APPENDIX J3

Sewer Service Study

DEXTER WILSON ENGINEERING, INC.

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CONSULTING ENGINEERS

OVERVIEW OF SEWER SERVICE
FOR
OTAY RANCH VILLAGE 4 SOUTH

December 2016

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OVERVIEW OF SEWER SERVICE
FOR
OTAY RANCH VILLAGE 4 SOUTH

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CHAPTER 1

INTRODUCTION

This report provides an overview of sewer service for the Otay Ranch Village 4 South Project. This report projects sewer flows for the project, outlines regional sewer facilities to be constructed, and recommends onsite facilities to accommodate project flows. This report recommends sewer facilities specific to the needs of Otay Ranch Village 4 South, but takes into account offsite sewer flows from adjacent properties.

DEVELOPMENT PLAN

The project location is provided in Figure 1-1 and Figure 1-2 provides the proposed development plan. Table 1-1 provides a land use summary table for the project and a description is provided below.

TABLE 1-1
VILLAGE 4 SOUTH
LAND USE SUMMARY

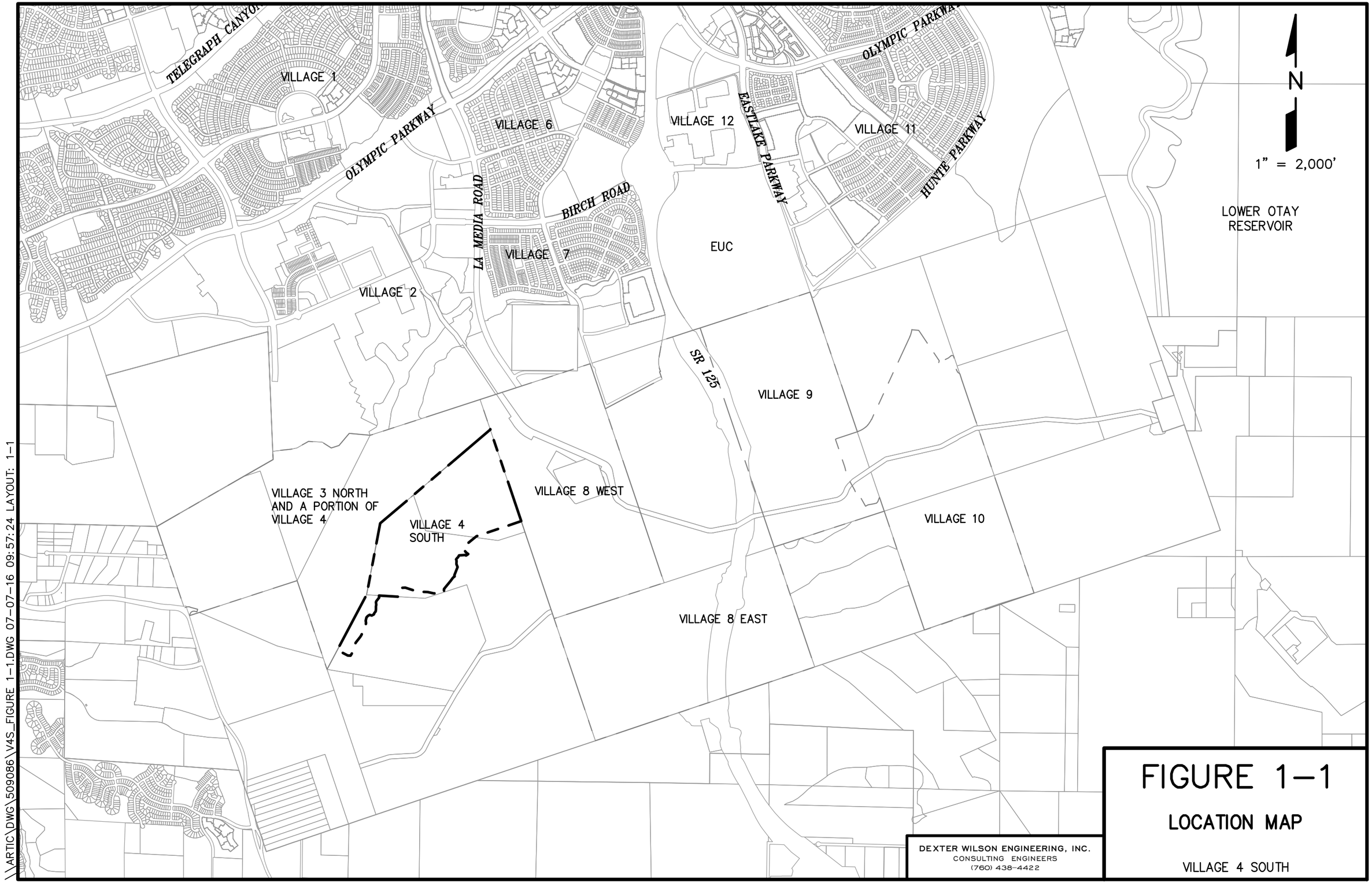
Planning Area	Gross Acres	Maximum Residential Units
Single Family		
R-1	15.18	73
Subtotal	**15.18**	**73**
Multi-Family		
R-2A	7.91	110
R-B	4.24	40
R-3	7.16	127
Subtotal	**19.31**	**277**
Open Space		
OS-1	0.59	0
OS-2	3.03	0
OS-3	3.08	0
OS-4	1.57	0
OS-5	0.58	0
OS-6	3.11	0
OS-8	1.35	0
OS-9	6.87	0
Subtotal	**20.19**	**0**
Preserve		
OS-7	1.37	0
OS-10	6.67	0
OS-11	44.27	0
OS-12	44.89	0
Subtotal	**97.20**	**0**
Community Purpose		
CPF-1	1.21	0
CPS-2	0.87	0
Subtotal	**2.08**	**0**
Circulation		
Internal Circulation	1.24	
External Circulation	10.82	0
Subtotal	**12.06**	**0**
TOTAL	**166.02**	**350**

