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CONSULTING ENGINEERS

WATER STUDY
FOR THE GRAMERCY DRIVE PROJECT
IN THE CITY OF SAN DIEGO

September 15, 2025

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WATER STUDY
FOR THE GRAMERCY DRIVE PROJECT
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9-15-25

Prepared by:
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Job No. 537-030

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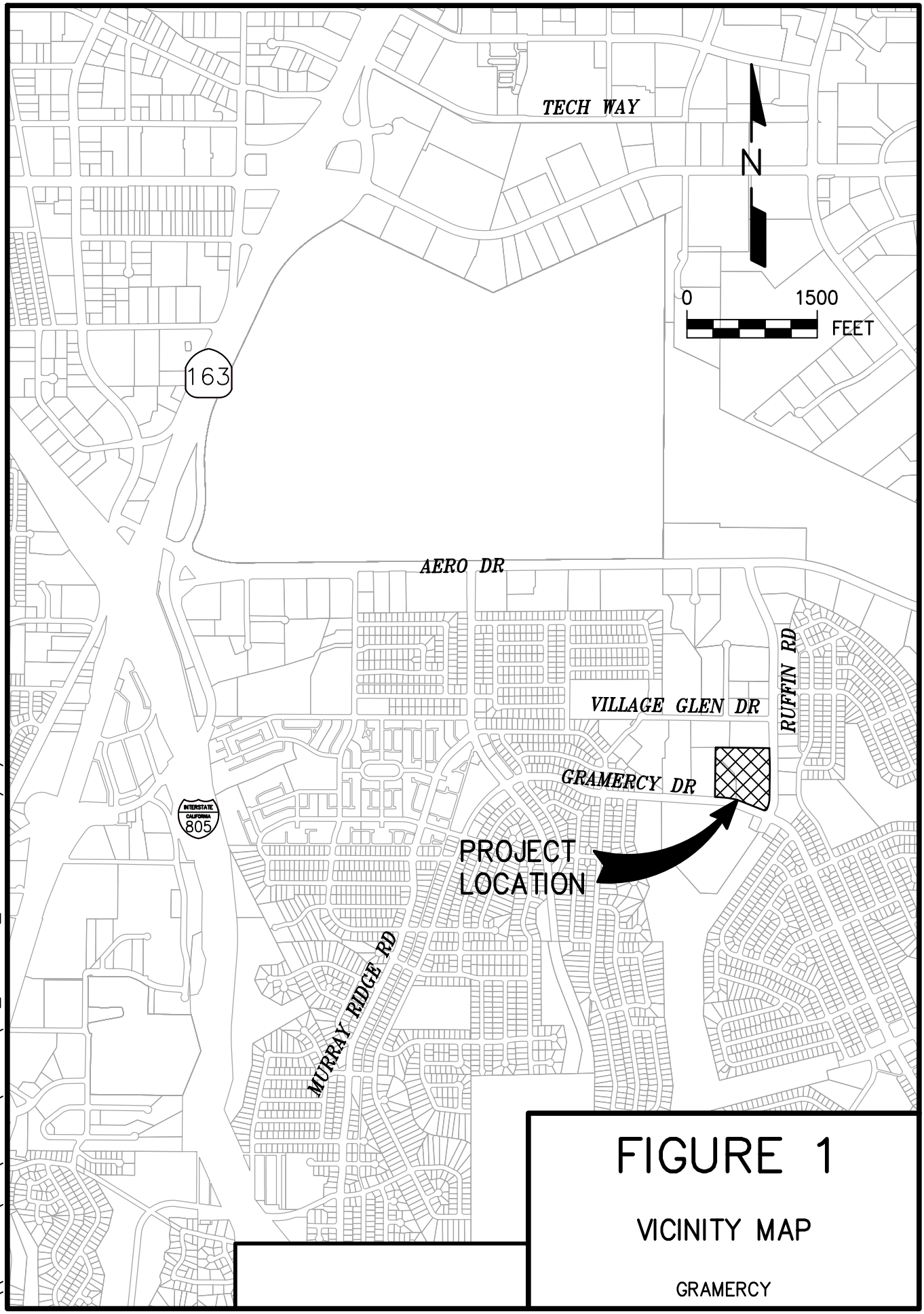
Subject: Water Study for the Gramercy Drive Project in the City of San Diego

Introduction

The Gramercy Drive project is located in the Serra Mesa community of the City of San Diego. The project site is located on the northwest corner of the intersection of Gramercy Drive and Ruffin Road. Figure 1 provides a vicinity map for the project.

The project site is currently occupied with an empty asphalt lot, an empty grass/gravel area, a vacant 3-story-building, and a parking lot. The Gramercy Drive project encompasses approximately 9.1 acres and proposes 199 for-sale dwelling units, eight of which shall be set aside as shopkeeper units. Appendix A provides a preliminary site plan for the project.

Finish Floor elevations within the project site range from approximately 372 feet to 380 feet. Topography of the site generally slopes from north to southeast. Water service for the project will be provided by the City of San Diego.



\\MERIDIAN\DWG\537030\REPORT\GP_FIGURE-1_VICMAP.DWG 9/12/2025 11:20:04 AM LAYOUT:8x11 USER:James

FIGURE 1

VICINITY MAP

GRAMERCY

Purpose of Study

The purpose of this study is to analyze and determine if the existing public water system in its current size and configuration has sufficient flow and pressure to serve the Gramercy Drive project. This report will determine the public water system improvements needed, if any, for the proposed development of the project; this determination will be made in conformance with the City of San Diego water system design standards.

A secondary purpose of this study is to provide preliminary sizing of the domestic water master meter that will serve the project. The domestic water master meter size will need to be confirmed during final engineering for the project.

The onsite domestic and fire protection systems for the project are proposed to be private. The analysis of the onsite private domestic water and fire protection systems will be addressed in a separate study.

Water Demands

Water demands were estimated in accordance with the City of San Diego Water Facility Design Guidelines, Revised January 2021 (2021 Water Design Guidelines). The project site is zoned for CC-1-3 mixed commercial and residential land use, and the Gramercy Drive project is not proposing a change to the existing zoning. Water demands for residential areas are estimated based on dwelling unit density (dwelling units/net acre), unit density (persons/dwelling unit), and a unit water demand factor of 150 gallons/person-day.

The dwelling unit density for the Gramercy Drive project is estimated to be 21.9 dwelling units per acre (199 dwelling units ÷ 9.1 acres = 21.9 dwelling units per acre). This corresponds to a unit density of 3.2 persons/dwelling unit in Table 1-1 of the 2021 Water Design Guidelines. The average potable water demand for the Gramercy Drive project is estimated to be 95,520 gpd (66.3 gpm). Table 1 presents a summary of the average potable water demand for the project.

TABLE 1 GRAMERCY DRIVE PROPOSED WATER DEMAND				
Land Use	**Quantity**	**Unit Density, Capita/DU**	**Water Demand Factor**	**Average Water Demand, gpd**
Residential	199 DUs [1]	3.2	150 gpd/person	95,520
TOTAL				**95,520**

1. Includes 8 shopkeeper units.

From Figure 2-2 of the 2021 Water Design Guidelines, the maximum day demand to average annual demand ratio is approximately 1.14 for the project. From Figure 2-1 of the 2021 Water Design Guidelines, the peak hour demand to average annual demand ratio is approximately 1.5 times 1.57, or 2.36 for the project. Appendix B of this report presents the backup data for determining these peaking factors. Average day, maximum day and peak hour demands for the Gramercy Drive project are as follows:

- Average Day Demand = 95,520 gpd (66.3 gpm)
- Maximum Day Demand = 95,520 gpd x 1.14 = 108,893 gpd (75.6 gpm)
- Peak Hour Demand = 95,520 gpd x 2.36 = 225,427 gpd or (156.5 gpm)

City of San Diego Design Criteria

The 2021 Water Design Guidelines were used to analyze the public water system. A summary of the design criteria from these guidelines is presented in Table 2.

TABLE 2 CITY OF SAN DIEGO WATER SYSTEM DESIGN CRITERIA	
Criteria	**Design Requirement**
Minimum Static Pressure	65 psi
Maximum Static Pressure	120 psi
Maximum Pressure Drop – Peak Hour	25 psi
Minimum Pressure – Peak Hour	40 psi
Minimum Pressure – Max Day plus Fire	20 psi
Maximum Pipeline Velocity (Fire Flow under Normal Operating Conditions)[1]	15 fps
Maximum Pipeline Velocity (Normal Operating Conditions)[2]	5 fps

[1] Section 3.3.1.5, 2021 Water Design Guidelines
[2] Section 3.10.1, 2021 Water Design Guidelines

Fire Flow Requirement

The fire flow requirement for the Gramercy Drive project was determined using the 2022 California Fire Code and the 2023 San Diego Municipal Code. The required fire hydrant flow is based on the largest anticipated building square footage, type of construction, and the installation of an automatic fire sprinkler system.

Per the architectural composite site plan in Appendix C, all buildings will be Construction Type V-B, will include automatic fire sprinkler systems, and the largest anticipated building square footage is 21,267 square feet. Using Table B105.1(2) of the 2022 California Fire Code, this corresponds to a fire flow requirement of 4,000 gpm. Per Table B105.2 of the 2023 San Diego Municipal Code, a 50 percent reduction of the fire flow requirement is allowed when fire sprinkler systems are installed. Therefore, the fire flow requirement for the Gramercy Drive project is 2,000 gpm. Table B105.1(1) of the 2023 San Diego Municipal Code is included in Appendix D for reference.

Existing Water System

Water service to the Gramercy Drive site will be provided by the City of San Diego from the Northwest Mesa 559 Pressure Zone public water system. Figure 2 shows the existing water facilities in the vicinity of the Gramercy Drive project, and Figure 3 presents a pressure zone map of the existing public water system.

