City of Isleton

Wastewater Master Plan

September 2023

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City of Isleton

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Abbreviations and Definitions

ADWF	Average Dry Weather Flow
AE	1% Annual chance flooding: Base flood elevations provided. Mandatory flood insurance purchase requirements and floodplain management standards apply
AMSL	Above Mean Sea Level
APN	Assessor Parcel Number
ADWF	Average Dry Weather Flow
BGS	Below Ground Surface
BOD	Biochemical Oxygen Demand
C	Commercial
CCTV	Closed Circuit Television
CDO	Cease and Desist Order
CIP	Capital Improvement Project
CIPP	Cured in Place Pipe
City	City of Isleton
City Limits	Service Area
CIMIS	California Irrigation Management Information System
CWSRF	Clean Water State Revolving Fund
d/D	Flow Depth to Diameter Ratio
Delta	Sacramento-San Joaquin Delta
DI	Drainage Inlet
Discing	Method to rotate the soil at the bottom of the pond and increase percolation rates
DWSRF	Drinking Water State Revolving Fund

EDU	Equivalent Dwelling Unit
FEMA	Federal Emergency Management Agency
Ft/s	Feet per second
GC	General Commercial
General Plan	2021 General Plan Public Review Draft
GPD	Gallons Per Day
HDPE	High Density Polyethylene
HP	Horsepower
I&I	Inflow and Infiltration
in	Inches
LF	Linear Feet
LHMP	Local Hazard Mitigation Plan
M	Industrial Zoning
Master Plan	Wastewater Master Plan
MG	Million Gallons
mgd	Million Gallon per Day
msl	Mean Sea Level
MPN	Most Probable Number
MRP	Monitoring and Reporting Program
MXU	Mixed Use
NEMA	National Electrical Manufacturer Association
NFIP	National Flood Insurance Program
NMC	Neighborhood Mixed Use Center
OS	Open Space
P/OS	Parks and Open Space

PDI	Planned Development Industrial
PF	Peaking Factor
PUD	Planned Unit Development
PWWF	Peak Wet Weather Flow
RCO	Resource Conservation and Open Space
RD	Residential/Multiple Family Residential
RM	Mobile Home Subdivision
SASD	Sacramento Area Sewer District
SCADA	Supervisory Control and Data Acquisition
SOI	Sphere of Influence
SSMH	Sanitary Sewer Manhole
TDS	Total Dissolved Solids
TKN	Total Kjeldahl Nitrogen
TSS	Total Suspended Solids
UR	Urban Reserve
WDR	Waste Discharge Requirement
WWTF	Wastewater Treatment Facility

1 Background

1.1 Introduction

The City is located in the southwestern corner of Sacramento County in the Delta, adjacent to the Sacramento River. The City collects, treats, and disposes of wastewater originating from the residential, commercial, and industrial dischargers within the service area. The City owns, maintains, and operates all wastewater facilities connected to the collection and treatment system within the service area.

The City is currently operating under CDO Number R5-2012-0006. The City's most recent WDR Order 90-186 was adopted in 1990. The City is required under a revised MRP to monitor effluent, ponds, groundwater, reclamation ditch, and sludge. The City must report monthly, quarterly, and annually per the MRP. The CDO was issued due to capacity problems and wastewater spills at the WWTF. The CDO will not be lifted until the Discharger can demonstrate that the WWTF has enough on-site storage to contain the design flow for a 100-year water year with two feet of freeboard. The capacity of the sanitary sewer collection system will be analyzed within this report and discussed in conjunction with storage capacities.

1.2 Purpose and Scope

The purpose of this Master Plan is to guide future development within the City limits by identifying capacity deficiencies, and developing CIP's to improve deficiencies and plan infrastructure that will serve future development. This master plan has been prepared to accompany the 2040 General Plan Update.

This master plan will evaluate the capacity of the sanitary sewer gravity system, the City's force main and discuss known storage capacity issues at the WWTF. The planning period of this master plan has been selected to match the same period as the 2040 General Plan. This plan is meant to guide the City in their planning and approval of developments. This plan does not dictate how many developments should be allowed to connect to the sewer system within the City. As repairs to the system are constructed, this master plan should be revised.

1.3 References

The following documents were referenced in the preparation of this master plan:

2040 General Plan, July 2020, City of Isleton

Cease and Desist Order No. R5-2012-0006, February 2012, California Regional Water Quality Control Board Central Valley Region

Hydrogeologic Evaluation Report: City of Isleton Wastewater Treatment Facility, July 2022, Wood Environment and Infrastructure Solutions, Inc.

Initial Study/Proposed Mitigated Negative Declaration for the Meadows of Isleton, February 2023, City of Isleton Planning Department

Notice of Intent to Adopt a Mitigated Negative Declaration, May 2022, City of Isleton

Standards and Specifications, November 2021, Sacramento Area Sewer District

Zoning Code of Sacramento County, January 2023, Sacramento County

2 Study Area

2.1 Study Area

The City provides sewer service to residents within City limits and accepts septage from nearby Oxbow Marina, the sewer service area can be seen in Figure 1.

Figure 1 - City of Isleton Wastewater Service Area

The City limits are bound by West Tyler Island Bridge Road, 6th Street and the Sacramento River. The parcel adjacent to Georgiana Slough, where the WWTF are located, is also within City limits. The service s area encompasses the City limits and cannot be expanded until the WWTF capacity issues have been addressed.

For the purpose of this report the service area and the study area will be the same as the City's General Plan does not include the proposal of an SOI outside the City limits, so the study area only considers buildout of the City limits.

