NIPOMO COMMUNITY SERVICES DISTRICT

DANA RESERVE DEVELOPMENT PHASING STUDY

MARCH 5, 2024

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March 5, 2024

Report Prepared Under the Responsible Charge of:

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Table of Contents

List of Tables

List of Figures

EXECUTIVE SUMMARY

The Dana Reserve Development (Development) Water and Wastewater Phasing Study summarizes the engineering work and analyses performed by MKN & Associates, Inc. (MKN) to develop a phasing plan for the Nipomo Community Services District (District) to provide water and wastewater service to the Development. The proposed Development is a multiuse neighborhood encompassing 288 acres of currently undeveloped land and includes 1,289 residential units, 4.7 acres of commercial development, and 10.1 acres of recreational land use. While the property is not within the District's service area, it is in the District's Sphere of Influence, and the developer has applied for annexation to the District for water and wastewater services.

The following documents were utilized by MKN to develop recommended improvements:

- **Final Dana Reserve Specific Plan Environmental Impact Report** (Final DRSP EIR, SWCA, 2023), provided the proposed phased development schedule and planned land use information.
- **Dana Reserve Development Water and Wastewater Service Evaluation** (Dana Reserve Evaluation, 2022, MKN) provided water demands, wastewater flow projections, and hydraulic analysis for the proposed Development.
- **Nipomo Community Services District Urban Water Management Plan** (UWMP MKN, 2020) provided District water supply and demand projections for the years 2020, 2025, and 2030.

The Development will have a significant impact on the District's water facilities. It is estimated that water demands for the District will increase from a projected 3,017 AF acre-feet (AF) to 3,357 AF (11%) in 2030 assuming the Development is completed by that date. These additional water demands will affect distribution system hydraulics and will require additional water storage, resulting in the need for distribution system improvements.

The recommended water infrastructure projects and estimated construction costs are listed below based on Engineering News Record Construction Cost Index for Los Angeles, CA (ENR CCI-LA) of 15179.26 (August 2023) and escalated assuming a five-year implementation schedule, phased with the Development plan provided in the Final DRSP EIR.

Table 1: Recommended Water Projects

Project and Description	Completed Residential Units	Total
Pipeline Distribution System Improvements		
Project 1 - New 16" Main on North Oak Glen Drive	Prior to first Unit	$4,240,000
Project 2 - New 16" HWY 101 Crossing at Sandydale	Prior to first Unit	$1,490,000
Project 3 – Extension of Water Service along N Frontage Rd	Prior to first Unit	By Developer
Project 4 – Willow EOL Connection	Prior to first Unit	By Developer
Project 5 - 16" Main Replacement on Tefft Street	Prior to Unit 689	$8,770,000
Water Storage Improvements		
Project 6 - Foothill Tank Improvements	Prior to first Unit	$4,950,000
Project 7 - Joshua Road Pump Station Reservoir	Prior to Unit 1000	$7,040,000
	Water Projects Subtotal	**$26,490,000**
Note: All numbers rounded to $10,000		

Projects 1 and 2 are necessary to meet fire flow conditions and provide redundancy in water transmission to the Development as soon as commercial and residential development begin. Project 3 and Project 4 should be completed by the Developer during initial onsite improvements. Project 5 can be deferred initially based on modeling results, but it is recommended to be installed prior to the completion of 689 residential units of the Development. Project 6 is necessary to meet existing District system deficiencies in addition to demand from the Development, and implementation should begin as soon as possible. Project 7 will need to be completed prior to completion of 1000 residential units of the Development.

The Development will also have a significant impact on the District's wastewater facilities. It is estimated that projected wastewater flows for the District will increase from 796,000 GPD to 1,005,000 GPD (26%) in 2030 with the addition of the Development to the District's existing system.

The recommended wastewater infrastructure projects and estimated construction costs are listed below based on ENR CCI-LA of 15179.26 (August 2023) and escalated assuming a five-year implementation schedule, phased with the Development plan provided in the Final DRSP EIR.

Table 2: Recommended Wastewater Projects

Project and Description	Completed Residential Units	Total
Collection System Improvements		
Project 1 – Connection to Dana Reserve Collection Area	Prior to first Unit	By Developer
Project 2 – Sanitary Sewer Lift Station for Dana Reserve	Prior to first Unit	By Developer
Project 3 – Frontage Road Trunk Sewer Replacement	In Progress by District	
Southland Wastewater Treatment Facility Improvements		
Project 4 – Influent Lift Station Addition of Pump No. 3	Prior to first Unit	$100,000
Project 5 – Install Grit Removal System	Prior to Unit 1009	$1,070,000
Project 6 – Extended Aeration Basins	Prior to first Unit	$5,580,000
Project 7 – Secondary Clarifiers	Prior to Unit 1009	$4,840,000
Project 8 – Gravity Belt Thickener	Prior to first Unit	$1,300,000
Project 9 – Dewatering Screw Press	Prior to first Unit	$2,380,000
Wastewater Projects Subtotal		**$15,270,000**
Note: All numbers rounded to $10,000		

Projects 1, 2, and 3 must be completed by the Developer before the first unit of the Development is completed. This initial phase will need to include all proposed lift station improvements with two of the three recommended pumps installed. While the third pump could be installed when approximately 689 residential units of the Development are completed, it is recommended that all three pumps are installed at the same time. This will ensure consistency of all pumps, both for performance and maintenance. Projects 4, 6, 8, and 9 should be completed before the first unit of the Development is completed. Projects 5 and 7 should be completed prior to completion of Unit 1009.

Over 60% of the investment for water and wastewater system recommended improvements to serve the Dana Reserve Development will be required prior to completion of the first unit within the Development.

The implementation schedule would be initiated with the approval of the annexation agreement between the District and the property owner.

1 INTRODUCTION

1.1 Description of Proposed Project

1.1.1 Overview

The Dana Reserve Development (Project) is a proposed multiuse neighborhood encompassing 288 acres of currently undeveloped land within unincorporated San Luis Obispo County. The property is not within the Nipomo Community Services District (District) service area but is within the District's Sphere of Influence (SOI). The development includes a variety of single-family residences, condominiums, townhomes, and multifamily apartments. The Project also incorporates open spaces and public parks, as well as various commercial uses including a village center, flex commercial/light industrial, neighborhood barn, hotel, daycare center, and a community college campus.

The developer has applied for annexation to the Nipomo Community Services District for water and wastewater services.

1.1.2 Proposed Phasing

The phasing plan submitted by the developer on **Table 1-1** displays the anticipated construction schedule for the Project. Residential units have been grouped as single-family, clustered single-family, or multi-family. Commercial and Park areas are grouped by type. This table is based on the Final Dana Reserve Specific Plan Environmental Impact Report (Final DRSP EIR, SWCA, 2023).

The precise timing of the development will depend on market factors and the goals of individual developers, as noted in the DRSP EIR. However, the development plan was provided to allow District staff to plan water and wastewater services to the Project.

Table 1-1: Anticipated Dana Reserve Specific Plan Construction Schedule											
RESIDENTIAL	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	**Total Units**
Residential Single Family - DR-SF1											
NBD - 7	–	–	–	31	31	31	31	33	–	–	157
NBD - 8	–	–	–	12	12	12	12	14	–	–	62
NBD - 9	–	–	–	30	40	40	40	40	8	--	198
NBD - 4	–	–	–	24	24	24		--	--	--	72
NBD - 5	–	–	–		10	20	25	24	25	–	104
NBD - 6	–	–	–	–	–	24	24	30	36	--	114
Total Units Per Year	**–**	**–**	**–**	**97**	**117**	**151**	**132**	**141**	**69**		**707**
Residential Single-Family (Cluster) - DR-SF2											
NBD - 3	**–**	**–**	**–**	**--**	**22**	**42**	**42**	**18**			**124**
Residential Multi-Family - DR-MF											
NBD - 1	–	–	–	--	80	--	93	–	–	–	173
NBD - 2	–	–	–		52	53	53	52	–	–	210
NBD - 10	–	–	–	38	37	--	–	–	–	–	75
Total Multi-Family Units per Year	**–**	**–**	**–**	**38**	**169**	**53**	**146**	**52**	–	–	**458**
All Units Per Year	**–**	**–**	**–**	**135**	**308**	**246**	**320**	**211**	**69**	**--**	**1,289**
COMMERCIAL AND PARK											**Total SF**
Flex Commercial - DR-FC											
Hotel	–	–	–	–	–	60,000	–	–	–	–	60,000
Education	–	–	–	–	–	–	–	15,000	15,000	–	30,000
Retail (Village & Flex)	–	–	–	15,000	15,000	40,000	43,000	–	–	–	113,000
Total Commercial SF Per Year	–	–	–	**15,000**	**15,000**	**100,000**	**43,000**	**15,000**	**15,000**	–	**203,000**
Park	–	–	–	–	–	–	–	–	–	–	–
Public Neighborhood Park	–	–	–	–	–	–	435,600	–	–	–	435,600
Daycare	–	–	–	–	–	–	4,500	–	–	–	4,500
Total Park SF Per Year	–	–	–	–	–	–	**440,100**	**–**	**–**	**–**	**440,100**

The Draft DRSP EIR also included a phasing plan shown as **Figure 1-1** below:

Figure 1-1: Phasing Plan

1.1.3 Dana Reserve Water and Wastewater Service Evaluation

In the Revised Draft Dana Reserve Development Water and Wastewater Service Evaluation (Dana Reserve Evaluation, 2022, MKN), water demands and wastewater flows were projected and compared to estimates provided by the developer. Capacities of water supply, distribution, storage, and wastewater collection and treatment systems were evaluated and compared to existing and future service area demands including Dana Reserve. Cost opinions were also developed for supporting infrastructure to serve the Dana Reserve development.

The projected water demands, wastewater flows, and recommended improvement projects were used as the basis for the analysis in this Report. However, it should be noted the Dana Reserve Evaluation analyzed 1,270 residential units, which were proposed in the Dana Reserve Specific Plan Update as referenced in that Report.

Figure 1-2 identifies the recommended water and wastewater improvements to serve the Project.

1.2 Purpose of Study

This Study was intended to provide the following information:

- Review of phased development plan submitted by developer.
- Identification of water demand and wastewater flow anticipated for each phase, based on prior total projections developed in the Dana Reserve Evaluation.
- Development of recommended list of required improvements and capital budget for phased water and sewer system improvements to meet scheduled development program; and
- Preparation of cashflow analysis and schedule for proposed offsite improvements to serve Dana Reserve Project.

1.3 Scope of Work

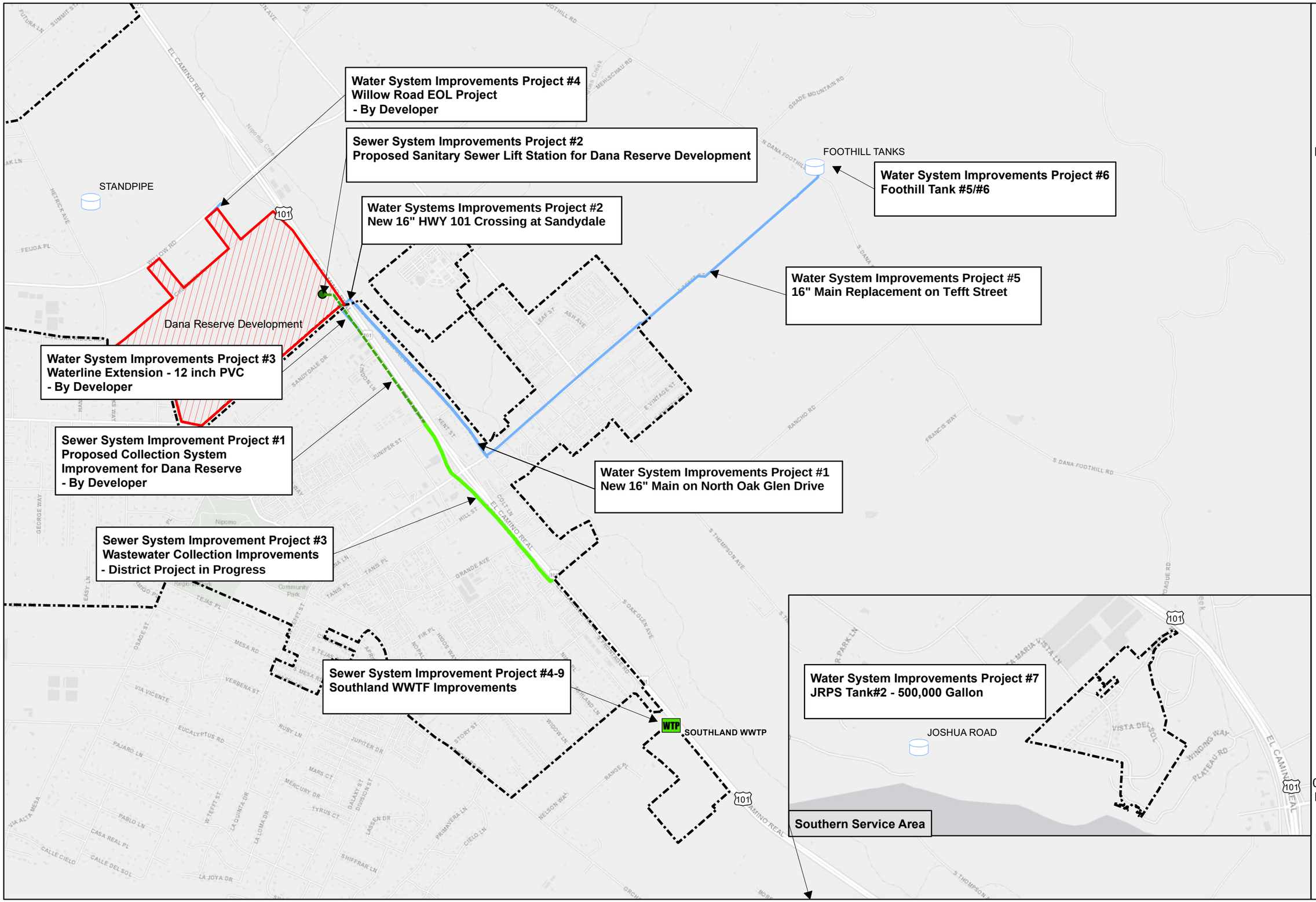
The Scope of Work for this project includes the following tasks:

Analysis of Water System Improvements

- Review proposed phasing plan from the developer and use to develop annual water demand projections.
- Perform hydraulic model analysis to confirm initial phase of water system development is adequate to meet fire flow, emergency, and operational storage demands.
- Recommend phased system improvements (based on analysis in the Dana Reserve Evaluation) for each stage of proposed development.
- Prepare draft schedule identifying design, bid-phase, and construction durations for each improvement.

Analysis of Wastewater System Improvements

- Develop planning-level cost opinion for District lift station and force main at Dana Reserve.
- Review proposed phasing plan from developer and use to develop annual wastewater flow projections, including peak flows.
- Recommend phased system improvements at Southland Wastewater Treatment Facility (based on analysis in the Dana Reserve Evaluation) for each stage of proposed development.
- Prepare draft schedule identifying design, bid-phase, and construction durations for each improvement.



Nipomo Community Services District

Nipomo Community Services District

Dana Reserve Development - Water and Wastewater Service Evaluation

Figure 1-2
Proposed Water and Sewer System Improvements

1 inch = 2,000 feet

0 1,000 2,000 Feet

2 WATER SYSTEM

2.1 Water Supply and Demand

Projected water demands for the existing District service area and Project were presented in the Dana Reserve Evaluation. Demand projections for years 2020, 2025, and 2030 were developed using analysis from the 2020 Urban Water Management Plan (MKN, 2022).

