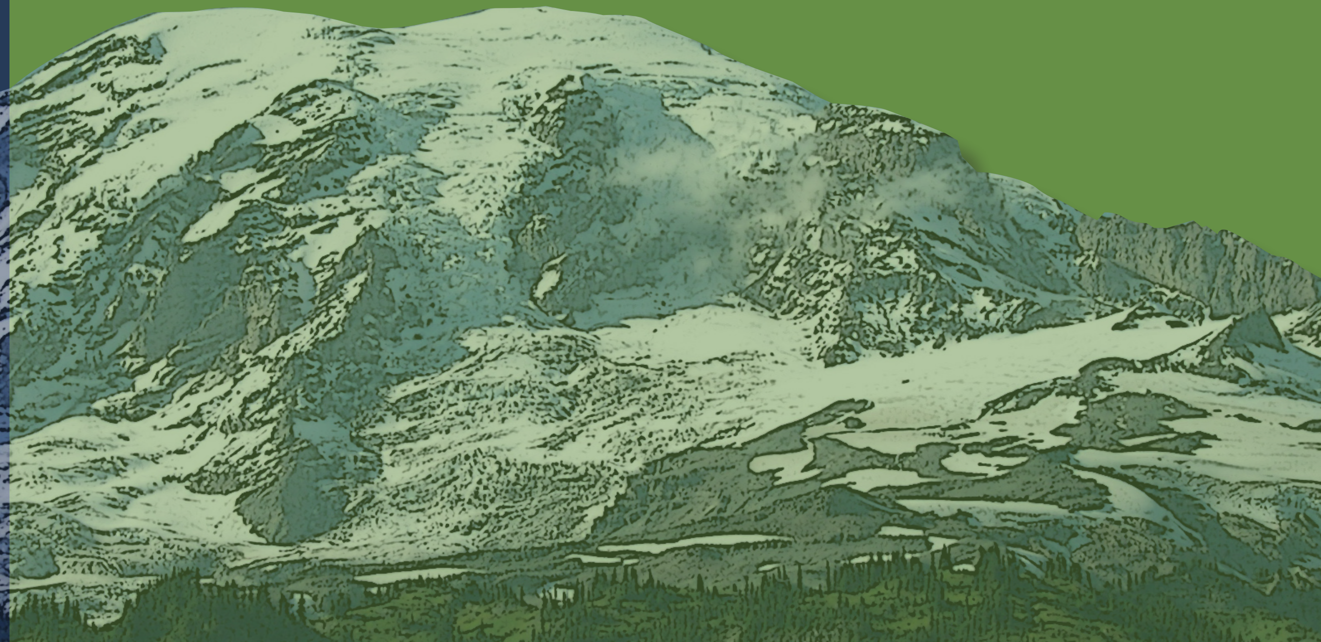
City of Auburn, Washington



Comprehensive Sewer Plan

December 2009

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Comprehensive Sewer Plan

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CITY OF AUBURN COMPREHENSIVE SEWER PLAN

Prepared for
City of Auburn Public Works Department,
Auburn, Washington
December 2009

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CITY OF AUBURN COMPREHENSIVE SEWER PLAN

Prepared for

City of Auburn Public Works Department, Auburn, Washington

December 2009

City of Auburn Contract Number AG-C-301

Brown and Caldwell Project Numbers 133347 and 135494

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LIST OF ABBREVIATIONS

Algona	City of Algona
Bonney Lake	City of Bonney Lake
CCF	100 cubic feet
CCTV	closed circuit television
CIP	Capital Improvement Program
City	City of Auburn, Washington
CMMS	computerized maintenance management system
Comp Plan	Comprehensive Plan
CTED	Community Trade and Economic Development
Ecology	Washington State Department of Ecology
Engineering	Engineering Division
EPA	U.S. Environmental Protection Agency
Finance	Department of Finance
FOG	fats, oils, and greases
FTE	full-time employee
GIS	geographic information system
GMA	Growth Management Act
GO	general obligation
I/I	inflow and infiltration
IS	Engineering and Information Services
Kent	City of Kent
LFC	local facilities charge
LOS	level of service
M&O	maintenance and operations
MIT	Muckleshoot Indian Tribe
PAA	Potential Annexation Area
Pacific	City of Pacific
PdM	predictive maintenance
PM	preventive maintenance
Public Works	Department of Public Works
R&R	repair and replacement
RCE	residential customer equivalents
RCW	Revised Code of Washington
RWSP	Regional Wastewater Services Plan
SCADA	supervisory control and data acquisition
SDC	system development charge
Sewer Plan	Comprehensive Sewer Plan
SOS	Save Our Streets
SR	State Route
SSSA	sanitary sewer service area
ULID/LID	Utility Local Improvement District

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EXECUTIVE SUMMARY

This Comprehensive Sewer Plan (Sewer Plan) for the city of Auburn, Washington (City), is an update to the previous plan that was completed in November 2001 (Roth Hill Engineering Partners, LLC). Evaluation of the sanitary sewer system for this Sewer Plan incorporated system-wide hydraulic modeling, economic life modeling of utility assets, and evaluation of the Capital Improvement Program (CIP) to account for completed projects, changes in system conditions, and new development, as well as to incorporate new financial information.

This Sewer Plan contains time frames which are the intended framework for future funding decisions and within which future actions and decisions are intended to occur. However, these time frames are estimates, and depending on factors involved in the processing of applications and project work, and availability of funding, the timing may change from the included time frames. The framework does not represent actual commitments by the City which may depend on funding resources available.

The purpose of the Sewer Plan is to guide the City's Sanitary Sewer Division with respect to future activities and improvements for the sanitary sewer utility. To fulfill this stated purpose the following objectives were achieved:

- review background information about the sewer utility including regulatory drivers (Chapter 2)
- evaluate environmental, social, and regulatory drivers to develop level of service (LOS) goals for capital facility infrastructure development, operation, maintenance, and other key elements of utility management (Chapter 3)
- study and characterize the current sewer system (Chapter 4)
- perform a hydraulic modeling analysis to evaluate system capacity, an economic life analysis of existing assets to determine optimal repair and replacement (R&R) timing, and condition assessments of the City's sanitary sewer pumping stations to identify future infrastructure improvement needs (Chapter 5)
- develop a CIP based on the results of hydraulic, economic life, and condition analyses by meeting required customer service levels, effectively managing risks, and minimizing the City's costs of sewer asset ownership (Chapter 6)
- develop recommendations for continuing the maintenance and operations (M&O) program to assist the City in maintaining a proactive maintenance environment (Chapter 7)
- develop a funding plan that optimizes use of rates, systems development charges and/or other service fees based on projected utility spending requirements and a review of funding sources and City financial policies (Chapter 8)
- prioritize capital improvement projects and R&R activities to accommodate both 6- and 20-year funding frameworks and create an implementation plan to meet LOS goals (Chapter 9).

The following sections summarize the development of the Sewer Plan and outline the recommendations contained in the implementation plan.

ES-1 LOS Goals

LOS goals provide a framework for the utility to assess its staffing levels, prioritize its resources, justify its rate structure, and document its successes. It is important that LOS goals include clear criteria to use in evaluating how well those goals are being met. LOS goals for the sewer utility were developed for this plan and are based on relevant City policies. LOS goals and associated City polices are listed in Table ES-1.

Table ES-1-1. Utility Levels of Service

Policy category	Service provision policy	Level of service
1. System capacity	1.1 The City will size ***gravity sewers*** for peak wet weather flow rates that include I/I flows.	Gravity sewers will be sized to convey the peak once-per-20-year flow without surcharging.
	1.2 The City will size ***pump stations and force mains*** for peak wet weather flow rates that include I/I flows.	Pump stations will be sized to convey the once per 5-year flow with one pump out of service and convey the once per 20-year flow with all pumps in service.
2. System performance and reliability	2.1 The City will monitor the frequency and causes of any service disruptions and develop programmatic methods for reducing the number of disruptions (e.g., backups).	The City will investigate all customer service calls and record results in the computerized maintenance management system (CMMS) system to establish baseline. The City will develop operation and maintenance plan to set goals for minimizing blockages, backups, response time, etc.
	2.2 The City will maintain an asset criticality database to be used in prioritizing asset maintenance and repair and replacement.	The City will develop and maintain an asset criticality database. The existing criticality database will be refined to include more asset age and material information, and will be validated using the results of M&O inspections.
	2.3 The City will perform condition assessments of critical assets.	The City will develop and implement a condition assessment schedule for all critical assets.
	2.4 The City will attempt to repair or replace system assets before they exceed their economic life.	The number of high-criticality pipe segments beyond economic life will be minimized.
	2.5 The City will conduct maintenance activities at a level that is consistent with optimizing system reliability, asset economic life, and system performance.	The City will develop schedules for maintenance of wastewater collection and conveyance assets and link its implementation to system performance, e.g., record instances of missed maintenance and identify inadequate performance related to maintenance (grease and roots blockages) including missed scheduled maintenance.
	2.6 The City will maintain a level of reliability for pump stations provided by redundancy of critical mechanical and electrical components.	The City will provide backup power generators or dual power feeds and provide a minimum of two pumps at each City pump station over next planning cycle.

Table ES-1-1. Utility Levels of Service		
Policy category	**Service provision policy**	**Level of service**
3. Protection and improvement of the environment	3.1 The City will comply with all federal, state, and local regulations in operation and maintenance of the City's wastewater collection and conveyance infrastructure.	The City will comply with the applicable regulations.
	3.2 The City will evaluate sanitary sewer utility activities to emphasize sustainability practices.	City staff will identify specific areas to measure sustainability. Examples could include weighing energy consumption impacts more heavily during capital project development, selecting less impactful cleaning and maintenance products, and structuring maintenance activities to minimize vehicle travel miles. While maintaining minimum flows for efficient operation of the system, water conservation will be practiced whenever possible. City staff will benchmark practices and log changes.
	3.3 The City will support the use the use of reclaimed water technologies where economically feasible.	City staff will evaluate opportunities for reclaimed water use and support initiatives where the benefits outweigh costs.
4. Utility financial performance	4.1 Continue to fund and provide wastewater collection and conveyance service through the existing sanitary sewer utility. The City's sanitary sewer utility should be responsible for ***implementation, maintenance, and operation*** of the City's collection system.	100% of cost of wastewater collection and conveyance service delivery will be recovered via sanitary sewer utility funding.
	4.2 Appropriate rates and system development charges shall be assessed to fund the ongoing maintenance, operation, and capital expenditures of the utility, in accordance with the Comprehensive Wastewater Plan. Periodic (typically every 5 years) cost of service studies shall be completed to reassess the monthly service and system development charges (both City and King County portions).	Updates will coincide with 6-year CIP updates.
	4.3 The City will track cost of claims as a metric.	The City will create a baseline against which to evaluate future improvements.
	4.4 The City will track schedule and budget accuracy and performance in CIP implementation.	The City will create a baseline against which to evaluate future improvements.
5. Customer satisfaction	5.1 The City will evaluate and strive to maintain customer satisfaction with sanitary sewer utility service delivery.	• The City will create a baseline against which to evaluate future improvements: o Annual assessment of complaints/citizen reports • The City will communicate proactively with community and stakeholders regarding wastewater service improvements.

ES-2 Evaluation of the Sewer Utility

In order to develop a plan for future improvements to the sewer utility, the existing collection system was evaluated. This included background into the organizational structure and policies of the utility, identification of service areas served by the utility, and a tabulation of existing infrastructure. With the tabulation of the City's existing infrastructure, an evaluation of current and future needs was completed through three tasks described in further detail below: hydraulic modeling, economic life analysis, and pump station condition assessments.

- **Hydraulic modeling.** The City provided an existing DHI MOUSE hydraulic model which was migrated to MIKE URBAN[1] software and updated to capture sewer facilities, sewered areas, and population data not included in the MOUSE model. The hydraulic capacity analysis of the City's sewer conveyance system assessed the capacity for current and projected wastewater flows. The analysis also provided the basis for identifying improvements that may be necessary for the City to provide the adopted LOS.
- **Economic life analysis.** An economic life analysis of the utility's sewer collection system was conducted using available data in system inventory. Those data within the system inventory that are used for such an analysis (e.g., pipe material, pipe age, and proximity to critical facilities) form what is referred to as a criticality database. The economic life analysis examined the probability of failure and the costs associated with a failure to determine the optimal timing for replacement and refurbishment (R&R) and to prioritize maintenance activities.
- **Condition assessments.** Each of the City's pump stations was evaluated the apparent physical condition of existing stations and equipment. Equipment checklists were prepared for mechanical/hydraulic and electrical/control systems, site visits were made to all stations, as-built information and O&M manuals were reviewed, and operators and maintenance personnel were asked about known issues at each location. Station operation was observed, but no detailed physical testing of equipment, wiring, controls, or structures was included. The results of the assessment were used to predict future serviceability and anticipated longevity for the development of the CIP.

ES-3 Implementation Plan

The implementation plan brings together information from the preceding chapters to form a work plan of future activities for the sewer utility. The implementation plan consists of 6-year and 20-year CIP, recommendations including monitoring and data collection, and recommendations for using asset management strategies to improve utility maintenance and operations with an outlook on long-term sustainability.

ES-3.1 6-Year and 20-Year CIP

The CIP projects mainly consist of ongoing and programmatic capital improvements. Ongoing projects include projects identified through previous studies. The City has previously allocated funding to each of these projects, which are currently in various stages of execution. These projects must continue to receive funding under the CIP until completion and have been included in this document to provide a complete picture of the program. Programmatic projects are included in the CIP to provide funding for maintaining

[1] MIKE URBAN is a GIS-integrated, modular software program developed by the Danish Hydraulic Institute for modeling water distribution and collection systems. The stormwater module is internally powered by the SWMM5 engine, which is public domain software distributed by EPA. Information about MIKE URBAN software can be found at http://www.dhigroup.com/Software/Urban/MIKEURBAN.aspx.

and/or improving the LOS. These projects do not address a specific problem, but allocate budget for addressing LOS goals.

The results of the system evaluation indicated very few new projects to be added to the 6-year CIP. The system hydraulic analysis indicated no need for capacity-related capital projects. With the exception of planned pump station decommissioning and replacement projects, the pump station conditions assessment identified relatively small projects in addition to installation of backup power at each station. The economic life analysis identified no projects in the 6-year CIP time frame and few for the 20-year planning window. The smaller projects resulting from the pump station condition assessment and economic life analysis are addressed by programmatic capital improvements.

Table ES-2 lists all 10 capital improvement projects included in this plan and lays out annual expenditures for the 6-year and 20-year CIP time frames.

Table ES-1-2. Annual Project Cost Summary for 6-Year CIP

Project number	Project name	Priority	2009	2010	2011	2012	2013	2014	2015–2028	Project Cost
1	SCADA (Telemetry) Upgrades	1	$167,000							$167,000
2a	Repair & Replacement/System Improvement Projects	1	$500,000	$150,000	$740,000	$320,000	$940,000	$975,000	$8,458,000	$12,083,000
2b	Repair & Replacement/System Improvement Projects	2	$500,000	$150,000	$740,000	$220,000	$740,000	$1,375,000	$8,692,000	$12,417,000
3a	Repair and Replacement Associated with Arterial Transportation Projects	3	$400,000	$400,000						$800,000
3b	Repair and Replacement Associated with SOS Transportation Projects	3	$500,000	$500,000						$1,000,000
4	Lea Hill Pump Station Decommissioning	2	$125,000							$125,000
5	Ellingson Pump Station Replacement/Upgrade	1	$600,000	$1,100,000	$100,000					$1,800,000
6	Dogwood Pump Station Replacement	2	$150,000	$150,000	$1,500,000					$1,800,000
7	Les Gove Area Improvements	1	$610,000	$10,000						$620,000
8	Emergency Power Generators	1	$300,000	$300,000	$300,000	$300,000	$300,000			$1,500,000
9	Replacement/Relining Anticipated by Economic Life Modeling	2							$66,000	$66,000
10	M&O Facility Improvements	1			$300,000					$300,000
	Total cost for priority 1 projects		$2,177,000	$1,560,000	$1,440,000	$620,000	$1,240,000	$975,000	$8,458,000	$16,470,000
	Total cost for priority 2 projects		$775,000	$300,000	$2,240,000	$220,000	$740,000	$1,375,000	$8,758,000	$14,408,000
	Total cost for priority 3 projects		$900,000	$900,000	$0	$0	$0	$0	$0	$1,800,000
	Total CIP cost		**$3,852,000**	**$2,760,000**	**$3,680,000**	**$840,000**	**$1,980,000**	**$2,350,000**	**$17,216,000**	**$32,678,000**

ES-3.2 Monitoring

Evaluating the adequacy of the sewer collection system and analyzing potential capital improvements require extensive data to produce accurate and reliable results. Flow monitoring and additional hydraulic model calibration is recommended in the locations where model results showed sewers (1) surcharging for current conditions and/or (2) surcharging when future growth occurs. Table ES-3 summarizes specific manholes to be monitored following large storm events.

Table ES-1-3. Proposed Sewer Manhole Monitoring Sites

Manhole ID	Purpose	Approximate duration
506-53A	Hydraulic model verification	After each significant storm event
606-08	Hydraulic model verification	After each significant storm event
1013-14	Hydraulic model verification	After each significant storm event
606-11	Hydraulic model verification	After each significant storm event
606-10	Hydraulic model verification	After each significant storm event
506-53A	Hydraulic model verification	After each significant storm event

ES-3.3 Asset Management and Maintenance and Operations

Additional recommendations were made for activities that will support asset management and ongoing M&O; specifically, the following recommendations were made:

- **Continue system inventory.** Asset management practices and maintenance and operations activities can best be utilized with a completed inventory of assets owned and maintained by the City. Many of the City's assets are currently included in its computerized maintenance management system (CMMS) but not all assets are currently included and some assets are missing important identifying information (such as age and material of construction). Completing the asset inventory along with an asset hierarchy system will help the City continue to best apply its M&O resources.

- **Update criticality database.** Detailed infrastructure data are stored in an asset criticality database which should be developed and maintained in conjunction with the system inventory. As the criticality database is improved, the economic life model can be updated to reflect changes in the where the City is carrying the majority of its risk and R&R priorities can be refined to address those areas. The economic life model is only a tool and will require annual updates as well as scrutiny from City staff as to the veracity of the results generated.

- **Optimize maintenance and operations program.** Optimizing M&O activities through an asset management-based program will lead to increased effectiveness in managing risk, public perception, regulatory compliance, and costs to the utility. The City should continue to develop an M&O program to provide strategies that will optimize resources, connect staff availability, identify critical assets, and prioritize M&O activities.

- **Discharge quality control.** The City should continue its efforts to minimize the impact of harmful components in the sewage discharged to the City's collection system. Specifically, the FOG reduction program, industrial waste permitting, and public education programs support the collection system's ability convey and pump sewage effectively.

- **Hazard planning.** The City should assess vulnerability of sewer collection system to examine the potential for natural disasters such as flood, erosion, earthquake or volcanic activity to cause system failures. The associated probabilities of failure should be weighed with the consequences of failure to determine if action is necessary and to identify appropriate mitigation measures.
- **Emergency operations.** The sewer utility's emergency operations are described in three City documents. The City's overall plan titled the City's "Emergency Operations Plan," the more specific public works plan titled the "Public Works Emergency Response Manual," and the sewer utility's manual.

A timeline was developed to illustrate how CIP and monitoring activities in the implementation plan fit together within 6-year and 20-year time frames. This timeline is presented on the following page.

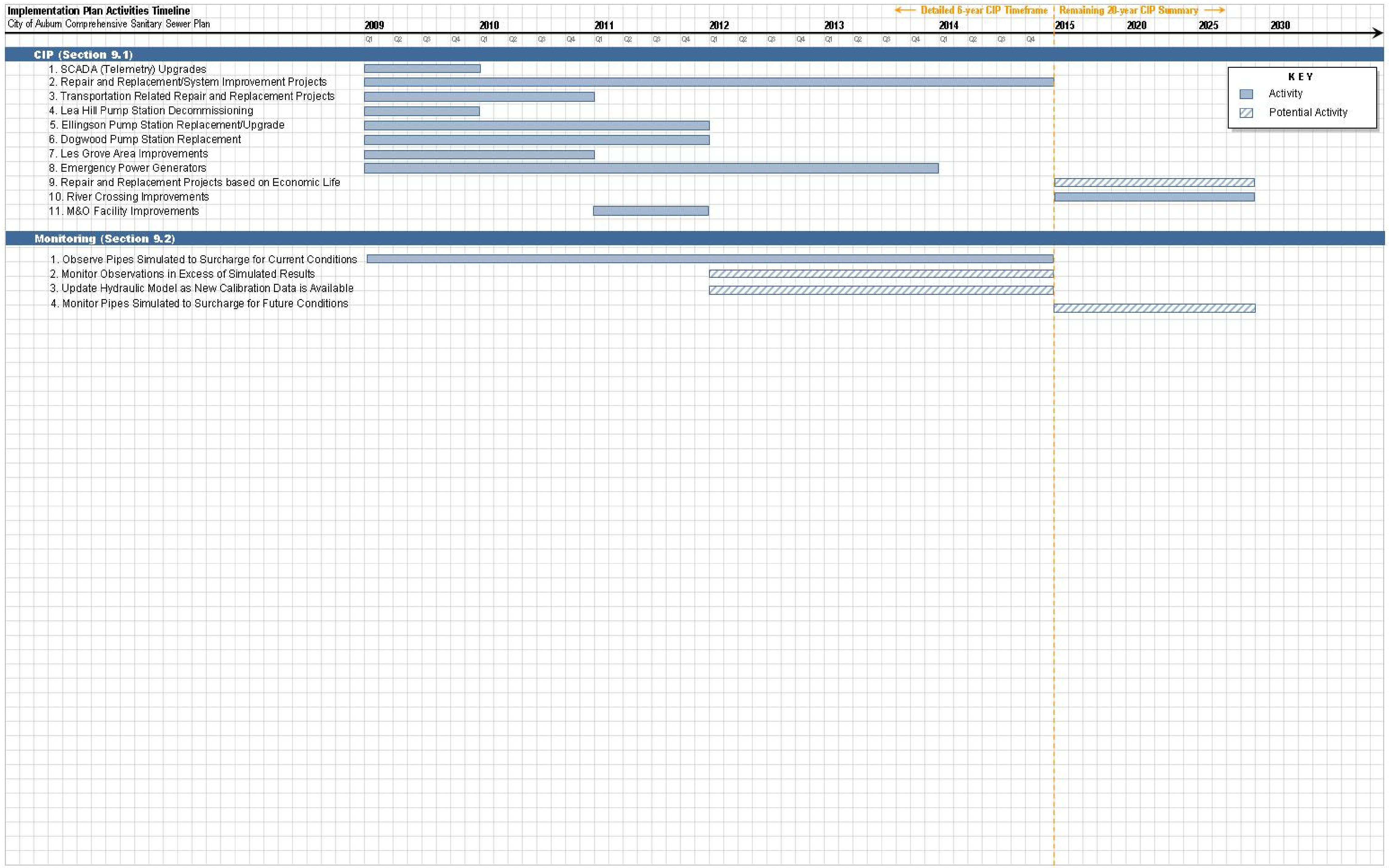


Figure ES-1. Implementation schedule

1. INTRODUCTION

This Comprehensive Sewer Plan (Sewer Plan) for the city of Auburn, Washington (City), is an update to the previous plan that was completed in November 2001 (Roth Hill Engineering Partners, LLC). A new evaluation approach of the sanitary sewer system was implemented for this Sewer Plan. The new evaluation approach incorporated the continued growth and development since completion of the 2001 Sewer Plan, and reevaluated the Capital Improvement Program (CIP) to account for completed projects, changes in system conditions, and new development, as well as to incorporate new financial information.

This Sewer Plan contains time frames which are the intended framework for future funding decisions and within which future actions and decisions are intended to occur. However, these time frames are estimates, and depending on factors involved in the processing of applications and project work, and availability of funding, the timing may change from the included time frames. The framework does not represent actual commitments by the City which may depend on funding resources available.

1.1 Purpose and Objectives

The purpose of the Sewer Plan is to guide the City's Sanitary Sewer Division with respect to future activities and improvements for the sanitary sewer utility. To fulfill this stated purpose the following objectives were achieved:

- evaluate environmental, social, and regulatory drivers to develop level of service (LOS) goals for capital facility infrastructure development, operation, maintenance, and other key elements of utility management
- create a comprehensive sanitary sewer system inventory that incorporates currently available infrastructure data into a digital database that can be directly linked with the hydraulic model used for analyzing the system
- perform hydraulic modeling analysis to evaluate system capacity
- evaluate the condition of the City's sanitary sewer pumping stations, and perform an economic life analysis of existing assets within the sanitary sewer collection system to develop recommendations for future repair and replacement (R&R) activities
- develop a CIP by sustainably meeting required customer service levels, effectively managing risks, and minimizing the City's costs of sewer asset ownership
- develop recommendations for creating a maintenance and operations (M&O) program that will assist the City in continuing to transition from a reactive maintenance environment to a proactive environment
- prioritize capital improvement projects and R&R activities to accommodate both 6- and 20-year funding frameworks.

1.2 Document Organization

This Sewer Plan is organized to focus on the actions that the utility will take while implementing the plan. Supporting documentation and background information will be included in appendices of the Sewer Plan where deemed appropriate. This Sewer Plan is organized into the following chapters:

Chapter 1	**Introduction:** describes the reasons for developing a Sewer Plan, and also states the purpose and objectives of the Sewer Plan
Chapter 2	**Background:** provides background information regarding the sewer utility and service area
Chapter 3	**Wastewater System Policies:** specifies the utility policies and LOS goals used to develop capital improvements and future M&O activities
Chapter 4	**Description of Existing System:** describes the existing conditions of the City's sanitary sewer system
Chapter 5	**Sewer System Analysis:** presents methodologies used to evaluate sewer asset conditions and analyze system capacity
Chapter 6	**Recommended Capital Improvements:** describes recommended capital improvement projects including cost estimates
Chapter 7	**Maintenance and Operations:** reviews the M&O associated with the Auburn sanitary sewer utility and introduces a criticality-based maintenance strategy
Chapter 8	**Finance:** develops a funding plan that optimizes use of rates, systems development charges and/or other service fees based on projected utility spending requirements and a review of funding sources and City financial policies
Chapter 9	**Implementation:** prioritizes capital improvement projects and lays out a future work plan.

2. BACKGROUND

2.1 Introduction

This chapter includes background information created or updated after publication of the 2001 Sewer Plan. Changes to the City's Comprehensive Plan (Comp Plan) policies that influence the design and operation of the sanitary system are provided. Also included is a description of the City sanitary sewer service area (SSSA) along with information on adjacent sewer utilities, which will facilitate an understanding of existing and potential opportunities for collaborative activities with other purveyors to potentially enhance system reliability or reduce costs. Changes to land use planning efforts affecting the city of Auburn's sanitary sewer service are also discussed. For reference, a vicinity map showing the City of Auburn in relation to the regional King County wastewater treatment plant is provided as Figure 2-1.

2.2 Previous Auburn Comprehensive Sewer Plans

The 2001 Sewer Plan superseded the previous 1968 and 1982 Sewer Plans. As stated in the 2001 Sewer Plan, many of the concepts established in the previous two plans were used. The 2001 Sewer Plan considered changes to service area and zoning, as established through the Growth Management Act (GMA) by the City and in unincorporated King County.

2.3 City Comprehensive Plan

The City most recently revised its Comp Plan in December 2008. The most recent revision included the following two changes to the capital facility objectives and policies (from the capital facilities chapter of the Comp Plan) identified in the 2001 Sewer Plan:

1. **Policy CF-5**: This capital facility policy was deleted in December 2001.
2. **Policy CF-22**: This capital facility policy was amended to remove reference to the 1982 Sewerage Plan.

City Comp Plan policies are included for reference in Chapter 3: Wastewater System Policies.

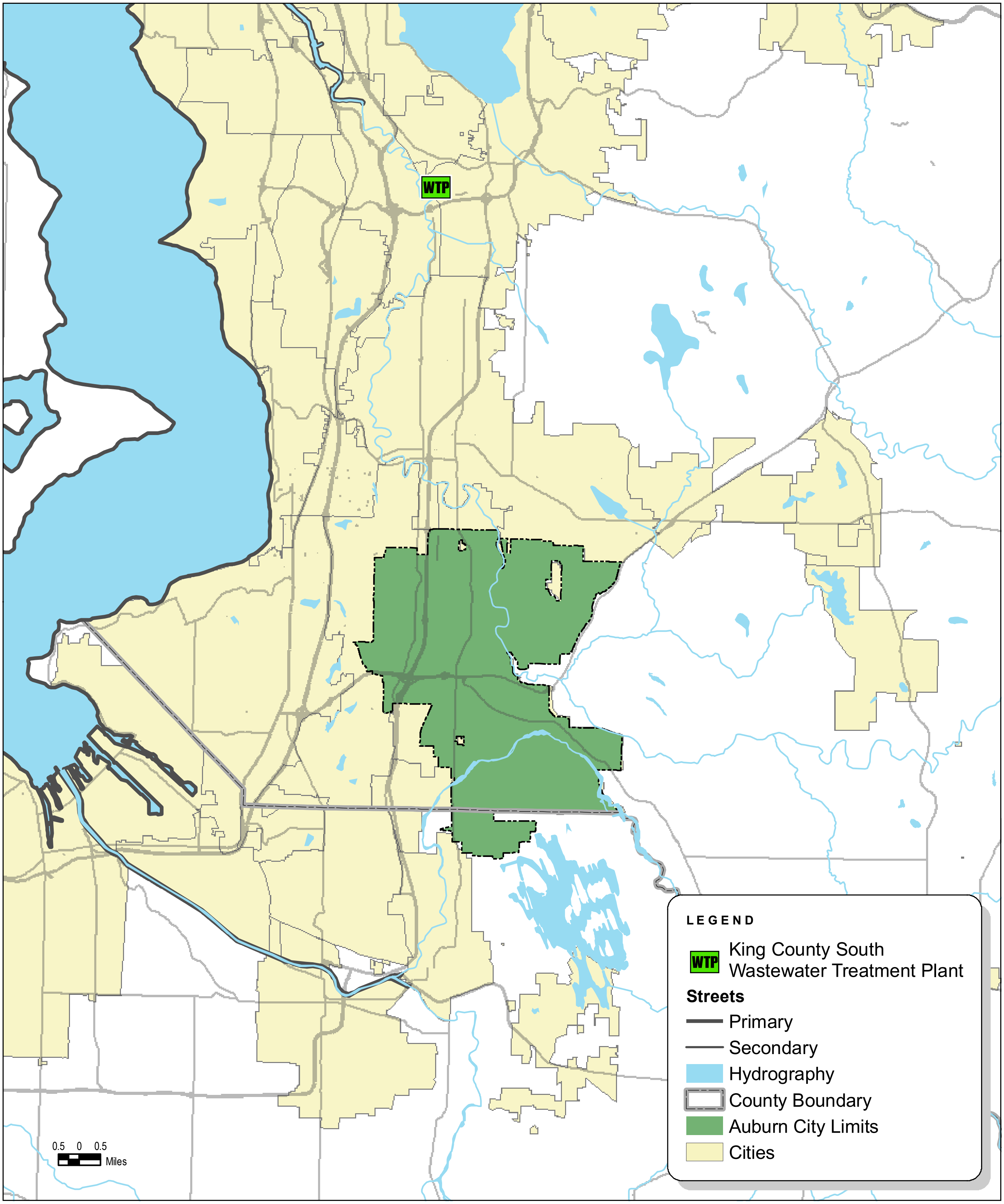
2.4 Potential Annexation Areas

The 2001 Sewer Plan discussed areas anticipated for annexation by the City, according to the 1995 City Comp Plan. These areas are identified as Potential Annexation Areas (PAAs) in the City Comp Plan. A significant portion of PAAs described previously were annexed into Auburn as of January 1, 2008. The City's remaining PAAs lie within its SSSA.

2.5 Sanitary Sewer Service Area

The City's SSSA has not changed significantly since the 2001 Sewer Plan. Portions of the service area have been annexed by the City, but the service area boundary remains essentially the same. The City is proposing to extend service to a small area of unincorporated King County located west of Algona which abuts the existing service area. The City coordinates service at the boundary of its service area with nearby sewer utilities. This coordination is discussed in Section 2.7. The existing and proposed SSSA is shown on Figure 2-1.

As stated in the 2001 Sewer Plan, when the City's SSSA extends beyond the current corporate limits of the city, a franchise is required by Auburn to own, maintain, and manage the sanitary sewer facilities within King and Pierce Counties' rights of way. King County Franchise 14458, which expires in 2027, includes all of Auburn's SSSA within King County as of 2002, when the franchise was granted. Since then, much of that area has been annexed into the City, and this plan proposes to add an additional area in the southwest portion of the City. Upon approval (or rejection) of this additional service area, the City should work with King County to revise the franchise agreement to accurately reflect the service area and current city limits.



COMPREHENSIVE SEWER PLAN
December 2009

BROWN AND CALDWELL

CITY OF AUBURN WASHINGTON

FIGURE 2-1
VICINITY

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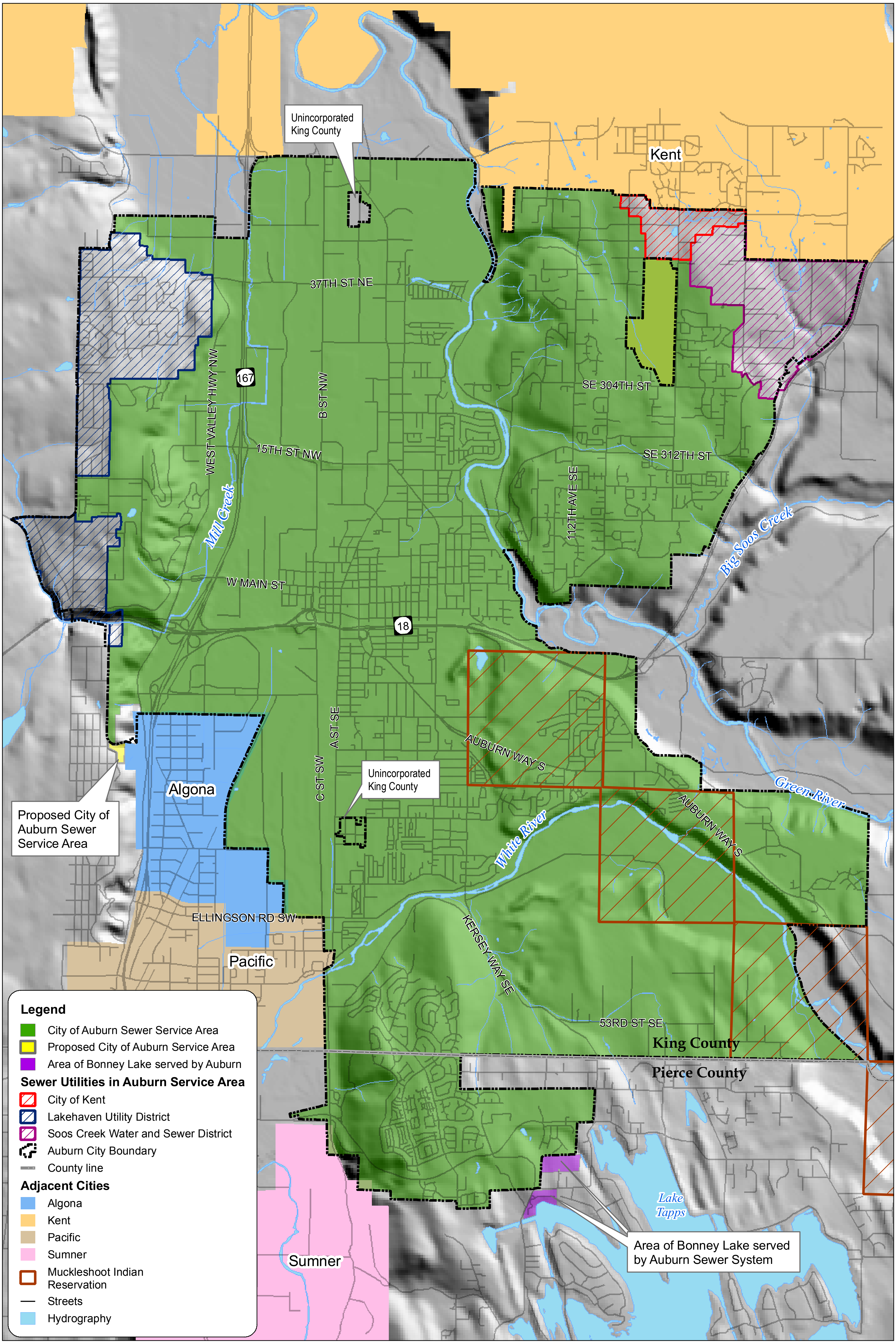

COMPREHENSIVE SEWER PLAN
December 2009

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CITY OF AUBURN WASHINGTON

FIGURE 2-2
CITY OF AUBURN
COMPREHENSIVE SEWER
PLAN STUDY AREA

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2.6 Existing Land Use Plans

Various land use plans govern the Auburn SSSA; these plans are described in the following section.

2.6.1 King County Comprehensive Land Use Plan

As stated in the 2001 Sewer Plan, the urban unincorporated areas of the City's SSSA are subject to the King County Comprehensive Plan. An update to the King County Comprehensive Plan that affects administration of this area was adopted on October 6, 2008. This section describes changes in this plan affecting policy direction for functional plans, such as a comprehensive sewer plan.

In the updated 2008 King County Comprehensive Plan, policy F-245 states:

> In the Urban Growth Area, all new development shall be served by Public sewers unless:
>
> a. Application of this policy to a proposal for a single-family residence on an individual lot would deny all reasonable use of the property; or
>
> b. Sewer service is not available for a proposed short subdivision of urban property in a timely or reasonable manner as determined by the Utility Technical Review Committee. These onsite systems shall be managed by one of the following entities, in order of preference:
>
> 1. The sewer utility whose service area encompasses the proposed short subdivision.
> 2. The provider most likely to serve the area.
> 3. An Onsite Sewage System Maintainer certified by the Seattle-King County Department of Health.
>
> The onsite system shall meet all state and county approval requirements. The approved short subdivision shall indicate how additional lots to satisfy the minimum density requirement of the zoning will be located on the subject property in case sewers become available in the future. There shall be no further subdivision of lots created under this policy unless served by public sewers.

In conjunction with F-245, policy F-246 states:

> In the Urban Growth Area, King County and sewer utilities should jointly prioritize the replacement of onsite systems that serve existing development with public sewers, based on the risk of potential failure. King County and sewer utilities should analyze public funding options for such conversion and should prepare conversion plans that will enable quick and cost-effective local response to health and pollution problems that may occur when many onsite systems fail in an area.

The City's service area currently includes two areas of unincorporated King County as shown on Figure 2-1. Additionally, the City is proposing to extend service to a small area of unincorporated King County southwest of the city.

2.6.2 King County Regional Wastewater Services Plan

In 2007, King County adopted a revised Regional Wastewater Services Plan (RWSP), which outlines proposed conveyance improvements. Improvements that impact Auburn are noted as a parallel interceptor to the existing "Valley Conveyance System" and/or a storage facility to equalize peak flows. Future extensions also include the possibility of locating a regional pump station at the east side of the Lea Hill sewer basin.

In conjunction with the RWSP, the City participated in an inflow and infiltration (I/I) study as a component sewer agency of King County. The city was the site of a pilot project that helped to demonstrate the following:

- I/I can be found
- I/I reduction can be achieved
- costs associated with I/I can be identified.

As a result of the pilot project and I/I study, King County has proposed to implement and evaluate two or three "initial" I/I reduction projects to test the effectiveness of I/I reduction on a larger scale than the pilot projects. An "initial" project is not scheduled to be constructed in Auburn. After completion of the "initial" I/I reduction projects, King County will make recommendations regarding long-term I/I reduction and control. As a partner agency to King County, Auburn will be involved with long term I/I reduction and control.

2.6.3 City of Auburn Water Resources Protection Report

As stated in the 2001 Sewer Plan, coordination with the water utility may be necessary in the future, as many of the City's unsewered areas lie within the Water Resource Protection Areas identified in the Water Resources Protection Report completed in 2000. In particular, planning for future sewer infrastructure could include the importance of removing potential contamination (i.e., onsite sewer systems) from the Water Resource Protection Areas, based on coordination with the water utility.

2.7 Neighboring Utility Plans

The communities that surround the city of Auburn administer their own sewer systems; the following section describes these systems and explains interlocal agreements between the City and these communities that establish SSSA boundaries and other conditions of service.

2.7.1 Soos Creek Water and Sewer District

In the northeast section of the City's recently annexed property, within Lea Hill, is an area served by the Soos Creek Water and Sewer District. In 2001, prior to annexation, Auburn and Soos Creek executed an interlocal agreement establishing sanitary sewer service boundaries in order for Auburn to receive a sewer certificate of availability of that area. This agreement will enable Soos Creek to provide the most efficient method of sanitary sewer service to this portion of the city while ensuring that the City's development standards are maintained. A copy of this agreement is included in Appendix A. Soos Creek last updated their Sewer Comprehensive Plan in 2005. The next update to the plan is scheduled for 2011.

2.7.2 City of Kent

In the northeast section of the city of Auburn's recently annexed property, adjacent to Soos Creek and within Lea Hill, is a small area served by the city of Kent (Kent). In 2001, prior to annexation, Auburn and Kent executed an interlocal agreement establishing sanitary sewer service boundaries in order for Auburn to receive a sewer certificate of availability of that area. Kent and Auburn agreed that Kent would provide sewer service to the area because Kent had the ability to provide gravity service while Auburn did not have a cost-effective means of providing comparable service. A copy of this agreement is included in Appendix A. Kent last updated their Sewer Comprehensive Plan in 2000 and currently do not have the next update scheduled.