2.2 Site Geology, Climate and Existing Topography

The location of the City and its facilities is unique, as it lies within the Delta on the Andrus Island. The site is located north of the Georgiana Slough and is located on Basin Deposits. The Basin deposits consist of unconsolidated beds of clay with very low Permeability (Ca DWR, 1973). A hydrogeological study completed by Wood in 2019, determined that the groundwater levels within the City limits are likely impacted by the tide in the delta, nearby surface water and local agriculture. The City monitors groundwater levels near the WWTF, and depth to static groundwater varies from 2-9 feet bgs.

Previous reports estimated that the City's average annual precipitation is 16.94 inches. Precipitation data from Staten Island weather station was used from CIMIS.

Elevations within City limits range from -2.4 to 15.6 feet AMSL. The majority of the City is below AMSL with the exception of the levee and River Road.

2.3 Delta Plan

The Sacramento-San Joaquin River Delta is a part of California's Delta Plan which aims to provide a more reliable water supply for California, protect and restore and enhance the Delta ecosystem and protect and enhance the unique cultural, recreational, natural resource and agricultural values of the Delta as an evolving place.

The City's future development should be aligned with the state's Delta Plan to protect beneficial uses of the nearby surface and groundwater. The City's WWTF lies between the Georgiana Slough and a drainage ditch, both of which flow to the Sacramento River. Excess effluent flows at the WWTF, coupled with inadequate storage poses a water quality threat to nearby and downstream water sources.

2.4 Land Use

Land use within City limits consists of low to high density residential, industrial, mixed use, and commercial land types. At the time of this report the land use element of the 2040 General Plan was being updated, see in Figure 2 - 2040 General Plan Land Use.

The 20240 General Plan contains a Land Use Build Out Analysis, including both residential and non-residential. In both the Land Use element and this report, it should be noted that the proposed land use designations will only be applied to vacant or underutilized acreage.

2.5 Historical and Future Population

The City's existing population is 737 and saw a 4.6% increase from 2010 to 2018 according to the US Census. Since 2018, the population has seen a slight decline. The 2040 General Plan's Land Use Element estimates that an additional 925-1224 people could move to the City based on the buildout capacity on vacant or underutilized land in Section 1.6.2.2 in the Land Use Element. For additional information please refer to the Land Use Element of the 2040 General Plan.

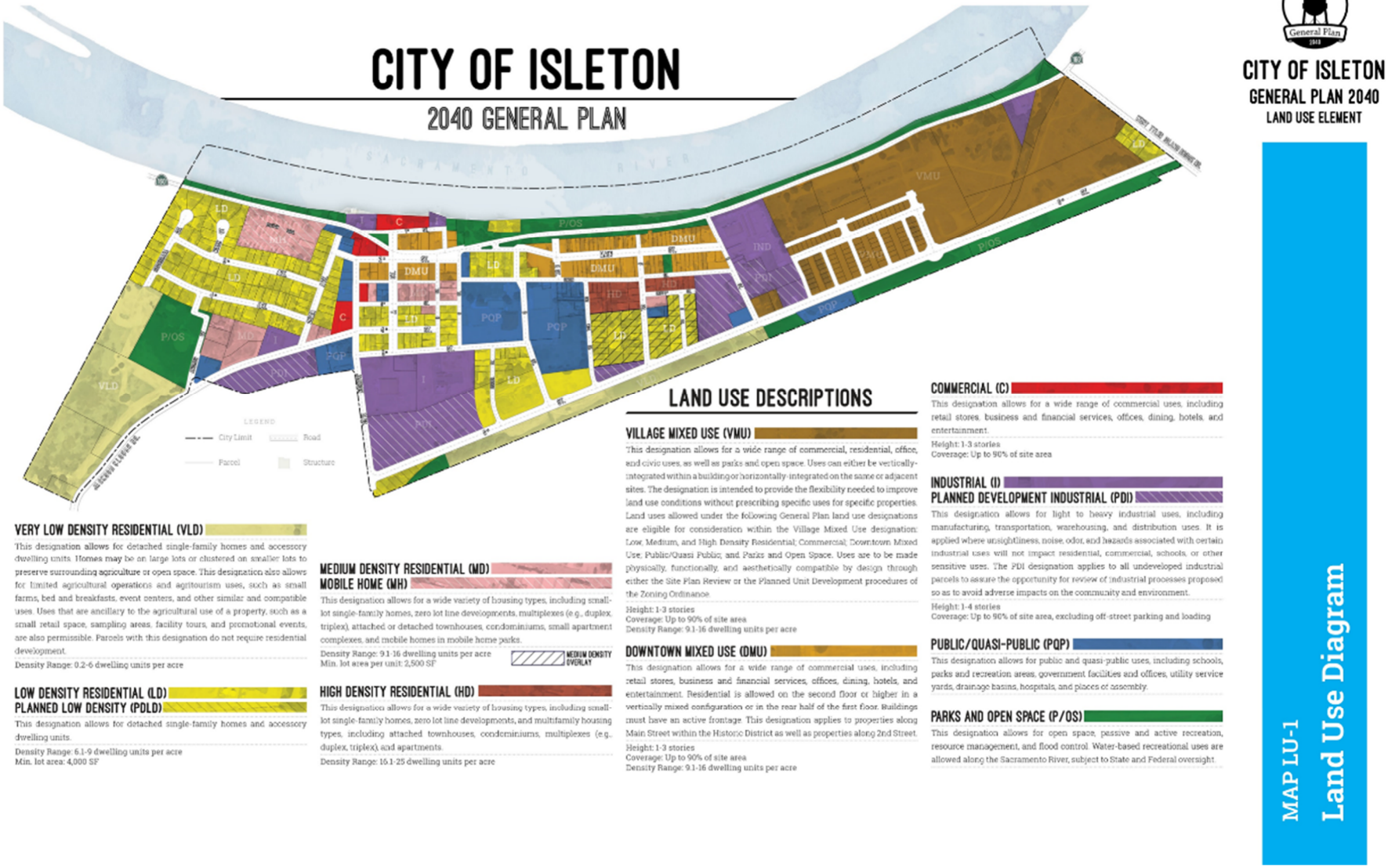

Figure 2 - 2040 General Plan Land Use

3 Wastewater System Evaluation

This section provides a summary of the System Evaluation completed in December 2021 by Bennett Engineering Services, refer to Appendix A for the System Evaluation. The existing facilities can be divided into four components: the collection system, the pump station, the treatment ponds, and disposal ponds.