The following sections provide annual water demand by year. Methodology is consistent with the analysis in the Dana Reserve Evaluation, but the total demand is slightly different to reflect the updated number of residential units (1289 instead of 1270).

2.1.1 Annual District Water Demand Projections

Table 2-1 provides a projection of total District water demand by year, including the existing service area, annexation areas under review, and sales to other agencies.

Table 2-1: NCSD Projected District Water Demand by Year

Land Use Type	Projected District Water Use[1] (AF)						
	2024	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**
Single Family	1,397	1,406	1,415	1,424	1,433	1,441	1,450
Multi-Family	135	136	136	137	138	139	140
Commercial	97	97	98	99	99	100	100
Landscape	263	265	267	268	270	272	273
Other	7	7	7	7	7	7	7
Agricultural Irrigation	18	18	18	18	18	18	18
Losses	189	190	191	192	194	195	196
District Subtotal[2]	**2,106**	**2,119**	**2,132**	**2,145**	**2,159**	**2,172**	**2,184**
Potential District Infill							
Annexations under Review	141	176	211	246	282	317	352
Sales to Other Agencies							
WMWC	0	417	417	417	417	417	417
GSWC	0	208	208	208	208	208	208
GSWCCR	0	208	208	208	208	208	208
Subtotal	**0**	**833**	**833**	**833**	**833**	**833**	**833**
TOTAL (AF)	**2,247**	**3,128**	**3,176**	**3,224**	**3,274**	**3,322**	**3,369**

NOTE:
1. Year 2025 and 2030 projections from NCSD 2020 UWMP **Table 4-2.**
2. Subtotals and total quantities have been rounded to the nearest AF.

In order to project annual water demand, linear interpolation was applied between 2025 and 2030 demands within the District service area and buildout projections from the EIR. 2024 demands were extrapolated using the average increase in demands between 2025 and 2030. It was assumed sales to other agencies would be equal to their contracted deliveries throughout the study period.

2.1.2 Annual Dana Reserve Water Demand Projections

In order to estimate proposed Dana Reserve water demand increases per year, duty factors developed in the Dana Reserve Evaluation were applied to the proposed phasing scenario summarized in **Table 1-1**. The table below presents the anticipated increase in water demand by year and the total anticipated demand for the development. All demands include a 10% contingency factor as described in the Dana Reserve Evaluation.

Table 2-2: Phased Annual Demand Increases for Dana Reserve

Land Use Type	Acreage[1]	Water Land-Use Factor[2] (AFY/acre)	Phased Water Demand Increase by Year (AF)							TOTAL
			2024	2025	2026	2027	2028	2029	2030	
Single Family	149.5	1.54	26.9	38.5	53.5	48.2	44.1	19.1	0.0	230.3
Multi-Family	23.5	2.72	5.3	23.6	7.4	20.4	7.2	0	0	63.9
Commercial	22.3	1.64	2.70	2.70	18.0	7.74	2.70	2.70	0	36.5
Recreation/ Park	11	0.87	–	–	–	9.56	0	0	0	9.6
Total	**206.3**		**34.9**	**64.8**	**78.9**	**85.9**	**54.0**	**21.8**	**0.0**	**340**

NOTES:
1. Acreage from Draft EIR **Table 2-1**
2. 10-Year Production Average Water Demand factor from Dana Reserve Water and Wastewater Service Evaluation **Table 2-6** with 10% contingency.

It should be noted the total demand above (340 AFY) is lower than the projected demand from the Dana Reserve Evaluation (352 AFY), although the number of residential units has increased from 1,270 in the previous report to 1,289 in this report. This is due to the inclusion of an additional 21.5 ac of neighborhood parks, streetscapes, and parkways in the Dana Reserve Evaluation which are now incorporated into the acreage for single family residential land use per the Draft EIR.

Since development schedule is expected to vary from what was originally proposed by the developer, it is recommended that milestones be set for completion of water improvements based on number of residential units. Since residential water demand represents over 86% of the total demand, using residential units to establish milestones for project completion as opposed to years allows District staff to set measurable milestones. Although multi-family residential units are anticipated to have a higher water demand than residential units, District staff intend to use the *total* number of residential units as "triggers" for project implementation as discussed in Section 2.2.5 and 2.2.6. The differences between water demands among type of residential development will be considered by District staff when scheduling projects, particularly if multi-family development significantly outpaces residential development.

The following table correlates projected total number of single and multi-family units with total water demand for the development according to the proposed construction schedule.

Table 2-3: Correlation Between Residential Development and Anticipated Water Demand for Dana Reserve Development

Land Use Type	Cumulative Development[1]						
	2024	2025	2026	2027	2028	2029	2030
Single-Family Residential Units	97	236	429	603	762	831	831
Multi-Family Residential Units	38	207	260	406	458	458	458
Total Residential Units	**135**	**443**	**689**	**1,009**	**1,220**	**1,289**	**1,289**
Cumulative Water Demand (AF)[2]	47.0	99.1	166	241	280	312	340

NOTES:
1. Planned cumulative residential units per annum from developer construction schedule
2. Total estimated annual water demand calculated from **Table 2-2**

2.1.3. Combined Water Demand Projections.

The demands shown in **Table 2-2** were used to calculate average day demand (ADD), maximum day demand (MDD), and peak hour demand (PHD) for each phase of the Dana Reserve development. **Table 2-4** below summarizes the total flow per year and at completion.

Table 2-4: Peak Water Demand by Year for Dana Reserve Development

Flow Condition		District Water Demand Flowrate						
	Peaking Factor[1]	2024	2025	2026	2027	2028	2029	2030
Average Day Flow (AFY)	–	35	100	179	264	318	340	340
Average Day Flow (MGD)	–	0.031	0.089	0.16	0.24	0.28	0.30	0.30
Maximum Day Flow (MGD)	1.7*ADD	0.053	0.15	0.27	0.40	0.48	0.52	0.52
Peak Hour Flow (MGD)	3.78*ADD	0.12	0.34	0.60	0.89	1.07	1.15	1.15

NOTE:
1. Peaking factors of 1.7 and 3.78 used for MDF and PHF respectively are per current District Standard Specifications.

2.1.3 Annual Combined Demand Projections

Table 2-5 presents the projected combined water demand per year for the existing District service area, District interconnections, and Dana Reserve development.

Table 2-5: NCSD & Dana Reserve Projected District Water Use							
Land Use Type	**Projected Water Demand (AF)**						
	2024	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**
Single Family	1,397	1,406	1,415	1,424	1,433	1,441	1,450
Multi-Family	135	136	136	137	138	139	140
Commercial	97	97	98	99	99	100	100
Landscape	263	265	267	268	270	272	273
Other	7	7	7	7	7	7	7
Agricultural Irrigation	18	18	18	18	18	18	18
Losses	189	190	191	192	194	195	196
Subtotal	**2,106**	**2,119**	**2,132**	**2,145**	**2,159**	**2,172**	**2,184**
District Interconnections							
WMWC	0	417	417	417	417	417	417
GSWC	0	208	208	208	208	208	208
GSWCCR	0	208	208	208	208	208	208
Subtotal	**0**	**833**	**833**	**833**	**833**	**833**	**833**
Dana Reserve Project							
Single Family	26.9	65.4	118.9	167	211	230	230
Multi-Family	5.3	28.9	36.2	56.6	63.8	63.8	63.8
Commercial	2.7	5.4	23.4	31.1	33.8	36.5	36.5
Recreation/ Park	–	–	–	9.6	9.6	9.6	9.6
Subtotal	**34.9**	**99.7**	**179**	**264**	**318**	**340**	**340**
TOTAL (AF)	**2,141**	**3,051**	**3,144**	**3,242**	**3,310**	**3,345**	**3,357**

2.2 Recommended Offsite Improvements

2.2.1 Summary from Dana Reserve Water and Wastewater Service Evaluation

The Dana Reserve Evaluation concluded the Project will have a significant impact on District water facilities. Groundwater and 2025 Nipomo Supplemental Water Project (NSWP) allocation are adequate to serve existing and future demands with Dana Reserve. However, pipeline and storage improvements will be needed. These projects are described below and illustrated on **Figure 1-2**.

As noted in the Dana Reserve Evaluation, installing the Willow Road End of Line (EOL) Connection will address the District's looping requirements. The following projects were recommended to convey NSWP water to Dana Reserve:

- Construction of new 16-inch ductile iron (DI) pipeline on North Oak Glen Drive from Tefft Street to the Sandydale Drive connection point.
- Replacement of the existing 10-inch AC pipeline from the Foothill Tanks to North Oak Glen Drive on Tefft Street with a new 16-inch DI pipeline.

Storage improvements were also recommended to manage additional flow from NSWP and to meet emergency, fire flow, and operational needs. The recommended improvements for Foothill Tank site include a new 1.0 MG storage tank, chloramination improvements, and an automated valve station to improve storage and protect water quality. A new 500,000 gallon reservoir at Joshua Road Pump Station should be constructed to provide required redundancy for NSWP deliveries from the City of Santa Maria.

The following table summarizes the recommended improvements. Estimated costs for these improvements are provided in **Section 6**.

Table 2-6: Recommendations for NCSD Water System Improvements

Project	Required Improvements
1, 2, 5	New 16" Main on North Oak Glen Avenue and Tefft Street
3	North Frontage Road Waterline Extension
4	Willow Road EOL Project
6	Foothill Tank Improvements
7	Joshua Road Reservoir

2.2.2 Hydraulic Analysis

The Dana Reserve Evaluation included a hydraulic analysis developed using the District's WaterCAD water distribution system model. MKN updated that analysis to evaluate impact of phasing proposed water system improvements based on planned development per year.

For the purpose of this report, scenarios were modeled for both current and future conditions within the District's Water System. All scenarios assumed delivery to the Woodlands Mutual Water Company (WMWC), Golden State Water Company (GSWC), and Golden State Water Company Cypress Ridge (GSWCCR) as outlined in **Table 2-5**. The existing conditions scenarios also assumed a delivery of 1,336 gpm (2,157 AFY) from the NSWP at the Joshua Road Pump Station (JRPS), which is based on the District's current delivery from JRPS (820 gpm) plus future required deliveries to other purveyors (516 gpm total). Model runs were performed under steady state conditions based on the following model settings:

a. Existing System Demands
    - Average day demand (ADD) conditions: 1,850 gpm
    - Maximum day demand (MDD) conditions: 2,784 gpm (1.7 peaking factor)
    - Peak hour demand (PHD) conditions: 5,559 gpm (3.78 peaking factor)
    - Residential fire-flow: 1,000 gpm per 2016 California Fire Code
    - Commercial fire-flow: 3,000 gpm
b. Delivery to WMWC at Trail View Place: 258 gpm (417 AFY)

c. Delivery to GSWC at Primavera Lane: 129 gpm (208 AFY)
d. Delivery to GSWCCR at Lyn Road: 129 gpm (208 AFY)
e. Joshua Road Pump Station at 1,336 gpm (2157 AFY)
f. Available Well Production
    - Blacklake #4: 360 gpm
    - Knollwood: 240 gpm
    - Sundale: 890 gpm
    - Via Concha: 610 gpm
g. Foothill Tanks in service
    - Tank level during ADD: 17 feet (540 feet)
    - Tank level during MDD: 15 feet (538 feet)
    - Tank level during PHD: 13 feet (536 feet)
h. Standpipe in service
    - Tank level during ADD: 80.4 feet (540 feet)
    - Tank level during MDD: 78.4 (538 feet)
    - Tank level during PHD: 76.4 (536 feet)

The scenarios were assessed based on the following criteria, in conjunction with current District Standards and Specifications for Water System Design:

i. System Pressure
    - Minimum Operating Pressure (ADD, MDD, PHD) = 40 psi
    - Minimum Operating Pressure (MDD plus fire-flow) = 20 psi
    - Maximum Recommended Operating Pressure (All conditions) = 80 psi
j. Pipeline Velocity
    - Maximum Pipeline Velocity (All conditions – as a goal not a requirement) = 5 ft/s

Table 2-7 provides a description of Scenarios 1 through 9 and results of the analysis for baseline conditions as well as 2024 demand conditions with the addition of the proposed Phase 1 of Dana Reserve Development. Modeled system pressures were observed at the following nine locations within the District's water distribution system to identify pressure impacts to the District's low pressure service area customers, high pressure service area customers, interconnection with WMWC, interconnection with GSWC, interconnection with GSWCCR, and four locations within the Dana Reserve development:

a. Low Pressure (high elevation) Area in Summit Station: Futura Lane
b. High Pressure (low elevation) Area in Main Zone: HoneyGrove Lane
c. WMWC Interconnection: Trail View Place
d. GSWC Interconnection: Primavera Lane
e. GSWCCR Interconnection: Lyn Road west of Red Oak Way
f. Dana Reserve Connection: Sandydale Drive
g. Future Dana Reserve Connection: Pomeroy Road
h. Future Dana Reserve Connection: Willow Road (west)
i. Dana Reserve Connection: Willow Road (east)

Scenarios 1 through 4 addressed system pressures at critical locations under existing conditions and are repeated from the Dana Reserve Evaluation. The following discussion addresses the hydraulic analysis results and conclusions for each set of scenarios.

Table 2-7: Hydraulic Modeling Results

WaterCAD Scenario							Dana Reserve Delivery	Futura Lane (EL = 454')	Honeygrove Lane (EL = 306')	Dana Reserve at Sandydale Drive (EL = 355')	Dana Reserve at Pomeroy Road (EL = 351')	Dana Reserve at Willow Road 1 (EL = 385')	Dana Reserve at Willow Road 2 (EL = 378')	WMWC Interconnect at Trail View Place (EL = 222')	GSWC Interconnect at Primavera Lane (EL = 312')	GSWCCR Interconnect at Lyn Road (EL = 328')
								619	3775	399	450	4343	4354	492	3450	874
Scenario	Description	Total Demand (GPM)	NSWP Delivery (GPM)	Wells	Quad Tanks Level (Feet)	Standpipe Level (Feet)	Flow (GPM)	Pressure (PSI)	Pressure (PSI)	Pressure (PSI)	Pressure (PSI)	Pressure (PSI)	Pressure (PSI)	Pressure (PSI)	Pressure (PSI)	Pressure (PSI)
Baseline System Conditions without Delivery to Dana Reserve																
1	Average Day Demand	1850	1336	Off	17	80.4	-	37	102	80	81	-	-	137	99	91
2	Maximum Day Demand	2784	1336	Off	15	78.4	-	37	101	79	81	-	-	136	98	91
3	Maximum Day Demand + 1000 GPM Fire-flow at Futura Lane	3784	1336	Off	15	78.4	-	19.9	101	79	80	-	-	136	98	80
4	Peak Hour Demand	5559	1336	Off	13	76.4	-	36	93	72	73	-	-	129	91	90
Delivery to Dana Reserve - Phase 1 (2024) with New 16" from Tefft to Sandydale and across HWY 101 and Willow Road EOL Assembly (Water Projects 1, 2, and 4)																
5	Average Day Demand	1879	1336	Off	17	80.4	29	37	102	80	81	67	70	137	99	91
6	Maximum Day Demand	2833	1336	Off	15	78.4	49	36	97	78	80	65	68	135	97	90
7	Maximum Day Demand + 1000 GPM Fire-flow at Futura Lane	3833	1336	Off	15	78.4	49	19	100	78	80	65	68	135	97	79
8	Maximum Day Demand + 3000 GPM Fire-flow at Dana Reserve	5833	1336	Off	15	78.4	3049	35	92	70	72	58	59	128	91	89
9	Peak Hour Demand	5669	1336	Off	13	76.4	110	34	88	68	69	57	59	124	85	88

Legend:
Falls within recommended range
Falls under recommended pressure (40 psi for ADD, MDD, PHD; 20 psi for Fire-flow)
Exceeds recommended pressure (80 psi for all scenarios)

Scenarios 1 through 4: Existing System Conditions

Scenarios 1-4 modeled existing pressures at the nine monitoring locations with NSWP delivery at 1,336 gpm, all storage tanks in service, and no wells in service under ADD, MDD, MDD plus fire-flow, and PHD conditions. Pressures throughout the water system under existing conditions vary slightly between ADD, MDD, MDD plus fire-flow, and PHD, but largely remain within the District's recommended pressure ranges. The District's high point, Futura Lane, faces pressures below the District's recommended range during all existing system condition scenarios. All purveyor interconnection sites experience high pressures (above 80 psi) throughout most existing system condition scenarios.