There is an existing 12-inch 559 Zone public water line in Gramercy Drive south of the project and an existing 20-inch 559 Zone public water line in Ruffin Road east of the project. The meters that serve the existing vacant building onsite will be turned in for capacity credit against the new meters that will be pulled for the proposed Gramercy Drove project.

Overview of Proposed Water Facilities

Figure 4 presents the proposed public water service connections and onsite private piping layout for the Gramercy Drive project. As shown in Figure 4, the Gramercy Drive project will make two connections to the existing 12-inch public water line in Gramercy Drive near the southwest corner of the project: one for the private domestic water system and one for the private fire protection system. The project will make a second fire protection system connection to the existing 20-inch public water line in Ruffin Road near the northeast corner of the project to provide a looped private fire protection system onsite. The domestic water service connections will include water meters and reduced pressure principle backflow preventers in accordance with City of San Diego Standards. The fire protection service connections will include reduced pressure detector assembly backflow preventers in accordance with City of San Diego Standards.

Finish Floor elevations within the project site range from approximately 372 feet to 380 feet. With service from the Northwest Mesa 559 Pressure Zone, the maximum static pressure range for the project is 77 psi to 81 psi.

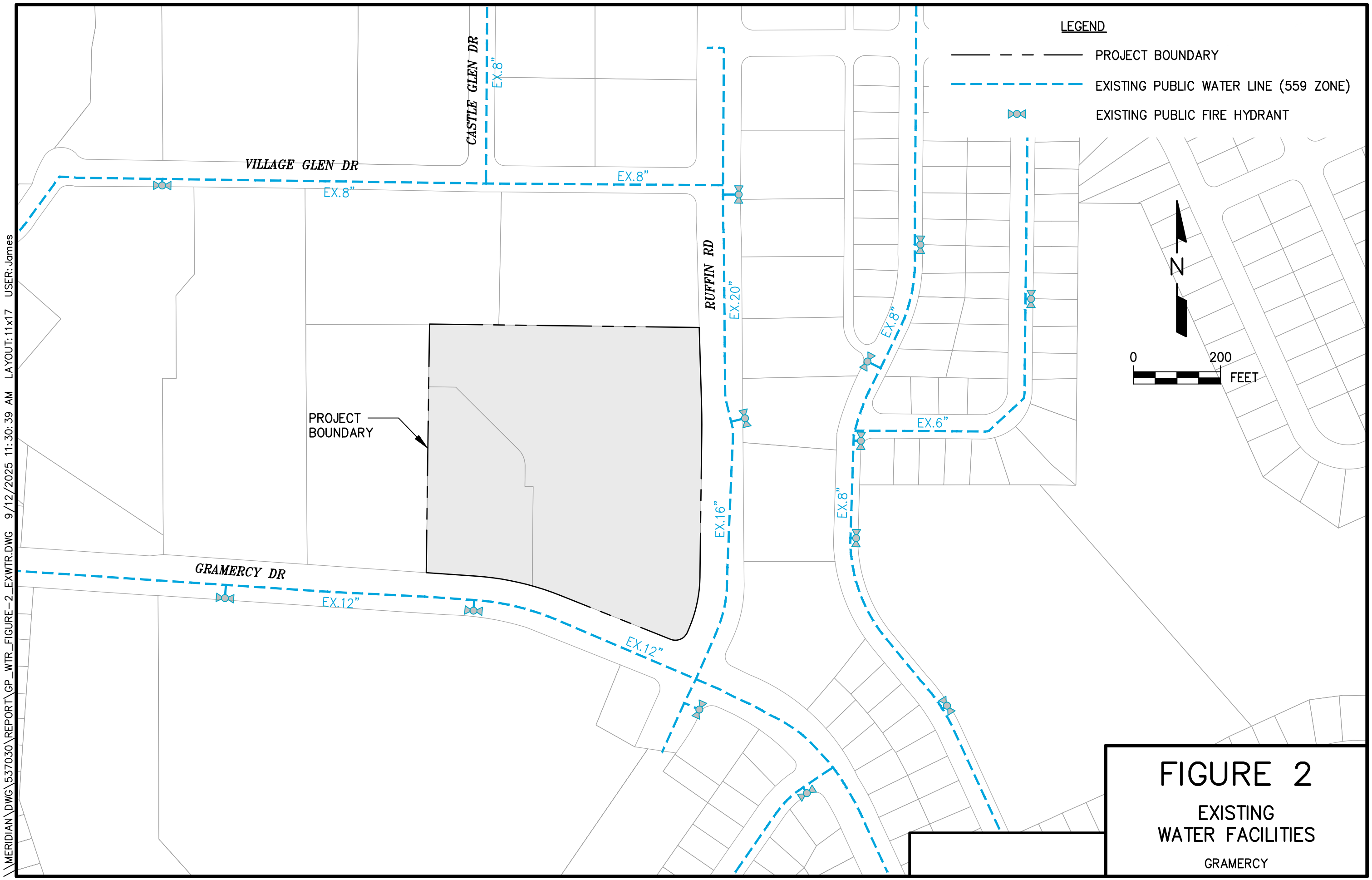
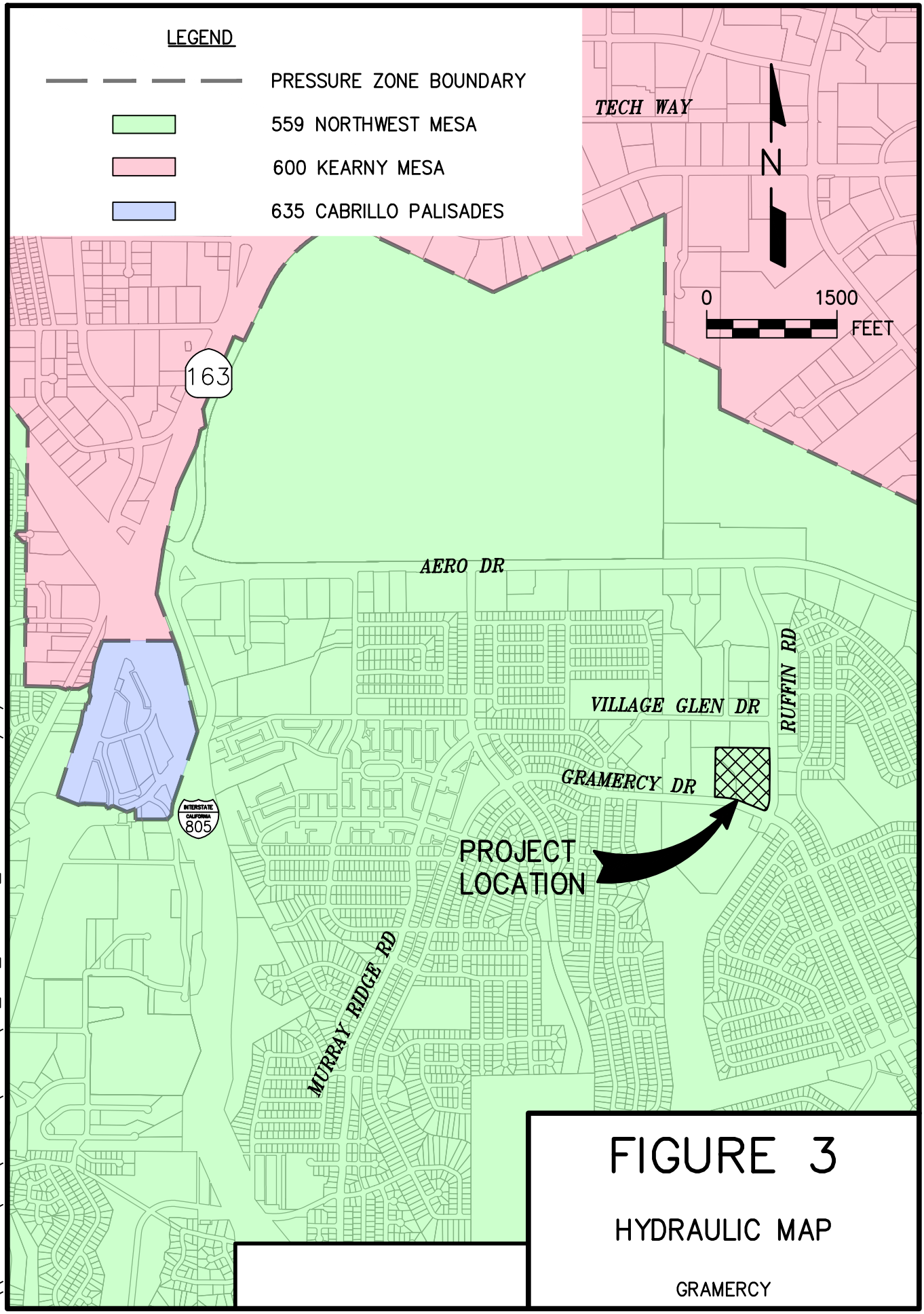