3.1 Collection System

The collection system consists approximately 21,107 LF of 6-12 inch gravity sewer mains and 81 manholes. The City's collection system generally flows North to South and then East to West. Approximately half of the City's pipes have been replaced or rehabilitated using the CIPP method, the remaining pipes are assumed to be from the early 1900s.

The gravity sewer mains and manholes are the primary source of I&I. Many pipes have leaky joints allowing groundwater to enter the system. Old and failing manholes are also a source of I&I. Catch basins, uncovered cleanouts, and down spout connections are a direct connection for inflow of stormwater into the system.

Maps of the City's collection system can be found in Appendix B.

3.2 Pump Station and Headworks

The City's headworks and pump station convey wastewater to the WWTF. The influent from the collection system runs through a 12-inch trunk line, into the 60-inch grinder manhole near the entry of the pump station, then into the wet well which contains two chopper pumps. Wastewater is then conveyed to the WWTF via the City's force main.

When the 12-inch trunk line was replaced, it was installed at an elevation lower than the invert for the headworks. The bar screen, comminutor, and Parshall flume became nonoperational. The pump station does not have operational bar screens, SCADA controls, auto dialer, back up pumps, or a backup generator. The lack of these components in the pump station contributes heavily to the sludge accumulation in the treatment ponds and requires staffing 24/7 during rainstorms (high flow events).

3.3 Force Main

The City's wastewater system conveys wastewater from the pump station through an 8-inch HDPE force main from the pump station to an existing gate valve, after the valve the force main increases from an 8-inch to a 10-inch HDPE force main. In total there is 4,300 LF of force main.

3.4 Treatment and Disposal Ponds

The City utilizes a pond system with primary aeration pond and a series of two facultative ponds which dispose of treated effluent via six disposal ponds. The disposal ponds utilize percolation and evaporation to dispose of treated effluent.

Currently treatment pond #1 is not operating as it was designed due to the lack of headworks screening and inefficient aeration. Treatment pond #1 does not meet freeboard requirements and has ongoing sludge accumulation and dead zones. Treatment ponds #2 and #3 are operating within freeboard and design parameters.

Historically during the wet season, the WWTF have violated the 2 feet of freeboard requirement. The repeated violations resulted in the issuance of a CDO. During the wet season the disposal ponds have a lower disposal rate due to reduced percolation from high groundwater and reduced evapotranspiration due to cloudy weather. The WWTF ponds (storage and treatment) lack sufficient capacity to contain the treated effluent and a 100-yr storm on site. In the past the City has spilled into the irrigation ditch along the northern side of the WWTF. For additional information related to the ponds and their capacity, please reference the System Evaluation in Appendix A and the Feasibility Study in Appendix C.

3.5 Oxbow Marina

The City's WWTF receives wastewater flows from the City's collection system and from the nearby Oxbow Marina via a 6-inch force main. The City is not responsible for any operations or maintenance of Oxbow's force main or collection system. Based on historical flow logs, Oxbow Marina discharges approximately 12,000 gpd to the WWTF. There is an agreement between Oxbow and the City of Isleton for the acceptance of the wastewater but there is not an agreed upon maximum flow.

4 Historical Wastewater Characteristics

4.1 Historic Flow Monitoring

Due to the City's limited budget and grant funding, flow monitoring was not completed as part of this project. The Isleton Wastewater System Improvement Project included flow monitoring however, the flow monitoring period was unusually dry. Historical Flow data was provided by the City and used to calculate I&I. Influent at the WWTF during dry months is 85,492 gpd and during the wet months is 139,760 gpd, including flows from the Oxbow Marina.

4.2 Inflow and Infiltration Study

An I&I study was not conducted as a part of this report. However, there was a study completed as a part of the Isleton Wastewater Improvement Project in 2021. The study included smoke testing, flow monitoring, and structural inspections of the manholes. Although the study was done during an extreme drought year, the historical data analysis and collection system inspections confirmed the excess I&I in the system and the need for improvements. The study concluded that the most concerning locations for I&I are the vented manhole lids, possible storm drain, catch basin, down spouts, or yard drains that are connected.

An evaluation of I&I was completed as part of the water balance effort. The annual I&I during an average water year was calculated to be 12.7 MG. I&I is known to be an issue within the system year-round due to high groundwater impacted by the surrounding river levels and tidal influences. During winter storms, with highly saturated soil on the island, the I&I can be much more significant.

In 2022, the City experienced one of the wettest years on record, with intense and frequent heavy rainstorms. Data from 2022-2023 was used to calculate the average, minimum and maximum flow per person.

Table 1 - Flows from 2022-2023

	Gallons Per Day Per Capita
Average	163.28
Minimum	59.33
Maximum	719.25

Refer to Appendix A for additional information.