Scenarios 5 through 9: Water Projects 1, 2, and 4; 2024 District Service Area Demands; and Phase 1 (2024) Dana Reserve Development

Results from Scenarios 5 through 9 include the new 16" water main across HWY 101 near Sandydale Drive; new 16" water main along Oak Glen Avenue to Tefft Street; and the end of line (EOL) connection at Willow Road. It is assumed only the new onsite 12" waterline on the east side of the development is in place as part of Phase 1 and connection to Pomeroy Road and west connection at Willow Road are not yet in place. See **Figure 2-1** below.

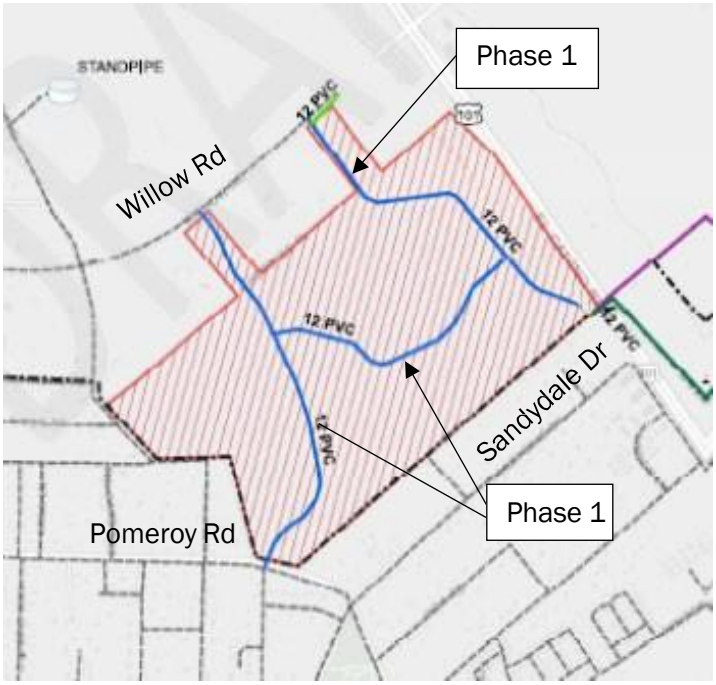


Figure 2-1: Dana Reserve Onsite Waterlines – Phase 1

As shown in the hydraulic model, these improvements are necessary to maintain pressures at Sandydale Drive and Frontage Road while preventing residual pressures from dropping further at Futura Lane under fire flow conditions.

The proposed 16" replacement along Tefft Street can be deferred initially based on modeling results, but it is recommended to be installed as soon as possible after installation of the North Oak Glen Avenue waterline to reduce risk of failure in the existing 10" asbestos cement (AC) pipeline. At system buildout,

as discussed in the Dana Reserve Evaluation, this pipeline is necessary to maintain high system pressures during MDD plus fire flow at buildout.

2.2.3 Storage Analysis

Table 2-9 summarizes the storage analysis from the Dana Reserve Evaluation under three scenarios, with and without the Dana Reserve Development. The first scenario represents existing conditions of the current District system based on current system demands and service population. The second scenario represents existing conditions with the full Dana Reserve Development. The third scenario represents the maximum anticipated infill potential based on parcels that could be added to the District system, particularly those designated NCSD Reserved Capacity, those on private wells, and vacant parcels.

The District is required by State law (California Code of Regulations Title 22) to maintain sufficient water storage capacity within its system to meet three basic needs: fire storage, equalization storage, and emergency storage. Fire flow storage must be greater than that required to produce the maximum anticipated fire-flow for a specified duration. Equalization storage is necessary to maintain availability of demand during peak conditions when system demands are greater than that being fed directly from supply sources. Emergency storage must be on hand to produce at least 50 gallons per capita per day for three days.

Fire-flow storage is calculated by multiplying fire-fighting flowrate by the duration of the fire-fighting event. A 3,000 gallon per minute flowrate for a duration of three hours was used to determine the minimum fire storage required for the system (540,000 gallons). This minimum value was assumed to be equal for both existing and future conditions.

Equalization storage is estimated by the formula: (1.5 – 1) x (MDD in GPM) x (14 hours) x (60 minutes per hour). The calculated values are displayed in **Table 2-9** for three scenarios.

Emergency storage is calculated by multiplying population by 50 gallons per day for three days. Existing population within the NCSD service area was estimated at 13,771 for the year of 2020 as calculated using the Department of Water Resources (DWR) Population Tool. Existing and future population projections from the 2020 DWR service population estimates are shown in **Table 2-8,** including future projections from the 2020 UWMP.

Table 2-8: NCSD Service Population Summary

Conditions	2020 Population	2045 Population with Maximum Anticipated Infill Development
District Service Area	13,771	16,031
District Service Area with Dana Reserve Project	13,771	18,398

Note:
1. Population per **Tables 3-1 and 3-1a** from the District's 2020 UWMP update.

Table 2-9: Water System Storage Capacity			
Storage Requirements	**Existing Conditions[1]**	**Existing Conditions with Dana Reserve**	**Maximum Anticipated Infill Development[2] with Dana Reserve**
	Gallons	**Gallons**	**Gallons**
Fire	540,000	540,000	540,000
Equalization	952,489	1,108,198	1,256,843
Emergency	2,065,650	2,486,250	2,550,600
Total	**3,558,139**	**4,134,448**	**4,347,443**
Existing Above-Ground Storage Capacity	3,280,000	3,280,000	3,280,000
Gross Surplus/(Deficiency)	(278,139)	(854,448)	(1,067,443)

Notes:
1. Existing conditions based on 2019 NCSD customer usage data.
2. Maximum anticipated infill development based on current land development status and potential future development status.

The Dana Reserve Evaluation recommended installation of a new 1.0 MG water storage tank at the Foothill Tanks site to meet fire, equalization, and emergency storage needs as described above. This project was also recommended in the 2007 Water and Sewer Master Plan. Chemical feed, instrumentation, and control systems will also be required to maintain water quality and allow remote monitoring of the new tank. As shown in **Table 2-9**, an additional 278,000 gallons of storage is recommended to meet existing conditions. It is not cost effective from a capital cost or an operational cost perspective to construct a smaller tank at the Foothill Tanks site. Installing a 1.0 MG tank provides redundancy to allow any of the tanks to be removed from service for maintenance while still providing system storage. Since the planning, design, and construction process will require several years, it is recommended the District pursue construction of the 1.0 MG water storage tank as Dana Reserve development begins.

An additional 500,000 gallon reservoir was recommended at the Joshua Road Pump Station (JRPS) site to improve operation of the Nipomo Supplemental Water Project at higher deliveries from Santa Maria. This reservoir is necessary to allow the existing JRPS Reservoir to be taken out of service for maintenance or cleaning. If the only JRPS Reservoir is removed from service, pressure conditions in the City of Santa Maria water distribution system can fluctuate and prevent JRPS from receiving a constant water supply. The new JRPS Reservoir should be in service by 2029 to accommodate buildout of the Dana Reserve Development.

2.2.4 Recommended Implementation Plan

A preliminary project schedule and cashflow analysis are provided in Section 5 of this report. The tables below summarize the anticipated planning, design, and construction timeline for each project but this information is provided in more detail in that section.

2.2.5 Pipeline Improvements

Table 2-10 summarizes the recommended projects and completion schedule based on the analysis presented above. Projects 1 and 2 are necessary to meet fire flow conditions and provide redundancy in water transmission to the development as soon as commercial development and residential development begin. Project 3 (extension of water service along North Frontage Road) and Project 4 should be completed by the developer during construction of their onsite improvements for Phase 1 of the development. Project 5 can be deferred initially based on modeling results, but it is recommended to be installed as soon as possible after installation of Project 1.

Table 2-10: Recommended Pipeline Project Completion Dates

Project	Implementation Timeline	Completed Residential Units
1 – New 16" Main on North Oak Glen Drive	2 Years	Before First Unit is Completed
2– New 16'" HWY 101 Crossing at Sandydale	2 Years	Before First Unit is Completed
5 – 16" Main Replacement on Tefft Street	2 Years	Prior to Completion of Unit No. 689 [1]

[1] See **Table 2-3** for anticipated development schedule.

2.2.6 Storage Improvements

Table 2-11 summarizes the recommended projects and completion schedule for storage improvements based on the analysis presented above. Because Project 6 is necessary to meet existing deficiencies in addition to demand from Dana Reserve Development, implementation of the project should begin as soon as possible.

Table 2-11: Recommended Storage Project Completion Dates

Project	Implementation Timeline	Completed Residential Units
6 – Foothill Tank Improvements	2 Years	Before First Unit is Completed
7 – Joshua Road Pump Station Reservoir Improvements	2 Years	1,009[1]

[1] See **Table 2-3** for anticipated development schedule.

3 WASTEWATER COLLECTION SYSTEM

3.1 Wastewater Flows

Projected wastewater flows for the existing District service area and Project were developed and presented in the Dana Reserve Evaluation. In that analysis, water billing records by parcel were adjusted using average 10-year water production records. These were used to develop water demand factors for each land use category. Sewer return factors were then applied to each land use to estimate existing and future sewer demands.

The following sections provide the estimated annual wastewater flows by year. Methodology is consistent with the analysis in the Dana Reserve Evaluation, but the total demand is slightly different to reflect the updated number of residential units (1289 instead of 1270).

3.1.1 Annual District Wastewater Flow Projections

Table 3-1 depicts the projected increase of wastewater flows within the District system by year showing the implementation of the planned Blacklake Consolidation project and progression of the service area toward ultimate buildout. The Dana Reserve Evaluation developed sewer flow projections for ultimate buildout of the service area, which is assumed to coincide with the ultimate water demand estimates for 2045 from the 2020 UWMP Update. These buildout projections are included in **Table 3-1** as 2045 sewer projections.

In order to project annual wastewater flows from expansion of the District's service area and the increase in planned additional dwelling units (ADU), linear interpolation was applied between 2020 and 2045.

Table 3-1: Annual District Wastewater Flow Projection								
Flows	**Projected District Wastewater Flows (GPD)**							
	2024	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2045**
Existing District and County Service Area Flows[1]	591,246	591,246	591,246	591,246	591,246	591,246	591,246	591,246
Future District Service Area Flows[2]	54,189	67,736	81,283	94,831	108,378	121,925	135,472	338,681
Future Blacklake Service Area[2]	--	58,000	58,000	58,000	58,000	58,000	58,000	58,000
ADU Contributions[2]	4,186	5,232	6,279	7,325	8,372	9,418	10,464	26,161
TOTAL (GPD)[3]	**650,000**	**722,000**	**737,000**	**751,000**	**766,000**	**781,000**	**795,000**	**1,014,000**

NOTES:
1. From Dana Reserve Evaluation **Table 3-4**
2. Flow Values from Dana Reserve Evaluation **Table 3-5**. Ultimate buildout of service area projected to occur in 2045 per the 2020 NCSD UWMP. The Blacklake Consolidation Project is anticipated to come online in the year 2025
3. Wastewater flow totals have been rounded to the nearest 1,000 GPD

3.1.2 Annual Dana Reserve Wastewater Flow Projections

Annual projected wastewater flow increases by year for the Project are shown in **Table 3-2.** In order to estimate ultimate wastewater flows from the Project, sewer return factors from the Dana Reserve Evaluation were applied to the ultimate water demands of **Table 2-3.** All flows incorporate the 10% contingency factor applied to water demands as described in the Dana Reserve Evaluation. These flow increases were obtained by calculating the ratio of the number of units per year (either residential units or acreage) to the total number of planned units in the development schedule shown on **Table 1-1.** This ratio was applied to the ultimate sewer flows to estimate yearly sewer flows.

Table 3-2: Phased Annual Sewer Flow Increases for Dana Reserve													
Land Use Type	**Acreage[1]**	**10-Year Water Land-Use Factor[2] (AFY/acre)**	**Converted 10-Year Water Land-Use Factor[2] (GPD/acre)**	**Ultimate Water Demand[3] (GPD)**	**Sewer Flow Return Factor[4] (%)**	**Projected Sewer Flowrate Increase per Year (GPD)**							**Total (GPD)**
						2024	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	
Single Family	149.5	1.54	1,371	204,906	60%	14,351	20,565	28,554	25,743	23,524	10,208	0	122,945
Multi-Family	23.5	2.72	2,418	56,826	90%	4,243	18,872	5,918	16,303	5,807	–	–	51,143
Commercial	22.3	1.64	1,459	32,529	90%	2,163	2,163	14,422	6,201	2,163	2,163	–	29,275
Recreation/Park	11	0.87	773	8,508	65%	–	–	–	5,530	–	–	–	5,530
Subtotal[5]	**206.3**			**303,000**		**21,000**	**42,000**	**49,000**	**54,000**	**31,000**	**12,000**	**0**	**209,000**

NOTES:
1. Acreage from Final EIR **Table 2-1**
2. From Dana Reserve Evaluation **Table 3-11** with 10% contingency applied
3. Ultimate water demand of the Dana Reserve is based on buildout of the Project in the year 2030 as estimated in **Table 1-1**
4. From Dana Reserve Evaluation **Table 3-3**
5. Flow subtotals have been rounded to the nearest 1,000 GPD

The following table correlates projected total number of single and multi-family units with total annual wastewater flowrates for the development according to the proposed construction schedule.

Table 3-3: Correlation Between Residential Development and Anticipated Wastewater Flows for Dana Reserve Development

Land Use Type	Cumulative Development [1]						
	2024	2025	2026	2027	2028	2029	2030
Single-Family Residential Units	97	236	429	603	762	831	831
Multi-Family Residential Units	38	207	260	406	458	458	458
Total Residential Units	135	443	689	1,009	1,220	1,289	1,289
Cumulative Wastewater Flowrate (GPD) [2]	21,000	63,000	112,000	166,000	197,000	209,000	209,000

NOTES:
1. Planned cumulative residential units per annum from developer construction schedule
2. Total estimated annual wastewater flows from **Table 3-2**

3.1.3 Annual Combined Wastewater Flow Projections

Table 3-4 presents the projected combined annual wastewater flows for the existing Town and Blacklake Collection areas as well as the Dana Reserve development.