FIGURE 2

EXISTING WATER FACILITIES

GRAMERCY

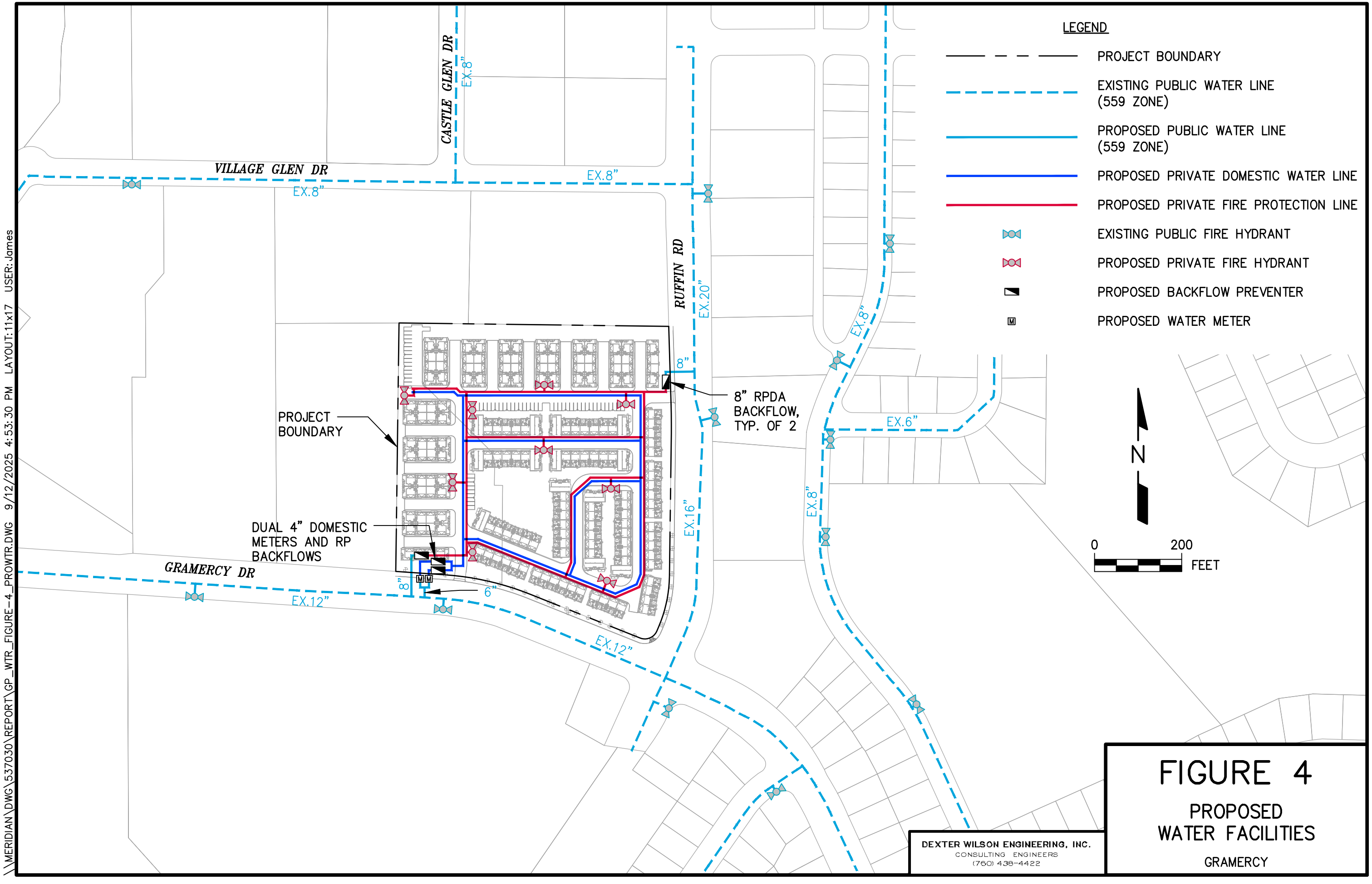


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FIGURE 3

HYDRAULIC MAP

GRAMERCY



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FIGURE 4

PROPOSED WATER FACILITIES

GRAMERCY

Public Water System Analysis

Water system hydraulic modeling was performed to evaluate the ability of the existing public water system to deliver adequate flow and pressure to the proposed project. The University of Kentucky KYPipe computer program was used to analyze the public water system. The computer program utilizes the Hazen-Williams equation for determining headloss in pipes; the Hazen-Williams "C" values used for all pipes is 120.

Available Hydraulic Grade Line. To analyze the proposed public water system presented in Figure 4, the available hydraulic grade line (HGL) in the vicinity of the project was determined using a fire hydrant flow test obtained from the City of San Diego. The fire hydrant flow test is provided in Appendix E for reference and shows that the test hydrant is located on Gramercy Drive approximately 550 feet west of the intersection between Gramercy Drive and Ruffin Road.

The fire hydrant flow test data shows a static pressure of 66.14 psi and a residual pressure of 55.93 psi at a flow of 1,243.03 gpm at the test hydrant. Per City of San Diego Department Instruction 180, a safety factor equal to 10 percent of the water supply system static pressure is deducted from the hydrant flow data for fire sprinkler design purposes. Because this analysis is for the public water system, the static pressure shown in the fire hydrant flow test was increased by 10 percent to 73.5 psi, and the residual pressure was increased to 63.3 psi (at 1,243.03 gpm) in order to account for the same pressure drop observed in the original fire hydrant flow test. Department Instruction 180 is included in Appendix F for reference.

Using the fire hydrant flow test data provided in the hydrant flow test, an extrapolation calculation was used to determine the available pressure and HGL under peak hour demand and maximum day plus fire flow demand for the project. The extrapolation calculation is provided at the end of Appendix E.

Hydraulic Modeling Results. The public water system was analyzed under peak hour demand and maximum day plus 2,000 gpm fire flow demand scenarios. For the maximum day plus 2,000 gpm fire flow demand scenarios, the 2,000 gpm fire flow demand was placed at a single node in each computer model run. Maximum day plus fire flow demand scenarios were modeled under normal operating conditions (all pipes open).

Appendix G presents the computer model results for the public water system. The computer model's corresponding Node and Pipe Diagram is presented in Exhibit A at the back of this report. Table 3 presents a summary of the computer model results for the project.

TABLE 3
PUBLIC WATER SYSTEM
COMPUTER MODEL RESULTS SUMMARY

Scenario	Maximum Pipeline Velocity, fps	Minimum Pressure, psi	At Node (Elevation)	Maximum ΔP, psi
Peak Hour Demand	0.44	71	12 (379 feet)	0.7
Maximum Day Demand plus 2,000 gpm Fire Flow at Node 4	5.89	45	12 (379 feet)	26.7
Maximum Day Demand plus 2,000 gpm Fire Flow at Node 12	5.67	41	12 (379 feet)	30.7

As shown in Table 3, minimum pressure and maximum velocity requirements are being met under peak hour demand and maximum day plus fire flow scenarios. Therefore, the public water system shown in Figure 4 will provide adequate flow and pressure to the Gramercy Drive project.

Preliminary Domestic Water System Master Meter Sizing

A domestic master water meter is proposed to serve the Gramercy Drive project. The meter size was determined based on the total number of Water Fixture Units that will be served by the meter. Irrigation internal to the project will be supplied by a separate irrigation meter to be sized by the landscape designer. Therefore, no allowance for irrigation demand will be included in the meter sizing.

The Water Fixture Unit count for the Gramercy Drive project is 5,686 and was determined using the project architectural plans. Appendix H includes a breakdown of the Water Fixture Unit count for the Gramercy Drive project by Floor Plan.

To convert the total Water Fixture Unit count to a maximum expected demand for the project, Chart A-103.1 of the 2022 California Plumbing Code was used. Using an extrapolation of Chart A103.1(1) of the 2022 California Plumbing Code, the total Water Fixture Unit count of 5,686 converts to a maximum expected demand of 709 gpm. The extrapolation curve is presented at the end of Appendix H for reference.

The maximum expected demand of 709 gpm can be satisfied with a single 6-inch meter, as a 6-inch meter has a City of San Diego maximum allowable capacity of 1,080 gpm; however, it is the City of San Diego's standard practice to install two smaller sized meters (next size down) in lieu of a single larger meter for redundancy. Therefore, two 4-inch meters will be required to serve the project. The 4-inch meters will be served by a single 6-inch water service lateral and will be followed by a 4-inch reduced pressure principle backflow preventer.

The domestic water master meter size will need to be confirmed during final engineering for the project.

Conclusions and Recommendations

The following conclusions and recommendations are summarized based on the water study prepared for the Gramercy Drive project.

1. The Gramercy Drive project will be served by the City of San Diego Northwest Mesa 559 Pressure Zone.

2. With service from the Northwest Mesa 559 Pressure Zone, the maximum static pressure range for the project is 77 psi to 81 psi.

3. The Gramercy Drive project will make two connections to the existing 12-inch public water line in Gramercy Drive near the southwest corner of the project: one for the private domestic water system and one for the private fire protection system. The project will make a second fire protection system connection to the existing 20-inch public water line in Ruffin Road near the northeast corner of the project to provide a looped private fire protection system onsite.

4. It is estimated that two 4-inch meters will be required to serve the project. The 4-inch meters will be served by a single 6-inch water service lateral and will be followed by a 4-inch reduced pressure principle backflow preventer. The domestic water master meter size will need to be confirmed during final engineering for the project.

5. Figure 4 presents the proposed water system for the project. The existing public water system will provide adequate flow and pressure to the project.

6. The public water system shall be designed and constructed in accordance with the guidelines, standards, and approved materials of the City of San Diego.

7. This report presents the sizing and a general schematic layout of the proposed water system. The design engineer for these systems should incorporate valves, fittings, and appurtenances as needed for proper installation and long-term operation of the water systems.

8. If any water lines to be constructed by this development are metallic, a California Licensed Corrosion Engineer will be required to perform a soil corrosivity study and to design a Corrosion Control System.

Please feel free to contact us to discuss any aspect of the information presented in this water system analysis for the Gramercy Drive project.

Dexter Wilson Engineering, Inc.

Fernando Fregoso, P.E.