5 Hydraulic Capacity

5.1 Approach and Calculations

Due to limited funding, an excel spreadsheet was used to create a numeric model evaluating the capacity of the main trunk line through the City. The spreadsheet and supporting calculations can be found in Appendix D. The numeric model was created by assigning design flows to each parcel within the City limits, then allocating flows to sewer nodes (or manholes) totaling the flows up to the pump station. These pipes make up the trunk system of the City and were evaluated for capacity as part of this report.

The first step included downloading the parcel information from the Sacramento County Assessor Parcel website. The information included land use, County zoning, lot size, address, and APN number.

The second step was to assign design flows based on the land use and zoning. The 2040 General Plan Land Use Diagram was used in conjunction with the existing land use provided by the County. It is important to note that the proposed land use designations were only be applied to vacant or underutilized acreage. Parcels which have been developed or fully utilized are assumed to maintain their existing land use. Parcels which have not been developed or are underutilized acreage will be assigned a number of EDUs per Table 2, which can also be found in Section 1.5.13 of the Land Use element.

Table 2 - Land Use Designations

Land Use Designations	Allowed Density*	Consistent Zoning Districts	County Zoning
Residential:			
Very Low Density	0.2-6	R-1	RD-3
Low Density and Planned Low Density	6.1-9	R-1	RD-7
Medium Density and Mobile Home	9.1-16	R-1; RM	RD-15
High Density	16.1-25	RM	RD-25
Mixed Use:			
Village Mixed Use	9.1-16	MXU; PUD	RD-7; NMC
Downtown Mixed Use	9.1-16	MXU; PUD	RD-25; NMC
Non-Residential:			
Commercial	n/a	C; PUD	GC
Industrial and Planned Development Industrial	n/a	PDI	M-1;M-2
Other:			
Public/Quasi-Public	n/a	Any District	Depends
Parks and Open Space	n/a	RCO; UR	P/OS

*Allowed Density = Dwelling Units per Acre

Once each parcel was assigned a number of EDU's, average dry weather and peak wet weather flows were calculated. SASD's standards and specifications from 2019 for flow estimation were utilized. Table 3 provides a summary of the average dry weather flow rates and how they were applied.

Table 3 - ADWF Summary

Land Use	EDU	Flow Rate (gal/day)
Per Residential Single-Family Unit	1	310
Per Residential Multi-Family Unit	0.75	233
Per student at Elementary School (Up to 1000 capita)	-	25,000
Per Acre of Commercial Development		1,900
Per Acre of School Site		1,900
Per Acre of Industrial Development		1,900
Per Acre of Other Usages		1,900

ADWF and PWWF were calculated using equations from SASD's standards and specifications from 2019. The formulas are listed along with their assumptions.

- ADWF (mgd) = (310 gpd/EDU)* ((# EDUs/acre) * # acres)/1000
- I&I (mgd)[1] = 0.20*(ADWF)
- PF[2]= 3.5-1.8*ADWF$^{0.05}$
- PWWF (mgd) = (ADWF*PF) + I&I

[1]I&I was calculated to be 20% of total flows in previous reports by Bennett Engineering.

[2]Minimum value for PF is 1.2

The third step was to allocate each parcel to a sewer shed based on topography and existing invert information. Each parcel and their flows were assigned to flow to a sewer node, located at an existing sanitary sewer manhole. At this node the flows are totaled and that is assumed to be the flow into the downstream pipe. See Figure 3 for the Sanitary Sewer Shed Map.

