOR
CHAMBERS GROUP INC.
COSTA MESA, CALIFORNIA**

PREPARED BY:

Christopher G. Langham, P.E., CFM
Technical Expert, Water Resources
Haley & Aldrich, Inc.

REVIEWED AND APPROVED BY:

To Be Determined

To Be Determined

Executive Summary

This preliminary draft Hydrology and Hydraulics Report evaluates stormwater management requirements for the proposed Orange County Fleet Facility located at 1300 to 1400 S. Grand Avenue in Santa Ana, California (Site). The project consolidates fleet operations on two parcels totaling approximately 11.3 acres, with improvements including two primary buildings, expanded access roads, surface parking, and a solar canopy.

The Site is currently developed with paved surfaces and drains via sheet flow to the municipal storm drain system. Post-development conditions will increase impervious coverage and therefore increase runoff potential. Hydrologic analysis using the Modified Rational Method indicates that unmitigated 100-year peak flows could increase from approximately 23 to 48 cubic feet per second (cfs).

Important Note: All calculations and assumptions presented in this report are preliminary and based on conceptual plans. They are subject to refinement during detailed design once survey data and finalized building footprints are available.

To comply with Orange County standards (Orange County Environmental Management Agency, 1986) and the Drainage Area Master Plan (DAMP), mitigation measures such as underground detention and water quality best management practices (BMPs) will be incorporated so that post-development discharge does not exceed existing conditions. Hydraulic design will utilize Manning's equation and HY-8 or stormwater design software to size storm drain infrastructure capable of conveying mitigated flows without surcharge, and maintaining hydraulic grade lines below finished grade. Final sizing and configuration will be refined during detailed design based on survey data and finalized building footprints.

This report provides an initial framework for stormwater compliance and outlines next steps for detailed design, including detention system sizing, BMP selection, and connection to the municipal storm drain system.

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1. Introduction

1.1 PROJECT DESCRIPTION AND PURPOSE

This preliminary draft hydrology and hydraulics report provides an initial evaluation of stormwater management requirements for the proposed Orange County Fleet Facility located at 1300 - 1400 S. Grand Avenue in Santa Ana, California (Site).

The proposed development encompasses two contiguous parcels totaling approximately 11.3 acres in Santa Ana, California. Orange County intends to consolidate its fleet operations at this location to improve efficiency, reduce redundancy, and position services adjacent to the Civic Center. The project footprint will occupy roughly 200,000 square feet (4.59 acres) and include two primary structures:

- **Fleet Maintenance and Administration Building:** approximately 45,706 square feet, housing vehicle service bays, administrative offices, technician workspaces, and storage areas.
- **Operations Support Building:** approximately 20,000 square feet, designed to accommodate future facility operations.

Additional Site improvements include a solar canopy over designated parking areas, expanded surface parking, an extended access road (approximately 50,000 square feet), and a disposal lot of roughly 10,000 square feet. Two points of ingress and egress will provide efficient circulation for fleet vehicles and staff.

Important Note: This report is based on conceptual site layouts and preliminary assumptions. Calculations and design recommendations herein are intended for planning purposes only and will be refined in a future version once detailed survey data, finalized building footprints, and additional project information become available.

The purpose of this report is to outline initial hydrologic and hydraulic considerations and provide a framework for a stormwater management system that complies with Orange County standards (Orange County Environmental Management Agency, 1986). Specifically, the analysis demonstrates that preliminary estimates of post-development peak flows relative to pre-development conditions at the point of connection to the municipal storm drain system along Grand Avenue, consistent with the Orange County Drainage Area Master Plan (DAMP). The report also identifies water quality requirements and mitigation measures necessary to comply with the California Environmental Quality Act (CEQA) and local regulatory criteria.

2. Project Site Conditions

2.1 EXISTING SITE (PRE-DEVELOPMENT) CONDITIONS

The Site consists of two parcels totaling approximately 11.3 acres. The area is largely developed with paved surfaces, storage areas, and minor landscaping. Topography is generally level with slight grading typical of urban parcels, sloping from north to south. Stormwater runoff sheet flows toward the centerline concrete gutter within the Paved Apron and Alley Layout (PAAL) and is collected into municipal storm drains. No natural drainage channels are present.

Note: Existing condition descriptions are based on available mapping and conceptual information. These will be confirmed during detailed survey and geotechnical investigations. See Appendix A for Existing Conditions Preliminary Map and Plan of Operations.

2.2 PROPOSED SITE (POST-DEVELOPMENT) CONDITIONS

The proposed development will convert the parcels into a centralized fleet operations facility with two primary buildings, expanded access roads, and associated infrastructure. Impervious coverage will increase significantly, resulting in higher runoff potential.

To address this, the conceptual design will incorporate the following:

- an internal storm drain network;
- underground detention facilities; and
- water quality best management practices (BMPs; e.g., modular wetlands or bioretention)

These measures are preliminary recommendations intended to support compliance with the Orange County Hydrology Manual (Orange County Environmental Management Agency, 1986). Final sizing and configuration will be refined during detailed design once survey data and finalized building footprints are available. See Appendix A for Proposed Conditions Preliminary Map and Plan of Operations.

2.3 PRECIPITATION

The Site is located in Santa Ana, California, within a semi-arid Mediterranean climate zone characterized by mild, wet winters and hot, dry summers. Average annual rainfall ranges from approximately 13 to 15 inches, with most precipitation occurring between November and March. Storm events are typically short-lived but can produce high-intensity rainfall during winter frontal systems and occasional atmospheric river conditions.

Hydrologic criteria for this project follow Orange County standards (Orange County Environmental Management Agency, 1986), which establish design storms with 24-hour durations for return periods of 2, 10, and 100 years to provide adequate protection of critical infrastructure.

Important Note: Rainfall intensities and design storm assumptions are based on National Oceanic and Atmospheric Administration (NOAA Atlas 14 data and Orange County criteria). These values are preliminary and subject to confirmation during detailed design (see rainfall data in Appendix B).

Table I. Santa Ana Rain Fall Intensities

Return Period	24-Hour Rainfall (inches)
2-Year	2.23
10-Year	3.52
25-Year	4.36
100-Year	5.72

2.4 WATERSHED DESCRIPTION

The Site is located within the Newport Bay watershed, which drains to Upper Newport Bay and ultimately the Pacific Ocean. Regional topography slopes gently toward the southwest.
(Preliminary characterization; subject to confirmation during detailed design.)

2.5 SOIL TYPES

The Natural Resources Conservation Service (NRCS) has classified Site soils as Hydrologic Soil Groups B and C, indicating moderate to slow infiltration rates (United States Department of Agriculture [USDA], 2025). See Appendix C for soil type classifications.
(Preliminary; field verification will occur during geotechnical investigations.)

2.6 LAND USE

The Site is zoned as Light Industrial according to the City of Santa Ana zoning map. It has a General Plan land use designation of Industrial and Institutional. Surrounding land uses Light Industrial, Commercial, and Residential Zones.
(Information based on current zoning maps; subject to confirmation.)

2.7 GROUNDWATER

Groundwater conditions are currently unknown and will be confirmed during geotechnical investigations.
(Assumed for preliminary analysis; no groundwater modeling performed at this stage.)

2.8 THE FEDERAL EMERGENCY MANAGEMENT AGENCY MAPPING

The Site is covered by Map Number 06069C0276J of the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) for Orange County, California. Santa Ana, community number 060232. The portion of the Site shown on the map is not within a FEMA-mapped special flood hazard area. The effective FEMA map is dated December 3, 2009 and is provided in the Appendix D.
(Preliminary reference; subject to verification during permitting.)

3. Hydrologic Analysis

3.1 METHODOLOGY

Hydrologic design for this project follows the criteria outlined in the Orange County Hydrology Manual (Orange County Environmental Management Agency, 1986). Runoff estimates were developed using the Modified Rational Method, which is the standard approach for small, urbanized sites in Orange County.

Important Note: All hydrologic calculations presented herein are preliminary and based on conceptual site layouts and assumed drainage patterns. These assumptions will be refined during detailed design once survey data, finalized building footprints, and geotechnical information are available.

Runoff coefficients were selected in accordance with Section D.5 of the Orange County Hydrology Manual, and precipitation intensities were derived from Figure B-3 of the manual. For this preliminary analysis, the Site was delineated as two drainage management areas (DA), pervious and impervious, assumed. The DAs were modeled by adding each area to the mainline at the mainline time of concentration rather than modeling all connections as confluences. This approach is conservative and produces slightly higher peak flow estimates. See Appendix E for Rational Method Calculation Sheets. Supporting calculations are provided in the Appendix E.

Table II. Rational Method Variables

Drainage Area	Area (ac)	C	Tc (min.)
DA-1	0.903	0.13	5
DA-2	4.81	0.90	5

The Site does not fall within a designated hydromodification zone; therefore, analysis of the two-year storm event was not required. Preliminary results indicate that underground detention may be necessary so that post-development discharge does not exceed existing conditions at the point of connection to the public storm drain system. Final determination of detention requirements and detailed design of the storm drain connection will be completed upon receipt of detailed Site survey data and finalized building footprints.

3.2 HYDROLOGIC RESULTS

Preliminary results indicate that unmitigated post-development peak flows could exceed existing conditions, necessitating detention and BMPs to maintain compliance.

Table III. Peak Flow Discharge Analysis

Condition	Area (ac)	100-Year Peak Flow (cfs)
Existing	11.3	22.5
Proposed (unmitigated)	11.3	48.2
Proposed (mitigated)	11.3	<=22.5

Notes and abbreviations:

<=: greater than or equal to

cfs: cubic feet per second

Disclaimer: These values are based on preliminary assumptions and conceptual design. Final sizing and mitigation requirements will be determined during detailed design.

4. Hydraulic Analysis

4.1 METHODOLOGY

Hydraulic calculations for PAAL capacity sizing have been performed using the Manning's equation. HY-8 will be used to verify preliminary pipe capacities and slopes. Storm drain software will be implemented to tie the stormdrain system in to the public system.

Note: All hydraulic design elements described herein are conceptual and intended for planning purposes only. Final pipe sizes, slopes, and material specifications will be determined during detailed design based on survey data and finalized grading plans.

4.2 RESULTS AND CONCLUSIONS

The proposed drainage system will be designed to convey the mitigated 100-year design flow without surcharge and maintain hydraulic grade lines below finished surface elevations. Pipe sizing will account for material type, roughness coefficient, and minimum slope requirements to comply with Orange County standards. A summary of preliminary pipe sizing criteria is provided below:

Pipe Size	Material	Manning 'n'	Slope (%)	Capacity (cfs)
TBD	HDPE/RCP	0.011 to 0.013	≥ 0.50	Varies

Disclaimer: Pipe sizes and capacities shown above are placeholders. Detailed hydraulic modeling will be completed during final design.

Global Disclaimer for Entire Report

This report is a preliminary draft prepared for planning purposes only. All calculations, assumptions, and design recommendations are based on conceptual site layouts and limited available data. Final hydrologic and hydraulic design will be completed upon receipt of detailed survey information, finalized building footprints, and geotechnical data. This document is not intended for construction or permitting.