Table 3-4: Annual District Wastewater Flow Projection

Flows	Projected Cumulative District Wastewater Flows (GPD)[1]						
	2024	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**
Town and Blacklake Collection Areas							
Existing District and County Service Area Flows	591,246	591,246	591,246	591,246	591,246	591,246	591,246
Future District Service Area Flows	–	67,736	81,283	94,831	108,378	121,925	135,472
Future Blacklake Service Area	–	58,000	58,000	58,000	58,000	58,000	58,000
ADU Contributions	–	5,232	6,279	7,325	8,372	9,418	10,464
Subtotal (GPD)	**592,000**	**723,000**	**737,000**	**752,000**	**766,000**	**781,000**	**796,000**
Dana Reserve Project							
Single Family	14,351	34,915	63,469	89,212	112,735	122,944	122,944
Multi-Family	4,243	23,115	29,034	45,337	51,144	51,144	51,144
Commercial	2,163	4,327	18,748	24,950	27,113	29,277	29,277
Recreation/Park	–	–	–	5,530	5,530	5,530	5,530
Subtotal (GPD)	**21,000**	**63,000**	**112,000**	**166,000**	**197,000**	**209,000**	**209,000**
TOTAL (GPD)[2]	**613,000**	**786,000**	**849,000**	**918,000**	**963,000**	**990,000**	**1,005,000**

NOTES:
1. Conversion factor: 1 AFY equals 892.022 gpd
2. Wastewater flow totals have been rounded to the nearest 1,000 GPD

3.2 Proposed District Lift Station Facility

3.2.1 Design Criteria

For the Dana Reserve Lift Station, a triplex lift station housing two pumps operating in a 2 plus 1 (lead/lag) configuration is recommended to accommodate phased development. This will allow two pumps to handle buildout sewer flows, and a third pump will provide redundancy if one pump fails. Until 2027, one pump could accommodate wastewater flows and a second pump would provide redundancy.

The primary factors affecting wetwell design include the volume and configuration of the selected pumps.

The selection of pump size is dependent on inflow to wetwell, the number of pumps in operation, and target velocities in the force main.

3.2.2 Design Flows

Flow criteria based on the analysis in Section 3.1.2 are presented in **Table 3-5.**

Table 3-5: Dana Reserve Lift Station Flows

Flows		Projected Cumulative Wastewater Flows (GPD)						
	Peaking Factor	2024	2025	2026	2027	2028	2029	2030
Average Day Flow (GPD)[2]	-	21,000	63,000	112,000	166,000	197,000	209,000	209,000
Average Day Flow (GPM)	-	15	44	78	115	137	145	145
Peak Hour Flow (GPM)[1]	2.6*ADF	38	114	202	300	356	377	377

NOTES:
1. A peaking factor of 2.6 was used to estimate PHF per **Table 3-12** of the Dana Reserve Evaluation
2. Rounded to the nearest whole GPM

The Dana Reserve Evaluation projected a future PHF of 367 gpm for the Project. The updated future PHF of 377 represents a 2.7% increase over the previous flow estimate. District staff applied a maximum d/D criteria of 75% in the 2007 Sewer Master Plan Update and this criteria was also used to determine pipe sizes in the Dana Reserve Evaluation. MKN confirmed this incremental increase will not exceed the District's d/D criteria downstream of Juniper Street, where the new sewer improvements would connect to the District's collection system. Final pump selection could result in a flow rate that exceeds the design point. Hydraulic capacity in the downstream sewer system should be reevaluated during final design to confirm capacity is not exceeded.

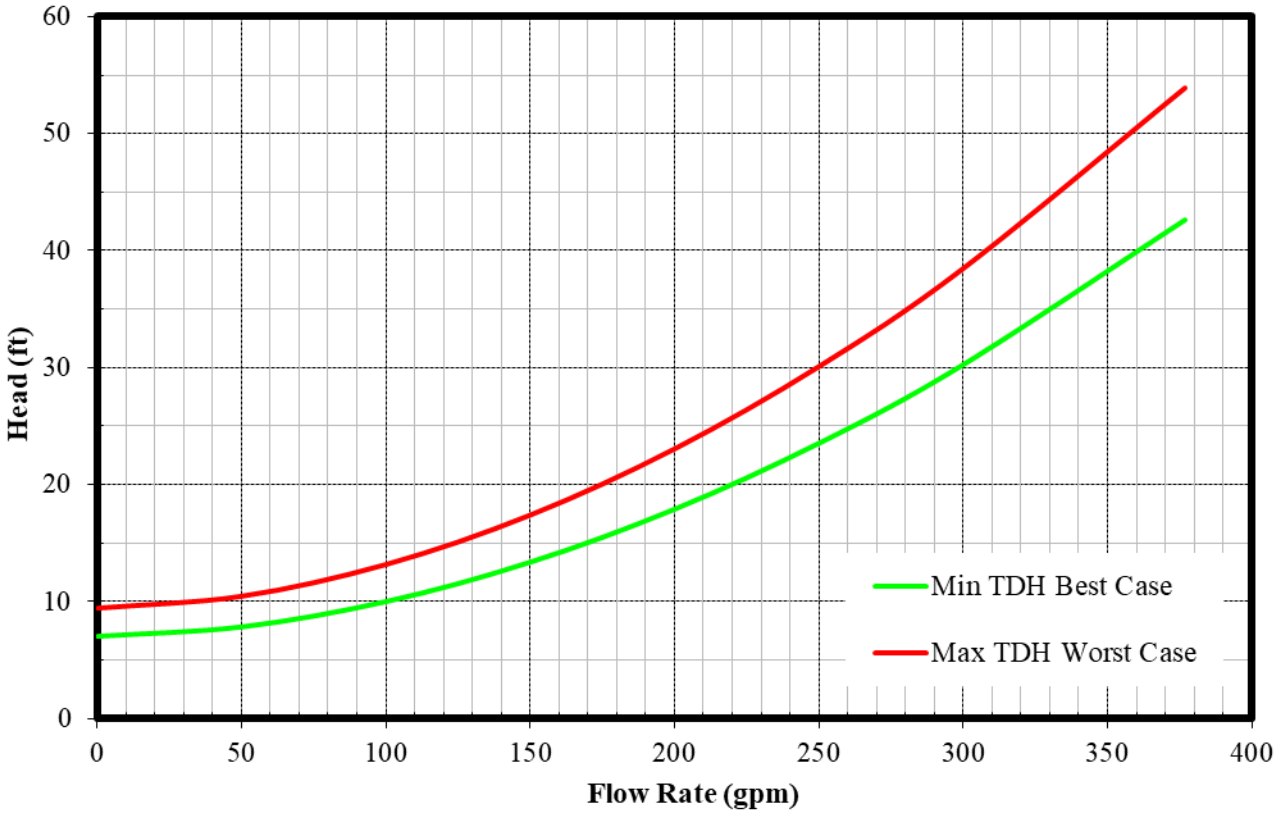
3.2.3 TDH Requirements

The Total Dynamic Head (TDH) is the total equivalent height that a fluid is to be pumped and is represented by a system curve. The system curve includes friction losses within the system as well as the elevation differential between the fluid level in the wetwell and the discharge point**. Figure 3-1** displays a preliminary system curve for the Dana Reserve Lift Station at buildout. For development of the system curve it has been assumed that the force main will be 6-inch AWWA C900 PVC. Using the low water

surface elevation and elevations of a possible force main alignment along Frontage Road, a maximum elevation difference of 9.5 feet (static lift) was estimated and used in the system curve calculations.

The design point for each pump should be a minimum of 202 gpm at approximately 22 ft TDH, based on a conservative Hazen Williams roughness coefficient of 130. This would meet PHF at 689 total residential units, which would generate a total flow of 109,000 gpd per **Table 3-3**. During final design, capacity to deliver 377 gpm using two pumps at 54 ft TDH should also be confirmed. Assuming a combined motor and pump efficiency of 70% and combined two-pump capacity of 377 gpm the preliminary motor size is estimated at 7.5 hp for each pump.

Figure 3-1: Dana Reserve Lift Station – System Curve



3.2.4 Wetwell Size

An 8-foot diameter, 12-foot deep wetwell with submersible, solids-handling pumps is recommended. The preliminary sizing of the lift station pumps and wetwell are based on projected future flows.

It is important that the wetwell is sized with the correct volume and controls for optimized pump station operation. The wetwell should be large enough to prevent rapid pump cycling, and small enough to reduce residence time and minimize odors and settling/accumulation of solids. The following equation is used to determine the recommended storage volume for a wetwell using constant speed pumps[1]:

$$V = \frac{Tq}{4}$$

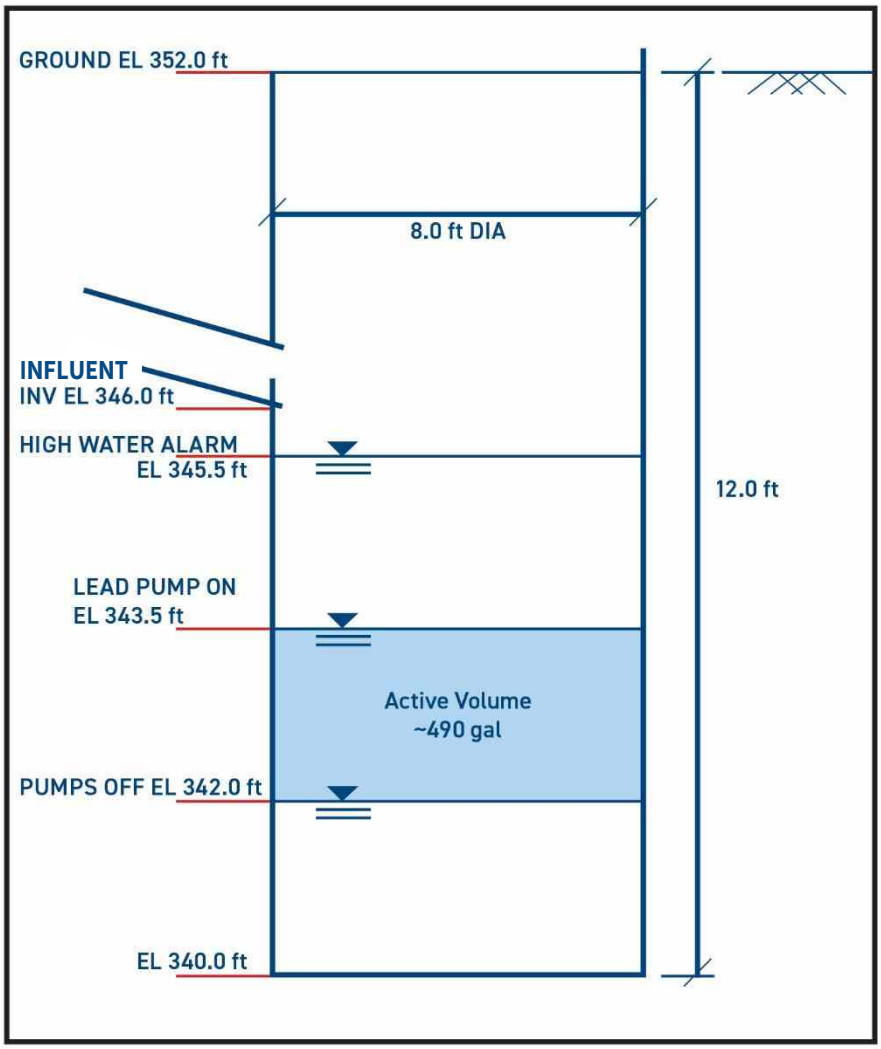
[1] Sanks, Robert L. *Pumping Station Design*, 2nd Edition. Butterworth-Heinemann: (1998), 370.

T is the allowable minimum cycle time between starts, q is the rated capacity of a single pump, and V is the active volume of the wetwell. The active volume is defined as the amount of storage available between pump cycles.

To protect the pumps from overheating, the recommended minimum cycle time is typically 10 minutes per pump. Under this condition, assuming each pump is rated at 202 gpm, the minimum wetwell active volume for the lift station is 490 gallons, or 66 cubic feet. Assuming an 8-foot diameter wetwell, the active depth is approximately 1.5 feet. The active depth is defined as the distance between the set point elevation at which the main pump is called on and the set point at which it is called off. Allowing space for additional set points such as a high-water alarm beneath the influent sewer invert is important for operational flexibility. Additionally, pump manufacturers require minimum submergence for the pumps, typically between 4 and 12 inches.

To be conservative for hydraulic calculations, a submergence depth of 2 feet was assumed. The influent sewer invert at Dana Reserve is estimated to be 6-feet below grade. Assuming a high wetwell level approximately 0.5 feet lower than the influent sewer and estimating the required submergence for the pumps and elevations for the control set points, a total wetwell depth of 12 feet would be recommended for an 8-foot diameter wetwell. **Figure 3-2** shows wet well dimensions and fluid levels.

Figure 3-2: Wetwell Dimensions and Fluid Levels

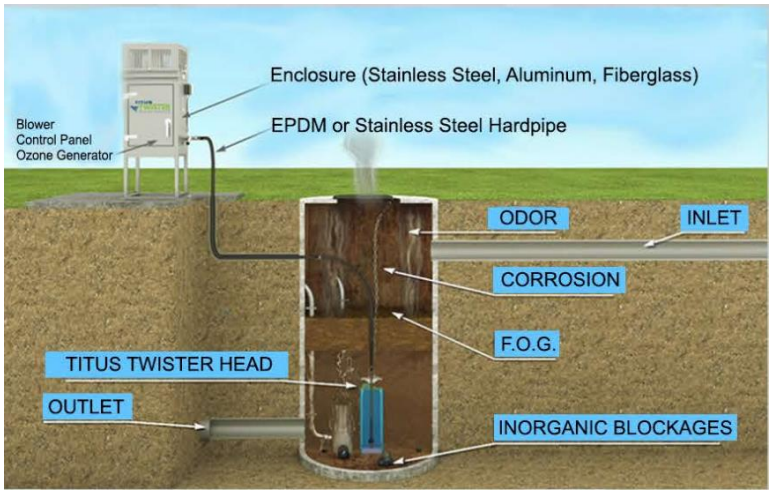


Note: Elevations are based on an assumed ground elevation of 352 ft mean sea level (MSL) per Google Earth Pro.

3.2.5 Odor Control System

Odor control is recommended for the new lift station due to the potential for long residence times in the wetwell and proximity to new homes. Construction of the new lift station will be phased, but the wetwell will be sized for buildout flows from the development. This can result in long residence times, which will increase potential for sulfide generation. The new lift station will also be sited in a residential area, increasing risk of odor complaints.

The District's standard odor control approach is the Titus Twister™ system which can control odor and F.O.G. by introducing oxygen into the wetwell. This system promotes aerobic conditions that reduce potential for sulfide generation and reduce potential for downstream odors.



3.2.6 Site Access and Design

A site will be dedicated for the new lift station and a vehicular ("all weather") access will be tied into an adjacent street. A new fence is recommended around the lift station for site security with a gate at the driveway entrance for vehicle access. Adequate space to allow a chemical delivery truck or vacuum truck to turn around will be provided within the site. It is assumed that all unpaved areas within the fenced area will have an aggregate base course (ABC) surface.

3.2.7 Power and Instrumentation

Power will be provided to the new lift station site. An emergency generator and automatic transfer switch should be provided. Design will conform with District standards for instrumentation, controls, and SCADA.

