DESIGN DEVELOPMENT REPORT
FINAL

WITHLACOOCHEE WPCP IMPROVEMENTS

VALDOSTA GEORGIA
UTILITIES DEPARTMENT

PARSONS

LOVELL ENGINEERING ASSOCIATES, PC
CIVIL • ENVIRONMENTAL • LAND PLANNING

AUGUST 2011

DESIGN DEVELOPMENT REPORT

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EXECUTIVE SUMMARY

ES.1 PROJECT SUMMARY

This Design Development Report (DDR) describes treatment plant improvements for the Withlacoochee Water Pollution Control Plant (WPCP) service area. Improvements will be issued as multiple construction packages to meet the needs of the City of Valdosta system while providing opportunities for local contractors to bid on the construction.

This project provides for a new headworks and flow equalization storage for the Withlacoochee WPCP. This project is being done in conjunction with sewer system improvements to eliminate the use of the 54-inch Withlacoochee Outfall which delivers flow to the existing Withlacoochee WPCP and replace it with two pump stations and a manifolded force main directly to the new headworks as described in a separate Preliminary Engineering Report (PER).

ES.2 RECOMMENDED FACILITIES

The Withlacoochee WPCP will be upgraded by construction of a new headworks and flow equalization on property owned by the City of Valdosta near the existing Withlacoochee WPCP. The improvements involve the following elements:

- A new headworks facility including coarse screening and grit removal.
- A new 6 million gallon equalization storage tank.
- Gravity piping to the existing Withlacoochee WPCP.

ES.3 COST AND SCHEDULE

The City of Valdosta anticipates funding the capital cost of this project either through FEMA or other funding resources. Operating costs and any debt service will be paid by revenue from the water and sewer service. The total capital cost of these improvements is estimated at $5.2 million. The components of this capital cost are shown in Table ES-1. Operation and maintenance (O&M) costs for the improvements will increase the City of Valdosta's annual operating budget requirements. O&M costs for these facilities, including planned capital renewal and replacement costs, are projected to be $79,000 per year. The components of this annual O&M cost are shown in Table ES-2.

Table ES-1. Capital Cost Estimate	
Item	**Cost, million dollars**
Withlacoochee WPCP Improvements	
Design	0.2
Construction	5.0
Total Projected Capital Cost	5.2

Table ES-2. Operations & Maintenance Cost Estimate	
Item	**Average Operation and Maintenance Cost, dollars**
Withlacoochee WPCP Improvements	
Labor	16,000
Electric Power	34,000
Maintenance	4,000
Renewal/Capital Replacements	15,000
Other	10,000
Estimated Annual Average O&M	79,000

The milestones for implementation of these improvements are shown in Table ES-3. Under this schedule, the improvements will be completed in 2013.

Table ES-3. Schedule	
Item	**Anticipated Date**
Detailed Design Complete	April 2012
Bid Opening	June 2012
Construction Contract Issued	July 2012
Construction Completion	October 2013
Testing, Startup and Training Completion	November 2013

SECTION 1
INTRODUCTION

This Design Development Report (DDR) describes treatment plant improvements for the Withlacoochee Water Pollution Control Plant (WPCP). This project is being done in conjunction with improvements to the Withlacoochee service are sewer system presented in a separate Preliminary Engineering Report (PER). Section 1 presents an overview of the project purpose, objectives, and related projects. Improvements will be issued as multiple packages to meet the needs of the City of Valdosta system while providing opportunities for medium sized local contractors to bid on the construction.

1.1 PROJECT PURPOSE AND OBJECTIVES

The outfall sewer to the Withlacoochee WPCP is located in the broad floodplain of the Withlacoochee River. Due to its location, the outfall is periodically underwater, allowing river water to directly inflow into manholes and other structures. The Withlacoochee service area wastewater flow to the interceptor combines with infiltration and inflow (I/I) into the collection system to overwhelm the collection and treatment systems. The outfall pipe is difficult to access making maintenance and operation of the collection system difficult. The City of Valdosta recognizes the need to address these sewer system issues, to protect receiving water quality, eliminate sanitary sewer overflows (SSOs) and provide for growth and economic development. This project is being done in conjunction with Withlacoochee service area sewer system improvements presented in a separate Preliminary Engineering Report (PER). Extreme rain events in April 2009 resulted in severe flooding of the Withlacoochee River and severely impacted the operation of the Withlacoochee WPCP. Approximately forty percent of the plant was flooded. Emergency construction of a 20-foot-high berm around the influent pump station controlled flooding, thus avoiding major influent lift station damage that would have resulted in an extended raw wastewater spill and extensive environmental impact.

The City of Valdosta has evaluated sewer flows and collection system condition. The system experiences higher than normal peaks during wet weather events. Flow monitoring and the sanitary sewer rehabilitation priorities are documented in 2010 engineering reports titled Sewer System Modeling and Capacity Evaluation Report, and Sanitary Sewer Condition Assessment and Rehabilitation Program Plan.

This project provides for the elimination of the influent lift station and headworks, replacing it with screening, degritting and equalization storage on property owned by the City of Valdosta at a higher elevation to protect it from flooding. An Environmental Information Document on the proposed property is included as Appendix A. Wastewater flows in the Withlacoochee collection system will be intercepted upstream of the 54-inch sewer and pumped to the new headworks and flow equalization facilities. The facilities are sized based on longer-term flows including peak

flow reductions, and are capable of handling current wet weather peak flow conditions. The 6 - million gallon equalization storage tank volume was based on analysis contained in the 2010 engineering reports referenced above. Wastewater flows will be equalized to provide for a more consistent flow rate with reduced peaks to the existing Withlacoochee WPCP and to maintain compliance with the plant's NPDES permit and protect receiving water quality.

This DDR describes the Withlacoochee WPCP improvements including the following:

- A new headworks facility including coarse screening and grit removal.
- A new 6 million gallon equalization storage tank.
- Gravity piping to the existing Withlacoochee WPCP.

This DDR provides a general description of the proposed scope of work and the criteria used in the selection of major equipment. This report forms the basis for the detailed design effort.

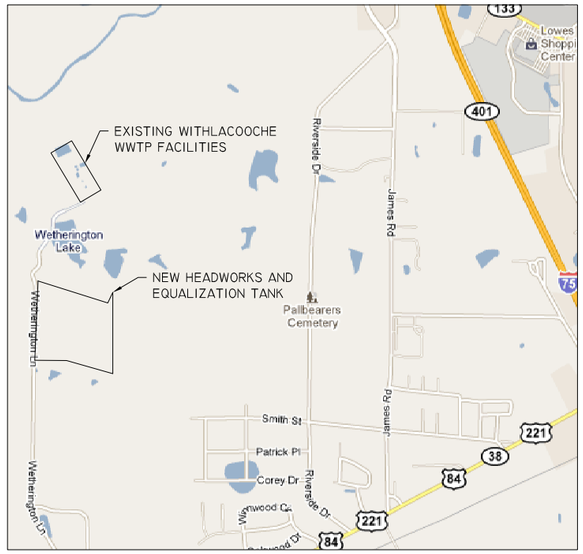
Topographic surveys were available for the new site of the headworks and equalization storage and included both aerial and limited ground run surveys. Figure 1-1 presents a site plan showing proposed facilities and how the site could accommodate a new Withlacoochee WPCP. Geotechnical engineering services including subsurface field investigations and laboratory analyses will provide information in support of the detailed foundation design.

1.2 RELATED PROJECTS

The City of Valdosta has recently completed a system capacity and condition assessment of it sewer system. Based on this assessment, areas of the system were prioritized for the City's infiltration and inflow control efforts. Due to aging infrastructure, rehabilitation is expected to include lining existing older pipelines, replacing pipelines and structures, construction of relief sewers, and both trenched and trenchless pipe rehabilitation. The City of Valdosta has initiated a sewer system rehabilitation and replacement program. They have CCTV recorded 2 interceptors in the areas of the system identified as high priority. The City of Valdosta is rehabilitating 20 manholes and developing an ongoing listing of other manholes requiring rehabilitation. They anticipate work beginning on at least 20 additional manuals within the next year. Lift stations in the system are being replaced. Planning is also underway for elimination of three dated aerial sewer lines near the new Remer Pump Station. Contracts have been issued for the replacement of four lift stations, including 2 damaged in the 2009 flood event. The remaining ten lift stations will be replaced as funding is identified.

The City of Valdosta is developing a Sewer System Improvement Project which will eliminate the use of the 54-inch outfall sewer, and pump flows from the sewer system directly to the new headworks and equalization storage. These Sewer System Improvements are being planned in conjunction with these Withlacoochee WPCP Improvements and are presented in a separate Preliminary Engineering Report. The estimated capital cost and the annual average operations

and maintenance cost for the Withlacoochee WPCP improvements are 27.1 million dollars and 470,000 dollars, respectively.



KEY PLAN
NTS

WITHERINGTON LANE

APPROXIMATE
WETLAND LINE

PROPERTY LINE

150' BUFFER

EQUALIZATION
TANK
DIA
200'

HEADWORKS

42" MAIN SEWER PIPE

SITE PLAN
1" = 100'

SCALE: 1" = 100'

J:\Withlacoochee WWTP\Construction Drawings\Phase 1\00_General\G07 SITE PLAN.dwg

By	Description	Date	Rev
	DESIGN DEVELOPMENT REPORT		A

Job No. 260501
Designed PG
Drawn XX
Checked XX
Reviewed XX
Approved XX
Reg. No.
Date 6/7/11

Issue Certification

PARSONS
WATER & INFRASTRUCTURE INC.
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WITHLACOOCHEE WATER POLLUTION CONTROL PLANT
AND SEWER SYSTEM IMPROVEMENTS

FIGURE 1-1
SITE PLAN

DRAWING NO. G07

REV. 0

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SECTION 2
BACKGROUND

The City of Valdosta provides wastewater collection and treatment services throughout the City limits. The Withlacoochee WPCP discharges into the Withlacoochee River, and the Mud Creek WPCP discharges into Mud Creek, which is a tributary of the Alapaha River. Both rivers are in the Suwannee River Basin. This section provides an overview of the Withlacoochee service area, the sewer system and the WPCP.

2.1 SERVICE AREA DESCRIPTION

The City of Valdosta is located in the coastal plain of Georgia along the Interstate 75 corridor. Its location approximately fifteen miles north of the Georgia's boundary with Florida allows it to serve as a commercial center of South Georgia. The coastal plain is generally characterized as flat, but the Withlacoochee service area has elevations ranging from 120 feet to 240 feet MSL. Soils in the coastal plain tend to be sandy. The climate can be described as humid subtropical with mild, wet winters and hot, humid summers.

Figure 2-1 shows the collection systems boundaries and locations of the City of Valdosta WPCPs.

2.2 WITHLACOOCHEE SERVICE AREA SEWER SYSTEM

The Withlacoochee WPCP, located at 3352 Wetherington Lane in Valdosta, Georgia receives and treats wastewater from a network of sewer systems in the north and west sections of the City of Valdosta as seen on Figure 2-1. The service area is generally bounded by Highway 84 on the south, Forrest Street and Bemiss Road on the east, and the northern corporate limits of the City of Valdosta. This service area consists of approximately 20 miles of 15 to 54-inch sewers with major interceptors along One Mile Branch, and Three Mile Branch. The 54-inch outfall sewer which delivers all influent flow to the Withlacoochee WPCP lies in the floodplain of the Withlacoochee River and is subject to flooding and direct inflow.