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References

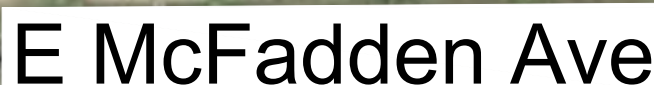
1. Orange County Environmental Management Agency, 1986. *Orange County Hydrology Manual*. October.
2. National Oceanic and Atmospheric Administration (NOAA), 2014. *Atlas 14 Precipitation Data, Volume 6, Version 2*.
3. United States Department of Agriculture (USDA), 2025. *Web Soil Survey, National Cooperative Soil Survey*. September 8.
4. Federal Emergency Management Agency (FEMA), 2009. *FEMA Flood Map, Firm Panel*. Dec 3.

https://haleyaldrich.sharepoint.com/sites/ChambersGroupInc/Shared Documents/0213742.Grand Avenue Fleet Garage/Deliverables/2025-1219_HAI_Grand_Avenue_Fleet_Garage_Hydrology_and_Hydraulics Report_DRAFT.docx

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APPENDIX A
Preliminary Figures



014-161-06

S Grand Ave

988-355-04

014-161-07

014-161-04

014-161-05

988-076-85

014-451-02

LEGEND



Parcel Boundaries

NOTES

1. AERIAL IMAGERY AND SITE PLAN PROVIDED BY CHAMBER GROUP
2. PARCEL DATA OBTAINED FROM ORANGE COUNTY PUBLIC WORKS

**HALEY
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Scale:	AS SHOWN
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Designed By:	H&A
Checked By:	CGL
Approved By:	H&A
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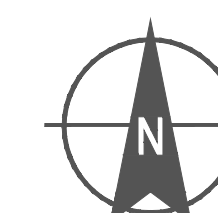
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FLEET SERVICE FACILITY
PROJECT
ORANGE COUNTY,
CALIFORNIA

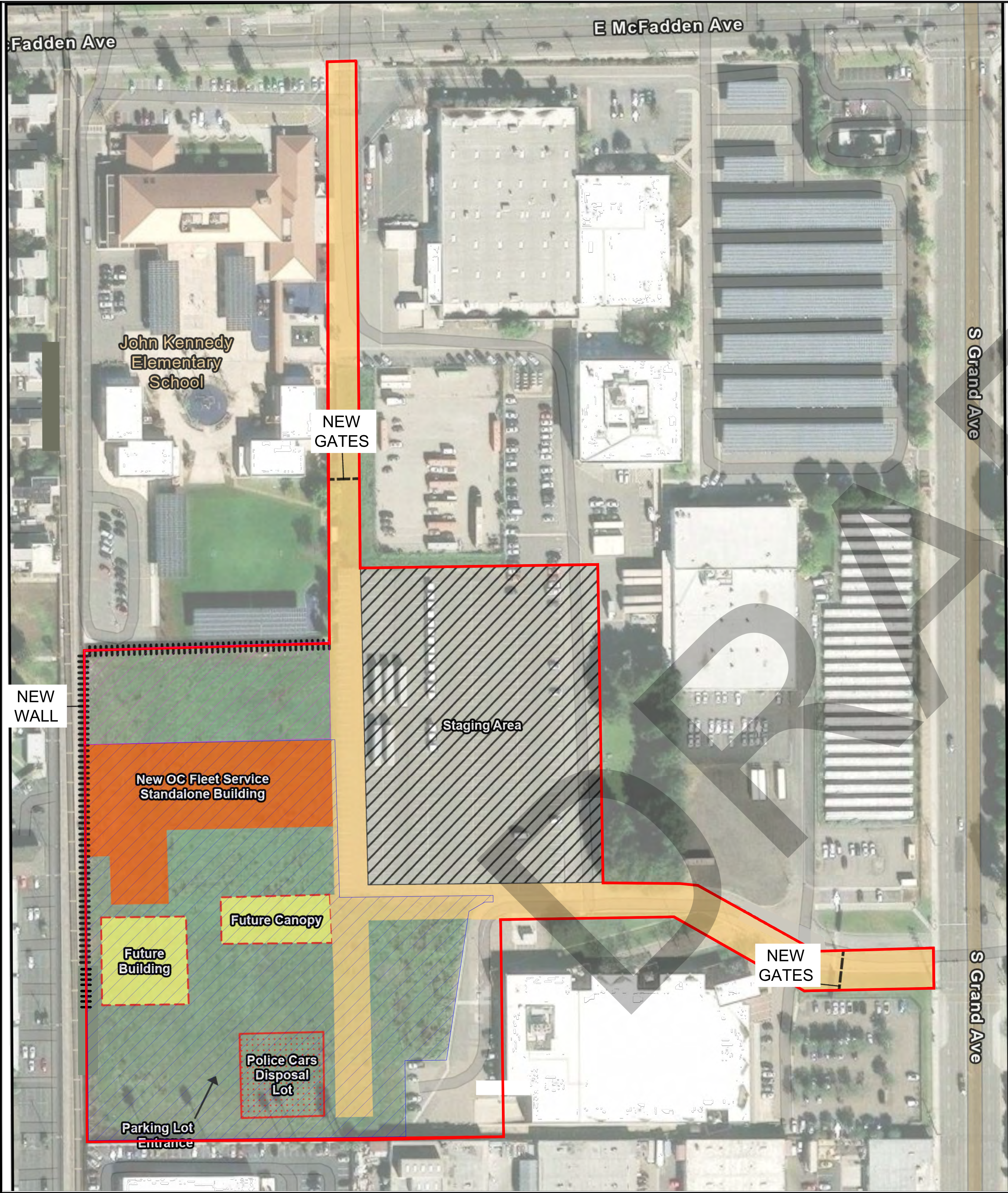
EXISTING
CONDITIONS MAP

C-100

Sheet: 1 of 2



FORITZ, VERONICA P:\144\12\10\2025 9:30 PM Layout: HA-ENG-D1
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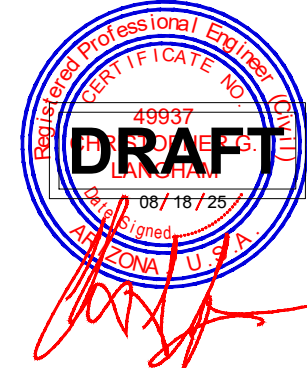


- LEGEND**
- SITE BOUNDARY
 - NEW OC FLEET SERVICE STANDALONE BUILDING
 - PROPOSED STRUCTURES
 - STAGING AREA
 - ACCESS ROAD
 - POLICE CARS DISPOSAL LOT
 - NEW GATES
 - NEW WALL
 - DA - 1
 - DA - 2

- NOTES**
1. AERIAL IMAGERY AND SITE PLAN PROVIDED BY CHAMBER GROUP
 2. PARCEL DATA OBTAINED FROM ORANGE COUNTY PUBLIC WORKS

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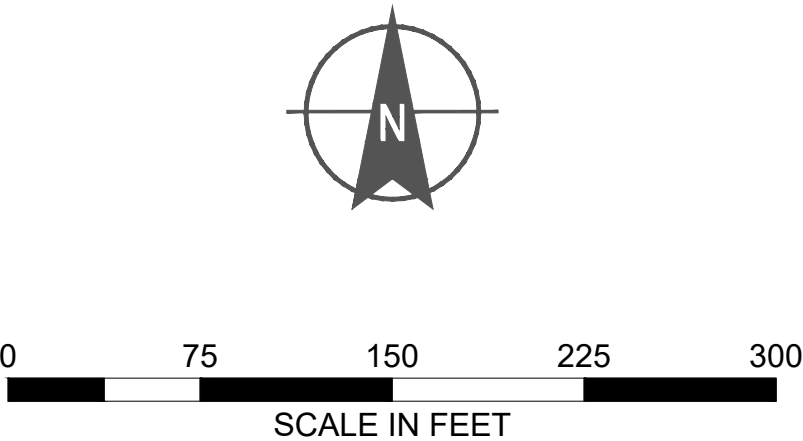


Rev.	Description	By	Date

FLEET SERVICE FACILITY
PROJECT
ORANGE COUNTY,
CALIFORNIA

PLAN OF
OPERATIONS

C-101
Sheet: 5 of 2



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APPENDIX B
NOAA Atlas 14 Data



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 & aerals](#)

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	0.115 (0.096-0.138)	0.150 (0.126-0.181)	0.198 (0.165-0.239)	0.237 (0.197-0.290)	0.292 (0.233-0.369)	0.335 (0.261-0.433)	0.379 (0.288-0.503)	0.425 (0.314-0.581)	0.488 (0.345-0.698)	0.538 (0.367-0.798)
10-min	0.164 (0.138-0.198)	0.215 (0.181-0.260)	0.284 (0.237-0.343)	0.340 (0.282-0.415)	0.419 (0.334-0.529)	0.480 (0.375-0.620)	0.543 (0.413-0.720)	0.609 (0.450-0.832)	0.700 (0.494-1.00)	0.771 (0.525-1.14)
15-min	0.199 (0.167-0.239)	0.261 (0.218-0.314)	0.343 (0.287-0.415)	0.412 (0.341-0.502)	0.506 (0.404-0.640)	0.580 (0.453-0.750)	0.656 (0.500-0.871)	0.736 (0.544-1.01)	0.846 (0.598-1.21)	0.933 (0.635-1.38)
30-min	0.276 (0.232-0.333)	0.363 (0.304-0.437)	0.478 (0.399-0.578)	0.573 (0.474-0.699)	0.704 (0.563-0.891)	0.807 (0.631-1.04)	0.914 (0.695-1.21)	1.02 (0.757-1.40)	1.18 (0.832-1.68)	1.30 (0.884-1.92)
60-min	0.385 (0.323-0.464)	0.505 (0.423-0.609)	0.665 (0.556-0.804)	0.798 (0.661-0.973)	0.981 (0.784-1.24)	1.12 (0.878-1.45)	1.27 (0.968-1.69)	1.43 (1.05-1.95)	1.64 (1.16-2.34)	1.81 (1.23-2.68)
2-hr	0.557 (0.467-0.671)	0.737 (0.617-0.888)	0.972 (0.812-1.18)	1.16 (0.964-1.42)	1.42 (1.14-1.80)	1.63 (1.27-2.10)	1.83 (1.39-2.43)	2.04 (1.51-2.80)	2.33 (1.65-3.34)	2.56 (1.74-3.79)
3-hr	0.692 (0.581-0.834)	0.916 (0.767-1.10)	1.21 (1.01-1.46)	1.44 (1.20-1.76)	1.77 (1.41-2.23)	2.02 (1.57-2.60)	2.27 (1.72-3.01)	2.53 (1.87-3.46)	2.88 (2.03-4.12)	3.15 (2.15-4.68)
6-hr	0.977 (0.820-1.18)	1.29 (1.08-1.56)	1.70 (1.42-2.05)	2.03 (1.68-2.48)	2.48 (1.98-3.14)	2.83 (2.21-3.66)	3.18 (2.42-4.22)	3.55 (2.62-4.85)	4.04 (2.86-5.78)	4.43 (3.02-6.57)
12-hr	1.29 (1.08-1.55)	1.68 (1.41-2.03)	2.21 (1.85-2.68)	2.65 (2.20-3.24)	3.26 (2.60-4.12)	3.73 (2.91-4.82)	4.22 (3.21-5.60)	4.73 (3.49-6.46)	5.43 (3.84-7.76)	5.98 (4.07-8.87)
24-hr	1.71 (1.51-1.97)	2.23 (1.97-2.57)	2.93 (2.58-3.40)	3.52 (3.08-4.12)	4.36 (3.69-5.26)	5.02 (4.16-6.18)	5.72 (4.63-7.20)	6.45 (5.08-8.35)	7.48 (5.66-10.1)	8.30 (6.08-11.6)
2-day	2.11 (1.87-2.44)	2.79 (2.46-3.22)	3.70 (3.25-4.28)	4.46 (3.89-5.20)	5.52 (4.67-6.66)	6.36 (5.27-7.82)	7.23 (5.85-9.11)	8.15 (6.42-10.6)	9.43 (7.14-12.7)	10.5 (7.66-14.6)
3-day	2.40 (2.12-2.77)	3.19 (2.81-3.68)	4.25 (3.74-4.92)	5.13 (4.48-6.00)	6.36 (5.38-7.68)	7.33 (6.08-9.02)	8.34 (6.75-10.5)	9.39 (7.40-12.2)	10.9 (8.22-14.6)	12.0 (8.80-16.8)
4-day	2.58 (2.28-2.98)	3.44 (3.04-3.98)	4.61 (4.06-5.34)	5.58 (4.87-6.52)	6.93 (5.86-8.36)	8.00 (6.63-9.84)	9.10 (7.37-11.5)	10.3 (8.09-13.3)	11.9 (9.00-16.0)	13.2 (9.64-18.4)
7-day	2.94 (2.60-3.39)	3.92 (3.46-4.53)	5.26 (4.63-6.10)	6.40 (5.59-7.48)	8.02 (6.78-9.67)	9.32 (7.73-11.5)	10.7 (8.66-13.5)	12.2 (9.58-15.7)	14.2 (10.8-19.2)	15.9 (11.6-22.2)
10-day	3.17 (2.80-3.66)	4.23 (3.73-4.89)	5.70 (5.02-6.60)	6.96 (6.08-8.13)	8.77 (7.42-10.6)	10.2 (8.50-12.6)	11.8 (9.57-14.9)	13.5 (10.7-17.5)	16.0 (12.1-21.5)	18.0 (13.1-25.0)
20-day	3.84 (3.39-4.43)	5.17 (4.56-5.97)	7.03 (6.19-8.15)	8.65 (7.56-10.1)	11.0 (9.31-13.3)	12.9 (10.7-15.9)	15.0 (12.2-18.9)	17.3 (13.6-22.4)	20.6 (15.6-27.8)	23.4 (17.1-32.6)
30-day	4.54 (4.01-5.24)	6.13 (5.41-7.09)	8.38 (7.38-9.71)	10.3 (9.03-12.1)	13.2 (11.2-15.9)	15.5 (12.9-19.1)	18.1 (14.6-22.8)	20.8 (16.4-27.0)	24.9 (18.8-33.5)	28.2 (20.6-39.3)
45-day	5.32 (4.70-6.14)	7.19 (6.35-8.31)	9.83 (8.65-11.4)	12.1 (10.6-14.2)	15.4 (13.1-18.6)	18.2 (15.1-22.4)	21.1 (17.1-26.6)	24.3 (19.2-31.5)	29.0 (21.9-39.1)	32.9 (24.0-45.8)
60-day	6.22 (5.50-7.19)	8.39 (7.41-9.70)	11.4 (10.1-13.2)	14.0 (12.3-16.4)	17.8 (15.1-21.5)	21.0 (17.4-25.8)	24.3 (19.7-30.6)	27.9 (22.0-36.2)	33.2 (25.1-44.7)	37.5 (27.4-52.3)