The proposed Village 4 South land plan proposes one single family neighborhood and three multi-family residential sites with a project total of 350 units. The remainder of the property is a mix of community facility use, open space, and preserve lands with circulation roads to support the project.

The project access will be through the adjacent Village 8 West project to the east. The Village 4 South project will extend Main Street westerly to the location of a future bridge across Wolf Canyon. The Main Street bridge and extension of Main Street to the west will be constructed by others through City of Chula Vista development impact fees.

PURPOSE OF STUDY

This report provides an overview of sewer service for the Otay Ranch Village 4 South project. This document is prepared as a supporting document for the project's SPA Plan and associated Environment Impact Report (EIR). The developer of the project will be required to prepare, for review and approval by the City of Chula Vista a manhole to manhole hydraulic analysis once pipe layouts and slopes are better established. This analysis will confirm pipe sizes and verify that City velocity criteria is being met.



\\ARTIC\DWG\509086\V4S_FIGURE 1-1.DWG 07-07-16 09:57:24 LAYOUT: 1-1

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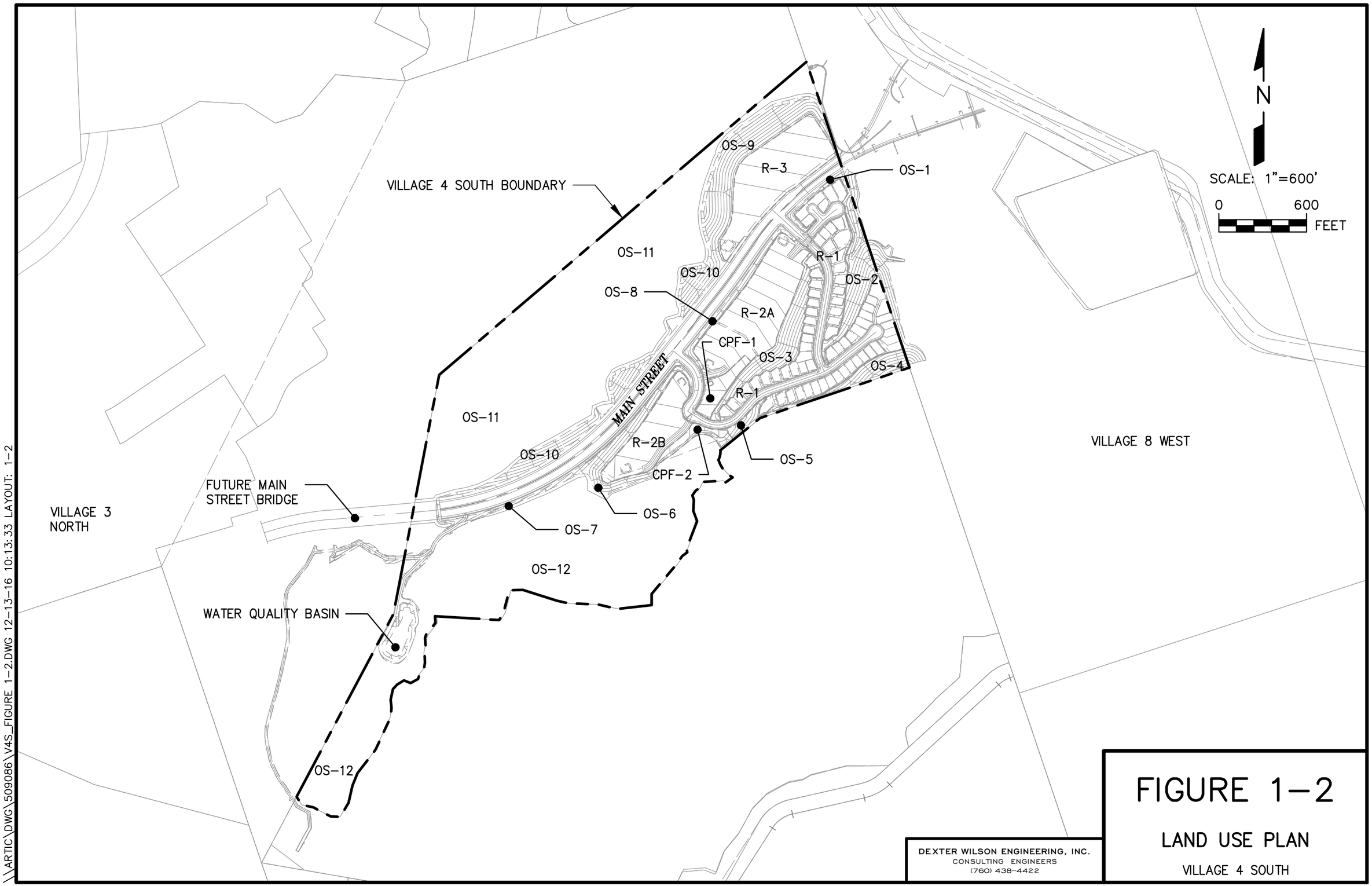
FIGURE 1-1

LOCATION MAP

VILLAGE 4 SOUTH



\\ARTIC\DWG\509086\V4S_FIGURE 1-2.DWG 12-13-16 10:13:33 LAYOUT: 1-2

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FIGURE 1-2

LAND USE PLAN

VILLAGE 4 SOUTH

CHAPTER 2

DESIGN CRITERIA AND PROJECTED SEWER FLOWS

This chapter presents the design criteria used to evaluate the sewer system for the project. The design criteria are utilized to analyze the existing sewer system as well as for design and sizing of proposed improvements and expansions required to accommodate flows in the study area. Unless otherwise noted, the design criterion was obtained from the City of Chula Vista Wastewater Master Plan (2014).

Generation Factors and Peaking Factors

Table 2-1 presents the generation factors used in projecting the total average day sewer flows for the project.