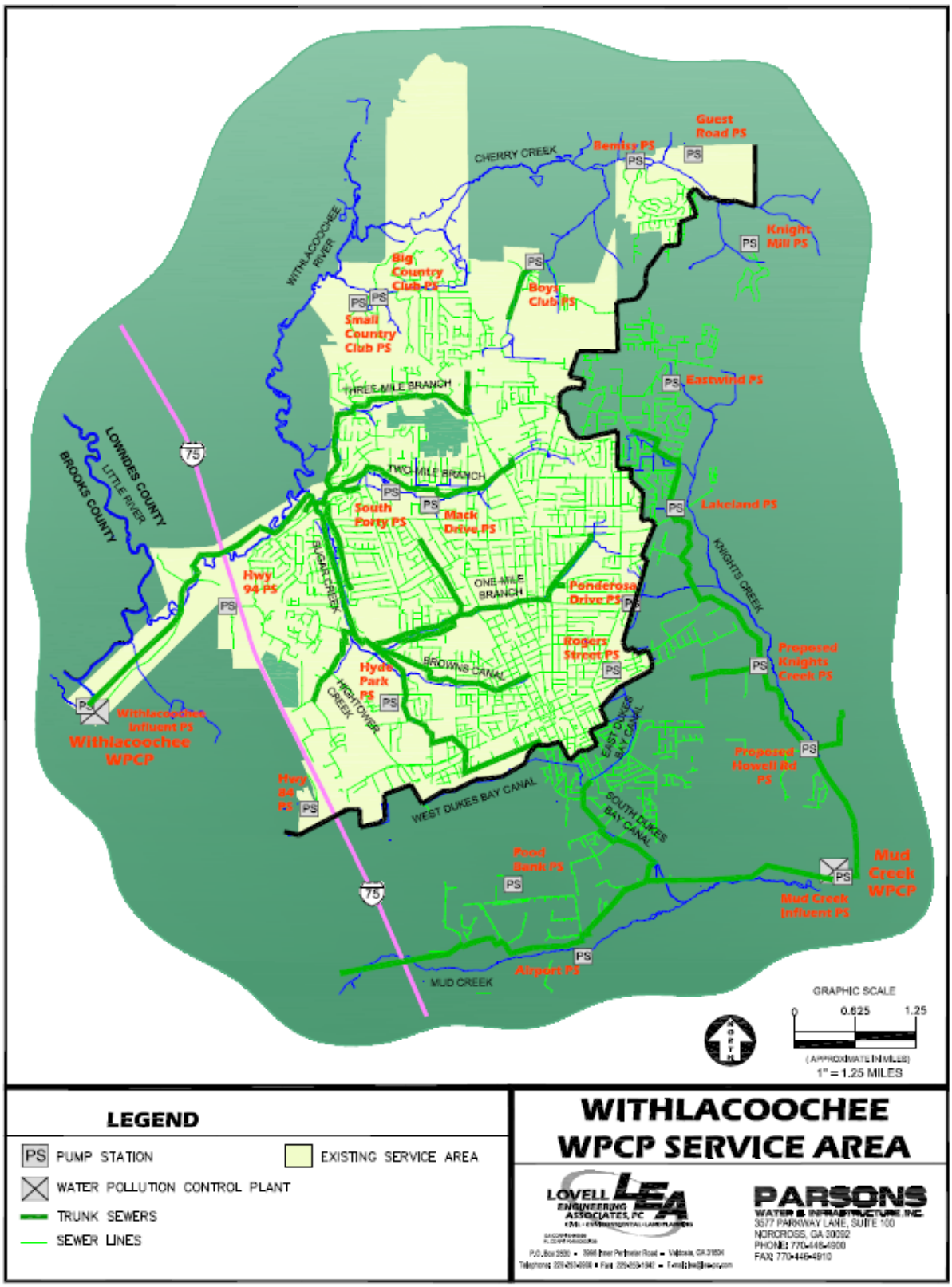


Figure 2-1. City of Valdosta Wastewater Service Areas

2.3 WITHLACOOCHEE WPCP

The Withlacoochee WPCP (NPDES permit No. GA 0033235) is currently permitted to discharge to the Withlacoochee River with seasonal effluent limitations. Seasonal flow limitations for the existing Withlacoochee WPCP are listed in Table 2-1. Biochemical oxygen demand, ammonia and total residual chlorine concentrations also vary seasonally.

Table 2-1. Withlacoochee WPCP NPDES Permit Effluent Flow Limitations

Months	Seasonal monthly discharge flow limitations, mgd
January – April	12
May	10
June – December	8

The Withlacoochee WPCP plant property is at a low elevation adjacent to the Withlacoochee River. The plant receives high peak flow following rain storms as a result of infiltration and inflow into the system, including significant inflow into to the 54-inch outfall sewer. Due to heavy rains in April 2009, the plant was underwater and during that time plant flows were estimated at 25 million gallons per day (mgd).

SECTION 3
WASTEWATER FLOW CHARACTERISTICS AND IMPROVEMENT OBJECTIVES

This section discusses wastewater projections for the Withlacoochee WPCP service area. The section further identifies wastewater design flows for each facility.

3.1 POPULATION AND FLOWS

Population and wastewater flow projections for the Withlacoochee service area in the years 2018, 2038 and build-out (2050) are developed and documented in the City of Valdosta Sewer System Modeling and Capacity Evaluation Report, January 2010 (Sewer System Modeling Report). The sizing of the equalization storage was determined in this engineering report. These projections serve as the basis for developing design flows. An analysis to develop design flows for this project is documented in a report titled Technical Memorandum (TM) No 1 Wastewater Flows dated January 28, 2011. A copy of this Technical Memorandum is included as Appendix B.

Average dry weather wastewater flows for the Withlacoochee service area are projected to increase from 5.16 mgd in year 2008 to 12.94 mgd at build out. These Camp Dresser & McKee (CDM) developed projections represent a 150 percent increase in average dry weather flow over a 42 year period. Build out was set at year 2050. Five-minute peak flow factors ranging from 1.7 to 12.4 times average dry weather flow are reported in the Sewer System Modeling Report. Average dry weather diurnal flow variation for each monitor location is included in the City's SewerCad model of the collection system.

Improvements to the sewer system presented in a separate Preliminary Engineering Report will pump flow directly to the Withlacoochee WPCP through a manifolded force main. Generally, flows converge at two locations in the collection system and will be pumped from those locations: Gornto Road and Remer Lane with the average dry weather flow projections shown in Table 3.1.

Table 3-1. Withlacoochee Basin Average Dry Weather Flow

Service Area	Average Dry Weather Flow, mgd			
	2008	**2018**	**2038**	**2050**
Remer Lane	3.31	4.76	6.41	7.33
Gornto Road	1.85	2.78	4.55	5.26
Direct to WPCP	0.00	0.10	0.30	0.35
Total, Withlacoochee WPCP	**5.16**	**7.64**	**11.26**	**12.94**

The City is undertaking a prioritized program to reduce the infiltration and inflow into its collection system. This program is expected to reduce the peak flows to the Withlacoochee WPCP. Therefore, it is appropriate to select a future peaking factor that reflects this reduction. Based on a review of peaking factors for similar sized facilities, a peaking factor of 3.0 times average dry weather flows is used to calculate peak hour flows for the development of long-term improvements to the system. This peaking factor is generally conservative to account for the uncertainty of future reductions of infiltration and inflow into the collection system. Peak hour projections are presented in Table 3-2.

Table 3-2. Withlacoochee Basin Peak Hour Flow

Service Area	Peak Hour Flow, mgd			
	2008	**2018**	**2038**	**2050**
Remer Lane	9.94	14.27	19.23	21.98
Gornto Road	5.54	8.35	13.66	15.79
Direct to WPCP [1]	0.00	0.30	0.90	1.05
Withlacoochee WPCP	**15.48**	**22.92**	**33.79**	**38.82**

[1]City of Valdosta service area adjacent to WPCP

Facilities sized based on these projections will provide for the future growth needs of the system, and provide additional peak capacity during the interim period, as the Sewer System Rehabilitation Program reduces infiltration and inflow into the system.

3.2 DESIGN FLOWS

The Withlacoochee WPCP Improvements will be designed for a peak hour flow of 40 mgd, the projected 2050 flow. The design flow rates for process units are shown on Drawing No. G-06 Forward Flow Schematic included in Appendix C.

SECTION 4
PROPOSED FACILITIES

This section presents the proposed facilities for the improvements to the Withlacoochee WPCP. These improvements are being done in conjunction with Sewer System Improvements which will discharge directly to these improvements. Subsection 4.1 presents the proposed facilities. Subsection 4.2 presents projected capital costs, operation and maintenance cost and the schedule for completion of the proposed facilities.

4.1 WITHLACOOCHEE WPCP IMPROVEMENTS

4.1.1 Summary of Expansion Concept

The design for the WPCP Improvements involves construction of a new headworks and flow equalization on higher elevation property near the existing Withlacoochee WPCP site. Upon completion of these both Withlacoochee WPCP and sewer system improvements flow will be routed away from the existing 52-inch outfall and pumped directly to the Withlacoochee WPCP headworks in a single 42" force main.

4.1.2 Basis of Design

The following sections present the basis of design for the proposed Withlacoochee WPCP Improvements.

Flow will be routed from the existing collection system directly to the new Withlacoochee WPCP Improvements. The pumping stations and general alignment of the force main, WPCP improvements and the existing Withlacoochee WPCP are shown on Figure 4-1. Table 4-1 presents the basis of design in tabular format. A hydraulic profile, and preliminary drawings of the improvements are included in Appendix C.

Table 4-1. Basis of Design

Withlacoochee WPCP Improvements	
Item	**Design Year 2050**
Headworks	
Coarse Screen	
Number, total/redundant (2 automatic, 1 manual)	2/1
Opening Size, inches	0.25
Screen Width, feet (screen face)	3.5

Table 4-1. Basis of Design	
Withlacoochee WPCP Improvements	
Item	**Design Year 2050**
Velocity, feet per second	3
Grit Removal	
Concentrator	
Description	Forced vortex grit chamber
Number, total/redundant	2/0
Capacity, each, mgd	20
Diameter, feet	16
Grit Pumps	
Number, total/redundant	4/2
Capacity, gpm	220
Motor size, HP	7.5
Grit Cyclone	
Description	Dominant free-vortex/secondary boundary layer velocities
Number, total/redundant	2
Capacity, gpm	220
Inlet Size, inches	4
Overflow Size, inches	6
Grit Classifier	
Description	Shafted screw
Number, total/redundant	2/0
Capacity, cy/hr	30
Screw Size, inches	12
Motor Size, HP	1
Equalization Tank	
Tank	
Volume, MG	6
Diameter, feet	200
Straight Side Depth, feet	25
Description	Pre-stressed concrete
Tank Mixing System	

Table 4-1. Basis of Design	
Withlacoochee WPCP Improvements	
Item	**Design Year 2050**
Description	Jet Mix Pumps
Pump Type	Submersible
Number, total/redundant	4/0
Capacity each, gpm	6590
Speed, rpm	1850
Head, feet	18
Efficiency, percent	68
Number jet mix headers	4
Number Jets/Header	18

4.1.2.1 Headworks

The headworks structure is designed to function as a barometric loop, maintaining a full pipe in the manifolded force main from the Remer Lane and Gornto Road pump stations. A magnetic flow meter will be installed on the influent line. Wastewater will flow though a coarse screen, with the screenings collected in a waste container. Screened wastewater will flow by gravity to the grit concentrator where the wastewater will be separated into water, organics, and grit. The grit is further dewatered by pumping it to a grit classifier with cyclone. The dewatered grit will be collected in a waste container with the screenings and will be disposed of off-site. De-gritted wastewater will flow to the equalization tank. Provision will be made in the headworks structure to allow for flow directly from the headworks to a new treatment plant in the future.