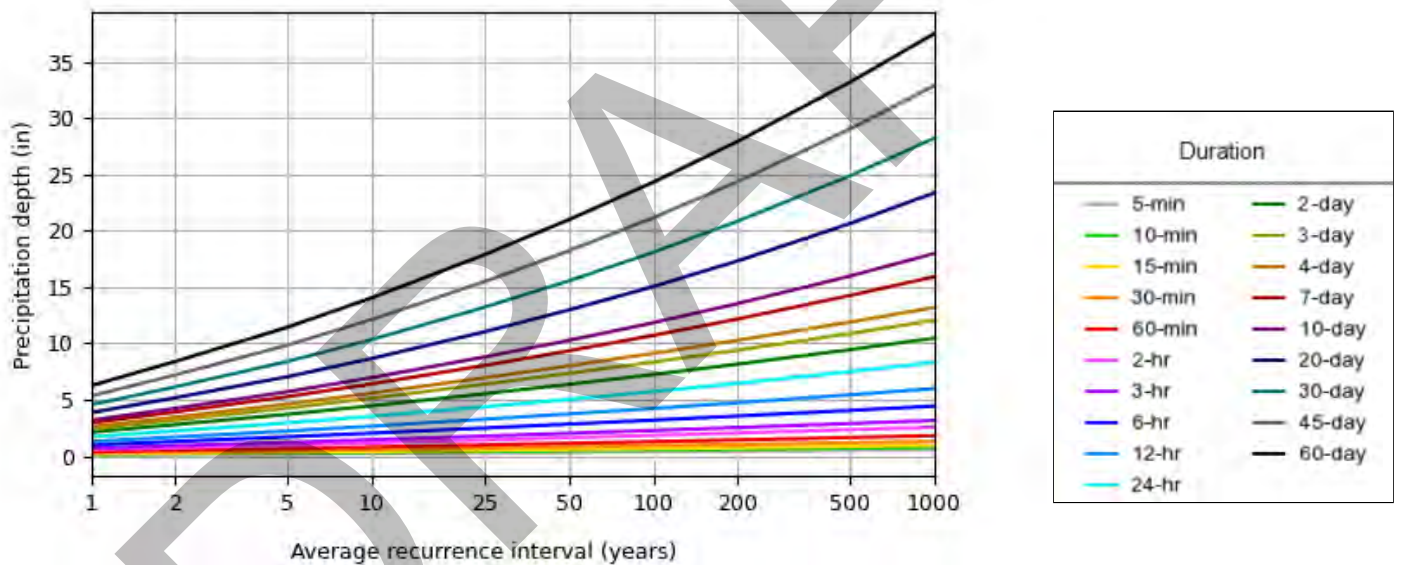
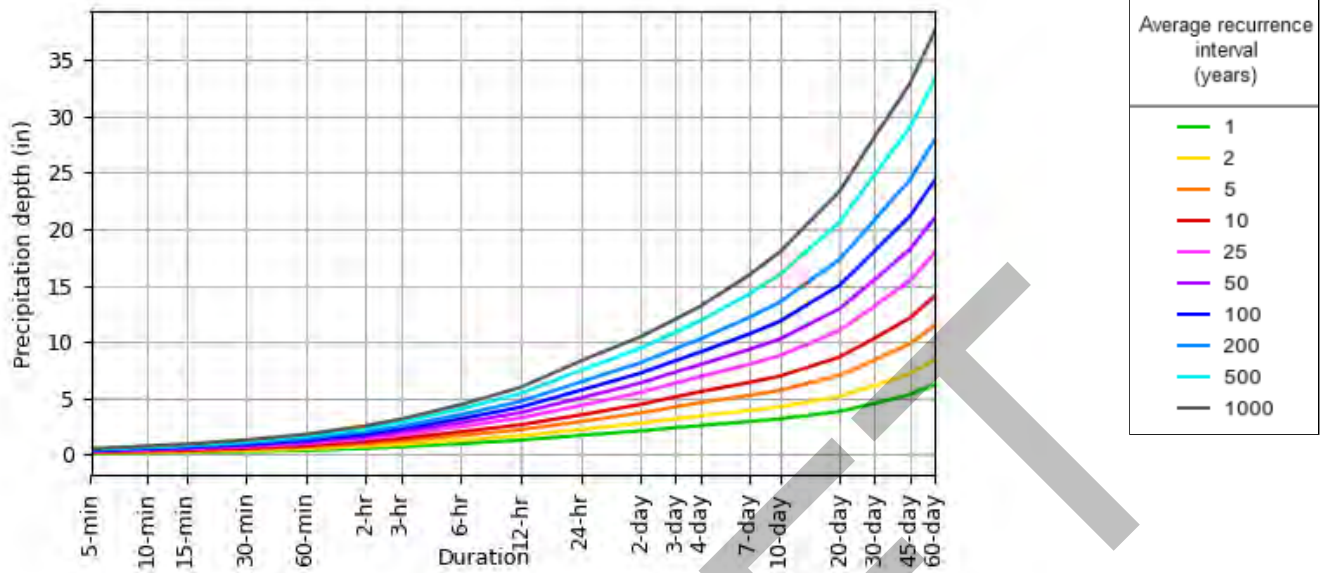
¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.
Please refer to NOAA Atlas 14 document for more information.

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PF graphical

PDS-based depth-duration-frequency (DDF) curves

Latitude: 33.7299°, Longitude: -117.8519°



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ps & aerials

Small scale terrain



Large scale terrain



Large scale map



Large scale aerial



[Back to Top](#)

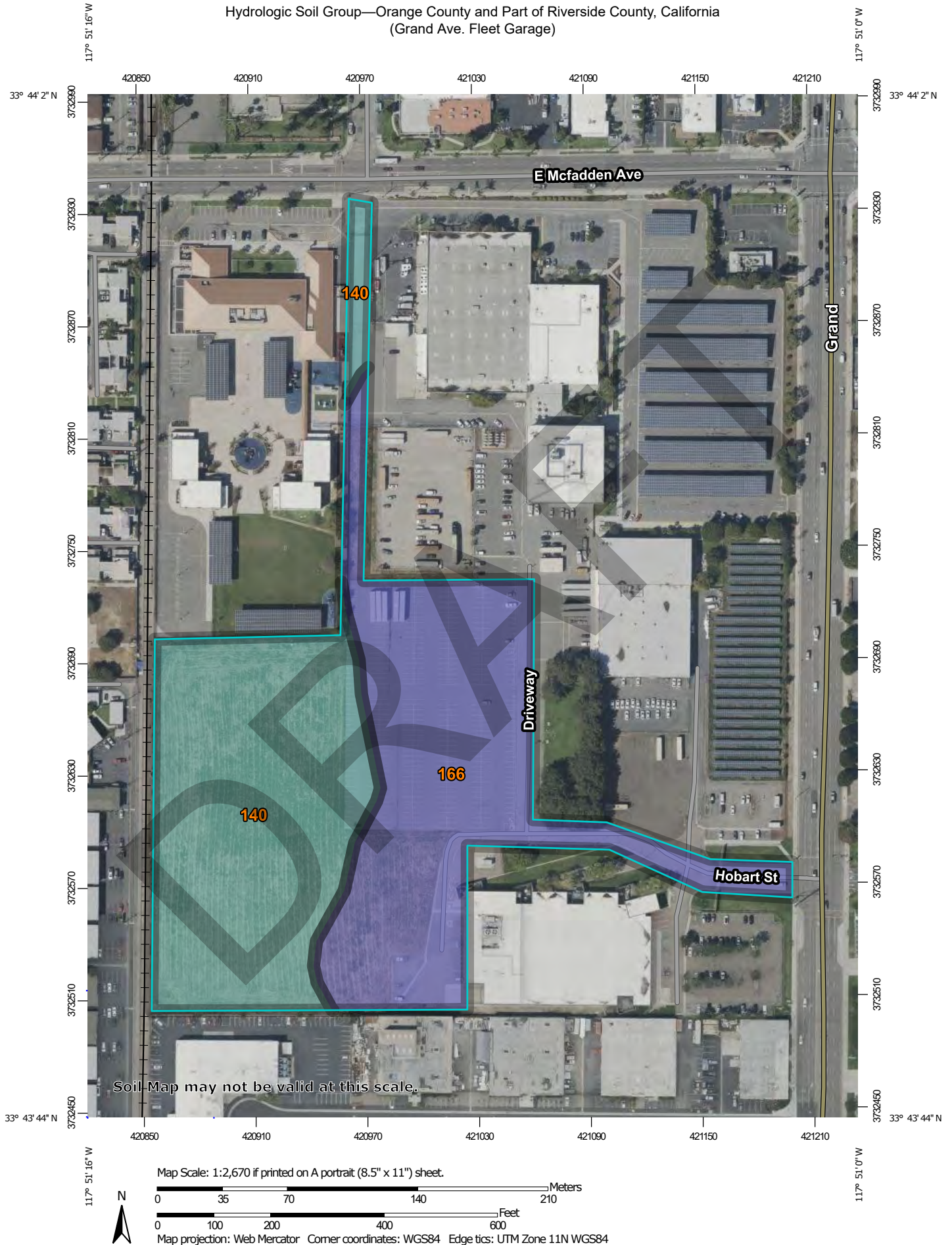
[US Department of Commerce](#)
[National Oceanic and Atmospheric Administration](#)
[National Weather Service](#)
[National Water Center](#)
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

[Disclaimer](#)

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APPENDIX C
NRCS Soils Classifications

Hydrologic Soil Group—Orange County and Part of Riverside County, California
(Grand Ave. Fleet Garage)



Hydrologic Soil Group—Orange County and Part of Riverside County, California
(Grand Ave. Fleet Garage)

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

Soil Rating Polygons

 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Lines

 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Points

 A
 A/D
 B
 B/D

 C
 C/D
 D
 Not rated or not available

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: Orange County and Part of Riverside County, California
Survey Area Data: Version 19, Sep 8, 2025

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 1, 2024—Jul 1, 2024

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.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
140	Chino silty clay loam, drained	C	5.6	49.3%
166	Mocho loam, 0 to 2 percent slopes, warm MAAT, MLRA 19	B	5.7	50.7%
Totals for Area of Interest			11.3	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

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APPENDIX D
FEMA FIRM Map

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The community map repository should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **Floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0 North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations tables in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations tables should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) Zone 11. The horizontal datum was NAD 83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at <http://www.ngs.noaa.gov> or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, NNGS12
National Geodetic Survey
SSM-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242, or visit its website at <http://www.ngs.noaa.gov>.