TABLE 2-1
SEWER GENERATION FACTORS

Land Use Designation	Unit Generation Factor
Single Family Residential	230 gpd/unit
Multi-Family Residential	182 gpd/unit
Community Purpose Facility	1,401 gpd/acre

Peaking Factor

To convert average daily flow to peak wet weather flows, the population based peaking factor curve (CVD-SW01) provided in the City of Chula Vista Subdivision Manual was utilized. This peaking factor curve has been included in Appendix A.

Gravity Sewers

All gravity sewers have been designed to convey peak wet weather flow. For pipes with a diameter of 12-inches and smaller, the sewers have been designed to convey this flow when flowing half full. For pipes with a diameter of larger than 12-inch, the sewers have been designed to convey peak wet weather flow when flowing three-fourths full by depth. Manning's equation with a roughness coefficient "n" of 0.012 was used to size all new PVC gravity sewers. All new sewers were designed to maintain a minimum velocity of two feet per second at design capacity to prevent the deposition of solids. Where this velocity cannot be achieved, a minimum slope of 1.0 percent is required

Projected Sewer Flows

Table 2-2 provides the projected sewer flows for the Village 4 South project. The total estimated average sewer flow is 0.07 mgd.

TABLE 2-2
OTAY RANCH VILLAGE 4 SOUTH
PROJECTED SEWER FLOWS

Planning Area	Land Use	Quantity	Unit Flow	Total Average Flow, gpd	EDUs
R-1	SF	73 units	230 gpd/unit	16,790	73
R-2A	MF	110 units	182 gpd/unit	20,020	87
R-2B	MF	40 units	182 gpd/unit	7,280	32
R-3	MF	127 units	182 gpd/unit	23,114	100
CPF-1, CPF-2	CPF	2.08 acres	1,401 gpd/unit	2,914	13
TOTAL				**70,188**	**305**

Based on a factor of 80 gpd/capita, the estimated population for the project is approximately 876 persons. Utilizing the City's peaking curve, this corresponds to a peaking factor of 2.5. Thus, the projected peak flow for the project is 0.175 mgd.

Offsite Sewer Flows

The Village 4 South sewer system will need to be sized to accommodate offsite sewer flows from development to the east in a sewer line that will be constructed to the property boundary in Main Street. The amount of flow to be conveyed to the project in Main Street will depend on the configuration of gravity sewer lines within the Village 8 West project. There are currently two alternatives for how flows will be handled within the Village 8 West project.

The first alternative is to collect flows from Village 7, the Easter Urban Center (EUC), and the northern portion of Village 8 West and convey them in Main Street to the Village 4 South property boundary. Under this scenario, Village 8 West would construct a temporary deep gravity sewer to allow flows to be conveyed south through the project. The November 2010 Overview of Sewer Service for Village 8 West identified a total average flow of 1,095,841 gpd that would be conveyed to the property boundary in Main Street. Since the time of that study, however, the EUC flows have been determined to flow a different direction and no longer need to be accounted for in the Main Street sewer. With the EUC flows removed, the total flow conveyed in Main Street at the Village 4 South boundary is 435,544 gpd.

The second alternative is to convey the majority of flows south through Village 8 West on a permanent basis and only convey flows to Main Street from the properties along La Media Road north of Village 8 West. A sewer system analysis for Village 8 West dated January 13, 2015 was conducted for this alternative and identified the flows in Main Street to be conveyed through Village 4 South to be 137,610 gpd.

Since the sewer alternative within Village 8 West has not been determined as of the writing of this report, the preliminary sewer line sizing for Village 4 South has been evaluated under both offsite sewer flow scenarios described above.

CHAPTER 3

EXISTING SEWER SYSTEM

There are no existing sewer facilities within the project area. The Salt Creek Interceptor is located to the south of Village 4. Figure 3-1 provides the location of the existing sewer facilities in the vicinity of Village 4 South.