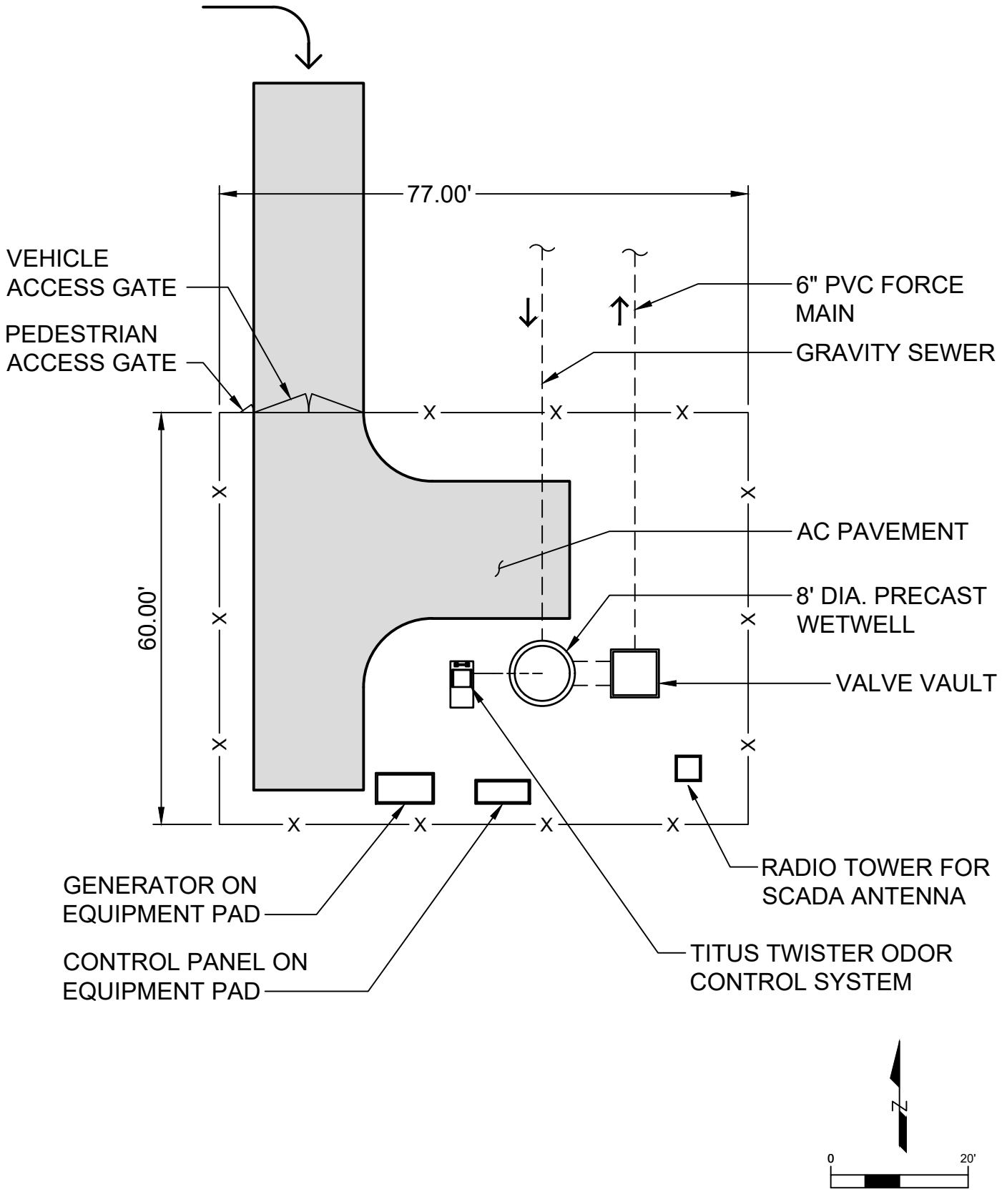
3.2.8 Force Main and Gravity Sewer

The new 6" AWWA C900 PVC force main will be constructed within the future road from the lift station to Frontage Road, continuing east to Camino Caballo. A new gravity sewer will extend from Camino Caballo to Juniper.

At a peak hour flow of 377 gpm from the lift station, assuming 0.5% slope, a 12-inch gravity sewer is recommended. This diameter would provide a capacity of 612 gpm at a d/D equal to 50% and is consistent with the upstream sewer main diameter proposed for the Dana Reserve Development onsite improvements.

Recommended pipeline improvements are summarized below:

1. Install approximately 2500 lf of new 6" AWWA C900 PVC force main from new lift station to Frontage Road and continue new pipeline to Camino Caballo;
2. Install approximately 1200 lf of 12" PVC gravity sewer main and new manholes.



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DANA RESERVE DEVELOPMENT - WATER AND WASTEWATER PHASING STUDY

TYPICAL DISTRICT LIFT STATION SITE LAYOUT

FIGURE 3-3

3.3 Recommended Offsite Improvements

3.3.1 Summary from Dana Reserve Water and Wastewater Service Evaluation

The Dana Reserve Development is anticipated to have a significant impact on District wastewater collection and treatment systems. A new sewer connection from the development to Juniper Street is anticipated as described in Section 3. Improvements to the trunk sewer along Frontage Road will also be necessary to accommodate flow from the development under existing District demands. These project improvements are listed below and identified in **Figure 3-4:**

Table 3-6: Recommendations for NCSD Sewer System Improvements

Project	Required Improvements
1	Connection to Dana Reserve collection area.
2	Sanitary sewer lift station for Dana Reserve Development. (by Developer)
3	Replace existing 10-inch with 3,500 LF of 15-inch PVC sewer main and manholes between Juniper Street and Grande Avenue. (In Progress by District)
	Replace existing 12-inch with 1,170 LF 18-inch PVC sewer main and manholes between Grande Avenue and Division Street. (In Progress by District)

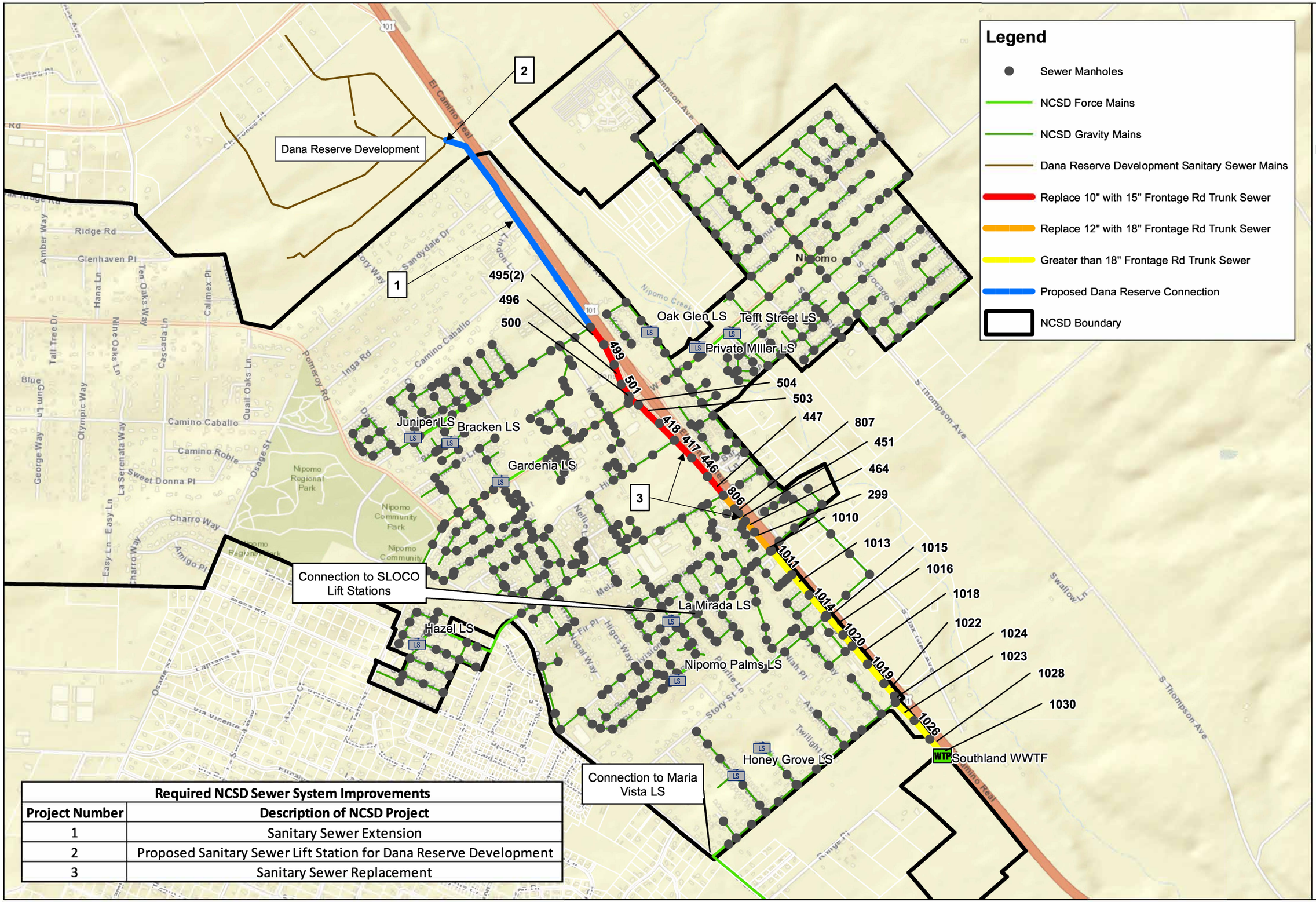
The hydraulic analysis in the Dana Reserve Evaluation concluded the Frontage Road sewer improvements should be implemented as soon as possible to meet existing system demands. The sewer main sizes were selected to meet future conditions including buildout of Dana Reserve Development.

Estimated costs for these improvements are provided in **Section 6**.

3.3.2 Recommended Phasing Plan

Gravity sewer improvements along Frontage Road are currently in design. All wastewater collection system work must be completed before the first unit is completed.

The initial phase will need to include all proposed lift station improvements with two of the three recommended pumps installed. The third pump could be installed when peak hour flows reach 202 gpm. Which is estimated to correspond to approximately 689 residential units. At this point, two pumps would no longer provide full redundancy with one pump out of service. To ensure consistency of all pumps, both for performance and maintenance, all proposed Dana Reserve lift station improvements should be installed at the same time.



Required NCSD Sewer System Improvements	
Project Number	**Description of NCSD Project**
1	Sanitary Sewer Extension
2	Proposed Sanitary Sewer Lift Station for Dana Reserve Development
3	Sanitary Sewer Replacement

Nipomo Community Services District

Dana Reserve Development - Water and Wastewater Phasing Study

Figure 3-4
Wastewater Collection System Improvements

4 WASTEWATER TREATMENT FACILITY

4.1 Influent Flows and Loads

Wastewater flow projections from the Dana Reserve Evaluation were expanded to incorporate recent updates in the quantity of developed area of the Project. Wastewater quality from the Dana Reserve Evaluation was assumed to remain consistent and to continue to provide a reasonable analogue for wastewater discharges from the Project.

Table 3-1 depicts the projected increase of wastewater flows within the District system by year showing the implementation of the planned Blacklake Consolidation project and progression of the service area toward ultimate buildout (2045). Projected loads were calculated based on these flows and the following concentrations originally presented in the Dana Reserve Evaluation.

Table 4-1: Influent Concentrations from Dana Reserve Evaluation

Parameter	Unit	Existing
Average Annual BOD_5 Concentration	mg/L	403
Maximum Month BOD_5 Concentration	mg/L	537
Average Annual TSS Concentration	mg/L	289
Maximum Month TSS Concentration	mg/L	333

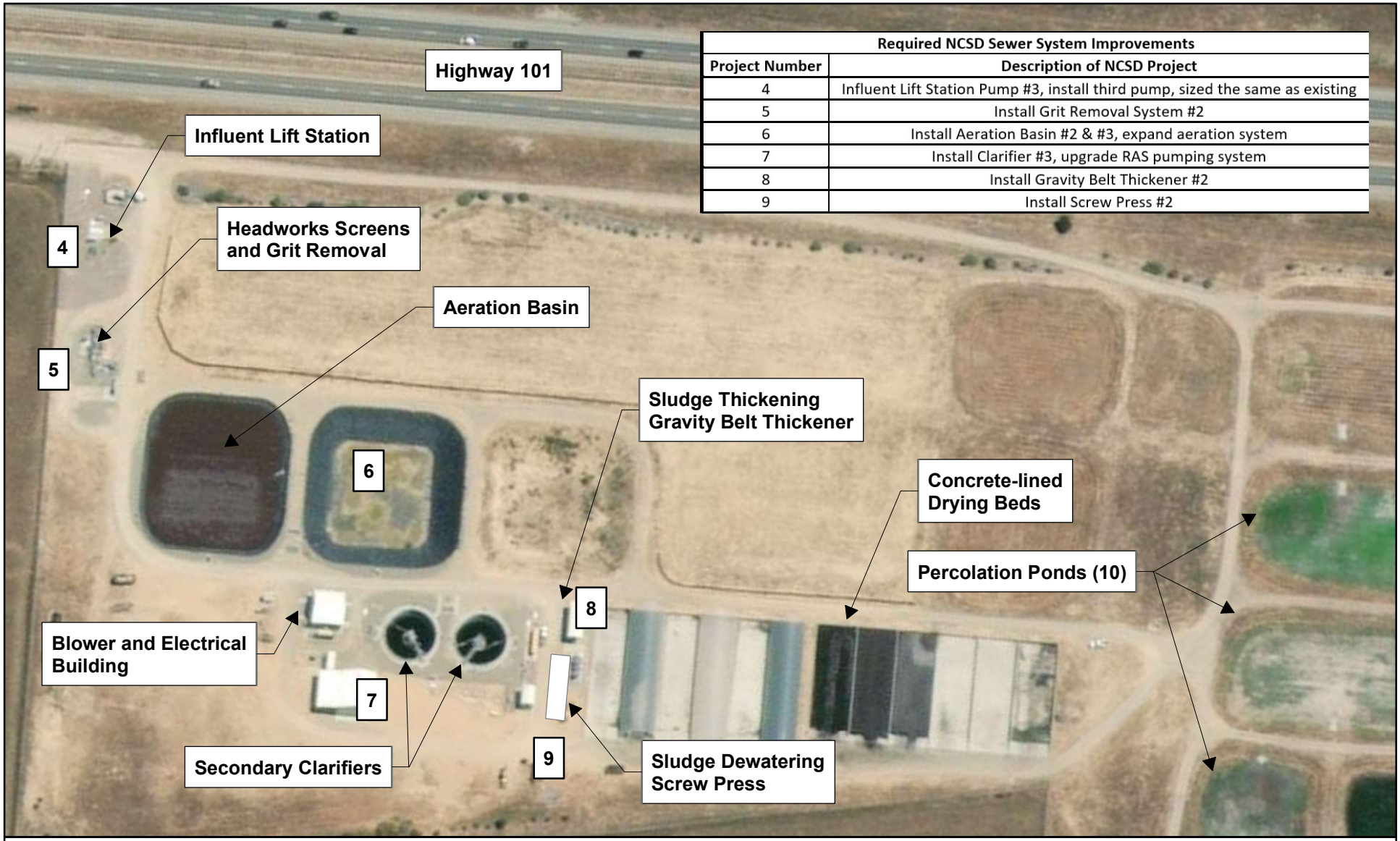
These concentrations were applied to average daily flows from both Dana Reserve and the District Service Area as shown in **Table 4-2**. The number of Dana Reserve residential units is also provided at the bottom of the table to provide correlation with total loads.