4.1.2.2 Equalization Storage

All flow from the headworks will flow through a 6-mg flow equalization tank prior to discharging to the Withlacoochee WPCP. A jet mix system, using recycled water from the tank will keep the contents of the equalization tank mixed, and solids in suspension. To minimize solids accumulation, the tank has a sloped bottom. Flows to the existing Withlacoochee WPCP and recycle back through the jet mixing system will be drawn from the bottom of the tank. An uninstalled spare jet mix pump will be maintained.

4.1.2.3 Gravity Outfall to the Existing WPCP

After equalization, wastewater flows by gravity to the Existing Withlacoochee WPCP through approximately 4,000 feet of 30-inch HDPE pipe. The general alignment of this outfall is shown

on Figure 4-1. Drawing 0489-01 in Appendix C shows the profile of this pipe. Influent samples will be collected in the splitter box at the existing Withlacoochee WPCP.

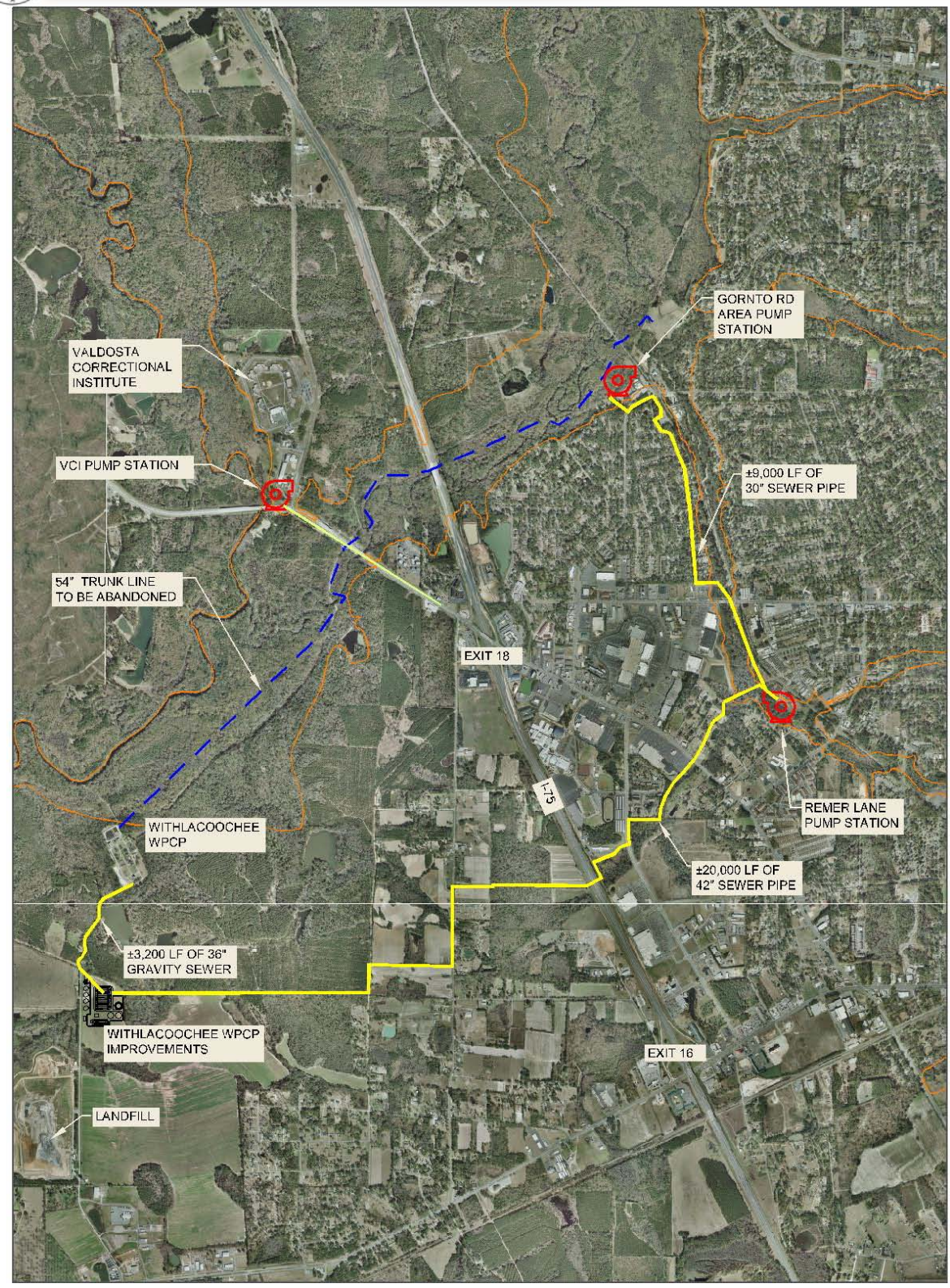


Figure 4-1. Withlacoochee Service Area Sewer System Improvements

4.1.2.4 Ancillary Facilities

This section presents a discussion of ancillary facilities utilized in the Withlacoochee WPCP Improvements. These facilities include odor control and electrical.

4.1.2.4.1 Odor Control

These improvements are located on an isolated site adjacent to a landfill, and property designated for industrial use. Provisions to cover the headworks are provided in the event that an odor control system is needed in the future.

4.1.2.4.2 Electrical

Primary electrical supply will be from the Georgia Power Company electrical distribution system. In the event of a power interruption, the influent flow will be screened through the manual bar screen, then flow by gravity through the headworks and equalization storage discharging to the existing plant splitter box.

4.2 CONSTRUCTION SEQUENCING

The following construction sequence summarizes the general order of planned construction activities for the Withlacoochee WPCP improvements. As detailed design progresses, a more detailed construction sequence will be incorporated in construction documents.

The headworks, equalization and force main are located to allow construction to start immediately. Site preparation will be followed by construction of the structures then installation of equipment as soon as it is delivered. Construction will be scheduled for commissioning of these improvements to coincide with completion of construction of the Sewer System Improvements which will supply flow.

Following commissioning, the existing influent lift station and 54-inch influent sewer will be plugged on both ends and abandoned in place.

4.3 PROJECTED COST AND SCHEDULE

Estimated capital costs for the facilities are summarized in Table 4-2. The City of Valdosta anticipates funding the project through the FEMA or other revenue sources.

Table 4-2. Projected Capital Cost

Item	Cost, million dollars
Withlacoochee WPCP Improvements	
Design	0.2
Construction	5.0
Total Projected Capital Cost	5.2

Projected annual operation and maintenance costs for the facilities are summarized in Table 4-3.

Table 4-3. Projected Annual Operation and Maintenance Cost

Item	Average Operation and Maintenance Cost, dollars
Withlacoochee WPCP Improvements	
Labor	16,000
Electric Power	34,000
Maintenance	4,000
Renewal/Capital Replacements	15,000
Other	10,000
Estimated Annual Average O&M	79,000

The City of Valdosta anticipates using a design-bid-build approach for this project, with a plan to have facilities in operation by the end of year 2013. The projected construction schedule for these facilities is outlined in Table 4-4.

Table 4-4. Anticipated Construction Schedule

Item	Anticipated Date
Detailed Design Complete	April 2012
Bid Opening	June 2012
Construction Contract Issued	July 2012
Construction Completion	October 2013
Testing, Startup and Training Completion	November 2013

Appendix A

Environmental Information Document

Appendix B

Flow Projections

Technical Memorandum No. 1

Wastewater Flows

Withlacoochee Water Pollution Control Plant & Sewer System Improvements

Date: January 28, 2011

PURPOSE

This technical memorandum (TM) defines wastewater flow characteristics to be used in the evaluation of alternatives for the Withlacoochee Water Pollution Control Plant (WPCP) & Sewer System Improvements. Pertinent tables and figures from the report titled City of Valdosta Sewer System Modeling and Capacity Evaluation Report, January 2010 (Sewer System Modeling Report) are included as exhibits in this TM.

FINDINGS

Wastewater flows for use in developing the Withlacoochee WPCP & Sewer System Improvements are based on the projections presented in the Sewer System Modeling Report prepared by CDM. The Withlacoochee WPCP collection system is generally divided into two subbasins for the purpose of developing and analyzing collection system improvements. Generally, flows converge at two locations in the collection system, in the area of the abandoned treatment facility off Remer Lane, and Gornto Road, near the Withlacoochee River. Flow projections for these two locations serve as the basis for developing improvement alternatives. Peak and minimum flows for use in developing alternatives are presented in Table 1.

Table 1. Wastewater Flows for Developing Improvement Alternatives, mgd.

Subbasin / Sewershed	2008	2018	2038	2050
Remer Lane, Peak Hour	9.94	14.27	19.23	21.98
Remer Lane, Minimum Hour	2.15	3.09	4.16	4.76
Gornto Road, Peak Hour	5.54	8.35	13.66	15.79
Gornto Road, Minimum Hour	0.83	1.25	2.05	2.37

BACKGROUND

Wastewater flow projections for the Withlacoochee Basin of the City of Valdosta wastewater service area in the years 2018, 2038 and build-out (2050) are developed and documented in the Sewer System Modeling Report.

In the previous work, the existing Withlacoochee WPCP service was divided into 14 sewersheds. These sewersheds are shown on Exhibit 1 from the Sewer System Modeling Report. The future service area is divided into an additional 10 sewersheds, and the point of each of these sewershed's loading into the present sewer collection system was identified. These future sewersheds are shown on the Exhibit 2 from the Sewer System Modeling Report**.**

Average Dry Weather Flow Projections

Exhibit 3 shows Table 3-2 from the Sewer System Modeling Report. It presents average dry weather wastewater flow projections by sewershed for the Withlacoochee WPCP service area. Average dry weather wastewater flows are projected to increase from 5.16 mgd in year 2008 to 12.94 mgd at build out. These CDM developed projections represent a 150 percent increase in average dry weather flow over a 42 year period. Build out was set at year 2050.

Monitored Flow Variations

Five-minute peak flow factors ranging from 1.7 to 12.4 times average dry weather flow are reported in the Sewer System Modeling Report.

Average dry weather diurnal flow variation for each monitor location is included in the City's SewerCad model of the collection system.