FF:cf

Attachments

APPENDIX A

GRAMERCY DRIVE
PRELIMINARY SITE PLAN

CONSTRUCTION NOTES

1. PROPOSED 6' SIDEWALK PER SDG-155.
2. PROPOSED RAISDED PAVED MEDIAN
3. PROPOSED 8' PERPENDICULAR CURB RAMP
4. PROPOSED 60' CONCRETE BUS PAD PER SDG 102
5. EXISTING 10' PUBLIC SEWER EASEMENT
6. PROPOSED PUBLIC WATER EASEMENT
7. PROPOED DUAL 6" ABOVE GROUND METERS WITH PRIVATE DUAL 6" BACKFLOW PREVENTORS PER SDW-157
8. PROPOSED PRIVATE SEWER LATERAL AND END CAP FOR PRIVATE SEWER CONNECTION PER SDS-103
9. PROPOSED PRIVATE 8" BACKFLOW PREVENTOR FOR ONSITE PRIVATE FIRE SERVICE
10. EXISTING IRRIGATION LATERAL AND METER TO REMAIN IN PLACE AND USED FOR PROJECT IRRIGATION.
11. PROPOSED CONNECTION TO EXISTING STORM DRAIN
12. PROPOSED ROADWAY STRIPING ADJUSTMENTS ALONG NEW DRIVEWAYS
13. EXISTING OVERHEAD AT&T TELECOMMUNICATIONS LINE. WAIVER PER SDMC 144.0242 TO KEEP EXISTING OVERHEAD LINE IN PLACE.
14. EXISTING PRIVATE LIGHTING TO BE REMOVED FROM PROPOSED PARKWAY
15. EXISTING STREET LIGHT TO BE REMOVED AND REPLACED TO CURRENT CITY STANDARDS
16. EXISTING WATER LATERAL TO BE KILLED AT THE MAIN.
17. EXISTING SEWER LATERAL TO BE ABANDONDED PER WHITEBOOK STANDARDS

NOTES:

PEDESTRIAN RAMP DEVIATION FROM STANDARD

1. NW CORNER OF GRAMERCY DR. AND RUFFIN RD. AN SINGLE 8' WIDE RAMP MUST BE USED BECUASE THERE IS AN EXISTING STORM DRAIN INLET AND TRAFFIC SIGNAL THAT CONFLICT WITH THE SOUTH BOUND DIRECTION RAMP.

OVERHEAD LINE WAIVER REQUEST PER SDMC 144.0242 QUALIFICATIONS

- THE CONVERSION INVOLVES A SHORT SPAN OF OVERHEAD FACILITY (LESS THAN A FULL BLOCK IN LENGTH) AND WOULD NOT REPRESENT A LOGICAL EXTENSION TO AN UNDERGROUND FACILITY.

- THE REQUESTED WAIVER WILL NOT CREATE A LONG TERM VISUAL OR FUNCTIONAL IMPACT TO ANY STREETS, SIDEWALKS OR THE PUBLIC REALM IN CONFLICT WITH ADOPTED LAND USE PLAN POLICIES.

GRAMERCY DRIVE

RUFFIN ROAD

MISSION VILLAGE DRIVE

SCALE: 1"=30'