2.7.3 City of Pacific

An interlocal agreement establishing sanitary sewer service boundaries between Auburn and the city of Pacific (Pacific) was executed in 2008. This agreement allows Auburn to provide sanitary sewer service to property located on the eastern portion of Pacific's municipal boundary which lies in the vicinity of Auburn's sanitary sewer infrastructure. The agreement recognizes that Auburn has sufficient wastewater conveyance capacity to support the service area with maximum efficiency in the use of existing and future facilities, together with orderly and efficient sanitary sewer planning. A copy of this agreement is included in Appendix A. Pacific last updated their Sewer Comprehensive Plan in 1996. An update to the plan is currently underway and scheduled for completion in 2010.

2.7.4 Muckleshoot Indian Tribe Reservation

The Muckleshoot Indian Tribe (MIT) reservation is located within and to the southeast of Auburn city limits, as shown in Figure 2-1. According to the 2001 Sewer Plan, in 1997, the MIT, Indian Health Service, and the city of Auburn entered into an agreement for the City to provide sanitary sewer service to the MIT property located outside city limits, outside the PAA, and outside the Urban Growth Area. An additional agreement was signed in 2004 which outlined improvements to the conveyance system from the south end of the City on Auburn Way South to the connection to King County's "M" Street Trunk. Two outcomes of that agreement were (1) that the MIT become a component agency of the King County Wastewater Treatment Division which officially happened in July 2004, and (2) that the MIT would own a portion of the capacity within that Auburn Way South sewer line for the conveyance of sewage to King County. Lands owned by the MIT within Auburn's sewer service area are billed as ordinary Auburn ratepayers. The MIT does not have a Sewer Comprehensive Plan, but one is currently in progress.

2.7.5 Lakehaven Utility District

In 2004, an interlocal agreement was established between the Lakehaven Utility District and Auburn delineating a mutual sewer service boundary within a portion of the West Hill Service Area, an area recently annexed by Auburn. The area was being serviced by Lakehaven, and it was determined that Lakehaven should continue to provide sewer service to this area in an efficient, cost-effective way.

An amendment to this agreement was established in 2005 transferring sewer service from Lakehaven to Auburn for the area known as Jovita Heights-West Hill, an area located within the West Hill Service Area. Copies of both agreements are included in Appendix A. Lakehaven last updated their Sewer Comprehensive Plan in 1999 and are currently working on an update scheduled for completion in 2009.

2.7.6 City of Algona

The city of Algona (Algona) borders Auburn to the southwest. In 2003, Algona and Auburn executed an interlocal agreement establishing sanitary sewer service boundaries. The agreement allows Algona to provide sewer service to a small area in southwest Auburn, within the city limits and adjacent to Algona. Sewer service by Algona provides efficiency in the use of existing and future facilities. A copy of this agreement is included in Appendix A.

2.7.7 City of Bonney Lake

An addendum to a 1998 interlocal agreement establishing sanitary sewer service boundaries between the city of Bonney Lake (Bonney Lake) and Auburn to roughly coincide with Auburn's PAA boundaries was executed in February 2005. The addendum added a single parcel to Auburn's SSSA because the parcel was partially located in both Auburn and Bonney Lake's service areas as a result of the previous agreement.

In April 2005, an interlocal agreement was established for Auburn to provide sanitary sewer service to a parcel within Bonney Lake's SSSA (and designated within Pierce County's Urban Growth Area). The maximum efficiency in the use of existing and future facilities is achieved by having Auburn provide sewer service to this area within Bonney Lake. A subsequent agreement, executed in August 2005, allows for Bonney Lake to serve the parcel in question once a sewer franchise with Pierce County has been secured for the area of Pierce County in which this parcel is located. Copies of both agreements are included in Appendix A.

2.7.8 King County

In 2002, Auburn was granted a sanitary sewer franchise from King County to operate, maintain, repair, and construct sewer mains, service lines and appurtenances in, over, along, and under County roads and rights-of-way in areas which at that time were located within unincorporated areas of King County. A copy of the agreement is included in Appendix A.

3. WASTEWATER SYSTEM POLICIES

This chapter presents policies and standards that guide the operation and development of the City's wastewater collection and conveyance system. The existing policies and standards are derived from the City's current Comp Plan, as amended through December 2008, and the 2001 Comprehensive Sewer Plan prepared by Roth Hill. Various utility service levels have been identified and included in this Comprehensive Sewer Plan for the purpose of setting utility performance metrics.

3.1 Sewer Comprehensive Plan Policies, Standards and Guidelines

This Sewer Plan presents a number of policies or standards related to system development, maintenance, and funding. Many of these have been drawn from the City's Comp Plan and the existing Sewer Plan. The following table organizes these various policies or standards within topics related to service area, system planning, facility design standards, and utility financing. Taken together with the Comp Plan, these policies define limits to City wastewater collection system expansion in terms of geographical area, jurisdictional boundaries, interlocal agreement, and expansion project funding.

Table 3-1. Sewer Comprehensive Plan Policies

Item	Category	Policy, Standard or Guideline Statement	Related City Comprehensive Plan Policy
1	Service Area	The city of Auburn comprehensive planning includes the provision for future sewer service to all properties located within its current city limits and potential annexation area.	CF-1, EN-9
2	Service Area	The Sanitary Sewer Utility will consider, but not encourage providing sanitary sewer service to properties outside the sewer service area. Property owners outside the sewer service area bear the burden of approaching adjacent sewer providers for service.	
3	Service Area	The Sanitary Sewer Utility does not intend to extend sanitary sewer service to or through King County rural zoned property.	LU-8, LU-10
4	Service Area	Development where sewer service is not readily available may be served by individual onsite systems if the individual lots are large enough to accommodate onsite systems per the requirements of the King County Department of Health.	
5	Planning Considerations	Future land use patterns for the Sanitary Sewer Service Area are expected to correspond to existing uses.	CF-22
6	Design Standards	The technical criteria utilized by the City for the design and construction of its sanitary sewer infrastructure are based on the most recent versions of the Department of Ecology publication "Criteria for Sewage Works Design" and WSDOT/APWA Standard Specifications. The City's modifications and supplements to this criterion are found in the City's Public Works Design and Construction Standards.	
7	Design Standards	It is the City's policy to transport sewage by gravity as the most cost-effective method.	

Table 3-1. Sewer Comprehensive Plan Policies			
Item	**Category**	**Policy, Standard or Guideline Statement**	**Related City Comprehensive Plan Policy**
8	Design Standards	The City prefers to serve all properties by gravity sewer. Pumped systems will only be used when it is not feasible to install a total gravity system. The City will give preference to the construction of fewer large pump stations over a greater number of smaller stations. Low pressure force mains are discouraged.	
9	Utility Financing	Capacity problems within the existing system created by future development should be funded by future developers.	CF-23, CF-25, CF-6
10	Utility Financing	The Utility shall implement an adequate system of internal controls and shall adopt an annual budget.	
11	Utility Financing	The Utility shall remain a self-supported enterprise fund, however, grants and other alternative financing may be sought and used.	
12	Utility Financing	The funding for the Capital Improvement Program shall be sustained at a level sufficient in order to maintain system integrity.	
13	Utility Financing	The Utility shall establish fees and charges to recover all utility costs related to development.	CF-3, CF-23, CF-25
14	Utility Financing	Sewer rates shall be established at a level sufficient to pay expenses and maintain adequate reserves.	
15	Utility Financing	Sewer rates shall be evaluated as part of the budgeting process.	
16	Utility Financing	The sewer rate structure shall allocate costs fairly between different customer classes.	
17	Utility Financing	Rates charged shall be uniform for all Utility customers of the same class throughout the service area.	
18	Utility Financing	Rate assistance programs are provided for qualified specific low-income seniors or totally or permanently disabled citizens.	
19	Utility Financing	The Sanitary Sewer Utility should maintain adequate reserves for operation and maintenance, capital improvement, and Sewer revenue bond obligations in order to ensure that the Utility can provide continuous, reliable service and meet its financial obligations under reasonably anticipated circumstances.	
20	Utility Financing	The City shall seek to require new customers to substantially pay for the costs of improvements designed to accommodate growth, while the costs to operate, maintain, repair, and improve the existing system capacity are paid by all sewer system customers.	
21	Utility Financing	The City has an established policy of reinvesting in utility capital assets in order to ensure that the integrity of the existing utility plant and equipment is maintained. This reinvestment is generally referred to as repair and replacement.	CF-25
22	Utility Financing	In addition to projects designed to maintain and replace existing facilities, the City shall seek to invest annually in system improvements designed specifically to upgrade the system in order to meet the City's standards and criteria. These improvements may include upgrades to the sanitary sewer SCADA and data management systems, upgrades to increase safety for both City personnel and the public, and reduction of environmental impacts.	
23	Wastewater Quality	The Utility, in cooperation with King County shall seek to maximize compliance with limits established in Auburn City Code 13.20.140 which designates prohibited discharges to the public sanitary sewer. Waters and wastes including, but not limited to, industrial process chemicals, pharmaceuticals, and fats, oils, and greases (FOG) are limited or prohibited from discharge to the public sewer according to the code.	

3.2 Sanitary Sewer Level of Service

In recent years wastewater utilities have begun to identify and articulate levels of service that define both the public service they provide and a measurable representation of that service. By defining service in a quantifiable way, the utility is able to determine whether it is meeting its own minimum performance standards and, conversely, determine whether reallocation of resources or additional funding may be justified to improve performance. Some service levels might even be set for internal functions for the same reason of helping to prioritize spending by recognizing critical activities.

3.2.1 Sanitary Sewer Level of Service

Table 3-2 presents the LOS for the Auburn SSSA and a description of how they might be defined and measured.

Table 3-2. Utility Levels of Service

Policy category	Service provision policy	Level of service
1. System capacity	1.1 The City will size ***gravity sewers*** for peak wet weather flow rates that include I/I flows.	Gravity sewers will be sized to convey the peak once-per-20-year peak hour flow without surcharging.
	1.2 The City will size ***pump stations and force mains*** for peak wet weather flow rates that include I/I flows.	Pump stations will be sized to convey the once per 5-year flow with one pump out of service and convey the once per 20-year flow with all pumps in service.
2. System performance and reliability	2.1 The City will monitor the frequency and causes of any service disruptions and develop programmatic methods for reducing the number of disruptions (e.g., backups).	The City will investigate all customer service calls and record results in the computerized maintenance management system (CMMS) system to establish baseline. The City will develop operation and maintenance plan to set goals for minimizing blockages, backups, response time, etc.
	2.2 The City will maintain an asset criticality database to be used in prioritizing asset maintenance and repair and replacement.	The City will develop and maintain an asset criticality database. The existing criticality database will be refined to include more asset age and material information, and will be validated using the results of M&O inspections.
	2.3 The City will perform condition assessments of critical assets.	The City will develop and implement a condition assessment schedule for all critical assets.
	2.4 The City will attempt to repair or replace system assets before they exceed their economic life.	The number of high-criticality pipe segments beyond economic life will be minimized.
	2.5 The City will conduct maintenance activities at a level that is consistent with optimizing system reliability, asset economic life, and system performance.	The City will develop schedules for maintenance of wastewater collection and conveyance assets and link its implementation to system performance, e.g., record instances of missed maintenance and identify inadequate performance related to maintenance (grease and roots blockages) including missed scheduled maintenance.

Table 3-2. Utility Levels of Service		
Policy category	**Service provision policy**	**Level of service**
	2.6 The City will maintain a level of reliability for pump stations provided by redundancy of critical mechanical and electrical components.	The City will provide backup power generators or dual power feeds and provide a minimum of two pumps at each City pump station over next planning cycle.
3. Protection and improvement of the environment	3.1 The City will comply with all federal, state, and local regulations in operation and maintenance of the City's wastewater collection and conveyance infrastructure.	The City will comply with the applicable regulations.
	3.2 The City will evaluate sanitary sewer utility activities to emphasize sustainability practices.	City staff will identify specific areas to measure sustainability. Examples could include weighing energy consumption impacts more heavily during capital project development, selecting less impactful cleaning and maintenance products, and structuring maintenance activities to minimize vehicle travel miles. While maintaining minimum flows for efficient operation of the system, water conservation will be practiced whenever possible. City staff will benchmark practices and log changes.
	3.3 The City will support the use the use of reclaimed water technologies where economically feasible.	City staff will evaluate opportunities for reclaimed water use and support initiatives where the benefits outweigh costs.
4. Utility financial performance	4.1 Continue to fund and provide wastewater collection and conveyance service through the existing sanitary sewer utility. The City's sanitary sewer utility should be responsible for ***implementation, maintenance, and operation*** of the City's collection system.	100% of cost of wastewater collection and conveyance service delivery will be recovered via sanitary sewer utility funding.
	4.2 Appropriate rates and system development charges shall be assessed to fund the ongoing maintenance, operation, and capital expenditures of the utility, in accordance with the Comprehensive Wastewater Plan. Periodic (typically every 5 years) cost of service studies shall be completed to reassess the monthly service and system development charges (both City and King County portions).	Updates will coincide with 6-year CIP updates.
	4.3 The City will track cost of claims as a metric.	The City will create a baseline against which to evaluate future improvements.
	4.4 The City will track schedule and budget accuracy and performance in CIP implementation.	The City will create a baseline against which to evaluate future improvements.
5. Customer satisfaction	5.1 The City will evaluate and strive to maintain customer satisfaction with sanitary sewer utility service delivery	• The City will create a baseline against which to evaluate future improvements: o Annual assessment of complaints/citizen reports • The City will communicate proactively with community and stakeholders regarding wastewater service improvements.

3.3 City Comprehensive Plan Goals and Policies

The Comp Plan is the City's growth management plan and contains policies for protecting critical areas and natural resource lands, designating urban growth areas, preparing comprehensive utility plans, and implementing them through capital investments and development regulations. Therefore, the Comp Plan provides a framework of policies for development, expansion and maintenance of the City's sanitary sewer utility.

Goals and sanitary sewer utility specific policies from the Comp Plan current at the time this Sewer Plan was completed are cited below. Note: the following excerpts from the Comp Plan should not be considered official and are provided for reference.

1. GOAL 1. PLANNING APPROACH - To manage growth in a manner which enhances, rather than detracts from community quality and values by actively coordinating land use type and intensity with City facility and service provision and development.
   a. Objective 1.3. To establish and support an effective regional system of growth management based on an efficient system of urban service delivery and appropriate development of unincorporated areas.
      i. GP-9 Provision of urban level services by the City of Auburn or a special district should be a prerequisite for development within Auburn's potential annexation area. Annexation should be required as a condition of the provision of utility services by the City of Auburn. Development should look to Auburn as the ultimate service provider.
   b. Objective 1.4. To ensure that new development does not out-pace the City's ability to provide and maintain adequate public facilities and services, by allowing new development to occur only when and where adequate facilities exist or will be provided, and by encouraging development types and locations which can support the public services they require.
      i. CF-1 Lands designated for urban growth by this Plan shall have an urban level of public facilities (sewer, water, storm drainage, and parks) prior to or concurrent with development.
      ii. CF-3 If adequate facilities are currently unavailable and public funds are not committed to provide such facilities, developers must provide such facilities at their own expense in order to develop.
      iii. CF-4 The City should continue to assist through direct participation, LIDs and payback agreements, to the extent permitted by law, where appropriate and financially feasible. Where funding is available, the City may participate in developer initiated facility extensions or improvements, but only to the extent that the improvements benefit the broader public interest, and are in accord with the specific policies and recommendations of the appropriate City public facilities plan.
      iv. CF-6 New connections to the City's sanitary sewer, water and/or storm drainage systems, shall contribute their fair share toward the construction and/or financing of future or on-going projects to increase the capacity of those systems.
      v. CF-7 The City shall encourage and approve development only where adequate public services including police protection, fire and emergency medical services, education, parks and other recreational facilities, solid waste collection, and other governmental services are available or will be made available at acceptable levels of service prior to project occupancy or use.
      vi. CF-8 Extension of any individual facility, irrespective of mode of financing, to serve new development should be approved only if it is determined that adequate fiscal capacity exists to support the extension of other needed facilities.
      vii. CF-9 Extension of any individual facility, irrespective of mode of financing, to serve new development should be approved only if it is determined that adequate fiscal capacity exists to support cost effective service by all on-going public services and maintenance of facilities.

2. GOAL 5. CITY EXPANSION AND ANNEXATION - To ensure the orderly development of the City's potential annexation area, in a manner that ensures adequate and cost-effective provision of required urban services and facilities, ensures that development is built to City standards, reduces sprawl, implements the goals, objectives and policies of the Auburn Comprehensive Plan, and protects designated rural areas.

a. Objective 5.2 To ensure that all development that occurs within Auburn's Potential Annexation Area is built in compliance with City codes and standards.
   i. CE-3 Until such time a joint planning agreement between the City and respective county is in effect that provides for development in the unincorporated Potential Annexation Areas (PAA) to meet City standards, annexation shall be required as a condition of the City's provision of sewer and/or water utility service to properties within the Potential Annexation Area. Exceptions to this involve requests for water and/or sewer service for the following:
      1. Single family residences on pre-existing lots;
      2. To address a documented imminent health or safety consideration; or,
      3. To development where a water/sewer availability agreement has previously been approved with the city and is still valid; or
      4. Public facilities, provided that development of the public facility is otherwise consistent with an applicable adopted capital facilities plan.
   ii. In situations where an exception applies, the City of Auburn shall require the property owner to enter into a legally binding, non-remonstrance pre-annexation agreement with the City. The agreement shall provide for the property owners support for annexation to the City at such time as the City deems annexation appropriate. In these instances, the following conditions shall also apply:
      1. The property owner/developer shall agree to comply with appropriate City development standards and public facility specifications where such requirements are not superseded by applicable County requirements (in the event of significant conflict between City and County requirements, the City may choose to not extend utility service). Any facilities to be dedicated to the City of Auburn upon completion (e.g. sewer and water lines and appurtenances) shall be built in accordance with City design and construction standards; and
      2. The property owner/developer shall allow City plan review prior to construction, and inspection during construction of all public improvements as they are built, regardless of the ownership of such improvements, and shall reimburse the City for any reasonable costs incurred in such plan review and inspection
   iii. CE-3A The city shall seek interlocal agreements with the adjacent sewer purveyors that provide sewer service to developers inside of Auburn's PAA to obtain an Auburn Pre-Annexation Agreement prior to issuing a Sewer Certificate of Availability.
b. Objective 5.3 To ensure that any urban service extension is in full compliance with the City's facility plans, this comprehensive plan and the Countywide Planning Policies.
   i. CE-4 The City of Auburn shall not extend or allow the extension or upsizing of City sanitary sewer or water utility service beyond its respective approved utility service areas, except through interlocal agreements with adjacent recognized service providers
   ii. CE-7 The City of Auburn shall not extend or allow the extension of City sewer or water utility service within areas designated as Rural on the City's Comprehensive Plan Map, or within designated Agricultural or Forest Resource Lands, except when the extension is necessary to alleviate an imminent threat to public health, in which case such extension shall be designed or conditioned to ensure that it does not promote additional urban development.
c. Objective 5.4. (Chapter 5) To ensure that new developments are supported by an adequate level of public services through an effective system of public facilities.
   i. CF-10 Public facilities shall be provided in accord with the guidance of the Capital Facilities Plan or, as may be appropriate a system plan for each type of facility designed to serve at an adequate level of service the locations and intensities of uses specified in this comprehensive plan.
   ii. CF-11 No new development shall be permitted unless the facilities specified in each facility plan are available or can be provided at a level adequate to support the development. The adequacy of facilities shall be determined by the following:
      1. An adopted system plan;
      2. Policy guidance as provided in the City Capital Facilities Plan;
      3. Appropriate engineering design standards as specified in applicable City Plans, Codes, and manuals as adopted by the City Council
      4. Environmental review standards (adequacy includes the absence of an unacceptable adverse impact on a public facility system).

            5. Case by case evaluation of the impacts of a proposed development on the public facility systems: first to determine the minimum amount of facilities necessary to support the development and second to determine a proportionate share of the system to be developed or financially guaranteed before approving the development.
        iii. CF-12 No new development shall be approved which is not supported by a minimum of facilities to support the development and which does not provide for a proportionate share of related system needs.
    d. Objective 5.4 (Chapter 13) To ensure coordination and cooperation between the City of Auburn and adjacent jurisdiction in implementing mutual goals, objectives and policies regarding urban growth.
        i. CE-11 Whenever onsite sewage facilities are allowed, they shall be sited, designed, built and maintained according to guidelines for the King County Department of Health for property situated in King County and the Pierce County Department of Health for property situated in Pierce County. If built in an area contributory to any beneficial groundwater use, including but not limited to planned or existing potable water sources or existing fisheries, such facilities shall demonstrate compliance with the Washington State Anti-Degradation Policy (WAC 173-200-030) and implement all known, available and reasonable methods of control and treatment for the reduction or elimination of pollutants.

3. GOAL 6. URBAN FORM - To establish an orderly urban form which separates uses on the basis of their functional relationship to the community, and which reinforces the identity of the community.
    a. Objective 6.3. To protect community identity while promoting diversity and conserving rural amenities, by designating rural areas along the city's periphery and in areas with significant environmental values.
        i. LU-8 The City shall not extend accessible City utility systems into the Upper Green Valley, and shall thus protect these agricultural soils from conversion to urban uses.
        ii. LU-10 The City shall support low density County zoning adjacent to the city on the Enumclaw Plateau and will not extend City sewer and water facilities into the area if it will promote urban development.

4. GOAL 11. INDUSTRIAL DEVELOPMENT - To provide for, establish and maintain a balance of industrial uses that respond to local and regional needs and enhance the city's image through optimal siting and location, taking into consideration tax policy impacts of streamlined sales tax and/or other similar legislation.
    a. Objective 11.2. To establish performance standards appropriate for developing industrial areas
        i. LU-105 Needed rights-of-way, on-site and off-site road improvements, and utilities should be assured before development occurs.
        ii. LU-106 Individual development projects shall provide the following minimal improvements in accordance with established City standards:
            1. Full standard streets and sidewalks in compliance with the Americans with Disabilities Act.
            2. Adequate off street parking for employees and patrons.
            3. Landscaping.
            4. Storm drainage.
            5. Water.
            6. Sanitary sewers.
            7. Controlled and developed access to existing and proposed streets.

5. GOAL 13. CITY UTILITIES - To protect the public health and safety by providing efficient and cost-effective water, sanitary sewer, storm drainage and solid waste services to the community. Ensure that development will only occur if the urban services necessary to support the development will be available at the time of development.
    a. Objective 13.2 To ensure the efficient transmission of sanitary sewage to the appropriate treatment and disposal facilities, in order to meet the needs of the existing community and provide for its planned growth.

i. CF-22 The Comprehensive Sanitary Sewerage Plan is incorporated as an element of this Comprehensive Plan. The Comprehensive Sanitary Sewer Plan for the City of Auburn shall reflect the planned land uses and densities of this Comprehensive Plan.

ii. CF-23 The City shall continue its policy of requiring that sewer system extensions needed to serve new development shall be built prior to or simultaneous with such development, according to the size and configuration identified by the Comprehensive Sanitary Sewer Plan and Comprehensive Plan as necessary to serve future planned development. The location and design of these facilities shall give full consideration to the ease of operation and maintenance of these facilities by the City. The City shall continue to use, to the extent permitted by law, direct participation, LIDs and payback agreements to assist in the financing of such oversized improvements. Wherever any form of City finance is involved in a sewer line extension, lines that promote a compact development pattern will be favored over lines traversing large undeveloped areas where future development plans are uncertain.

iii. CF-24 Whenever a street is to be substantially reconstructed or a new street built, the City Engineer shall determine whether sewer facilities in that street right of way shall be constructed or brought up to the size and configuration indicated by the Comprehensive Sanitary Sewer Plan and Comprehensive Plan.

iv. CF-25 The City shall continue to recognize the overall system impacts of new development upon the City sewer system, through the collection and appropriate use of system development charges or similar fees.

v. CF-26 The City shall continue to require the separation of sanitary and storm sewer facilities wherever combined sewers may be discovered, and shall continue to aggressively seek to minimize any storm water infiltration of the sanitary sewer system

6. GOAL 14. PUBLIC BUILDINGS - To maximize public access and provide for the appropriate location and development of public and quasi-public facilities that serve the cultural, educational, recreational, religious and public service needs of the community and the region.
   a. Objective 14.1. To site public buildings in accord with their service function and the needs of the members of the public served by the facility.
      i. CF-63 The location of utility facilities is often dependent upon the physical requirements of the utility system. Sewerage lift stations, water reservoirs, and other similar facilities should be sited, designed, and buffered (through extensive screening and/or landscaping) to fit in with their surroundings harmoniously. When sited within or adjacent to residential areas, special attention should be given to minimizing noise, light and glare impacts.

7. GOAL 18. ENVIRONMENT AND NATURAL RESOURCES - To maintain and promote a safe and healthy environment and preserve the quality of life, and to protect the area's most unique, sensitive and productive natural resources. To encourage natural resource industries within the city to operate in a manner which enhances (rather than detracts from), the orderly development of the City.
   a. Objective 18.1. To continue to enhance and maintain the quality of surface water, ground water, and shoreline resources in the City and Region.
      i. EN-9 The City shall discourage the use of septic tanks except in those areas which are designated for rural uses and have suitable soils.

4. DESCRIPTION OF EXISTING SYSTEM

This chapter describes the existing wastewater collection and conveyance system and service area. In many instances, the system and service area has not changed significantly since the 2001 Sewer Plan; however, all necessary description is included in this document.

The City provides wastewater collection service to city residences through a variety of facilities including gravity sewers, pump stations, and force mains. The wastewater flow is conveyed to the King County Regional Wastewater System for treatment and disposal. The City's system consists of 16 pump stations, approximately 4,330 manholes, and approximately 210 miles of sewers and force mains. Since the 2001 Sewer Comprehensive Plan was completed, approximately 33 miles of sewers and five pump stations have been constructed and put into service.

4.1 Overview

For purposes of discussion, the City's wastewater collection system is divided geographically into five major sewer basins. The descriptions of the five major sewer basins (Valley, West Hill, Lea Hill, Auburn Way South, and South Hill) are presented below and shown on Figure 4-1. The hydraulic model, described later in this plan, further divided the sewer basins based on King County "mini basins." A description of the "mini basins" and how they relate to the sewer basins is included in the technical memorandum detailing the hydraulic modeling which is Appendix C of this document.

4.1.1 Valley Sewer Basin

The Valley Sewer basin has not changed significantly from the description in the 2001 Sewer Plan, which presents the following about the Valley Sewer Basin:

> The Valley Sewer Basin receives flow from all the other sewer basins. It represents the main backbone of the Auburn sanitary sewer system. This sewer basin is located on the valley floor where flows from the other four sewer basins are transported to King County's sewer trunk lines. The topography of the valley is very flat with a minor incline sloping from the south end of Auburn (elevation 109 feet) to the north end of Auburn (elevation 53 feet). Three primary King County trunk sewer lines stretch north and south along the valley providing the backbone for service to Auburn. The Valley Sewer Basin is bound by the Lea Hill and Auburn Way South Sewer Basins to the east, the South Hill Sewer Basin to the south, the West Hill Sewer Basin to the west, and the City of Kent to the north.

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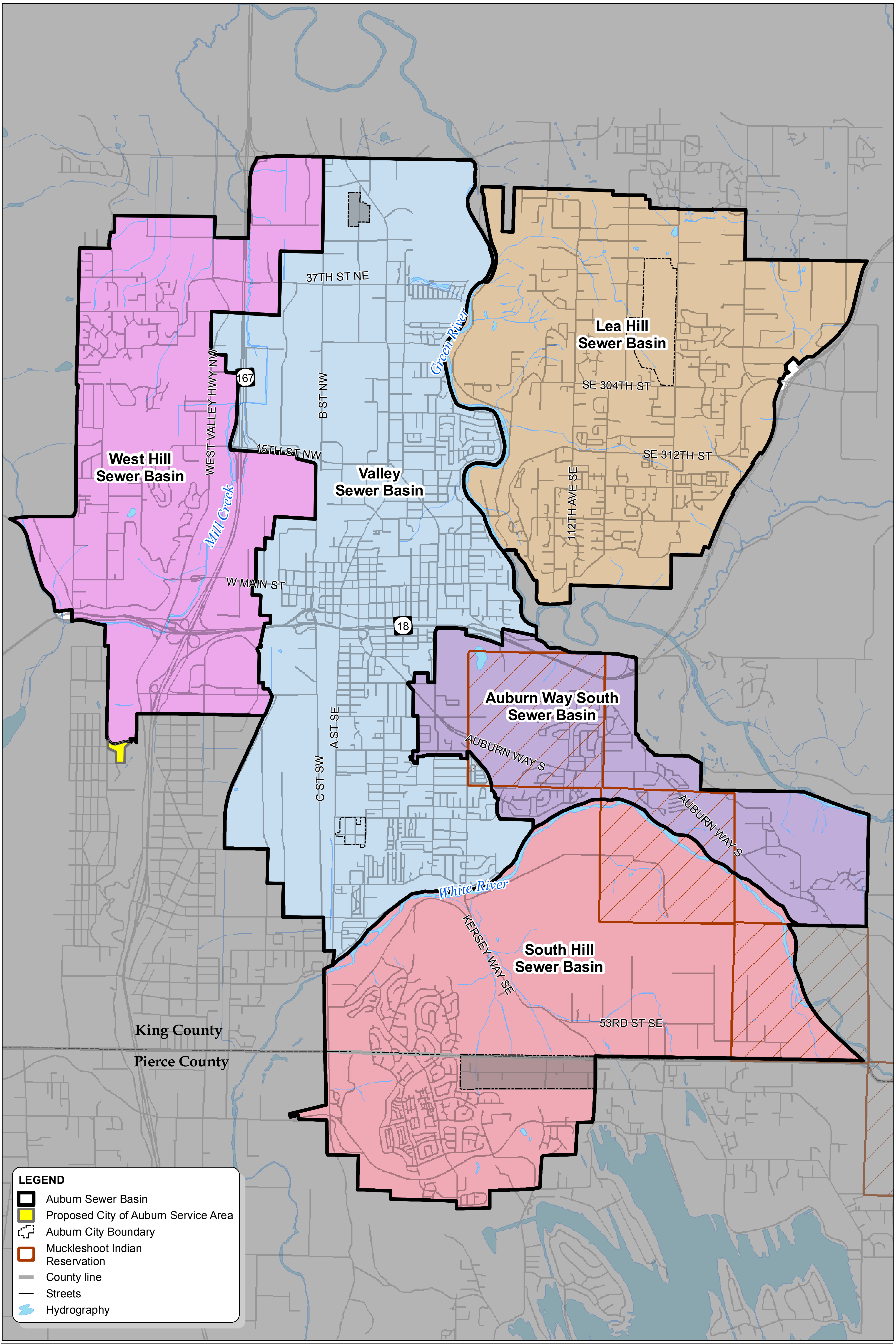


COMPREHENSIVE SEWER PLAN
December 2009

BROWN AND CALDWELL

2,500 0 2,500 5,000
Feet

N

CITY OF AUBURN WASHINGTON

FIGURE 4-1
SEWER SERVICE BASINS

P:\135347 Auburn Drainage Phase II\GIS\MXD\Draft Plan Figures\AuburnSewer_ExSystem (fig5-1).mxd

4.1.2 West Hill Sewer Basin

A significant portion of the West Hill Sewer Basin was recently (since 2001) annexed by the city of Auburn. In addition, the Peasley Ridge pump station was constructed in the sewer basin. However, the following sewer basin description from the 2001 plan is still accurate:

> The West Hill Sewer Basin is located on the West Hill above the valley floor. Flows from the four West Hill Basin are transported to two King County trunk lines – the West Valley Interceptor and the Auburn Valley Interceptor. The sewer basin is bound by the Valley Sewer Basin to the east, the City of Algona to the south, Lakehaven Utility District to the west, and the City of Kent to the north.

There is a small area (consisting of approximately 10 tax parcels) south of the West Hill Sewer Basin the city of Auburn is proposing to serve. Wastewater flow from the proposed area would be conveyed to the West Hill Sewer Basin.

4.1.3 Lea Hill Sewer Basin

Most of the Lea Hill Sewer Basin was outside Auburn city limits when the 2001 Sewer Plan was completed, but has since been annexed by the City. The White Mountain Trails pump station, designed to serve a specific area of development, has been constructed since 2001. The pump station, along with the Rainier Shadows pump station, is scheduled to be removed when the proposed Verdana pump station becomes operational. The following 2001 Sewer Plan description of the Lea Hill Sewer Basin is still accurate:

> The Lea Hill Sewer Basin is defined as that portion of Auburn's Sanitary Sewer Service Area that is bound by State Route 18 to the east, the Green River to the south and west, and the City of Kent to the north.

4.1.4 Auburn Way South Sewer Basin

The Auburn Way South Sewer Basin has not changed significantly since 2001. The 2001 Sewer Plan described the Auburn Way South Sewer Basin as follows:

> The Auburn Way South Sewer Basin is east of the Valley Sewer Basin along Auburn Way South on the Enumclaw Plateau. It is geographically bound by State Route 18 to the north and the White River to the south.

A portion of the basin receives flow from the large Academy development and the Muckleshoot Indian Tribe sewage system. The Auburn Way South sanitary sewer system discharges into a King County interceptor in the Valley Sewer basin.

Since completion of the 2001 Sewer Plan, the Muckleshoot Indian Tribe has become a separate component agency of the King County Wastewater Treatment Division. Upgrades have been made to the trunk line within Auburn Way South to accommodate the Tribe's flows and for growth in the basin. The final phase of those upgrades is expected to be completed in 2009.

4.1.5 South Hill Sewer Basin

The city of Auburn annexed a portion of the South Hill Sewer Basin since completion of the 2001 Sewer Plan. Significant growth occurred in the South Hill Sewer Basin, which is evidenced by addition of three new city of Auburn pump stations (Area 19, Terrace View, and North Tapps). Construction of the North Tapps pump station allowed for removal of the existing Eastpointe pump station. The following sewer basin description from the 2001 plan is still accurate:

> The South Hill Sewer Basin, historically referred to as Lakeland Hills, was primarily developed in the 1980s by a local developer. It is bound by the White River on the north and east, and the City of Pacific to the west.

4.2 Sanitary Sewer Facilities

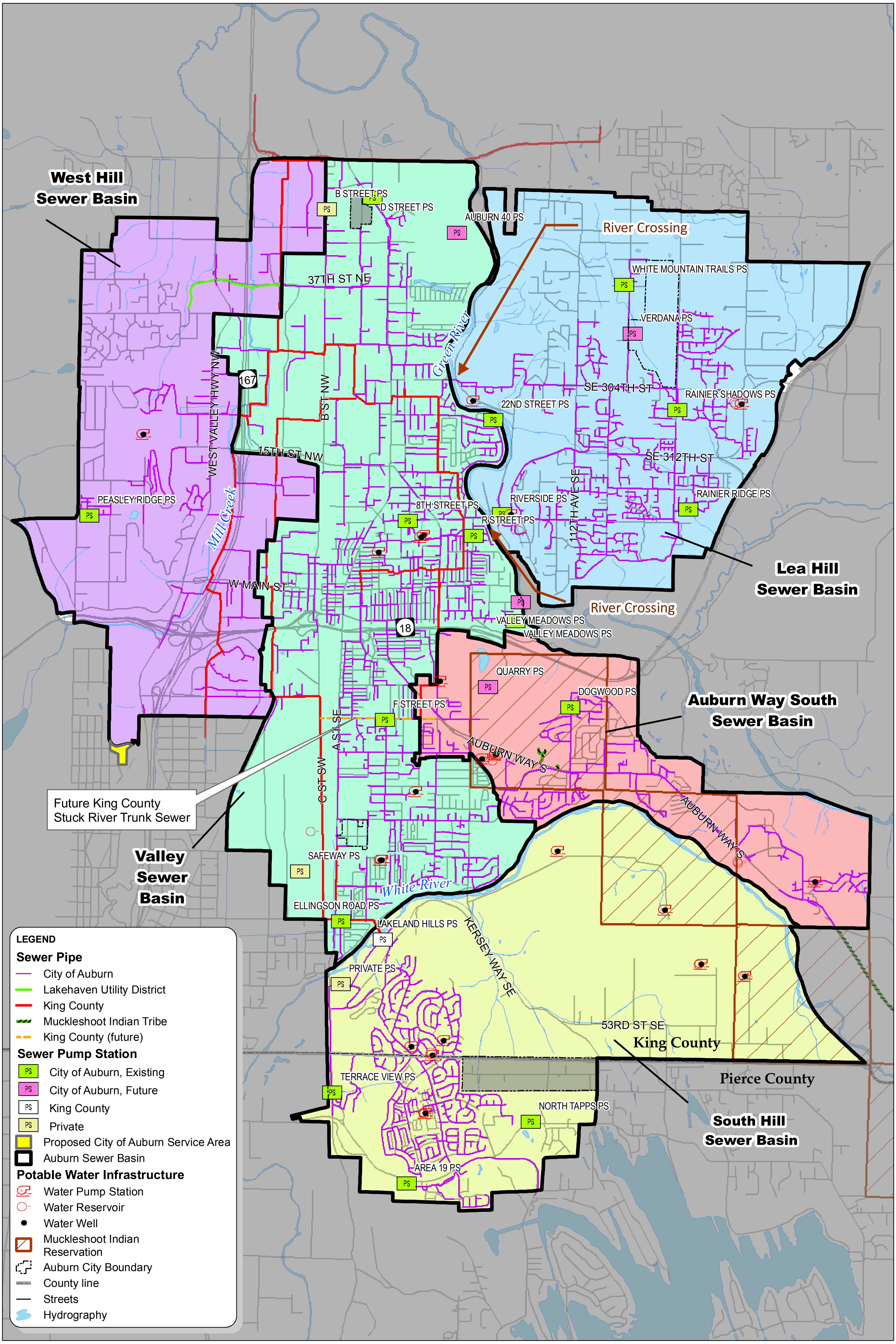
The following sections provide information regarding Auburn's wastewater facilities. Locations of the pumping facilities, river crossings, King County trunk lines, and other key system elements may be seen on Figure 4-2.

4.2.1 Critical Infrastructure

For planning purposes, the City considers all sewer pump stations, force mains, river crossings, and major trunk lines to be critical infrastructure. Also, all gravity sewer lines serving the hospital, city hall, the City maintenance facility, Justice Center, and fire stations are considered critical.

4.2.2 Pump Stations

The City now has 16 sewage pump stations within its SSSA. The pump stations are listed in Table 4-1 along with their location and year of construction. More detailed information regarding the pump stations is provided below.



COMPREHENSIVE SEWER PLAN
December 2009

BROWN AND CALDWELL

2,500 0 2,500 5,000 Feet

N

CITY OF AUBURN WASHINGTON

FIGURE 4-2
EXISTING WASTEWATER CONVEYANCE SYSTEM

P:\135347 Auburn Drainage Phase II\GIS\MXD\Draft Plan Figures\AuburnSewer_ExSystem (fig4-2) 11x17.mxd

Table 4-1. City of AuburnSewer Pump Station Inventory					
	Pump station	**Year constructed**	**Cross streets**	**Approximate address**	**Sewer basin**
	Sanitary sewer				
1	Area 19	2006	Lake Tapps Pkwy. E & west of 72nd St. SE	800 71st Street SE	South Hill
2	D Street NE	1971	D St. NE & Auburn Way N	4750 D St. NE	Valley
3	Dogwood	1967	Dogwood St. SE & 15th St. SE	1435 Dogwood St. SE	Auburn Way S
4	Ellingson	1968	41st St. SE, East of A St. SE	40 41st St. SE	Valley
5	F Street SE	1980	F St. SE & 17th St. SE	510 17th St. SE	Valley
6	North Tapps	2007	Lake Tapps Pkwy SE & west of 176th Ave. E	Lake Tapps Pkwy SE	South Hill
7	Peasley Ridge	2001	S. 320th St. & 53rd Ave. S	On city of Auburn tract	West Hill
8	R Street NE	1977	R St. NE & 6th St. NE	1603 5th St. SE	Valley
9	Rainier Ridge	1980	125th Pl. SE & south of SE 318th Way	31818 125th Pl. SE	Lea Hill
10	Rainier Shadows	1991	124th Ave. SE & SE 306th Pl.	30700 124th Ave. SE	Lea Hill
11	Riverside	1981	8th St. NE & 104th Ave. SE	31902 104th Ave. SE	Lea Hill
12	Terrace View	2007	East Valley Hwy. E & north of Terrace View Dr. SE	605 East Valley Highway	South Hill
13	Valley Meadows	1992	4th St. SE & V St. SE	2022 4th St. SE	Valley
14	White Mountain Trails	2007	SE 292nd St. & west of 118th Ave. SE	11726 SE 292nd Street	Lea Hill
15	8th St. NE	1974	J St. NE & 8th St. NE	820 8th St. NE	Valley
16	22nd St. NE	1967	22nd St. SE & Riverview Dr.	1741 22nd St. NE	Valley
	Future				
17	Verdana [a]				
18	Auburn 40 [b]				

a. This pump station is being constructed midway between Rainier Shadows and White Mountain Trails pump stations and will replace them both.

b. This pump station is being constructed as part of a new development known as Auburn 40 located between 40th and 45th Streets NE, east of I Street NE, and west of the Green River.