Salt Creek Interceptor

The Salt Creek Interceptor was constructed in sections with the majority being completed approximately nine years ago. This interceptor starts as a 15-inch line in Hunte Parkway within the Rolling Hills Ranch project. From there, the line increases in size as it heads south along Salt Creek. The interceptor then turns westerly and follows the Otay River to a point of connection with the City of San Diego Metro Sewer System. At the location where the Salt Creek Interceptor passes south of Village 4 South, the line is 36-inches in size.

Treatment Capacity

All sewage generated within the City of Chula Vista is currently conveyed to the City of San Diego Metro Sewer System for treatment and disposal. The Metro sewer system treats wastewater from the City of San Diego and 15 other cities and districts, including Chula Vista. Flows are conveyed to the Point Loma Wastewater Treatment plant which has a capacity of 240 mgd and currently treats approximately 180 mgd.

The City of Chula Vista has capacity rights of 20.864 mgd in the Metro sewer system. Current flows in the City average approximately 16.2 mgd. While this excess available capacity is not anticipated to be adequate to serve ultimate buildout needs of the City, the current available capacity represents approximately 20,000 EDUs that can be connected to the system before the capacity is used up. Discussion on how the City will meet their buildout treatment needs is provided in Chapter 4 of this study.

VILLAGE 6

VILLAGE 12

VILLAGE 11

BIRCH ROAD

LA MEDIA ROAD

EASTLAKE PARKWAY

HUNTE PARKWAY

VILLAGE 7

EUC

VILLAGE 2

VILLAGE 7

VILLAGE 4
COMMUNITY
PARK

SR 125

VILLAGE 9

CITY OF SD SOUTH
SAN DIEGO RESERVOIR

VILLAGE 10

VILLAGE 8 EAST

CITY OF SD
TRANSMISSION
LINE EASEMENT

VILLAGE 3 NORTH
AND A PORTION
OF VILLAGE 4

VILLAGE 4
SOUTH

VILLAGE 8 WEST

SALT CREEK
INTERCEPTOR

SCALE: 1" = 1500'

LEGEND

EXISTING GRAVITY SEWER

FIGURE 3–1

EXISTING SEWER FACILITIES

VILLAGE 4 SOUTH

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\\ARTIC\DWG\509086\SEWER\V4S_FIGURE 3-1.DWG 07-07-16 09:38:31 LAYOUT: 3-1

CHAPTER 4

RECOMMENDED SEWER FACILITIES

Sewer facility improvements required to serve the Village 4 South project include onsite gravity sewer lines, a connection to the Salt Creek Interceptor, and payment of fees for capacity in regional facilities.