Table 4-2: Annual Projected Influent Flows and Loadings from Dana Reserve Project and Existing District Service Area								
Parameter	**Unit**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**
Average Daily Flow (ADF)[1]	MGD	0.61	0.79	0.85	0.92	0.96	0.99	1.01
Maximum Monthly Flow (MMF)[2]	MGD	0.64	0.83	0.89	0.96	1.01	1.04	1.06
Peak Hour Flow (PHF)[3]	MGD	1.66	2.13	2.30	2.49	2.61	2.68	2.72
Average Annual BOD_5 Concentration[4]	mg/L	403	403	403	403	403	403	403
Average Annual BOD_5 Loading	lb/day	2,061	2,643	2,855	3,087	3,238	3,329	3,380
Maximum Monthly BOD_5 Concentration[4]	mg/L	537	537	537	537	537	537	537
Maximum Monthly BOD_5 Loading	lb/day	2,743	3,517	3,799	4,108	4,309	4,430	4,497
Average Annual TSS Concentration[4]	mg/L	289	289	289	289	289	289	289
Average Annual TSS Loading	lb/day	1,478	1,895	2,047	2,213	2,322	2,387	2,423
Maximum Monthly TSS Concentration[4]	mg/L	333	333	333	333	333	333	333
Maximum Monthly TSS Loading	lb/day	1,701	2,181	2,356	2,548	2,672	2,747	2,789
Total Residential Units - Dana Reserve		135	443	689	1,009	1,220	1,289	1,289

NOTES:
1. Total ADF from Dana Reserve per **Table 3-2.** Total flow from existing District service area per Dana Reserve Evaluation **Table 3-4**.
2. MMF estimated using peaking factor of 1.05*ADF. Factor calculated from 2022 Dana Reserve Evaluation **Table 4-3** for combined service area and Dana Reserve flows**.**
3. PHF estimated using peaking factor of 2.71*ADF. Factor calculated from 2022 Dana Reserve Evaluation **Table 4-3** for combined service area and Dana Reserve flows**.**
4. Constituent concentrations per Dana Reserve Evaluation **Table 4-1**.

4.2 Capacity Assessment from Dana Reserve Water and Wastewater Service Evaluation

The Dana Reserve Evaluation concluded the Project will have a significant impact on Southland WWTF. Additionally, the Central Coast Regional Water Quality Control Board (RWQCB) has notified the District that the Southland WWTF will be enrolled under General Waste Discharge requirements for Discharges from Domestic Wastewater Systems with Flows Greater than 100,000 gallons per day (Order No. R3-2020-0020). Recommended projects to meet current and future regulatory requirements with the addition of Dana Reserve loading are described below and illustrated on **Figure 4-1**.



Required NCSD Sewer System Improvements	
Project Number	**Description of NCSD Project**
4	Influent Lift Station Pump #3, install third pump, sized the same as existing
5	Install Grit Removal System #2
6	Install Aeration Basin #2 & #3, expand aeration system
7	Install Clarifier #3, upgrade RAS pumping system
8	Install Gravity Belt Thickener #2
9	Install Screw Press #2

1 inch = 150 feet

0 75 150

Figure 4-1
Proposed Southland WWTF Improvements

Dana Reserve Development
Water and Wastewater Service Evaluation
Nipomo Community Services District

The following table summarizes the capacity assessment performed in that study:

Table 4-3: Summary of Southland WWTF Evaluation		
Process	**Summary of Findings**	**Recommendations to Meet Existing Demands with Dana Reserve**
Influent Lift Station	Capacity is adequate for existing conditions.	Install a third pump, sized the same as existing
Influent Screen	Capacity is adequate for existing flowrates	–
Grit Removal	Capacity is adequate for existing conditions.	Install second grit system
Extended Aeration Basins	Additional basins required	Install Aeration Basin #2 to meet current capacity requirements. Install Aeration Basin #3 to meet anticipated permit requirements. Expand blower system as needed
Secondary Clarifiers	Overflow rate is adequate for existing conditions. Peak solids loading rate is exceeded at existing demands with Dana Reserve.	Install third clarifier for redundancy. Upgrade RAS pumping system.
Gravity Belt Thickener (GBT)	Additional operating hours will be necessary to meet existing demands with Dana Reserve. No redundancy is available if the single GBT fails.	Install second GBT
Dewatering Screw Press	Additional press required to meet combined loading.	Install second screw press

4.3 Analysis of Unit Processes

4.3.1 Influent Lift Station

The existing influent lift station at the Southland WWTF consists of two screw centrifugal pumps with 20 horsepower motors, and each with a capacity of 1,700 GPM (2.45 MGD) at 30 feet of total dynamic head (TDH). The pumps alternate operation, with one pump operating and the other remaining on standby to provide 100% redundancy.

The District plans to install a third pump which will deliver a peak flow of 4.83 MGD with one pump out of service, as noted in the Dana Reserve Evaluation.

4.3.1.1 Influent Screens

The two (2) influent screens each have a capacity of 4.83 MGD peak flow, with a maximum equipment capacity of 5.5 MGD. The screens have the ability to handle anticipated peak hour flow rates.

4.3.1.2 Grit Removal

Southland WWTF's existing grit removal system consists of one vortex-type grit tank with a single, self-priming grit pump. Provisions were included in the Phase I improvements to facilitate installation of a second grit tank and appurtenances in the future.

The existing system has a peak flow capacity of 2.5 MGD. As shown in **Table 4-2**, a combined Dana Reserve and District service area PHF of 2.49 MGD is projected when 1,009 residential units are completed. Therefore, the additional grit removal system would need to be commissioned and operating at that time.

4.3.1.3 Extended Aeration System

As discussed in the Dana Reserve Evaluation, three aeration basins and supporting equipment will be necessary to meet future permit requirements under existing conditions with Dana Reserve. In addition to the aeration basins, new diffusers, and supporting electrical, mechanical, and instrumentation will be required. A new blower building or expansion of the existing blower building will also be necessary. **Table 4-4** below includes the minimum system design criteria (5 to 9 lb BOD_5/1000 cubic feet (cf)) with two basins in operation to provide adequate nitrogen removal under the new permit requirements.

Table 4-4: Extended Aeration Basin Capacity for Denitrification via Wave Oxidation (Two Basins)

Condition	Units	System Design Criteria
Average Annual BOD_5 Load	lb/day	1,886 – 3,394
Maximum Month BOD_5 Load	lb/day	1,886 – 3,394

Table 4-5 identifies the range of design criteria for a three basin system.

Table 4-5: Extended Aeration Basin Capacity for Denitrification via Wave Oxidation (Three Basins)

Flow Condition	Units	Minimum System Design Criteria
Average Annual BOD_5 Load	lb/day	2,829 – 5,091
Maximum Monthly BOD_5 Load	lb/day	2,829 – 5,091

A two-basin system would be adequate to handle a maximum month BOD_5 load up to 3,394 lb/day. This would include the existing service area loads with 135 residential units at Dana Reserve with a maximum month BOD_5 load of 2,743 lb/day as shown in **Table 4-2**. When 443 units are completed with a projected maximum month BOD_5 load of 3,517 lb/day the third basin would need to be in service.

Since the third basin would provide capacity to treat 2,829 to 5,091 lb/day BOD_5, as shown in **Table 4-5**, it is recommended to complete the second and third basin when 135 residential units are in service. This would only provide an additional 86 lb/day capacity (3.0%) over the minimum loading rate of 2,829 lb/day BOD_5 at that phase of development.

4.3.1.4 Secondary Clarifiers

Two existing 55-foot diameter concrete circular secondary clarifiers are operating at Southland WWTF, each with a design overflow rate (OFR) of 240 gallons per day per square foot (gpd/ft^2) at ADF and 694 gpd/ft^2 at PHF. Industry standards[2] recommend overflow rates of 200 – 400 gpd/ft^2 for average flow conditions and 600 – 800 gpd/ft^2 at peak flow conditions. Each clarifier is designed for a solids loading rate (SLR) of 0.95 pounds per square foot per hour (lbs/ft^2/hr) at average conditions and 1.67 lbs/ft^2/hr at peak conditions. The design overflow rates and solids loading rates are compared with the anticipated combined flow and loading condition in **Table 4-6**. Values exceeding the original design value or the recommended range are in italicized, bold text. These design conditions are correlated with planned number of residential units. It was assumed one clarifier was in operation to provide full redundancy.

Table 4-6: Clarifier Capacity (1 Clarifier in operation)

Parameter	Unit	Design Value	Recommended Range	Number of Residential Units – Dana Reserve						
				135	443	689	1,009	1,220	1,289	1,289
Average Overflow Rate	gpd/ft^2	240.00	200 – 400	258	331	357	386	***405***	***417***	***423***
Peak Overflow Rate	gpd/ft^2	694.00	600 – 800	699	***897***	***968***	***1,047***	***1,098***	***1,129***	***1,146***
Average Solids Loading Rate	lb/ft^2/hr	0.95	0.2 – 1.0	0.7	0.9	***1.0***	***1.1***	***1.1***	***1.2***	***1.2***
Peak Solids Loading Rate	lb/ft^2/hr	1.67	<1.4	***2.0***	***2.5***	***2.7***	***2.9***	***3.1***	***3.2***	***3.2***

With one clarifier operating, the average OFR falls within the recommended range outlined by Tchbanoglous, et al. (ibid.) until 1,220 residential units are completed and occupied. However, the upper range of the average SLR is reached at 689 units. Peak SLR and OFR are both exceeded at 135 and 443 residential units, respectively.

[2] Wastewater Engineering Treatment & Reuse, 4th Edition, Tchbanoglous, et. al.

Table 4-7 predicts overflow and loading rates with 2 clarifiers in operation. Values exceeding the original design value or the recommended range are in italicized, bold text.

Table 4-7: Clarifier Capacity (2 Clarifiers)									
Parameter	**Unit**	**Design Value**	**Recommended Range**	**Number of Residential Units – Dana Reserve**					
				443	689	1,009	1,220	1,289	1,289
Average Overflow Rate	gpd/ft^2	240.00	200 – 400	165	179	193	203	208	212
Peak Overflow Rate	gpd/ft^2	694.00	600 – 800	448	484	524	549	565	573
Average Solids Loading Rate	lb/ft^2/hr	0.95	0.2 – 1.0	0.5	0.5	0.5	0.6	0.6	0.6
Peak Solids Loading Rate	lb/ft^2/hr	1.67	<1.4	1.3	1.4	***1.5***	***1.5***	***1.6***	***1.6***

With two clarifiers operating, both the existing combined average OFR falls under the lower bound of the recommended range until 1,220 residential units are completed and occupied. However, this is not anticipated to be an issue as the District is successfully operating two clarifiers under existing conditions. The average SLR falls within the recommended range. However, this leaves no redundancy in the event one clarifier is out of service. Therefore, a third clarifier is recommended to meet existing conditions with Dana Reserve's contribution.

Meeting the recommended average SLR and OFR range is more critical than meeting the peak OFR and SLR ranges, since the peak hour is infrequent and impact can be minimized through operational mitigation measures such as reducing influent pump speed. In order to provide full redundancy with one clarifier out of service, the third clarifier should be operating when 1,009 units are completed and occupied to prevent exceeding the average SLR. It is also recommended to upgrade the Return Activated Sludge (RAS) pumps when the third clarifier is constructed.

4.3.1.5 Gravity Belt Thickener

Southland WWTF currently conveys between 34,000 and 51,000 gallons of sludge per day to the single existing gravity belt thickener. It is operated between 6 and 7 hours per day for approximately 35 hours per week. The Dana Reserve Evaluation discussed the need for an additional gravity belt thickener to address redundancy. The planning and design for the additional unit should begin as soon as practicable to allow the existing thickener to be removed from service for emergencies or redundancy before significant development is completed at Dana Reserve.

4.3.1.6 Sludge Dewatering Screw Press and Sludge Drying Beds

The District recently completed installation of a new sludge dewatering screw press at the Southland WWTF. During normal operation, the screw press will receive thickened sludge from the gravity belt thickener, and, thus, will operate for the same durations as the thickener. Two days of operation will be

added to accommodate Dana Reserve loads as discussed in the Dana Reserve Evaluation. A second press is necessary for redundancy. The planning and design for the additional unit should begin as soon as practicable to allow the existing press to be removed from service for emergencies or redundancy before significant development is completed at Dana Reserve.

The District has sludge drying beds that are utilized to store dewatered sludge. They can be used to temporarily store thickened sludge in case a screw press is out of service. The remaining screw press can also be operated for longer periods during the day to accommodate a short-term outage.

4.4 Recommended Improvements

4.4.1 Summary from Dana Reserve Water and Wastewater Service Evaluation

Southland WWTF will require significant improvements to meet existing demands with Dana Reserve and future demands. **Table 4-8** summarizes improvements necessary to meet current and eminent Waste Discharge Requirements.

Table 4-8: Recommendations for Southland WWTF Improvements

Project	Process	Required Improvement
4	Influent Lift Station	Install a third pump, sized the same as existing
5	Grit Removal	Install second grit system
6	Extended Aeration Basins	Install Aeration Basins #2 & #3 and expand aeration system
7	Secondary Clarifiers	Install third clarifier for redundancy. Upgrade RAS pumping system.
8	Gravity Belt Thickener (GBT)	Install second GBT
9	Dewatering Screw Press	Install second screw press

In addition to the aeration basins, new diffusers and supporting electrical, mechanical, and instrumentation will be required. A new blower building or expansion of the existing blower building will also be necessary.

Estimated costs for these improvements are provided in **Section 6**.

4.4.2 Recommended Phasing Plan

Table 4-9 recommends the phase of residential development for initiating each project at Southland WWTF. In order to determine when to initiate the project, the development schedule presented in **Table 4-2** was reviewed to correlate number of planned residential units to the planned year of completion. For example, if a project was required to be in service when a certain number of residential units were completed and occupied, and implementation was anticipated to require two years, the number of units planned two years prior was used as the “trigger” to initiate the project.

Table 4-9: Recommended Project Completion Dates			
Project	**Process**	**Implementation Timeline**	**Completed Residential Units**
4	Influent Lift Station	1.5 Year	Before First Unit is Completed
5	Grit Removal	2.5 Years	Prior to Unit 1009[1]
6	Extended Aeration Basins	2.5 Years	Before First Unit is Completed
7	Secondary Clarifier	2.5 Years	Prior to Unit 1009[1]
8	Gravity Belt Thickener (GBT)	2.5 Years	Before First Unit is Completed
9	Dewatering Screw Press	2.5 Years	Before First Unit is Completed

[1] See **Table 3-3** for anticipated development schedule.