REGISTERED PROFESSIONAL ENGINEER
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9160-9280 GRAMERCY DRIVE

Project Name:
GRAMERCY
TENTATIVE MAP EXEMPTION EXHIBIT

Sheet Title:
PROPOSED SITE IMPROVEMENTS

PRJ #

1872-6289 CCS83 COORDINATES
232-1729 LAMBERT COORDINATES

APPENDIX B

CITY OF SAN DIEGO
DESIGN GUIDE PEAKING FACTORS

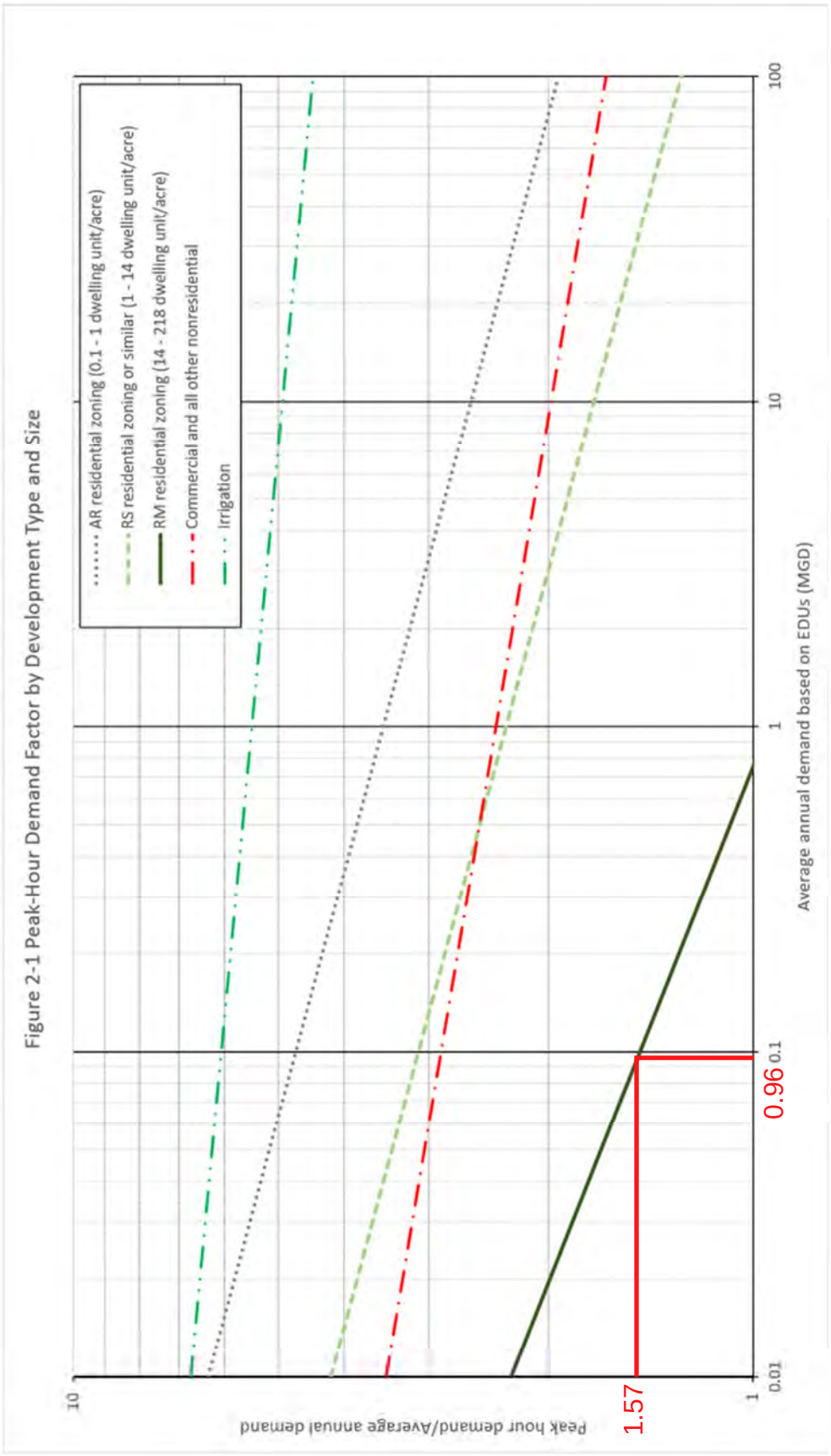


Figure 2-1 Peak-Hour Demand Factor by Development Type and Size

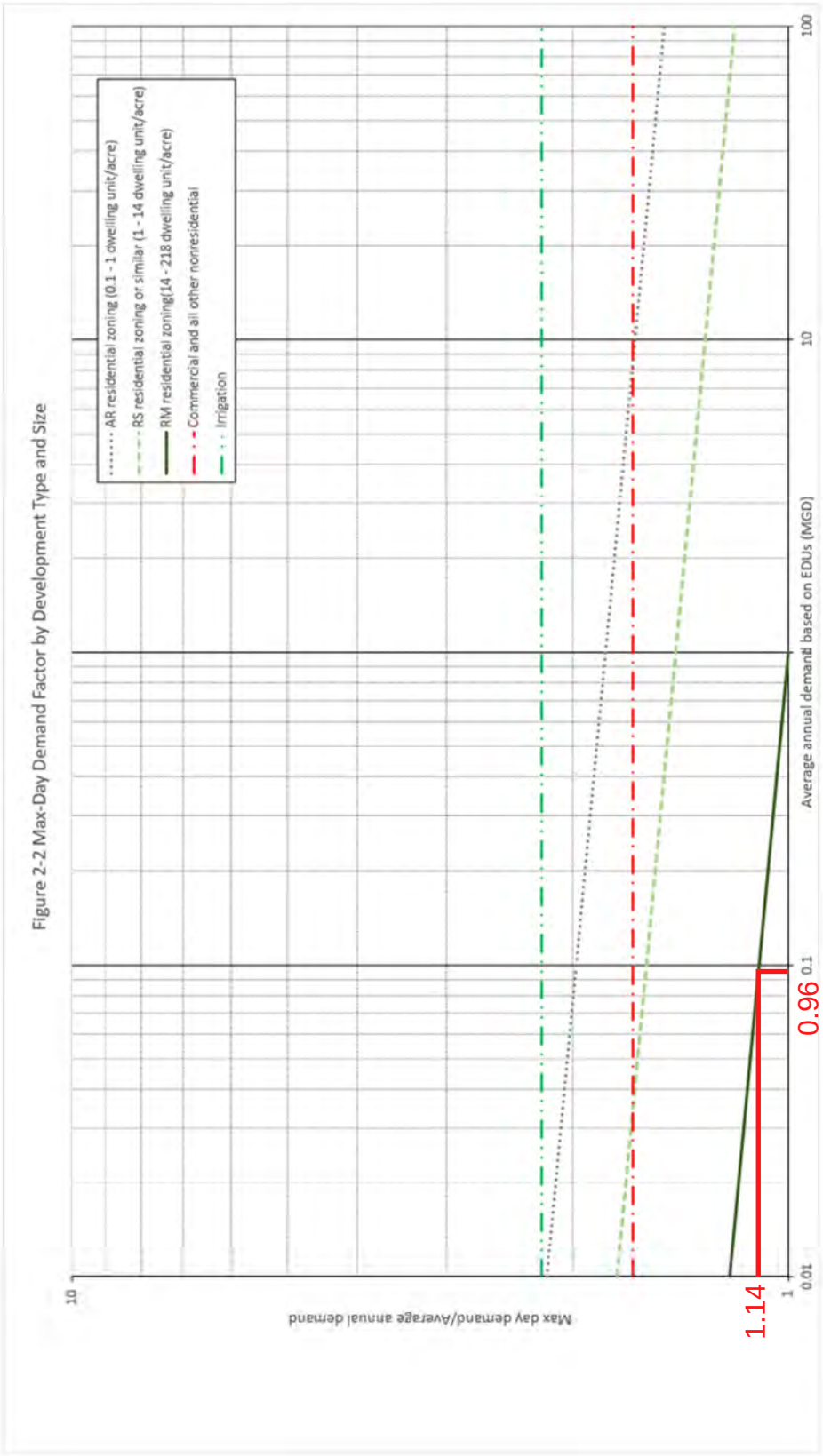


Figure 2-2 Max-Day Demand Factor by Development Type and Size

APPENDIX C

GRAMERCY DRIVE
ARCHITECTURAL COMPOSITE SITE PLAN



UNIT MIX SUMMARY

LEGEND	PLAN TYPE	DESCRIPTION	# OF UNITS	MIX	NET S.F. CONDITIONED	GARAGE NET S.F.	DECK / PORCH NET S.F.
	PLAN 1	2 BD / 2.5 BA / SxS	44 UNITS	22%	**1,240 SF**	488 SF	77 SF
	PLAN 2	3 BD / 2 BA + 2 PDR. / SxS	44 UNITS	22%	**1,683 SF**	402 SF	84 SF
	PLAN 3	2 BD / 2.5 BA / SxS	7 UNITS	4%	**1,214 SF**	439 SF	65 SF
	PLAN 4	2 BD / 2.5 BA / SxS	7 UNITS	4%	**1,191 SF**	461 SF	85 SF
	PLAN 5	2 BD / 2.5 BA / TANDEM	6 UNITS	3%	**1,197**	419	57
	PLAN 6	2 BD / 2.5 BA / TANDEM	6 UNITS	3%	**1,253**	457	57
	PLAN 7	3 BD / 3.5 BA. / SxS	55 UNITS	28%	**1,744**	420	0
	PLAN 8	4 BD / 3.5 BA / SxS	30 UNITS	15%	**1,923 SF**	434 SF	57 SF
		TOTAL	**199 UNITS**	100%			

BUILDING AREA CALCULATIONS

COMPOSITE TYPE	PLEX	OCCUPANCY TYPE	TYPE OF CONSTRUCTION	FIRE SPRINKLER TYPE	No. OF STORIES	# OF BUILDINGS ON SITE	CONDITONED, GARAGE, & DECK FLOOR AREA PER BLDG.	TOTAL BUILDING AREA ON SITE
A1	4-PLED	R2 / U	TYPE V-B	NFPA 13	3	2	7,948 SF	15,896.00 SF
B1	8-PLEX	R2 / U	TYPE V-B	NFPA 13	3	10	15,896 SF	158,960.00 SF
C1	4-PLEX	R2 / U	TYPE V-B	NFPA 13	3	2	9,156 SF	18,312.00 SF
D1	5-PLEX	R2 / U	TYPE V-B	NFPA 13	3	2	11,320 SF	22,640.00 SF
E1	6-PLEX	R2 / U	TYPE V-B	NFPA 13	3	3	13,484 SF	40,452.00 SF
F1	8-PLEX	R2 / U	TYPE V-B	NFPA 13	3	1	16,924 SF	16,924.00 SF
G1	9-PLEX	R2 / U	TYPE V-B	NFPA 13	3	2	18,215 SF	36,430.00 SF
G2	9-PLEX	R2 / U	TYPE V-B	NFPA 13	3	1	19,103 SF	19,103.00 SF
H1	10-PLEX	R2 / U	TYPE V-B	NFPA 13	3	3	20,379 SF	61,137.00 SF
H2	10-PLEX	R2 / U	TYPE V-B	NFPA 13	3	1	21,267 SF	21,267.00 SF
GRAND TOTAL						**27**		**411,121 SF**

ktgy

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ktgy.com
949 851 2133

KTGY Project No: 231034

Project Contact: Juan Flores
Email: jflores@ktgy.com

Principal: Alan Scales
Project Designer: Juan Flores
Project Director: Tien Shin-Shen

Developer

KB HOME
9915 MIRA MESA BLVD. #100
SAN DIEGO, 92131
PHONE NUMBER : 760-550-1957

GRAMERCY
San Diego,Ca.

No.	Date	Description

It is the clients responsibility prior to or during construction to notify the architect in writing of any perceived errors or omissions in the plans and specifications of which a contractor thoroughly knowledgeable with the building codes and methods of construction should reasonably be aware. Written instructions addressing such perceived errors or omissions shall be received from the architect prior to the client or clients subcontractors proceeding with the work. The client will be responsible for any defects in construction if these procedures are not followed.

License Stamp

ARCHITECTURAL
COMPOSITE SITE PLAN

ARCHITECTURAL COMPOSITE SITE PLAN | SCALE: 1"=30'-0" | 1

A1-10

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APPENDIX D

EXCERPT FROM
CITY OF SAN DIEGO
MUNICIPAL CODE

TABLE B105.2

TABLE B105.2 REQUIRED FIRE FLOW FOR BUILDINGS OTHER THAN ONE- AND TWO-FAMILY DWELLINGS, GROUP R-3 AND R-4 BUILDINGS AND TOWNHOUSES

Automatic Sprinkler Systems (design-standard)	Minimum Fire-Flow (gallons per minute)	Flow Duration (hours)
No automatic sprinkler system	Value in Table B105.1(2)	Duration in Table B105.1(2)
Section 903.3.1.1 of the California Fire Code	50% of the value in Table B105.1(2)[a]	Duration in Table B105.1(2) at the original flow rate
Section 903.3.1.2 of the California Fire Code	50% of the value in Table B105.1(2)[a]	Duration in Table B105.1(2) at the original flow rate

For SI: 1 gallon per minute = 3.785 L/m

a. The reduced fire-flow rate shall not be less than 1,500 gallons per minute.

(c) ***Appendix BB***: Adopted

(d) ***Appendix C*** is adopted with modifications as follows:

TABLE C102.1
REQUIRED NUMBER AND SPACING OF FIRE HYDRANTS[f]

FIRE-FLOW REQUIREMENT(gpm)	MINIMUM NUMBER OF HYDRANTS	AVERAGE SPACING BETWEEN HYDRANTS[a, b, c,] (feet)	MAXIMUM DISTANCE FROM ANY POINT ON STREET OR ROAD FRONTAGE TO A HYDRANT[d]
1,750 or less	1	500	250
1,751–2,250	2	450	225
2,251–2,750	3	450	225
2,751–3,250	3	400	225
3,251–4,000	4	350	210
4,001–5,000	5	300	180
5,001–5,500	6	300	180
5,501–6,000	6	250	150
6,001–7,000	7	250	150
7,001 or more	8 or more[e]	200	120

APPENDIX E

FIRE HYDRANT FLOW TEST
AND
EXTRAPOLATION SPREADSHEET

City of San Diego
Development Services
Attention: **Hydrant Flow Request**
1222 First Ave., MS-401
San Diego, CA 92101
(619) 446-5000

Hydrant Flow Request

FORM
DS-160
October 2016

Fill out the information below completely for all sprinkler system flow requests, including NFPA 13, 13D and 13R systems. E-mail form to: DSDHydrantFlow@sandiego.gov, or mail request to the above address.

Please print or type legibly.

Company Requesting Hydrant Flow:
Dexter Wilson Engineering Inc.