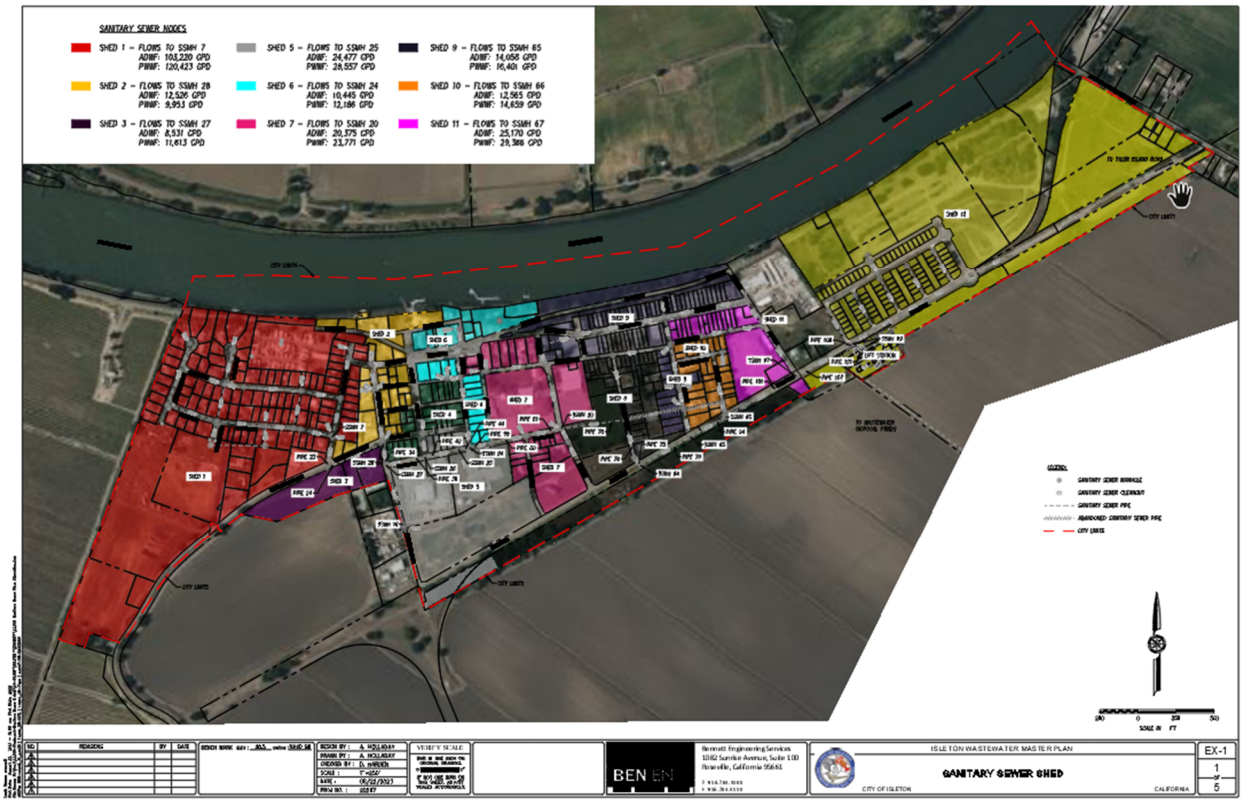

Figure 3 - Sanitary Sewer Shed Map

Flows were summed at each node, including ADWF, ADWF plus I&I and PWWF. ADWF plus I&I is different than PWWF, I&I was added to ADWF since the City sees high rates of I&I all year round. Refer to Table 4 for a summary of flows at each node and the total in the system.

Table 4 - Sewer Shed/Node Flow Allocation

Shed	Node	SSMH	ADWF (gpd)	ADWF plus I&I (gpd)	PWWF (gpd)
1	1	7	86,017	103,220	120,423
2	2	28	10,553	12,663	14,774
3	3	27	6,330	7,596	8,862
4	4	26	8,295	9,954	11,613
5	5	25	20,398	24,477	28,557
6	6	24	8,704	10,445	12,186
7	7	20	16,979	20,375	23,771
8	8	64	22,355	26,827	31,298
9	9	65	11,715	14,058	16,401
10	10	66	10,471	12,565	14,659
11	11	67	13,666	16,399	19,133
12	12	69	103,914	124,697	145,480
TOTAL:			319,398	383,277	447,157

Once the flows were established into each node, the flow out of the node is equal to the flow into the downstream pipe. Using the pipe material, length, slope, and calculated flow the percent full was calculated for both ADWF and PWWF. The goal seek function in excel was used to iterate the percent full that the pipe flows based on the specified flow rates.

Figure 4 and 5 are schematic flow diagrams which were created to illustrate the calculation and results for ADWF plus I&I and PWWF, respectively. A tabular summary of the results for both ADWF plus I&I and PWWF is in Table 5.