5 PHASED IMPLEMENTATION SCHEDULE

Figure 5-1 provides the anticipated schedule for implementation of the water and wastewater projects described earlier. Each project is divided into the following phases:

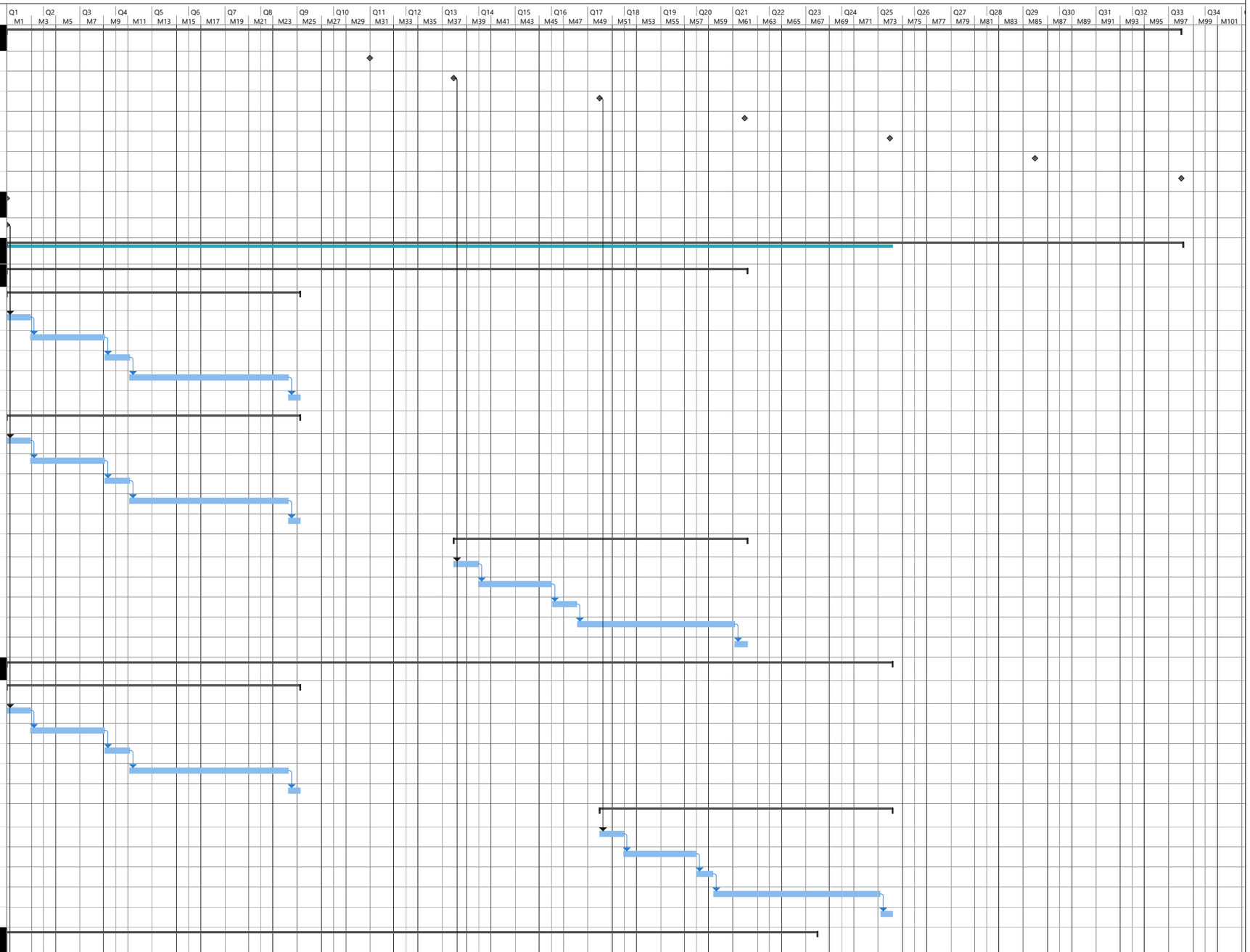
- Preliminary Planning, Permitting, and Procurement – This phase includes project initiation, financial planning, and procurement of design and permitting professionals.
- Design
- Bid Phase
- Construction Phase
- Startup and Commissioning

The implementation schedule would be initiated with the approval of the annexation agreement between the District and property owner. The schedule is organized according to months from completion of the annexation agreement.

Figure 5-1

Nipomo Community Services District
Dana Reserve Development
Water and Wastewater Phasing Study

ID	Task Name
1	**RESIDENTIAL UNITS CONSTRUCTION SCHEDULE (ASSUMED)**
2	1st Unit Completed
3	135 Units Completed
4	443 Units Completed
5	689 Units Completed
6	1009 Units Completed
7	1220 Units Completed
8	1289 Units Completed
9	**PROJECT MILESTONES**
10	Anticipated Annexation Approval
11	**WATER PROJECTS**
12	**Pipeline Improvements**
13	**Project 1 - New 16" Main on North Oak Glen Drive**
14	I. Preliminary Planning, Permitting, and Procurement
15	II. Design
16	III. Bid Phase
17	IV. Construction Phase
18	V. Startup and Commissioning
19	**Project 2 - New 16" HWY 101 Crossing at Sandydale**
20	I. Preliminary Planning, Permitting, and Procurement
21	II. Design
22	III. Bid Phase
23	IV. Construction Phase
24	V. Startup and Commissioning
25	**Project 5 - 16" Main Replacement on Tefft Street**
26	I. Preliminary Planning, Permitting, and Procurement
27	II. Design
28	III. Bid Phase
29	IV. Construction Phase
30	V. Startup and Commissioning
31	**Storage Improvements**
32	**Project 6 - Foothill Tank Improvements**
33	I. Preliminary Planning, Permitting, and Procurement
34	II. Design
35	III. Bid Phase
36	IV. Construction Phase
37	V. Startup and Commissioning
38	**Project 7 - Joshua Road Pump Station Reservoir Improvements**
39	I. Preliminary Planning, Permitting, and Procurement
40	II. Design
41	III. Bid Phase
42	IV. Construction Phase
43	V. Startup and Commissioning
44	**WASTEWATER PROJECTS**



Project: NCSD Dana Reserve Phasing Schedule
Date: Thu 12/7/23

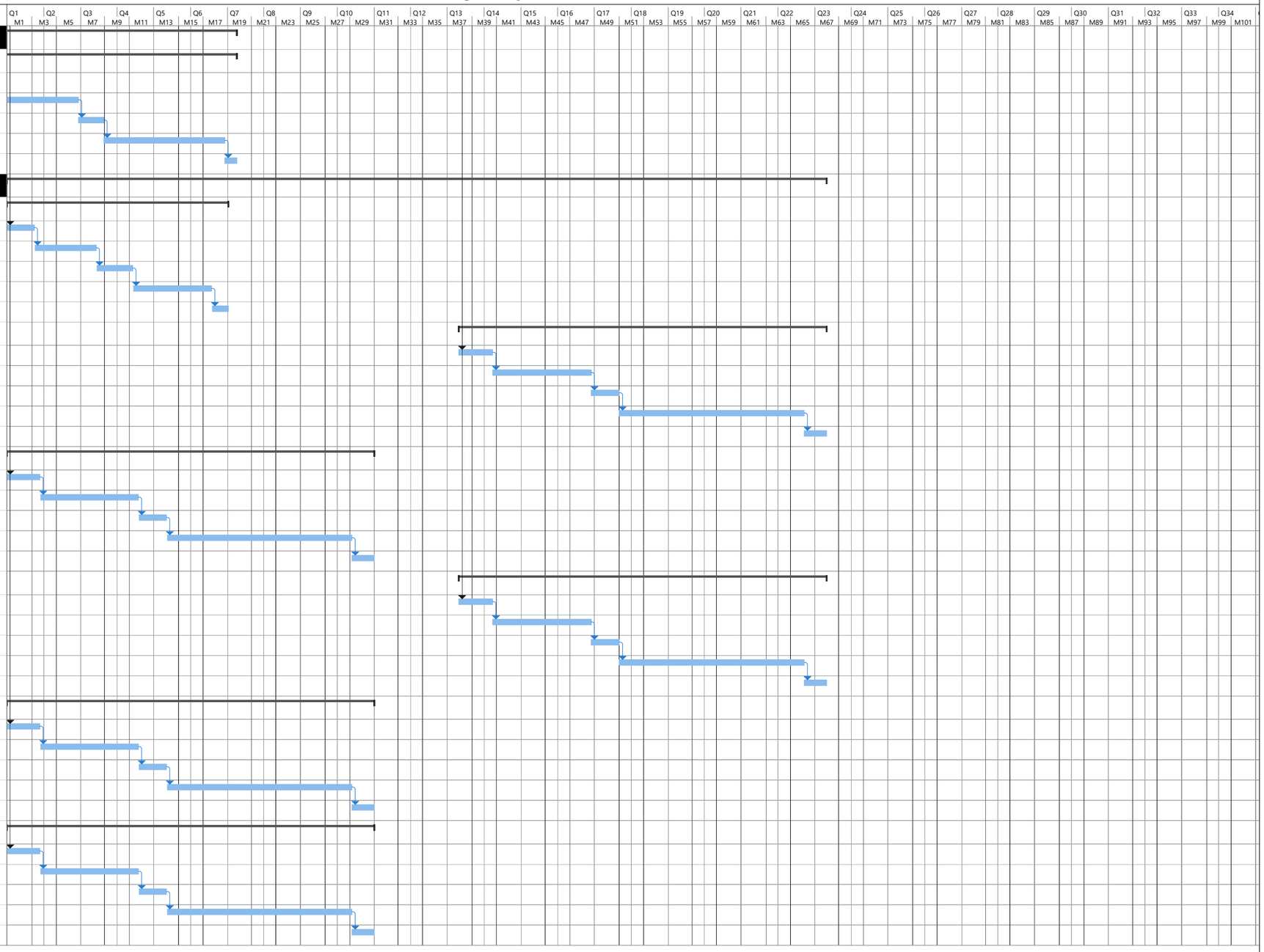
Task, Split, Milestone, Summary, Project Summary, Inactive Task, Inactive Milestone, Inactive Summary, Manual Task, Duration-only, Manual Summary Rollup, Manual Summary, Start-only, Finish-only, External Tasks, External Milestone, Deadline, Progress, Manual Progress

Page 1

Figure 5-1

Nipomo Community Services District
Dana Reserve Development
Water and Wastewater Phasing Study

ID	Task Name
45	**Wastewater Collection System Improvements**
46	**Project 3 - Sanitary Sewer Replacement (Frontage Road Trunk Sewer Replacement)**
47	I. Preliminary Planning, Permitting, and Procurement
48	II. Design
49	III. Bid Phase
50	IV. Construction Phase
51	V. Startup and Commissioning
52	**Southland WWTF Improvements**
53	**Project 4 - Influent Lift Station**
54	I. Preliminary Planning, Permitting, and Procurement
55	II. Design
56	III. Bid Phase
57	IV. Construction Phase
58	V. Startup and Commissioning
59	**Project 5 - Grit Removal**
60	I. Preliminary Planning, Permitting, and Procurement
61	II. Design
62	III. Bid Phase
63	IV. Construction Phase
64	V. Startup and Commissioning
65	**Project 6 - Extended Aeration Basins**
66	I. Preliminary Planning, Permitting, and Procurement
67	II. Design
68	III. Bid Phase
69	IV. Construction Phase
70	V. Startup and Commissioning
71	**Project 7 - Secondary Clarifiers**
72	I. Preliminary Planning, Permitting, and Procurement
73	II. Design
74	III. Bid Phase
75	IV. Construction Phase
76	V. Startup and Commissioning
77	**Project 8 - Gravity Belt Thickener (GBT)**
78	I. Preliminary Planning, Permitting, and Procurement
79	II. Design
80	III. Bid Phase
81	IV. Construction Phase
82	V. Startup and Commissioning
83	**Project 9 - Dewatering Screw Press**
84	I. Preliminary Planning, Permitting, and Procurement
85	II. Design
86	III. Bid Phase
87	IV. Construction Phase
88	V. Startup and Commissioning



Project: NCSD Dana Reserve Phasing Schedule
Date: Thu 12/7/23

Task | Milestone | Project Summary | Inactive Milestone | Manual Task | Manual Summary Rollup | Start-only | External Tasks | Deadline | Manual Progress
Split | Summary | Inactive Task | Inactive Summary | Duration-only | Manual Summary | Finish-only | External Milestone | Progress

Page 2

6 PROJECT COST OPINIONS

6.1 Opinions of Probable Project Cost

The following table summarizes total project costs from the Dana Reserve Evaluation, escalated to 2023 dollars using the Engineering News-Record Los Angeles Construction Cost Index (ENR-LA CCI) as identified below. The cost opinions for engineering, administration, and construction management; construction; and contingency are shown separately.

Table 6-1: Summary of Project Cost Opinions

Project and Description	Complete Units to Initiate Construction	Engineering, Administration, & Construction Management	Construction	Contingency	Total
Water Projects					
Project 1 - New 16" Main on North Oak Glen Drive	Prior to first Unit	$730,000	$2,410,000	$730,000	$3,870,000
Project 2 - New 16" HWY 101 Crossing at Sandydale	Prior to first Unit	$260,000	$850,000	$260,000	$1,370,000
Project 4 - Willow EOL Connection	Prior to first Unit	Developer Funded			
Project 5 - 16" Main Replacement on Tefft Street	Prior to Unit 689	$1,300,000	$4,320,000	$1,300,000	$6,920,000
Project 6 - Foothill Tank Improvements	Prior to first Unit	$850,000	$2,820,000	$850,000	$4,520,000
Project 7 - Joshua Road Pump Station Reservoir	Prior to Unit 1000	$1,030,000	$3,420,000	$1,030,000	$5,480,000
Water Projects Subtotal		**$4,170,000**	**$13,820,000**	**$4,170,000**	**$22,160,000**
Wastewater Projects					
Project 2A – Proposed Sanitary Sewer Lift Station, Force Main, and Wastewater Connection System Connection for Dana Reserve Development	Prior to first Unit	Developer Funded			
Project 2B – Dana Reserve Lift Station Pump #3	Prior to first Unit	Developer Funded			
Project 3 – Sanitary Sewer Replacement	In Progress – District Funded				
Project 4 – Influent Lift Station	Prior to first Unit	$20,000	$50,000	$20,000	$90,000
Project 5 – Grit Removal	Prior to Unit 1009	$160,000	$510,000	$160,000	$830,000
Project 6 – Extended Aeration Basins	Prior to first Unit	$930,000	$3,080,000	$930,000	$4,940,000
Project 7 – Secondary Clarifiers	Prior to Unit 1009	$710,000	$2,350,000	$710,000	$3,770,000
Project 8 – Gravity Belt Thickener	Prior to first Unit	$220,000	$710,000	$220,000	$1,150,000
Project 9 – Dewatering Screw Press	Prior to first Unit	$400,000	$1,310,000	$400,000	$2,110,000
Wastewater Projects Subtotal		**$2,440,000**	**$8,010,000**	**$2,440,000**	**$12,890,000**

Notes:

1. All project costs were escalated using the ENR-LA CCI (August 2023 = 15179.26). All costs (except Wastewater Project 3) were developed in the Dana Reserve Evaluation (ibid.)
2. Wastewater Project 3 (Sanitary Sewer Replacement) was updated in the June 2023 60% Progress Submittal. 20% of construction cost was assumed for contingency and 30% was assumed for engineering, administration, and construction management.
3. All numbers rounded to $10,000.

In the cashflow analysis in **Table 6-2**, all project costs were escalated to the midpoint of construction by a factor of 5% per year, which is the rounded annual average ENR-CCI LA increase from August 2018 to August 2023.

Table 6-2: Summary of Project Cost Opinions with Escalation to Midpoint of Construction

Project and Description	Complete Units to Initiate Construction	Engineering, Administration, & Construction Management	Construction	Contingency	Total
Water Projects					
Project 1 - New 16" Main on North Oak Glen Drive	Prior to first Unit	$800,000	$2,640,000	$800,000	$4,240,000
Project 2 - New 16" HWY 101 Crossing at Sandydale	Prior to first Unit	$280,000	$930,000	$280,000	$1,490,000
Project 4 - Willow EOL Connection	Prior to first Unit	Developer Funded			
Project 5 - 16" Main Replacement on Tefft Street	Prior to Unit 689	$1,650,000	$5,470,000	$1,650,000	$8,770,000
Project 6 - Foothill Tank Improvements	Prior to first Unit	$930,000	$3,090,000	$930,000	$4,950,000
Project 7 - Joshua Road Pump Station Reservoir	Prior to Unit 1000	$1,360,000	$4,500,000	$1,180,000	$7,040,000
Water Projects Subtotal		**$5,020,000**	**$16,630,000**	**$4,840,000**	**$26,490,000**
Wastewater Projects					
Project 2A – Proposed Sanitary Sewer Lift Station, Force Main, and Wastewater Connection System Connection for Dana Reserve Development	Prior to first Unit	Developer Funded			
Project 2B – Dana Reserve Lift Station Pump #3	Prior to first Unit	Developer Funded			
Project 3 – Sanitary Sewer Replacement	In Progress – District Funded				
Project 4 – Influent Lift Station	Prior to first Unit	$20,000	$60,000	$20,000	$100,000
Project 5 – Grit Removal	Prior to Unit 1009	$210,000	$650,000	$210,000	$1,070,000
Project 6 – Extended Aeration Basins	Prior to first Unit	$1,050,000	$3,480,000	$1,050,000	$5,580,000
Project 7 – Secondary Clarifiers	Prior to Unit 1009	$910,000	$3,020,000	$910,000	$4,840,000
Project 8 – Gravity Belt Thickener	Prior to first Unit	$250,000	$800,000	$250,000	$1,300,000
Project 9 – Dewatering Screw Press	Prior to first Unit	$450,000	$1,480,000	$450,000	$2,380,000
Wastewater Projects Subtotal		**$2,890,000**	**$9,490,000**	**$2,890,000**	**$15,270,000**

Notes: All numbers rounded to $10,000

6.2 Annual Cashflow Projections

In order to estimate quarterly cashflow, the following breakdown of Engineering, Administration, and Construction Management cost was assumed:

- Preliminary Planning and Permitting = 10%
- Engineering design = 40%; and
- Engineering services during construction and construction management = 50% .