Area 19 Pump Station

Year built:	2006		
Basin:	South Hill		
Address:	Lake Tapps Pkwy. E & West of 72nd St. SE		
Description:	Two 15-hp pumps, each rated at 325 gpm at 75' of head; impeller size 9¼"; 6" suction and 6" discharge. The station is equipped with a permanent onsite generator.		
Bypass:	If required, the sewage pump station could be bypassed by pumping wastewater from the wet well to MH 1610-15 located 2,050' NE on Lakeland Hills Way SE.		
Manufacturer:	Smith and Loveless 14040 Santa Fe Trail Drive Lenexa, KS 66215 (913) 888-5201	Rep:	ADS Equipment P.O. Box 81045 Seattle, WA 98108 (206) 763-3600
Serial number:	09-07383-00V		

D Street NE Pump Station

Year built:	1971		
Basin:	Valley		
Address:	D St. NE & Auburn Way N		
Description:	½ hp, 400 gpm, wet well depth of 15', dry well depth of 15', impeller size 9", shaft size 1⅞", 6" suction, 6" discharge, and 6" force main. The station is fitted with a 230-V generator hookup.		
Bypass:	If required, the sewage pump station could be bypassed by pumping wastewater from the wet well to MH 209-07 located 1,100' away.		
Manufacturer:	Smith and Loveless 14040 Santa Fe Trail Drive Lenexa, KS 66215 (913) 888-5201	Rep:	ADS Equipment P.O. Box 81045 Seattle, WA 98108 (206) 763-3600
Serial number:	07-6396		

Dogwood Pump Station

Year built:	1967		
Basin:	Auburn Way S		
Address:	Dogwood St. SE & 15th St. SE		
Description:	3 hp, 200 gpm, wet well depth of 18', dry well depth of 19', impeller size 9", shaft size 1⅝", 6" suction, 6" discharge, and 6" force main. The station is fitted with a 230-V generator hookup.		
Bypass:	If required, the sewage pump station could be bypassed by pumping wastewater from the wet well to MH 1012-36 located 570' away.		
Manufacturer:	Cornell Pumps Portland, OR Lenexa, KS 66215 (913) 888-5201	Rep:	Ideal Pump 8625 219th SE Woodinville, WA 98072 (425) 481-7777
Serial number:	Unknown		

Ellingson Pump Station

Year built:	1968
Basin:	Valley
Address:	41st St. SE, East of A St. SE
Description:	15 hp, 500 gpm, wet well depth 22', dry well depth 23', impeller size 11½", shaft size 2⅛", 8" suction, 8" discharge, and 8" force main. This station is fitted with a 480-V generator hookup.
Bypass:	If required, the sewage pump station could be bypassed by pumping wastewater from the wet well to MH 1109-18 located 4,000' away.
Manufacturer:	Smith and Loveless 14040 Santa Fe Trail Drive Lenexa, KS 66215 (913) 888-5201 Rep: ADS Equipment P.O. Box 81045 Seattle, WA 98108 (206) 763-3600
Serial number:	08-5204

F Street SE Pump Station

Year built:	1980
Basin:	Valley
Address:	F St. SE & 17th St. SE
Description:	7½ hp, 600 gpm, wet well depth of 23', dry well depth of 25', impeller size 9", shaft size 1⅞", 8" suction, 8" discharge, and 8" force main. The station is equipped with a permanent onsite generator.
Bypass:	If required, the sewage pump station could be bypassed by pumping wastewater from the wet well to MH 909-66 located 1,240' away.
Manufacturer:	Smith and Loveless 14040 Santa Fe Trail Drive Lenexa, KS 66215 (913) 888-5201 Rep: ADS Equipment P.O. Box 81045 Seattle, WA 98108 (206) 763-3600
Serial number:	08-7822-D

North Tapps Pump Station

Year built:	2007
Basin:	South Hill
Address:	Lake Tapps Pkwy. E & west of 176th Ave. E
Description:	Two 20-hp pumps, each rated at 507 gpm at 82' of head; impeller size 9 ⅝"; 8 suction and 8"discharge. The station is equipped with a permanent onsite generator.
Bypass:	If required, the sewage pump station could be bypassed by pumping wastewater from the wet well to MH 1611-05 located 2,100' to the southwest on Lake Tapps Parkway.
Manufacturer:	Smith and Loveless 14040 Santa Fe Trail Drive Lenexa, KS 66215 (913) 888-5201 Rep: ADS Equipment P.O. Box 81045 Seattle, WA 98108 (206) 763-3600
Serial number:	09-07382-00N

Peasley Ridge Pump Station

Year built:	2001		
Basin:	West Hill		
Address:	South 320th St. & 53rd Ave. S		
Description:	Two 10-hp pumps, each rated at 275 gpm at 70' of head; impeller size 8¾"; 6" suction and 6" discharge. The station is equipped with a permanent onsite generator.		
Bypass:	If required, the sewage pump station could be bypassed by pumping wastewater from the wet well to MH 606-39 located 2,900' to the east on Hi Crest Drive NW.		
Manufacturer:	Smith and Loveless 14040 Santa Fe Trail Drive Lenexa, KS 66215 (913) 888-5201	Rep:	ADS Equipment P.O. Box 81045 Seattle, WA 98108 (206) 763-3600
Serial number:	08-8478-K		

R Street NE Pump Station

Year built:	1977		
Basin:	Valley		
Address:	R St. NE & 6th St. NE		
Description:	1½ hp, 100 gpm, wet well depth of 18', dry well depth of 18', impeller size 8⅛", shaft size 1-⅞", 4" suction, 4" discharge, and 4" force main. The station is fitted with a 230-V generator hookup.		
Bypass:	If required, the sewage pump station could be bypassed by pumping wastewater from the wet well to MH 710-24 located 400' away.		
Manufacturer:	Smith and Loveless 14040 Santa Fe Trail Drive Lenexa, KS 66215 (913) 888-5201	Rep:	ADS Equipment P.O. Box 81045 Seattle, WA 98108 (206) 763-3600
Serial number:	07-7563-F		

Rainier Ridge Pump Station

Year built:	1980		
Basin:	Lea Hill		
Address:	125th Pl. SE & south of SE 318th Way		
Description:	5 hp, 200 gpm, wet well depth of 22', dry well depth of 26', impeller #S4N32, shaft size 1⅞", 6" suction, 6" discharge and 6" force main diameter with a length of approximately 720'. The station is fitted with a 480-V generator hookup. A mobile generator is station at this facility.		
Bypass:	If required, the sewage pump station could be bypassed by pumping wastewater from the wet well to MH 613-35 located 720' away.		
Manufacturer:	Smith and Loveless 14040 Santa Fe Trail Drive Lenexa, KS 66215 (913) 888-5201	Rep:	ADS Equipment P.O. Box 81045 Seattle, WA 98108 (206) 763-3600
Serial number:	07-7699C		

Rainier Shadows Pump Station

Year built:	1991		
Basin:	Lea Hill		
Address:	124th Ave. SE & SE 306th Pl.		
Description:	20 hp, 500 gpm, wet well depth of 28', dry well depth of 30', impeller size 9⅜", shaft size 2⅛", 8" suction, 6" discharge, and approximately 3,600 linear feet (LF) of 8" force main. The station is fitted with a 460-V generator hookup.		
Bypass:	If required, the sewage pump station could be bypassed by pumping wastewater from the wet well to MH 513-01 located 470' away.		
Manufacturer:	Smith and Loveless 14040 Santa Fe Trail Drive Lenexa, KS 66215 (913) 888-5201	Rep:	ADS Equipment P.O. Box 81045 Seattle, WA 98108 (206) 763-3600
Serial number:	08-8351-C		

Riverside Pump Station

Year built:	1981		
Basin:	Lea Hill		
Address:	8th St. NE & 104th Ave. SE		
Description:	7½ hp, 400 gpm, wet well depth of 31.3', dry well depth of 33.35', impeller size 10⅛", shaft size 1⅞", 6" suction, 6" discharge, and approximately 160 LF of 6" force main. Discharges directly into the sewer main crossing the 8th St. NE bridge. No generator is currently onsite. The station is fitted with a 460-V generator receptacle and a portable generator can be plugged in to provide standby power during an electrical outage. A mobile generator is stationed at this facility.		
Bypass:	If required, the sewage pump station could be bypassed by pumping wastewater from the wet well to MH 611-02 located 800' away.		
Manufacturer:	Smith and Loveless 14040 Santa Fe Trail Drive Lenexa, KS 66215 (913) 888-5201	Rep:	ADS Equipment P.O. Box 81045 Seattle, WA 98108 (206) 763-3600
Serial number:	07-7784-R		

Terrace View Pump Station

Year Built:	2007		
Basin:	South Hill		
Address:	East Valley Hwy. E & North of Terrace View Dr. SE		
Description:	Two 20-hp pumps, each rated at 675 gpm at 75' of head; impeller size 9⅝"; 8" suction and 8" discharge. The station is equipped with a permanent onsite generator.		
Bypass:	If required, the sewage pump station could be bypassed by pumping wastewater from the wet well to MH 1309-43 located 4,700' to the north on Oravetz Place SE.		
Manufacturer:	Smith and Loveless 14040 Santa Fe Trail Drive Lenexa, KS 66215 (913) 888-5201	Rep:	ADS Equipment P.O. Box 81045 Seattle, WA 98108 (206) 763-3600
Serial Number:	09-07382-00N		

Valley Meadows Pump Station

Year built:	1992		
Basin:	Valley		
Address:	4th St. SE & V St. SE		
Description:	7½ hp, 125 gpm, wet well depth 20', dry well depth 7', impeller size 7⅛", shaft size 1⅞", 4" suction, 4" discharge, and 4" force main. The station is fitted with a 240-V generator hookup.		
Bypass:	If required, the sewage pump station could be bypassed by pumping wastewater from the wet well to MH 811-03 located 1,220' away.		
Manufacturer:	Smith and Loveless 14040 Santa Fe Trail Drive Lenexa, KS 66215 (913) 888-5201	Rep:	ADS Equipment P.O. Box 81045 Seattle, WA 98108 (206) 763-3600
Serial number:	14-1723-Z		

White Mountain Trails Pump Station

Year built:	2007		
Basin:	Lea Hill		
Address:	SE 292nd St. & west of 118th Ave. SE		
Description:	Two 15-hp pumps, each rated at 125 gpm at 104' of head; impeller size 9⅞"; 4" suction and 6" discharge.		
Bypass:	If required, the sewage pump station could be bypassed by pumping wastewater from the wet well to MH 413-20 located 2,900' to the south on 118th Avenue SE. The station is equipped with a permanent onsite generator.		
Manufacturer:	Smith and Loveless 14040 Santa Fe Trail Drive Lenexa, KS 66215 (913) 888-5201	Rep:	ADS Equipment P.O. Box 81045 Seattle, WA 98108 (206) 763-3600
Serial number:	16-07690-00W		

8th Street NE Pump Station

Year built:	1994		
Basin:	Valley		
Address:	J St. NE & 8th St. NE		
Description:	2 hp, 150 gpm, wet well depth of 20', dry well depth of 7', impeller size 8⅜", shaft size 1⅞", 4" suction, 4" discharge, and 4" force main. The station is fitted with a 240-V generator hookup. Station configuration is dry-well mounted over the wet well.		
Bypass:	The station is fitted with an overflow pipe which will allow sewage to drain from the wet well prior to overflowing to the surface. If required, the sewage pump station could be bypassed by pumping wastewater from the wet well to MH 710-03 located 230' away.		
Manufacturer:	Smith and Loveless 14040 Santa Fe Trail Drive Lenexa, KS 66215 (913) 888-5201	Rep:	ADS Equipment P.O. Box 81045 Seattle, WA 98108 (206) 763-3600
Serial number:	14-1795-Z		

22nd Street NE Pump Station

Year built:	1967		
Basin:	Valley		
Address:	22nd St. SE & Riverview Dr.		
Description:	15 hp, 550 gpm, wet well depth 18', dry well depth 18', impeller size 11¼", shaft size 1⅝", 6" suction, 6" discharge, and 6" force main. The station is fitted with a 240-V generator hookup.		
Bypass:	If required, the sewage pump station could be bypassed by pumping wastewater from the wet well to MH 510-26 located 1,590' away.		
Manufacturer:	Cornell Pumps Portland, OR	Rep:	Ideal Pump 8625 219th SE Woodinville, WA 98072 (425) 481-7777
Serial number:	800-5		

Two additional pump stations are currently under construction for the Auburn wastewater system. The Verdana pump station is being constructed midway between the existing Rainier Shadows and White Mountain Trails pump stations and will replace them both. The Auburn 40 pump station is being built as part of a new development known as Auburn 40 located between 40th and 45th Streets NE, east of I Street NE, and west of the Green River.

4.2.3 Force Mains

The length of City-owned force mains has increased with the addition of new pump stations in recent years. The City-owned force mains serving the 16 pump stations range in diameter from 2 to 20 inches with a total force main length of approximately 26 miles. In addition to City force mains, the Auburn SSSA contains force mains associated with King County and private pump stations.

4.2.4 Interceptor and Collection System

The City's interceptor and collection system has not changed significantly from the system presented in the 2001 Sewer Plan. However, additional interceptor and collector sewers have been constructed to serve new development in the service area since 2001. Of note, a sewer main has been constructed in the South Hill Basin, but, as of the analysis contained in this report, had not been completed and transferred to the City. Also, the Auburn Way South sewer trunk line which runs from the southern boundary of the City on SR-164 to the connection with King County's trunk line has been replaced with larger pipes. That work is expected to be completed in 2009. The current interceptor and collection system is shown on Figure 4-2.

4.2.5 River Crossings

As described in the 2001 Sewer Plan, the city of Auburn collection system contains two crossings of the Green River. The crossings are located at the 8th Street NE bridge and near 26th Street NE. The detailed description of the river crossings, as provided in the 2001 Sewer Plan, is provided below. The locations of the river crossings are shown on Figure 4-2.

Green River Crossing (via 8th Street NE)

The first crossing of the Green River was constructed in 1965, as described in Chapter 2. The crossing consists of a cast-iron pipe mounted on the 8th St. NE bridge. Due to the bridge being at a higher in elevation than the bank on either side, the pipe does not have a positive downhill slope across the bridge and must rely on upstream pressure developed in the line as it comes down Lea Hill to force the flow across the bridge.

For this reason, the pipe on the bridge, and continuing up Lea Hill approximately 900 linear feet, is constructed of 14-inch-diameter cast-iron pressure pipe. At the bottom of the hill, just upstream of the bridge, a valve chamber houses a mechanically operated control valve. The valve was designed to remain closed until pressure, as caused by the upstream pipe filling, opens the valve, and releases the flow across the bridge. Currently, the flow in this pipe is large enough that the valve does not completely close before opening. Therefore, the valve is currently operated in the open position.

Green River Crossing (via Inverted Siphon at 26th Street NE)

The inverted siphon across the Green River near 26th Street NE was constructed in 1986. It consists of a flushing manhole, located in Isaac Evans Park, which houses an 18-inch pinch valve that utilizes a mercury level sensor to open and close at specific wastewater elevations within the manhole. The manhole serves to flush the siphon with a slug of flow during periods of otherwise low flow. The valve is pneumatically operated. The flushing manhole has an overflow pipe to allow flow by gravity into the siphon during a power outage.

Due to the increase in flow from the upstream basin for this facility, this valve has been left permanently open since 2005.

Both 8- and 12-inch-diameter siphons were installed in parallel under the river. The 8-inch siphon is currently in use. When increased flows permit, wastewater will be redirected to the 12-inch siphon. If needed, both siphons are capable of working together.

4.3 King County Conveyance

The King County wastewater conveyance facilities serving the City include the Auburn West Valley interceptor, Auburn West interceptor, M Street trunk sewer, and the Lakeland Hills pump station. As shown on Figure 4-2, the King County facilities convey wastewater from the south to the north, collecting inflow from the Auburn sewer service areas. The Auburn West interceptor begins in Algona and flows through the West Hills basin. The Auburn West interceptor carries flow from the Lakeland Hills pump station north. The M Street trunk sewer mainly lies on the eastern side of the Valley basin. All flows are conveyed to the King County South Treatment Plant in Renton.

The County has proposed several modifications to its conveyance system to address projected capacity limitations. Two phases of those projects are currently in design with Phases A and B planned for completion in 2011 and 2015, respectively.

Phase A consists of constructing a new sewer, called the Stuck River trunk, to take wastewater flow from the south end of the existing M Street trunk and route it west to the Lakeland Hills trunk. The current preferred alignment for this sewer is shown on Figure 4-2.

Phase B consists of constructing a new sewer, called the Auburn West interceptor parallel, which will run parallel to the existing County Auburn West interceptor sewer. This pipe will run north from the intersection of Perimeter Road and 15th Street SW, cross under State Route 18, and connect to the existing Auburn West interceptor at West Main Street and Clay Street in Auburn. This phase also includes a new pipeline to carry wastewater north from Pacific to Auburn. The sewer will run from the County's Pacific pump station to the new Auburn West interceptor parallel.

4.4 Infiltration and Inflow

King County has been conducting studies of existing I/I conditions in various local sewer agencies, including the city of Auburn, since 2000 as part of the Regional I/I Control program. The study includes flow monitoring, modeling, construction of pilot I/I reduction projects, and follow-up analyses to determine the cost-effectiveness of various approaches. As a result of this program, King County will undertake several I/I reduction projects. Based on the results of these efforts, the County plans to launch a regional program working with local sewer agencies starting as early as 2013. At present, the King County I/I reduction program has not yet proposed that any capital projects be constructed in Auburn.

Because Auburn does not have a history of significant I/I problems, and because King County is studying the City's I/I conditions as part of the Regional I/I Control program, this report will not conduct an independent I/I evaluation. The City provided the flow assumptions regarding I/I contributions to each basin delineated in the hydraulic model. The City will address this issue through the evaluation of its construction standards and the development of projects to address large sources of I/I identified by maintenance staff. For example, in 2007, a series of pipes located within the high groundwater table on Riverview Drive were identified as a large source of I/I, so a CIP relining project was completed to significantly reduce the problem.

4.5 Water Reuse

While the sanitary sewer utility has no current specific plans for water reuse, the City will support the use of reclaimed water technologies where economically feasible. City staff should continue to participate in King County's reclaimed water comprehensive planning process to promote the City's interests in County policies, criteria, and implementation strategies. Staff should also continue to evaluate and encourage local opportunities for the production and use of reclaimed water.

4.6 Industrial Waste

As part of its conveyance service, the City accepts industrial waste from permitted industrial waste dischargers. At present, the City does not project future industrial expansion; however, there is a policy in place to collaborate with King County regarding permitting processes if expansion should occur. Table 4-2 below identifies the current industrial waste discharge permits associated with the City.

Table 4-2. City of Auburn Industrial Waste Discharge Permits

Company Name	Business Type	Address	Permit No.	Permit Type
Aero Controls, Inc.	Metal Finishing: CFR433	1602 Pike Street NW	7708-03	Permit
Aero Controls, Inc.	Metal Finishing: CFR 433	1610 20th Street NW	7761-02	Permit
Aim Aviation Auburn, Inc.	General Type	1530 22nd Street NW	10179-01	Letter Of Authorization

Table 4-2. City of Auburn Industrial Waste Discharge Permits				
Company Name	**Business Type**	**Address**	**Permit No.**	**Permit Type**
Alan Ritchey, Inc.	General Type	22 30th Street NE, Suite 109	11091-01	Letter Of Authorization
American Powder Coating	Metal Finishing: CFR 433	3802 B St. NW	10182-01	Letter Of Authorization
Auburn Dairy Products	Food Processing: Dairy	702 West Main Street	451-04	Major Discharge Authorization
Auburn Muffler and Radiator	Radiator Repair	1301 Auburn Way S	10852-01	Letter Of Authorization
Auburn Regional Medical Center	Construction Dewatering	101 N. Division Street	11087-01	Letter Of Authorization
Auburn, City of: Decant Facility	Decant Station	1305 C Street SW	687-02	Major Discharge Authorization
Auburn, City of: Sidewalk Cleaning Operation	Pressure Washing		10405-01	Letter Of Authorization
Black Oxide, LLC	Metal Finishing: CFR 433	131 30th Street Ne, Suite 25	7702-04	Permit
Boeing Commercial Airplane: Auburn	Metal Finishing: CFR 433	700 15th St. SW	50195-01	Verbal
Boeing Commercial Airplane: Auburn	Metal Finishing: CFR 433	700 15th St. SW	7599-05	Permit
Burke Gibson	General Type	702 3rd Street Southwest	10711-01	Letter Of Authorization
ChemStation	General Type	3104 C Street NE, Suite 202	10982-01	Letter Of Authorization
ConocoPhillips Company	Groundwater Remediation: Petroleum	112 3rd Street NW	4060-02	Major Discharge Authorization
Formula Corp.: Auburn	Chemical Manufacturing	4432 C Street NE	4067-02	Major Discharge Authorization
Green River Community College	General Type	12401 SE 320th St.	50123-01	Verbal
Ply Gem Pacific Windows Corporation	Manufacturing: Misc	5001 D Street NW	626-03	Minor Discharge Authorization
Poblano Carpet Cleaning, Inc.	General Type	704 A Street SE	11078-01	Letter Of Authorization
Pregis Innovative Packaging, Inc.	Printing	2820 B Street, Suite 109	10140-01	Letter Of Authorization
Puget Sound Recycling	Centralized Waste Treatment	523 A Street SE	7758-03	Permit
Safeway, Inc.: Auburn Distribution Center	General Type	Ellingson Road and C Street SE	719-01	Minor Discharge Authorization
Skills, Inc.: Auburn Facility	Metal Finishing: CFR 433	715, 30th Street NE	7719-03	Permit
Southland Corporation: Auburn	Groundwater Remediation: Petroleum	2202 Auburn Way N	522-03	Major Discharge Authorization

Table 4-2. City of Auburn Industrial Waste Discharge Permits

Company Name	Business Type	Address	Permit No.	Permit Type
System Three Resins, Inc.	Paint Manufacturing	3500 West Valley North, Suite 105	10148-01	Letter Of Authorization
Tharco	Corrugated Container	501 10th Avenue N	580-03	Major Discharge Authorization
Tri-Way Industries, Inc. (Auburn)	Metal Finishing: CFR 433	506 44th Street NW	7746-02	Permit
Utility Vault Company	Cement/Readymix	2802 “A” Street SE	720-02	Minor Discharge Authorization
Valley Centre	Groundwater Remediation: Metals	2820 B. Street NW	50100-01	Verbal

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5. WASTEWATER SYSTEM ANALYSIS

This chapter describes the economic life analysis of the wastewater collection system, the pump station condition assessment, and expansion of the hydraulic model of the City's sewer system, all completed as part of this Sewer Plan. The economic life analysis of the wastewater collection system is summarized below and is available in its entirety as Appendix B. The pump station condition assessment is included as Appendix B and the findings are summarized below. The purpose for updating the hydraulic model of the City's sewer system was to incorporate facilities constructed since the model was originally built and to provide an assessment of system capacities for current and projected wastewater flows. The capacity assessment provides the basis for identifying improvements that may be necessary for the utility to provide the adopted LOS discussed in Chapter 3. The capacity assessment is summarized below and presented in more detail as Appendix C.

5.1 Economic Life Analysis

An economic life analysis of the City's wastewater collection system was created to support CIP development. An economic life analysis identifies optimal timing for facility replacement or repair and prioritizes facilities for maintenance attention. The analysis assists with achieving the City's goals for capital program development, which include sustainably meeting required customer service levels, effectively managing risks, and minimizing the City's costs of ownership. The analysis also helps with defining M&O program recommendations and aids the utilities continuing efforts to achieve a proactive maintenance environment.

The economic life analysis identifies the economically optimal time to replace or refurbish each of the City's sewer segments by evaluating the probability of each segment failing and the corresponding consequence of a failure. Parameters used to identify a segment's probability of failure included age, material, length, slope, susceptibility to corrosion, frequency of maintenance activities, and sensitivity to an earthquake. Parameters used to measure the consequence of a segment failure included the cost of a spot repair; proximity to a railroad and to a water body; location with respect to zoning, street type, and critical facilities; slope; and diameter.

These parameters were used to develop a percent probability of failure (using a Weibull failure distribution) and a cost of failure in 2008 dollars. By multiplying the probability of failure by its cost, a risk cost carried for each segment was developed. Comparing the risk cost carried by each segment to the cost of either replacing or refurbishing (when appropriate) the pipe, the economically optimal time for R&R projects for each of the City's sewer segments was identified. Additionally, identifying which assets carry the most risk gives the City a means to prioritize future conditional assessments and optimize current maintenance practices.

The results of this analysis indicate, due largely to the relatively young age of the wastewater collection system, that no projects are recommended within the next 6 years. Furthermore, only six projects, identifying R&R of approximately 2,300 linear feet of sewer pipe, are recommended in the 20-year planning period.

The analysis also produced a prioritized list of sewer segments for maintenance and condition assessment activities. It is recommended that these segments receive first priority for condition assessments and that the maintenance strategy for these segments should focus on proactively identifying problems (rather than reactively responding to them).

The economic life analysis is intended as an ongoing effort performed by the City. The initial assessment described above was completed using limited condition data. The condition data should be updated to improve accuracy of results as additional data are collected by the City. As additional condition data are available for use in the analysis, the likelihood of more R&R projects and maintenance and condition assessment activities is increased.

Specific information describing the economic life analysis, including details regarding the results, are available as a technical memorandum located in Appendix A.

5.2 Pump Station Condition Assessment

A condition assessment was conducted for existing pump stations in the City's SSSA. The condition assessment evaluated the apparent physical condition of existing stations and equipment. The purpose of the assessment was to predict future serviceability, and anticipated longevity, for development of the CIP.

Pump stations must meet the LOS adopted by regulatory agencies and do so in a safe and reliable manner. Upgraded stations must meet current code conditions that may differ from those that existed when the stations were originally built. Therefore, the assessment identifies the following:

- requirements necessary to meet the City's LOS
- requirements necessary for the health and safety of staff and the public
- suggestions that might increase reliability or reduce cost of operations or maintenance.

For this condition assessment, equipment checklists were prepared for mechanical/hydraulic and electrical/control systems, site visits were made to all stations, as-built information and O&M manuals were reviewed, and operators and maintenance personnel were asked about known issues at each location. Station operation was observed, but no detailed physical testing of equipment, wiring, controls, or structures was included.

Evaluation of certain electrical equipment was excluded from the assessments because it was already being evaluated by others. Specifically, the assessment did not evaluate the details of the SCADA system and backup power systems for the pump stations. A general discussion of backup power is provided to address possible flow and storage capacity issues.

Also, evaluation of pump station flow capacity was excluded from the assessments. Capacity for existing and future conditions was addressed in the hydraulic capacity analysis and is discussed in Section 5.3.

As a result of the condition assessment, two general system-wide observations can be made. First, Auburn's wastewater pump stations are highly uniform and standardized; most are prefabricated underground stations constructed by two manufacturers. Second, the city of Auburn has done an excellent job of maintaining all of its stations, many of which are now more than 40 years old.

The condition assessment identified numerous improvements estimated to require minimal capital expenditures. The assessment recommended that the Dogwood pump station be replaced as soon as possible. The Ellingson pump station, while not recommended for replacement as a result of the condition assessment, is also a candidate for replacement as the suggested mechanical and electrical improvements were extensive for this station. A complete description of the pump station condition assessment and recommended improvements are provided in a technical memorandum included as Appendix B.

5.3 Hydraulic Capacity Analysis

A hydraulic capacity analysis of the City's sewer conveyance system was performed to assess capacity for current and projected wastewater flows. The analysis also provided the basis for identifying improvements that may be necessary for the City to provide the adopted LOS.

The hydraulic capacity analysis was completed using a hydraulic model of the City's collection and conveyance system. The City provided an existing DHI MOUSE hydraulic model, which was migrated to the DHI MIKE URBAN modeling platform for this analysis. The model was updated with major sewer facilities not already included in the MOUSE model. In addition, sewered areas and population data were updated in the model using water service area population provided by the City.

The updated model was used to simulate base and wet weather wastewater flow for current and projected (i.e., 20-year planning period) scenarios. The projected scenario incorporated estimated future population and sewer area expansion. The wet weather flow was a 20-year peak flow from the King County I/I study. The peak 20-year flow is the LOS as defined for wastewater collection and conveyance. Monitoring data was not available for model calibration; however, the current scenario model results agreed with City staff observations. This, in addition to the use of I/I values developed by King County during work in the City, provided confidence in the accuracy of the model. Model results were used to identify surcharging conditions, which is a LOS for system capacity. The locations identified as surcharging for current and projected scenarios are shown on Figure 5-1. Each identified surcharge location was further examined to assess the LOS in comparison to the City's goals.

The current condition scenario resulted in approximately 50 sewer pipes in the city conveyance system with surcharging. However, upon further examination, all but 14 sewer pipes were found to be King County pipes or directly impacted by flows in King County pipes. King County is responsible for providing sufficient capacity to avoid surcharging in their infrastructure and they address these needs through the Conveyance System Improvement Program. Thus, King County-related surcharges will be addressed by King County.

The remaining 14 pipes were determined to be either inverted (i.e,. negative pipe slope or offset inverts in a manhole) or have a depth from ground surface to maximum simulated water surface greater than 6 feet. This does not meet the City's LOS goal of no surcharging; however, acknowledging the hydraulic model was not calibrated to measured flow data and recognizing the simulated surcharge conditions do not necessarily pose a decrease in customers LOS leads to a recommendation to observe these sewer pipes. If the recommended observation indicates pipe surcharging (for the 20-year peak flow) in excess of simulated results, then more formal flow monitoring is suggested in support of preliminary design activities for a capital project. The specific recommendations for observation are provided in the implementation chapter (Chapter 9).

A similar process with similar results was conducted for analysis of the projected scenario simulation results. There were more pipes simulated to surcharge in the projected scenario (approximately 80 before King County pipes were removed or further examination was conducted), but no pipes were recommended for rehabilitation or replacement. Additional monitoring as growth occurs is recommended for pipes simulated to surcharge in the projected scenario. Monitoring data will allow for the model to be validated prior to recommending capital projects.

The capacity of each City pump station was compared to simulated flows for the projected scenario for assessment of pump station performance. As a result of this comparison, no City pump station was identified as having inadequate capacity for projected scenario simulated flows.

No system capacity-related capital improvements are proposed as a result of the hydraulic analysis. For a more detailed description of the capacity analysis and evaluation of the simulation results, please see the technical memorandum included as Appendix C.

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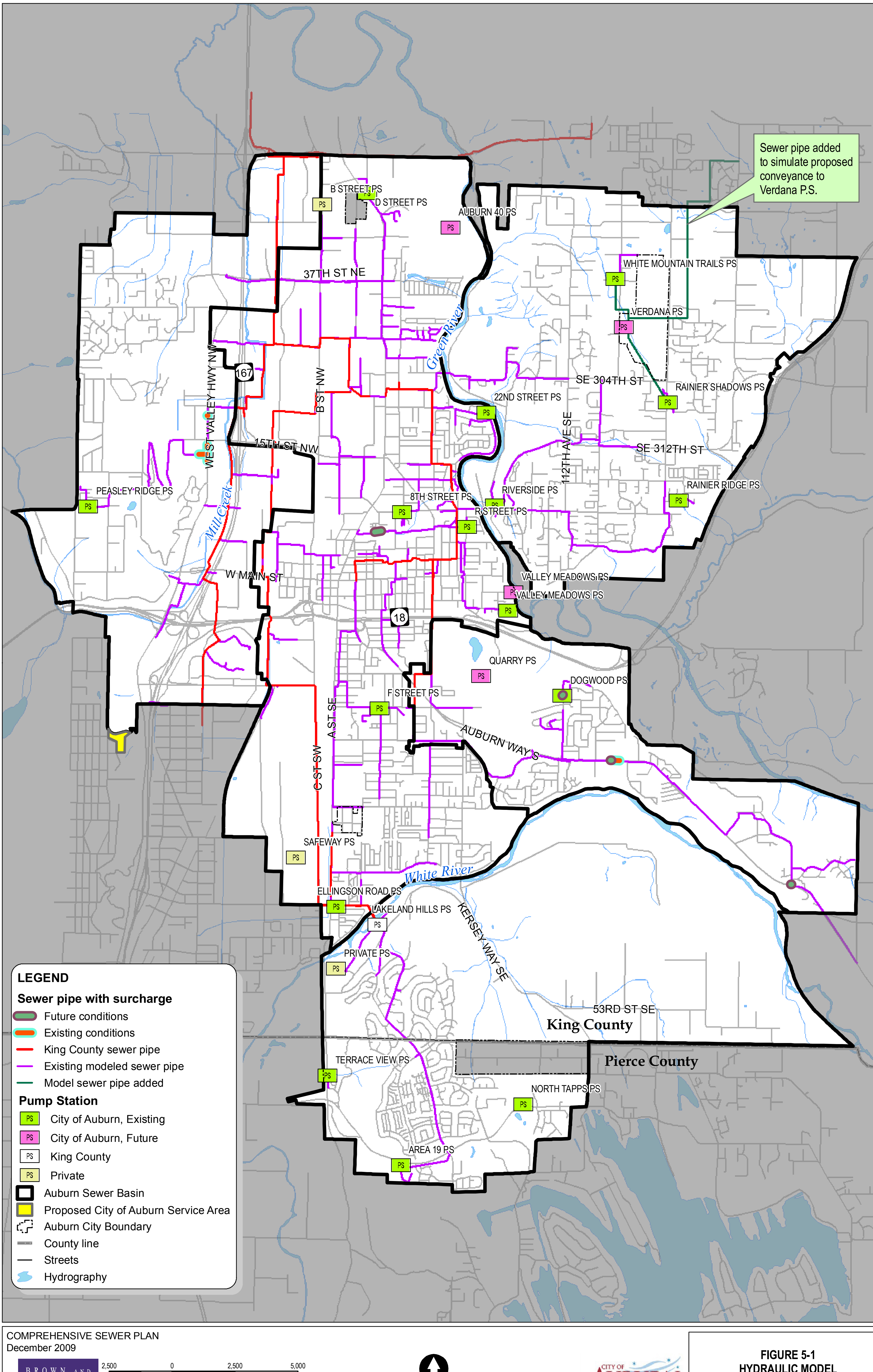

COMPREHENSIVE SEWER PLAN
December 2009

BROWN AND CALDWELL

CITY OF AUBURN WASHINGTON

FIGURE 5-1
HYDRAULIC MODEL RESULTS

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6. RECOMMENDED PLAN

This chapter discusses recommended capital projects for the city of Auburn's sewer system. The capital projects necessary to meet and maintain the City's LOS through the 20-year planning period (2028) are presented as a CIP.

This Sewer Plan contains time frames which are the intended framework for future funding decisions and within which future actions and decisions are intended to occur. However, these time frames are estimates, and depending on factors involved in the processing of applications and project work, and availability of funding, the timing may change from the included time frames. The framework does not represent actual commitments by the City which may depend on funding resources available.

The identification of projects is an ongoing effort requiring periodic evaluation. Therefore, the CIP from the 2001 Sewer Plan was reviewed during development of this plan. Some of the projects from the 2001 plan have been constructed, some have been determined to be no longer necessary through the system analysis described in Chapter 5, and some projects have been included in the CIP.

6.1 Capital Improvement Program

The CIP focuses on addressing known problems in a manner identifying cost-effective solutions that incorporate the risks associated with underperforming facilities and the uncertainty inherent in engineering calculations/model simulations. A flow chart depicting the process of CIP development is shown in Figure 6-1.

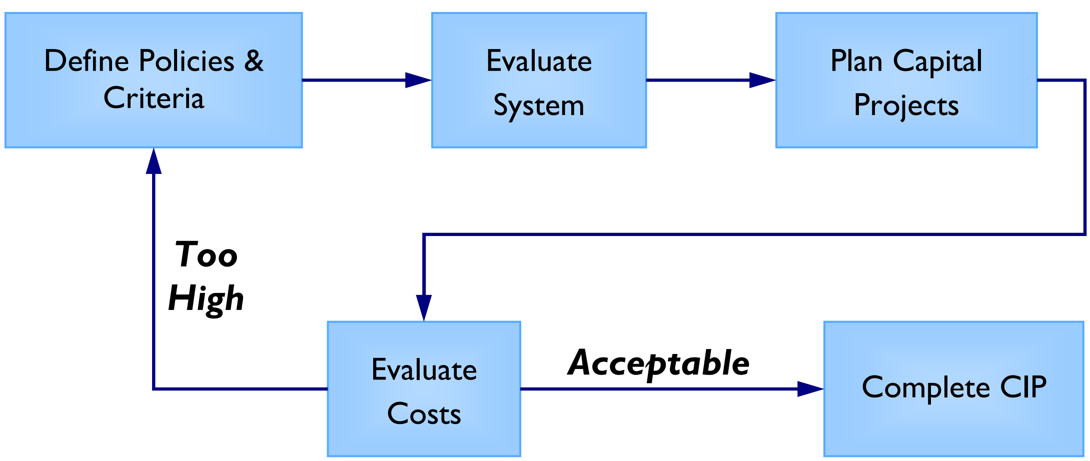

Figure 6-1. CIP development flow chart

The CIP places emphasis on projects identified for implementation between 2009 and 2014, which constitutes the 6-year planning period for utility capital funding requirements and staffing needs. This period provides a realistic outer limit for accurately forecasting the annual cycle of utility projects and priorities. This Sewer Plan also includes a 20-year CIP that examines long-term capital requirements, such as the replacement of infrastructure as it exceeds its useful life. All projects in the CIP are consistent with the LOS described in Chapter 3 of this document.

6.1.1 Project Priority

All projects in the CIP have been designated a priority for implementation. Priority was assigned as one of three designations. Projects in the top tier, or highest priority, are designated priority 1; projects in the middle tier are designated priority 2; and projects with lowest priority relative to the other projects are considered priority 3. The project descriptions below include the designated priority.

6.1.2 Project Cost

Estimated costs for each project are included in the CIP descriptions below. The costs are planning-level estimates. Actual costs will depend on various factors at the time of design and construction including labor and material costs. Estimated costs include an allowance for engineering, administration, legal fees, construction costs, sales tax, and construction supervision. Permitting and land, easement, and/or right-of-way acquisitions are not included in the cost estimate. The costs are assumed to be 2009 estimates.

6.2 Project Summary

The CIP projects mainly consist of ongoing and programmatic capital improvements. Ongoing projects include projects identified through previous studies. The City has previously allocated funding to each of these projects, which are currently in various stages of execution. These projects must continue to receive funding under the CIP until completion and have been included in this document to provide a complete picture of the program. Programmatic projects are included in the CIP to provide funding for maintaining and/or improving the LOS. These projects do not address a specific problem, but allocate budget for addressing LOS goals.

As discussed in Chapter 5, the system hydraulic analysis indicated no need for capacity-related capital projects. With the exception of planned pump station decommissioning and replacement projects, the pump station conditions assessment identified relatively small projects in addition to installation of backup power at each station. The economic life analysis, also described in Chapter 5, identified no projects in the 6-year CIP time frame and few for the 20-year planning window. The smaller projects resulting from the pump station condition assessment and economic life analysis are addressed by programmatic capital improvements.

Project number:	1	**Project priority:**	1	**Total 20-year cost estimate:**	$167,000[a]

Project name:	SCADA (Telemetry) Upgrades
Project description:	The City's SCADA/telemetry system requires an upgrade. This project will upgrade the portion of the system utilizing antiquated equipment, while maintaining the portions of equipment that are compatible with newer technologies. The existing system, based on an independent SCADA Assessment Study and the vulnerability study, has numerous obsolete components and does not allow control of the sewer and storm utility pump stations. The new system will utilize an open architecture so that the City will no longer be reliant on one vendor for repairs and maintenance. This project is currently underway and is planned for completion during the 6-year CIP.

a. The project's 2008 budget allocation of $682,600 has been carried forward to 2009 for a total of $849,600.

Project number:	2A	**Project priority:**	1	**Total 20-year cost estimate:**	$12,084,000

Project name: Repair and Replacement/System Improvement Projects, Priority 1

Project description: This project is R&R of existing sewer lines, manholes, and public side sewers. The project does not target a specific location or known deficiency, but is a general budget allotment to address needed, unscheduled improvements. This project will reduce risk of interruption to LOS by addressing known/reported system deficiencies. This project includes improvements recommended in the pump station assessment discussed in Chapter 5. This will contribute to maintaining system reliability. This project is planned to occur during both the 6- and 20-year CIPs.

Project number:	2B	**Project priority:**	2	**Total 20-year cost estimate:**	$12,417,000

Project name: Repair and Replacement/System Improvement Projects, Priority 2

Project description: See the Project 2A description for details. This project will be ongoing during both the 6- and 20-year CIPs. The lower priority designation for this project, in comparison to Project 2A, indicates implementation would occur after monies allocated to Project 2A have been expended.

Project number:	3a	**Project priority:**	3	**Total 20-year cost estimate:**	$800,000

Project name: Repair and Replacement in Association with Arterial Transportation Projects

Project description: This project is R&R of existing sewer lines, manholes, and public side sewers located within the project limits of City arterial transportation projects. Coordinating sanitary sewer utility projects with arterial transportation projects can lower the unit cost of pipe replacement by eliminating the pavement restoration component of the sewer project's costs. This project is planned to occur during the 6-year CIP period only.

Project number:	3b	**Project priority:**	3	**Total 20-year cost estimate:**	$1,000,000

Project name: Repair and Replacement in Association with SOS Transportation Projects

Project description: This project is R&R of existing sewer lines, manholes, and public side sewers located within the project limits of City SOS transportation projects. Coordinating sanitary sewer utility projects with SOS transportation projects can lower the unit cost of pipe replacement by eliminating the pavement restoration component of the sewer project's costs. This project is planned to occur during the 6-year CIP period only.

Project number:	4	**Project priority:**	2	**Total 20-year cost estimate:**	$125,000[A]

Project name: Lea Hill Pump Station Decommissioning

Project This project allows two existing City wastewater pump stations to be decommissioned. Gravity sewer lines

description: have been extended from the two existing stations to the Verdana pump station (which is currently under construction). The Verdana pump station has been designed to pump sewage from the contributing area served by two existing stations as well as the new Verdana ("Bridges") development. This project will result in the consolidation of several pumping facilities on Lea Hill, allowing for more efficient pump station maintenance. This project is planned to occur during the 6-year CIP period only. The project cost is low because a portion of this project work has been completed already, and a portion of the project was budgeted for 2008.

A. The project's 2008 budget allocation of $345,900 has been carried forward to 2009 for a total of $470,900.

Project number:	5	**Project priority:**	1	**Total 20-year cost estimate:**	$1,800,000

Project name: Ellingson Pump Station Replacement/Upgrade

Project description: This project is the replacement of the Ellingson pump station on or near the existing site. The existing pump station is in poor condition and requires an upgrade or replacement to maintain overall system reliability and safety. The capacity of the new station will be increased to account for growth within the Valley Basin. This project is currently being funded and is planned to occur during the 6-year CIP period only.