Exhibit 1. Existing Sewer System Sewersheds

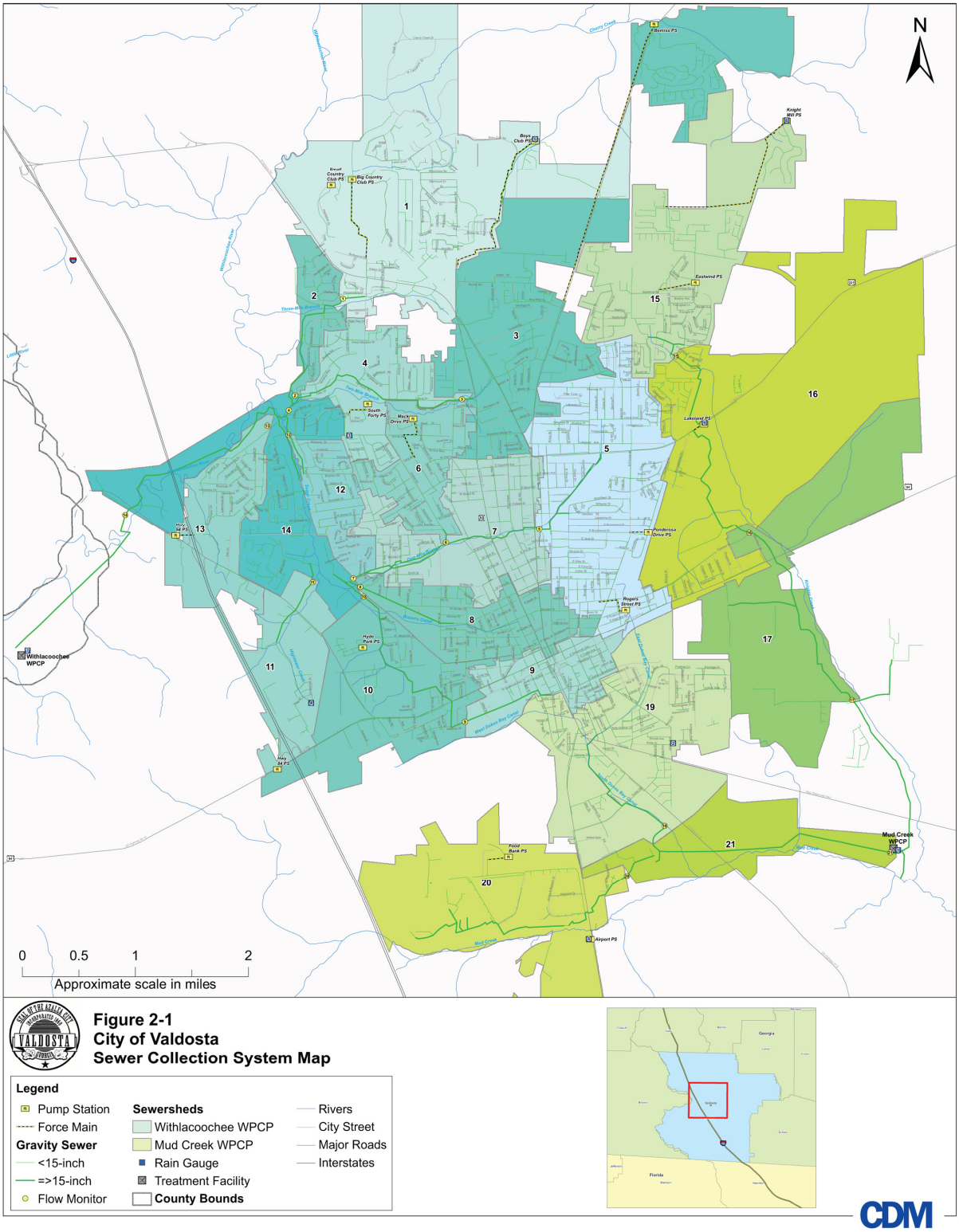


Exhibit 2. Future Sewer System Sewersheds

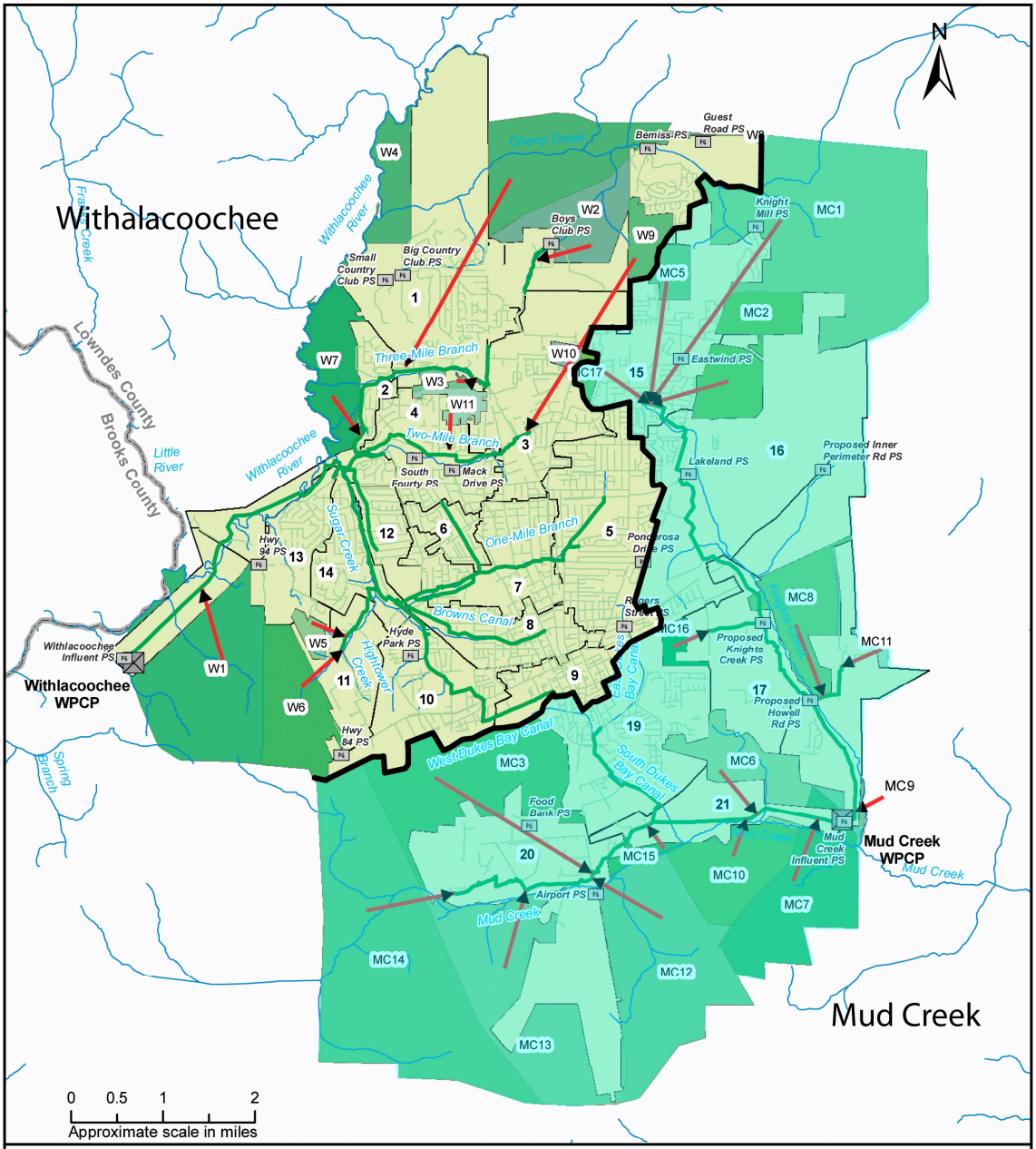


Figure 3-2
City of Valdosta
Future Service Areas Loading Points

Legend

- Water Pollution Control Plant
- Modeled Trunk Sewers
- Loading Points
- Pump Station
- Sewer < 15" Diameter
- Existing Service Area
- County Bounds

CDM

Exhibit 3. Average Dry-Weather Flow for Withlacoochee Sewersheds

Table 3-2: Summary of Future Average Dry-Weather Flow

Sewershed	2008 Measured ADWF (mgd)	2018 ADWF (mgd)	2038 ADWF (mgd)	Buildout (2050) ADWF (mgd)
Withlacoochee WWTP				
1	0.52	0.54	0.71	0.82
2	0.08	0.08	0.08	0.09
3	0.54	1.19	1.60	1.85
4	0.06	0.17	0.22	0.26
5	0.91	1.28	1.69	1.93
6	0.15	0.18	0.24	0.27
7	0.63	0.94	1.26	1.46
8	0.33	0.66	0.89	1.02
9	0.19	0.49	0.63	0.71
10	0.86	0.86	0.99	1.12
11	0.10	0.16	0.22	0.25
12	0.16	0.22	0.29	0.33
13	0.22	0.24	0.32	0.37
14	0.41	0.53	0.71	0.82
5000	0.00	0.10	0.13	0.15
W1	N/A	N/A	0.17	0.20
W2	N/A	N/A	0.05	0.06
W3	N/A	N/A	0.25	0.28
W4	N/A	N/A	0.03	0.04
W5	N/A	N/A	0.11	0.12
W6	N/A	N/A	0.24	0.28
W7	N/A	N/A	0.12	0.14
W8	N/A	N/A	0.11	0.13
W9	N/A	N/A	0.17	0.20
W10	N/A	N/A	0.034	0.04

Shading indicates that flow projections were lower than monitored flow. The higher flows were substituted.

WASTEWATER FLOWS FOR ALTERNATIVES DEVELOPMENT

The Withlacoochee WPCP collection system is divided into two subbasins for the purpose of developing and analyzing collection system improvements. Generally, flows converge at two locations in the collection system, in the area of the abandoned treatment facility off Remer Lane, and Gornto Road, near the Withlacoochee River. Table 2 presents the sewersheds in the previous work that are mapped to each of these subbasins. Exhibit 4 shows the boundaries of these subbasins. Gravity flows from Sewershed 11, and approximately 35% of Sewershed 14 discharge

to the line downstream from Remer Lane. In the alternatives, these Sewershed 11 and Sewershed 14 flows will be intercepted and rerouted from the Gornto Road Subbasin into the Remer Lane Subbasin.

Table 2. Sewersheds in Each Subbasin

Subbasin	Existing Sewersheds	Future Sewersheds
Remer Lane	5, 6, 7, 8, 9, 10, 11, 14 (35%)	W6
Gornto Road	1, 2, 3, 4, 12, 13, 14 (65%)	W2, W3, W4, W5, W7, W8, W9, W10

Average Dry Weather Flow Projections summarized by subbasin are presented in Table 3.

Table 3. Withlacoochee Basin Average Dry Weather Flow, mgd

Subbasin	2008	2018	2038	2050
Remer Lane	3.31	4.76	6.41	7.33
Gornto Road	1.85	2.78	4.55	5.26
Direct to WPCP	0.00	0.10	0.30	0.35
Total, Withlacoochee WPCP	**5.16**	**7.64**	**11.26**	**12.94**

The City is undertaking a prioritized program to reduce the infiltration and inflow into its collection system. This program is expected to reduce the peak flows that will be conveyed to the Withlacoochee WPCP. Therefore, it is appropriate to select a future peaking factor that reflects this reduction. Exhibit 5 shows peaking factor for various size facilities from Wastewater Engineering: Treatment and Reuse. Based on a review of peaking factors for similar sized facilities, a peaking factor of 3.0 times average dry weather flows is used to calculate peak hour flows for the development of long-term improvements to the system. The basis of the selection of this peaking factor can be seen in Exhibit 5. This peaking factor is generally conservative to account for the uncertainty of future reductions of infiltration and inflow into the collection system. Peak hour projections are presented in Table 4. These projections are illustrated graphically in Exhibit 6.

Facilities sized based on these projections will provide for the future growth needs of the system, and provide additional peak capacity during the interim period, as the Sewer System Rehabilitation Program reduces infiltration and inflow into the system. For example, firm capacity to meet the Remer Lane 2038 peak hour flows of 19.23 mgd, provides infrastructure that is initially capable of conveying peak flows that are approximatly 9 mgd higher than projected peak hour wastewater flows using a factor of 3.0. This interim capacity is shown graphically on Exhibits 6 and 7 for the Remer Lane and Gornto Road subbasins.