These factors were applied to the cost opinions above in order to develop cost opinions for each phase of project development. It was assumed contingency would be spread throughout the construction phase of the project. Those cost opinions were applied to the schedule presented in **Figure 5-1** and were spread evenly through each phase of the project in order to estimate quarterly cashflow. **Figures, 6-1, 6-2, and 6-3** present the anticipated expenditures, not including financing charges, interest, or any fees associated with project financing. The cashflow analysis was developed assuming money is spent at the end of the quarter.

Figure 6-1 Cash Flow Report - Water Projects

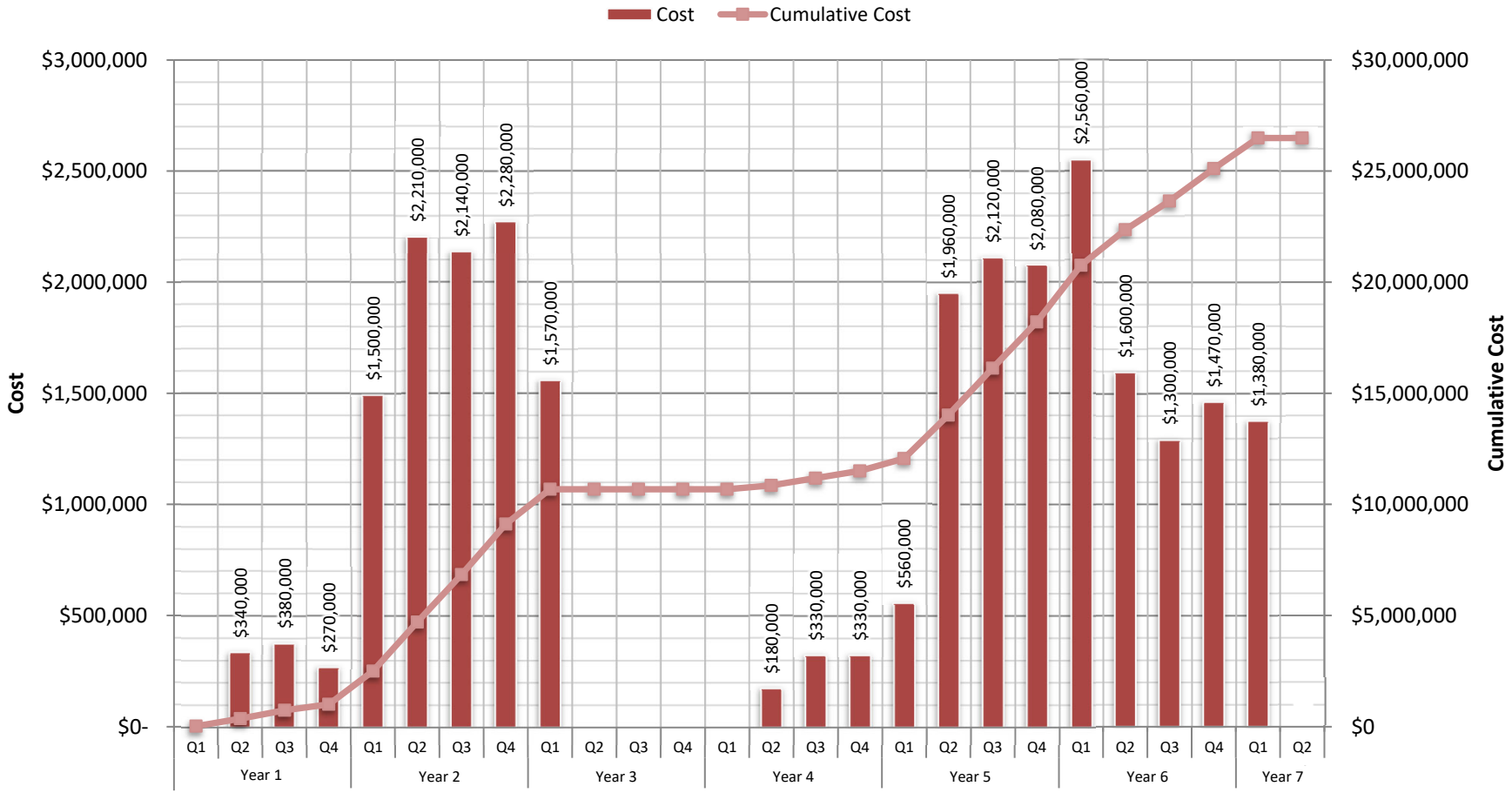


Figure 6-2 Cash Flow Report - Wastewater Projects

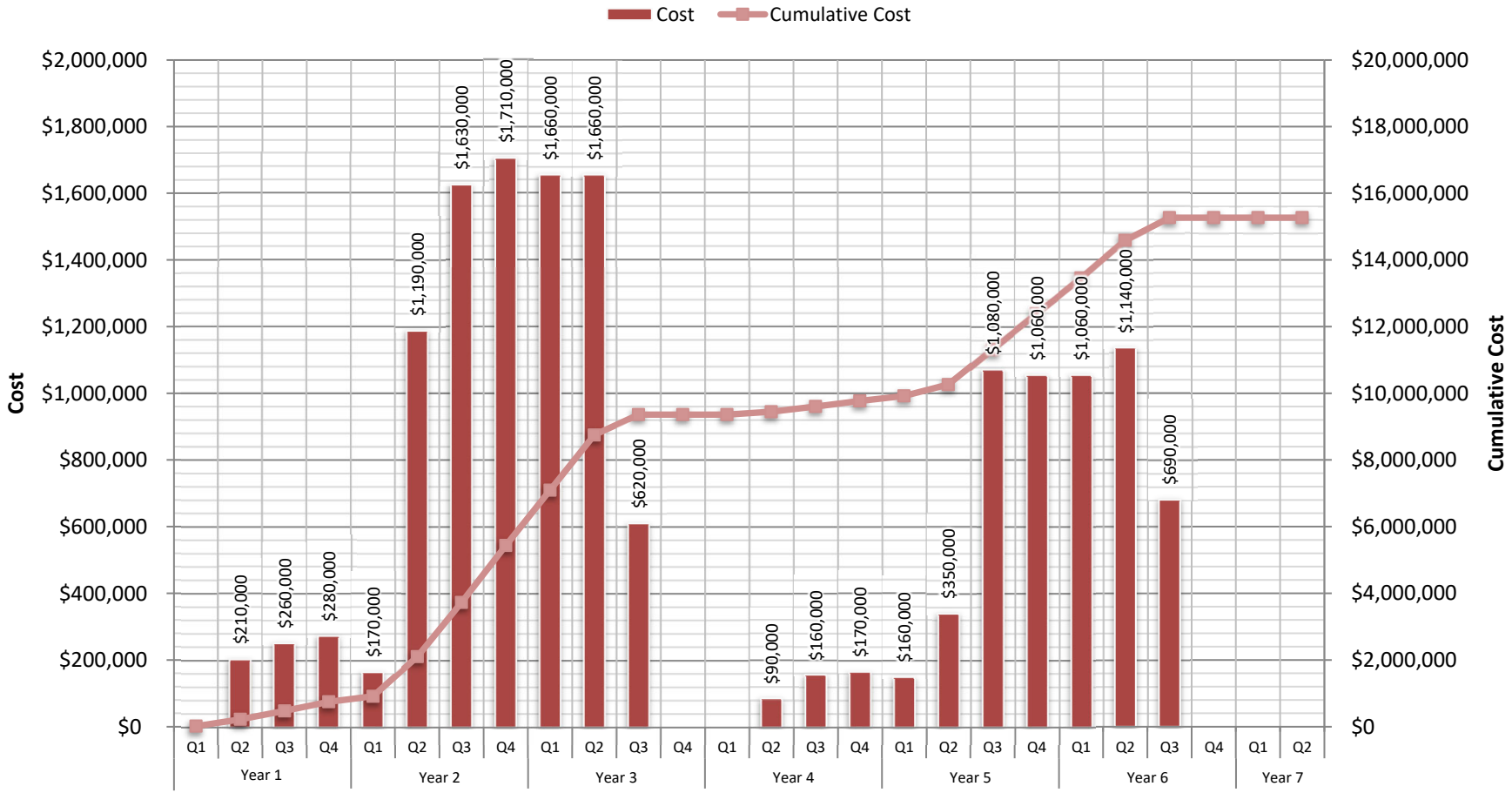
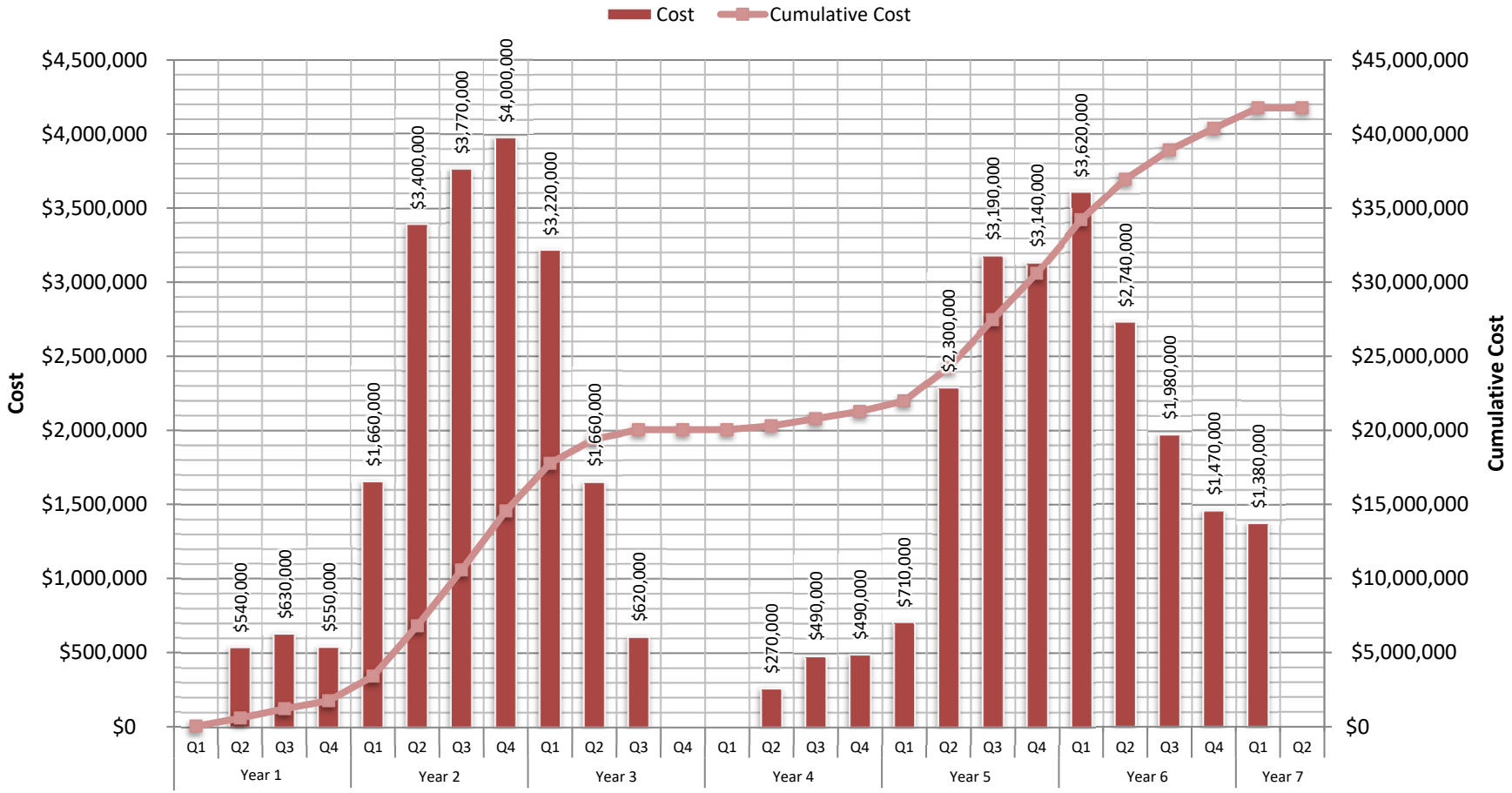


Figure 6-3 Cash Flow Report - Water and Wastewater Projects



7 CONCLUSIONS

Over 60% of the investment for water and sewer improvements to serve the Dana Reserve Development and approximately 30% completion of recommended projects will be required prior to completion of the first unit within the development. All cost estimates are of August 2023.

Water Improvements

Major water transmission and storage projects were recommended for implementation prior to completion and occupancy of the first residential unit due to the need for fire flow, emergency storage, and redundant water supply to the project. Several projects will need to be initiated as soon as possible after the annexation agreement is approved in order to address the proposed development schedule.

The developer will need to complete, at the developer's expense, as part of onsite improvements prior to completion of first residential unit, the following projects:

- Water Project 3 – Frontage Road Extension
- Water Project 4 – Willow EOL Connection

The District will need to complete, subject to developer providing funding, prior to completion of the first residential unit, the following projects:

- Water Project 1 – New 16" Main on North Oak Glen Drive - $4,240,000
- Water Project 2 – New 16" HWY 101 Crossing at Sandydale - $1,490,000
- Water Project 6 Foothill Tank Improvements - $4,950,000

Additionally, the District will need to complete, subject to developer providing funding, the following projects prior to completion of residential unit 689:

- Water Project 5 – 16" Main Replacement on Tefft Street - $8,770,000

Additionally, the District will need to complete, subject to developer providing funding, the following projects prior to completion of residential unit 1000:

- Water Project 7 – 500,000 gallon Tank at Joshua Pump Station - $7,040,000

Wastewater Improvements

Major wastewater collection and treatment improvements are also necessary to provide wastewater service. Several projects will need to be initiated as soon as possible after the annexation agreement is approved in order to address the proposed development schedule.

Wastewater Project 3 (Frontage Road Trunk Sewer Replacement) is already in design and needs to be completed prior to completion of the first residential unit.

The developer will need to complete, at the developer's expense, as part of onsite improvements prior to completion of first residential unit:

- Wastewater Project 1 – Frontage Road Sewer Extension
- Wastewater Project 2 – Dana Reserve Lift Station

The District will need to complete, subject to developer providing funding, prior to completion of the first residential unit:

- Wastewater Project 4 – Influent Lift Station - $100,000
- Wastewater Project 6 – Extended Aeration Basins - $5,580,000
- Wastewater Project 8 – Gravity Belt Thickener - $1,300,000
- Wastewater Project 9 – Dewatering Screw Press - $2,380,000

Additionally, the following projects will need to be completed prior to completion of Unit 1009:

- Wastewater Project 7 – Secondary Clarifier - $4,840,000
- Wastewater Project 5 – Grit Removal - $1,070,000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