Project number:	6	**Project priority:**	2	**Total 20-year cost estimate:**	$1,800,000

Project name: Dogwood Pump Station Replacement

Project description: This project is the replacement of the Dogwood pump station on or near the existing site. The existing pump station is in poor condition and requires an upgrade or replacement to maintain overall system reliability and safety. This project is currently being funded and is planned to occur during the 6-year CIP period only.

Project number:	7	**Project priority:**	1	**Total 20-year cost estimate:**	$620,000

Project name: Les Gove Area Improvements

Project description: This project is the replacement of several sewer mains in conjunction with the Save Our Streets (SOS) program in the Les Gove neighborhood. This project also includes the replacement of failing sewer trunk lines in F Street. The project will result in increased system reliability due to the replacement of aging sewer pipes. The project is also an opportunity for improved LOS and reliability in the project area at reduced unit costs. This project is planned to occur during the 6-year CIP period only.

Project number:	8	**Project priority:**	1	**Total 20-year cost estimate:**	$1,500,000

Project name: Emergency Power Generators

Project description: This project is the installation of backup power generators and automatic transfer switches at all sewer pump stations. This project may involve purchase of property, easements, or installation of underground generator vaults. The project contributes to overall system reliability by providing redundancy in the event of power failure. This project is a considered a program where work consists of individual stand-alone projects, or may be integrated with other projects. This project is planned to occur during the 6-year CIP period only.

Project number:	9	**Project priority:**	2	**Total 20-year cost estimate:**	$66,000

Project name: Replacements/Relining anticipated by Economic Life Modeling

Project description: This project is the replacement or relining of pipes as predicted by an economic life model. The need for any projects identified by the model will be verified by field assessment. Replacing aging infrastructure using an economic life model will ensure sewer system reliability and allow the City to plan out replacement costs over time. The annual budget allotment should be refined once the model is updated with more actual pipe data (e.g., material, age). This project is planned to occur during the 20-year CIP period only.

Project number:	10	**Project priority:**	1	**Total 20-year cost estimate:**	$300,000

Project name: M&O Facility Improvements

Project description: This project covers general facility improvements. This expenditure is scheduled to occur during 2011.

6.3 Developer-Funded Projects

The 2001 Sewer Plan included capital projects funded by developers. As discussed in Chapter 3, the City's Comp Plan states that "if adequate facilities are currently unavailable and public funds are not committed to provide such facilities, developers must provide such facilities at their own expense in order to develop," so such projects were included.

A selection of the large projects, defined as having a total estimated cost (in 2001 dollars) greater than $250,000, is included in this Sewer Plan. These projects will not be funded by current ratepayers, but are included for reference and general planning purposes. The timing of development projects is much less predictable than that of typical capital projects involving R&R; therefore, assigning projects to a schedule (e.g., 6- or 20-year CIP) is very difficult and is not addressed in this Sewer Plan.

Many of the developer-funded projects were identified as being necessary to provide capacity for ultimate peak flows. The current hydraulic model should be updated with proposed developments for evaluation of capacity in the facilities proposed for improvement.

Table 6-1. Summary of Large Developer-Funded Projects from 2001 Sewer Plan		
2001 CIP project #	**Project name and description**	**Total project cost (2009 dollars[a])**
PS-501	**Valley Meadows Pump Station and Force Main Sewer:** Construct a new pump station and force main to replace the existing Valley Meadows pump station. This project is necessary for extending sewer service to unserved areas in the Valley basin.	$1,971,000
PS-2202	**Quarry Pump Station and Force Main Sewer:** Construct a new pump station and force main for undeveloped properties in the northwest region of the Auburn Way South basin.	$1,996,000

a. Costs escalated from 2001 estimates based on following assumption: 2009 Cost = 2001 Cost x (1 + rate)^(number of years). Escalation rate assumed to be 5%.

7. MAINTENANCE AND OPERATIONS

This chapter provides an overview of the organization and common procedures associated with the ongoing M&O of the Auburn sanitary sewer system. The purpose of the chapter is to document existing procedures and identify areas where changes may enhance system operation.

7.1 Utility Responsibility and Authority

The following section describes the responsibilities and authority invested in the sanitary sewer utility.

7.1.1 Organizational Structure

The Auburn sanitary sewer utility is operated as a utility enterprise under the direction of the Public Works director. The Department of Public Works (Public Works) is responsible for planning, design, construction, operation, maintenance, quality control, and management of the sanitary sewer system. Auburn has a mayor-council form of government; therefore, the Public Works director reports to the mayor, with oversight provided by a Public Works Committee comprising three City Council members. The mayor and the Public Works Committee provide oversight for the implementation of policies, planning, and management for the sanitary sewer utility.

The Engineering Division (Engineering) within Public Works is the lead group for comprehensive sanitary sewer system planning, development of a CIP, and the design, construction, and inspection of projects related to the sanitary sewer system. The city engineer/Public Works assistant director oversees Engineering and reports directly to the Public Works director.

The sanitary sewer manager oversees the sanitary sewer utility, and is responsible for the day-to-day maintenance and operation of the utility, inspection of the sanitary sewer system, and sewage spill notification as required by Washington State Department of Ecology (Ecology). The M&O manager, who reports to the City engineer/Public Works assistant director, oversees the sanitary sewer manager, who in turn oversees 10 employees including a field supervisor and two pump specialists. In addition to maintaining the sewer pump stations, the pump specialists are responsible for the operation and maintenance of six storm pump stations. The division also operates the closed-circuit television (CCTV) equipment as part of the condition assessment effort for both the Storm Drainage and Sanitary Sewer divisions. The location of the Auburn sanitary sewer utility within the Public Works Department organizational structure is shown on Figure 7-1.

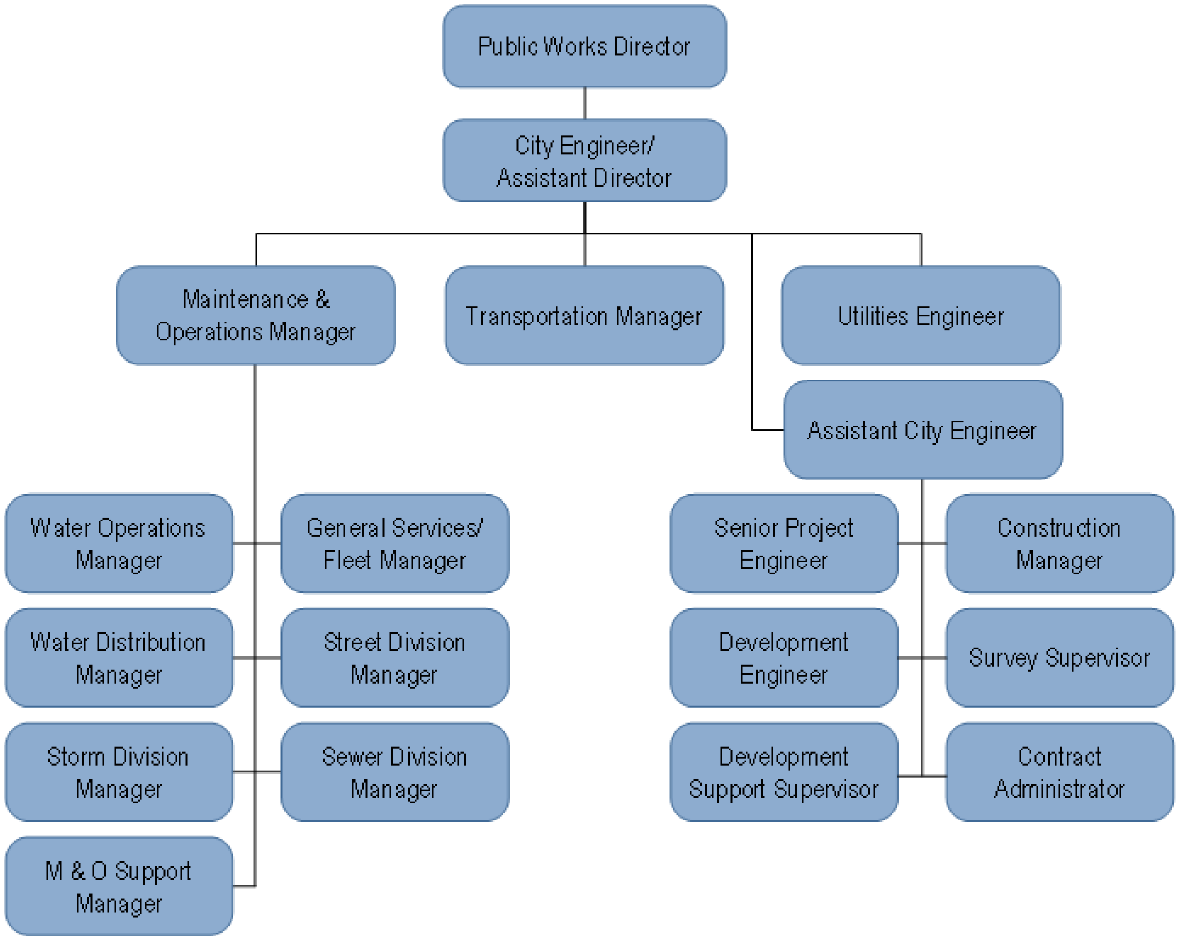

Figure 7-1. Sanitary sewer utility as part of the public works organizational chart

The Department of Finance (Finance) provides all financial functions for the sanitary sewer utility including utility billing services and history of customers' accounts. Staff assigned to Finance currently perform water meter reading and provide the information used to generate sanitary sewer bills.

7.1.2 Staffing Level

The maintenance worker staffing level has increased from six full-time employees (FTEs) at the time of the 2001 Sewer Plan to nine FTEs (including two pump station specialists). Additionally, the storm/sewer manager and storm/sewer supervisor positions have been modified with the Sanitary Sewer and the Storm Drainage Divisions each having their own dedicated manager and field supervisor. The primary functions of the 11 full-time M&O staff working in the Sanitary Sewer Division are shown in Table 7-1.

Table 7-1. Sanitary Sewer Utility Personnel List	
Position	**Primary function (s)**
Sewer manager	Management of sanitary system
Sewer field supervisor	Supervision of sanitary system
Pump station specialist	Pump station O&M (including storm)
Pump station specialist	Pump station O&M (including storm)
Maintenance worker I	Construction & maintenance
Maintenance worker II	Construction & maintenance
Maintenance worker II	Construction & maintenance
Maintenance worker II	Construction & maintenance
Maintenance worker II	Construction & maintenance
Maintenance worker II	Construction & maintenance
Maintenance worker II	Construction & maintenance

7.1.3 Level of Service

The sanitary sewer utility operates in accordance with the LOS criteria outlined in Chapter 3, and additional internally adopted goals integral to meeting those levels. These goals are based on the current staffing level and tasks deemed most critical to Auburn and its residents.

7.1.4 Infrastructure Growth

Development within Auburn's SSSA has been brisk since completion of the 2001 Sewer Plan. Auburn currently has approximately 210 miles of sewer pipe, more than 4,330 manholes, 16 sewer pump stations, 3 siphons and, most importantly, more than 18,000 customers.

7.1.5 Operator Training and Education

The City recognizes the value of having a knowledgeable and well-trained staff operating the sanitary sewer utility, and encourages employees to obtain the highest level of training available. At this time, the state of Washington does not require certification for sanitary sewer maintenance operators but the City would support any effort to establish certification for these positions. Seminars, conferences, and college coursework have become tools to advance knowledge for maintenance staff with subjects covered including safety, pumps, generators, forklift training, confined space, first aid, CPR, electric, and electronic fundamentals.

Many of the staff members are specialized in specific job functions which can promote expertise through specialization but which also limits the ability of the utility to absorb absences due to vacation, sickness, retirement, and termination. To mitigate this limitation, the City has broadened the scope of the sanitary sewer utility's education system by initiating a cross training program.

7.1.6 Sewer Meter Reading

The sanitary sewer utility has two sewer accounts whose wastewater discharge to the sanitary sewer system is directly measured by sewer meters. Auburn City Code requires that authorization to use privately owned sewer meters be limited to situations where metering water usage would be impractical or inaccurate, and states that approval of their use is discretionary.

7.1.7 Utility Locating Service

Currently the services for sewer utility locates are performed by a designated locator who is under the supervision of the M&O support manager. The locator is responsible for locating water, sewer, and storm facilities within the public right-of-way.

7.1.8 Public Notification for Sewage Spills

The sanitary sewer utility reports any sewage spills and/or overflows to Ecology whenever they occur. Public notification is required in some cases, and the City is prepared to respond accordingly. The appropriate media to contact for public notification of spills is noted in the "Public Works Emergency Response Manual" described later in this chapter.

7.1.9 Technical Support

Engineering provides technical support to developers and City maintenance crews. Engineering develops technical specifications and standards to be used in the construction of sanitary sewer system facilities, as well as any technical computations or analyses required to support system operation.

Engineering and Information Services (IS) are also responsible for developing and maintaining records for the sanitary sewage collection system and its associated infrastructure. The City uses geographic information system (GIS) data for its conveyance system and although "record" drawings are required on all sanitary sewer projects, IS adds information from those drawings to the existing GIS system.

Permit applications for connection to the existing sanitary sewer system are received by the Permit Center, and processed by the utility permit technician. This staff member also provides customer support, responses to inquiries, and assistance with applications. Once a side sewer permit is issued, construction staff within Engineering inspect the construction and verify that the facility is built to the City's standards. "As-built" drawings showing the location of the private side sewer are noted on the back of the permits and the permits are filed with the City.

Engineering reviews facility extension permits and plans to ensure that the City's standards and specifications are maintained. Facility extensions are processed through the Development Division of Engineering and evaluated using the "Design and Construction Standards."

7.1.10 Fats, Oils, and Grease (FOG) Reduction Program

Engineering has a 0.5-FTE water resources technician to implement and oversee the FOG Reduction Program. The program focuses on regulation of food processing and food service industry discharges in order to minimize the amount of FOG entering the City sewer system.

7.2 Routine Operations

Routine operations for the sanitary sewer utility can be divided into functional activities as described in the following sections.

7.2.1 Sewage Pump Station Maintenance

All of the sanitary sewage pump stations are inspected weekly. Facility status is verified and routine maintenance is performed. Maintenance personnel responsible for the routine maintenance of sanitary sewer pump stations are also responsible for storm pumping facilities. This is a full-time commitment for one maintenance worker and one pump station specialist. The sanitary sewer pump stations that are maintained by the City's sanitary sewer personnel are identified in Chapter 4.

7.2.2 Generator Testing and Maintenance

All of the sanitary sewer power generators are inspected monthly. The inspection process includes, but is not limited to, running the generators, facility status verification, and routine maintenance. The inspection verifies the generator's ability to perform in an emergency. Permanent generators are situated at the Rainier Shadows, Rainier Ridge, "F" Street, Terrace View, Area-19, Peasely Ridge, White Mountain Trails, and North Tapps pump stations. A portable generator is stationed at Riverside Pump Station.

The Public Works Department has two portable generators that can be transported to specific sewer pump stations in the event of an emergency: a 60-kW Olympian generator and a 100-kW Aptech generator. The 60-kW generator can power the D Street, R Street, Dogwood, 8th Street, 22nd Street, and Valley Meadows pump stations, and the 100-kW generator can power the Ellingson, and Riverside pump stations.

7.2.3 Preventive Maintenance

The sanitary sewer utility's preventive maintenance (PM) program consists of an active, but selective, program. Records on existing facilities and equipment are maintained as hard-copy records and filed with the sanitary sewer/storm manager. The sanitary sewer utility uses the hard-copy system to track pipe, pumps, operating equipment, etc., and to record maintenance activity associated with the particular device. While this system has served the City well, it is difficult to access information quickly and to plan for specific maintenance. The City is transitioning to a CMMS which will be used to create work orders and to track preventive maintenance activities.

Weekly pump station maintenance activities include the following tasks:

- check lubrication of all pumping equipment
- check and clean seal filters
- check bubbler line pressure
- check pump run times
- bleed lines of moisture
- inspect control valves at pump stations.

Monthly maintenance activities include the following tasks:

- inspect and test engine-generators
- inspect pump station mechanical bypass pumping.

Equipment manufacturer recommendations for PM are incorporated into the weekly and monthly maintenance routine.

PM tasks are essential for reliable operation and preservation of investment but they must be adhered to in order to be effective. The sanitary sewer utility is focused on the most critical preventive maintenance operations. Other activities that are important, but not the most critical, are not being routinely addressed due to the limited workforce within the sanitary sewer utility. As a result, a lack of routine maintenance efforts, such as painting the stations, may have long-term impacts on the life of the facilities.

7.2.4 Manhole Inspection Program

The City's sanitary sewer utility personnel routinely inspect sanitary sewer manholes for the following situations:

- A visual guarantee of proper sewage conveyance.
- Assessment of the state of solids buildup in manhole wet wells. This examination works in conjunction with the vacuum/high-velocity cleaning/jetting program (discussed below).
- Verification of the condition of the manhole lid/covers and support rings for wear and stability.
- Visual affirmation of condition of sewer channels and ladder rungs.

As of May 8, 2001, the City's system has approximately 4,330 sanitary sewer manholes. The City is able to inspect each manhole an average of once every 3 years.

7.2.5 Closed-Circuit Television Inspection

Routine CCTV inspection of the sanitary sewer system is an essential activity in meeting the City's M&O responsibilities. Structural defects and obstructions are the primary cause of line failure in sanitary sewer pipes; routine inspection of the lines is crucial to identifying these potential trouble spots. In addition, sewage spill claims have proven to be a very costly type of litigation for municipalities and routine CCTV inspection of the sewer system can mitigate the risk of a spill. The City has one CCTV truck to service both the sanitary sewer and storm drainage systems.

Since the end of 2007, inspection reports and digital video captured by the CCTV crews have been stored on the City's computer network. The flexidata software program is used to store and organize the data. While the ability to edit information in flexidata is limited to licensed machines, the flexidata reader is available for all City staff. For the past year, maintenance, engineering, design, and inspection staff all have been able to readily research field locations and conditions. The City's goal is to inspect all sewer mains within a 7-year cycle.

7.2.6 High-Velocity Cleaning/Jetting Service

Jetting a sanitary sewer pipe is the principal means of cleaning the line portion of the sewer of sludge, debris, or obstructions and is done with the City's vactor/jet truck. A hose with a special end fitting is inserted into a pipe and high-pressure water (up to 2,500 psi) is sent through the hose. The high-pressure water exits the small hole at the tip of the nozzle, breaking down the sludge and obstructions. The hose is propelled down the length of the pipe via the numerous other holes found in the nozzle. The hose is inserted through a manhole into the pipe and the line is jetted to the next manhole. The hose is then retracted via a hydraulic reel system, back to the entry manhole. All of the sludge/debris is scoured toward the entry manhole because the spraying water forces it in that direction and is vacuumed out as required.

7.2.7 Vacuum Service

Another service performed by the sanitary sewer utility is vacuum cleaning of manholes, sewer lines, and wet wells. Wet wells have a catch for solids and grease to settle out of the wastewater flow. The solids must be periodically removed and the City's vactor/jet truck is employed for this process. These solids are removed via the vacuum feature and transported to King County's Renton Treatment Plant as necessary. The vacuuming portion of the truck is also very helpful in cleaning up surcharged manholes and sewage spills.

7.3 Field Operations

In addition to activities listed above, the sanitary sewer utility usually maintains two-person field crews that perform a variety of other ongoing utility functions. The field functions include repair of breaks or leaks on pipes, system infrastructure, and installation of equipment, pipe, etc., for improvements to the infrastructure. Grounds and building maintenance at utility facilities, such as mowing, gardening, painting, carpentry work, plumbing, etc., are also performed at pump stations and the M&O building. The sanitary sewer utility is also available to assist other Public Works divisions such as Water, Storm Drainage, or Transportation during manpower shortages or emergencies. The sanitary sewer staff performs liaison functions with Engineering and construction inspections for new projects, repairs, or modification of existing lines. They also assist supervision and maintenance staff by responding to customer inquiries, requests, and complaints.

7.3.1 Vehicles and Equipment

The sanitary sewer utility maintains an extensive inventory of equipment available to respond to problems or emergencies. The fleet is currently equipped with seven trucks, one CCTV van, one sewer vactor/jet truck, and one emergency bypass pump. Each component of this fleet is equipped with valve operators and traffic control equipment.

7.3.2 Inventory of Supplies

The sanitary sewer utility maintains an inventory of supplies and parts that are available for use in responding to emergency situations as well as normal utility operations. Supplies and parts are tracked in an inventory control system that allows easy identification of available materials.

7.4 Emergency Operations

The following section describes the sanitary sewer utility's emergency response program and contacts.

7.4.1 Emergency Response Program

The sanitary sewer utility, in conjunction with the other utilities at the City, has prepared a "Public Works Emergency Response Manual" as a guide on how to handle emergency situations. The manual is by no means all-inclusive for every type of disaster; however, it is a valuable tool for dealing with many of the emergency situations that municipalities face. The Emergency Response Manual is one element of the City's overall Emergency Plan. The primary objectives of the Emergency Plan are to ensure public safety, restore essential services as quickly as possible, and to provide assistance to other areas as required.

The Emergency Response Manual is very thorough and yet is written in a reader-friendly style for ease of use. Three copies of the manual have been published. Three copies are available: at the M&O building, at city hall with the Public Works director, and at Fire Station 33 with the fire chief. The entire Emergency Response Manual is too lengthy to include in this document.

The Public Works Emergency Response Manual is only one element of the City's overall Emergency Response Plan. There is also a master response program for the entire City and it is documented as the City's Emergency Operations Plan. The material in the Operations Plan provides guidance to the Emergency Management Organization for mitigation, preparedness, responsibilities, recovery operations, training and community education activities. The Plan also describes the functions of local government and incorporation of essential non-governmental organizations into the Emergency Management Organization. Copies are located in each City Department, the Public Works Maintenance and Operations Building, and the Valley Regional Fire Authority, Station 31.

7.4.2 Sanitary Sewer Utility Personnel Contact

The sanitary sewer utility maintains an automated dialer system to respond to sanitary sewer system alarms that occur outside of normal working hours. This system calls sanitary sewer utility staff, based on a prioritized employee telephone list, until it receives a response. The division has implemented a standby program whereby one on-call employee is designated to be the first to receive after-hours emergency calls and alarms.

Most sanitary sewer system problems that occur outside normal working hours are reported through the City's 911 emergency response system. An emergency call-out list is provided to the emergency operator in order to contact sanitary sewer utility staff in case of an emergency or alarm. As mentioned above, the primary responder to those after-hours calls is the on-call employee. Sanitary sewer utility employees have been trained to respond to system alarms or emergencies. The contacted employee assesses the situation and then responds in accordance with established emergency response procedures, as described above.

7.5 Communications and Data Collection

The following section describes the communication systems and data collection activities performed by the City's sanitary sewer utility.

7.5.1 Telemetry and Pump Controls

The sanitary sewer utility currently uses telephone landlines to monitor the operation of sanitary sewer pump stations. The information from all sewer, storm, and water facilities is routed to the M&O control center located at 1305 C Street SW. The control center monitors wet well levels at all of the sewer pump stations together with pump run times and cycles. The telemetry and control center is used by the water, storm, and sanitary sewer utilities.

Logic programming automates the sewer pump station process. The control center is configured to sound an alarm in the M&O building if a recognized anomaly is detected. The alarm system is linked to an automatic telephone dialer that will seek sewer personnel to investigate the anomaly, in the event that the problem occurs during non-working hours. All alarm and pump information is recorded within the computer that functions as the control center.

The entire telemetry system is currently undergoing an evaluation, and standards are being developed in an effort to update the system to current technologies and improve uniformity. The City is also considering replacing the landline-based telemetry with a radio-based system to increase reliability and independence from outside utilities.

7.5.2 Record-Keeping

Record-keeping responsibilities for the Auburn sanitary sewer utility are divided between Public Works and Finance. Public Works keeps all records on sanitary sewer M&O, record drawings for sewer main extensions, pump station construction, side sewer installations and other system analyses. Finance maintains records on sewage meter readings and the financial status of the utility. All records were used to develop this Sewer Plan and are used to manage the sanitary sewer utility.

Public Works is in the process of implementing a CMMS called CartêGraph, which is described in the following section. This system will be able to plan, track, record, and receive information concerning citizen requests, developer projects, and maintenance issues. In addition, a CMMS will integrate City archive records, GIS data, and CCTV reports. The ability to seamlessly multitask among these issues will increase the utility's ability to organize and complete the tasks that are required.

Records on the operation and maintenance of the sanitary sewer system are helpful in developing future operational procedures and to identify needed changes or improvements to current system facilities.

7.5.2.1 Computerized Records

As described previously in this chapter, the sewer system is controlled by a computerized control system. This system includes record-keeping functions that log data on system operation and status. The system is a proprietary system developed and maintained by the City's control system vendor. Recent records can be retrieved from the computer terminal and hard copies of data can be printed. Historic records are downloaded from active computer memory in compressed files that can be retrieved later. The system also records alarm data which allows the City to create a database that includes the types and frequency of system problems. Types of data recorded in the sanitary sewer utility computer database for sewage pump stations include the following:

- pump run
- pump fail
- low wet well
- high wet well
- power fail
- intrusion
- generator run
- pump on/off cycles

As-built drawings of sewer extensions and of sewer permits have also been scanned and are available through the City's archive system. As part of the effort to update Auburn's telemetry system, the data management system and SCADA controls are also being evaluated, and the City may opt for a non-proprietary system.

As discussed earlier, Finance uses the utility billing system to maintain sewer account data. The utility billing system also includes information on property sales plus a tracking feature that reports on sewage registered monthly and annually.

7.5.3 CartêGraph CMMS

CMMS can be an indispensable tool for modernizing public works departments. CartêGraph software is generally used as a GIS tool, but has developed complementary maintenance functions. The customer service requests and work order generation functions of the system are currently in use, while other features of the system are in the process of being implemented.

7.6 Analysis of Maintenance and Operations

The sanitary sewer utility has a robust maintenance program in place with sufficient history to predict troublesome line attributes with a reasonable degree of accuracy. Most data are well captured and stored in flexidata. This information, combined with experienced staff, provides the City with a reliable sewer system operation. The following items are highlighted items identified from discussions with maintenance staff.

- Approximately 90 percent of all sewer lines are entered in the GIS system.
- Condition assessment information is believed to be around 70 percent complete with more then 90 percent of the assessment data coming from north of Highway 18 and the balance coming from south of Highway 18. This data discrepancy is due to the fact that newer construction has not been captured yet and it is generally on the south side of Highway 18.

- The sewer pipe database includes information on roots, line bellies, and other typical line maintenance problems. This information is stored in flexidata and used to establish work schedules.
- The CCTV program was reported to be very effective. Video clips are tied to problems found, making it easier to provide data to contractors and other agencies as needed.
- Recent "Mud Monster" equipment enhancements allow the CCTV capability to extend to pipes with diameters up to 48 inches.
- Color coding line condition data would aid staff in quick identification of condition of lines in an area and would provide valuable information when performing R&R planning.
- Decisions on maintenance priorities could be made more precise by the continued collection and analysis of decision-support data including pipe type, age, and condition, maintenance history of nearby pipes, etc.

The following items are improvement opportunities available to the utility. These improvement opportunities are based on improving existing services, LOS to ratepayers, improving regulatory compliance, and improving work productivity.

- Institutionalize criticality practices (see section 8.3.3)
- Continue to migrate PM to CartêGraph
- Continue to establish a more computerized work environment integrating information, updates, and reporting as a common craft work process
- Apply a data dashboard to enable staff to efficiently assess routine indications of system performance.
- Evaluate FTEs for maintenance improvements
- Develop and use the training matrix to accelerate the learning curve for all employees
- Continue to train staff to qualify for a standby program for after-hours service and support
- Use the lift station training matrix to ensure that information is consistently provided to personnel involved in lift station maintenance.

8. FINANCE

8.1 Introduction

The objective of the financial plan is to identify the total cost of providing sewer service and to provide a financial program that allows the sewer utility to remain financially viable during execution of the Capital Improvement Program (CIP) identified in Chapter 6. This viability analysis considers the historical financial condition of the utility, the sufficiency of utility revenues to meet current and future financial and policy obligations, and the financial impact of executing the CIP.

8.2 Past Financial Performance

This section includes a historical (2003–2008) summary of financial performance as reported by the city of Auburn on the Statement of Revenues, Expenses, and Changes in Fund Equity and the Statement of Net Assets, specific to the sewer utility.

In general, these statements indicate that the utility has not been able to generate sufficient revenues from service charges to meet its financial obligations. Table 8-1 shows a consolidated Statement of Revenues, Expenses, and Changes in Fund Net Assets for 2003–2008. This table shows that over the past 6 years, growth in revenues, which is derived primarily from sewer service charges, has not been able to keep pace with growth in operating expenses over the same time period, resulting in an annual operating loss since 2004. The City recognizes this deficiency and a comprehensive rate study is underway to evaluate the forecasted financial needs of the utility over the 2009–2014 planning horizon and identify the level of sewer rate increases necessary to fully fund its financial obligations. Results from this study are anticipated by the end of the first quarter 2010.

8.2.1 Findings and Trends

As discussed above and as shown in Table 8-1, revenues from operations have not been able to keep pace with expenses. For example, operating income, which is a measurement of the difference between revenues and operating expenses, declined from a net income of $245,000 in 2003 to a net operating loss of $551,000 in 2004. Annual net operating losses have continued, ending 2008 with $556,000. Key performance indicators over this time frame are discussed below:

- The **M&O coverage ratio** (service revenues divided by operating expenses) declined from 1.02 in 2003 to 0.95 in 2004 and has remained below the desired ratio of 1.0 since, ending 2008 with a ratio of 0.96.
- The **operating ratio** (total operating expenses divided by total operating revenues) has increased from 98 percent in 2003 to 104 percent in 2008. A ratio greater than 90 percent indicates that there is little room for new debt service and capital replacement without additional rate increases. A ratio greater than 100 percent indicates that operating expenses exceed operating revenues and indicates an unsustainable financial condition.

Table 8-1. Statement of Revenues, Expenses and Changes in Fund Net Assets						
	2003	2004	2005	2006	2007	2008
OPERATING REVENUES:						
Charges for services	10,369,853	10,800,747	11,318,110	12,186,548	13,352,474	13,601,390
Other operating revenue		159				997
Total operating revenues	10,369,853	10,800,906	11,318,110	12,186,548	13,352,474	13,602,387
OPERATING EXPENSES:						
Operations and maintenance	7,908,341	8,312,541	9,232,367	9,229,476	10,180,017	10,071,648
Administration	914,831	1,031,572	1,041,240	1,269,221	1,351,278	1,774,962
Depreciation/amortization	521,872	1,179,836	838,360	883,686	986,668	1,282,599
Other operating expenses	779,790	827,818	840,706	889,549	1,034,275	1,029,045
Total operating expenses	10,124,834	11,351,767	11,952,673	12,271,932	13,552,238	14,158,254
OPERATING INCOME (LOSS)	245,019	(550,861)	(634,563)	(85,384)	(199,764)	(555,867)
NON OPERATING REVENUE (EXPENSES)						
Interest revenue	103,947	127,413	329,230	555,394	706,993	426,168
Other non-operating revenue	420,255	465,724	1,863,531	1,532,264	222,135	
Interest expense			(2,022)	(11,447)	(20,434)	(20,807)
Other non-operating expenses	(8,518)			(8,176)	(103,216)	(2,177)
Total non-operating revenue (expenses)	515,684	593,137	2,190,739	2,068,035	805,478	403,184
INCOME (LOSS) BEFORE CONTRIBUTIONS AND TRANSFERS	760,703	42,276	1,556,176	1,982,651	605,714	(152,683)
CAPITAL CONTRIBUTIONS	2,730,606	2,832,987	3,175,512	1,542,419	4,700,246	7,095,833
TRANSERS IN				77,044		
TRANSFERS OUT	(10,473)	(365,000)	(157,400)	(50,000)	(50,000)	(50,000)
Change in net assets	3,480,836	2,510,263	4,574,288	3,552,114	5,255,960	6,893,150
TOTAL NET ASSETS BEGINNING OF YEAR	39,390,571	42,871,407	45,381,670	49,955,958	53,508,072	58,764,032
TOTAL NET ASSETS END OF YEAR	42,871,407	45,381,670	49,955,958	53,508,072	58,764,032	65,657,182

Table 8-2 presents the Statement of Net Assets. The City's total net assets, which represent the difference between total assets and total liabilities, has increased between 2003 and 2008, reflecting a rise in the utility's capital assets. Key performance indicators and trends are discussed below.

8.2.2 Findings and Trends

- **Total net assets:** Total net assets, which represent the difference between total assets and total liabilities, steadily increased from $42.9 million in 2003 to $65.7 million in 2008, driven primarily by an increase in capital assets.
- **Liquidity ratio:** The current ratio (unrestricted current assets divided by current liabilities) declined from 57.0 in 2003 to 25.4 in 2008, reflecting a rise in the amount of current payables between 2003 and 2008. Despite this, the City's current ratio remains strong, as a ratio of 2:1 or higher is considered good in terms of healthy liquidity.

The City does not have any outstanding revenue bonds. Its outstanding debt is limited to three Public Works Trust Fund loans which were issued for the construction of various sewer projects.

Table 8-2. Statement of Net Assets

	2003	2004	2005	2006	2007	2008
ASSETS						
Current assets:						
Cash and cash equivalents	5,831,430	8,000,527	8,551,048	7,382,663	9,958,790	11,337,351
Investments	3,004,585	2,469,855	2,479,531	3,956,117	4,000,918	2,003,750
Restricted cash						
Bond payments			-	-	-	-
Customer deposits			1,361	15,670	18,471	18,471
Other			1,120,391	2,736,690	989,826	738,017
Restricted cash, cash equivalents, and investments	615,723	603,757				
Customer accounts	1,632,595	1,748,956	1,790,955	1,924,165	1,620,525	1,636,060
Other receivables		6,917	20,139	35,445	29,439	37,069
Inventories	2,124	2,124	1,919	2,227	4,330	8,968
Total current assets	11,086,457	12,832,136	13,965,344	16,052,977	16,622,299	15,779,686
Non-current assets						
Long-term contracts and notes	1,973,400	1,838,400	1,613,400	1,478,400	1,163,400	1,073,400
Capital assets						
Land	1,654,958	1,654,958	1,654,958	1,654,958	1,654,958	1,654,958
Buildings and equipment	965,725	1,014,344	1,073,476	1,073,964	1,120,740	1,131,744
Improvements other than buildings	37,081,209	39,180,001	43,235,214	48,759,304	53,232,004	65,113,774
Construction in progress	334,964	652,720	3,335,872	2,109,108	4,589,591	846,620
Less: accumulated depreciation (A/D)	(10,028,867)	(11,208,703)	(12,047,063)	(12,930,749)	(13,917,417)	(15,200,016)
Total capital assets (net of A/D)	30,007,989	31,293,320	37,252,457	40,666,585	46,679,876	53,547,080
Other non-current assets						
Deferred charges						
Total non-current assets	31,981,389	33,131,720	38,865,857	42,144,985	47,843,276	54,620,480
Total assets	**43,067,846**	**45,963,856**	**52,831,201**	**58,197,962**	**64,465,575**	**70,400,166**
LIABILITIES						
Current liabilities						
Current payables	96,082	324,906	564,087	894,974	1,158,317	424,743
Customer deposits			1,360	10,461	18,471	18,471
Interfund payables					-	
Loans payable: current			107,844	107,844	243,955	
Employee leave benefits: current	50,022	45,542	53,925	56,638	59,756	69,282
Revenue bonds payable: current					-	
General obligation bonds payble: current					-	
Accured interest			2,022	6,318	12,493	13,183
Deposits	8,892	11,549			-	
Other liabilities payable					-	
Total current liabilities	154,996	381,997	729,238	1,076,235	1,492,992	525,679
Non-current liabilities						
Deferred revenue		162,203	162,203	162,203	162,203	162,203
Employee leave benefits	41,443	37,986	42,610	43,104	6,955	8,545
Deferred credits						
Loans payable			1,941,192	3,408,348	4,039,393	4,046,557
Revenue bonds payable						
General obligation bonds payable						
Total non-current liabilities	41,443	200,189	2,146,005	3,613,655	4,208,551	4,217,305
Total liabilities	196,439	582,186	2,875,243	4,689,890	5,701,543	4,742,984
NET ASSETS						
Invested in capital assets, net of related debt	35,407,547	31,293,320	35,203,421	37,150,393	42,396,528	53,547,080
Restricted for:						
Debt service			-	-	-	
Construction	606,831	637,900	1,137,051	1,182,579	304,152	21,398
Unrestricted	6,857,029	13,450,450	13,615,486	15,175,100	16,063,352	12,088,704
Total net assets	42,871,407	45,381,670	49,955,958	53,508,072	58,764,032	65,657,182
Total liabilities and net assets	**43,067,846**	**45,963,856**	**52,831,201**	**58,197,962**	**64,465,575**	**70,400,166**

8.3 Financial Plan

The city of Auburn sewer utility is an enterprise that is responsible to fund all of its related costs. It does not depend on general tax revenues or general fund resources. The primary source of funding for the utility is collections from sewer service charges. The City controls the level of service charges by ordinance; subject to statutory authority, it can adjust user charges as needed to meet financial objectives.

The financial plan can only provide a qualified assurance of financial feasibility if it considers the "total system" costs of providing sewer service—both operating and capital. To meet these objectives, the following elements are completed:

- **Capital Funding Plan:** This plan identifies the total CIP obligations for the 2009–2014 planning period. The plan defines a strategy for funding the CIP including an analysis of available resources from rate revenues, existing reserves, SDCs, debt financing, and any special resources that might be readily available (e.g., grants, developer contributions, etc.). The capital funding plan impacts the financial plan through use of debt financing (resulting in annual debt service) and the assumed rate revenue resources available for capital funding.
- **Financial Forecast:** This forecast identifies annual non-capital costs associated with the operation, maintenance, and administration of the sewer system. Included in the financial plan is a reserve analysis that forecasts cash flow and fund balance activity along with testing for satisfaction of actual or recommended minimum fund balance policies. The financial plan ultimately evaluates the sufficiency of utility revenues in meeting all obligations, including cash uses such as operating expenses, debt service, and reserve contributions, as well as any coverage requirements associated with long-term debt.

Utility Fund Structure

To account for operating, capital, and restricted activities, the City maintains the following three separate accounts within the sewer utility:

- **Operations:** serves as an operating account where operating revenues are deposited and operating expenses are paid
- **Capital Projects:** serves as a capital account where capital revenues are deposited (SDCs, grant proceeds, and debt proceeds) and capital expenditures are paid
- **Restricted Bond Reserve:** serves as a restricted account set up to comply with revenue bond covenants as discussed above.

Minimum balance thresholds for these accounts are discussed under the next section.

8.4 Financial Policies

A brief summary of the key financial policies employed by the City, as well as those recommended and incorporated in the financial program, are discussed below.

Reserve Policies

Utility reserves serve multiple functions. They can be used to address variability and timing of expenditures and receipts; occasional disruptions in activities, costs, or revenues; utility debt obligations; and many other functions. The collective use of individual reserves helps to limit the City's exposure to revenue shortfalls, meet long-term capital obligations, and reduce the potential for bond coverage defaults. Common reserves among municipal utilities are operating reserves, capital contingency reserves, and bond reserves. The City currently maintains a form of the following reserves:

- **Operating reserve:** An operating reserve, or working capital reserve, provides a minimum unrestricted fund balance needed to accommodate the short-term cycles of revenues and expenses. These reserves are intended to address both anticipated and unanticipated changes in revenues and expenses. Anticipated changes could include billing and receipt cycles, payroll cycles, and other payables. Operating reserves can be used to meet short-term cash deficiencies due to the timing of annual revenues and expenditures.

  Generally, utilities target a certain number of days of working capital as a beginning cash balance to provide the liquidity needed to allow regular management of payable and payment cycles. Consistent with industry practice, a working capital reserve of between 12 and 16 percent, or 45 to 60 days of M&O expenses, is targeted. Based upon the City's 2009 budget, this target is equivalent to approximately $600,000 to $800,000.[1]
- **Capital contingency reserve:** A capital contingency reserve is an amount of cash set aside in case of an emergency should a piece of equipment or a portion of the utility's infrastructure fail unexpectedly. Additionally, the reserve could be used for other unanticipated capital needs including capital project cost overruns. There are various approaches to identifying an appropriate level for this reserve, such as identifying a percentage of a utility system's fixed asset costs and determining the cost of replacing highly critical assets or facilities. For purposes of this analysis, a minimum fund balance equal to 1 percent of plant in service is targeted.
- **Bond reserve:** Bond covenants often establish reserve requirements as a means of protecting an agency against the risk of nonpayment. This bond reserve can be funded with cash on hand, but is more often funded at the time of borrowing as part of the bond principal. This reserve requirement can also be met by using a surety bond. The City maintains a restricted bond reserve in compliance with its bond covenants.

System Reinvestment Policies

The purpose of system reinvestment funding is to provide for the replacement of aging system facilities to ensure sustainability of the system for ongoing operation. Each year, the utility's assets lose value as they move toward eventual replacement. That accumulating loss in value and future liability is typically measured for reporting purposes through annual depreciation expense, which is based on the original cost of the asset over its anticipated useful life. While this expense reflects the consumption of the existing asset and its original investment, the replacement of that asset will likely cost much more, factoring in inflation and construction conditions. Therefore, the added annual replacement liability is even greater than the annual depreciation expense.

This analysis assumes no system reinvestment funding for the future replacement of system assets, consistent with current City practice. We recommend that the City incorporate a policy of system reinvestment funding through rates as soon as feasible.

Debt Policies

Bond covenants often establish a minimum debt coverage ratio as a means of protecting an agency against the risk of nonpayment. The City's current bond covenants require a ratio of 1.25 times annual revenue bond debt service.

As stated earlier, the City does not have any outstanding revenue bonds. Long-term debt for the utility is limited to three Public Works Trust Fund loans issued for the construction of various sewer projects.

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[1] City financial policies require a minimum working capital balance of $1.0 million in each utility fund (combined operations and CIP). This financial analysis is compliant with this fiscal policy.