Exhibit 4. Withlacoochee WPCP Subbasins

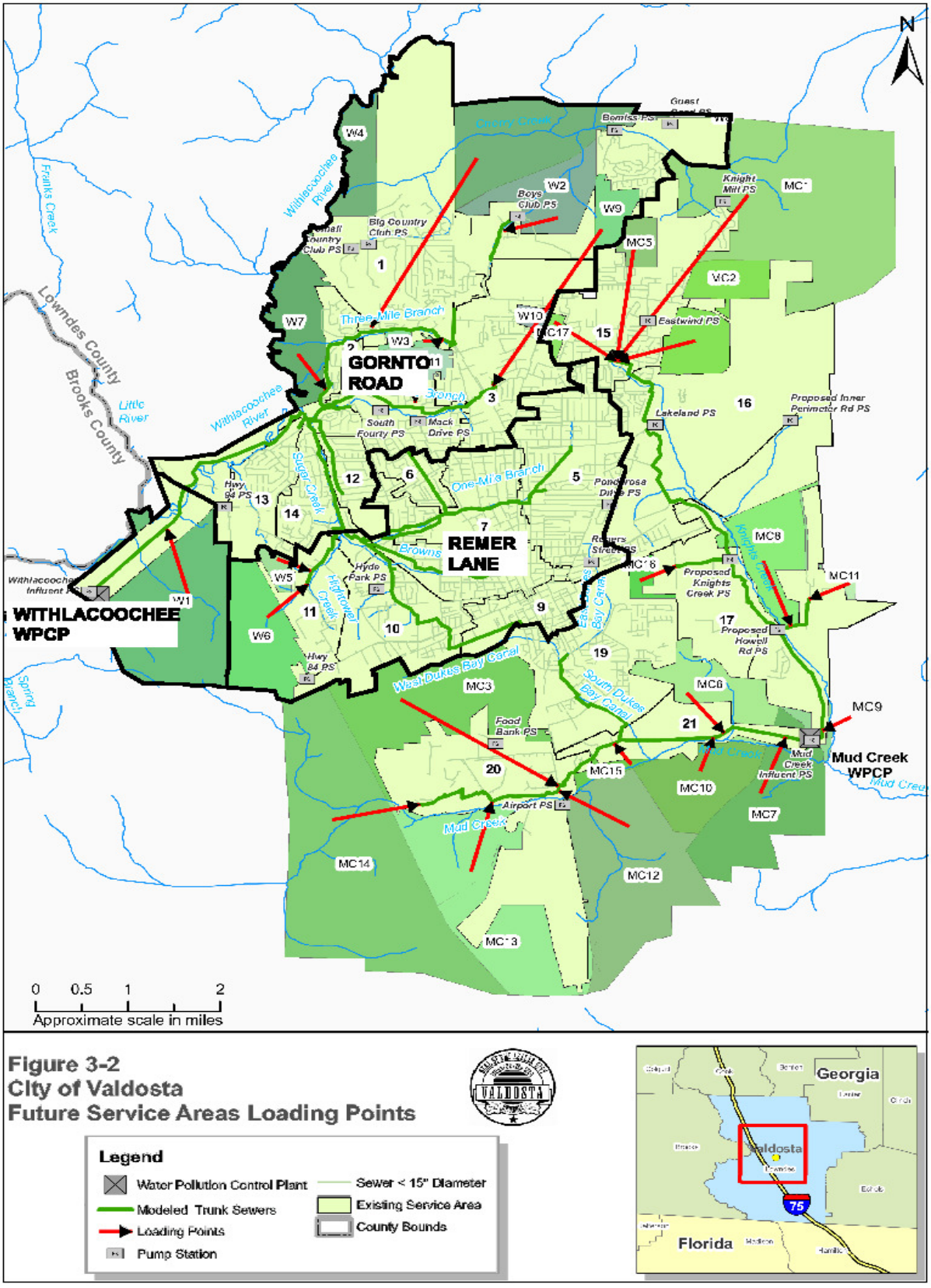


Exhibit 5. Peaking Factors for Various Sized Facilities

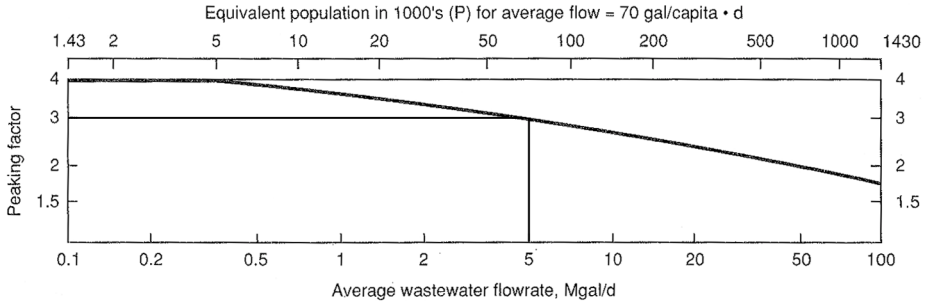


FIGURE 5-1
Hourly peaking factor for domestic wastewater flowrates. Peaking factor is the ratio of maximum hourly flowrate to average flowrate. *Note:* Mgal/d × 0.043813 = m^3/s.

Source: Wastewater Engineering Treatment, Disposal, Reuse

Table 4. Withlacoochee Basin Peak Hour Flow, mgd

Subbasin / Sewershed	2008	2018	2038	2050
Remer Lane	9.94	14.27	19.23	21.98
Gornto Road	5.54	8.35	13.66	15.79
Direct to WPCP	0.00	0.30	0.90	1.05
Withlacoochee WPCP	**15.48**	**22.92**	**33.79**	**38.82**

Exhibit 6. Peak Hour Flows based on a 3.0 peaking factor

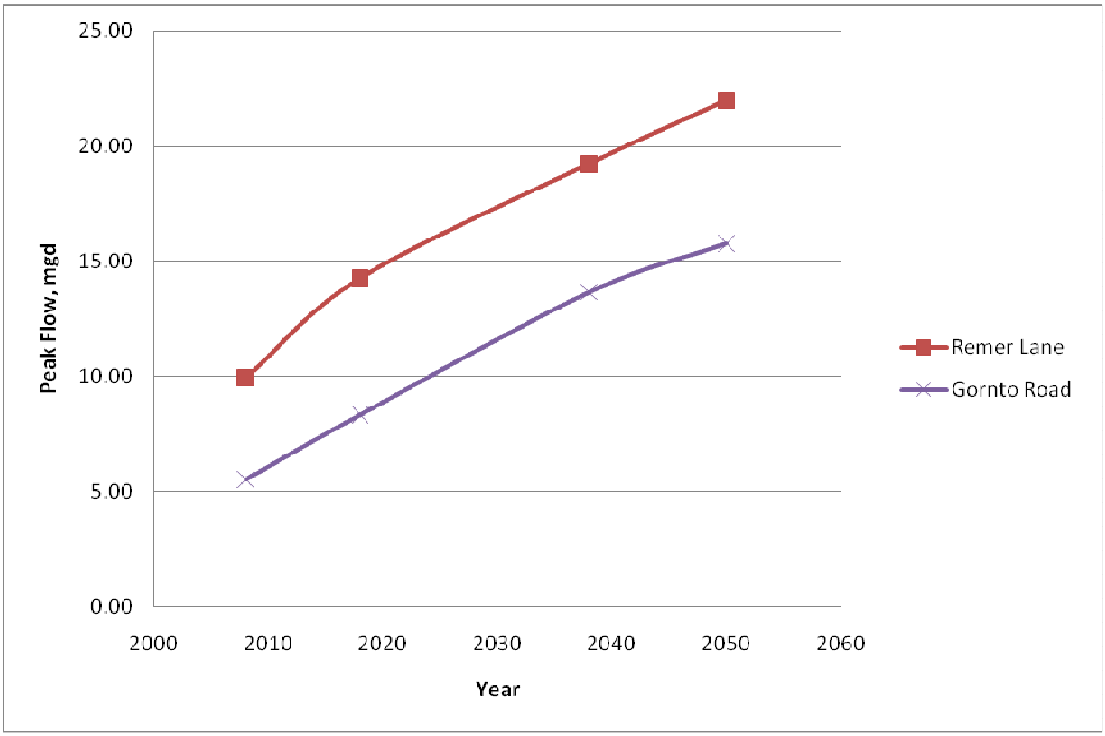


Exhibit 7. Peak Hour Capacity Remer Lane Subbbasin During Implementation of Sanitary Sewer Rehabilitation Program

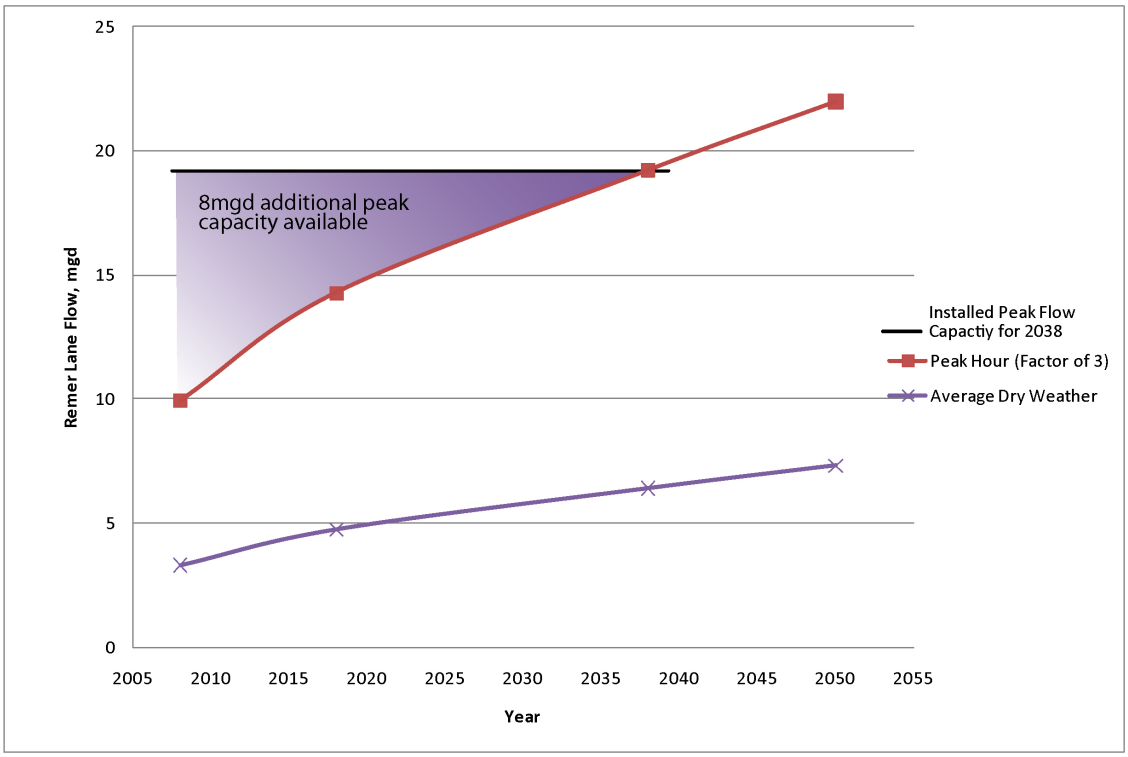
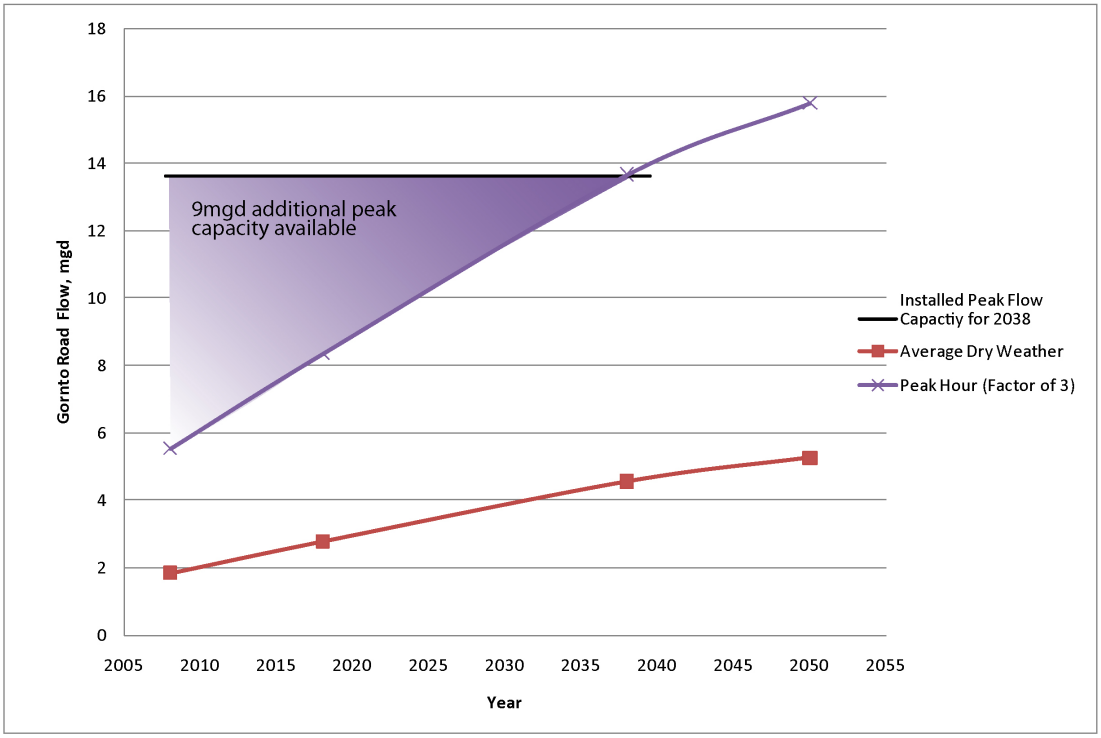