Onsite Sewer Facilities

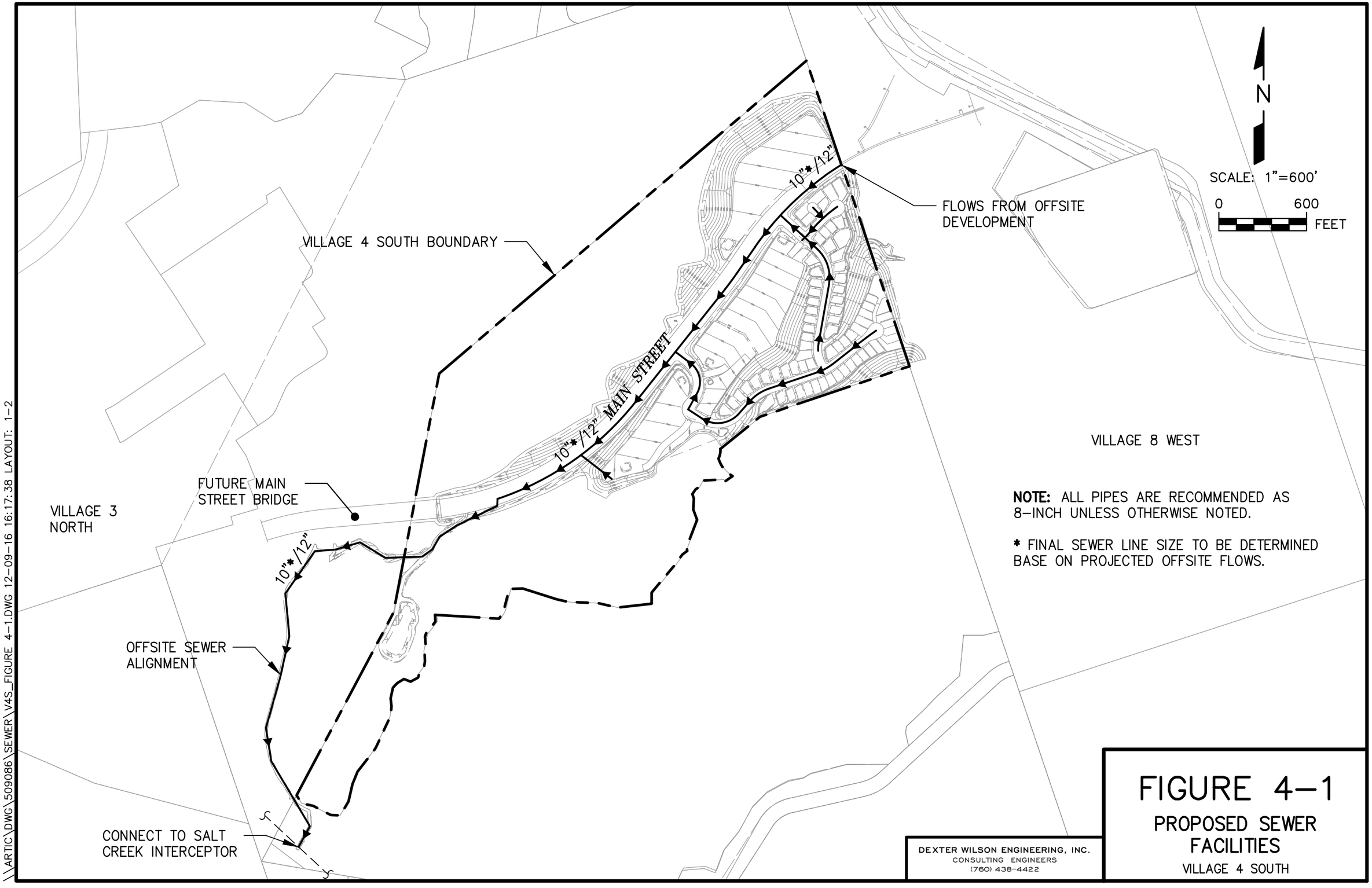
The Village 4 South project can be served by constructing gravity sewer lines to convey flows south to a point of connection with the Salt Creek Interceptor. The connection to the Salt Creek Interceptor will require an offsite alignment in a utility easement. Figure 4-1 shows the proposed onsite sewer system and offsite alternative alignments.

Sewer facilities in Village 4 South are adequate as 8-inch to serve the project only, but will need to be oversized to accommodate flows from offsite development to the east. Based on the information provided in Chapter 3, the backbone sewer line in Village 4 South will need to be oversized to a 10-inch or 12-inch line depending on the offsite flows conveyed through the site.

Regional Facilities

Regional facilities that will serve Village 4 South include the Salt Creek Interceptor and treatment plant capacity. To convey flow to the Salt Creek Interceptor, a single point of connection is proposed from the project.

Salt Creek Interceptor. The Salt Creek Interceptor was completed approximately nine years ago to serve regional development in the area, including Village 4 South. To reimburse the City for the cost to construct the Salt Creek Interceptor, all development that proposes connections to this line are required to pay a development impact fee. Ordinance 2974 provides the fees to be collected by the City for properties to be served by the Salt Creek Interceptor. Table 4-1 summarizes the Salt Creek Sewer impact fees to be paid by Village 4 South.