Base map information shown on this FIRM was derived from the National Agriculture Imagery Program, dated 2005.

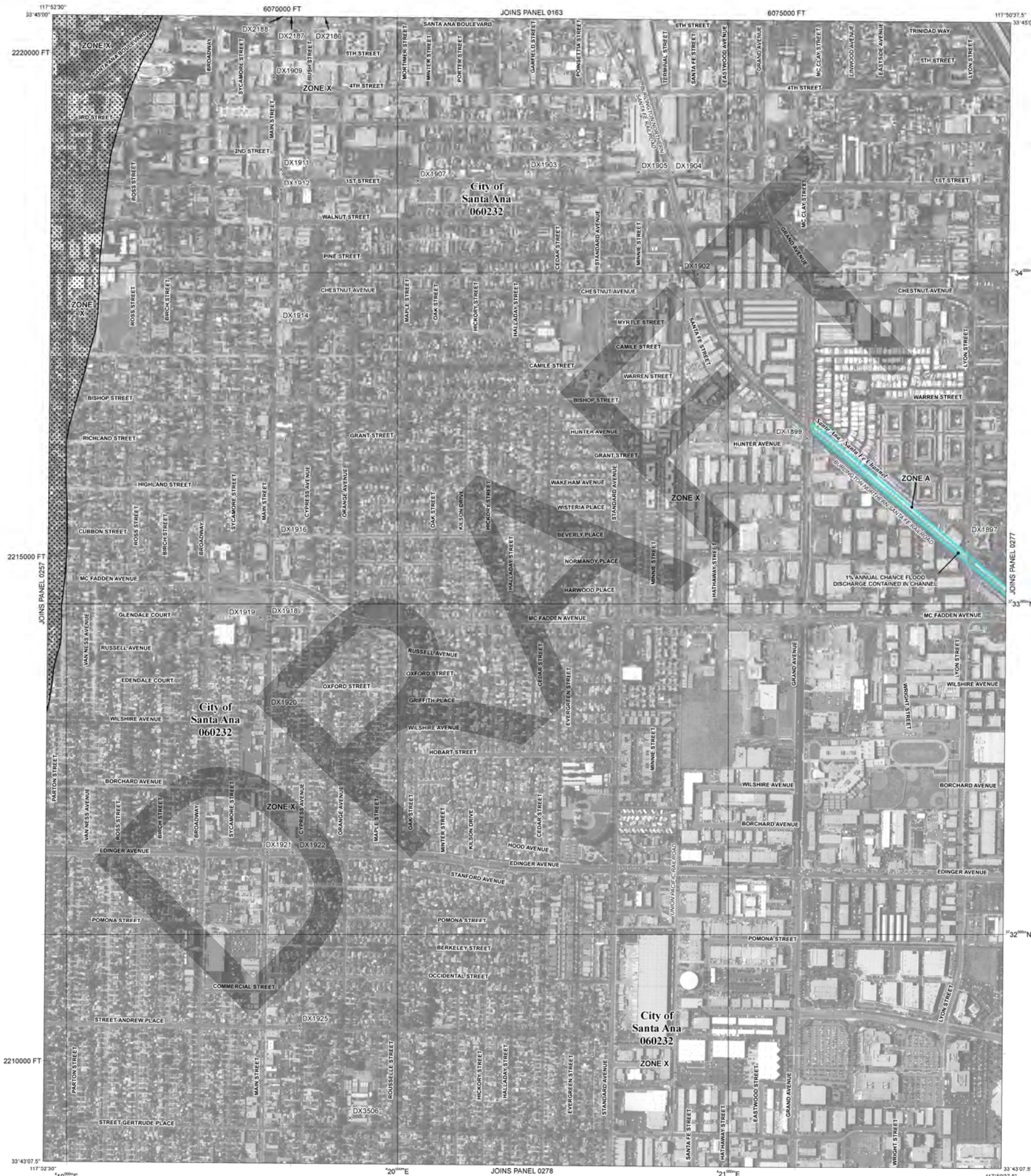
This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels, community map repository addresses, and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-800-358-9618 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at <http://msc.fema.gov>.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call 1-877-FEMA MAP (1-877-336-2627) or visit the FEMA website at <http://www.fema.gov>.



LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AD, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

- ZONE A** No Base Flood Elevations determined.
- ZONE AE** Base Flood Elevations determined.
- ZONE AD** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- ZONE AR** Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently identified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- ZONE A99** Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; No Base Flood Elevations determined.
- ZONE V** Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- ZONE VE** Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities
- Base Flood Elevation line and value; elevation in feet*
- Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

- ⊙ Cross section line
- ⊙ Transsect line
- 87°07'45", 32°22'30" Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
- 76°N 1000-meter Universal Transverse Mercator grid values, zone NAD 1983 UTM Zone 11N
- 600000 FT 5000-foot grid ticks; California State Plane coordinate system, zone VI (FIPSZONE 4606), Lambert Conformal Conic projection
- DX5510 x Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
September 15, 1989

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
February 5, 1982 - November 3, 1993 - January 3, 1997 - February 18, 2004 - December 3, 2009
For description of revisions, see Notice to Users page in the Flood Insurance Study report.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 500 1000 FEET
150 0 150 300 METERS

NFIP

PANEL 0276J

FIRM
FLOOD INSURANCE RATE MAP

ORANGE COUNTY, CALIFORNIA AND INCORPORATED AREAS

PANEL 276 OF 539
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS

COMMUNITY	NUMBER	PANEL	SUFFIX
SANTA ANA, CITY OF	060232	0276	J

Notice to User: The Map Number shown below should be used when placing map orders: the Community Number shown above should be used on insurance applications for the subject community.



MAP NUMBER
06059C0276J

MAP REVISED
DECEMBER 3, 2009

Federal Emergency Management Agency

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APPENDIX E
Rational Method Calculation Output

Duration (Hrs)	Average Recurrence Interval (Yrs)	Intensity	DA-1	DA-2
			Roughness Coefficient	
			0.13	0.9
2	2	0.737	0.087	3.188
2	5	0.972	0.114	4.205
2	10	1.16	0.136	5.018
3	2	0.916	0.108	3.963
3	5	1.21	0.142	5.234
3	10	1.44	0.169	6.229
6	2	1.29	0.151	5.581
6	5	1.7	0.200	7.354
6	10	2.03	0.238	8.782

DA-1 Area: 0.903

DA-2 Area: 4.81

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COUNTY OF ORANGE/SANTA ANA REGION PRIORITY PROJECT
PRELIMINARY WATER QUALITY MANAGEMENT PLAN (WQMP)
GRAND AVENUE FLEET GARAGE
1300 TO 1400 S. GRAND AVENUE
SANTA ANA, CALIFORNIA

by
Haley & Aldrich, Inc.
San Diego, California

for
Chambers Group Inc.
Costa Mesa, California

File No. 0213742
December 2025

DRAFT





HALEY & ALDRICH, INC
5333 Mission Center Road
Suite 300
San Diego, CA 92108
619.280.9210

December 29, 2025
File No. 0213742

Chambers Group Inc.
3151 Airway Avenue, Suite F208
Costa Mesa, California 92626

Attention: Lisa Louie, Senior Project Manager

Subject: Water Quality Management Plan
Grand Avenue Fleet Garage
1300 to 1400 S. Grand Avenue
Santa Ana, California 92705

Dear Ms. Louie,

Haley & Aldrich, Inc. (Haley & Aldrich) is pleased to submit this preliminary draft Water Quality Management Plan (WQMP) for the proposed Orange County Fleet Facility located at 1300-1400 S. Grand Avenue in Santa Ana, California.

This preliminary WQMP has been prepared based on conceptual project information and preliminary assumptions documented in the Preliminary Draft Hydrology and Hydraulic Report, which identifies potential changes in runoff conditions and considers preliminary mitigation concepts, including underground detention and water quality best management practices. Together, the preliminary draft WQMP and the Preliminary Draft Hydrology and Hydraulic Report are intended to provide an initial framework for water quality management, regulatory compliance considerations, and stormwater design concepts to support ongoing project development.

A future updated WQMP will be prepared, concurrently with an updated version of the Hydrology and Hydraulic Report, once detailed survey data, the finalized site layout, building footprints, and additional project information become available.

We appreciate the opportunity to support this project and look forward to continued coordination as the project advances. Please feel free to contact us with any questions or comments.

Sincerely yours,
HALEY & ALDRICH, INC.

Kendra Coblentz, P.E., QSD, QISP
Project Manager, Environmental Engineer
Enclosures

To Be Determined

https://haleyaldrich.sharepoint.com/sites/ChambersGroupInc/Shared Documents/0213742.Grand Avenue Fleet Garage/Deliverables/2025_12_WQMP/2025-1229_HAI_Grand_Avenue_Fleet_Garage_WQMP_DRAFT.docx

DRAFT

SIGNATURE PAGE FOR

**WATER QUALITY MANAGEMENT PLAN
GRAND AVENUE FLEET GARAGE
1400 S. GRAND AVENUE
SANTA ANA, CALIFORNIA**

**PREPARED FOR
CHAMBERS GROUP INC.
COSTA MESA, CALIFORNIA**

PREPARED BY:

Kendra Coblenz, P.E., QSD, QISP
Project Manager, Environmental Engineer
Haley & Aldrich, Inc.

REVIEWED AND APPROVED BY:

To Be Determined

To Be Determined

Certifications

Project Owner's Certification			
Planning Application No. (If applicable)		Grading Permit No.	
Tract/Parcel Map and Lot(s) No.	(APN) 014-161-07 and 014-451-01	Building Permit No.	
Address of Project Site and APN (If no address, specify Tract/Parcel Map and Lot Numbers)			1300-1400 South Grand Avenue

This preliminary draft Water Quality Management Plan (WQMP) has been prepared for Chambers Group Inc. by Haley & Aldrich, Inc. and is intended to comply with the requirements of the County of Orange National Pollutant Discharge Elimination System (NPDES) Stormwater Program requiring the preparation of the plan.

The undersigned, while it owns the subject property, is responsible for the implementation of the provisions of this plan, including the ongoing operation and maintenance of all best management practices (BMPs), and will ensure that this plan is amended as appropriate to reflect up-to-date conditions on the Site consistent with the current Orange County Drainage Area Management Plan (DAMP) and the intent of the non-point source NPDES Permit for Waste Discharge Requirements for the County of Orange, Orange County Flood Control District and the incorporated Cities of Orange County within the Santa Ana Region. Once the undersigned transfers its interest in the property, its successors-in-interest shall bear the aforementioned responsibility to implement and amend the WQMP. An appropriate number of approved and signed copies of this document shall be available on the subject Site in perpetuity.

Owner:			
Title			
Company			
Address			
Email			
Telephone #			
I understand my responsibility to implement the provisions of this WQMP, including the ongoing operation and maintenance of the BMPs described herein.			
Owner Signature		Date	

Preparer (Engineer):			
Title		PE Registration #	
Company			
Address			
Email			
Telephone #			
I hereby certify that this WQMP is in compliance with, and meets the requirements set forth in, Order No. R8-2009-0030/NPDES No. CAS618030, of the Santa Ana Regional Water Quality Control Board.			
Preparer Signature		Date	
Place Stamp Here			

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Section I Permit(s) and Water Quality Conditions of Approval or Issuance

Provide discretionary or grading/building permit information and water quality conditions of approval, or permit issuance, applied to the project. If conditions are unknown, please request applicable conditions from staff. Refer to Section 2.1 in the Technical Guidance Document (TGD) available on the Orange County (OC) Planning website (ocplanning.net).