8.4.1 Capital Funding Plan

The CIP developed for this Plan totals eight separate projects valued at $16.9 million ($17.9 million inflated) over the 2009–2014 planning horizon. Costs are stated in 2009 dollars and escalated to the year of planned spending for financing projections at an annual inflation rate of 3 percent.

Significant projects during the 2009–2014 period include replacement of the Dogwood pump station ($2.1 million), emergency power generators ($1.6 million), Ellingson pump station replacement/upgrade ($2.0 million), and annual repair/replacement system improvement projects ($8.1 million)[2].

Table 8-3 summarizes the annual costs associated with the 6-year CIP.

Table 8-3. Annual Costs Associated with the 6-yar CIP

Year	2009 Dollars	Escalated[a]
2009	5,273,577	5,273,577
2010	2,760,000	2,842,800
2011	3,680,000	3,904,112
2012	840,000	917,891
2013	1,980,000	2,228,507
2014	2,350,000	2,724,294
6-year total	$16,883,577	$17,891,181

a. Values escalated to year of project construction based upon an annual inflation rate of 3 percent.

A capital funding plan is developed to determine the total resources available to meet the CIP needs and determine if new debt financing will be required. The utility started 2009 with a cash balance of $5.4 million for its capital program. Future SDC collections are projected at $200,000 in 2009 increasing to $350,000 annually through 2014. To be conservative, no growth in this revenue source is assumed.

The 2009–2014 funding plan includes $2.0 million in SDCs, $5.2 million in existing cash reserves including interest, and $10.8 million in new revenue bonds. A summary of the 2009–2014 capital funding plan is summarized in Table 8-4 below. Figures presented are in inflated dollars.

Table 8-4. 2009–2014 Capital Financing Plan

	2009	2010	2011	2012	2013	2014	Total
Total capital projects	**$ 5,273,577**	**$ 2,842,800**	**$ 3,904,112**	**$ 917,891**	**$ 2,228,507**	**$ 2,724,294**	**$ 17,891,181**
New revenue bond proceeds	-	2,435,097	3,543,919	558,886	1,869,532	2,365,320	$ 10,772,755
Use of system development charges	200,000	350,000	350,000	350,000	350,000	350,000	$ 1,950,000
Use of capital fund balance	5,073,577	57,703	10,193	9,005	8,975	8,974	$ 5,168,427
Total funding sources	**$ 5,273,577**	**$ 2,842,800**	**$ 3,904,112**	**$ 917,891**	**$ 2,228,507**	**$ 2,724,294**	**$ 17,891,181**

[2] Values escalated to year of project construction based upon an annual inflation rate of 3 percent.

8.5 Available CIP Funding Assistance and Financing Resources

Feasible long-term capital funding strategies should be defined to ensure that adequate resources are available to fund the CIP identified in this Plan. In addition to the utility's resources such as accumulated cash reserves, capital revenues, bond proceeds, and SDCs, capital needs can also be met from outside sources such as grants, low-interest loans, and bond financing. The following is a summary of utility resources and outside resources.

8.5.1 Utility Resources

Utility resources appropriate for funding capital needs include accumulated cash in the CIP funds, bond proceeds, and capital revenues, such as SDCs. The first two resources have been discussed in the Financial Policies section. Capital-related revenues are discussed below.

System Development Charges

An SDC as provided for by RCW 35.92.025 refers to a one-time charge imposed on new customers as a condition of connection to the utility system. The SDC has two purposes: to promote equity between new and existing customers, and to provide a source of revenue to fund capital projects. Equity is served by providing a vehicle for new customers to share in the capital costs incurred to support their addition to the system. SDC revenues provide a source of cash flow used to support utility capital needs; revenue can only be used to fund utility capital projects or to pay debt service incurred to finance those projects.

In the absence of an SDC, growth-related capital costs would be borne in large part by existing customers. In addition, the net investment in the utility already collected from existing customers, whether through rates, charges, and/or assessments, would be diluted by the addition of new customers, effectively subsidizing new customers with prior customers' payments. To establish equity, an SDC should recover a proportionate share of the existing and future infrastructure costs from a new customer. From a financial perspective, a new customer should become financially equivalent to an existing customer by paying the SDC.

Table 8-5 summarizes the City's current SDC schedule.

Table 8-5. Current System Development Charge schedule[a]

	SDC
Charge per Residential Customer Equivalent (RCE)[b]	$850

a. Source: City of Auburn fee schedule, Fees for City Permits and Actions, effective January 1, 2009. As approved per Ord. 5819, as amended.

b. RCE is a term used by the King County Department of Natural Resources and Parks to define the capacity that is required by new development within the sewer system. A single family house is established as 1.0 RCE.

It should be noted that, as part of a comprehensive rate study started in late 2008, the City will be evaluating its SDC level based upon the City's planned 20-year CIP. Results are expected by the end of 2009.

Local Facilities Charge

While an SDC is the manner in which new customers pay their share of general facilities costs, local facilities funding is used to pay the costs of local facilities that connect each property to the system's infrastructure. Local facilities funding is often overlooked in a rate forecast because it is funded upfront by either connecting customers, developers, or through an assessment to properties—but never from rates. Although these funding mechanisms do not provide a capital revenue source toward funding CIP costs, the discussion of these charges is included in this chapter, as they are an impact to the new customer of the system.

A number of mechanisms can be considered toward funding local facilities. One of the following scenarios typically occurs:

the utility charges a connection fee based on the cost of the local facilities (under the same authority as the SDC) a developer funds extension of the system to their development and turns those facilities over to the utility (contributed capital) a local assessment is set up called a Utility Local Improvement District (ULID/LID) which collects tax revenue from benefited properties. A **local facilities charge** (LFC) is a variation of the SDC authorized through RCW 35.92.025. It is a city-imposed charge to recover the cost related to service extension to local properties. Often called a front-footage charge and imposed on the basis of footage of main "fronting" a particular property, it is usually implemented as a reimbursement mechanism to a city for the cost of a local facility that directly serves a property. It is a form of connection charge and, as such, can accumulate up to 10 years of interest. It typically applies to instances in which no developer-installed facilities are needed through developer extension due to the prior existence of available mains already serving the developing property.

The **developer extension** is a requirement that a developer install onsite and sometimes offsite improvements as a condition of extending service. These are in addition to the SDC required and must be built to City standards. The City is authorized to enter into developer extension agreements under RCW 35.91.020. Part of the agreement between the City and the developer for the developer to extend service might include a latecomer agreement, resulting in a latecomer charge to new connections to the developer extension.

Latecomer charges are a variation of developer extensions whereby a new customer connecting to a developer-installed improvement makes a payment to the City based on their share of the developers cost (RCW 35.91.020). The City passes this on to the developer who installed the facilities. This is part of the developer extension process, and defines the allocation of costs and records latecomer obligations on the title of affected properties. No interest is allowed, and the reimbursement agreement cannot exceed 15 years in duration.

LID/ULID is another mechanism for funding infrastructure that assesses benefited properties based on the special benefit received by the construction of specific facilities (RCW 35.43.042). Most often used for local facilities, some ULIDs also recover related general facilities costs. Substantial legal and procedural requirements can make this a relatively expensive process, and there are mechanisms by which a ULID can be rejected by a majority of property ownership within the assessment district boundary.

8.5.2 Outside Resources

The following section provides a description of grants, low-cost loans, and public debt options available to the City to fund its CIP.

Grants and Low-Cost Loans

Historically, federal and state grant programs were available to local utilities for capital funding assistance. However, these assistance programs have been mostly eliminated, substantially reduced in scope and amount, or replaced by loan programs. Remaining miscellaneous grant programs are generally lightly funded and heavily subscribed. Nonetheless, the benefit of even the very low-interest loans makes the effort of applying worthwhile. Grants and low cost loans for Washington State utilities are available from Ecology and the Department of Community Trade and Economic Development (CTED). Each includes programs for which the City might be eligible. They are primarily targeted at low-income and/or rural communities.

Department of Community, Trade, and Economic Development (from the CTED Web site)

The Department of Community, Trade, and Economic Development has two grant and loan programs that the City might be eligible for:

- Community Economic Revitalization Board grant and loan program
- Public Works Trust Fund loan program.

Each of these programs is described in greater detail below.

Community Economic Revitalization Board: CERB primarily offers low-cost loans; grants are made available only to the extent that a loan is not reasonably possible. The CERB targets public facility funding for economically disadvantaged communities, specifically targeting job creation and retention. Priority criteria include the unemployment rates, number of jobs created and/or retained, wage rates, projected private investment, and estimated state and local revenues generated by the project. Traditional construction projects are offered at a maximum dollar limit per project of $1 million. A local match of 25 percent is targeted.

Eligible applicants include cities, towns, port districts, special purpose districts, federally recognized Indian tribes, and municipal corporations.

The Board's policy is that all loans made by the CERB will be secured by a general obligation (GO) pledge of the taxing power of the borrowing entity. Terms do not exceed 20 years including available payment deferral of interest and principal for up to 5 years. Interest rates match the most current rate of Washington State bonds (not to exceed 10 percent).

Further detail is available at http://www.cted.wa.gov/site/64/default.aspx.

Public Works Trust Fund: Cities, towns, counties, and special purpose districts are eligible to receive loans. Water, sewer, storm, roads, bridges, and solid waste/recycling facilities are eligible and funds may be used for repair, replacement, rehabilitation, reconstruction, and improvements including reasonable growth (generally the 20-year growth projection in the comprehensive plan).

PWTF loans are available at interest rates of 0.5, 1, and 2 percent, with the lower interest rates given to applicants who pay a larger share of the total project costs. The loan applicant must provide a minimum local match of funds of 5 percent toward the project cost to qualify for a 2 percent loan, 10 percent for a 1 percent loan, and 15 percent for a 0.5 percent loan. The useful life of the project determines the loan term up to a maximum of 20 years.

Further detail is available at http://www.cted.wa.gov/site/361/default.aspx.

8.5.3 Public Debt

General Obligation Bonds: GO bonds are bonds secured by the full faith and credit of the issuing agency, committing all available tax and revenue resources to debt repayment. With this high level of commitment, GO bonds have relatively low interest rates and few financial restrictions. However, the authority to issue GO bonds is restricted in terms of the amount and use of the funds, as defined by Washington constitution and statute. Specifically, the amount of debt that can be issued is linked to assessed valuation.

RCW 39.36.020 states:

> (ii) Counties, cities, and towns are limited to an indebtedness amount not exceeding one and one-half percent of the value of the taxable property in such counties, cities, or towns without the assent of three-fifths of the voters therein voting at an election held for that purpose.

(b) In cases requiring such assent counties, cities, towns, and public hospital districts are limited to a total indebtedness of two and one-half percent of the value of the taxable property therein.

While bonding capacity can limit availability of GO bonds for utility purposes, these can sometimes play a valuable role in project financing. A rate savings can be realized through two avenues: the lower interest rate and related bond costs, and the extension of repayment obligation to all tax-paying properties (not just developed properties) through the authorization of an *ad valorem* property tax levy.

Revenue Bonds: Revenue bonds are commonly used to fund utility capital improvements. The debt is secured by the revenues of the issuing utility and the debt obligation does not extend to the City's other revenue sources. With this limited commitment, revenue bonds typically bear higher interest rates than GO bonds and also require security conditions related to the maintenance of dedicated reserves (a bond reserve) and financial performance (added bond debt service coverage). The City agrees to satisfy these requirements by ordinance as a condition of bond sale.

Revenue bonds can be issued in Washington without a public vote. There is no bonding limit, except perhaps the practical limit of the utility's ability to generate sufficient revenue to repay the debt and provide coverage. In some cases, poor credit might make issuing bonds problematic.

Summary

An ideal funding strategy would include the use of grants and low-cost loans when debt issuance is required. However, these resources are very limited and competitive in nature and do not provide a reliable source of funding for planning purposes. It is recommended that the City pursue these funding avenues but assume bond financing to meet needs above the utility's available cash resources. GO bonds might be useful for special circumstances, but due to the bonding capacity limits they are most often reserved for other City (non-utility) purposes. Revenue bonds are a more secure financing mechanism for utility needs. The Capital Financing Strategy developed to fund the updated CIP assumes the following funding priority:

1. Available grant funds
2. Accumulated capital cash reserves
3. Annual revenue collections from SDCs
4. Annual transfers of rate-funded capital or excess cash (above minimum balance targets) from operating accounts
5. Interest earnings on CIP Fund balances and other miscellaneous capital resources
6. Revenue bond financing

8.6 Financial Forecast

The Financial Forecast, or revenue requirement analysis, forecasts the amount of annual revenue that needs to be generated by rates. The analysis incorporates operating revenues, M&O expenses, debt service payments, rate funded capital needs, and any other identified revenues or expenses related to utility operations, and determines the sufficiency of the current level of rates. Revenue needs are also impacted by debt covenants (typically applicable to revenue bonds) and specific fiscal policies and financial goals of the utility.

For this analysis, two revenue sufficiency criteria have been developed to reflect the financial goals and constraints of the utility: (1) cash needs must be met, and (2) debt coverage requirements must be realized. In order to operate successfully with respect to these goals, both tests of revenue sufficiency must be met.

Cash Test

The cash flow test identifies all known cash requirements for the utility in each year of the planning period. Capital needs are identified and a capital funding strategy is established. This can include the use of debt, cash reserves, outside assistance, and rate funding. Cash requirements to be funded from rates are determined. Typically, these include M&O expenses, debt service payments, system reinvestment funding or directly funded capital outlays, and any additions to specified reserve balances. The total annual cash needs of the utility are then compared to total operating revenues (under current rates) to forecast annual revenue surpluses or shortfalls.

Coverage Test

The coverage test is based on a commitment made by the City when issuing revenue bonds. For purposes of this analysis, revenue bond debt is assumed for any needed debt issuance. As a security condition of issuance, the City is required per covenant to agree that the revenue bond debt would have a higher priority for payment (a senior lien) compared to most other utility expenditures; the only outlays with a higher lien are M&O expenses. Debt service coverage is expressed as a multiplier of the annual revenue bond debt service payment. For example, a 1.0 coverage factor would imply that no additional cushion is required. A 1.25 coverage factor means revenues must be sufficient to pay M&O expenses, annual revenue bond debt service payments, plus an additional 25 percent of annual revenue bond debt service payments. The excess cash flow derived from the added coverage, if any, can be used for any utility purpose, including funding capital projects. The existing coverage requirement on the City's outstanding revenue bonds is 1.25 times bond debt.

In determining the annual revenue requirement, both the cash and coverage sufficiency tests must be met—the test with the greatest deficiency drives the level of needed rate increase in any given year.

8.6.1 Financial Forecast

The financial forecast is developed from the City's adopted 2009–2010 biennial budget documents along with other key factors and assumptions to develop a complete portrayal of the sewer utility annual financial obligations. The following is a list of the key revenue and expense factors and assumptions used to develop the forecast:

- Annual customer growth is estimated at 2.0 percent over the study period based on discussions with City staff.
- The City's 2009–2010 budget forms the baseline for revenue and expense forecasts. Included in the 2009–2010 budget is a City-adopted sewer rate increase of 6.06 percent effective January 2009 and a 5.99 percent rate increase effective January 2010. These increases were applied across the board, affecting all rates and customer classes.
- City rate revenues include revenues from sewer service charges. Estimated sewer service charges for 2009 were reconciled to the City's 2007 customer billing data detail and are forecasted incorporating customer growth.
- Interest earnings assume a rate of 2.5 percent applied to beginning of year cash balances.
- M&O expenses are escalated from the 2010 budget figures at 4.0 percent per year for general cost and labor inflation and 6 percent for employee benefit cost inflation. State taxes are calculated based on prevailing tax rates.
- Existing debt service schedules were provided by the City and include three Public Works Trust Fund loans with varying payoff schedules.
- Future debt service has been added as outlined in the capital funding plan. The forecast assumes a revenue bond interest rate of 6 percent, issuance cost of 2 percent, and a 20-year term.

- Consistent with current City practice, no system reinvestment funding is forecasted.

This financial plan focuses on the planning period of 2009 through 2014. Table 8-6 summarizes the projected financial performance for the 2009–2014 planning period based upon the above assumptions.

Table 8-6. Financial Forecast

	2009	2010	2011	2012	2013	2014
Revenues						
Rate revenues under existing rates	$ 3,865,938	$ 4,185,537	$ 4,269,248	$ 4,354,633	$ 4,441,725	$ 4,530,560
Metro rate revenues	10,949,625	11,059,121	12,839,743	14,423,866	16,011,032	16,518,882
Non-rate revenues	218,750	167,003	140,903	107,510	77,711	49,642
Total revenues	**$ 15,034,313**	**$ 15,411,661**	**$ 17,249,894**	**$ 18,886,009**	**$ 20,530,469**	**$ 21,099,084**
Expenses						
Cash operating expenses	$ 4,898,935	$ 4,980,825	$ 5,272,448	$ 5,562,773	$ 5,861,110	$ 6,092,048
Metro audit payment (one-time)	991,477	-	-	-	-	-
Metro wastewater treatment payments	10,949,625	11,059,121	12,839,743	14,423,866	16,011,032	16,518,882
Existing debt service	264,152	517,485	613,749	612,061	610,373	608,685
New debt service	-	237,790	583,859	638,434	820,997	1,051,973
Rate funded system reinvestment	-	-	-	-	-	-
Total expenses	**$ 17,104,189**	**$ 16,795,221**	**$ 19,309,798**	**$ 21,237,134**	**$ 23,303,512**	**$ 24,271,589**
Annual surplus/(deficiency)	**$ (2,069,876)**	**$ (1,383,560)**	**$ (2,059,904)**	**$ (2,351,126)**	**$ (2,773,043)**	**$ (3,172,505)**
Debt service coverage (target: at least 1.25)	**n/a**	**(1.13)**	**(0.88)**	**(1.20)**	**(1.27)**	**(1.14)**

Table 8-6 shows the forecasted rate revenues under the City's adopted 2009–2010 budget[3], and the forecasted rate revenues over the remaining 2011–2014 planning period. This financial forecast shows that planned and forecasted sewer utility service charges under current adopted rates are not sufficient to fund the "total system" cost of the utility. The gap between revenues and expenses is forecasted to increase from $2.1 million in 2009 to $3.2 million by 2014. In addition, as a result of the resource deficiency, debt service coverage is forecasted to fall below the minimum threshold as prescribed by the City's bond covenants starting in 2010.

The City recognizes that forecasted sewer utility service charge revenues under existing rates are insufficient to meet its forecasted financial obligations. A comprehensive rate study is underway to evaluate the forecasted financial needs of the utility over the 2009–2014 planning horizon and identify the level of sewer rate increases necessary to fully fund its financial obligations. This rate study currently remains underway with results anticipated by the end of the first quarter 2010.

8.6.2 City Funds and Reserve Balances

Table 8-7 shows a summary of the projected ending City operating and capital reserve balances through 2014 based on the rate forecasts presented herein[4]. As shown below, as forecasted revenues are unable to keep pace with the forecasted growth in expenses, the operating fund is projected to fall into a deficit position starting in 2013. The capital fund balance is forecasted to decline to about $360,000 starting in 2010, reflecting the annual collection of SDC revenues and associated interest earnings. While the utility does not have any outstanding revenue bonds in 2009, new revenue bonds will be required in 2010 to support the

[3] 2009–2010 rate revenues reflect City Ordinance 6204, adopted September 2008, which increased monthly stormwater rates 6.06 percent in January 2009 and 5.99 percent in January 2010.

[4] Beginning 2009 fund balance for the sewer utility is $14,097,590 and includes resources for operations and capital. No debt reserve is required as the utility does not have any outstanding revenue bonds.

proposed capital construction program. The forecasted debt reserve balance starting in 2010 is set by covenant and is in compliance with coverage requirements.

Table 8-7. Cash Balance Summary

	2009	2010	2011	2012	2013	2014
Operating Fund	$ 6,680,124	$ 5,296,564	$ 3,228,171	$ 850,239	$ (1,979,259)	$ (5,201,406)
Capital Fund	407,703	360,193	359,005	358,975	358,974	358,974
Debt Reserves	-	237,790	583,859	638,434	820,997	1,051,973
Total	**$ 7,087,827**	**$ 5,894,547**	**$ 4,171,034**	**$ 1,847,649**	**$ (799,288)**	**$ (3,790,459)**
Combined minimum target balance	$ 1,305,955	$ 1,460,033	$ 1,881,096	$ 1,978,770	$ 2,222,273	$ 2,508,964

8.7 Rate Structures

The following section presents a description of existing rates and projected retail sewer rates.

8.7.1 Existing Rates

The City's existing sewer rate structure for inside City customers consists of two rate classes. The rate schedule for the single family residential customer class is a flat monthly charge. The rate schedule for the non-single family residential customer class consists of a base monthly charge with a consumption allowance of 7.50 ccf and a single volume rate for consumption exceeding this allowance[5].

Because the city of Auburn sends its wastewater to King County for treatment, King County assesses a separate monthly fee of $31.90 per single family residential account and $31.90 for each 7.5 ccf of water used for all other customers. The City assesses this charge on behalf of the County as part of the City's monthly sewer billings. The City collects revenue from this separate fee and transfers it to the County[6].

Retail sewer utility customers residing outside of the City's boundaries are assessed charges based upon the inside City rate schedule plus a 50 percent premium. Low-income single family residential customers are provided a 50 percent discount to the rates presented. To qualify for a low-income discount, a customer must be at least 62 years old and meet low-income guidelines as defined by the U.S. Department of Housing and Urban Development[7].

Table 8-8 presents the City's existing retail sewer monthly rate schedule (local portion only) for each customer classification[8].

[5] AMC 13.20.440.

[6] AMC 13.20.440A.

[7] AMC 13.24 and 13.24.040.

[8] Does not include King County Metro wastewater treatment rate of $31.90 for single-family residences and $31.90 for each 7.5 ccf of water used for all other customers.

Table 8-8. Existing Retail Sewer Rates		
	Current Monthly Rates	
	Jan. 1, 2009	Jan. 1, 2010
Inside city		
Single family residential	$11.02	$11.68
Non-single family residential		
Base rate (includes first 7.5 ccf)	$11.02	$11.68
Volume rate per ccf (7.5 ccf and above)	$1.11	$1.18
Low income discount: 50%		
Outside city multiplier: 1.5		

8.7.2 Projected Retail Rates

As discussed above, a rate study is presently underway to assess the level of retail sewer rate increases necessary to fully fund utility financial obligations. Potential equity and conservation enhancements to the rate structure will also be evaluated.

8.8 Affordability

A common affordability benchmark for utility rates is to test the monthly median income equivalent against the existing and projected monthly utility rates. The typical threshold used to assess relative affordability is 1.5 percent of the median household income. In the case of the city of Auburn's sewer utility, utility billings should not exceed $814.10 over the course of a year or $67.84 on a monthly basis. Based upon the City's adopted rates for 2010, a typical sewer service billing is $140.16 per year or $11.68 per month, both of which are well within the affordability benchmark as outlined above.

Table 8-9 below presents the results of the affordability test[9].

Table 8-9. Affordability Test	
1999 median household income	$39,208
Assumed annual growth in MHI	3.00%
Estimated 2010 median household income	$54,273
Affordability benchmark	1.50%
Maximum affordable billing	
- Annual	$814.10
- Monthly	$67.84
Actual billing at 7.5 ccf per month	
- Annual	$140.16
- Monthly	$11.68

Rate affordability should be evaluated for future years following completion of the rate study.

[9] Based on city of Auburn 1999 median household income of $39,208 as published by the U.S. Census Bureau. Median household income is escalated to 2010 values at rate of 3 percent per year. Current billings are based upon existing 2010 rates.

8.9 Conclusion

This financial plan indicates that the City's adopted rates will not be sufficient to fund utility financial obligations. The City is aware of this financial situation and has therefore initiated a comprehensive sewer rate study to determine the appropriate level of adjustment to sewer rates over the 2009–2014 planning period. This study is presently underway with results expected by the end of the first quarter 2010.

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9. IMPLEMENTATION PLAN

Building upon the projects described in Chapter 6 and the maintenance and operations activities outlined in Chapter 7, this chapter presents the work plan of future activities for the Auburn sanitary sewer utility. The critical elements of plan implementation (e.g., CIP implementation and criticality-based maintenance plans) are presented and a planning-level schedule is provided to guide the sanitary sewer utility's activities in the coming years.

The discussion of plan implementation is divided into two sections:

- presentation of the CIP for both 6- and 20-year time frames
- description of the steps forward in order to implement the activities described in this chapter.

Funding for these activities is described in a separate rate analysis study prepared in conjunction with this Sewer Plan.

The timeline at the conclusion of this chapter shows the proposed implementation schedule.

9.1 6-Year and 20-Year CIP

The CIP for the 2009–2014 period is summarized in Table 9-1 below. The CIP includes the estimated costs for the improvement projects (in 2009 dollars). Project timing is based on project priorities weighed with likely budgetary constraints. Therefore, project costs are distributed somewhat evenly from year to year.

The 6-year CIP contains projects identified by the City as requiring immediate action. Many of these projects were scheduled for implementation prior to the Sewer Plan and are currently in design and/or construction. Details regarding these projects are provided in Chapter 6. The 6-year CIP also contains general improvement projects allowing for annual repair and replacement of facilities in the next 6 years.

Table 9-1. Annual Project Cost Summary for 6-Year CIP

Project number	Project name	Priority	2009	2010	2011	2012	2013	2014	6-year project cost
1	SCADA (Telemetry) Upgrades	1	$167,000						$167,000
2a	Repair & Replacement/System Improvement Projects (Priority 1)	1	$500,000	$150,000	$740,000	$320,000	$940,000	$975,000	$3,625,000
2b	Repair & Replacement/System Improvement Projects (Priority 2)	2	$500,000	$150,000	$740,000	$220,000	$740,000	$1,375,000	$3,725,000
3a	Repair and Replacement Associated with Arterial Transportation Projects	3	$400,000	$400,000					$800,000
3b	Repair and Replacement Associated with SOS Transportation Projects	3	$500,000	$500,000					$1,000,000
4	Lea Hill Pump Station Decommissioning	2	$125,000						$125,000
5	Ellingson Pump Station Replacement/Upgrade	1	$600,000	$1,100,000	$100,000				$1,800,000
6	Dogwood Pump Station Replacement	2	$150,000	$150,000	$1,500,000				$1,800,000
7	Les Gove Area Improvements	1	$610,000	$10,000					$620,000
8	Emergency Power Generators	1	$300,000	$300,000	$300,000	$300,000	$300,000		$1,500,000
10	M&O Facility Improvements	1			$300,000				$300,000
		Total 6-year CIP cost for priority 1 projects	$2,177,000	$1,560,000	$1,440,000	$620,000	$1,240,000	$975,000	$8,012,000
		Total 6-year CIP cost for priority 2 projects	$775,000	$300,000	$2,240,000	$220,000	$740,000	$1,375,000	$5,650,000
		Total 6-year CIP cost for priority 3 projects	$900,000	$900,000	$0	$0	$0	$0	$1,800,000
		Total 6-year CIP cost	**$3,852,000**	**$2,760,000**	**$3,680,000**	**$840,000**	**$1,980,000**	**$2,350,000**	**$15,462,000**

The CIP after the 6-year time period includes ongoing programmatic efforts to develop projects for facility repair or replacement, including projects based on the City's asset management tools. The projects proposed for expenditures in the years 2015 to 2028 and an estimate of total CIP costs for the 20-year period from 2009 through 2028 are shown in Table 9-2 below.

Table 9-2. Cost Summary for 20-Year CIP

Project number	Project name	Priority	Project costs for 2015–2028 (2009 dollars)
2a	Repair & Replacement/System Improvement Projects (Priority 1)	1	$8,458,000
2b	Repair & Replacement/System Improvement Projects (Priority 2)	2	$8,692,000
9	Replacement/Relining Anticipated by Economic Life Modeling	2	$66,000
	Total 2015–2028 CIP cost for priority 1 projects		$8,458,000
	Total 2015–2028 CIP cost for priority 2 projects		$8,758,000
	Total 2015–2028 CIP cost for priority 3 projects		$0
	Total CIP cost (2015 to 2028)		**$17,216,000**
	Total 20-year CIP cost		**$32,678,000**

9.2 Monitoring

Flow monitoring and additional hydraulic model calibration is recommended in the locations where simulation results showed sewers (1) surcharging for current conditions and/or (2) surcharging when future growth occurs.

Based on the hydraulic model results for current conditions, which show surcharging only at significant depths below the ground surface (for example, more than 6 feet below ground), monitoring should initially consist of observing water depths after significant storm events in manholes that the model shows as surcharging. Appendix D and Table 9-3 lists sewer pipes simulated to surcharge for current conditions. This list identifies manholes for initial observations. If surcharging is observed to be significant, or more than predicted by the model, then more formal flow monitoring (e.g., installation of flow meters) is recommended for the current CIP cycle (i.e., the next 6 years). The flow monitoring data collected during this period would be used to calibrate the hydraulic model.

Table 9-3. Proposed Sewer Manhole Monitoring Sites

Manhole ID (MUID)	Purpose	Approximate duration
506-53A	Hydraulic model verification	After each significant storm event
606-08	Hydraulic model verification	After each significant storm event
1013-14	Hydraulic model verification	After each significant storm event
606-11	Hydraulic model verification	After each significant storm event
606-10	Hydraulic model verification	After each significant storm event
506-53A	Hydraulic model verification	After each significant storm event

Pipes shown to surcharge in projected development scenarios should be identified as potential future monitoring sites. The timing of the monitoring and resulting model calibration for the potential future sites will be based on (1) the results of the first round of calibration, if completed, and (2) the presence of some of the forecasted growth. With regard to item 1, if the initial monitoring/calibration shows higher flow rates than our current model, then the monitoring effort should be scaled up to include projected surcharging sites.

9.3 Asset Management and Maintenance and Operation

Asset management is a defined process for managing facilities and activities that will optimize the life cycle cost of utility assets as well as ensure the utility meets defined service levels. The economic life model presented in Chapter 5 is an example of a criticality-based approach to deciding the optimal timing for renewal or replacement of existing sewers and force mains. This method can also be used for managing risks to the performance of sewers and force mains through maintenance strategies. Transition to a criticality-based maintenance strategy for the City will involve several major activities. Each of these activities is described below in a narrative providing a descriptive explanation of the recommended path forward.

9.3.1 Collect Asset Data

The sanitary sewer system is a complex network of pipes and pump stations that collect and convey wastewaters produced within the City to the King County collection system. It was reported that not all system attributes are currently included in the City's CMMS database. Each of these attributes should be identified including location, condition, age, and type before being entered into the asset database. A data standard for each attribute type should be developed to ensure completeness of the data collected. Data collection templates for each asset type should be developed to insure the thoroughness and accuracy of the collection process.

9.3.2 Building a System Hierarchy

As described earlier, the sewer system is an interdependent arrangement of assets with a common purpose. When a single element fails the impacts may cause overloading and flooding may result. To better understand the system complexity, we recommend a hierarchical presentation of the assets. This hierarchy may look like the following:

Zone 1:	Name of zone or area
System:	Gravity sewer
Component:	Manhole
Part:	Cover

Hierarchy is an excellent method for organizing the attributes and identifying the interdependencies of a complex sewer system.

9.3.3 Determining Asset Criticality

Criticality is determined based on the consequences of failure and the likelihood of the failure occurring. Factors that impact criticality include the age of the asset, the repair history of the asset, and the consequences, in terms of dollars, should a failure occur. Consequences of a system failure include such considerations as whether a failure impacts a hospital or school as compared to a residence or unoccupied property. Each asset is evaluated based on these likelihood and consequence factors and a numerical weighting assigned. The combination of these factors results in the assignment of a criticality value. Figure 9-1 depicts an example of assessing asset criticality values to a large collection system by identifying a likelihood of failure and consequence of failure for each asset. The data on the figure are not specific to Auburn's sanitary sewer system.

9.3.4 Defining Maintenance Strategies

As Figure 9-2 illustrates, an asset's criticality can be used to determine the best maintenance strategy for that asset. There are four general maintenance strategies based on the risk carried by the asset and the specific maintenance strategy used should be assigned on an individual asset basis to insure that the appropriate actions are being taken. As a rule of thumb though, the four maintenance strategies are described below as long as the spare parts strategy and the frequency of maintenance activities.

High-risk assets are identified as having both a high likelihood of failure and a high consequence of failure. These assets should be modified in order to mitigate this risk. Risk mitigation can be done by adding redundancy to reduce the consequence of failure or by selecting a more robust type of asset that can perform the same function with a lower likelihood of failure. An example of this would be adding a redundant pump to a pump station to reduce the consequence of any one pump failing or using a different type of pump to reduce the occurrence of clogs.

Moderate-risk assets have been separated into two regions: high-likelihood/low-consequence assets and high-consequence/low-likelihood assets. The assets with a high likelihood of failure but a low consequence of failure should receive time-based maintenance care. This maintenance strategy includes PM including inspection, calibration, oil changes, and tasks recommended by the manufacturer or other best practices. Corrective maintenance should also be conducted to address defects as they are revealed and the spare parts strategy should be prepared for the high incidence of failures. The frequency of these maintenance activities is driven by the economics of maintaining the asset; the cost of maintaining the asset should be in proportion with the cost of replacing the asset in order to optimize the life-cycle cost of asset.

An example of a high-likelihood/low-consequence asset would be a ventilation fan in a pump station. The consequence of the fan failing may be relatively low and as a result, expensive maintenance activities should not be performed on an inexpensive fan. Instead, performing routine preventive maintenance to extend the life of the fan should be done at a frequency that is cost-effective and the fan should be replaced upon failure. Spare fans may be kept on hand or an on-call contract with a vendor may be used, if appropriate.

The second region of moderate-risk assets are assets that have a high consequence of failure but are not very likely to fail. These assets should receive condition-based maintenance care. This maintenance strategy includes the same PM identified above but also includes predictive maintenance (PdM). PdM includes technologies and practices designed to evaluate assets in operation and, based on known failure modes, predict failures before they occur. PdM technologies include vibration monitoring, infrared detection, oil analysis, and other condition evaluative tools. Once these measures identify deteriorating condition, corrective maintenance activities should be taken to prevent a failure and the spare parts strategy should reflect that the high consequence of failure requires that these assets be non-functional for as short a period of time as possible. The frequency of these maintenance activities should be based on the condition of the asset; as the condition declines, more frequent maintenance efforts may be required.

An example of a high-consequence/low-likelihood asset would be a new sewer line serving the City's downtown area. The sewer may be relatively unlikely to fail but the costs of a failure are such that preventing a failure is worth the cost of PdM activities. Standard PM such as jet cleaning may still be appropriate but PdM activities such as monitoring the line via CCTV are appropriate to identify failures before they occur. Once a failure has been identified, the spare parts strategy should be such that the time for repair or replacement minimizes the loss of service to the City's customers. This may mean keeping spare supplies on hand or having an on-call contract with a contractor for quick repairs.

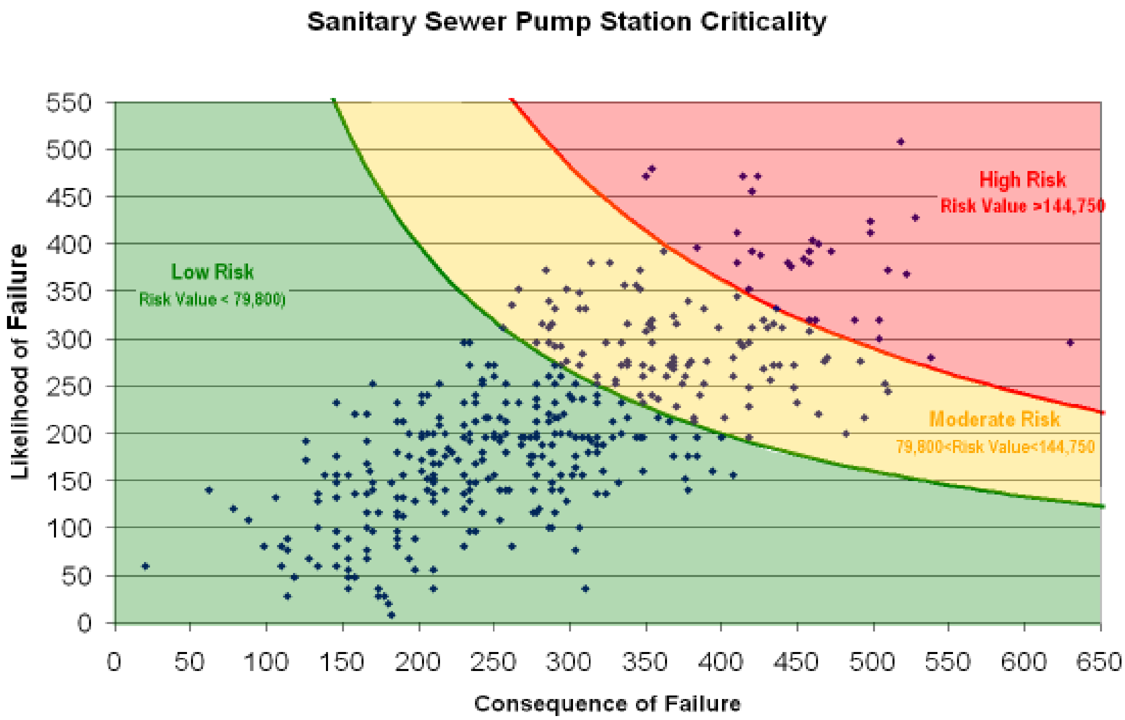

Figure 9-1. Example of identifying asset criticality

The points shown above are sample data and do not represent a specific evaluation of Auburn's sanitary sewer system.

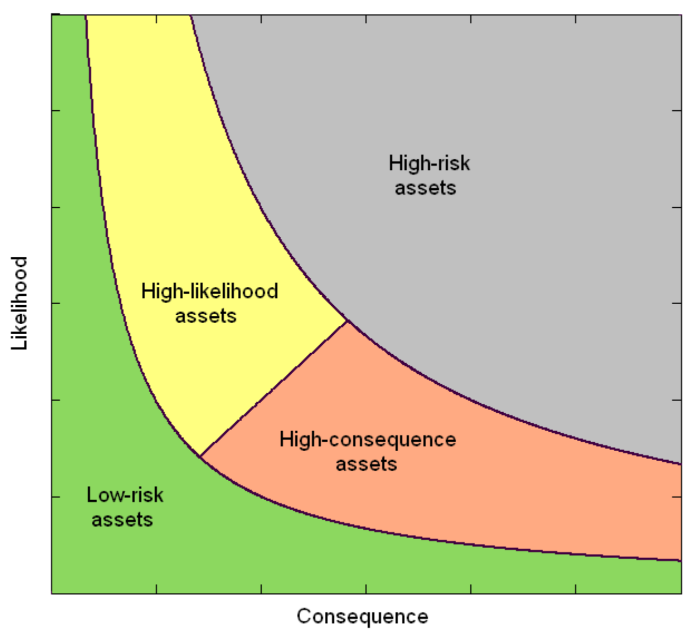

Figure 9-2. Maintenance strategies based on risk

The assets with the lowest risk should receive only minimal, routine PM and most maintenance activities should be reactive. It may be expected to run these assets to failure as the consequences of failure are low. Because of the low consequence and likelihood of failure, replacements for these assets should be ordered rather than kept as spare parts in order to minimize costs. A sump pump in a pump station may have a low likelihood of failing and a low consequence in case of failure. Occasional routine maintenance may be conducted on sump pumps but in general, they are allowed to run to failure. Once they have failed, it may be more cost-effective to purchase a new sump pump "off the shelf" rather than rebuild the existing pump or carry spares.

Error! Reference source not found. summarizes the criticality-based maintenance strategies.

Table 9-4. Criticality-Based Maintenance Strategy Summary

Asset criticality	Maintenance strategy	Frequency basis	Spare parts strategy	Risk optimization
High	**Engineer-out.** Mitigate risk by minimizing the likelihood and/or consequence of a failure.	None	None	Unacceptable risk
Moderate (high-likelihood)	**Time-based**. Routine PM sustains the asset's condition and extends its life.	Economic	Prepare for high rate of failure	Minimize risk
Moderate (high-consequence)	**Condition-based**. Routine PM is supplemented with PdM to identify failures before they occur.	Asset condition	Minimize downtime	No unexpected failures
Low	**Reactive**. Only minimal routine maintenance is done to sustain the asset's condition.	Economic or as needed	No spares	Run to failure

9.3.5 Condition Assessments

For the City's roughly 4,500 pipe segments, predictive maintenance activities will require condition assessments of pipes through CCTV inspections. As with the maintenance strategies, the priority and frequency of CCTV inspections should be related to the relative criticality of the pipe being assessed. High-criticality pipes (those that are in the top 20 percent of the criticality scoring) should get the first priority in receiving inspections and subsequent inspections should be more frequent for these pipes than for less critical pipes. Moderate-criticality pipes (pipes that are in the next 30 percent of criticality scoring) should also receive inspections when available but should be on a less frequent recurring schedule than highly critical pipes. Low-criticality pipes should only receive inspections if the resources are available without hindering the inspection of high and moderate criticality pipes.

After condition assessments have been completed, the results should be reentered into the criticality model to either update or confirm the criticality rating. Entering condition assessment data could result in some pipes considered highly critical to be downgraded to moderately critical or could result in some pipes thought to be only moderately critical to become more critical. For example, currently there are two pipes crossing the Green River that should be included in the City's next round of CCTV inspections. If the results of the inspection show that the pipes are in excellent condition, the pipes may be considered less critical and may not need to be reevaluated for a number of years. However, if the inspection shows that the pipes are in poor condition, more frequent inspection may be needed or including a replacement/lining of the pipes in the next CIP may be appropriate.

9.3.6 Continual Improvement

Once asset criticality and the optimal maintenance strategy have been identified, continual reevaluation is important to ensure that the most appropriate strategy has been identified. This process includes reevaluating the likelihood and consequence factors to ensure that they accurately measure the risk an asset carries, recalculating each asset's criticality to identify any changes since the last evaluation, and reviewing each asset's maintenance and spare parts strategy to make certain that the appropriate level and frequency of activities are being performed. This continual improvement guarantees that the minimal life-cycle cost is being achieved for each of the City's assets while still meeting the City's desired LOS.