Exhibit 8. Peak Hour Capacity Gornto Road Subbbasin During Implementation of Sanitary Sewer Rehabilitation Program



In developing and evaluating alternatives, consideration must also be given to the minimum flows from each subbasin. Minimum flows from each subbasin are based on diurnal variations monitored in 2008. Exhibit 9 is a graph of diurnal flow in the Remer Lane subbasin. Minimum hourly flows from the Remer Lane subbasin are approximately 65 percent of average dry weather flow. Exhibit 10 is a graph of diurnal flow in the Gornto Road subbasin. Minimum hourly flows from the Gornto Road subbasin are approximately 45 percent of average dry weather flow. Projected minimum hourly flows are summarized in Table 5.

Exhibit 9. Diurnal Variation Remer Lane Subbasin

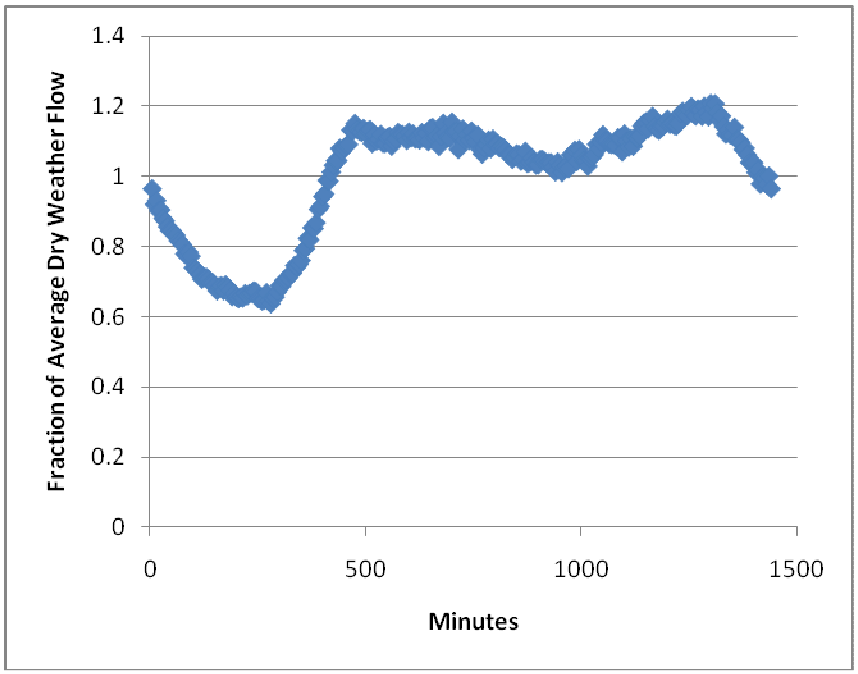


Exhibit 10. Diurnal Variation Gornto Road Subbasin

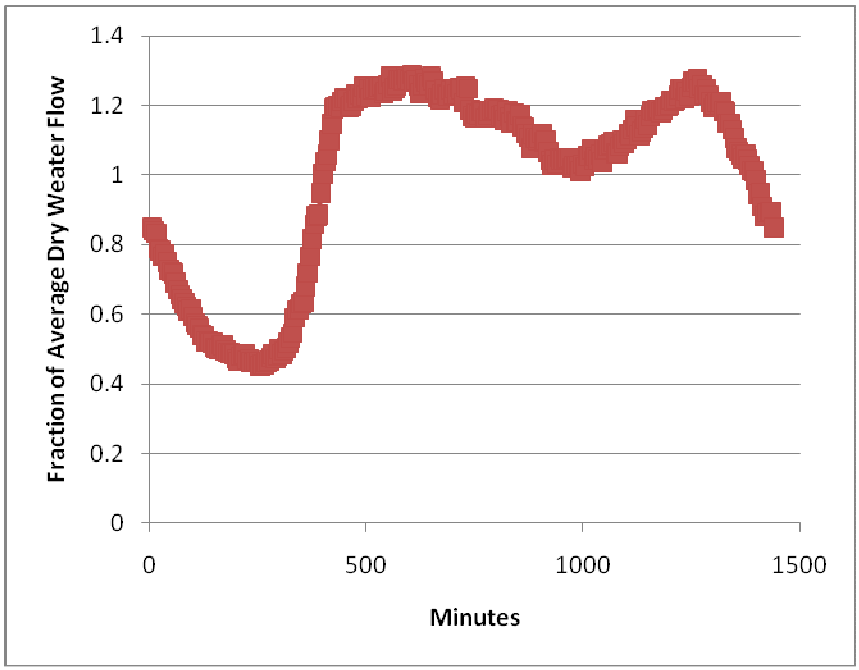


Table 5. Minimum Hourly Wastewater Flows for Developing Improvement Alternatives, mgd.

Subbasin / Sewershed	2008	2018	2038	2050
Remer Lane, Minimum Hour	2.15	3.09	4.16	4.76
Gornto Road, Minimum Hour	0.83	1.25	2.05	2.37

ACCEPTANCE

Signature acknowledges review and acceptance of TM-1 Wastewater Flows by the City of Valdosta:

_____

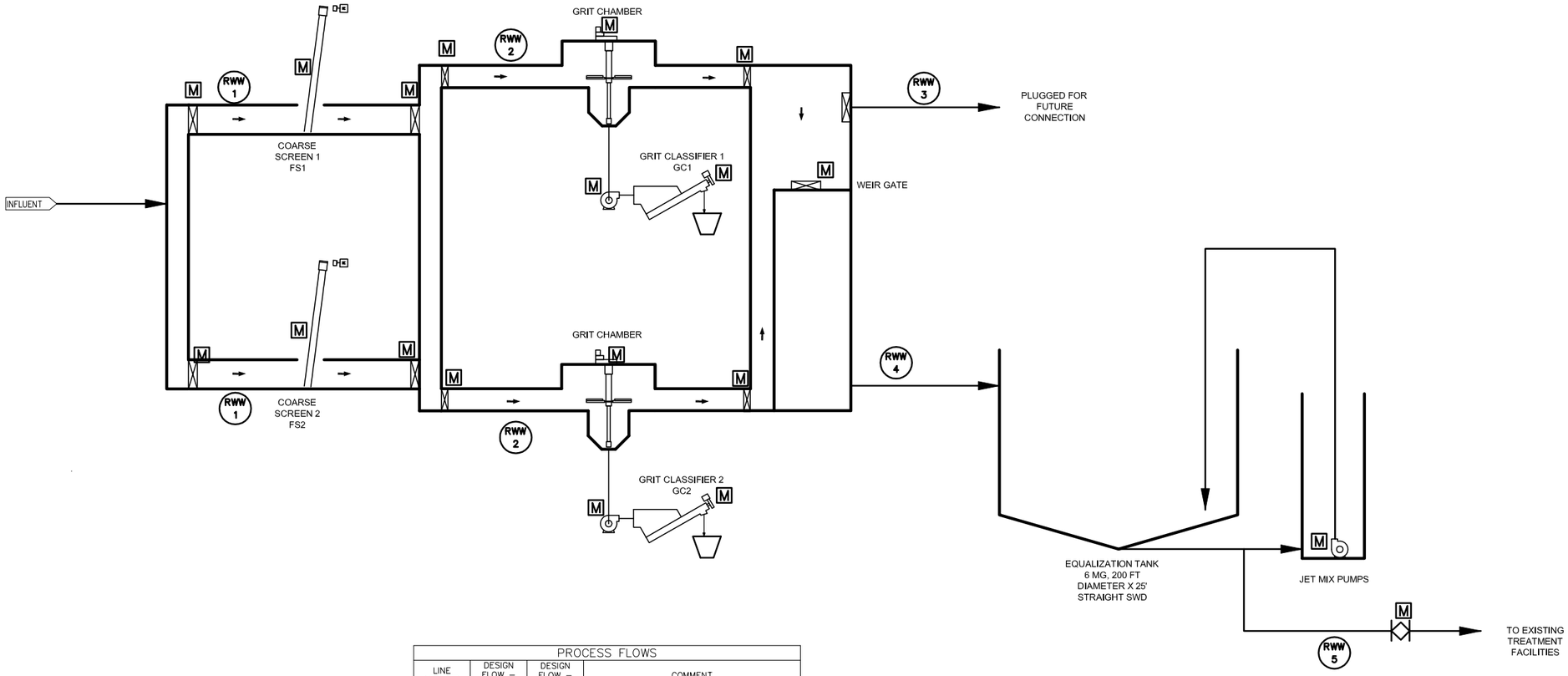
signature

_____

date

Appendix C

Related Documents



PROCESS FLOWS			
LINE NUMBER	DESIGN FLOW – PEAK, MGD	DESIGN FLOW – MMADF	COMMENT
RWW1	38	NA	COARSE SCREENS – 1 DUTY/1 STANDBY
RWW2	14	NA	GRIT CHAMBERS – 2 DUTY
RWW3	TBD	TBD	FUTURE TREATMENT FACILITIES
RWW4	38	NA	TOTAL FLOW TO EQUALIZATION
RWW5	22	12 (WINTER)	EQUALIZED FLOW TO EXISTING FACILITIES

Rev	Date	Description	By
A		DESIGN DEVELOPMENT REPORT	

Job No. 260384
Designed PG
Drawn PG
Checked XX
Reviewed XX
Approved XX
Reg. No.
Date 3/16/11