Project Information	
Permit/Application No. (If applicable)	Grading or Building Permit No. (If applicable)
Address of Project Site (or Tract Map and Lot Number if no address) and APN	1300-1400 South Grand Avenue, Santa Ana, California (the "Site") Assessor Parcel Number (APN) 014-161-07 and 014-451-01
Water Quality Conditions of Approval or Issuance	
Water Quality Conditions of Approval or Issuance applied to this project. (Please list verbatim.)	Prior to the issuance of any grading or building permits, the applicant shall submit to Orange County (the County), for review and approval, a Project Water Quality Management Plan (WQMP). The project is subject to the water quality conditions set forth per City of Santa Ana Municipal Code (Part 1, Chapter 18, Article IV, Section 18-156), which requires that all new development and significant redevelopment projects comply with the requirements of the Orange County Drainage Area Management Plan (DAMP).
Conceptual WQMP	
Was a Conceptual Water Quality Management Plan previously approved for this project?	No
Watershed-Based Plan Conditions	
Provide applicable conditions from watershed - based plans including WIHMPs and TMDLS.	Santa Ana River Basin Plan

Section II Project Description

II.1 PROJECT DESCRIPTION AND PURPOSE

Provide a detailed project description including:

- Project areas;
- Land uses;
- Land cover;
- Design elements;
- A general description not broken down by drainage management areas (DMAs).

Include attributes relevant to determining applicable source controls. Refer to Section 2.2 in the Technical Guidance Document (TGD) for information that must be included in the project description.

Description of Proposed Project					
Development Category (From Model WQMP, Table 7.11-2; or -3):	8. All significant redevelopment projects, where significant redevelopment is defined as the addition or replacement of 5,000 or more square feet (sq ft) of impervious surface on an already developed site. Redevelopment does not include routine maintenance activities that are conducted to maintain original line and grade, hydraulic capacity, original purpose of the facility, or emergency redevelopment activity required to protect public health and safety. If the redevelopment results in the addition or replacement of less than 50 percent of the impervious area on-site and the existing development was not subject to the WQMP requirement, the numeric sizing criteria discussed in Section 7.II-2.0 only applies to the addition or replacement area. If the addition or replacement accounts for 50 percent or more of the impervious area, the Project WQMP requirements apply to the entire development.				
Project Area (sq ft): 200,000	Number of Dwelling Units: 0		SIC Code: 7538 (to be confirmed with County)		
Project Area	Pervious		Impervious		Total
	Area (acres or sq ft)	Percentage	Area (acres or sq ft)	Percentage	
Pre-Project Conditions	To be determined (TBD) during final design (minor landscaping only)	TBD	TBD during final design (majority of 11.3 acres)	TBD	Approximate: 200,000 sq ft (4.59 acres)

Description of Proposed Project					
Post-Project Conditions	TBD during final design (landscaping/ bioretention/ other pervious)	TBD		TBD	Approximate: 200,000 sq ft (4.59 acres)
Drainage Patterns/Connections	Under existing conditions, the Site is generally level and slopes slightly from north to south. Stormwater runoff sheet flows toward the centerline concrete gutter within the Paved Apron and Alley Layout and is collected into the municipal storm drain system along Grand Avenue. No natural drainage channels are present on the Site. Under post-development conditions, an internal storm drain network will collect roof and pavement runoff and route it through proposed water quality best management practices (BMPs) and underground detention before discharge to the existing public storm drain system along Grand Avenue. Post-development peak discharges at the connection to the public storm drain will be mitigated so they do not exceed existing conditions. Final inlet locations, pipe alignments, and connection details will be confirmed during final design. The Site is located within the Newport Bay watershed, which drains to Upper Newport Bay and ultimately the Pacific Ocean. Regional topography slopes gently toward the southwest. <i>(Preliminary characterization; subject to confirmation during detailed design.)</i>				
Narrative Project Description: (Use as much space as necessary.)	The proposed project is the Orange County Fleet Services Facility (Grand Avenue Fleet Garage), a new fleet services facility on County-owned land at 1300-1400 South Grand Avenue in the City of Santa Ana. The project consolidates existing OC Fleet Services operations at 445 Civic Center West and 1102 East Fruit Street into a single site adjacent to existing County offices and the County Data Center. The Site consists of two contiguous parcels totaling approximately 11.3 acres in a developed urban setting. The area is currently largely paved and used for parking, storage, and laydown, with minor landscaping. Topography is generally level, with slight grading and drainage to the municipal storm drain system along Grand Avenue. The proposed development encompasses two contiguous parcels totaling approximately 11.3 acres. The project footprint will occupy roughly 200,000 sq ft (4.59 acres) and include two primary structures: • Fleet Maintenance and Administration Building: approximately 45,706 sq ft, housing vehicle service bays, administrative offices, technician workspaces, and storage areas. • Operations Support Building: approximately 20,000 sq ft, designed to accommodate future facility operations.				

Description of Proposed Project

Additional Site improvements include:

- A solar canopy structure of approximately 10,000 sq ft over designated parking spaces.
- Surface parking areas (about 70,000 sq ft) for staff, visitors, emergency vehicles, delivery trucks, and fleet vehicles.
- Access roads totaling approximately 50,000 sq ft extending from existing driveways on McFadden Avenue and South Grand Avenue.
- An open disposal lot of approximately 5,000 to 10,000 sq ft for storage of about 20 decommissioned police vehicles prior to auction.
- Security fencing, controlled access gates, Site lighting, wayfinding signage, and drought-tolerant landscaping consistent with County standards.
- Two points of ingress and egress will provide efficient circulation for fleet vehicles and staff.

The facility will continue existing OC Fleet Services core functions, including maintenance and repair of over 3,000 County-owned vehicles and equipment, emissions compliance and reporting, and support of County fueling operations and vehicle operations programs. Operations will involve the use and storage of automotive fluids, fuels, solvents, batteries, and related hazardous materials in compliance with applicable federal, state, and County regulations.

The project will install a new storm drain system with underground detention and water quality BMPs, such as modular wetland units or bioretention, to comply with the Orange County Hydrology Manual and the Model WQMP. These features will manage increased impervious cover and runoff potential, maintain post-development peak flows at or below existing discharge rates at the connection to the public system, and provide required treatment of stormwater runoff. All hydrologic and hydraulic calculations are preliminary and will be refined based on detailed survey, geotechnical data, and finalized building and site layouts.

Important Note: This plan is based on conceptual site layouts and preliminary assumptions. Calculations and design recommendations herein are intended for planning purposes only and will be refined in a future version once detailed survey data, finalized building footprints, and additional project information become available.

II.2 POTENTIAL STORMWATER POLLUTANTS

Pollutants of Concern			
Pollutant	Check One for each: E = Expected to be of concern N = Not Expected to be of concern		Additional Information and Comments
Suspended-Solid/ Sediment	E ☒	N ☐	
Nutrients	E ☒	N ☐	
Heavy Metals	E ☒	N ☐	
Pathogens (Bacteria/Virus)	E ☒	N ☐	
Pesticides	E ☒	N ☐	
Oil and Grease	E ☒	N ☐	
Toxic Organic Compounds	E ☒	N ☐	
Trash and Debris	E ☒	N ☐	

II.3 HYDROLOGIC CONDITIONS OF CONCERN

Determine if streams located downstream from the project area are potentially susceptible to hydromodification impacts. Refer to Section 2.2.3.1 in the Technical Guidance Document (TGD) for North Orange County or Section 2.2.3.2 for South Orange County.

☒ No – Show map

☐ Yes – Describe applicable hydrologic conditions of concern below. Refer to Section 2.2.3 in the Technical Guidance Document (TGD).

The Site does not fall within a designated hydromodification management area.

A map showing the Site outside of designated hydromodification areas will be provided with the final WQMP and will be based on the most recent County hydromodification screening tools.

II.4 POST DEVELOPMENT DRAINAGE CHARACTERISTICS

Describe post development drainage characteristics. Refer to Section 2.2.4 in the Technical Guidance Document (TGD).

Under existing conditions, the 11.3-acre Site is largely paved, with minor landscaping, and drains by sheet flow toward the centerline concrete gutter of the internal paved apron and alley layout. Runoff then enters the municipal storm drain system along Grand Avenue. No natural drainage channels cross the Site.

Under proposed conditions, the Site will remain fully urbanized. An internal storm drain network will collect runoff from roofs, paved access roads, parking, and the disposal lot and convey it to underground detention and water quality BMPs before discharging to the existing public storm drain system along Grand Avenue. Drainage management areas will be defined to group similar land covers (roof, pavement, landscaped areas) and to ensure that each area drains to appropriately sized Low Impact Development (LID) BMPs and detention facilities.

Hydrologic modeling for this project used the Modified Rational Method consistent with the Orange County Hydrology Manual. The Site was conceptually represented by two drainage areas (DA-1 and DA-2) with the Rational Method parameters summarized in Table II of the Hydrology and Hydraulics Report. The total area modeled is 11.3 acres. The existing 100-year peak discharge was estimated at 22.5 cubic feet per second (cfs). The proposed unmitigated 100-year peak discharge was estimated at 48.2 cfs, indicating the need for detention. The conceptual design includes underground detention sized such that the mitigated post-development 100-year discharge will be less than or equal to 22.5 cfs at the connection to the public storm drain system.

Final drainage patterns, Drainage Management Area (DMA) boundaries, and detention and BMP sizing will be refined during detailed design based on survey data, finalized grading, and geotechnical information.

II.5 PROPERTY OWNERSHIP/MANAGEMENT

Describe property ownership/management. Refer to Section 2.2.5 in the Technical Guidance Document (TGD).

The Site is owned by the County of Orange. The County, or its designated department, will be responsible for implementation of this WQMP, including construction and long-term operation, inspection, and maintenance of all structural and non-structural BMPs described herein. Upon transfer of any portion of the property, successors-in-interest will assume responsibility for WQMP implementation, including BMP operation and maintenance, as documented through recorded WQMP and property transfer instruments.

Section III. Site Description

III.1 PHYSICAL SETTING

Fill out table with relevant information. Refer to Section 2.3.1 in the Technical Guidance Document (TGD).

Name of Planned Community/Planning Area (if applicable)	Not Applicable
Location/Address	1300-1400 South Grand Avenue, Santa Ana, California 92705 (new addresses to be established as 1310 and 1324 South Grand Avenue for the Fleet Services and Facility Operations buildings, respectively).
General Plan Land Use Designation	Industrial (IND) and Institutional (INS).
Zoning	Light Industrial (M1) – City of Santa Ana zoning.
Acreage of Project Site	Approximately 11.3 acres total; an approximately 200,000-sq-ft (4.59-acre) project footprint.
Predominant Soil Type	Natural Resources Conservation Service (NRCS) Hydrologic Soil Groups B and C.

III.2 SITE CHARACTERISTICS

Fill out table with relevant information and include information regarding BMP sizing, suitability, and feasibility, as applicable. Refer to Section 2.3.2 in the Technical Guidance Document (TGD).

Site Characteristics	
Precipitation Zone	0.7 inches (85th Percentile) (per the North Orange County Technical Guidance Document, December 2013, Exhibit XVI-1, Orange County Rainfall Zones Map)
Topography	The Site is generally level with slight grading typical of urban parcels, sloping gently from north to south toward the existing paved apron and municipal storm drain system along Grand Avenue. No significant elevation changes occur across the project footprint.
Drainage Patterns/Connections	Existing drainage consists of sheet flow to a centerline concrete gutter and collection by the municipal storm drain system. Under proposed conditions, runoff will be collected by a new on-site storm drain system, treated by LID BMPs, detained underground, and discharged to the existing public storm drain system along Grand Avenue at one or more existing connection points. The project Site is located within the Hydrologic Unit Code (HUC) 12-180702040103, corresponding to the Santa Ana-Delhi Channel subwatershed, as defined by the U.S. Geological Survey Watershed Boundary Dataset (WBD). Runoff from this subwatershed drains to the

Site Characteristics	
	Santa Ana-Delhi Channel, then to San Diego Creek, and ultimately to Upper Newport Bay. No natural drainage channels are present on the Site.
Soil Type, Geology, and Infiltration Properties	Soils are mapped as NRCS Hydrologic Soil Groups B and C, indicating moderate to slow infiltration rates. Detailed subsurface conditions and infiltration rates will be confirmed by the project geotechnical investigation. Until infiltration testing is completed, large-scale infiltration BMPs will be considered conceptual and subject to feasibility confirmation.
Hydrogeologic (Groundwater) Conditions	Groundwater depth and seasonal variation at the Site are currently unknown and will be confirmed during geotechnical investigations. No groundwater modeling has been performed at this stage.
Geotechnical Conditions (relevant to infiltration)	A project-specific geotechnical report is being prepared. Preliminary design assumes typical urban fill and native alluvial soils. Final recommendations will address bearing capacity, settlement, infiltration feasibility, and any constraints such as shallow groundwater or low-permeability layers that may limit the use of infiltration BMPs.
Off-Site Drainage	The Site lies within the Newport Bay watershed, with regional drainage trending toward Upper Newport Bay and the Pacific Ocean. Local off-site drainage is conveyed via the municipal storm drain system; off-site flows are not routed through the Site except via underground utilities. No off-site natural channels enter the property.
Utility and Infrastructure Information	The Site is served by existing municipal utilities, including water, sewer, storm drain, and dry utilities. The project will extend and upgrade underground water, sewer, storm drain, power, gas, and telecommunications within the access road alignments to serve the new facility and will connect to existing utility mains at or near the Site boundaries. A solar canopy will reduce demand on the electrical grid. All utility improvements will comply with applicable County and agency standards.