9.4 Discharge Quality Control

The characteristics of sewage discharged to the system can have negative impacts on wastewater treatment and conveyance capability. Such discharges—which include rags, diapers, harmful chemicals, pharmaceuticals, and FOG—should be minimized to the maximum extent possible.

9.4.1 Control of Fats, Oils, and Greases

The City is currently in the beginning stages of implementing a FOG reduction program. This program seeks to enforce the City's code prohibiting the discharge of FOGs by restaurants and other food service businesses by requiring the submittal of a FOG control plan as a requirement to obtain a business license. This plan outlines best management practices which will be taken by the business such as dry wiping plates, installing and/or regularly cleaning a grease trap or interceptor, and disposing of grease by recycling it or disposing of it with solid waste. The City should continue to move forward with the implementation of this program.

9.4.2 Industrial Waste

As applications for permits are reviewed by City staff, activities, mainly industrial, which are likely to introduce chemicals or other materials to the sanitary sewer system, are identified. Applicants are directed to coordinate with the King County Wastewater Treatment Division's Industrial Waste Program for the required level of discharge authorization for that activity.

9.4.3 Public Education

The City should continue to educate the general public about what is appropriate to put in the sewer system. The City should use bill stuffers, posters, general announcements, and other actions to inform the public about the harmful effects that some discharges have to the system.

9.5 Hazard Planning

The city of Auburn is situated in a geographic area where natural hazards exist. Specifically, the proximity to the Green and White Rivers presents the potential for flooding and nearby Mt. Rainier looms as a volcanic and lahar hazard. In addition, the numerous faults present in the Puget Sound lowlands increase the likelihood of an earthquake. The sanitary sewer utility should understand the vulnerability of facilities to such natural hazards to be prepared for responding if such an event should occur.

An evaluation of sewer facilities for hazard planning purposes should be completed. The evaluation should identify the potential hazards for Auburn and assess the vulnerability of sewer facilities to the hazards. As a result of the evaluation, a plan outlining the hazards, the facilities vulnerability to hazards, and activities for mitigating the risk associated with the hazards should be developed.

9.6 Schedule

Figure 9-3 below outlines the general schedule for CIP and monitoring over the next six years. Projects marked as potential activities are tasks that may or may not be needed to address changing conditions or updated modeling. In cases of funding or resource scarcity, activities should be performed in the order of their impact on addressing the gap between the City's expected level of service and the actual level of service being provided.

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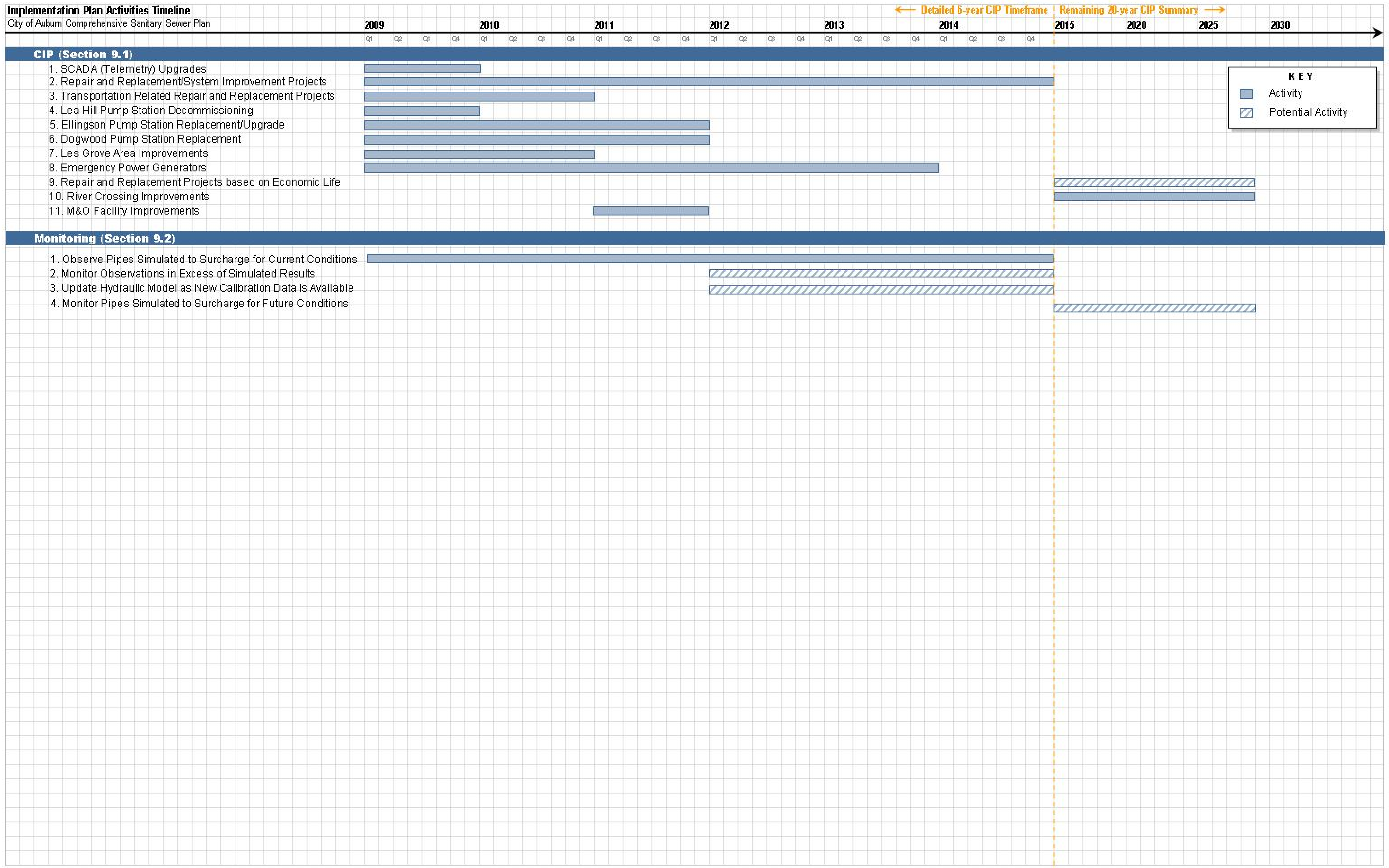

Figure 9-3. City of Auburn Sewer Plan implementation timeline

10. LIMITATIONS

Report Limitations

This document was prepared solely for the city of Auburn in accordance with professional standards at the time the services were performed and in accordance with the contract between the city of Auburn and Brown and Caldwell dated June 7, 2007. This document is governed by the specific scope of work authorized by the city of Auburn; it is not intended to be relied upon by any other party except for regulatory authorities contemplated by the scope of work. We have relied on information or instructions provided by the city of Auburn and other parties and, unless otherwise expressly indicated, have made no independent investigation as to the validity, completeness, or accuracy of such information.

Further, Brown and Caldwell makes no warranties, express or implied, with respect to this document, except for those, if any, contained in the agreement pursuant to which the document was prepared. All data, drawings, documents, or information contained this report have been prepared exclusively for the person or entity to whom it was addressed and may not be relied upon by any other person or entity without the prior written consent of Brown and Caldwell unless otherwise provided by the Agreement pursuant to which these services were provided.

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REFERENCES

Auburn City Code (ACC). 2009. http://www.codepublishing.com/wa/auburn/.

City of Auburn Comprehensive Plan (Comp Plan). Amended 2008. City of Auburn. http://www.auburnwa.gov/business/Planning___Development/Comprehensive_Plan.asp.

King County, 2002. *2001/2002 Wet Weather Flow Monitoring*; Regional Infiltration/ Inflow (I/I) Control Program. King county Department of Natural Resources and Parks, Wastewater Division. June 2002.

Roth HIll, Inc. November 2001. City of Auburn Comprehensive Sewer Plan. Prepared for the City of Auburn by Roth Hill, Inc.

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APPENDIX A: INTERLOCAL AGREEMENTS

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APPENDIX B: ECONOMIC LIFE ANALYSIS

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APPENDIX C: PUMP STATION CONDITION ASSESSMENT

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APPENDIX D: HYDRAULIC CAPACITY ANALYSIS

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APPENDIX E: SEPA COMPLIANCE

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RESOLUTION NO. 3589

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF AUBURN, WASHINGTON, AUTHORIZING THE MAYOR AND CITY CLERK TO EXECUTE AN INTERLOCAL AGREEMENT ESTABLISHING SANITARY SEWER SERVICE BOUNDARIES BETWEEN THE CITY OF AUBURN AND THE CITY OF ALGONA

WHEREAS, pursuant to RCW 35A.11.040 Auburn and Algona have the legal authority to exercise their powers and perform any of their functions as set forth in RCW 39.34; and

WHEREAS, pursuant to RCW 39.34, the Interlocal Cooperation Act, Auburn and Algona have the legal authority to cooperate with other localities on the basis of mutual advantage and provision of services; and

WHEREAS, pursuant to RCW 35A.21.150 Auburn and Algona have the legal authority to maintain a sewerage system.

NOW, THEREFORE, THE COUNCIL OF THE CITY OF AUBURN, WASHINGTON, IN A REGULAR MEETING DULY ASSEMBLED, HEREWITH RESOLVES THAT:

Section 1. The Mayor and City Clerk of the City of Auburn are herewith authorized to execute an Interlocal Agreement establishing sanitary sewer service boundaries between the City of Auburn and the City of Algona in the form substantially as the agreement attached hereto, marked as Exhibit "1" and incorporated herein by this reference.

Section 2. That the Mayor is hereby authorized to implement such administrative procedures as may be necessary to carry out the directions of this legislation.

Section 3. That this resolution shall be in full force and effect upon passage and signatures hereon.

DATED this 21st day of April, 2003.

CITY OF AUBURN

PETER B. LEWIS
MAYOR

ATTEST:

Danielle E. Daskam, City Clerk

APPROVED AS TO FORM:

Daniel B. Heid, City Attorney

Return Address:
Auburn City Clerk
City of Auburn
25 West Main St.
Auburn, WA 98001

RECORDER'S COVER SHEET

Document Title(s) (or transactions contained therein):

8/26 PiNWT
Lv 6179

Interlocal Agreement (RES 3589) Sanitary Sewer Boundaries

Reference Number(s) of Documents assigned or released:
☐ Additional reference #'s on page ______ of document

Grantor(s)/Borrower(s) (Last name first, then first name and initials)
Auburn, City of

Grantee/Assignee/Beneficiary: (Last name first)
1. Algona, City of

Legal Description (abbreviated: i.e. lot, block, plat or section, township, range)

PER RCW 39.34

☐ Additional legal is on page of document.

Assessor's Property Tax Parcel/Account Number

N/A

☐ Assessor Tax # not yet assigned

EXHIBIT 1

INTERLOCAL AGREEMENT
between
CITY OF ALGONA and CITY OF AUBURN
for the
THE ESTABLISHMENT OF SANITARY SEWER SERVICE BOUNDARIES

THIS AGREEMENT, made and entered into this 21st day of April, 2003, by and between the **CITY OF ALGONA**, a Washington municipal corporation (hereinafter referred to as "Algona"), and the **CITY OF AUBURN**, a Washington municipal corporation, (hereinafter referred to as "Auburn"), both being duly organized and existing under and by virtue of the laws of the State of Washington,

WITNESSETH:

WHEREAS, pursuant to RCW 35A.11.040 Auburn and Algona have the legal authority to exercise their powers and perform any of their functions as set forth in RCW 39.34; and

WHEREAS, pursuant to RCW 39.34, the Interlocal Cooperation Act, Auburn and Algona have the legal authority to cooperate with other localities on the basis of mutual advantage and provision of services; and

WHEREAS, pursuant to RCW 35A.21.150 Auburn and Algona have the legal authority to maintain a sewerage system; and

WHEREAS, the parties recognize the responsibility of public sanitary sewer utilities to provide efficient and reliable service to their customers at reasonable cost; and

WHEREAS, portions of the Algona sanitary sewer system have been sized and are situated so as to be capable of affording sewer service to a portion of the Auburn Sanitary Sewer Service Area; and

WHEREAS, Auburn has evaluated and determined it is in Auburn's best interest to allow Algona to provide sewer service to property within Auburn's municipal boundary that lies adjacent to Algona's sanitary sewer infrastructure; and

WHEREAS, Algona has sufficient capacity within their sanitary sewer facilities to support these adjustments to the existing sewer service areas; and

WHEREAS, the parties desire to allow Algona to construct, reconstruct, repair and maintain sewer facilities, and to authorize connections to Algona's sewer system for service to the areas noted in Exhibit A; and

WHEREAS, Algona's delivery of sewer service to these areas will provide the maximum efficiency in the use of existing and future facilities, together with orderly and efficient sanitary sewer planning.

NOW, THEREFORE:

IT IS HEREBY AGREED by and between the parties hereto as follows:

1. **Sewer Service Area.** The parties have agreed to adjust their sewer service area boundary between them. The area to be adjusted is graphically depicted on the map attached hereto as Exhibit "A", which is by this reference incorporated herein. Exhibit "A" represents an increase in Algona's sewer service area and a decrease in Auburn's current sewer service area. Both parties further agree that Algona, in providing sewer service to the additional areas as shown on Exhibit "A", shall be furnishing sewer service to properties within Auburn's water service area and Auburn's municipal jurisdiction in accordance with and subject to the terms and conditions of this Agreement.

2. **Management, Regulation and Control of Sewer System.** Algona shall have the sole responsibility and authority to construct, maintain, manage, conduct and operate its sewerage system as installed within the areas described in Exhibit "A", together with any additions, extensions and betterments thereto. Algona shall also be responsible for obtaining all necessary governmental franchises, approvals, easements and permits for the installation, maintenance, and operation of said sewerage systems as described above.

3. **Rates, Charges, Permits, and Billing Responsibilities.** Through this Agreement Auburn is turning over the responsibility to own, operate, and maintain the sanitary sewer system including private side sewers within the public right of way to Algona. Algona shall be the responsible agency to issue sewer certificates of availability for any development located within the area described by Exhibit "A".

No connection or modification shall be made to Algona's sanitary sewer system and or private side sewer services connected to Algona's sewer system unless the property owner first pays the associated fees and submits the proper information to obtain an Algona sanitary sewer permit. Sanitary sewer permits shall be subject to inspection and approval for compliance with Algona's Sanitary Sewer Standards as adopted at the time the connection is made.

The rates charged to Algona's sanitary sewer customers shall be fixed, altered, regulated and controlled by Algona pursuant to all applicable laws or regulations promulgated on the subject of rates and charges for sewer service. No surcharge shall be charged to the customers served under this agreement on the sole basis that those customers are outside of Algona's city limits.

To establish a quantitative usage, Algona shall manually read Auburn's water meters servicing those properties described in Exhibit "A". Algona shall also have the ability to annually request water usage data from Auburn for said properties.

4. **Boundary Review Board.** In the event that implementation of the terms hereof results in permanent sewer service to areas that will be outside the respective service boundaries of Algona or Auburn, the parties will at the time of such service jointly seek approval of the King County Boundary Review Board in accordance with R.C.W. 36.93.090.

5. **Comprehensive Sewer Planning.** The terms of this Agreement will be included as an element of Auburn and Algona's Comprehensive Sewerage Plans.

6. **Reliance.** Each party hereto acknowledges that the other will rely upon the terms of this agreement in its comprehensive planning to meet the needs of the service area designated herein.

7. **Indemnification**. Algona agrees to indemnify and hold Auburn and its agents, employees, and/or officers, harmless from and shall process and defend at its own expense any and all claims, demands, suits, at law or equity, actions, penalties, loses, damages or costs, of whatsoever kind or nature, brought against Auburn arising out of, in connection with, or incident to the execution of this agreement and/or Algona's performance or failure to perform any aspect of this Agreement; provided, however, that if such claims are caused by or result from the concurrent negligence of Auburn, its agents, employees, and/or officers, this indemnity provision shall be valid and enforceable only to the extent of the negligence of Algona; and provided further, that nothing herein shall require Algona to hold harmless or defend Auburn, its agents, employees, and/or officers, from any claims arising from the sole negligence of Auburn, its agents, employees, and/or officers. No liability shall attach to Auburn by reason of entering this agreement except as expressly provided herein.

Auburn agrees to indemnify and hold Algona and its agents, employees, and/or officers, harmless from and shall process and defend at its own expense any and all claims, demands, suits, at law or equity, actions, penalties, loses, damages or costs, of whatsoever king or nature, brought against Algona arising out of, in connection with, or incident to the execution of this agreement and/or Auburn's performance or failure to perform any aspect of this Agreement; provided, however, that if such claims are caused by or result from the concurrent negligence of Algona, its agents, employees, and/or officers, this indemnity provision shall be valid and enforceable only to the extent of the negligence of Auburn; and provided further, that nothing herein shall require Auburn to hold harmless or defend Algona, its agents, employees, and/or officers, from any claims arising from the sole negligence of Algona, its agents, employees, and/or officers. No liability shall attach to Algona by reason of entering this agreement except as expressly provided herein.

8. **Assignment.** The parties shall not assign this agreement or any interest, obligation or duty therein without the express written consent of the other party.

9. **Attorney's Fees.** If either party shall be required to bring any action to enforce any provision of this Agreement, or shall be required to defend any action brought by the other party with respect to this Agreement, and in the further event that one party shall substantially prevail in such action, the losing party shall, in addition to all other payments required therein, pay all of the prevailing party's reasonable costs in connection with such action, including such sums as the court or courts may adjudge reasonable as attorney's fees in trial court and in appellate courts.

10. **Government Approvals.** The parties will give notice of the adoption of this Agreement to King County's Department of Natural Resources – Wastewater Treatment Division, to the Department of Health, and to any other agency with jurisdiction or mission relevant to the terms hereof, and shall cooperate and assist in all reasonable manner in procuring any necessary approvals hereof by those agencies.

11. **Service Amendments.** Any changes to the service areas described herein shall be by mutual agreement. Each party may give permission to the other on a case-by-case basis to provide service by one party into the other party's adjacent or nearby service area based upon considerations of economic efficiency for providing the service with mutual consent of Auburn's Director of Public Works and Algona's Director of Public Works.

12. **Notices.** All notices between the two agencies hereunder may be delivered or mailed. If mailed, they shall be sent to the following respective addresses:

City of Algona
Director of Public Works
402 Wards Street
Algona, WA 98001
253-833-2741

City of Auburn
Director of Public Works
25 west Main Street
Auburn, WA 98001
253-931-3010

or to such other representative as either party may hereafter from time to time designate in writing. All notices and payments mailed by regular post (including first class) shall be deemed to have been given on the second business day following the date of mailing, if properly mailed and addressed. Notices and payments sent by certified or registered mail shall be deemed to have been given on the day next following the date of mailing, if properly mailed and addressed. For all types of mail, the postmark affixed by the United States Postal Service shall be conclusive evidence of the date of mailing.

13. Alteration, Amendment or Modification. Algona and Auburn hereby reserve the right to alter, amend or modify the terms and conditions of this Agreement upon written agreement of both parties to such alteration, amendment or modification. Such written consent(s) shall be filed with this agreement for future reference.

14. Sanctity of Agreement. This agreement constitutes the entire agreement of the parties regarding the subject matter hereof, and there are no other representations or oral agreements other than those listed herein, which vary the terms of this agreement. Future agreements may occur between the parties to transfer additional or future service areas by mutual agreement.

15. Obligation Intact. Nothing herein shall be construed to alter the rights, responsibilities, liabilities, or obligations of either Algona or Auburn regarding provision of sewer service, except as specifically set forth herein.

16. Miscellaneous.

A. The captions in this agreement are for convenience only and do not in any way limit or amplify the provisions of this agreement.

B. This agreement is established in perpetuity. Modifications can be established upon written agreement between both parties.

C. The purpose of this agreement is to clarify Algona's and Auburn's sanitary sewer responsibilities for providing service and maintaining public sewer facilities.

D. If any term, provision, condition or portion of this Agreement is held to be invalid, or unenforceable by a final decision of any court having jurisdiction on the matter, the remaining of this Agreement or the application of such term or provision to persons or circumstances other then those as to which it is held invalid or unenforceable shall not be affected thereby and shall continue in full force and effect, unless such court determines that invalidity or unenforceability materially interferes with or defeats the purposes hereof, at which time Auburn or Algona shall have the right to terminate the Agreement.

E. No modifications or amendments of this agreement shall be valid or effective unless evidenced by an agreement in writing signed by both parties.

IN WITNESS WHEREOF the parties hereto have executed this agreement as of the day and year first above written.

CITY OF ALGONA
Approved by Resolution No. 703-03 of the City of Algona, Washington, at its regular meeting held on the 1st day of April, 2003.

By:

Glenn Wilson
GLENN WILSON,
Mayor, City of Algona

Attest:

DANIELLE STAFFORD,
City Clerk, City of Algona

Approved as to form:

George S. Kelley
GEORGE KELLEY,
City Attorney, City of Algona

CITY OF AUBURN
Approved by Resolution No. 3589, of the City of Auburn, Washington, at its regular meeting held on the 21st day of April, 2003.

By:

P. B. L.
PETER B. LEWIS,
Mayor, City of Auburn

Attest:

Danielle Daskam
DANIELLE DASKAM,
City Clerk, City of Auburn

Approved as to form:

DANIEL B. HEID,
City Attorney, City of Auburn

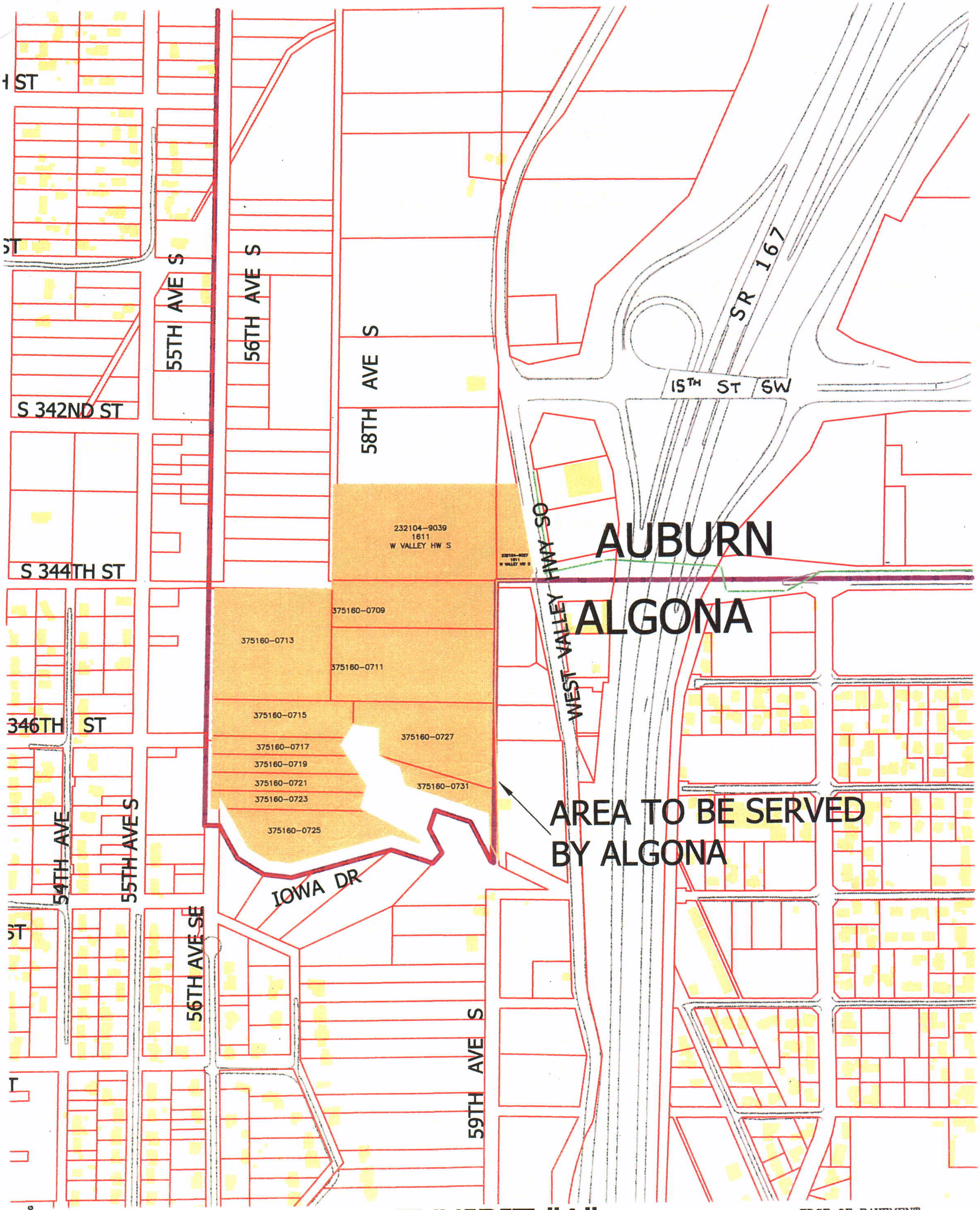

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Exhibit 1
Resolution 3589
Page 7 of 7

EXHIBIT "A"
Auburn's Sewer Service Area to be Transferred to Algona

EDGE OF PAVEMENT
SEWER
PARCEL/ROW LINE
CITY LIMITS

PAGE 1 of 1

PNWF W2305-12

\

200508220499 8 PGS
08-22-2005 10:30am $0.00
PIERCE COUNTY, WASHINGTON

Return Address:
Auburn City Clerk
City of Auburn
25 West Main St.
Auburn, WA 98001

RECORDER'S COVER SHEET

Document Title(s) (or transactions contained therein):

Interlocal Agreement (RES 3760)

Reference Number(s) of Documents assigned or released:
☐ Additional reference #'s on page ______ of document

Grantor(s)/Borrower(s) (Last name first, then first name and initials)
Auburn, City of

Grantee/Assignee/Beneficiary: (Last name first)
1. Bonney Lake, City of

Legal Description (abbreviated: i.e. lot, block, plat or section, township, range)

PER RCW 39.34

☐ Additional legal is on page of document.

Assessor's Property Tax Parcel/Account Number
N/A

☐ Assessor Tax # not yet assigned

$39

RESOLUTION NO. 3760

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF AUBURN, WASHINGTON, AUTHORIZING THE MAYOR AND CITY CLERK TO EXECUTE AN ADDENDUM TO AN INTERLOCAL AGREEMENT BETWEEN THE CITY OF AUBURN AND THE CITY OF BONNEY LAKE FOR THE ESTABLISHMENT OF SANITARY SEWER SERVICE BOUNDARIES

WHEREAS, in March of 1998 the City Council of the City of Auburn adopted Resolution No. 2925 authorizing the Mayor and City Clerk to execute a settlement agreement that was subsequently signed by the City of Auburn and the City of Bonney Lake; and

WHEREAS, among other items, that settlement agreement set forth a water service area boundary between the City of Auburn and the City of Bonney Lake; and

WHEREAS, subsequent to approval of the settlement agreement the Potential Annexation Areas (PAA) for the City of Auburn and City of Bonney Lake were amended to coincide with the water service area boundary; and

WHEREAS, since the time of the agreement it has been found that a parcel was divided by the water service area boundary set forth in said settlement agreement, and by the subsequent PAA boundary established based on the water service area boundary, and said parcel lies partially within and partially outside of the Auburn PAA; and

WHEREAS, part of the Lake Tapps Parkway East extension's right-of-way also lies partially within and partially outside of the Auburn water service area boundary established by the settlement agreement, and partially within and partially outside the subsequent PAA boundary established based on the water service area boundary; and

WHEREAS, sound growth management and transportation planning principles are best served by including entire parcels and entire street right-of-ways entirely within a PAA.

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF AUBURN, WASHINGTON, HEREBY RESOLVES as follows:

Section 1. The Mayor and City Clerk are hereby authorized to execute Addendum No. 1 to the Settlement Agreement between the City of Auburn and the City of Bonney Lake in substantial conformity with the Addendum attached hereto, marked as Exhibit "A" and incorporated herein by this reference.

Section 2. That the Mayor is authorized to implement such other administrative procedures as may be necessary to carry out the directives of this legislation.

Section 3. That this Resolution shall take effect and be in full force upon passage and signatures hereon.

Dated and Signed this 7th day of February, 2005.

CITY OF AUBURN

PETER B. LEWIS
MAYOR

ATTEST:

Danielle E. Daskam,
City Clerk

APPROVED AS TO FORM:

Daniel B. Heid,
City Attorney

ADDENDUM NO. 1

ADDENDUM TO SETTLEMENT AGREEMENT BETWEEN THE CITY OF BONNEY LAKE AND THE CITY OF AUBURN RELATING TO WATER SERVICE AREA BOUNDARY

THIS ADDENDUM is made and entered into this 14th day of February, 2005, by and between the **CITY OF BONNEY LAKE**, a municipal corporation of the State of Washington (hereinafter referred to as "Bonney Lake") and the **CITY OF AUBURN**, a municipal corporation of the State of Washington (hereinafter referred to as the "Auburn"), as an addendum to the Settlement Agreement between the parties executed on the 5th day of March, 1998.

WITNESSETH:

WHEREAS, in March 1998 the City Council of the City of Auburn passed Resolution No. 2925 authorizing the Mayor and City Clerk to execute a settlement agreement that was subsequently signed by the City of Auburn and the City of Bonney Lake; and

WHEREAS, among other items, the settlement agreement set forth a water service area boundary between the City of Auburn and the City of Bonney Lake; and

WHEREAS, Exhibit B to the settlement agreement implied that Auburn's Urban Growth Area (UGA) was established to conform with the water service area boundary set forth in the settlement agreement; and

WHEREAS, subsequent to approval of the settlement agreement the Potential Annexation Area (PAA) for the City of Auburn was amended to coincide with the water service area boundary; and

WHEREAS, Exhibit B to the settlement agreement stated that the UGA and water service area boundary was established to follow property lines; and

WHEREAS, since the time of the agreement it has been found that a parcel was divided by the water service area boundary set forth in said settlement agreement, and by the subsequent PAA boundary established based on the water service area boundary, and said parcel lies partially within and partially outside of the Auburn PAA; and

WHEREAS, part of the Lake Tapps Parkway East extension's right-of-way also lies partially within and partially outside of the Auburn water service area boundary established by the settlement agreement, and partially within and partially outside the subsequent PAA boundary established based on the water service area boundary; and

WHEREAS, sound growth management and planning principles are best served by including entire parcels within a PAA.

NOW THEREFORE in consideration of their mutual covenants, conditions and promises, the PARTIES DO HEREBY AGREE as follows:

ITEM ONE: ADDITION OF PROPERTY
The Settlement Agreement is revised to include a portion of Pierce County parcel # 052005-4046, a portion of the Lake Tapps Parkway as it extends from the west boundary of 182nd Ave East west to Auburn's existing Urban Growth Area, and a portion of the natural gas pipe line parcel as noted in the attached Exhibit C. Exhibit C, attached hereto and incorporated by reference as if fully set forth herein, shall provide both a graphical representation and a legal description for the parcels that are to be included in Auburn's UGA for urban services and incorporated into the area that Bonney Lake shall be the water purveyor for within Auburn's UGA as defined in the original settlement agreement between Auburn and Bonney Lake.

ITEM TWO: REMAINING TERMS UNCHANGED:
That all other provisions of the Settlement Agreement between the parties executed on the 5th day of March, 1998, shall remain unchanged, and in full force and effect.

IN WITNESS WHEREOF the parties hereto have executed this Agreement as of the day and year first above written.

CITY OF BONNEY LAKE	**CITY OF AUBURN**
ROBERT YOUNG, Mayor	PETER B. LEWIS, Mayor
Attest:	**Attest:**
Harwood Edvalson, City Clerk	Danielle E. Daskam. City Clerk
Approved as to form:	**Approved as to form:**
James Dionne, City Attorney	Daniel B. Heid, City Attorney

EXHIBIT C

ADDENDUM 1

AUBURN BONNEY LAKE SETTLEMENT AGREEMENT

LEGAL DESCRIPTION OF AREA

THAT PORTION OF SECTION 5, TOWNSHIP 20 NORTH, RANGE 5 EAST, W.M. IN PIERCE COUNTY WASHINGTON, DESCRIBED AS FOLLOWS:

BEGINNING AT THE SOUTHEAST CORNER OF THE WEST HALF OF THE NORTHEAST QUARTER OF THE SOUTHEAST QUARTER OF SAID SECTION 5;

THENCE WESTERLY ALONG THE SOUTH LINE OF THE NORTH HALF OF THE SOUTHEAST QUARTER OF SAID SECTION 5 A DISTANCE OF 1360 FEET, MORE OR LESS, TO THE NORTHWESTERLY LINE OF THE LANDS CONVEYED TO EL PASO NATURAL GAS COMPANY BY DEED RECORDED UNDER PIERCE COUNTY AUDITOR'S NUMBER 2410280;

THENCE NORTHEASTERLY ALONG SAID NORTHWESTERLY LINE A DISTANCE OF 1880 FEET, MORE OR LESS, TO THE NORTH LINE OF THE SOUTHEAST QUARTER OF SAID SECTION 5;

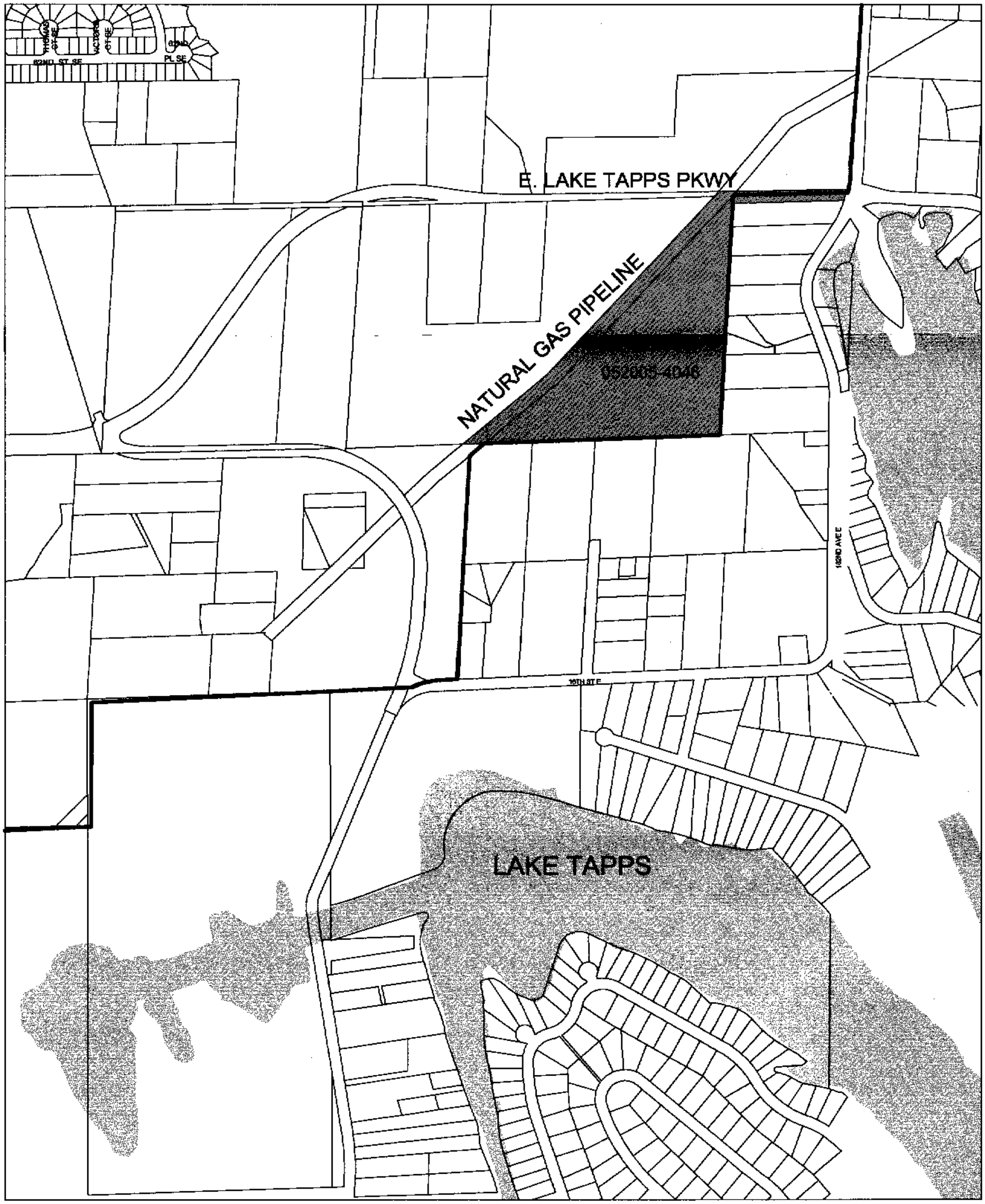
THENCE EASTERLY ALONG THE NORTH LINE OF SAID SOUTHEAST QUARTER A DISTANCE OF 700 FEET, MORE OR LESS, TO THE WEST LINE OF THE LANDS GRANTED TO PIERCE COUNTY FOR 182ND AVENUE EAST DESCRIBED IN DEED RECORDED UNDER PIERCE COUNTY AUDITOR'S NUMBER 2257762;

THENCE SOUTHERLY ALONG THE WEST LINE OF 182ND AVENUE EAST AS DESCRIBED IN SAID INSTRUMENT A DISTANCE OF 40 FEET, MORE OR LESS, TO THE SOUTH LINE OF THE LANDS CONVEYED TO PIERCE COUNTY IN DEED RECORDED UNDER AUDITORS FILE NUMBER 9902110924;

THENCE WESTERLY ALONG LAST SAID SOUTH LINE AND ALONG THE SOUTH LINE OF THE LANDS CONVEYED TO PIERCE COUNTY IN DEED RECORDED UNDER AUDITORS FILE NUMBER 200405180889 AND DEPICTED IN MAP ON FILE IN THE OFFICE OF THE DIRECTOR OF PIERCE COUNTY PUBLIC WORKS AND UTILITIES IN TACOMA, WASHINGTON, ENTITLED "LAKE TAPPS PARKWAY EAST – RIGHT OF WAY PLAN - CRP 5486" AND BEARING APPROVAL DATE OF NOVEMBER 17, 2003, A DISTANCE OF 600 FEET, MORE OR LESS, TO THE EAST LINE OF THE WEST HALF OF THE NORTHEAST QUARTER OF THE SOUTHEAST QUARTER OF SAID SECTION 5;

THENCE SOUTHERLY ALONG THE EAST LINE OF SAID WEST HALF OF THE NORTHEAST QUARTER OF THE SOUTHEAST QUARTER OF SAID SECTION 5 A DISTANCE OF 1220 FEET, MORE OR LESS, TO THE POINT OF BEGINNING.

EXHIBIT C



PNWT W2371-13

2

200511100193 14 PGS
11-10-2005 10:49am $0.00
PIERCE COUNTY, WASHINGTON

Return Address:
Auburn City Clerk
City of Auburn
25 West Main St.
Auburn, WA 98001

RECORDER'S COVER SHEET

Document Title(s) (or transactions contained therein):

Interlocal Agreement (Resolution No. 3796)

Reference Number(s) of Documents assigned or released:
☐Additional reference #'s on page ______ of document

Grantor(s)/Borrower(s) (Last name first, then first name and initials)
Auburn, City of

Grantee/Assignee/Beneficiary: (Last name first)
1. Bonney Lake, City of

Legal Description (abbreviated: i.e. lot, block, plat or section, township, range)

PER RCW 39.34

☐ Additional legal is on page of document.

Assessor's Property Tax Parcel/Account Number
N/A

☐ Assessor Tax # not yet assigned

Said document(s) were filed for record by Pacific Northwest Title as accommodation only. It has not been examined as to proper execution or as to its effect upon title.

31.15

RESOLUTION NO. 3796

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF AUBURN, WASHINGTON, AUTHORIZING THE MAYOR TO EXECUTE AN INTERLOCAL AGREEMENT WITH THE CITY OF BONNEY LAKE TO PROVIDE SANITARY SEWER SERVICE FROM AUBURN TO PROPERTY LOCATED WITHIN BONNEY LAKE'S SANITARY SEWER SERVICE AREA

WHEREAS, pursuant to RCW 35A.11.040 Bonney Lake and Auburn have the legal authority to exercise their powers and perform any of their functions as set forth in RCW 39.34; and

WHEREAS, pursuant to RCW 39.34, the Interlocal Cooperation Act, Bonney Lake and Auburn have the legal authority to cooperate with other localities on the basis of mutual advantage and provision of services; and

WHEREAS, pursuant to RCW 35A.21.150 Bonney Lake and Auburn have the legal authority to maintain a sewerage system; and

WHEREAS, the parties recognize the responsibility of public sanitary sewer utilities to provide efficient and reliable service to their customers at reasonable cost; and

WHEREAS, portions of the Auburn sanitary sewer system are sized and are situated so as to be capable of affording sewer service to a portion of the Bonney Lake Sanitary Sewer Service Area; and

WHEREAS, Bonney Lake has evaluated and determined it is in Bonney Lake's best interest to establish this Agreement allowing Auburn to provide sewer service to property within Bonney Lake's sanitary sewer service area that lies in the vicinity of Auburn's sanitary sewer infrastructure; and

WHEREAS, Auburn's delivery of sewer service to these areas will provide the maximum efficiency in the use of existing and future facilities, together with orderly and efficient sanitary sewer planning.

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF AUBURN, WASHINGTON, HEREBY RESOLVES as follows:

Section 1. The Mayor is hereby authorized to execute an Interlocal Agreement with the City of Bonney Lake in substantial conformity with the agreement attached hereto, marked as Exhibit "1" and incorporated herein by this reference.

Section 2. That the Mayor is authorized to implement such other administrative procedures as may be necessary to carry out the directives of this legislation.

Section 3. That this Resolution shall take effect and be in full force upon passage and signatures hereon.

Dated and Signed this 4th day of April, 2005.