NOTE: ALL PIPES ARE RECOMMENDED AS 8–INCH UNLESS OTHERWISE NOTED.

* FINAL SEWER LINE SIZE TO BE DETERMINED BASE ON PROJECTED OFFSITE FLOWS.

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FIGURE 4–1

PROPOSED SEWER FACILITIES

VILLAGE 4 SOUTH

\\ARTIC\DWG\509086\SEWER\V4S_FIGURE 4–1.DWG 12–09–16 16:17:38 LAYOUT: 1–2

TABLE 4-1 SALT CREEK SEWER IMPACT FEES		
Land Use	**EDU Factor**	**Fee $**
Single Family-Residential	1.0 EDU/unit	1,330/unit
Multi-Family Residential	0.75 EDU/unit	997.5/unit

The October 2010 Salt Creek Interceptor Technical Sewer Study for South Otay Ranch, prepared by PBS&J, specifically looked at the impact that the revised general plan, including the densification of properties in the area, would have on the Salt Creek Interceptor. This study concluded that certain sections of the Salt Creek Interceptor may require upgrades at ultimate buildout, but these sections are upstream of the proposed project. The EDU projections for the Village 4 South property in this study was 486 EDUs which is higher than the current projection of 305 EDUs (see Table 2-2). Therefore, the proposed project is not anticipated to impact the capacity of the Salt Creek Interceptor.

Treatment Capacity. Currently all sewage from the City of Chula Vista is collected and conveyed to the City of San Diego Metro System for treatment and disposal. The City currently has capacity rights of 20.864 mgd of flow in the Metro sewer system. Existing average flows in the City are approximately 16.2 mgd. The estimated year 2030 flows based on the 2005 General Plan were 23.3 mgd. As a result of densification in the 2010 General Plan Update, the projected year 2030 average flow for the preferred alternative was increased to 26.222 mgd. Thus, the City would have needed to acquire capacity rights for an additional 5.358 mgd to accommodate year 2030 flows. The October 2010 study prepared by PBS&J as a supporting document to the General Plan Amendment EIR addresses the City's current projections regarding the need to acquire additional treatment plant capacity in the future and includes potential increased flows from the Bayfront Redevelopment project. With these flows included, the total future treatment capacity needed in the cumulative condition, including the proposed project, is 32.548 mgd, leaving 11.684 mgd of capacity that would need to be acquired above current capacity rights. The City may acquire rights for this additional capacity in the Metro system through negotiations with the City of San Diego, but the City of Chula Vista is also evaluating the construction of a new wastewater treatment plant and other alternatives to meet its future treatment capacity and disposal requirements. The project will be timed to proceed with the City's acquisition of additional treatment capacity. Building permits will be issued only if the City Engineer has determined that adequate sewer capacity exists.

REFERENCES

1. Wastewater Master Plan for the City of Chula Vista, 2014, IEC.

2. Subdivision Manual, 2013, City of Chula Vista.

3. Designed and Construction Standards, 2002, City of Chula Vista.

4. Salt Creek Interceptor Technical Sewer Study for the South Otay Ranch (Village 8 West and Village 9). October 2010, PBS&J.