III.3 WATERSHED DESCRIPTION

Fill out table with relevant information and include information regarding BMP sizing, suitability, and feasibility, as applicable. Refer to Section 2.3.3 in the Technical Guidance Document (TGD).

Receiving Waters	The project is located within the Newport Bay watershed. Stormwater runoff from the Site is discharged to the municipal storm drain system and ultimately conveyed to Upper Newport Bay and the Pacific Ocean.
303(d) Listed Impairments	Benthic Community Effects; sedimentation/siltation (sediment); indicator bacteria (pathogens); malathion, toxaphene, and DDT (pesticides); nutrients; selenium; toxicity (total toxics). (San Diego Creek, Reach 1). Benthic Community Effects; sedimentation/siltation (sediment); indicator bacteria (pathogens); toxicity (total toxics); nutrients. (San Diego Creek, Reach 2). Indicator bacteria (pathogens), nutrients, sediment/siltation (sediment), metals (copper), pesticides (DDT, malathion), polychlorinated biphenyls (PCBs), toxicity (total toxics) (Upper Newport Bay).
Applicable TMDLs	Based on the most recent approved total maximum daily loads (TMDLs) for the San Diego Creek/Upper Newport Bay watershed, the following TMDLs are applicable to downstream receiving waters: Bacteria TMDLs for San Diego Creek and Upper Newport Bay Organochlorine Pesticide TMDLs (including DDT and chlordane) for San Diego Creek and Upper Newport Bay PCBs TMDL for Upper Newport Bay No standalone TMDLs have been adopted for metals, nutrients, or sediment in the San Diego Creek or Upper Newport Bay watershed. These constituents are managed through municipal separate storm sewer system (MS4) permit requirements, BMP implementation, and receiving water limitations rather than numeric TMDL allocations. pH and ammonia are Basin Plan water quality parameters, but are not currently listed as impairments on the State of California 303(d) list for San Diego Creek or Upper Newport Bay, and are not subject to adopted TMDLs in this watershed. Accordingly, they are not identified as applicable 303(d) impairments or TMDLs for this project. The following items listed are derived from the California 2020-2022 Integrated Report and are provided for informational context: • DDT, nutrients, sedimentation/siltation, toxaphene (San Diego Creek Reach 1) • Nutrients, sedimentation/siltation, toxicity (San Diego Creek Reach 2) • Organochlorine Pesticide TMDLs (DDT, chlordane) (Upper Newport Bay) • Bacterial TMDLs (San Diego Creek & Upper Newport Bay)

	• Nutrient TMDLs (San Diego Creek/Newport Bay) • PCBs TMDL (Upper Newport Bay) • Sediment-related TMDLs (Newport Bay)
Pollutants of Concern for the Project	Suspended solids/sediment, nutrients, metals, pathogens, pesticides, oil and grease, toxic organic compounds, and trash and debris, consistent with the project land use and activities identified in Section II.2.
Environmentally Sensitive and Special Biological Significant Areas	No environmentally sensitive areas or Areas of Special Biological Significance are located on the Site, which is fully developed with urban uses. Any downstream sensitive areas or special designations in the watershed will be confirmed during final WQMP preparation.

Section IV Best Management Practices (BMPs)

IV.1 PROJECT PERFORMANCE CRITERIA

Describe project performance criteria. Several steps must be followed in order to determine what performance criteria will apply to a project. These steps include:

- If the project has an approved WIHMP or equivalent, then any watershed specific criteria must be used and the project can evaluate participation in the approved regional or sub-regional opportunities. (Please ask your assigned planner or plan checker regarding whether your project is part of an approved WIHMP or equivalent.)
- Determine applicable hydromodification control performance criteria. Refer to Section 7.II-2.4.2.2 of the Model WQMP.
- Determine applicable LID performance criteria. Refer to Section 7.II-2.4.3 of the Model WQMP.
- Determine applicable treatment control BMP performance criteria. Refer to Section 7.II-3.2.2 of the Model WQMP.
- Calculate the LID design storm capture volume for the project. Refer to Section 7.II-2.4.3 of the Model WQMP.

(NOC Permit Area only) Is there an approved WIHMP or equivalent for the project area that includes more stringent LID feasibility criteria or if there are opportunities identified for implementing LID on regional or sub-regional basis?	YES ☐	NO ☒
If yes, describe WIHMP feasibility criteria or regional/sub-regional LID opportunities.		

The Site is in the Santa Ana Region and within the Newport Bay watershed. No approved Watershed Implementation and Hydromodification Management Plan (WIHMP) with more stringent LID criteria or regional LID participation requirements has been identified for the project location at this preliminary stage. This will be confirmed prior to final WQMP approval.

Project Performance Criteria	
If HCOC exists, list applicable hydromodification control performance criteria (Section 7.II-2.4.2.2 in MWQMP)	N/A The Site is located outside designated hydromodification management areas. Hydromodification control BMPs are not required; however, detention will be provided for flood/peak flow control so that post-development peak discharges to the public storm drain do not exceed existing conditions for the 100-year design storm.
List applicable LID performance criteria (Section 7.II-2.4.3 from MWQMP)	The project is a North Orange County Priority Project (significant redevelopment) and must implement Low Impact Development BMPs that: • Retain the LID Design Capture Volume (DCV) onsite through infiltration, evapotranspiration, and rainwater harvesting where feasible; • Biotreat any remaining DCV that cannot be retained; and

Project Performance Criteria	
	- Route each DMA to one or more LID BMPs sized using the County methodology. The LID strategy will prioritize: - Infiltration BMPs where geotechnical and groundwater conditions allow; - Bioretention and modular wetland units for treatment where infiltration is constrained; and - Integration of LID BMPs within landscaped areas and parking lot islands so they receive roof and pavement runoff.
List applicable treatment control BMP performance criteria (Section 7.II-3.2.2 from MWQMP)	If it is not feasible to retain and biotreat the full DCV with LID BMPs due to Site constraints (limited pervious area, utility conflicts, and operational requirements for extensive paving), the project will: - Implement treatment control BMPs sized using the applicable numeric criteria (volume-based or flow-based) in the Model WQMP; and - Place proprietary treatment units on storm drain laterals upstream of the underground detention system or at the connection to the public storm drain along Grand Avenue.
Calculate LID design storm capture volume for Project.	The DCV will be calculated separately for each DMA using the Orange County method: $DCV = C \times A \times d \times 43,560 \times (1/12)$, where C is based on imperviousness. - At this preliminary phase, final drainage areas and impervious percentages are not yet established. DCV calculations and BMP sizing will be provided in the final WQMP once detailed grading and drainage plans are available.

IV.2 SITE DESIGN AND DRAINAGE

Describe site design and drainage including

- A narrative of site design practices utilized or rationale for not using practices;
- A narrative of how site is designed to allow BMPs to be incorporated to the MEP
- A table of DMA characteristics and list of LID BMPs proposed in each DMA.
- Reference to the WQMP "BMP Exhibit."
- Calculation of Design Capture Volume (DCV) for each drainage area.
- A listing of GIS coordinates for LID and Treatment Control BMPs.

Refer to Section 2.4.2 in the Technical Guidance Document (TGD).

Site Design Practices

The project is a redevelopment of a largely impervious industrial site and maintains existing regional drainage patterns while providing improved on-site collection, treatment, and detention. Key site design practices include:

- Consolidating the active fleet operations within an approximate 200,000-sq-ft footprint to limit additional disturbance.
- Locating landscaped and potential bioretention areas adjacent to building frontages, access roads, and parking aisles to allow direct routing of roof and pavement runoff.
- Maintaining logical access road alignments to support heavy vehicle circulation while still providing opportunities to intercept runoff at catch basins or trench drains and route flows through LID BMPs.
- Reserving space for underground detention near the connection(s) to the existing municipal storm drain along Grand Avenue, maximizing flow control efficiency and facilitating maintenance.

How the Site Is Designed to Allow BMPs to the Maximum Extent Practicable (MEP)

Roof downspouts will be routed by surface flow or via drain lines to bioretention areas or modular wetland units located within landscape zones and parking lot islands, to the extent feasible.

Paved parking and drive aisles will drain to catch basins or trench drains that discharge to a treatment train consisting of LID BMPs and underground detention prior to entering the public storm drain system.

BMPs will be sited close to pollutant-generating activities, including vehicle maintenance, parking, and circulation areas, while accounting for safety, access, and structural constraints.

Because a large portion of the Site must remain paved for fleet operations and since soils are mapped as Hydrologic Soil Groups B and C (moderate to slow infiltration), it may not be practicable to meet the entire DCV through infiltration alone. Biotreatment, modular wetlands, and proprietary treatment units will therefore play a key role in achieving performance criteria.

DMA Characteristics and LID BMPs: Definitive DMA boundaries and areas will be established during final design. The following conceptual DMAs and LID BMPs are recommended as a starting point:

DMA-1: Fleet Maintenance & Administration Building Roof

- Approximate Area: TBD; expected to be on the order of 45,700 sq ft.
- Land Cover: Roof (fully impervious).
- Proposed LID BMPs: Bioretention with underdrains or proprietary vegetated modular wetland units located adjacent to the building and within nearby landscape areas.

- Flow Path: Roof drains to leaders; discharge by surface or piped flow to bioretention/modular wetland units; overflow to on-site storm drain and underground detention; then to public storm drain in Grand Avenue.

DMA-2: Operations Support Building Roof

- Approximate Area: TBD; expected to be on the order of 20,000 sq ft.
- Land Cover: Roof (fully impervious).
- Proposed LID BMPs: Similar to DMA-1; bioretention with underdrains or modular wetland units.
- Flow Path: Roof drains to LID BMPs, then to underground detention and public storm drain.

DMA-3: Surface Parking and Access Roads

- Approximate Area: TBD; expected to include approximately 70,000 sq ft of parking and approximately 50,000 sq ft of access roads.
- Land Cover: Paved parking, drive aisles, and associated hardscape.
- Proposed LID BMPs: Bioretention with underdrains in parking lot islands; vegetated swales or modular wetland units along internal drive aisles; proprietary media filters on select storm drain laterals where space is constrained.
- Flow Path: Sheet flow from paved surfaces to curb inlets, trench drains, or swales; treatment by LID BMPs; discharge to underground detention; then to public storm drain.

DMA-4: Disposal Lot and Outdoor Storage

- Approximate Area: approximately 5,000 to 10,000 sq ft.
- Land Cover: Paved or compacted surface used for temporary storage of decommissioned vehicles.
- Proposed LID BMPs: Modular wetland or other proprietary biotreatment unit on the drainage lateral from this area; supplemental canopy, covers, or curbing as needed to minimize exposure of pollutant sources.
- Flow Path: Local drainage directed to catch basins and proprietary treatment unit; then to underground detention and public storm drain.

DMA-5: Landscaped / Bioretention Areas

- Approximate Area: TBD during final design.
- Land Cover: Landscaped planters, parking lot islands, and other pervious areas (including bioretention cells).
- Proposed LID BMPs: Bioretention with or without underdrains, depending on infiltration feasibility; infiltration planters where geotechnical conditions allow.
- Flow Path: Receives diverted roof and pavement runoff; overflow to onsite storm drain and underground detention.