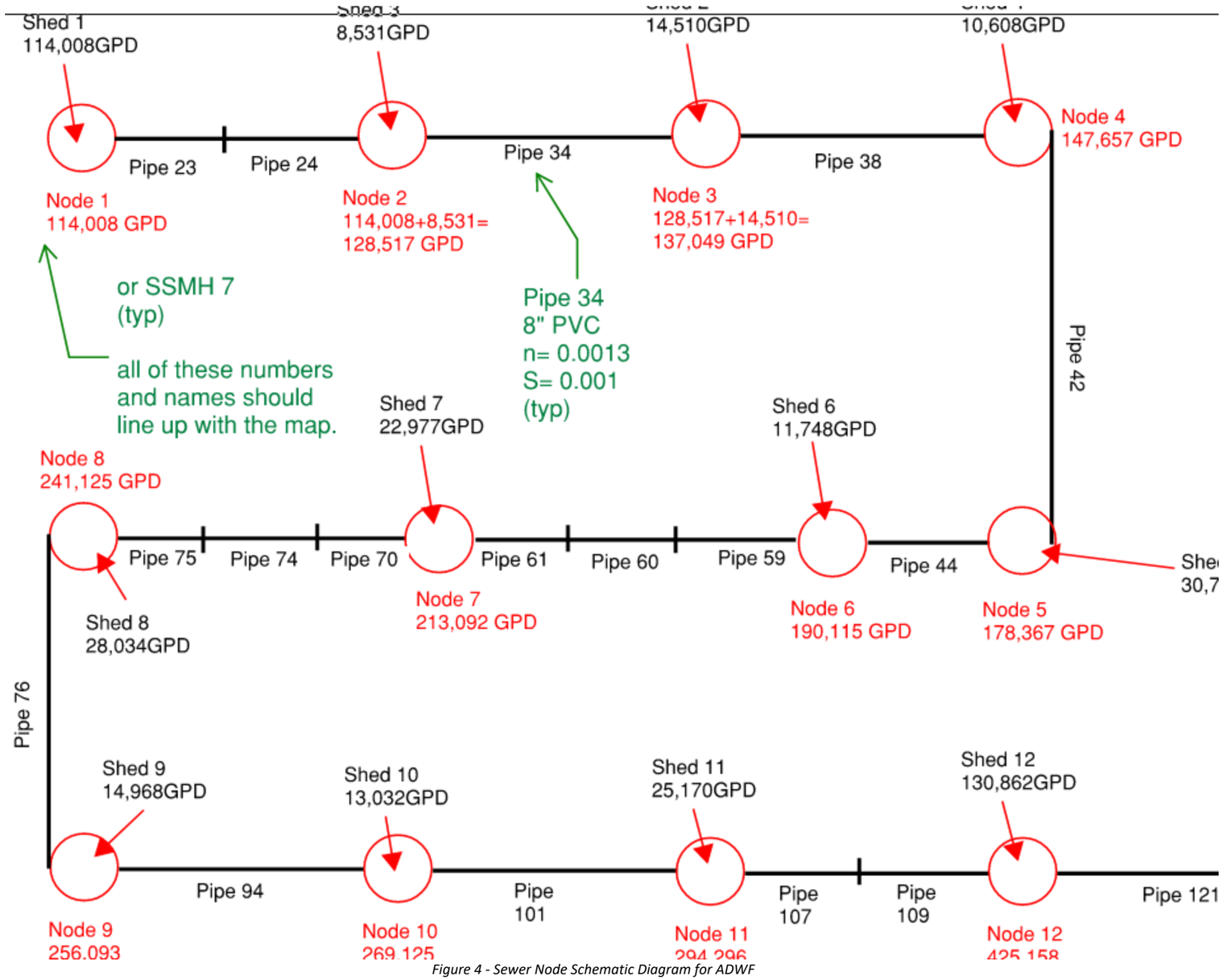

Figure 4 - Sewer Node Schematic Diagram for ADWF

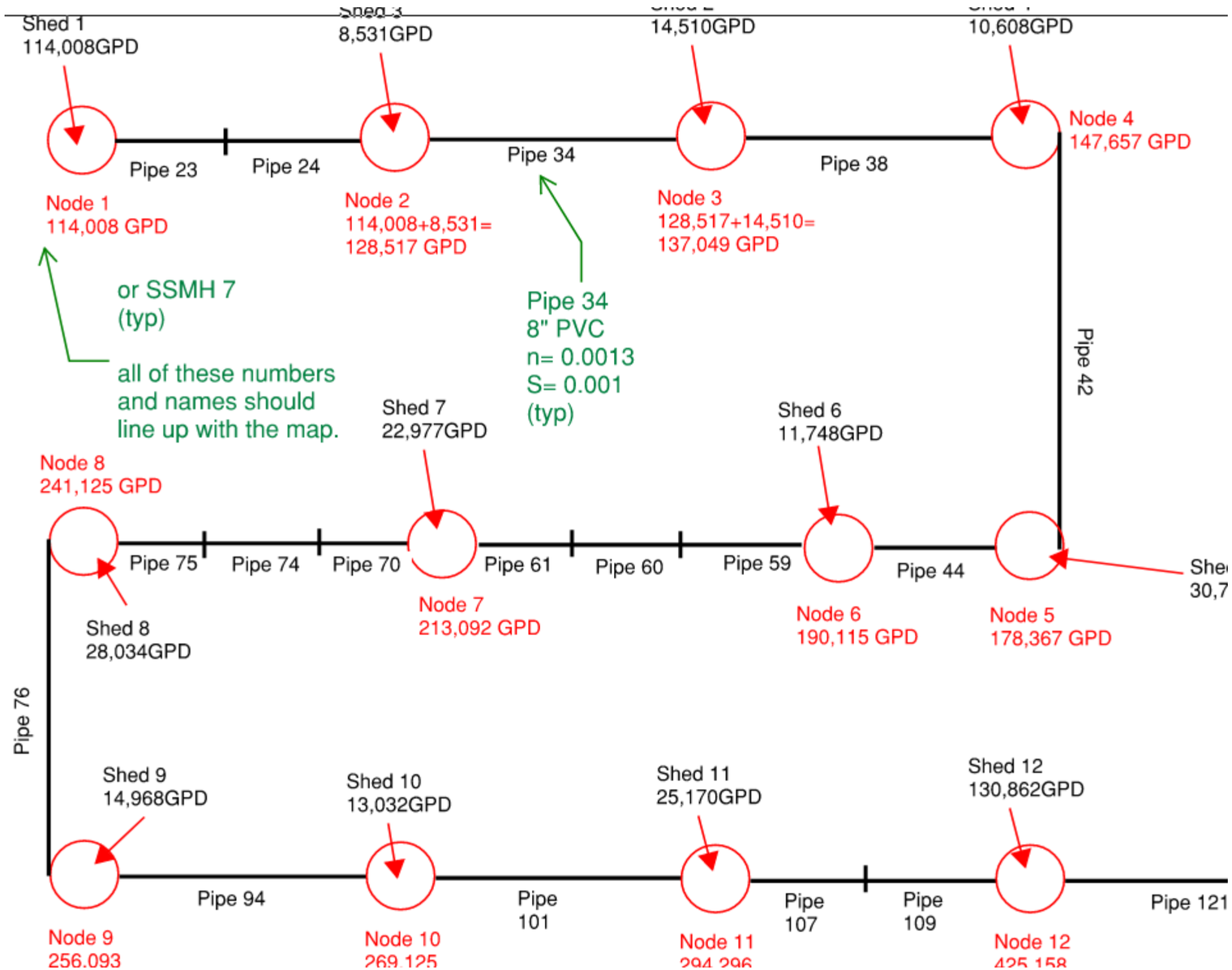

Figure 5 - Sewer Node Schematic Diagram for PWWF

Table 5 - Hydraulic Pipe Capacity Summary

Shed	Pipe Segment #	Upstream SSMH	Downstream SSMH	Pipe Material	Length (ft)	Mannings (n)	Slope (ft/ft)	Pipe Diameter (in)	ADWF + I&I			PWWF		
									Flow In (gpd)	Hydraulic Depth (in)	Ratio of Percent Full	Flow In (gpd)	Hydraulic Depth (in)	Ratio of Percent Full
1	23	7	8	PVC	205	0.01	0.010	10	103,220	1.82	18.18%	120,423	1.96	19.61%
-	24	8	28	Clay	400	0.014	0.014	10	103,220	2.28	22.82%	120,423	2.47	24.66%
3	34	28	27	PVC	144	0.01	0.010	8	115,883	4.22	52.69%	135,197	4.64	57.97%
2	38	27	26	CIPP	261	0.011	0.011	10	123,480	2.49	24.76%	144,059	2.68	26.77%
4	42	26	25	CIPP	228	0.011	0.011	10	133,434	3.65	36.47%	155,672	3.95	39.46%
5	44	25	24	CIPP	73	0.011	0.011	10	157,911	2.55	25.49%	184,229	2.75	27.48%
6	59	24	23	CIPP	134	0.011	0.011	10	168,356	3.55	35.53%	196,415	3.85	38.48%
-	60	23	22	CIPP	221	0.011	0.011	10	168,356	2.86	28.56%	196,415	3.05	30.54%
-	61	22	20	CIPP	247	0.011	0.011	10	168,356	2.41	24.12%	196,415	2.60	26.01%
7	70	20	53	Clay	424	0.014	0.014	12	188,731	4.25	35.41%	220,186	4.61	38.40%
-	74	53	63	PVC	254	0.01	0.010	12	188,731	3.02	25.20%	220,186	3.22	26.86%
-	75	63	64	PVC	69	0.01	0.010	12	188,731	3.02	25.20%	220,186	3.22	26.86%
8	76	64	65	PVC	374	0.01	0.010	12	215,557	3.27	27.27%	251,483	3.52	29.32%
9	94	65	66	PVC	269	0.01	0.010	12	229,615	3.38	28.16%	267,884	3.64	30.30%
10	101	66	67	PVC	533	0.01	0.010	12	242,180	3.47	28.93%	282,544	3.74	31.14%
11	107	67	68	PVC	398	0.01	0.010	12	258,580	2.90	24.14%	301,677	3.13	26.09%
-	109	68	69	PVC	70	0.01	0.010	12	258,580	3.57	29.75%	301,677	3.87	32.22%
12	121	69	Pump Station	PVC	62	0.01	0.010	12	383,277	4.39	36.57%	447,157	4.77	39.75%

5.2 Collection System Capacity Evaluation

The collection system's capacity is based on the percent full that the pipe flows under each flow condition. Based on SASD's standards and specifications from 2019 a gravity collection pipe smaller than 12 inches shall not have a percent full ratio greater than 70% and pipes larger than 12 inch can run between 70-100% full. According to Table 5, all the pipe segments evaluated fall within the design parameters with the maximum being 57.10%.

The gravity pipes evaluated have sufficient capacity to convey both ADWF and PWWF based. However, it is recommended that pipe segment 34, between manholes 27 and 28, be upsized. The percentage full in pipe segment 34 is considerably higher than other pipes within the system. This pipe also could surcharge as there is a larger diameter pipe upstream and downstream of the pipe.

5.3 Facilities Capacity Evaluation

5.3.1 Force Main

A calculation was run on the 10-inch HDPE force main using the flow rates of a single pump and both pumps in operation. The velocities were approximately 3 ft/s and 5 ft/s, respectively. Per SASD's standards and specifications from 2019, force mains shall be sized for no less than 3 feet per second and no more than 8 feet per second. Based on these calculations the force main is appropriately sized. It should be noted that the force main was replaced and upsized in 2010 from an 8 inch to a 10-inch pipe. It is assumed that the force main was upsized to provide additional capacity for future growth.