Issue Certification

PARSONS
WATER & INFRASTRUCTURE INC.
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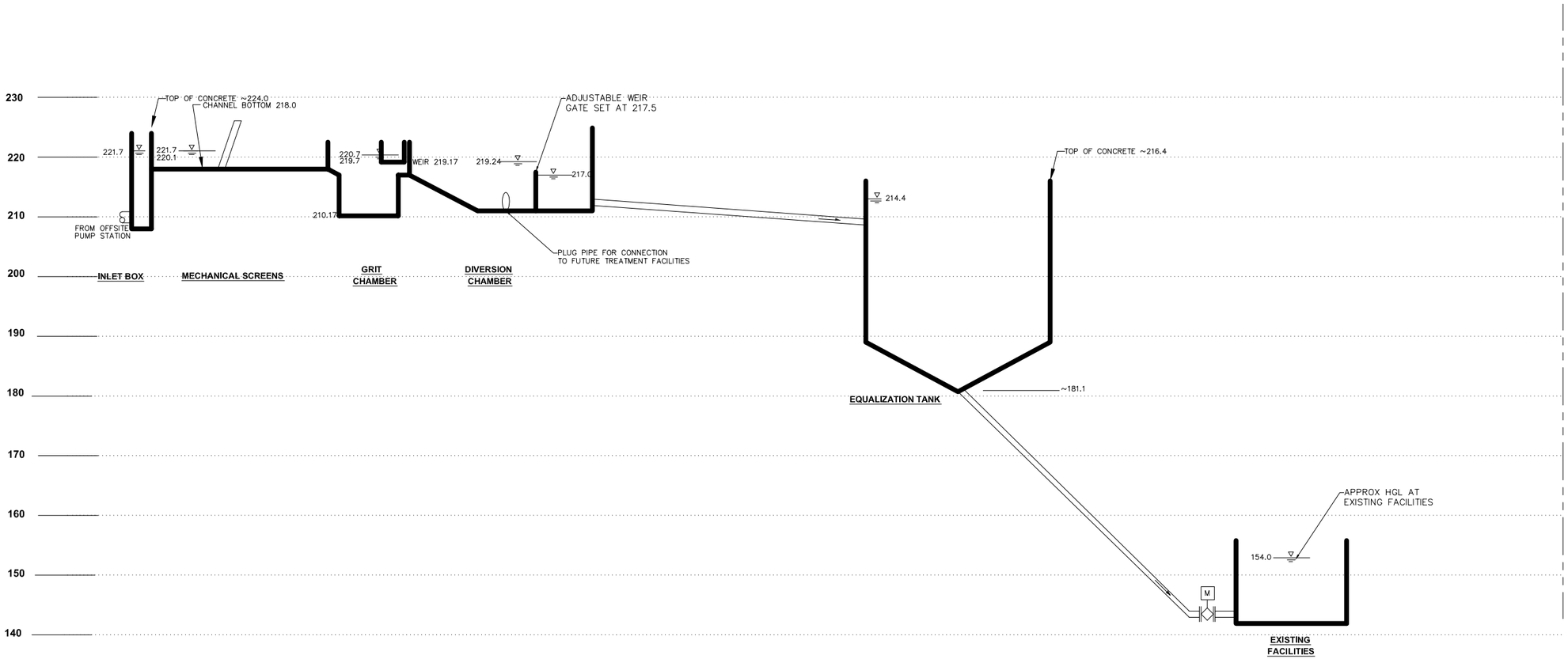
1016 Myrtle Street, Valdosta, GA 31603
Phone: 229-293-3892

WITHLACOOCHEE WATER POLLUTION CONTROL PLANT
AND SEWER SYSTEM IMPROVEMENTS

FORWARD FLOW SCHEMATIC

DRAWING NO. G06
REV 0

J:\Withlacoochee WWTP\Construction Drawings\Phase 1\00_General\G06 FORWARD FLOW SCHEMATIC.dwg



LEGEND

——— WATER SURFACE AT PEAK FLOW

781.5 WATER SURFACE ELEVATION AT PEAK FLOW
780.4 WATER SURFACE ELEVATION AT MIN OR MMADF

HYDRAULIC PROFILE

SCALE: 1' = 10'-0"

By	Description	Date	Rev
	DESIGN DEVELOPMENT REPORT		A

Job No. 260384
Designed PG
Drawn TAL
Checked
Reviewed
Approved
Reg. No.
Date 6/7/2011

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WITHLACOOCHEE WATER POLLUTION CONTROL PLANT
AND SEWER SYSTEM IMPROVEMENTS

HYDRAULIC PROFILE

DRAWING NO. G05

REV. 0

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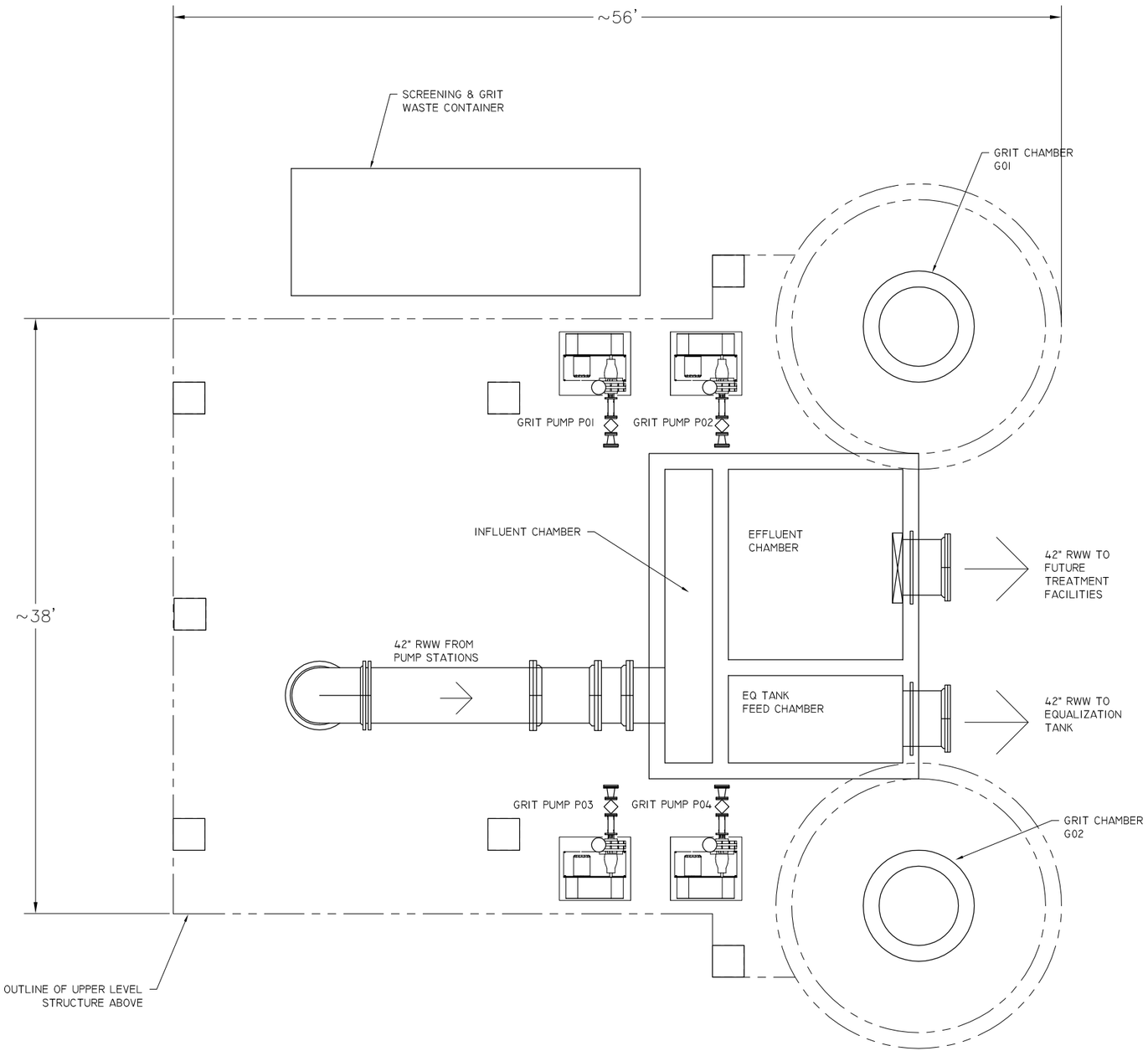

LOWER LEVEL PLAN VIEW
1/4"=1'-0"

SCALE: 1/4"=1'-0"

Rev	Date	Description	By
A		DESIGN DEVELOPMENT REPORT	

Job No. 260501
Designed
Drawn PG
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Reviewed XX
Approved XX
Reg. No.
Date 6/7/11

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WITHLACOOCHEE WATER POLLUTION CONTROL PLANT
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LOWER LEVEL PLAN

DRAWING NO. M02.01

REV 0

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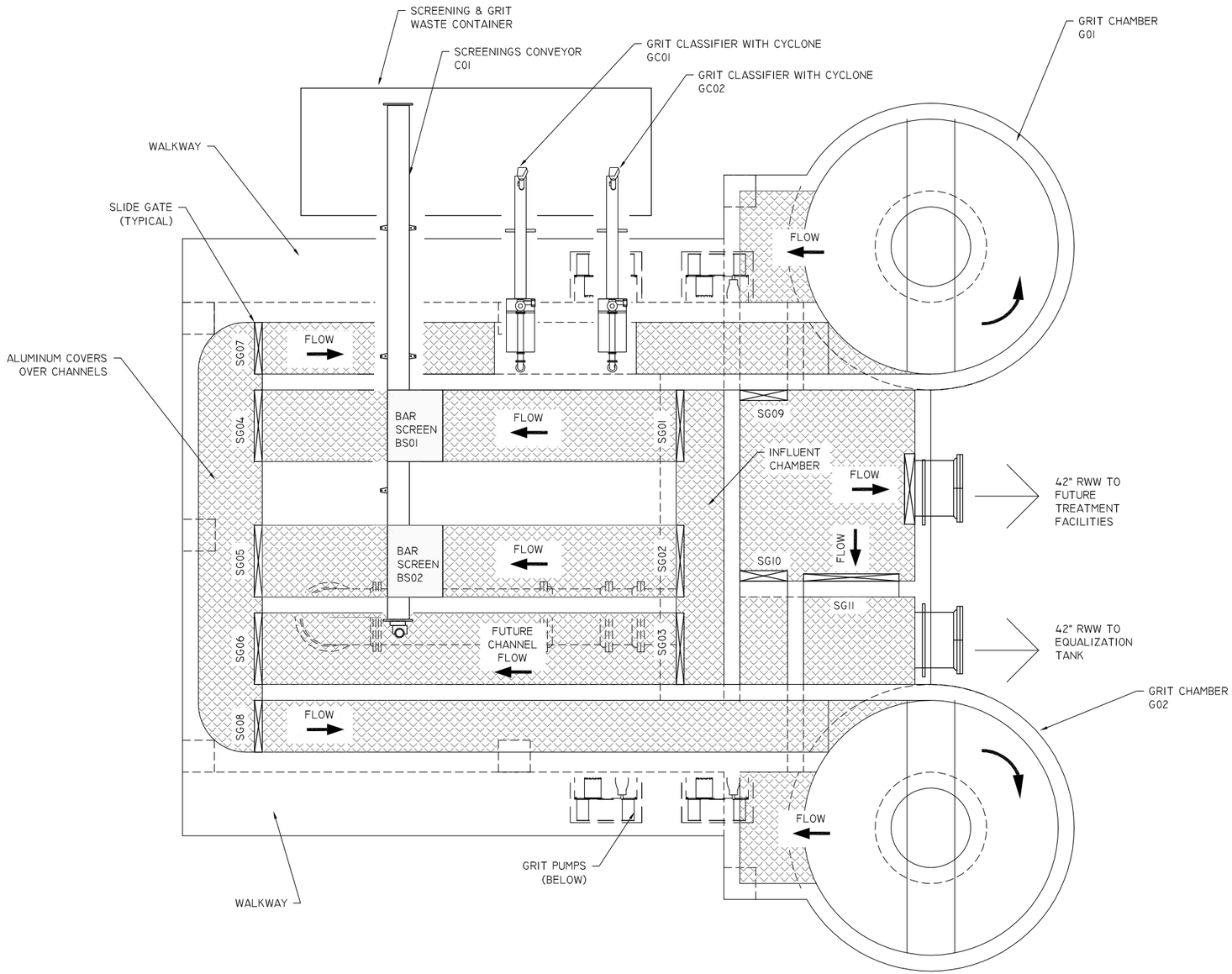

UPPER LEVEL PLAN VIEW
1/4"=1'-0"

SCALE: 1/4"=1'-0"