DCV for each drainage area: Because final grading, drainage boundaries, and impervious fractions are still under development, DCV values are currently “TBD.” The final WQMP will include:

- A DCV calculation for each DMA;
- Sizing calculations for each LID BMP showing that combined infiltration, evapotranspiration, and biotreatment achieve the LID DCV to the maximum extent practicable; and

- Documentation of any shortfalls and associated reliance on treatment control BMPs.

GIS coordinates for LID and Treatment Control BMPs: GIS coordinates for each LID and treatment control BMP will be provided in the final WQMP and on the BMP Exhibit. At this preliminary stage, only conceptual locations have been identified.

IV.3 LID BMP SELECTION AND PROJECT CONFORMANCE ANALYSIS

Each sub-section below documents that the proposed design features conform to the applicable project performance criteria via check boxes, tables, calculations, narratives, and/or references to worksheets. Refer to Section 2.4.2.3 in the Technical Guidance Document (TGD) for selecting LID BMPs and Section 2.4.3 in the Technical Guidance Document (TGD) for conducting conformance analysis with project performance criteria.

IV.3.1 Hydrologic Source Controls (HSCs)

If required HSCs are included, fill out applicable check box forms. If the retention criteria are otherwise met with other LID BMPs, include a statement indicating HSCs not required.

Name	Included?
Localized on-lot infiltration	☐
Impervious area dispersion (e.g. roof top disconnection)	☐
Street trees (canopy interception)	☐
Residential rain barrels (not actively managed)	☐
Green roofs/Brown roofs	☐
Blue roofs	☐
Impervious area reduction (e.g. permeable pavers, site design)	☐
Other:	☐
Other:	☐
Other:	☐
Other:	☐
Other:	☐
Other:	☐
Other:	☐
Other:	☐

Hydrologic source controls will be included to the extent feasible during final design. Given the highly urban, industrial nature of the Site and the need for robust pavement, HSCs will supplement but not replace structural LID BMPs.

Because a significant portion of the Site must remain paved for fleet operations, and due to potential constraints related to soil permeability, groundwater, and hazardous materials management, it may not be feasible to meet the complete LID Design Storm Capture Volume via infiltration BMPs alone. The volume that can be retained by infiltration BMPs will be quantified during final design based on tested infiltration rates and available footprint area.

DRAFT

IV.3.2 Infiltration BMPs

Identify infiltration BMPs to be used in project. If design volume cannot be met, state why.

Name	Included?
Bioretention without underdrains	☐
Rain gardens	☐
Porous landscaping	☐
Infiltration planters	☐
Retention swales	☐
Infiltration trenches	☐
Infiltration basins	☐
Drywells	☐
Subsurface infiltration galleries	☐
French drains	☐
Permeable asphalt	☐
Permeable concrete	☐
Permeable concrete pavers	☐
Other:	☐
Other:	☐

Soils are mapped as NRCS Hydrologic Soil Groups B and C, which indicate moderate to slow infiltration capacity. Groundwater conditions and detailed soil properties will be confirmed by a project-specific geotechnical investigation and infiltration testing.

Given the need for heavy pavement to support fleet vehicles and possible depth constraints, full infiltration of the LID DCV across the Site may not be feasible. Infiltration will be targeted to opportunities with favorable soil and groundwater conditions, such as landscaped areas and planters.

At this preliminary stage, the volume of stormwater that can be managed by infiltration BMPs is unknown. The final WQMP will:

- Present infiltration test results;
- Identify where infiltration BMPs are feasible;
- Quantify the portion of the LID DCV managed through infiltration; and
- Document reasons why full DCV cannot be achieved by infiltration alone, if applicable.

Show calculations below to demonstrate if the LID Design Storm Capture Volume can be met with infiltration BMPs. If not, document how much can be met with infiltration and document why it is not feasible to meet the full volume with infiltration BMPs.

The Site soils are mapped as Hydrologic Soil Groups B and C, indicating moderate to slow infiltration rates. Current groundwater conditions and detailed soil properties will be confirmed by a geotechnical investigation and infiltration testing.

Infiltration BMPs, such as bioretention without underdrains, porous landscaping, and infiltration planters, may be considered for the proposed development for landscaped areas and along parking lot edges where geotechnical conditions and groundwater depth permit. Selection, feasibility, and sizing of these BMPs will be finalized once infiltration testing is complete.

IV.3.3 Evapotranspiration, Rainwater Harvesting BMPs

If the full Design Storm Capture Volume cannot be met with infiltration BMPs, describe any evapotranspiration and/or rainwater harvesting BMPs included.

Name	Included?
All HSCs; See Section IV.3.1	☐
Surface-based infiltration BMPs	☐
Biotreatment BMPs	☐
Above-ground cisterns and basins	☐
Underground detention	☐
Other:	☐
Other:	☐
Other:	☐

Show calculations below to demonstrate if the LID Design Storm Capture Volume can be met with evapotranspiration and/or rainwater harvesting BMPs in combination with infiltration BMPs. If not, document below how much can be met with either infiltration BMPs, evapotranspiration, rainwater harvesting BMPs, or a combination, and document why it is not feasible to meet the full volume with these BMP categories.

Evapotranspiration

- Landscaped areas and bioretention cells will provide evapotranspiration of intercepted stormwater, contributing to the management of the LID DCV.
- Final landscape design will favor drought-tolerant plantings with adequate canopy and root structures to support evapotranspiration while minimizing irrigation demands.

Rainwater harvesting

- Actively managed rainwater harvesting (e.g., cisterns) is not currently proposed because:
 - Practical non-potable reuse opportunities at the fleet facility are limited;

- The Site is already highly impervious and operationally constrained; and
 - Added operational complexity and maintenance may outweigh benefits for this project type.
- This assumption will be revisited during final design if feasible reuse opportunities (e.g., irrigation supply for landscaping) are identified.

The final WQMP will quantify the combined volume managed by infiltration and evapotranspiration (including bioretention) and document any remaining DCV that must be biotreated or treated by flow-through BMPs.

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IV.3.4 Biotreatment BMPs

If the full Design Storm Capture Volume cannot be met with infiltration BMPs, and/or evapotranspiration and rainwater harvesting BMPs, describe biotreatment BMPs included. Include sections for selection, suitability, sizing, and infeasibility, as applicable.

Name	Included?
Bioretention with underdrains	☐
Stormwater planter boxes with underdrains	☐
Rain gardens with underdrains	☐
Constructed wetlands	☐
Vegetated swales	☐
Vegetated filter strips	☐
Proprietary vegetated biotreatment systems	☐
Wet extended detention basin	☐
Dry extended detention basins	☐
Other:	☐
Other:	☐

Show calculations below to demonstrate if the LID Design Storm Capture Volume can be met with infiltration, evapotranspiration, rainwater harvesting and/or biotreatment BMPs. If not, document how much can be met with either infiltration BMPs, evapotranspiration, rainwater harvesting BMPs, or a combination, and document why it is not feasible to meet the full volume with these BMP categories.

Biotreatment will likely be the primary mechanism for meeting the LID DCV where infiltration is infeasible or limited. Biotreatment BMPs will be distributed throughout the Site to intercept runoff from individual DMAs.

Potential biotreatment BMPs include:

- Bioretention with underdrains located in landscape strips and parking lot islands.
- Stormwater planter boxes with underdrains along building frontages.
- Vegetated swales or filter strips in select open areas.
- Proprietary vegetated biotreatment systems (e.g., modular wetland units) installed on storm drain laterals upstream of the underground detention system or public storm drain connection.

During final design, biotreatment BMPs will be sized based on:

- DCV from each tributary DMA;
- Approved surface loading rates and ponding depths; and
- Hydraulic constraints (head, depth to outlet, etc.).

Calculations in the final WQMP will demonstrate that the combination of infiltration, evapotranspiration, and biotreatment meets the LID DCV to the maximum extent practicable. Any residual volume not addressed by LID BMPs will be treated through appropriately sized treatment control BMPs.

IV.3.5 Hydromodification Control BMPs

Describe hydromodification control BMPs. See Section 5 of the Technical Guidance Document (TGD). Include sections for selection, suitability, sizing, and infeasibility, as applicable. Detail compliance with Prior Conditions of Approval (if applicable).

Hydromodification Control BMPs	
BMP Name	BMP Description

Hydromodification management criteria do not apply because the Site is located outside designated hydromodification management areas. Nevertheless, to maintain peak flow conditions at the public storm drain connection, the project will provide underground detention so that the mitigated post-development 100-year peak discharge does not exceed the estimated existing 100-year discharge. Detailed hydrologic modeling and detention sizing will be completed as part of the final design.

IV.3.6 Regional/Sub-Regional LID BMPs

Describe regional/sub-regional LID BMPs in which the project will participate. Refer to Section 7.II-2.4.3.2 of the Model WQMP.

Regional/Sub-Regional LID BMPs
No regional or sub-regional LID BMPs or regional facilities have been identified for participation by this project at this time. If such facilities are identified by the County or the City of Santa Ana in the future, opportunities for participation or credit will be evaluated during final WQMP preparation.

IV.3.7 Treatment Control BMPs

Treatment control BMPs can only be considered if the project conformance analysis indicates that it is not feasible to retain the full design capture volume with LID BMPs. Describe treatment control BMPs including sections for selection, sizing, and infeasibility, as applicable.

Treatment Control BMPs	
BMP Name	BMP Description

Due to Site constraints (extensive paving for fleet operations, moderate to slow soil infiltration, and potential groundwater and utility limitations), it may not be feasible to retain and/or biotreat the entire DCV on the Site with LID BMPs alone. Treatment control BMPs will therefore be considered for any portion of the DCV that cannot be managed through LID BMPs.

Potential treatment control BMPs include:

- Proprietary vegetated modular wetland units installed on storm drain laterals from:
 - High-use parking and access areas;
 - The disposal lot; and
 - Other pollutant-generating areas where standard landscape-based LID BMPs are constrained.
- Media-based cartridge or vault filters placed near the point of connection to the existing public storm drain system, if needed to provide additional polishing treatment.

Treatment control BMPs will be sized using the applicable numeric criteria (e.g., treating the DCV or a design flow rate associated with the required storm event), in accordance with the Model WQMP.

The final WQMP will include:

- Sizing calculations for each treatment control BMP;
- A summary table relating each DMA to its LID and treatment control BMPs; and
- Documentation that treatment control BMPs are only used to address the portion of the DCV that cannot be feasibly managed with LID BMPs.

IV.3.8 Non-structural Source Control BMPs

Fill out non-structural source control check box forms or provide a brief narrative explaining if non-structural source controls were not used.

Non-Structural Source Control BMPs				
Identifier	Name	Check One		If not applicable, state brief reason
		Included	Not Applicable	
N1	Education for Property Owners, Tenants and Occupants	☒	☐	Educational materials and signage will be recommended with the final WQMP to inform staff and contractors about stormwater protection practices, proper waste handling, and spill response.
N2	Activity Restrictions	☒	☐	Facility operating procedures will be recommended with the final WQMP to restrict outdoor vehicle maintenance, fueling, and material handling to designated controlled areas.
N3	Common Area Landscape Management	☒	☐	Landscaping management using minimal fertilizers and pesticides, with preference for integrated pest management, will be recommended with the final WQMP.
N4	BMP Maintenance	☒	☐	An Operations and Maintenance Plan defining inspections and maintenance tasks will be recommended with the final WQMP.
N5	Title 22 CCR Compliance (How development will comply)	☒	☐	Hazardous waste management will comply with Title 22 requirements through the facility's hazardous materials program.
N6	Local Industrial Permit Compliance	☒	☐	The County will comply with applicable industrial stormwater permits and local discharge requirements.
N7	Spill Contingency Plan	☒	☐	A spill response and cleanup plan will address spills of fuel, oils, and other hazardous materials.
N8	Underground Storage Tank Compliance	☒	☐	If underground storage tanks (USTs) are present, the facility will comply with all UST monitoring, containment, and reporting requirements.
N9	Hazardous Materials Disclosure Compliance	☒	☐	The facility will maintain hazardous materials business plans and disclosures as required by local and state regulations.