5.3.2 Pump Station and Headworks

The pump station's wet well capacity is 7,759 gallons with 1100 gpm being pumped to the force main by two chopper pumps in a dry well. During high flow events the City has had to rent pumps in order to keep up with flows and reduce the likelihood of sanitary sewer overflows. The pump station and pumps should be evaluated for upsizing or modified to allow for emergency pumps to be added to handle the excess I&I, until the improvements to the collection system are made.

5.3.3 Treatment and Disposal Ponds

As part of the Wastewater System Evaluation (September 2021) a water balance was completed. The report concluded that the treatment and disposal ponds do not have sufficient capacity to contain the permitted flow of 0.43 gpd and a 100-year rain event without spilling or violating the 2-foot freeboard requirements.

The report discusses the loss of pond capacity as the pond berms settle over time, and increased flow due to I&I. An in-depth water balance of the 2016-2017 water year was created which fell between a 50-year and 75-year rain event. The water balance determined that groundwater was likely flowing into the percolation pond during high river stages, rather than treated effluent percolating out.

The City has consistently struggled with maintaining sufficient capacity at the WWTF during the wet season, and spills during extremely wet years. The disposal ponds are the limiting factor for the maximum permitted flow of the City. Table 6 compares the existing flows and the 2016-2017 water to the build out capacity flows calculated in this report.

Table 6 - Flow Comparison

WWTF Flows	City Flow (MGD)	Oxbow Flow (MGD	Total Flow (MGD)	Annual MG
2016-2017	-	-	0.16	57.39
Average (2014-2020)	-	-	0.107	39.32
ADWF plus I&I	0.383	0.012	0.395	144.28
PWWF	0.447	0.012	0.459	167.59

The Feasibility Study finalized in 2023 recommended that regionalization be considered, and that an I&I reduction project is constructed. It is anticipated that the improvements to the collection system will drastically reduce the I&I entering the system. With the mitigation of I&I the treatment facilities should have time to dry out and operate properly, allowing for a renewed permit and lifting the CDO. Once the excessive I&I is be mitigated, and the City can demonstrate that there is sufficient capacity during the wet season to provide a water balance fulfilling the CDO, the WWTF should be re-evaluated is developments with significant flows are to be added to the system.

Infill fill developments and minor modifications infill land uses are assumed to already be adding flow to the system through existing connections, or I&I from land area. Developed lots that had lateral stubs connected to the sewer system, but failed to construct buildings, may be contributing to the excess I&I and should be considered for build out to help cap areas of potential inflow.