Rev	Date	Description	By
A		DESIGN DEVELOPMENT REPORT	

Job No. 260501
Designed
Drawn PG
Checked XX
Reviewed XX
Approved XX
Reg. No.
Date 5/8/11

Issue Certification

PARSONS
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UPPER LEVEL PLAN

DRAWING NO. G02.02
REV 0

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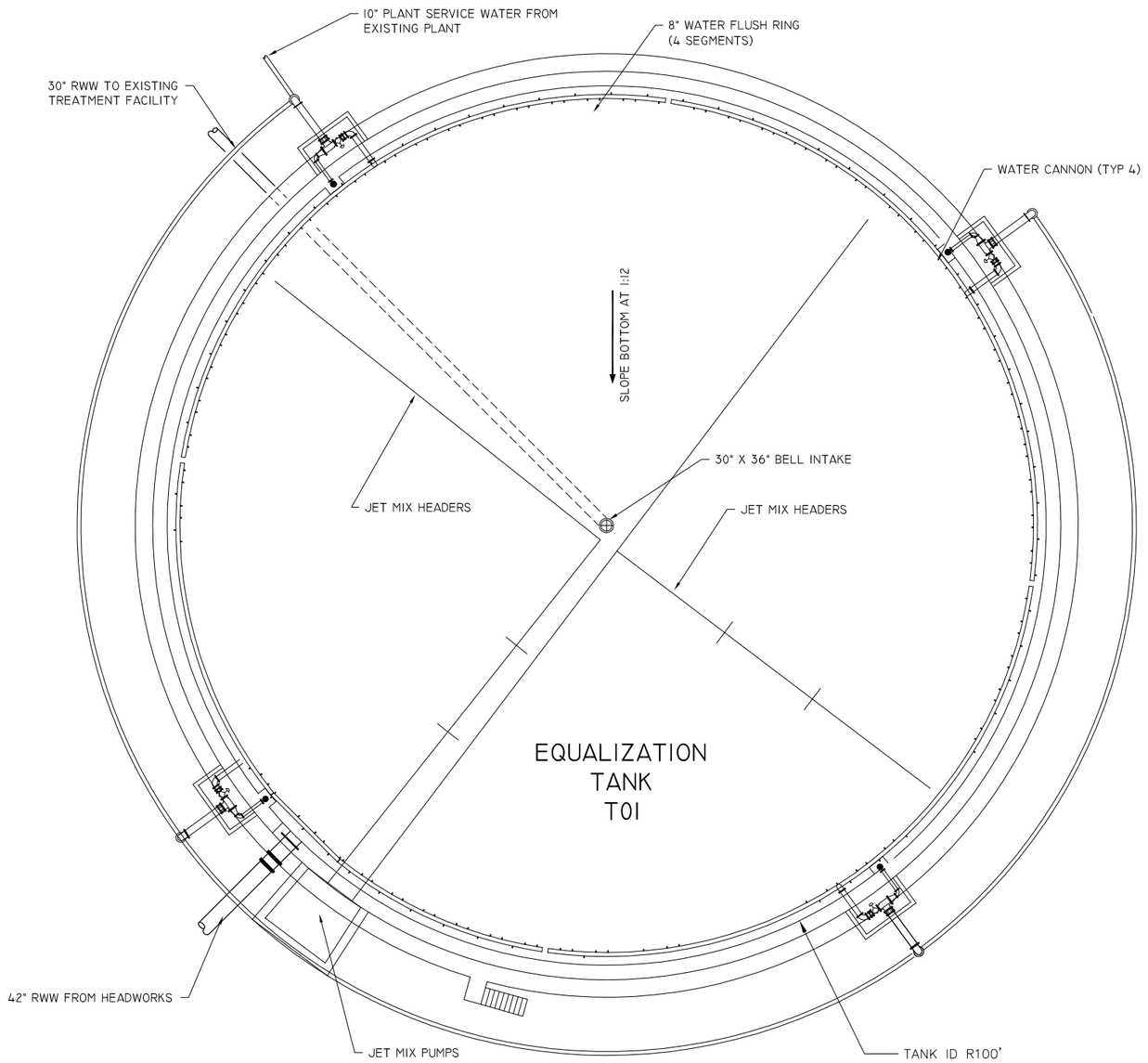

EQUALIZATION TANK PLAN
1/16" = 1'

SCALE: 1/16"=1'-0"

By	Description	Date	Rev
	DESIGN DEVELOPMENT REPORT		A

Job No. 260501
Designed
Drawn PG
Checked XX
Reviewed XX
Approved XX
Reg. No.
Date 6/7/11

Issue Certification

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WITHLACOOCHEE WATER POLLUTION CONTROL PLANT
AND SEWER SYSTEM IMPROVEMENTS

EQUALIZATION TANK PLAN

DRAWING NO. M02.03

REV. 0

J:\Withlacoochee WWTP\Construction Drawings\Phase 1\06_Mech\02_Plant\02 EQ TANK Plan.dwg

6/7/2011 11:33:50 AM

30" RWW FROM EQUALIZATION TANK

TIE INTO EXISTING SPLITTER BOX

GRID NORTH

MAGNETIC NORTH

Primary Clarifier #3

Primary Clarifier #4

Future Roughing Filter

Future Pump Building

Primary Clarifier Distribution Box

Nitrification Basin

Secondary Clarifier #3

Secondary Clarifier #4

Sec. Clarifier Dist. Box

Automatic Backwash Filter

RCP Flared Section

RCP Flared End Section

Relocated Fence

Exist. Fence

Solids Handling Facility

Existing Flow Splitter Box

15'R Grit Chamber

Existing Grit Chamber (To Be Modified)

Parshall Flume

Entrance Sign

Road Sta. 0+00=E5+00 (New Perimeter Road)

CB-1 CB-2 CB-3 CB-4 CB-5 CB-6 CB-7 CB-8

Primary Clarifier Distribution Box

Temporary Fence (See Note 1)

Chemical Storage Tank

Fuel Oil Storage Facility

Air Meter Boxes (See Dwg. 12-M1)

Secondary Sludge Pump Sta./Blower Building

Nitrification Tanks

Secondary Clarifier Dist. Box

Automatic Backwash Filter

Roughing Filters #1 #2

Standby Generator

Blower Building

Primary Clarifier #1

Primary Clarifier #2

Secondary Clarifier #1

Secondary Clarifier #2

P.B.

Chlorine Building

New Junct. Box

Sludge Drying Beds

Chlorine Contact Chamber

Sample Pump

Control Building

Potable Water Well

Aerobic Digester

Sludge Thickener

LEGEND

- Exist. Facility
- Exist. Facility To Be Modified
- New Facility
- New Pavement
- Existing Pavement To Be Resurfaced

SITE PLAN - EXISTING WWTP

NO SCALE

Rev	Date	Description	By
A		DESIGN DEVELOPMENT REPORT	

Job No. 260501
Designed PG
Drawn XX
Checked XX
Reviewed XX
Approved XX
Reg. No.
Date 6/7/11

Issue Certification

PARSONS
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5565 GLENRIDGE CONNECTOR, SUITE 100
NORCROSS, GA 30092
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FAX: 770-446-4910

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Phone: 229-259-3592

WITHLACOOCHEE WATER POLLUTION CONTROL PLANT
AND SEWER SYSTEM IMPROVEMENTS

SITE PLAN - EXISTING WWTP

DRAWING NO. G08

REV 0

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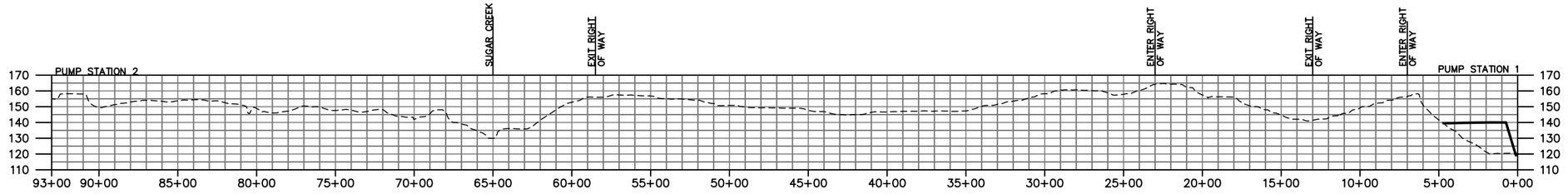
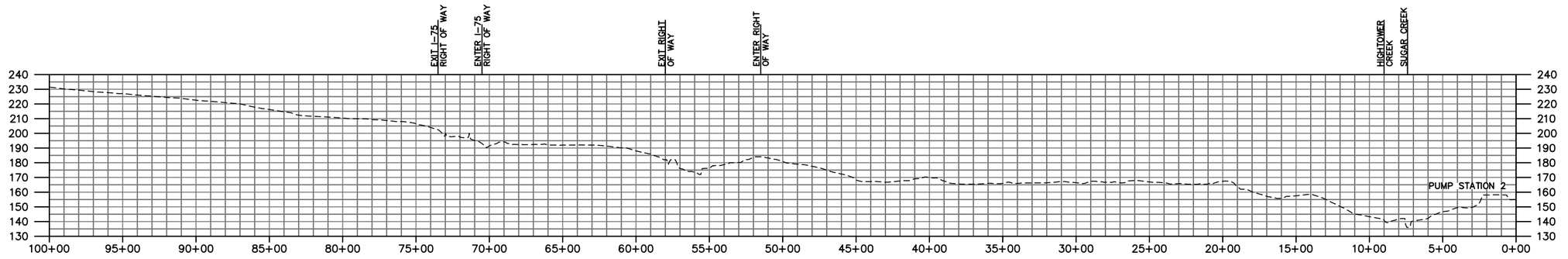
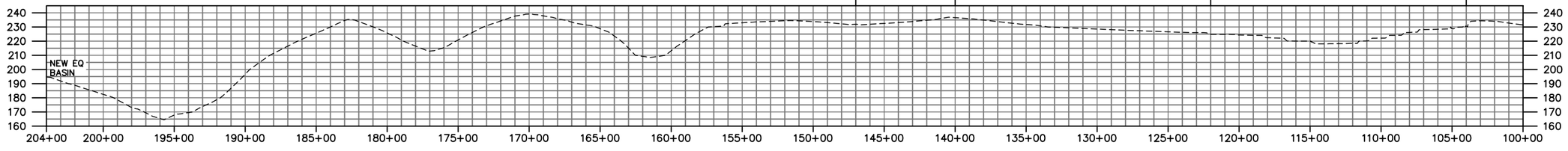
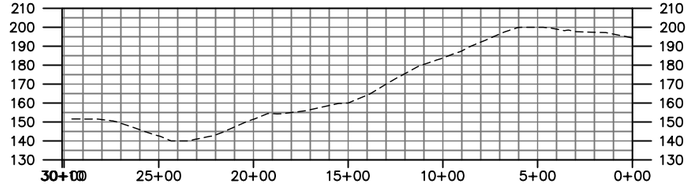


FORCE MAIN ROUTE PROFILE - GORNTO ROAD PS TO REMER LANE PS





FORCE MAIN ROUTE PROFILE - REMER LANE PS TO NEW EQ BASIN



GRAVITY SEWER MAIN ROUTE PROFILE - NEW EQ BASIN TO EXISTING WPCP

GRAPHIC SCALE
0 400 800 1600
1 inch = 800 ft.

By	Description	Date	Rev

Job No.
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Drawn
Checked
Reviewed
Approved
Reg. No.
Date

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LOVELL LEA
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CIVIL ENGINEERING & LAND PLANNING

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WITHLACOOCHEE WATER POLLUTION CONTROL PLANT
AND SEWER SYSTEM IMPROVEMENTS

FORCE MAIN AND GRAVITY SEWER ROUTE PROFILES

DRAWING NO. 0489-01
REV 0