CITY OF AUBURN

PETER B. LEWIS
MAYOR

ATTEST:

Danielle E. Daskam,
City Clerk

APPROVED AS TO FORM:

Daniel B. Heid,
City Attorney

EXHIBIT 1

INTERLOCAL AGREEMENT
between
CITY OF AUBURN and CITY OF BONNEY LAKE
for the
THE ESTABLISHMENT OF SANITARY SEWER SERVICE BOUNDARIES

(Fairweather Cove)

Recording # 20051100193

THIS AGREEMENT, made and entered into by and between the **CITY OF AUBURN**, a Washington municipal corporation (hereinafter referred to as "Auburn"), and the **CITY OF BONNEY LAKE**, a Washington municipal corporation, (hereinafter referred to as "Bonney Lake"), both being duly organized and existing under and by virtue of the laws of the State of Washington,

WITNESSETH:

WHEREAS, pursuant to RCW 35A.11.040 Bonney Lake and Auburn have the legal authority to exercise their powers and perform any of their functions as set forth in RCW 39.34; and

WHEREAS, pursuant to RCW 39.34, the Interlocal Cooperation Act, Bonney Lake and Auburn have the legal authority to cooperate with other localities on the basis of mutual advantage and provision of services; and

WHEREAS, pursuant to RCW 35A.21.150 Bonney Lake and Auburn have the legal authority to maintain a sewerage system; and

WHEREAS, the parties recognize the responsibility of public sanitary sewer utilities to provide efficient and reliable service to their customers at reasonable cost; and

WHEREAS, portions of the Auburn sanitary sewer system have been sized and are situated so as to be capable of affording sewer service to a portion of the Bonney Lake Sanitary Sewer Service Area; and

WHEREAS, Bonney Lake has evaluated and determined it is in Bonney Lake's best interest to establish this Agreement allowing property located within Bonney Lake's sewer service area and designated within Pierce County's Urban Growth Area (CUGA), to connect into Auburn's public sanitary sewer facilities; and

WHEREAS, Auburn recognizes the negative impacts septic tanks can have on water quality and the quality of life within and around Lake Tapps; and

WHEREAS, Auburn has sufficient wastewater conveyance capacity within their sanitary sewer facilities to support these adjustments to the existing sewer service areas; and

WHEREAS, Auburn's delivery of sewer service to these areas will provide the maximum efficiency in the use of existing and future facilities, together with orderly and efficient sanitary sewer planning.

NOW, THEREFORE:

IT IS HEREBY AGREED by and between the parties hereto as follows:

1. **Sewer Service Area.** The parties have agreed that Auburn will provide sanitary sewer service to Bonney Lake for a portion of Bonney Lake's sanitary sewer service area as graphically depicted on the map and legally described as Attachment "A", attached hereto, which is by this reference incorporated herein. Attachment "A" represents Bonney Lake's sewer service area that Bonney Lake has negotiated with Auburn for wastewater conveyance and treatment via Auburn and King County facilities. The actual sewer service provider to the area depicted within Attachment "A" shall remain Bonney Lake. Both parties further agree that Auburn and Bonney Lake shall be subject to the terms and conditions of this Agreement.

2. **Management, Regulation and Control of Sewer System.** Auburn shall have the sole responsibility and authority to construct, maintain, manage, conduct and operate its sewerage system as installed within Auburn's sanitary sewer service area. Auburn shall be responsible for obtaining and maintaining a franchise from Pierce County for Auburn facilities located in Pierce County right of way.

Bonney Lake shall have the sole responsibility and authority for those facilities that extend outside of the public right of way within the region depicted within Attachment "A". Bonney Lake shall be responsible for obtaining and maintaining a franchise from Pierce County for Bonney Lake facilities located in Pierce County right of way. Bonney Lake shall be responsible for the issuance of side sewer permits and the inspection of facilities located upon private property. Certificates of sewer availability shall be issued from Auburn to Bonney Lake. Bonney Lake shall be responsible for ensuring the conditions of these certificates are met.

3. **Rates, Charges, Permits, and Billing Responsibilities.** Auburn rates and connection charges (system development charges) shall be billed from Auburn to Bonney Lake in accordance with existing Auburn City Code at the time of service. Bonney Lake shall provide Auburn with the appropriate information so that accurate billings can be established. Auburn and King County shall have the authority to visit sites, upon threat of termination of service, to verify information provided by the property owner and/or Bonney Lake is accurate. King County's capacity charge shall be billed to the property seeking service directly from King County. Bonney Lake may elect to pay the King County capacity charge directly to King County and collect

the costs with the price of the Bonney Lake permit. Auburn shall issue permits to Bonney Lake prior to Bonney Lake's issuing of permits to the property owners. Neither Auburn nor this agreement governs Bonney Lake's rates and fees to be charged to the property owner for the appropriate Bonney Lake side sewer permit.

For Commercial establishments, no additional connections or modification to existing facilities shall be made that would alter the number of plumbing fixtures in the facilities that convey wastewater to Auburn, unless the property owner first pays the associated fees and submits the proper information to obtain a Bonney Lake sanitary sewer permit. Bonney Lake shall in turn seek an Auburn side sewer permit.

Sanitary sewer permits shall be subject to inspection and approval by Bonney Lake. Bonney Lake shall ensure that compliance with Auburn's Sanitary Sewer Standards, as adopted at the time the connection, is made. With this agreement Bonney Lake is providing Auburn with the right to manually read Bonney Lake's water meters for the properties described in Attachment "A"; however, if requested by Auburn, Bonney Lake shall provide water usage information.

The rates and fees charged to Auburn's sanitary sewer customers shall be fixed, altered, regulated and controlled by Auburn pursuant to all applicable laws and regulations promulgated on the subject of rates and charges for sewer service. No surcharge shall be charged to the customers served under this agreement on the sole basis that those customers are outside of Auburn's city limits.

Auburn shall send bills for sanitary sewer service from said property to Bonney Lake's Finance department once every two months.

4. Boundary Review Board. In the event that implementation of the terms hereof results in permanent sewer service to areas that will be outside the respective service boundaries of Auburn or Bonney Lake, the parties will at the time of such service jointly seek approval of the Pierce County Boundary Review Board in accordance with R.C.W. 36.93.090.

5. Comprehensive Sewer Planning. The terms of this Agreement will be included as an element of Bonney Lake and Auburn's Comprehensive Sewerage Plans.

6. Reliance. Each party hereto acknowledges that the other will rely upon the terms of this agreement in its comprehensive planning to meet the needs of the service area designated herein.

7. Indemnification. Auburn agrees to indemnify and hold Bonney Lake and its agents, employees, and/or officers, harmless from and shall process and defend at its own expense any and all claims, demands, suits, at law or equity, actions, penalties, loses, damages or costs, of whatsoever kind or nature, brought against Bonney Lake arising out of, in connection with, or incident to the execution of this agreement and/or Auburn's performance or failure to perform any aspect of this Agreement; provided, however, that if such claims are caused by or result from the concurrent negligence of Bonney Lake, its agents, employees, and/or officers, this indemnity provision shall be valid and enforceable only to the extent of the negligence of Auburn; and provided further, that nothing herein shall require Auburn to hold harmless or defend Bonney Lake, its agents, employees, and/or officers, from any claims arising from the sole negligence of Bonney Lake, its agents, employees, and/or officers. No liability shall attach to Bonney Lake by reason of entering this agreement except as expressly provided herein.

Bonney Lake agrees to indemnify and hold Auburn and its agents, employees, and/or officers, harmless from and shall process and defend at its own expense any and all claims, demands, suits, at law or equity, actions, penalties, loses, damages or costs, of whatsoever kind or nature, brought against Auburn arising out of, in connection with, or incident to the execution of this agreement and/or Bonney Lake's performance or failure to perform any aspect of this Agreement; provided, however, that if such claims are caused by or result from the concurrent negligence of Auburn, its agents, employees, and/or officers, this indemnity provision shall be valid and enforceable only to the extent of the negligence of Bonney Lake; and provided further, that nothing herein shall require Bonney Lake to hold harmless or defend Auburn, its agents, employees, and/or officers, from any claims arising from the sole negligence of Auburn, its agents, employees, and/or officers. No liability shall attach to Auburn by reason of entering this agreement except as expressly provided herein.

8. Assignment. The parties shall not assign this agreement or any interest, obligation or duty therein without the express written consent of the other party.

9. Attorney's Fees. If either party shall be required to bring any action to enforce any provision of this Agreement, or shall be required to defend any action brought by the other party with respect to this Agreement, and in the further event that one party shall substantially prevail in such action, the losing party shall, in addition to all other payments required therein, pay all of the prevailing party's reasonable costs in connection with such action, including such sums as the court or courts may adjudge reasonable as attorney's fees in trial court and in appellate courts.

10. Government Approvals. The parties will give notice of the adoption of this Agreement to King County's Department of Natural Resources – Wastewater Treatment Division, to the Pierce County Department of Health, and to any other agency with jurisdiction or mission relevant to the terms hereof, and shall cooperate and assist in all reasonable manner in procuring any necessary approvals hereof by those agencies.

11. Service Amendments. Any changes to the service areas described herein shall be by mutual agreement. Each party may give permission to the other on a case-by-case basis to provide service by one party into the other party's adjacent or nearby service area based upon considerations of economic efficiency for providing the service with mutual consent of Bonney Lake's Director of Public Works and Auburn's Director of Public Works.

12. Notices. All notices between the two agencies hereunder may be delivered or mailed. If mailed, they shall be sent to the following respective addresses:

City of Auburn
Director of Public Works
25 West Main Street
Auburn, WA 98001

253-931-3010

City of Bonney Lake
Director of Public Works
PO Box 7380
19306 Bonney Lake Blvd
Bonney Lake, WA 98390
253-862-8602

or to such other representative as either party may hereafter from time to time designate in writing. All notices and payments mailed by regular post (including first class) shall be deemed to have been given on the second business day following the date of mailing, if properly mailed and addressed. Notices and payments sent by certified or registered mail shall be deemed to have been given on the day next following the date of mailing, if properly mailed and addressed. For all types of mail, the postmark affixed by the United States Postal Service shall be conclusive evidence of the date of mailing.

13. Alteration, Amendment or Modification. Auburn and Bonney Lake hereby reserve the right to alter, amend or modify the terms and conditions of this Agreement upon written agreement of both parties to such alteration, amendment or modification. Such written consent(s) shall be filed with this agreement for future reference.

14. Sanctity of Agreement. This agreement constitutes the entire agreement of the parties regarding the subject matter hereof, and there are no other representations or oral agreements other than those listed herein, which vary the terms of this agreement. Future agreements may occur between the parties to transfer additional or future service areas by mutual agreement.

15. Obligation Intact. Nothing herein shall be construed to alter the rights, responsibilities, liabilities, or obligations of either Auburn or Bonney Lake regarding provision of sewer service, except as specifically set forth herein.

CITY OF AUBURN
Approved by Resolution No. **3796**, of the City of Auburn, Washington, at its regular meeting held on the 4th day of April, 2005.

By:

PETER B. LEWIS,
Mayor, City of Auburn

Attest:

DANIELLE DASKAM,
City Clerk, City of Auburn

Approved as to form:

DANIEL B. HEID,
City Attorney, City of Auburn

ATTACHMENT "A"

Legal Description

THAT PORTION OF THE NORTHWEST QUARTER OF THE NORTHEAST QUARTER AND THAT PORTION OF THE NORTHEAST QUARTER OF THE NORTHWEST QUARTER OF SECTION 8, TOWNSHIP 20 NORTH, RANGE 5 EAST, LYING EASTERLY OF SUMNER TAPPS HIGHWAY, SOUTHERLY OF NORTH TAPPS ROAD (16^{TH} STREET EAST (FOREST CANYON ROAD)); EASTERLY OF THE PLAT OF LAKE TAPPS TACOMA POINT ADDITION, ACCORDING TO PLAT RECORDED IN BOOK 17 OF PLATS AT PAGES 1 TO 8, INCLUSIVE, AND NORTHERLY OF THE INTAKE CANAL TO LAKE TAPPS, IN PIERCE COUNTY, WASHINGTON. EXCEPT THAT PORTION LYING WITHIN LAKE TAPPS.

AREA DESCRIBED IS APPROXIMATELY ± 16.7 ACRES.
PARCEL NUMBER 0520081001

SE QUARTER OF SECTION 8, TOWNSHIP 20 N, RANGE 5 E

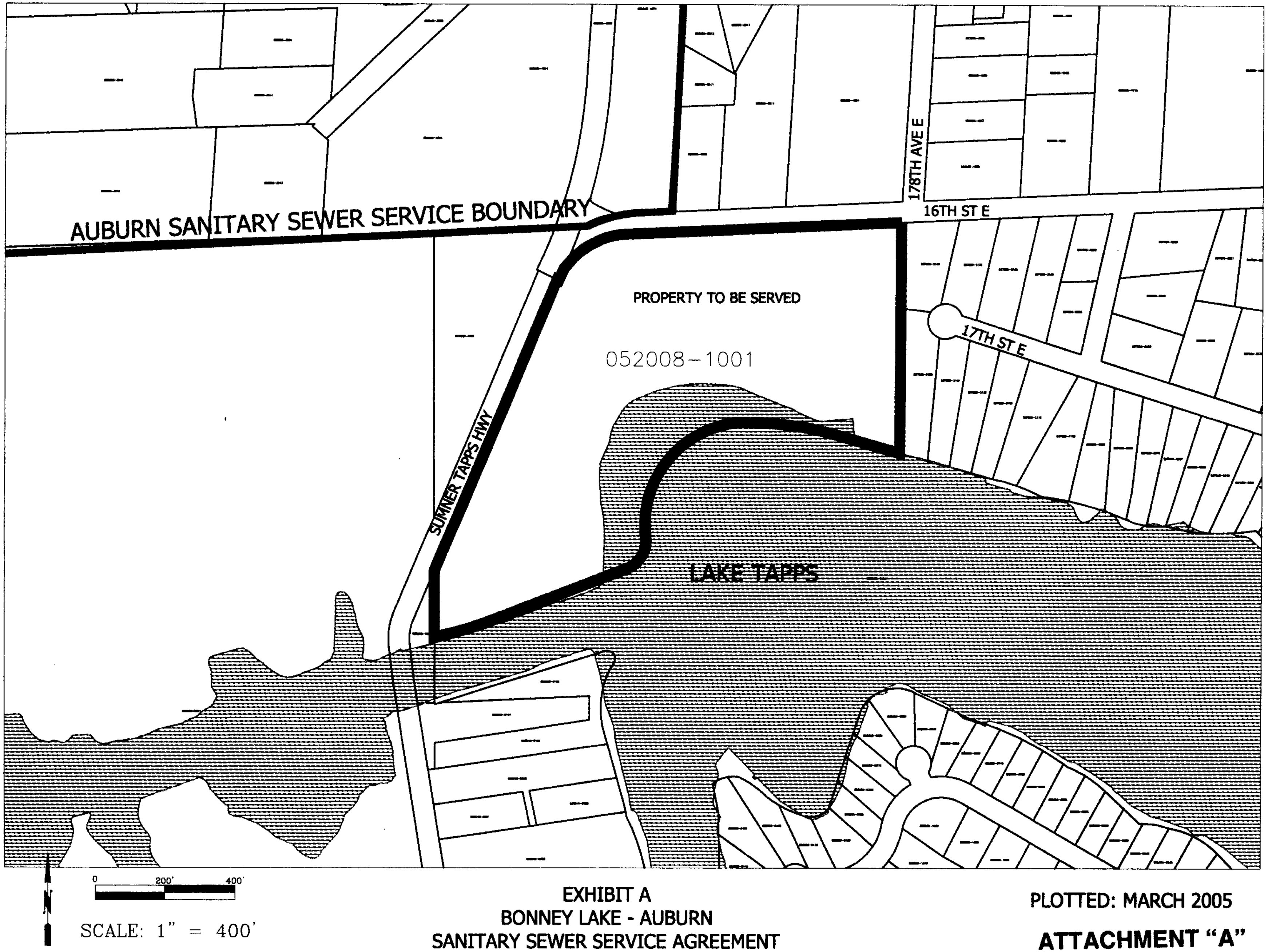


EXHIBIT A
BONNEY LAKE - AUBURN
SANITARY SEWER SERVICE AGREEMENT
FAIRWEATHER COVE

PLOTTED: MARCH 2005

ATTACHMENT "A"
Page 2 of 2

Pierce County Recording
20051110 0194

RESOLUTION NO. 3873

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF AUBURN, WASHINGTON, AUTHORIZING THE MAYOR TO EXECUTE AN INTERLOCAL AGREEMENT WITH THE CITY OF BONNEY LAKE FOR THE ESTABLISHMENT OF A RIGHT OF WAY USE PERMIT WITH PIERCE COUNTY

WHEREAS, both Auburn and Bonney Lake are agencies qualified to engage in furnishing sanitary sewer service within their approved service areas; and

WHEREAS, the residential development of "Fairweather Cove" is located within an unincorporated area of Pierce County designated to be serviced with sanitary sewer service from Bonney Lake at approximately 16th Street East and Sumner Tapps Highway,

WHEREAS, Bonney Lake lacks a franchise to operate, maintain, repair, and construct sewer mains and service lines, and appurtenances in, over, along, and under County roads and rights-of-way within the area of Pierce County, Washington in which Fairweather Cove is located; and

WHEREAS, Bonney Lake is in the process of completing an update to its Comprehensive Sewer Plan and intends to thereafter apply for, and receive, a franchise with Pierce County to enable it to provide sewer service to that area of Pierce County in which Fairweather Cove is located; and

WHEREAS, Auburn maintains a franchise agreement with Pierce County, dated July 8, 1996, and expiring on July 8, 2021, covering the area of Pierce County in which Fairweather Cove is located; and

WHEREAS, while service through Auburn's sewer system is available, sewer service to Fairweather Cove is more feasible through Bonney Lake's sewer system; and

WHEREAS, Bonney Lake received a request for sewer service to Fairweather Cove from Harbour Homes, the owner thereof, hereinafter referred to as "Developer", in August 2001; and

WHEREAS, Bonney Lake and Auburn are pursuing a separate agreement between them that would allow for Bonney Lake to convey wastewater from a portion of Bonney Lake's service area into Auburn's wastewater conveyance system for treatment and disposal in an effort to provide for the most efficient sewer service to future customers at a reasonable cost; and

WHEREAS, both Bonney Lake and Auburn agree that Fairweather Cove is best served by Bonney Lake under an interlocal agreement with Auburn; and

WHEREAS, Bonney Lake entered into a Developer Public Facility Extension Agreement ("Extension Agreement"), with the Developer under which the Developer is required to construct necessary public improvements to serve Fairweather Cove; and

WHEREAS, Auburn is willing to accept interim ownership and to assume interim responsibility for operation and maintenance of the Developer's public sewer improvements, subject to the terms, limitations, and conditions of this Agreement; and

WHEREAS, Bonney Lake is willing to accept transfer of ownership and responsibility for operation and maintenance of the Developer's public sewer improvements upon obtaining a sanitary sewer franchise from Pierce County to serve the area in which Fairweather Cove is located.

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF AUBURN, WASHINGTON, HEREBY RESOLVES as follows:

Section 1. The Mayor is hereby authorized to execute an interlocal agreement with the City of Bonney Lake, in substantial conformity with the agreement attached hereto, marked as Exhibit 1 and incorporated herein by this reference.

Section 2. That the Mayor is authorized to implement such other administrative procedures as may be necessary to carry out the directives of this legislation.

Section 3. That this resolution shall take effect and be in full force upon passage and signatures hereon.

DATED and signed this 18th day of July, 2005.

CITY OF AUBURN

PETER B. LEWIS
MAYOR

ATTEST:

Danielle E. Daskam

Danielle E. Daskam,
City Clerk

APPROVED AS TO FORM:

Daniel B. Held,
City Attorney

EXHIBIT 1

AUBURN – BONNEY LAKE INTERLOCAL AGREEMENT For Pierce County Right of Way Permit

(Fairweather Cove)

This Agreement entered into by and between the City of Bonney Lake, a municipal corporation of the State of Washington (hereinafter "Bonney Lake"), and the City of Auburn, a municipal corporation of the State of Washington (hereinafter "Auburn").

WHEREAS, both Auburn and Bonney Lake are agencies qualified to engage in furnishing sanitary sewer service within their approved service areas; and

WHEREAS, the residential development of "Fairweather Cove" is located within an unincorporated area of Pierce County designated to be serviced with sanitary sewer service from Bonney Lake at approximately 16th Street East and Sumner Tapps Hwy.,

WHEREAS, Bonney Lake lacks a franchise to operate, maintain, repair, and construct sewer mains and service lines, and appurtenances in, over, along, and under County roads and rights-of-way within the area of Pierce County, Washington in which Fairweather Cove is located; and

WHEREAS, Bonney Lake is in the process of completing an update to its Comprehensive Sewer Plan and intends to thereafter apply for, and receive, a franchise with Pierce County to enable it to provide sewer service to that area of Pierce County in which Fairweather Cove is located; and

WHEREAS, Auburn maintains a franchise agreement with Pierce County, dated July 8, 1996, and expiring on July 8, 2021, covering the area of Pierce County in which Fairweather Cove is located; and

WHEREAS, while service through Auburn's sewer system is available, sewer service to Fairweather Cove is more feasible through Bonney Lake's sewer system; and

WHEREAS, Bonney Lake received a request for sewer service to Fairweather Cove from Harbour Homes, the owner thereof, hereinafter referred to as "Developer", in August 2001; and

WHEREAS, Bonney Lake and Auburn are pursuing a separate agreement between them that would allow for Bonney Lake to convey wastewater from a portion of Bonney Lake's service area into Auburn's wastewater conveyance system for treatment and disposal in an effort to provide for the most efficient sewer service to future customers at a reasonable cost; and

WHEREAS, both Bonney Lake and Auburn agree that Fairweather Cove is best served by Bonney Lake under an interlocal agreement with Auburn; and

WHEREAS, Bonney Lake entered into a Developer Public Facility Extension Agreement ("Extension Agreement"), with the Developer under which the Developer is required to construct necessary public improvements to serve Fairweather Cove; and

WHEREAS, Auburn is willing to accept interim ownership and to assume interim responsibility for operation and maintenance of the Developer's public sewer improvements, subject to the terms, limitations, and conditions of this Agreement; and

WHEREAS, Bonney Lake, shall accept transfer of ownership and responsibility for operation and maintenance of the Developer's public sewer improvements upon obtaining a sanitary sewer franchise from Pierce County to serve the area in which Fairweather Cove is located.

NOW, THEREFORE BE IT AGREED AS FOLLOWS:

1. Consistent with the terms of this Agreement and Auburn's sewer franchise agreement with Pierce County, Auburn shall own, operate, and maintain, for the period of time described herein, public sewer improvements for Fairweather Cove, constructed pursuant to the Extension Agreement between Bonney Lake and Developer, to the point of connection of said improvements with Auburn's existing gravity sewer located along the Sumner Lake Tapps Hwy. Auburn shall receive wastewater from Fairweather Cove through these improvements, and shall provide sewer service from this point through Auburn's conveyance system to King County's conveyance system for ultimate disposal at the King County sewer treatment plant located in Renton, Washington.

2. Bonney Lake shall administer all aspects of the Extension Agreement, including the construction of the sewer improvements required to serve Fairweather Cove to Bonney Lake standards. Auburn shall have the right to inspect and approve plans for and construction of the public sewer improvements required to serve Fairweather Cove as necessary to comply with Auburn's sewer franchise with Pierce County. Upon request from Bonney Lake, Auburn shall apply for the R-O-W permit required from Pierce County for construction of the Developer's public sewer improvements in Pierce County right-of-way.

3. Auburn and Bonney Lake shall work in good faith to review all project plans, and to inspect all project construction, in a timely manner, and, where and when appropriate, to modify Bonney Lake's standards to facilitate compliance with the terms and conditions of Auburn's sewer franchise with Pierce County. Bonney Lake agrees that it shall be responsible to comply with any requirements that may be generated if this Agreement is submitted to the Pierce County Boundary Review Board for approval.

4. Upon Developer's completion of construction of sewer improvements and satisfaction of all terms and conditions of the Extension Agreement Bonney Lake shall transfer temporary ownership to Auburn, for all public sewer improvements in Pierce County required to serve Fairweather Cove.

5. Following satisfactory completion of the sewer improvements, property owners within Fairweather Cove may apply for connection to the sewer system as single-family residential customers of the Bonney Lake Sewer Utility. Connection charges, monthly rates and other charges shall be collected as defined by the Auburn - Bonney Lake Interlocal Agreement for the Establishment of Sanitary Sewer Service Boundaries attached hereto and incorporated herein by this reference as Attachment B (Auburn Resolution No. 3796).

6. In consideration of the receipt of the charges referenced in paragraph 5 above, Bonney Lake agrees to provide the operation, repair and maintenance, both ordinary and extraordinary, of the Auburn-owned public sewer improvements for Fairweather Cove, as referenced in paragraph 4 of this Agreement. If any such operation and maintenance triggers any of the provisions of Auburn's sewer franchise with Pierce County, Bonney Lake shall promptly notify Auburn. Bonney Lake shall abide by any such provisions at the sole discretion of Auburn and at the sole cost of Bonney Lake.

7. Upon Bonney Lake's written notice to Auburn that it has secured a sewer franchise with Pierce County for the area of Pierce County in which the Fairweather Cove development is located, a copy of which franchise shall be provided with the written notice to Auburn, Auburn shall, by bill of sale, immediately thereafter transfer ownership of the facilities temporarily owned by Auburn pursuant to this Agreement, to Bonney Lake.

8. Bonney Lake agrees to reimburse Auburn for all expenses incurred by Auburn, including the cost of time spent by Auburn employees calculated at labor rates used to establish Auburn's fees and charges, in connection with this Agreement and the provision of service to Bonney Lake's customers pursuant to the provisions herein. Auburn agrees to submit to Bonney Lake, no less than annually, a statement of charges due and Bonney Lake shall pay the same within 45 days of the billing date. The parties agree to work cooperatively to resolve any dispute that may arise with respect to any such billing.

9. This Agreement may be terminated or modified, but only as agreed to in writing by both the parties.

10. Bonney Lake and Auburn agree to indemnify, defend and hold each other harmless from and against any loss, cost, damage, or expense of any kind arising out of injury to person or damage to property in any manner caused by the parties' own negligent conduct in the performance of this interlocal agreement.

11. This Agreement constitutes the only agreement between the parties concerning sewer service to the Fairweather Cove Development and nothing herein shall be construed to alter the rights, responsibilities, liabilities, or obligations of either Bonney Lake or Auburn regarding the provision of sewer service within their respective service areas except as specifically set forth herein.

CITY OF AUBURN
Approved by Resolution No. 3873 of the City of Auburn, Washington, at its regular meeting held on the 18th day of July, 2005.

By: ______________________

Peter B. Lewis, Mayor
City of Auburn

Attest:

____

Danielle Daskam, City Clerk

Approved as to form:

____

Daniel B. Heid, City Attorney

CITY OF BONNEY LAKE

Approved by Resolution No. 1471 of the City of Bonney Lake, Washington, at its regular meeting held on the 9th day of August 2005.

By:

Bob Young, Mayor
City of Bonney Lake

Attest:

Woody Edvalson, City Clerk

Approved as to form:

James Dionne, City Attorney

ATTACHMENT "B"

INTERLOCAL AGREEMENT
between
CITY OF AUBURN and CITY OF BONNEY LAKE
for the
THE ESTABLISHMENT OF SANITARY SEWER SERVICE BOUNDARIES

(Fairweather Cove)

THIS AGREEMENT, made and entered into by and between the **CITY OF AUBURN**, a Washington municipal corporation (hereinafter referred to as "Auburn"), and the **CITY OF BONNEY LAKE**, a Washington municipal corporation, (hereinafter referred to as "Bonney Lake"), both being duly organized and existing under and by virtue of the laws of the State of Washington,

WITNESSETH:

WHEREAS, pursuant to RCW 35A.11.040 Bonney Lake and Auburn have the legal authority to exercise their powers and perform any of their functions as set forth in RCW 39.34; and

WHEREAS, pursuant to RCW 39.34, the Interlocal Cooperation Act, Bonney Lake and Auburn have the legal authority to cooperate with other localities on the basis of mutual advantage and provision of services; and

WHEREAS, pursuant to RCW 35A.21.150 Bonney Lake and Auburn have the legal authority to maintain a sewerage system; and

WHEREAS, the parties recognize the responsibility of public sanitary sewer utilities to provide efficient and reliable service to their customers at reasonable cost; and

WHEREAS, portions of the Auburn sanitary sewer system have been sized and are situated so as to be capable of affording sewer service to a portion of the Bonney Lake Sanitary Sewer Service Area; and

WHEREAS, Bonney Lake has evaluated and determined it is in Bonney Lake's best interest to establish this Agreement allowing property located within Bonney Lake's sewer service area and designated within Pierce County's Urban Growth Area (CUGA), to connect into Auburn's public sanitary sewer facilities; and

WHEREAS, Auburn recognizes the negative impacts septic tanks can have on water quality and the quality of life within and around Lake Tapps; and

ATTACHMENT "B"

WHEREAS, Auburn has sufficient wastewater conveyance capacity within their sanitary sewer facilities to support these adjustments to the existing sewer service areas; and

WHEREAS, Auburn's delivery of sewer service to these areas will provide the maximum efficiency in the use of existing and future facilities, together with orderly and efficient sanitary sewer planning.

NOW, THEREFORE:

IT IS HEREBY AGREED by and between the parties hereto as follows:

1. Sewer Service Area. The parties have agreed that Auburn will provide sanitary sewer service to Bonney Lake for a portion of Bonney Lake's sanitary sewer service area as graphically depicted on the map and legally described as Attachment "A", attached hereto, which is by this reference incorporated herein. Attachment "A" represents Bonney Lake's sewer service area that Bonney Lake has negotiated with Auburn for wastewater conveyance and treatment via Auburn and King County facilities. The actual sewer service provider to the area depicted within Attachment "A" shall remain Bonney Lake. Both parties further agree that Auburn and Bonney Lake shall be subject to the terms and conditions of this Agreement.

2. Management, Regulation and Control of Sewer System. Auburn shall have the sole responsibility and authority to construct, maintain, manage, conduct and operate its sewerage system as installed within Auburn's sanitary sewer service area. Auburn shall be responsible for obtaining and maintaining a franchise from Pierce County for Auburn facilities located in Pierce County right of way.

Bonney Lake shall have the sole responsibility and authority for those facilities that extend outside of the public right of way within the region depicted within Attachment "A". Bonney Lake shall be responsible for obtaining and maintaining a franchise from Pierce County for Bonney Lake facilities located in Pierce County right of way. Bonney Lake shall be responsible for the issuance of side sewer permits and the inspection of facilities located upon private property. Certificates of sewer availability shall be issued from Auburn to Bonney Lake. Bonney Lake shall be responsible for ensuring the conditions of these certificates are met.

3. Rates, Charges, Permits, and Billing Responsibilities. Auburn rates and connection charges (system development charges) shall be billed from Auburn to Bonney Lake in accordance with existing Auburn City Code at the time of service. Bonney Lake shall provide Auburn with the appropriate information so that accurate billings can be established. Auburn and King County shall have the authority to visit sites, upon threat of termination of service, to verify information provided by the property owner and/or Bonney Lake is accurate. King County's capacity charge shall be billed to the property seeking service directly from King County. Bonney Lake may elect to pay the King County capacity charge directly to King County and collect the costs with the price of the Bonney Lake permit. Auburn shall issue permits to Bonney Lake prior to Bonney Lake's issuing of permits to the property owners. Neither Auburn nor this agreement governs Bonney Lake's rates and fees to be charged to the property owner for the appropriate Bonney Lake side sewer permit.

For Commercial establishments, no additional connections or modification to existing facilities shall be made that would alter the number of plumbing fixtures in the facilities that convey wastewater to Auburn, unless the property owner first pays the associated fees and submits the proper information to obtain a Bonney Lake sanitary sewer permit. Bonney Lake shall in turn seek an Auburn side sewer permit.

Sanitary sewer permits shall be subject to inspection and approval by Bonney Lake. Bonney Lake shall ensure that compliance with Auburn's Sanitary Sewer Standards, as adopted at the time the connection, is made. With this agreement Bonney Lake is providing Auburn with the right to manually read Bonney Lake's water meters for the properties described in Attachment "A"; however, if requested by Auburn, Bonney Lake shall provide water usage information.

The rates and fees charged to Auburn's sanitary sewer customers shall be fixed, altered, regulated and controlled by Auburn pursuant to all applicable laws and regulations promulgated on the subject of rates and charges for sewer service. No surcharge shall be charged to the customers served under this agreement on the sole basis that those customers are outside of Auburn's city limits.

Auburn shall send bills for sanitary sewer service from said property to Bonney Lake's Finance department once every two months.

4. **Boundary Review Board.** In the event that implementation of the terms hereof results in permanent sewer service to areas that will be outside the respective service boundaries of Auburn or Bonney Lake, the parties will at the time of such service jointly seek approval of the Pierce County Boundary Review Board in accordance with R.C.W. 36.93.090.

5. **Comprehensive Sewer Planning.** The terms of this Agreement will be included as an element of Bonney Lake and Auburn's Comprehensive Sewerage Plans.

6. **Reliance.** Each party hereto acknowledges that the other will rely upon the terms of this agreement in its comprehensive planning to meet the needs of the service area designated herein.

ATTACHMENT "B"

7. **Indemnification**. Auburn agrees to indemnify and hold Bonney Lake and its agents, employees, and/or officers, harmless from and shall process and defend at its own expense any and all claims, demands, suits, at law or equity, actions, penalties, loses, damages or costs, of whatsoever kind or nature, brought against Bonney Lake arising out of, in connection with, or incident to the execution of this agreement and/or Auburn's performance or failure to perform any aspect of this Agreement; provided, however, that if such claims are caused by or result from the concurrent negligence of Bonney Lake, its agents, employees, and/or officers, this indemnity provision shall be valid and enforceable only to the extent of the negligence of Auburn; and provided further, that nothing herein shall require Auburn to hold harmless or defend Bonney Lake, its agents, employees, and/or officers, from any claims arising from the sole negligence of Bonney Lake, its agents, employees, and/or officers. No liability shall attach to Bonney Lake by reason of entering this agreement except as expressly provided herein.

Bonney Lake agrees to indemnify and hold Auburn and its agents, employees, and/or officers, harmless from and shall process and defend at its own expense any and all claims, demands, suits, at law or equity, actions, penalties, loses, damages or costs, of whatsoever kind or nature, brought against Auburn arising out of, in connection with, or incident to the execution of this agreement and/or Bonney Lake's performance or failure to perform any aspect of this Agreement; provided, however, that if such claims are caused by or result from the concurrent negligence of Auburn, its agents, employees, and/or officers, this indemnity provision shall be valid and enforceable only to the extent of the negligence of Bonney Lake; and provided further, that nothing herein shall require Bonney Lake to hold harmless or defend Auburn, its agents, employees, and/or officers, from any claims arising from the sole negligence of Auburn, its agents, employees, and/or officers. No liability shall attach to Auburn by reason of entering this agreement except as expressly provided herein.

8. **Assignment.** The parties shall not assign this agreement or any interest, obligation or duty therein without the express written consent of the other party.

9. **Attorney's Fees.** If either party shall be required to bring any action to enforce any provision of this Agreement, or shall be required to defend any action brought by the other party with respect to this Agreement, and in the further event that one party shall substantially prevail in such action, the losing party shall, in addition to all other payments required therein, pay all of the prevailing party's reasonable costs in connection with such action, including such sums as the court or courts may adjudge reasonable as attorney's fees in trial court and in appellate courts.

ATTACHMENT "B"

10. Government Approvals. The parties will give notice of the adoption of this Agreement to King County's Department of Natural Resources – Wastewater Treatment Division, to the Pierce County Department of Health, and to any other agency with jurisdiction or mission relevant to the terms hereof, and shall cooperate and assist in all reasonable manner in procuring any necessary approvals hereof by those agencies.

11. Service Amendments. Any changes to the service areas described herein shall be by mutual agreement. Each party may give permission to the other on a case-by-case basis to provide service by one party into the other party's adjacent or nearby service area based upon considerations of economic efficiency for providing the service with mutual consent of Bonney Lake's Director of Public Works and Auburn's Director of Public Works.

12. Notices. All notices between the two agencies hereunder may be delivered or mailed. If mailed, they shall be sent to the following respective addresses:

City of Auburn	City of Bonney Lake
Director of Public Works	Director of Public Works
25 West Main Street	PO Box 7380
Auburn, WA 98001	19306 Bonney Lake Blvd
	Bonney Lake, WA 98390
253-931-3010	253-862-8602

or to such other representative as either party may hereafter from time to time designate in writing. All notices and payments mailed by regular post (including first class) shall be deemed to have been given on the second business day following the date of mailing, if properly mailed and addressed. Notices and payments sent by certified or registered mail shall be deemed to have been given on the day next following the date of mailing, if properly mailed and addressed. For all types of mail, the postmark affixed by the United States Postal Service shall be conclusive evidence of the date of mailing.

13. Alteration, Amendment or Modification. Auburn and Bonney Lake hereby reserve the right to alter, amend or modify the terms and conditions of this Agreement upon written agreement of both parties to such alteration, amendment or modification. Such written consent(s) shall be filed with this agreement for future reference.

14. Sanctity of Agreement. This agreement constitutes the entire agreement of the parties regarding the subject matter hereof, and there are no other representations or oral agreements other than those listed herein, which vary the

ATTACHMENT "B"

terms of this agreement. Future agreements may occur between the parties to transfer additional or future service areas by mutual agreement.

15. Obligation Intact. Nothing herein shall be construed to alter the rights, responsibilities, liabilities, or obligations of either Auburn or Bonney Lake regarding provision of sewer service, except as specifically set forth herein.

16. Miscellaneous.

A. The captions in this agreement are for convenience only and do not in any way limit or amplify the provisions of this agreement.

B. This agreement is established in perpetuity. Modifications can be established upon written agreement between both parties.

C. The purpose of this agreement is to clarify Auburn's and Bonney Lake's sanitary sewer responsibilities for providing service and maintaining public sewer facilities.

D. If any term, provision, condition or portion of this Agreement is held to be invalid, or unenforceable by a final decision of any court having jurisdiction on the matter, the remaining of this Agreement or the application of such term or provision to persons or circumstances other then those as to which it is held invalid or unenforceable shall not be affected thereby and shall continue in full force and effect, unless such court determines that invalidity or unenforceability materially interferes with or defeats the purposes hereof, at which time Bonney Lake or Auburn shall have the right to terminate the Agreement.

E. No modifications or amendments of this agreement shall be valid or effective unless evidenced by an agreement in writing signed by both parties.

IN WITNESS WHEREOF the parties hereto have executed this agreement as of the day and year first above written.

ATTACHMENT "B"

CITY OF BONNEY LAKE
Approved by Resolution No. ________ of the City of Bonney Lake, Washington, at its regular meeting held on the _____ day of ________________, 2005.

By:

____

ROBERT YOUNG,
Mayor, City of Bonney Lake

Attest:

____

HARWOOD T. EDVALSON
City Clerk, City of Bonney Lake

Approved as to form:

____

JAMES DIONNE,
City Attorney, City of Bonney Lake

CITY OF AUBURN
Approved by Resolution No. **3796**, of the City of Auburn, Washington, at its regular meeting held on the _____ day of ________________, 2005.

By:

____

PETER B. LEWIS,
Mayor, City of Auburn

Attest:

____

DANIELLE DASKAM,
City Clerk, City of Auburn

Approved as to form:

____

DANIEL B. HEID,
City Attorney, City of Auburn

ATTACHMENT "B"

ATTACHMENT "A"

Legal Description

THAT PORTION OF THE NORTHWEST QUARTER OF THE NORTHEAST QUARTER AND THAT PORTION OF THE NORTHEAST QUARTER OF THE NORTHWEST QUARTER OF SECTION 8, TOWNSHIP 20 NORTH, RANGE 5 EAST, LYING EASTERLY OF SUMNER TAPPS HIGHWAY, SOUTHERLY OF NORTH TAPPS ROAD (16^{TH} STREET EAST (FOREST CANYON ROAD)); EASTERLY OF THE PLAT OF LAKE TAPPS TACOMA POINT ADDITION, ACCORDING TO PLAT RECORDED IN BOOK 17 OF PLATS AT PAGES 1 TO 8, INCLUSIVE, AND NORTHERLY OF THE INTAKE CANAL TO LAKE TAPPS, IN PIERCE COUNTY, WASHINGTON. EXCEPT THAT PORTION LYING WITHIN LAKE TAPPS.