Telephone No: (760)-438-4422
Fax No:
E-mail Address: max@dwilsoneng.com

Project Number for the Building Permits:
TBD

Location of Hydrants:
Gramercy Drive

Cross Street: Ruffin Road
City: San Diego
State: CA
ZIP Code: 92123

FOR CITY USE ONLY

Facility Sequence Number: (FSN): 529566

Static: 66.14 PSI
Elevation: 375 FEET

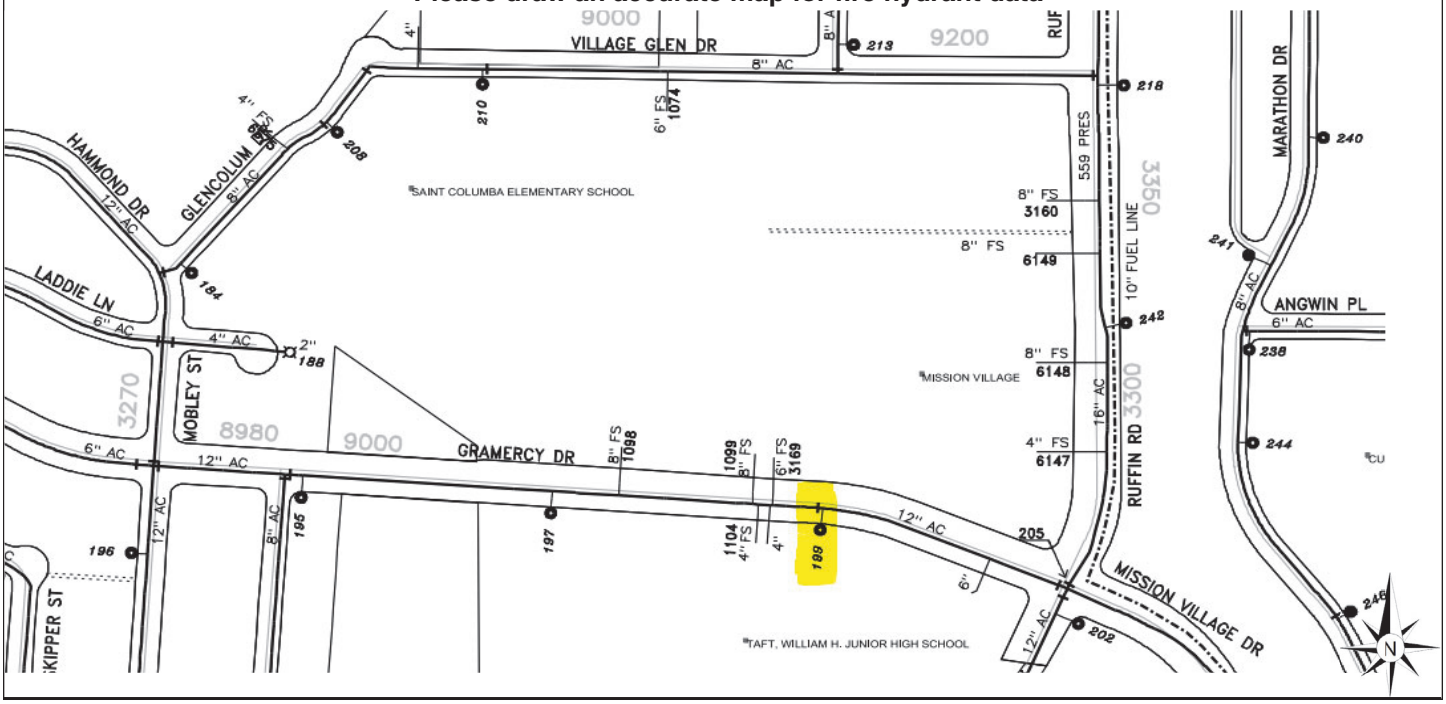
Pitot: --- PSI
Residual: 55.93 PSI

Date: 8-21-2025
Flow: 1243.03 GPM

Researched in database by: Zach Green

The information provided above is based upon a water model. It is the contractor's responsibility to confirm the available static pressure at the system point of connection. If a discrepancy is noticed at that time, notify DSDHydrantFlow@sandiego.gov as soon as possible.

Please draw an accurate map for fire hydrant data



Fire Hydrant Flow Test Date 8/21/2025

Input Fire Flow Test Results			**Modified Fire Flow Test Results**[1]		
Static Pressure	66.14	PSI	Static Pressure	73.5	PSI
Residual Pressure	55.93	PSI	Residual Pressure	63.3	PSI
Hydrant Flow	1243.03	GPM	Hydrant Flow	1243.03	GPM

Acutal Hydrant Elevation		Feet	HGL	Feet
Fire Flow Test Results Elevation	375	Feet	HGL	544.6 Feet

Equation $\Delta H = k\,Q^{1.85}$

k = 4.4409E-05

Extrapolated Calculations

Q, gpm	Residual Pressure	Available HGL
157	73.3 psi	544.1 ft
700	70.0 psi	536.5 ft
900	67.9 psi	531.6 ft
1100	65.3 psi	525.8 ft
1300	62.4 psi	519.0 ft
1500	59.0 psi	511.3 ft
1700	55.3 psi	502.6 ft
1900	51.1 psi	493.0 ft
2000	48.9 psi	487.8 ft
2076	47.1 psi	483.8 ft
2100	46.6 psi	482.4 ft
2300	41.6 psi	471.0 ft
2500	36.3 psi	458.8 ft
2700	30.6 psi	445.6 ft
3000	21.4 psi	424.3 ft
3100	18.1 psi	416.8 ft
3300	11.3 psi	401.2 ft
3500	4.2 psi	384.7 ft
3700	-3.3 psi	367.3 ft
3900	-11.2 psi	349.2 ft
4000	-15.2 psi	339.8 ft
4100	-19.4 psi	330.3 ft
4300	-27.9 psi	310.5 ft
4500	-36.8 psi	290.0 ft
4700	-46.1 psi	268.6 ft
4900	-55.7 psi	246.5 ft
5100	-65.6 psi	223.6 ft

Residual Pressure, psi	Available Flow, gpm
0 psi	3,613
10 psi	3,338
20 psi	3,043
30 psi	2,721
40 psi	2,362
50 psi	1,950
60 psi	1,445
70 psi	696
80 psi	Residual Pressure Exceeds Static Pressure
90 psi	Residual Pressure Exceeds Static Pressure
100 psi	Residual Pressure Exceeds Static Pressure
110 psi	Residual Pressure Exceeds Static Pressure
120 psi	Residual Pressure Exceeds Static Pressure
130 psi	Residual Pressure Exceeds Static Pressure
140 psi	Residual Pressure Exceeds Static Pressure
150 psi	Residual Pressure Exceeds Static Pressure
160 psi	Residual Pressure Exceeds Static Pressure
170 psi	Residual Pressure Exceeds Static Pressure
180 psi	Residual Pressure Exceeds Static Pressure
190 psi	Residual Pressure Exceeds Static Pressure

1. Static pressure increased by 10% to remove safety factor associated with fire sprinkler design. See City of San Diego Department Instruction 180.

APPENDIX F

CITY OF SAN DIEGO
DEPARTMENT INSTRUCTION 180

INFORMATION BULLETIN

180

March 2022

Hydrant Flow Data

This information bulletin describes the procedure for obtaining the available water flow and pressure at a fire hydrant for projects in the City of San Diego. This information is required when applying for fire sprinkler or standpipe permits requiring hydraulic calculations within the City's jurisdiction. The City of San Diego utilizes a computer model to track and display the flow and pressure of fire hydrants within the City of San Diego water district.

I. Completing Form DS-160

Print/type all necessary information for the desired fire hydrant flow and pressure location on the Hydrant Flow Request form (DS-160). At a minimum, include the name of the company requesting the hydrant flow data, the project address, the location of the nearest hydrants, and nearest cross streets to the project address.

On the bottom of the form, draw or insert an accurate site map of the area. The site map must show the location of the fire hydrant for which the hydrant flow data is being requested, the project street name and address, the general location of the project, the nearest cross street and name, and a north arrow. The map must be drawn or inserted to a size or scale sufficient to clearly show all elements described above.

II. Submitting Form DS-160

To request available hydrant flow data, complete form DS-160 and e-mail the request to DSDHydrantFlow@sandiego.gov. The request may also be mailed to:

City of San Diego Development Services
Attention: Hydrant Flow Request
1222 First Avenue, MS401
San Diego, CA 92101-4101

III. Locations Without Water Model Data

A. For existing private fire service mains or fire hydrants where water model data is not available, a hydrant flow request must be submitted for the off-site public fire hydrant that is closest to the point of connection for the on-site private fire main. Flow testing of public or private fire hydrants will not be witnessed by Development Services or Fire Department personnel, and data from such test will not be accepted for the design of fire suppression systems. Any hydraulic calculations must be carried back through the private on-site system to the point of connection to the City water distribution system.

B. For new developments without current fire hydrants or where water model data is not available, the project's water study or a hydraulic analysis prepared by a registered professional engineer shall be provided with the fire sprinkler plans in lieu of hydrant flow data.

C. For projects located outside the City of San Diego Public Utilities Department Water District, water supply information obtained from the applicable water purveyor shall be used.

IV. Using Hydrant Flow Data

A signed copy of the Hydrant Flow Request form complete within 6 months of the Permit application date shall be electronically affixed to the fire suppression system plans uploaded for the permit submittal. Note that a safety factor equal to 10% of the water supply system static pressure will be deducted from the hydrant flow data that is provided, so no additional safety factors need to be applied to the data that is provided.

V. Contractor's Responsibility

It is the contractor's responsibility to confirm the available static pressure at the system point of connection prior to beginning design of the system(s) and to report any discrepancies to DSDHydrantFlow@sandiego.gov as soon as possible.

☐

Reference Table
• How to Obtain a Permit for Fire Sprinkler Systems (Information Bulletin 139) • Fire Permit Fees, Information Bulletin 506 • Hydrant Flow Request (Form DS-160)

APPENDIX G

COMPUTER MODELING OUTPUT
FOR THE
PUBLIC WATER SYSTEM

NODE AND PIPE DIAGRAM REFERENCE:

Exhibit A at the back of this report.