Non-Structural Source Control BMPs				
Identifier	Name	Check One		If not applicable, state brief reason
		Included	Not Applicable	
N10	Uniform Fire Code Implementation	☒	☐	Storage and handling of hazardous materials will comply with applicable fire code requirements.
N11	Common Area Litter Control	☒	☐	Regular patrols and trash collection will be conducted to prevent litter from entering the storm drain system.
N12	Employee Training	☒	☐	Staff training will cover BMP implementation, spill response, and good housekeeping practices.
N13	Housekeeping of Loading Docks	☒	☐	Loading and unloading areas will be kept clean and managed to prevent pollutants from entering storm drains.
N14	Common Area Catch Basin Inspection	☒	☐	Catch basins and inlets will be inspected and cleaned routinely, especially before and during the wet season.
N15	Street Sweeping Private Streets and Parking Lots	☒	☐	Regular sweeping of internal roads and parking areas will remove sediment and debris.
N16	Retail Gasoline Outlets	☐	☒	The project does not include a retail gas station; onsite fueling areas will be managed through other BMPs.

The applicable checked items above are preliminary and will be finalized with the final WQMP.

IV.3.9 Structural Source Control BMPs

Fill out structural source control check box forms or provide a brief narrative explaining if structural source controls were not used.

Structural Source Control BMPs				
Identifier	Name	Check One		If not applicable, state brief reason
		Included	Not Applicable	
S1	Provide storm drain system stenciling and signage	☒	☐	Catch basins and inlets will be labeled with "No Dumping – Flows to Ocean" or similar messaging.
S2	Design and construct outdoor material storage areas to reduce pollution introduction	☒	☐	Any outdoor material storage will be covered, bermed, or otherwise protected from contact with stormwater.
S3	Design and construct trash and waste storage areas to reduce pollution introduction	☒	☐	Trash enclosures will be roofed and graded to prevent stormwater run-on and runoff, with drains directed to the sanitary sewer where allowed.
S4	Use efficient irrigation systems & landscape design, water conservation, smart controllers, and source control	☒	☐	Irrigation will be designed to minimize runoff and overspray, with smart controllers where feasible.
S5	Protect slopes and channels and provide energy dissipation	☒	☐	The Site is generally level, but energy dissipation measures will be provided at concentrated discharge points if needed.
	Incorporate requirements applicable to individual priority project categories (from SDRWQCB NPDES Permit)	☐	☐	
S6	Dock areas	☒	☐	If loading docks are present, dock areas will be graded and drained to minimize stormwater contact with pollutants.
S7	Maintenance bays	☒	☐	Interior maintenance bays will drain to the sanitary sewer or oil-water separators, not to the storm drain system.

Structural Source Control BMPs				
Identifier	Name	Check One		If not applicable, state brief reason
		Included	Not Applicable	
S8	Vehicle wash areas	☒	☐	Will be included if vehicle washing is conducted in a designated wash area with appropriate collection and treatment/disposal.
S9	Outdoor processing areas	☒	☐	Will be included as applicable. Any outdoor processing will be located and designed to minimize pollutant contact with stormwater.
S10	Equipment wash areas	☒	☐	Will be included as applicable. Equipment washing will be conducted in controlled areas connected to the sanitary sewer or treatment systems.
S11	Fueling areas	☒	☐	Fueling areas will be paved, covered where feasible, graded away from storm drains, and equipped with spill containment features.
S12	Hillside landscaping	☐	☒	Not applicable; the Site is generally level.
S13	Wash water control for food preparation areas	☐	☒	Not applicable; no commercial food preparation is anticipated.
S14	Community car wash racks	☐	☒	Not applicable.

IV.4 ALTERNATIVE COMPLIANCE PLAN (IF APPLICABLE)

Describe an alternative compliance plan (if applicable). Include alternative compliance obligations (i.e., gallons, pounds) and describe proposed alternative compliance measures. Refer to Section 7.II 3.0 in the WQMP.

IV.4.1 Water Quality Credits

Determine if water quality credits are applicable for the project. Refer to Section 3.1 of the Model WQMP for description of credits and Appendix VI of the Technical Guidance Document (TGD) for calculation methods for applying water quality credits.

Description of Proposed Project				
Project Types that Qualify for Water Quality Credits (Select all that apply):				
☐ Redevelopment projects that reduce the overall impervious footprint of the project site.	☐ Brownfield redevelopment, meaning redevelopment, expansion, or reuse of real property which may be complicated by the presence or potential presence of hazardous substances, pollutants or contaminants, and which have the potential to contribute to adverse ground or surface WQ if not redeveloped.		☐ Higher density development projects which include two distinct categories (credits can only be taken for one category): those with more than seven units per acre of development (lower credit allowance); vertical density developments, for example, those with a Floor to Area Ratio (FAR) of 2 or those having more than 18 units per acre (greater credit allowance).	
☐ Mixed use development, such as a combination of residential, commercial, industrial, office, institutional, or other land uses which incorporate design principles that can demonstrate environmental benefits that would not be realized through single use projects (e.g. reduced vehicle trip traffic with the potential to reduce sources of water or air pollution).		☐ Transit-oriented developments, such as a mixed use residential or commercial area designed to maximize access to public transportation; similar to above criterion, but where the development center is within one half mile of a mass transit center (e.g. bus, rail, light rail or commuter train station). Such projects would not be able to take credit for both categories, but may have greater credit assigned		☐ Redevelopment projects in an established historic district, historic preservation area, or similar significant city area including core City Center areas (to be defined through mapping).
☐ Developments with dedication of undeveloped portions to parks, preservation areas and other pervious uses.	☐ Developments in a city center area.	☐ Developments in historic districts or historic preservation areas.	☐ Live-work developments, a variety of developments designed to support residential and vocational needs together – similar to criteria to mixed use development; would not be able to take credit for both categories.	☐ In-fill projects, the conversion of empty lots and other underused spaces into more beneficially used spaces, such as residential or commercial areas.
Calculation of Water Quality Credits (if applicable)				

The project is a significant redevelopment of an already developed industrial site and may qualify as an infill/redevelopment project in an urbanized area. At this preliminary stage, water quality credits have not been quantified or applied. Final determination of eligibility and the magnitude of any credits will be made in the final WQMP based on the most current Model WQMP guidance and project details.

IV.4.2 Alternative Compliance Plan Information

Describe an alternative compliance plan (if applicable). Include alternative compliance obligations (i.e., gallons, pounds) and describe proposed alternative compliance measures. Refer to Section 7.II 3.0 in the Model WQMP.

No off-site or alternative compliance program is currently proposed. If it is demonstrated during final design that (i) the full LID DCV cannot be met on the Site, despite implementation of all feasible LID BMPs, and (ii) no additional on-site opportunities exist, then the project proponent may evaluate participation in an approved alternative compliance program, if available, consistent with Model WQMP provisions.

Section V Inspection/Maintenance Responsibility for BMPs

Fill out information in table below. Prepare and attach an Operation and Maintenance Plan. Identify the funding mechanism through which BMPs will be maintained. Inspection and maintenance records must be kept for a minimum of five years for inspection by the regulatory agencies. Refer to Section 7.II 4.0 in the Model WQMP.

BMP Inspection/Maintenance			
BMP	Reponsible Party(s)	Inspection/ Maintenance Activities Required	Minimum Frequency of Activities

Detailed inspection and maintenance procedures will be documented in a separate O&M Plan attached to the final WQMP.

Section VI BMP Exhibit (Site Plan)

VI.1 BMP EXHIBIT (SITE PLAN)

Include a BMP Exhibit (Site Plan), at a size no less than 24" by 36," which includes the following minimum information: Insert in the title block (lower right hand corner) of BMP Exhibit: the WQMP Number (assigned by staff) and the grading/building or Planning Application permit numbers

- *Project location (address, tract/lot number(s), etc.)*
- *Site boundary*
- *Land uses and land covers, as applicable*
- *Suitability/feasibility constraints*
- *Structural BMP locations*
- *Drainage delineations and flow information*
- *Delineate the area being treated by each structural BMP*
- *GIS coordinates for LID and Treatment Control BMPs*
- *Drainage connections*
- *BMP details*
- *Preparer name and stamp*

Please do not include any areas outside of the project area or any information not related to drainage or water quality. The approved BMP Exhibit (Site Plan) shall be submitted as a plan sheet on all grading and building plan sets submitted for plan check review and approval. The BMP Exhibit shall be at the same size as the rest of the plan sheets in the submittal and shall have an approval stamp and signature prior to plan check submittal.

The final BMP Exhibit will be included with the final WQMP.

VI.2 SUBMITTAL AND RECORDATION OF WATER QUALITY MANAGEMENT PLAN

Following approval of the Final Project-Specific WQMP, three copies of the approved WQMP (including BMP Exhibit, Operations and Maintenance (O&M) Plan, and Appendices) shall be submitted. In addition, these documents shall be submitted in a PDF format.

Each approved WQMP (including BMP Exhibit, Operations and Maintenance (O&M) Plan, and Appendices) shall be recorded in the Orange County Clerk-Recorder's Office, prior to close-out of grading and/or building permit. Educational Materials are not required to be included.

Once the Final Project-Specific WQMP is approved, the County will:

- Submit the required number of hard copies and electronic (PDF) copies of the WQMP, BMP Exhibit, and O&M Plan; and
- Record the approved WQMP and associated documents with the Orange County Clerk-Recorder's Office prior to grading and/or building permit close-out, as required.

Section VII Educational Materials

Refer to the Orange County Stormwater Program ([ocwatersheds.com](http://www.ocwatersheds.com)) for a library of materials available. Please only attach the educational materials specifically applicable to this project. Other materials specific to the project may be included as well and must be attached.

Education Materials			
Residential Material (http://www.ocwatersheds.com)	Check If Applicable	Business Material (http://www.ocwatersheds.com)	Check If Applicable
The Ocean Begins at Your Front Door	☐	Tips for the Automotive Industry	☒
Tips for Car Wash Fund-raisers	☐	Tips for Using Concrete and Mortar	☐
Tips for the Home Mechanic	☐	Tips for the Food Service Industry	☐
Homeowners Guide for Sustainable Water Use	☐	Proper Maintenance Practices for Your Business	☒
Household Tips	☐	Other Material	Check If Attached
Proper Disposal of Household Hazardous Waste	☒		
Recycle at Your Local Used Oil Collection Center (North County)	☐	Additional customized materials may be developed to address: • Spill prevention and response at fueling and maintenance areas; • Proper cleaning of vehicles and equipment; • Good housekeeping practices in parking, storage, and laydown areas.	☐
Recycle at Your Local Used Oil Collection Center (Central County)	☐		☐
Recycle at Your Local Used Oil Collection Center (South County)	☐		☐
Tips for Maintaining a Septic Tank System	☐		☐
Responsible Pest Control	☐		☐
Sewer Spill	☐		☐

Education Materials			
Residential Material (http://www.ocwatersheds.com)	Check If Applicable	Business Material (http://www.ocwatersheds.com)	Check If Applicable
Tips for the Home Improvement Projects	☐		☐
Tips for Horse Care	☐		☐
Tips for Landscaping and Gardening	☐		☐
Tips for Pet Care	☐		☐
Tips for Pool Maintenance	☐		☐
Tips for Residential Pool, Landscape and Hardscape Drains	☐		☐
Tips for Projects Using Paint	☐		☐

Copies of applicable educational materials will be attached to the final WQMP.

Global Disclaimer for Entire WQMP

This report is a preliminary draft prepared solely for planning purposes. All calculations, assumptions, and design recommendations are based on conceptual site layouts and limited available data. Final hydrologic and hydraulic designs, BMP selection and design, non-structural source controls, and inspection and maintenance plans will be completed after receiving detailed survey information, finalized building footprints, and geotechnical data. This document is not intended for construction or permitting.

https://haleyaldrich.sharepoint.com/sites/ChambersGroupInc/Shared Documents/0213742.Grand Avenue Fleet Garage/Deliverables/2025_12_WQMP/2025-1229_HAI_Grand_Avenue_Fleet_Garage_WQMP_DRAFT.docx