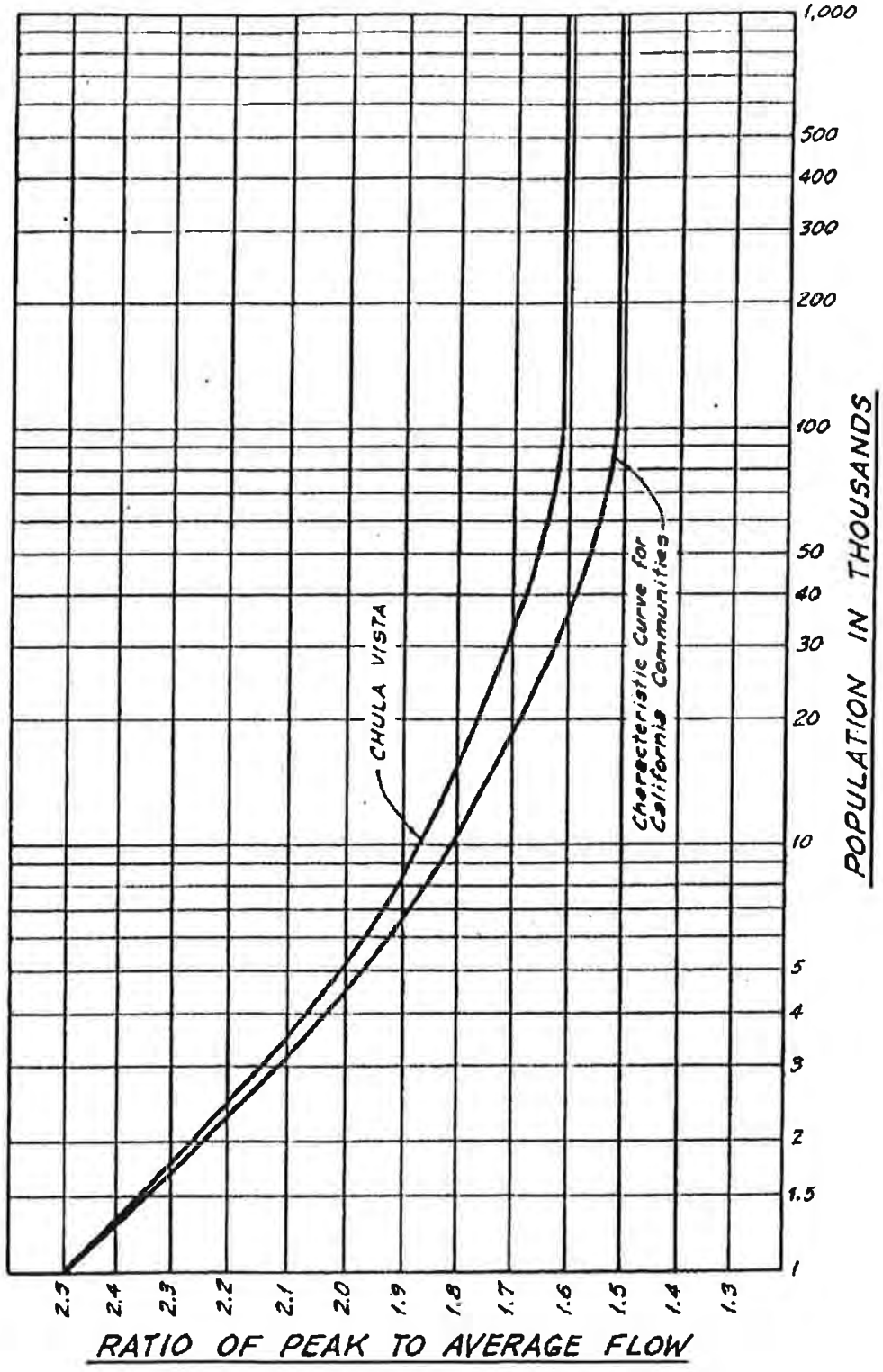
5. Overview of Sewer Service for Otay Ranch Village 8 West, November 2010, Dexter Wilson Engineering, Inc.

6. Sewer System Analysis for Otay Ranch Village 8 West, January 2015, Dexter Wilson Engineering, Inc.

APPENDIX A

PEAK FACTOR CURVE

RATIO OF PEAK TO AVERAGE SEWAGE FLOW VS. MAGNITUDE OF TRIBUTARY POPULATION



Revised	Drawn J.W.H. Date 10-10-72	CITY OF CHULA VISTA PUBLIC WORKS DEPARTMENT	
	Approved Date 8-18-78		
	Clifford Swanson	PEAK TO AVERAGE SEWER FLOW	CVD-SW01
	CITY ENGINEER Date: 11-7-02		