CONDITIONS MODELED:

1. Peak Hour Demand

2. Maximum Day Demand plus 2,000 gpm Fire Flow at Node 4

3. Maximum Day Demand plus 2,000 gpm Fire Flow at Node 12

U N I T S S P E C I F I E D

FLOWRATE ..... = gallons/minute
HEAD (HGL) ..... = feet
PRESSURE ..... = psig

P I P E L I N E D A T A

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NAMES #1	#2	LENGTH (ft)	DIAMETER (in)	ROUGHNESS COEFF.	MINOR LOSS COEFF.
1	0	4	73.50	12.00	120.0000	0.95
5	0	8	543.40	12.00	120.0000	1.13
9	8	12	720.00	16.00	120.0000	2.79

P U M P/L O S S E L E M E N T D A T A

THERE IS A DEVICE AT NODE 0 DESCRIBED BY THE FOLLOWING DATA: (ID= 1)

HEAD (ft)	FLOWRATE (gpm)
169.62	0.00
146.08	1243.03
84.64	2486.06

N O D E D A T A

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	JUNCTION ELEVATION (ft)	EXTERNAL GRADE (ft)
4		156.50	375.00	
8		0.00	372.00	
12		0.00	379.00	
0		----	375.00	375.00

O U T P U T O P T I O N D A T A

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT
MAXIMUM AND MINIMUM PRESSURES = 2
MAXIMUM AND MINIMUM VELOCITIES = 2

S Y S T E M C O N F I G U R A T I O N

NUMBER OF PIPES .....(P) = 3
NUMBER OF END NODES .....(J) = 3
NUMBER OF PRIMARY LOOPS .....(L) = 0
NUMBER OF SUPPLY NODES .....(F) = 1
NUMBER OF SUPPLY ZONES .....(Z) = 1

==========

Case: 0

RESULTS OBTAINED AFTER 3 TRIALS: ACCURACY = 0.00000E+00

Gramercy Drive Project
Public Water System Analysis
Peak Hour Demand

P I P E L I N E R E S U L T S

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NUMBERS #1	#2	FLOWRATE gpm	HEAD LOSS ft	MINOR LOSS ft	LINE VELO. ft/s	HL+ML/ 1000 ft/f	HL/ 1000 ft/f
1	0	4	156.50	0.01	0.00	0.44	0.13	0.09
5	0	8	0.00	0.00	0.00	0.00	0.00	0.00
9	8	12	0.00	0.00	0.00	0.00	0.00	0.00

P U M P/L O S S E L E M E N T R E S U L T S

NAME	FLOWRATE gpm	INLET HEAD ft	OUTLET HEAD ft	PUMP HEAD ft
0	156.50	0.00	169.11	169.1

N O D E R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND gpm	HYDRAULIC GRADE ft	NODE ELEVATION ft	PRESSURE HEAD ft	NODE PRESSURE psi
4		156.50	544.10	375.00	169.10	73.28
8		0.00	544.11	372.00	172.11	74.58
12		0.00	544.11	379.00	165.11	71.55
0		----	544.11	375.00	169.11	73.28

M A X I M U M A N D M I N I M U M V A L U E S

P R E S S U R E S

JUNCTION NUMBER	MAXIMUM PRESSURES psi	JUNCTION NUMBER	MINIMUM PRESSURES psi
8	74.58	12	71.55
0	73.28	4	73.28

V E L O C I T I E S

PIPE NUMBER	MAXIMUM VELOCITY (ft/s)	PIPE NUMBER	MINIMUM VELOCITY (ft/s)
1	0.44	1	0.44

S U M M A R Y O F I N F L O W S A N D O U T F L O W S

(+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES
(-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE gpm	NODE TITLE
0	156.50	

NET SYSTEM INFLOW = 156.50
NET SYSTEM OUTFLOW = 0.00
NET SYSTEM DEMAND = 156.50

==========
Case: 1

C H A N G E S F O R N E X T S I M U L A T I O N (Change Number = 1)

JUNCTION DEMANDS CHANGED - PLEASE SEE RESULTS TABLE

RESULTS OBTAINED AFTER 3 TRIALS: ACCURACY = 0.00000E+00

Gramercy Drive Project
Public Water System Analysis
Maximum Day Demand plus 2000 GPM Fire Flow at Node 4

P I P E L I N E R E S U L T S

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NUMBERS #1	#2	FLOWRATE gpm	HEAD LOSS ft	MINOR LOSS ft	LINE VELO. ft/s	HL+ML/ 1000 ft/f	HL/ 1000 ft/f
1	0	4	2075.60	0.84	0.51	5.89	18.33	11.37
5	0	8	0.00	0.00	0.00	0.00	0.00	0.00
9	8	12	0.00	0.00	0.00	0.00	0.00	0.00

P U M P/L O S S E L E M E N T R E S U L T S

NAME	FLOWRATE gpm	INLET HEAD ft	OUTLET HEAD ft	PUMP HEAD ft
0	2075.60	0.00	108.78	108.8

N O D E R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND gpm	HYDRAULIC GRADE ft	NODE ELEVATION ft	PRESSURE HEAD ft	NODE PRESSURE psi
4		2075.60(**)	482.43	375.00	107.43	46.55
8		0.00	483.78	372.00	111.78	48.44
12		0.00	483.78	379.00	104.78	45.41
0		----	483.78	375.00	108.78	47.14

M A X I M U M A N D M I N I M U M V A L U E S

P R E S S U R E S

JUNCTION NUMBER	MAXIMUM PRESSURES psi	JUNCTION NUMBER	MINIMUM PRESSURES psi
8	48.44	12	45.41
0	47.14	4	46.55

V E L O C I T I E S

PIPE NUMBER	MAXIMUM VELOCITY (ft/s)	PIPE NUMBER	MINIMUM VELOCITY (ft/s)
1	5.89	1	5.89

S U M M A R Y O F I N F L O W S A N D O U T F L O W S

(+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES
(-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE gpm	NODE TITLE
0	2075.60	

NET SYSTEM INFLOW = 2075.60
NET SYSTEM OUTFLOW = 0.00
NET SYSTEM DEMAND = 2075.60

==========
Case: 2

C H A N G E S F O R N E X T S I M U L A T I O N (Change Number = 2)

JUNCTION DEMANDS CHANGED - PLEASE SEE RESULTS TABLE

RESULTS OBTAINED AFTER 3 TRIALS: ACCURACY = 0.00000E+00

Gramercy Drive Project
Public Water System Analysis
Maximum Day Demand plus 2000 GPM Fire Flow at Node 12

P I P E L I N E R E S U L T S

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NUMBERS #1	#2	FLOWRATE gpm	HEAD LOSS ft	MINOR LOSS ft	LINE VELO. ft/s	HL+ML/ 1000 ft/f	HL/ 1000 ft/f
1	0	4	75.60	0.00	0.00	0.21	0.03	0.02
5	0	8	2000.00	5.77	0.56	5.67	11.66	10.62
9	8	12	2000.00	1.88	0.44	3.19	3.23	2.62

P U M P/L O S S E L E M E N T R E S U L T S

NAME	FLOWRATE gpm	INLET HEAD ft	OUTLET HEAD ft	PUMP HEAD ft
0	2075.60	0.00	108.78	108.8

N O D E R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND gpm	HYDRAULIC GRADE ft	NODE ELEVATION ft	PRESSURE HEAD ft	NODE PRESSURE psi
4		75.60(0.48)	483.78	375.00	108.78	47.14
8		0.00	477.45	372.00	105.45	45.69
12		2000.00	475.12	379.00	96.12	41.65
0		----	483.78	375.00	108.78	47.14

M A X I M U M A N D M I N I M U M V A L U E S

P R E S S U R E S

JUNCTION NUMBER	MAXIMUM PRESSURES psi	JUNCTION NUMBER	MINIMUM PRESSURES psi
0	47.14	12	41.65
4	47.14	8	45.69

V E L O C I T I E S

PIPE NUMBER	MAXIMUM VELOCITY (ft/s)	PIPE NUMBER	MINIMUM VELOCITY (ft/s)
5	5.67	1	0.21
9	3.19	9	3.19

S U M M A R Y O F I N F L O W S A N D O U T F L O W S

(+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES
(-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE gpm	NODE TITLE
0	2075.60	

NET SYSTEM INFLOW = 2075.60
NET SYSTEM OUTFLOW = 0.00
NET SYSTEM DEMAND = 2075.60

APPENDIX H

WATER FIXTURE UNIT SUMMARY
AND
EXTRAPOLATION GRAPH

Project Name Gramercy Drive Project

Job Number 537-030
Date 8/15/2025

Water Fixture Units

The basis for the Water Fixture Units is "Private" per the 2022 California Plumbing Code.

DESCRIPTION	A1			B1			C1			D1			E1		
	QUANTITY	FIXTURE UNITS EACH	TOTAL FIXTURE UNITS	QUANTITY	FIXTURE UNITS EACH	TOTAL FIXTURE UNITS	QUANTITY	FIXTURE UNITS EACH	TOTAL FIXTURE UNITS	QUANTITY	FIXTURE UNITS EACH	TOTAL FIXTURE UNITS	QUANTITY	FIXTURE UNITS EACH	TOTAL FIXTURE UNITS
CLOTHES WASHER	4	4	16	8	4	32	4	4	16	5	4	20	6	4	24
LAUNDRY SINK	0	1.5	0	0	1.5	0	0	1.5	0	0	1.5	0	0	1.5	0
TUB/SHOWER	4	4	16	8	4	32	8	4	32	10	4	40	12	4	48
SHOWER	4	2	8	8	2	16	4	2	8	5	2	10	6	2	12
KITCHEN SINK	4	1.5	6	8	1.5	12	4	1.5	6	5	1.5	7.5	6	1.5	9
DISHWASHER	4	1.5	6	8	1.5	12	4	1.5	6	5	1.5	7.5	6	1.5	9
LAVATORY	18	1	18	36	1	36	20	1	20	25	1	25	30	1	30
WATER CLOSET (1.6 GPF) TANK	14	2.5	35	28	2.5	70	16	2.5	40	20	2.5	50	24	2.5	60
WATER CLOSET (1.6 GPF) VALVE	0	5	0	0	5	0	0	5	0	0	5	0	0	5	0
HOSE BIBB	1	2.5	2.5	1	2.5	2.5	1	2.5	2.5	1	2.5	2.5	1	2.5	2.5
EACH ADDTL HB	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0
POOL	0	30	0	0	30	0	0	30	0	0	30	0	0	30	0
OTHER			0			0			0			0			0
TOTAL			**107.5**			**212.5**			**130.5**			**162.5**			**194.5**