6 Planning Criteria

The City does not have design standards or specifications. The Sacramento County Improvement Standards and SASD Standards and Specifications shall be used for improvement projects within the City.

7 Capital Improvement Projects

This chapter presents the recommended CIP for the City sewer system, and a summary of the capital costs. This chapter is organized to assist the City in making finance decisions, and to plan the sewer system improvements for future development.

7.1 Project 1-Facilities and Collection System Improvements

This project includes sewer collection system improvements, removing illicit storm drain connections, headworks improvements, and WWTF improvements.

The sanitary sewer improvements will focus on the older areas of town where CCTV footage shows damage to the pipes and manholes or evidence of I&I. Approximately 5,425 linear feet of sanitary sewer pipe and 25 manholes will be replaced. Approximately 1,200 linear feet of pipe will be abandoned using current industry standards to reduce any I&I from entering the system through the pipes that are no longer in service.

The storm drain reconnections will include installing new storm drainpipes to reroute the flows to the storm drain system instead of being directly connected to the sanitary sewer system. By removing these connections from the sanitary sewer system, I&I will be greatly reduced. Approximately 1,200 linear feet of new storm drainpipe, 9 manholes, and 4 drain inlets will be installed. Once an additional survey has been conducted additional DI’s may be required.

Headworks improvements will help reduce solids reaching the treatment facility. The improvements will screen large solids prior to entering the headworks grinder and lift station. The improvements will help maintain treatment and disposal capacity in the ponds.

The aeration and equipment upgrades must be designed and sized, but it is anticipated that 8 aerators and 1 blower will be installed, as well as a new NEMA control panel at the WWTF. Additionally, the flow monitoring equipment would be replaced with minor alteration to piping, as well as upgrades to sensors, controls, telemetry, and backup generator to provide operational efficiencies and reliability.

For a more information about the project refer to Appendix C. It is anticipated that a construction grant will fund the construction of the project and the construction funding application was submitted in February 2023.

7.2 Project 2-Headworks Upgrades

This project will upgrade the facilities located around and within the headworks/ pump station corporation yard. Improvements to the corporation yard include security fencing, and video surveillance to reduce theft and vandalism. The wet well would be evaluated for storage capacity, pump capacity and time to overflow. This project would also reinstate the existing comminutor, Parshall flume and bar screen in operation or look to install new appurtenances. The project would also include procurement of emergency backup resources such as a generator, and portable trailer mounted pump.

7.3 Project 3-Pond Improvements

This project includes the maintenance/rebuilding of the treatment and disposal pond berms and other treatment improvements. This project would include grading to rebuild the berms back up to their design elevations, installation of rip rap and other erosion control along the berms, and installation of additional aerators and or evaporators.

The pond berm stability and berm height will be increased per geotechnical recommendations. It is recommended that the berm heights be increased 1 foot every 5 years to provide capacity and adequate freeboard for future permit requirements. When the berms are raised the staff gauges should also be recalibrated for accurate freeboard readings. The first phase of the project will cost more than the following years due to the installation of the aerators and or evaporators. Pest mitigation will be implemented during grading activities to reduce the potential of berm failure due to burrowing animals.

Table 7 illustrates how this project will be broken up throughout the time period.

Table 7 - Project 3 Summary Table

Pond Improvement 1	$8,348,000	2027-2032
Pond Improvement 2	$9,295,000	2032-2037
Pond Improvement 3	$10,517,000	2037-2042
Pond Improvement 4	$11,899,000	2042-2047

7.4 Project 4-Long Term Planning

The City will need to investigate two alternatives for long-term planning, regionalization and land application, in order to serve the City's future needs.

Regionalization would benefit the City and the neighboring parcels outside City limits, and potentially the surrounding delta ecosystem. This project would likely include a force main from the City to Rio Vista to transport the effluent. This project would include a force main, one pump station and a crossing under the Sacramento River.

Land application would benefit the City by adding more capacity to the WWTF to hold treated effluent during the wet season. To proceed with this effort, the City would need to acquire more land around the WWTF.

A feasibility study will need to be completed to determine which alternative is feasible, and how the project can be funded.

7.5 Capital Improvements Project Implementation

The CIPs are prioritized based on their urgency to mitigate existing deficiencies and for servicing anticipated growth. It is recommended that improvements to mitigate existing deficiencies be constructed as soon as possible. Table 8 summarizes the projects, their cost, and the implementation period.

Table 8 - CIP Prioritization

Project	Improvement	Estimated Cost	Implementation Period
1-Facilities and Collection System Improvements	Reduce I&I, regain capacities	$9,041,000	2023-2026
2-Headworks Upgrades	Improve treatment, redundancy, and functionality	$1,53,000	2027-2031
3- Pond Improvements	Pond Berm Stability	$40,059,000	2027-2047
4-Long Term Planning	Improve Delta water quality	$1,500,000	2040-2050

The City is a disadvantaged community which relies on grants and loans to complete CIP projects. Below are funding options to be investigated but are not limited to:

- Clean Water Sate Revolving Fund (CWSRF)
- Drinking Water State revolving Fund (DWSRF)
- Nonpoint Source Grants Program
- US Department of Agriculture, Rural Development, Water and Environmental Programs

Appendices

Appendix A - City of Isleton System Improvement Project: System Evaluation
Appendix B - City of Isleton Wastewater Collection System
Appendix C - City of Isleton System Improvement Project: Feasibility Study
Appendix D - Hydraulic Capacity Model

Appendix A - City of Isleton System Improvement Project: System Evaluation

Appendix B - City of Isleton Wastewater Collection System

Appendix C - City of Isleton System Improvement Project: Feasibility Study

Appendix D - Hydraulic Capacity Model