DESCRIPTION	F1			G1			G2			H1			H2		
	QUANTITY	FIXTURE UNITS EACH	TOTAL FIXTURE UNITS	QUANTITY	FIXTURE UNITS EACH	TOTAL FIXTURE UNITS	QUANTITY	FIXTURE UNITS EACH	TOTAL FIXTURE UNITS	QUANTITY	FIXTURE UNITS EACH	TOTAL FIXTURE UNITS	QUANTITY	FIXTURE UNITS EACH	TOTAL FIXTURE UNITS
CLOTHES WASHER	8	4	32	9	4	36	9	4	36	10	4	40	10	4	40
LAUNDRY SINK	0	1.5	0	0	1.5	0	0	1.5	0	0	1.5	0	0	1.5	0
TUB/SHOWER	12	4	48	12	4	48	16	4	64	14	4	56	18	4	72
SHOWER	10	2	20	11	2	22	9	2	18	12	2	24	10	2	20
KITCHEN SINK	8	1.5	12	9	1.5	13.5	9	1.5	13.5	10	1.5	15	10	1.5	15
DISHWASHER	8	1.5	12	9	1.5	13.5	9	1.5	13.5	10	1.5	15	10	1.5	15
LAVATORY	38	1	38	40	1	40	42	1	42	45	1	45	47	1	47
WATER CLOSET (1.6 GPF) TANK	30	2.5	75	31	2.5	77.5	33	2.5	82.5	35	2.5	87.5	37	2.5	92.5
WATER CLOSET (1.6 GPF) VALVE	0	5	0	0	5	0	0	5	0	0	5	0	0	5	0
HOSE BIBB	1	2.5	2.5	1	2.5	2.5	1	2.5	2.5	1	2.5	2.5	1	2.5	2.5
EACH ADDTL HB	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0
POOL	0	30	0	0	30	0	0	30	0	0	30	0	0	30	0
OTHER			0			0			0			0			0
TOTAL			**239.5**			**253**			**272**			**285**			**304**

TOTAL WFU

Building Type	Quantity	WFU/Bldg	WFU
A1	2	107.5	215
B1	10	212.5	2,125
C1	2	130.5	261
D1	2	162.5	325
E1	3	194.5	584
F1	1	239.5	240
G1	2	253	506
G2	1	272	272
H1	3	285	855
H2	1	304	304
TOTAL	**27**		**5,686.0**

WFU	Demand, gpm
5,686	709

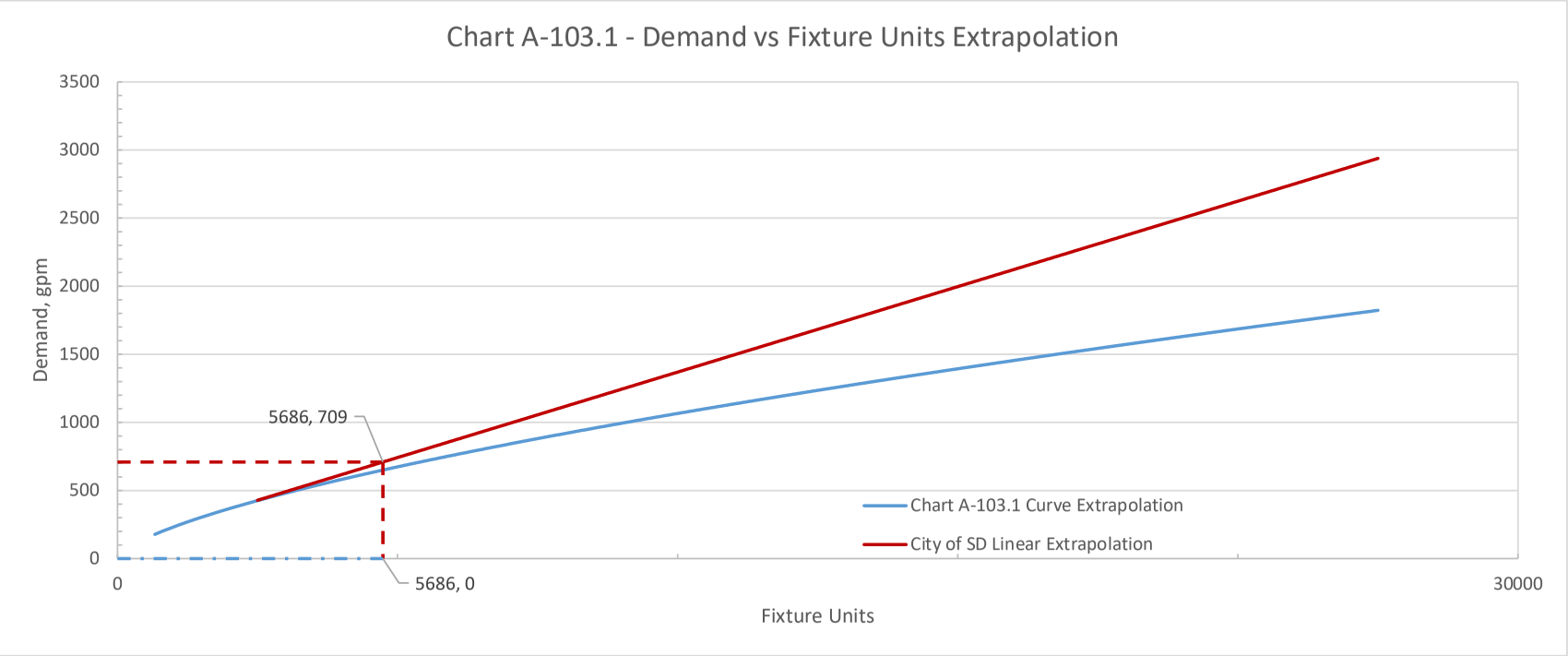
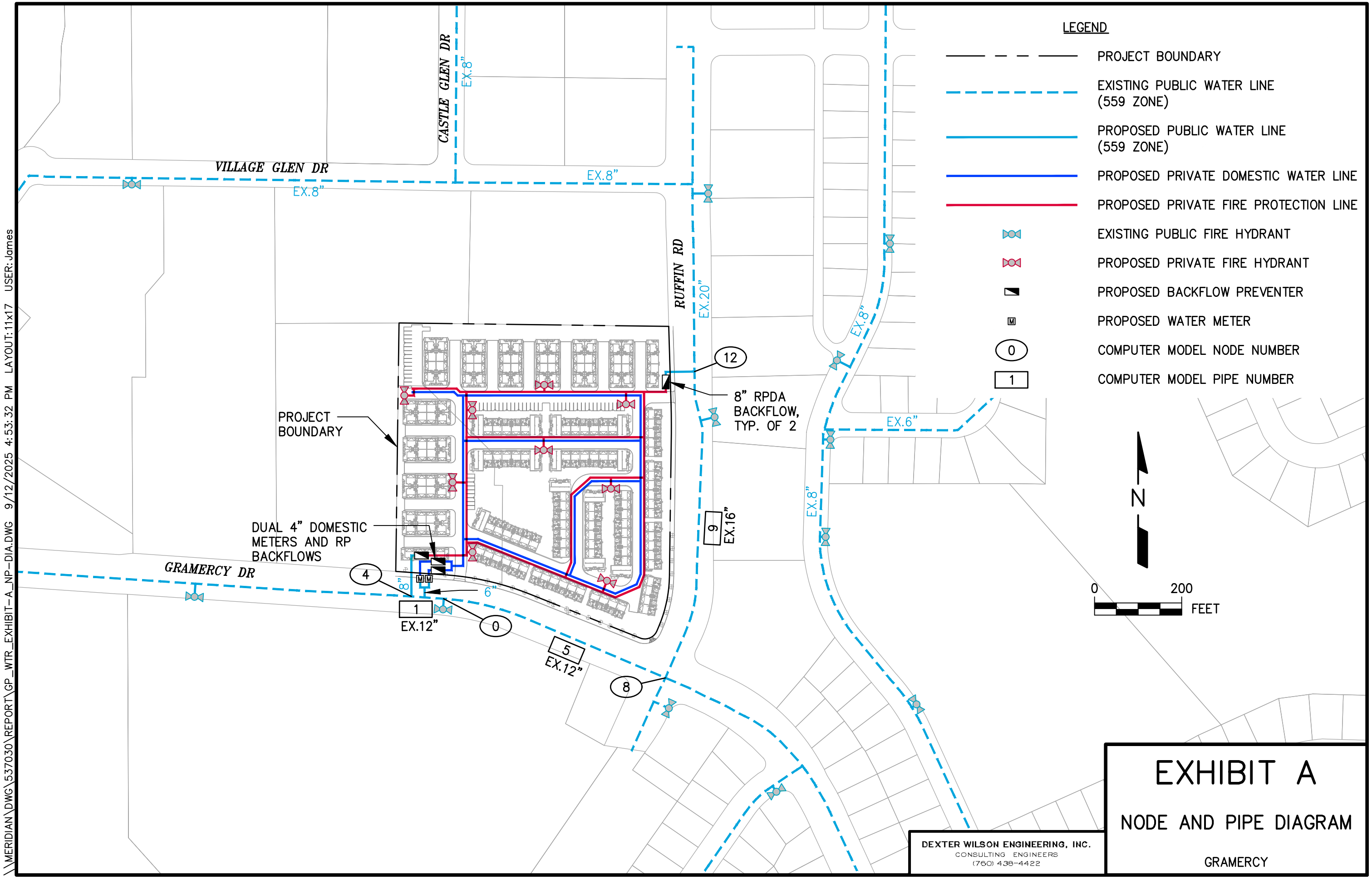


EXHIBIT A

NODE AND PIPE DIAGRAM



\\MERIDIAN\DWG\537030\REPORT\GP_WTR_EXHIBIT-A_NP-DIA.DWG 9/12/2025 4:53:32 PM LAYOUT:11x17 USER: James