AREA DESCRIBED IS APPROXIMATELY ± 16.7 ACRES.
PARCEL NUMBER 0520081001

SE QUARTER OF SECTION 8, TOWNSHIP 20 N, RANGE 5 E

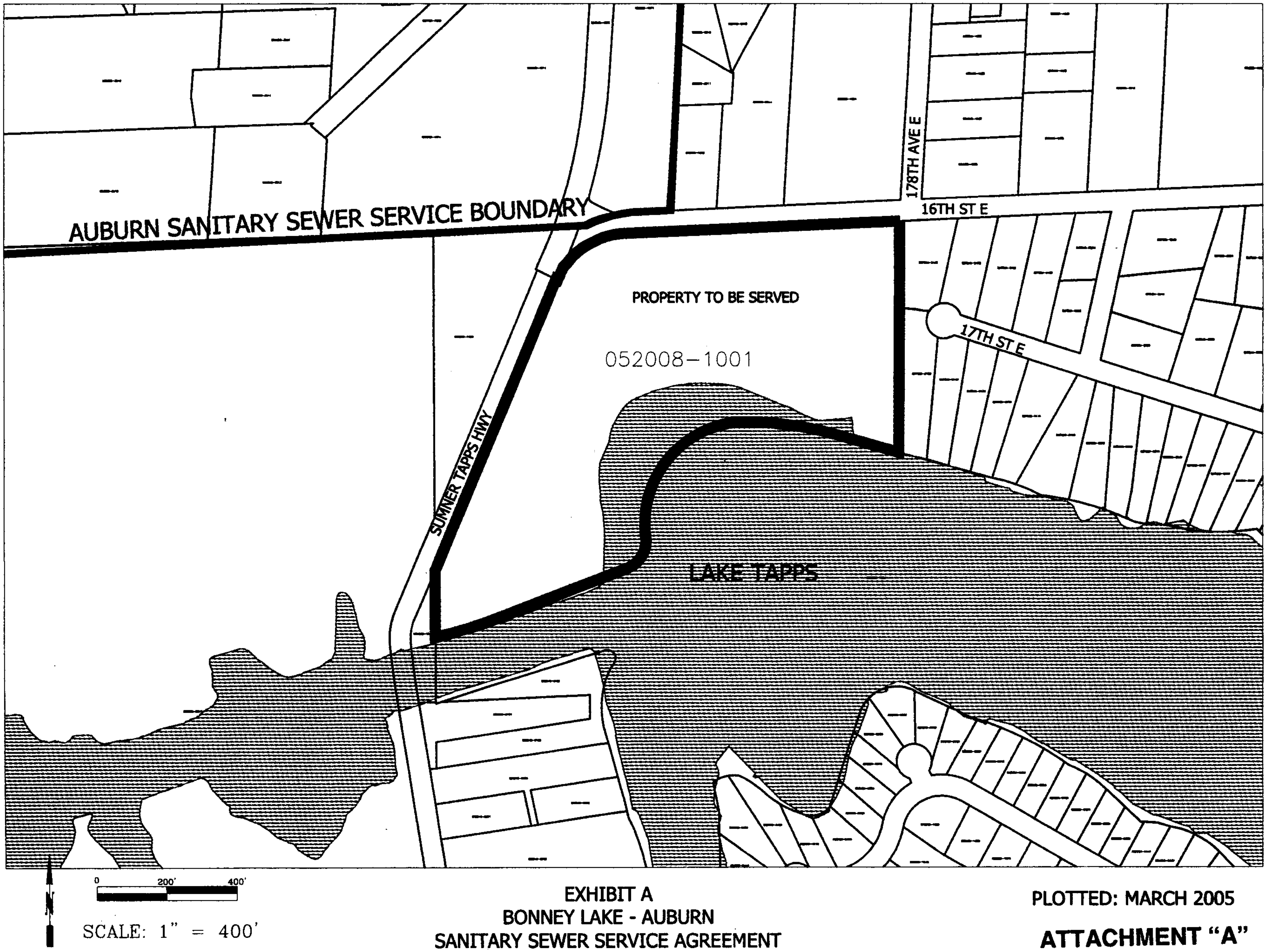


EXHIBIT A
BONNEY LAKE - AUBURN
SANITARY SEWER SERVICE AGREEMENT
FAIRWEATHER COVE

PLOTTED: MARCH 2005

ATTACHMENT "A"
Page 2 of 2

RESOLUTION NO. 1471

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF BONNEY LAKE, PIERCE COUNTY, WASHINGTON, AUTHORIZING AN INTERLOCAL AGREEMENT BETWEEN CITY OF AUBURN AND CITY OF BONNEY LAKE PIERCE COUNTY RIGHT OF WAY PERMIT FOR SEWER SERVICE TO FAIRWEATHER COVE.

The City Council of the City of Bonney Lake, Washington, does hereby resolve that the Mayor is authorized to sign the contract attached hereto and incorporated herein by this reference.

PASSED by the City Council this 9th day of August 2005.

Robert Young, Mayor

ATTEST:

Harwood T. Edvalson, City Clerk

APPROVED AS TO FORM:

James Dionne, City Attorney

RESOLUTION NO. 3322

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF AUBURN, WASHINGTON, AUTHORIZING THE MAYOR AND CITY CLERK TO EXECUTE AN INTERLOCAL AGREEMENT ESTABLISHING SANITARY SEWER SERVICE BOUNDARIES BETWEEN THE CITY OF AUBURN AND THE CITY OF KENT.

WHEREAS, pursuant to RCW 35A.11.040 Auburn and Kent have the legal authority to exercise their powers and perform any of their functions as set forth in RCW 39.34; and

WHEREAS, pursuant to RCW 39.34, the Interlocal Cooperation Act, Auburn and Kent have the legal authority to cooperate with other localities on the basis of mutual advantage and provision of services; and

WHEREAS, pursuant to RCW 35A.21.150 Auburn and Kent have the legal authority to maintain a sewerage system.

NOW, THEREFORE, THE COUNCIL OF THE CITY OF AUBURN, WASHINGTON, IN A REGULAR MEETING DULY ASSEMBLED, HEREWITH RESOLVES THAT:

Section 1. The Mayor and City Clerk of the City of Auburn are herewith authorized to execute an Interlocal Agreement establishing sanitary sewer service boundaries between the City of Auburn and the City of Kent. A copy of said Agreement is attached hereto, denominated as Exhibit "1" and made a part hereof as though set forth in full herein.

Section 2. The Mayor is hereby authorized to implement such administrative procedures as may be necessary to carry out the directives of this legislation.

DATED this 20th day of February, 2001.

CITY OF AUBURN

Charles A. Booth

CHARLES A. BOOTH
MAYOR

ATTEST:

Danielle E. Daskam

Danielle E. Daskam,
City Clerk

APPROVED AS TO FORM:

Michael J. Reynolds,
City Attorney

Return Address:
Auburn City Clerk
City of Auburn
25 West Main St.
Auburn, WA 98001

20010406001623
PACIFIC NW TIT AG 14.00
PAGE 001 OF 007
04/06/2001 15:37
KING COUNTY, WA

RECORDER'S COVER SHEET

Document Title(s) (or transactions contained therein):
7/14 PNWT W-8385-12

INTERLOCAL AGREEMENT BETWEEN CITY OF AUBURN AND THE CITY OF KENT FOR THE ESTABLISHMENT OF SANITARY SEWER SERVICE BOUDNARIES

Reference Number(s) of Documents assigned or released:
☐ Additional reference #'s on page ______ of document

Grantor(s)/Borrower(s) (Last name first, then first name and initials)

CITY OF AUBURN & CITY OF KENT

Grantee/Assignee/Beneficiary: (Last name first)

CITY OF AUBURN & CITY OF KENT

Legal Description (abbreviated: i.e. lot, block, plat or section, township, range)

PER RCW 39.34

☐ Additional legal is on page ____ of document.

Assessor's Property Tax Parcel/Account Number

PER RCW 39.34

☐ Assessor Tax # not yet assigned

Said document(s) were filed for record by Pacific Northwest Title as accommodation only. It has not been examined as to proper execution or as to its effect upon title.

2001 040 6001623

CITY OF KENT and CITY OF AUBURN INTERLOCAL AGREEMENT FOR THE ESTABLISHMENT OF SANITARY SEWER SERVICE BOUNDARIES

THIS AGREEMENT, made and entered into this 5th day of March, 2001, by and between the **CITY OF KENT**, a Washington municipal corporation (hereinafter referred to as "Kent"), and the **CITY OF AUBURN**, a Washington municipal corporation, (hereinafter referred to as "Auburn"), both being duly organized and existing under and by virtue of the laws of the State of Washington,

WITNESSETH:

WHEREAS, pursuant to RCW 35A.11.040 Auburn and Kent have the legal authority to exercise their powers and perform any of their functions as set forth in RCW 39.34; and

WHEREAS, pursuant to RCW 39.34, the Interlocal Cooperation Act, Auburn and Kent have the legal authority to cooperate with other localities on the basis of mutual advantage and provision of services; and

WHEREAS, pursuant to RCW 35A.21.150 Auburn and Kent have the legal authority to maintain a sewerage system; and

WHEREAS, the parties recognize the responsibility of public sanitary sewer utilities to provide efficient and reliable service to their customers at reasonable cost; and

WHEREAS, Auburn desires new developments within it's Potential Annexation Area to complete a Pre-annexation agreement with Auburn prior to receiving a certificate of sanitary sewer availability; and

WHEREAS, portions of the Kent sanitary sewer system have been sized and are situated so as to be capable of affording sewer service to a portion of Auburn's Potential Annexation Area; and

WHEREAS, Auburn has evaluated and determined it is not cost feasible to provide direct sewer service to Auburn's Potential Annexation Area property existing adjacent to Kent's sanitary sewer infrastructure; and

WHEREAS, the parties desire to allow Kent to construct, reconstruct, repair and maintain sewer facilities as necessary, and to authorize connections to Kent's sewer system for service to noted areas, or portions thereof; and

WHEREAS, Kent's sewer service to these areas will provide for maximum efficient use of existing and future facilities together with orderly and efficient sanitary sewer planning.

NOW, THEREFORE:

IT IS HEREBY AGREED by and between the parties hereto as follows:

1. **Sewer Service Area.** The parties have agreed to a sewer service area boundary between them. The boundary is graphically depicted on the map attached hereto as Exhibit "A", which is by this reference incorporated herein. Both parties further agree that Kent in providing sewer service to the area shown on Exhibit "A", as Area To Be Served By Kent, shall be furnishing sewer service to properties within Auburn's Potential Annexation Area. Kent shall provide service in accordance with and subject to the terms and conditions of this Agreement.

2. **Management, Regulation and Control of Sewer System.** Kent shall have the sole responsibility and authority to construct, maintain, manage, conduct and operate its sewerage system as installed within the area described in Exhibit "A", together with any additions, extensions and betterments thereto. Kent shall also be responsible for obtaining all necessary governmental franchises, approvals, easements and permits for the installation of said sewerage system as described above.

3. **Service Rates and Connection Charges.**

   a) **Permit Required.** No connection shall be made to Kent's sanitary sewer system unless the property owner first pays the associated fees and submits the proper information to obtain a Kent sanitary sewer connection permit. The connection shall be subject to inspection and approval for compliance with Kent's Sanitary Sewer Standards as adopted at the time the connection is made.

   b) **Rates.** The rates charged to the sanitary sewer customer by Kent within the area described in Exhibit "A" shall be fixed, altered, regulated and controlled by Kent pursuant to all applicable laws or regulations promulgated on the subject of rates and charges for sewer service. No surcharge shall be charged to the customers served under this agreement on the sole basis that those customers are within Auburn's Potential Annexation Area.

4. Planning Areas. Kent hereby acknowledges the region to be within Auburn's Potential Annexation Area. Both parties acknowledge that Auburn desires a Pre-annexation Agreement from property seeking a sewer certificate of availability within Auburn's Potential Annexation Area.

5. Sewer Availability Certificates. Commencing on March 1, 2001, Kent shall issue sewer availability certificates for property within the area described in Exhibit "A". Kent agrees not to issue the availability certificate or any side sewer permit in the case of an existing development until Kent receives a copy of the City of Auburn Pre-Annexation Agreement in a form accepted and approved by the City of Auburn.

6. Future Annexations. Each of the parties agree that Kent shall provide sanitary sewer service to the areas shown in Exhibit "A" without regard to the present corporate limits of the parties, and without regard to future corporate limits as they may be amended by annexation to either party.

7. Kent Comprehensive Sewer Planning. The terms of this Agreement will be included as an element of Kent's Comprehensive Sewerage Plan. Kent will submit to Auburn all Comprehensive Sewerage Plans and amendments thereto involving area and/or system improvements within Auburn's planning area.

8. Auburn Comprehensive Planning. The terms of this Agreement will be included as an element of the sewerage portion of Auburn's Comprehensive Plan.

9. Reliance. Each party hereto acknowledges that the terms hereof will be relied upon by the other in its comprehensive planning to meet the needs of the service area designated herein.

10. Liability. Neither party to this agreement shall be liable to the other party for any failure or interruption of service in the service area of the other party.

11. Government Approvals. The parties will give notice of the adoption of this Agreement to Metropolitan/King County, to the Department of Ecology, to the Department of Health, and to any other agency with jurisdiction or mission relevant to the terms hereof, and shall cooperate and assist in all reasonable manner in procuring any necessary approvals hereof by those agencies.

12. Boundary Review Board. In the event that implementation of the terms hereof results in permanent sewer service to areas that will be outside the respective service boundaries of Kent or Auburn, the parties will at the time of such service jointly seek approval of the King County Boundary Review Board in accordance with R.C.W. 36.93.090.

13. Service Amendments. Any changes to the service areas described herein shall be by mutual agreement. Each party may give permission to the other on a case-by-case basis to provide service by one party into the other party's adjacent or nearby service area based upon considerations of economic efficiency for providing the service with mutual consent of the Director of Public Works from both jurisdictions.

14. Alteration, Amendment or Modification. Kent and Auburn hereby reserve the right to alter, amend or modify the terms and conditions of this Agreement upon written agreement of both parties to such alteration, amendment or modification.

15. Sanctity of Agreement. This agreement constitutes the entire agreement of the parties regarding the subject matter hereof, and there are no other representations or oral agreements other than those listed herein, which vary the terms of this agreement. Future agreements may occur between the parties to transfer additional or future service areas by mutual agreement.

16. Obligation Intact. Nothing herein shall be construed to alter the rights, responsibilities, liabilities, or obligations of either Kent or Auburn regarding provision of sewer service, except as specifically set forth herein.

CITY OF KENT

Approved by ~~Resolution No~~. MOTION of the City of Kent, Washington, at its regular meeting held on the 6TH day of FEBRUARY, 2001.

By:

Mayor

Attest:

Brenda Jacober

City Clerk, City of Kent

Approved as to form:

Kent City Attorney, DEPUTY

CITY OF AUBURN
Approved by Resolution No. 3322, of the City of Auburn, Washington, at its regular meeting held on the 20th day of February, 2001.

By:

Charles A. Booth
Charles A. Booth, Mayor

Attest:

Danielle Daskam
Danielle Daskam, City Clerk

Approved as to form:

Auburn City Attorney

2001 040 6001623

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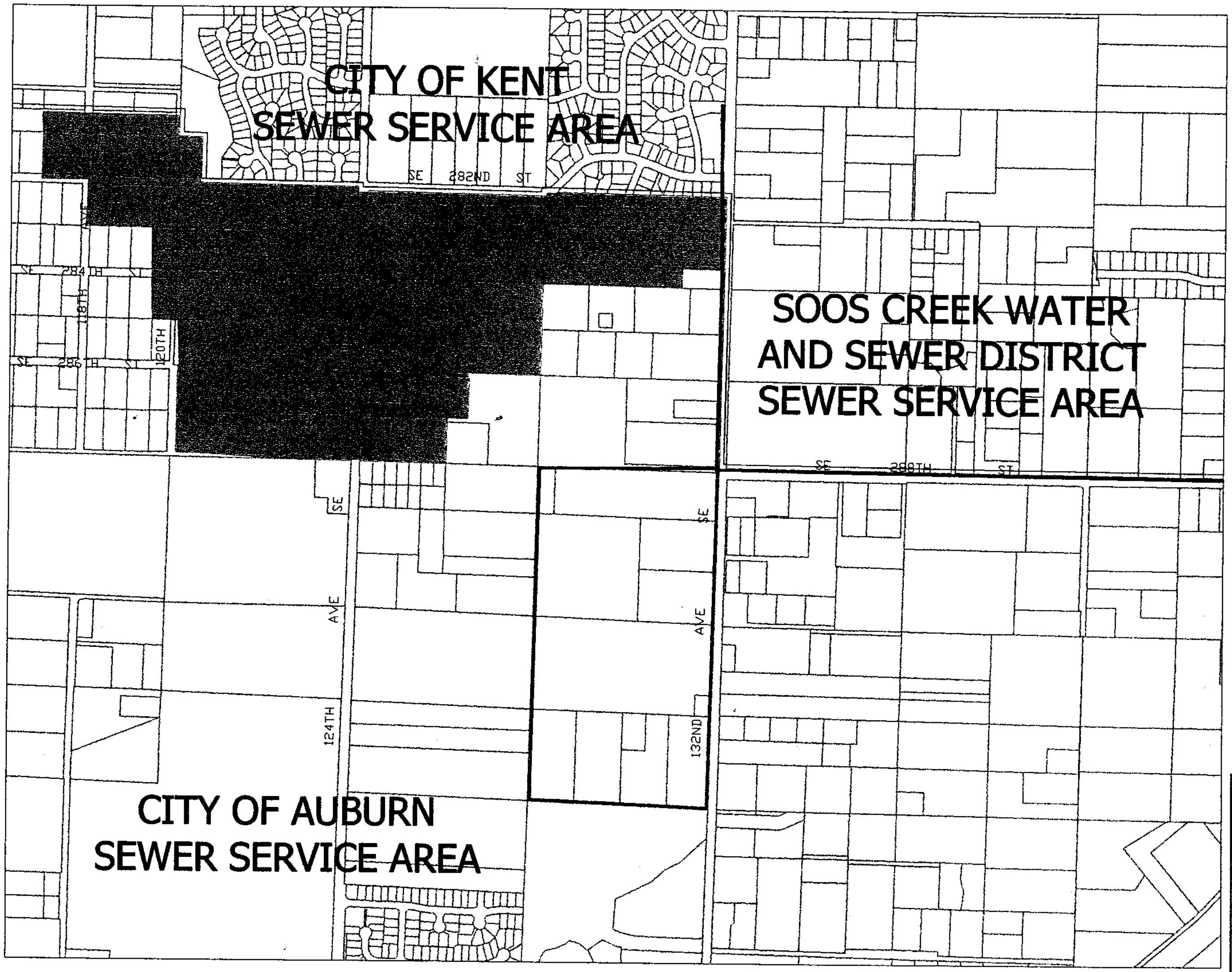


LEGEND

AUBURN POTENTIAL ANNEXATION AREA BOUNDARY

CURRENT SCWSD SEWER SERVICE AREA

AREA TO BE SERVED BY KENT CITY

EXHIBIT A

CITY OF AUBURN AND CITY OF KENT INTERLOCAL AGREEMENT FOR THE ESTABLISHMENT OF SANITARY SEWER SERVICE BOUNDARIES

PLEASE INITIAL IF APPROVED		02/07/2001
KENT	AUBURN	1/1

D:\SEWER\KENTSAB

Return Address:
Auburn City Clerk
City of Auburn
25 West Main St
Auburn, WA 98001

20021001001676
PACIFIC NW TIT AG 42.00
PAGE 001 OF 024
10/01/2002 14:08
KING COUNTY, WA

RECORDER'S COVER SHEET

24/42
PNWT
W4072-12

Document Title(s) (or transactions contained therein)

1 Franchise Agreement

Reference Number(s) of Documents assigned or released:

☐ Additional reference #'s on page ___ of document

Grantor(s) (Last name first, then first name and initials)
1 King County

Grantee: (Last name first)
1 Auburn, City of

Said document(s) were filed for record by Pacific Northwest Title as accommodation only. It has not been examined as to proper execution or as to its affect upon title

Legal Description (abbreviated i e. lot, block, plat or section, township, range)

See Exhibit A

☒ Additional legal is on page 3 of the document

Assessor's Property Tax Parcel/Account Number:

King County Franchise No 14458

☐ Assessor Tax # not yet assigned

2002 100 1001676

14458
July 23, 2002

Franchise No. 14458

In the matter of the application for a franchise to operate, maintain, repair, and construct and sewer mains, service lines, and appurtenances in, over, along, and under County roads and rights-of-way in King County, Washington

---

The application of the City of Auburn for a franchise to operate, maintain, repair and construct sewer mains, service lines, and appurtenances in, over, along, and under County roads and rights-of-way located within the area described in attached Exhibit "A" has been heard on this 26th day of August, 2002 All of the property described in Exhibit "A" lies outside the limits of any incorporated Town or City.

Legal notice of the franchise application and of the hearing has been given as is required by law.

The King County Council, having considered the interests proposed and advanced, and finding that the granting of this franchise is in the public interest, ORDERS that a franchise be granted to the City of Auburn, the Grantee, subject to the conditions set forth in Exhibit "B" attached hereto, this franchise and Ordinance No 14458. This franchise grants the right, privilege, authority and franchise to operate, maintain, repair and construct mains and service lines and appurtenances as a part of its distribution system in, over, along, and under County roads and rights-of-way located within the area described in Exhibit "A"

Res 3511

14458

This franchise is granted subject to all of the terms and conditions contained herein, within Ordinance No 14458 and Exhibit "B", and shall expire in twenty-five years on 9/14, 2027.

Dated this 4 day of September, 20__.

KING COUNTY, WASHINGTON

BY ______________________

TITLE King County Executive

The undersigned accepts all the rights, privileges, and duties of this franchise subject to all terms, conditions, stipulations, and obligations contained herein, within Ordinance 14458 and Exhibit "B"

CITY OF AUBURN
GRANTEE

BY ______________________

TITLE Mayor

Dated this 16th day of September, 2002

EXHIBIT " A"

Area A

BEGINNING AT THE INTERSECTION OF THE EAST-WEST CENTERLINE OF SECTION 16, TOWNSHIP 21 NORTH, RANGE 5 EAST, W.M WITH THE SOUTHEASTERLY MARGIN OF THE RIGHT OF WAY FOR PRIMARY STATE HIGHWAY NUMBER 2, AKA STATE HIGHWAY 18,

THENCE NORTHEASTERLY ALONG SAID SOUTHEASTERLY MARGIN OF SAID RIGHT OF WAY FOR STATE HIGHWAY NUMBER 2 TO THE SOUTH LINE OF SECTION 34, TOWNSHIP 22 NORTH, RANGE 5 EAST, W.M ,

THENCE WESTERLY ALONG THE SOUTH LINE OF SAID SECTION 34 AND ALONG THE SOUTHERLY LIMITS OF THE CITY OF KENT TO THE SOUTHWEST CORNER OF SAID SECTION 34,

THENCE CONTINUING NORTHERLY AND WESTERLY ALONG THE WEST LINE OF SAID SECTION 34 AND THE SOUTHERLY LIMITS OF THE CITY OF KENT THROUGH SECTIONS 33 AND 32, TOWNSHIP 22 NORTH, RANGE 5 EAST, W.M TO THE NORTHEAST CORNER OF THAT PORTION OF LAND ANNEXED BY THE CITY OF KENT BY CITY OF KENT ORDINANCE NUMBER 3171,

THENCE SOUTHERLY ALONG THE EAST BOUNDARY OF SAID KENT CITY LIMITS ESTABLISHED BY CITY OF KENT ORDINANCE NUMBER 3171 TO THE SOUTHEAST CORNER THEREOF, AND AN ANGLE POINT IN THE EASTERLY BOUNDARY OF THE CITY OF AUBURN CITY LIMITS AS ANNEXED TO THE CITY OF AUBURN BY CITY OF AUBURN ORDINANCE 4710,

THENCE SOUTHERLY ALONG THE EASTERLY CITY LIMITS OF THE CITY OF AUBURN ANNEXED TO THE CITY OF AUBURN BY ORDINANCES 4710, 3266, AND 5370 TO THE EASTERLY EDGE OF THE GREEN RIVER,

THENCE SOUTHERLY ALONG THE EASTERLY EDGE OF THE GREEN RIVER TO THE NORTHERLY LINE OF THAT PORTION OF LAND ANNEXED TO THE CITY OF AUBURN BY CITY OF AUBURN ORDINANCE NUMBER 5346,

THENCE NORTHEASTERLY, EASTERLY AND SOUTHERLY ALONG THE EASTERLY CITY LIMITS OF THE CITY OF AUBURN ANNEXED TO THE CITY OF AUBURN BY ORDINANCES 5346, 5088, AND 5346 TO THE EAST-WEST CENTERLINE OF SECTION 17, TOWNSHIP 21 NORTH, RANGE 5 EAST, W.M.;

THENCE EASTERLY ALONG SAID EAST-WEST CENTERLINE OF SAID SECTION 17 AND ALONG THE EAST-WEST CENTERLINE OF SECTION 16, TOWNSHIP 21 NORTH, RANGE 5 EAST, W M. TO THE POINT OF BEGINNING

SITUATE IN KING COUNTY, WASHINGTON

Area B

BEGINNING AT THE NORTHWEST CORNER OF THE SOUTH HALF OF SECTION 35, TOWNSHIP 22, RANGE 4, SOUTH ALONG THE WEST LINE OF SAID SECTION TO A POINT WHERE IT INTERSECTS WITH NORTH LINE OF SECTION 2, TOWNSHIP 21, RANGE 4 EAST, THENCE SOUTH ALONG SAID LINE TO ITS INTERSECTION WITH NORTHWEST CORNER OF SECTION 11, TOWNSHIP 21, RANGE 4, THENCE SOUTH ALONG SAID LINE TO ITS INTERSECTION WITH THE NORTHEAST CORNER OF SECTION 15, TOWNSHIP 21, RANGE 4 EAST, THENCE WEST ALONG THE NORTH LINE OF SECTION 15, TOWNSHIP 21, RANGE 4, TO THE NORTHWEST CORNER OF THE NORTHEAST QUARTER OF SAID SECTION 15, THENCE SOUTH ALONG THE WEST LINE OF SAID SECTION 15, TO SOUTHWEST CORNER OF THE SOUTHEAST QUARTER OF SAID SECTION 15, THENCE EAST ALONG THE SOUTH LINE OF SAID SECTION 15 TO ITS INTERSECTION WITH THE NORTHWEST CORNER OF SECTION 23, TOWNSHIP 21, RANGE 4, THENCE SOUTH ALONG THE WEST LINE OF SAID SECTION 23, TO SOUTHWEST CORNER OF NORTHWEST QUARTER OF SAID SECTION 23, THENCE EAST ALONG THE SOUTH LINE OF THE NORTHWEST QUARTER OF ITS INTERSECTION WITH THE WEST LINE OF THE CORPORATE BOUNDARY OF THE CITY OF AUBURN LOCATED IN SAID SECTION 23, THENCE CONTINUING ALONG SAID CORPORATE BOUNDARY LOCATED IN SECTION 14, 11, 2 , 35, 22, 5, TO ITS NORTH LINE OF THE SOUTH HALF
OF SECTION 36, TOWNSHIP 22, RANGE 5 EAST, THENCE WEST ALONG SAID NORTH LINE TO ITS INTERSECTION WITH THE NORTHWEST CORNER OF THE SOUTH HALF OF SECTION 35, TOWNSHIP 22, RANGE 4 EAST, ALSO KNOWN AS THE TRUE POINT OF BEGINNING.

Area C

THAT PORTION OF WHITE RIVER VALLEY HOME TRACTS SECOND ADDITION LOCATED IN THE WEST HALF OF SOUTHWEST QUARTER OF SECTION 31 TOWNSHIP 22 NORTH, RANGE 5 EAST, W M , DESCRIBED AS FOLLOWS

BEGINNING AT THE SOUTHEAST CORNER OF THAT PORTION OF LAND ANNEXED TO THE CITY OF AUBURN BY CITY OF AUBURN ORDINANCE NUMBER 3823, THENCE NORTHERLY ALONG THE EAST BOUNDARY OF SAID CITY LIMITS AS ESTABLISHED BY ORDINANCE NUMBER 3823 TO THE SOUTHEAST CORNER OF THAT PORTION OF LAND ANNEXED TO THE CITY OF AUBURN BY CITY OF AUBURN ORDINANCE NUMBER 4347, THENCE NORTHERLY ALONG THE EAST BOUNDARY OF SAID CITY LIMITS AS ESTABLISHED BY ORDINANCE NUMBER 4347 TO AN ANGLE POINT IN THE SOUTHERLY BOUNDARY OF THAT PORTION OF LAND ANNEXED TO THE CITY OF AUBURN BY CITY OF AUBURN ORDINANCE NUMBER 4780 AND AMENDED BY CITY OF AUBURN ORDINANCE NUMBER 4843, THENCE NORTHERLY, EASTERLY AND NORTHERLY ALONG THE BOUNDARY OF SAID CITY LIMITS AS ESTABLISHED BY ORDINANCE NUMBER 4843 TO THE SOUTHWESTERLY MARGIN OF

AUBURN WAY NORTH AND THE WESTERLY BOUNDARY OF THAT PORTION OF LAND ANNEXED TO THE CITY OF AUBURN BY CITY OF AUBURN ORDINANCE NUMBER 2511, THENCE SOUTHEASTERLY ALONG THE WESTERLY BOUNDARY OF SAID CITY LIMITS AS ESTABLISHED BY ORDINANCE NUMBER 2511 TO THE NORTHEAST CORNER OF THAT PORTION OF LAND ANNEXED TO THE CITY OF AUBURN BY CITY OF AUBURN ORDINANCE NUMBER 3621, THENCE WESTERLY ALONG THE NORTHERLY BOUNDARY OF SAID CITY LIMITS AS ESTABLISHED BY ORDINANCE NUMBER 3621 TO THE NORTHWEST CORNER OF THAT PORTION OF LAND ANNEXED TO THE CITY OF AUBURN BY CITY OF AUBURN ORDINANCE NUMBER 3621, THENCE SOUTHERLY AND EASTERLY ALONG THE BOUNDARY OF SAID CITY LIMITS AS ESTABLISHED BY ORDINANCE NUMBER 3621 TO THE WESTERLY LINE OF THAT PORTION OF LAND ANNEXED TO THE CITY OF AUBURN BY CITY OF AUBURN ORDINANCE NUMBER 2511; THENCE SOUTHERLY ALONG THE WESTERLY BOUNDARY OF SAID CITY LIMITS AS ESTABLISHED BY ORDINANCE NUMBER 2511 TO THE NORTHEAST CORNER OF THAT PORTION OF LAND ANNEXED TO THE CITY OF AUBURN BY CITY OF AUBURN ORDINANCE NUMBER 5412, THENCE WEST ALONG THE NORTHERLY BOUNDARY OF SAID CITY LIMITS AS ESTABLISHED BY ORDINANCE NUMBER 5412 TO THE NORTHWEST CORNER OF THAT PORTION OF LAND ANNEXED TO THE CITY OF AUBURN BY CITY OF AUBURN ORDINANCE NUMBER 5412; THENCE SOUTHERLY ALONG THE WESTERLY BOUNDARY OF SAID CITY LIMITS AS ESTABLISHED BY ORDINANCE NUMBER 5412 TO THE BOUNDARY OF THAT PORTION OF LAND ANNEXED TO THE CITY OF AUBURN BY CITY OF AUBURN ORDINANCE 2511; THENCE WEST ALONG SAID CITY LIMITS AS ESTABLISHED BY ORDINANCE NUMBER 2511 TO THE POINT OF BEGINNING

SITUATE IN KING COUNTY, WASHINGTON

Area D

A PORTION OF THE SOUTHEAST QUARTER OF SECTION 31, AND THE SOUTHWEST QUARTER OF SECTION 32, ALL IN TOWNSHIP 22 NORTH, RANGE 5 EAST, W M , DESCRIBED AS FOLLOWS

BEGINNING AT THE NORTHWEST CORNER OF THAT PORTION OF LAND ANNEXED BY THE CITY OF AUBURN BY CITY OF AUBURN ORDINANCE NUMBER 4710,
THENCE SOUTHERLY ALONG THE WESTERLY BOUNDARY OF SAID AUBURN CITY LIMITS ESTABLISHED BY CITY OF AUBURN ORDINANCE NUMBER 4710 TO THE EASTERLY EDGE OF THE GREEN RIVER,
THENCE NORTHERLY ALONG SAID EASTERLY EDGE OF THE GREEN RIVER TO THE SOUTHERLY LINE OF THE CITY OF KENT CITY LIMITS,
THENCE EASTERLY ALONG SAID SOUTHERLY LINE OF THE CITY OF KENT CITY LIMITS TO THE POINT OF BEGINNING

SITUATE IN KING COUNTY, WASHINGTON

Area E

THAT PORTION OF THE NORTHWEST QUARTER OF SECTION 17, TOWNSHIP 21 NORTH, RANGE 5 EAST, W M DESCRIBED AS FOLLOWS·

BEGINNING AT A POINT ON WESTERLY MARGIN OF THE GREEN RIVER AT THE INTERSECTION OF THE NORTHERLY BOUNDARY OF THAT PORTION OF LAND ANNEXED TO THE CITY OF AUBURN BY CITY OF AUBURN ORDINANCE 1543, THENCE WESTERLY AND NORTHERLY ALONG SAID NORTHERLY BOUNDARY THEREOF, TO A POINT ON THE WEST BOUNDARY OF THE EAST HALF OF THE SOUTHWEST QUARTER OF THE NORTHWEST QUARTER OF SAID SECTION 17; THENCE NORTHERLY ALONG SAID WEST BOUNDARY OF THE EAST HALF OF THE SOUTHWEST QUARTER OF THE NORTHWEST QUARTER OF SECTION 17, A DISTANCE OF 320 FEET MORE OR LESS TO THE SOUTHERLY BOUNDARY OF THAT PORTION OF LAND ANNEXED TO THE CITY OF AUBURN BY CITY OF AUBURN ORDINANCE 4317, THENCE EASTERLY AND NORTHERLY ALONG THE EASTERLY BOUNDARY THEREOF TO THE WESTERLY MARGIN OF SAID GREEN RIVER, THENCE SOUTHEASTERLY ALONG SAID WESTERLY MARGIN OF THE GREEN RIVER TO THE POINT OF BEGINNING

SITUATE IN KING COUNTY, WASHINGTON

Area F

THAT PORTION OF THE SOUTHWEST QUARTER OF SECTION 17, TOWNSHIP 21 NORTH, RANGE 5 EAST, W M , KING COUNTY, WASHINGTON, DESCRIBED AS FOLLOWS

BEGINNING AT THE NORTHWEST CORNER OF SAID SOUTHWEST QUARTER OF SECTION 17, THENCE SOUTHERLY ALONG THE WEST BOUNDARY OF SAID SOUTHWEST QUARTER OF SECTION 17 A DISTANCE OF 33.01 FEET TO THE SOUTH MARGIN OF EAST MAIN STREET (SE 328TH ST) EXTENDED TO THE WEST AND THE TRUE POINT OF BEGINNING, THENCE CONTINUING SOUTHERLY ALONG SAID WEST BOUNDARY OF THE SOUTHWEST QUARTER OF SECTION 17 TO THE NORTHWEST CORNER OF AUBURN ANNEXATION DESCRIBED IN CITY OF AUBURN ANNEXATION ORDINANCE 1991, THENCE EASTERLY TO THE NORTHEAST CORNER OF SAID AUBURN ANNEXATION DESCRIBED IN CITY OF AUBURN ANNEXATION ORDINANCE 1991, THENCE SOUTHERLY ALONG THE EAST BOUNDARY OF SAID AUBURN ANNEXATION DESCRIBED IN CITY OF AUBURN ANNEXATION ORDINANCE 1991 TO THE NORTHERNMOST BOUNDARY OF AUBURN ANNEXATION DESCRIBED IN CITY OF AUBURN ANNEXATION ORDINANCE 2085, THENCE EASTERLY ALONG SAID NORTHERNMOST BOUNDARY OF AUBURN ANNEXATION DESCRIBED IN CITY OF AUBURN ANNEXATION ORDINANCE 2085 AND CONTINUING EASTERLY ALONG THE NORTHERNMOST BOUNDARY OF AUBURN ANNEXATION DESCRIBED IN CITY OF AUBURN ANNEXATION ORDINANCE 2229 TO THE WESTERNMOST BOUNDARY OF AUBURN ANNEXATION DESCRIBED IN CITY OF AUBURN ANNEXATION ORDINANCE 3525, THENCE NORTHERLY ALONG SAID WESTERNMOST BOUNDARY OF AUBURN ANNEXATION DESCRIBED IN CITY OF AUBURN ANNEXATION ORDINANCE 3525 TO THE NORTH BOUNDARY OF AUBURN ANNEXATION DESCRIBED IN CITY OF AUBURN ANNEXATION ORDINANCE 3525, THENCE EASTERLY ALONG SAID NORTH BOUNDARY OF

AUBURN ANNEXATION DESCRIBED IN CITY OF AUBURN ANNEXATION ORDINANCE 3525 TO THE EAST BOUNDARY OF AUBURN ANNEXATION DESCRIBED IN CITY OF AUBURN ANNEXATION ORDINANCE 3525, THENCE SOUTHERLY ALONG THE EAST BOUNDARY OF AUBURN ANNEXATION DESCRIBED IN CITY OF AUBURN ANNEXATION ORDINANCE 3525 TO THE NORTH MARGIN OF SECOND STREET SE (SE 330TH ST) AND THE NORTH BOUNDARY OF AUBURN ANNEXATION DESCRIBED IN CITY OF AUBURN ANNEXATION ORDINANCE 5350, THENCE EASTERLY ALONG SAID NORTH MARGIN OF SECOND STREET SE AND SAID NORTH BOUNDARY OF AUBURN ANNEXATION DESCRIBED IN CITY OF AUBURN ANNEXATION ORDINANCE 5350 TO THE SOUTHWEST CORNER OF LOT 1, BLOCK 2 OF THE PLAT OF EAST AUBURN GARDEN TRACTS AS RECORDED IN VOLUME 18 OF PLATS, PAGE 98, RECORDS OF KING COUNTY, WASHINGTON, THENCE SOUTHERLY ALONG THE WEST BOUNDARY OF AUBURN ANNEXATION DESCRIBED IN CITY OF AUBURN ANNEXATION ORDINANCE 5350 TO THE NORTH BOUNDARY OF AUBURN ANNEXATION DESCRIBED IN CITY OF AUBURN ANNEXATION ORDINANCE 4605, THENCE EASTERLY ALONG THE NORTH BOUNDARY OF AUBURN ANNEXATION DESCRIBED IN CITY OF AUBURN ANNEXATION ORDINANCE 4605 TO THE WEST BOUNDARY OF AUBURN ANNEXATION DESCRIBED IN CITY OF AUBURN ANNEXATION ORDINANCE 5505, THENCE NORTHERLY AND EASTERLY ALONG THE BOUNDARY OF AUBURN ANNEXATION DESCRIBED IN CITY OF AUBURN ANNEXATION ORDINANCE 5505 TO THE WEST MARGIN OF THE GREEN RIVER, THENCE NORTHWESTERLY ALONG SAID WEST MARGIN OF THE GREEN RIVER TO THE SOUTH BOUNDARY OF AUBURN ANNEXATION DESCRIBED IN CITY OF AUBURN ANNEXATION ORDINANCE 5084, THENCE WESTERLY ALONG SAID SOUTH BOUNDARY OF AUBURN ANNEXATION DESCRIBED IN CITY OF AUBURN ANNEXATION ORDINANCE 5084 TO THE SOUTHWEST CORNER THEREOF, THENCE NORTHERLY ALONG THE WEST BOUNDARY OF AUBURN ANNEXATION DESCRIBED IN CITY OF AUBURN ANNEXATION ORDINANCE 5084,TO THE SOUTH MARGIN OF EAST MAIN STREET (SE 328TH ST), THENCE WESTERLY ALONG SAID SOUTH MARGIN OF EAST MAIN STREET TO THE TRUE POINT OF BEGINNING.

SITUATE IN KING COUNTY, WASHINGTON

Area G

THAT PORTION SOUTH AUBURN GARDEN TRACTS LOCATED IN GOVERNMENT LOT 2 IN THE NORTHWEST QUARTER OF SECTION 30 TOWNSHIP 21 NORTH, RANGE 5 EAST, W M., DESCRIBED AS FOLLOWS

BEGINNING AT THE SOUTHEAST CORNER OF THAT PORTION OF LAND ANNEXED TO THE CITY OF AUBURN BY CITY OF AUBURN ORDINANCE NUMBER 3726; THENCE NORTHERLY ALONG THE EAST BOUNDARY OF SAID CITY LIMITS AS ESTABLISHED BY ORDINANCE NUMBER 3726 TO THE SOUTHEAST CORNER OF THAT PORTION OF LAND ANNEXED TO THE CITY OF AUBURN BY CITY OF AUBURN ORDINANCE 4138; THENCE NORTHERLY ALONG THE EAST BOUNDARY OF SAID CITY LIMITS AS ESTABLISHED BY ORDINANCE NUMBER 4138 TO THE SOUTHEAST CORNER OF THAT PORTION OF LAND ANNEXED TO THE CITY OF AUBURN BY CITY OF AUBURN ORDINANCE NUMBER 4665; THENCE NORTHERLY ALONG THE EAST BOUNDARY OF SAID CITY LIMITS AS ESTABLISHED BY ORDINANCE NUMBER 4665 TO THE SOUTHERLY BOUNDARY THAT PORTION OF LAND ANNEXED TO THE CITY OF

AUBURN BY CITY OF AUBURN ORDINANCE 1279, THENCE EAST ALONG THE SOUTHERLY BOUNDARY OF SAID CITY LIMITS AS ESTABLISHED BY ORDINANCE 1279 TO THE NORTHWEST CORNER OF THAT PORTION OF LAND ANNEXED TO THE CITY OF AUBURN BY CITY OF AUBURN ORDINANCE 3244, THENCE SOUTH ALONG THE WESTERLY BOUNDARY OF SAID CITY LIMITS AS ESTABLISHED BY ORDINANCE 3244 TO THE SOUTHWEST CORNER OF SAID PORTION OF LAND ANNEXED TO THE CITY OF AUBURN BY CITY OF AUBURN ORDINANCE 3244, THENCE EAST ALONG THE SOUTHERLY BOUNDARY OF SAID CITY LIMITS AS ESTABLISHED BY ORDINANCE NUMBER 3244 TO THE SOUTHEAST CORNER OF SAID PORTION OF LAND ANNEXED TO THE CITY OF AUBURN BY CITY OF AUBURN ORDINANCE 3244; THENCE NORTH ALONG THE EASTERLY BOUNDARY OF SAID CITY LIMITS AS ESTABLISHED BY ORDINANCE NUMBER 3244 TO THE SOUTHERLY BOUNDARY OF THAT PORTION OF LAND ANNEXED TO THE CITY OF AUBURN BY CITY OF AUBURN ORDINANCE 1279; THENCE EAST ALONG THE SOUTHERLY BOUNDARY OF SAID CITY LIMITS AS ESTABLISHED BY ORDINANCE NUMBER 1279 TO THE NORTHWEST CORNER OF THAT PORTION OF LAND ANNEXED TO THE CITY OF AUBURN BY CITY OF AUBURN ORDINANCE NUMBER 1225, THENCE SOUTH ALONG THE WESTERLY BOUNDARY OF SAID CITY LIMITS AS ESTABLISHED BY ORDINANCE NUMBER 1225 TO THE NORTHERLY BOUNDARY OF THAT PORTION OF LAND ANNEXED TO THE CITY OF AUBURN BY CITY OF AUBURN ORDINANCE 3839, THENCE WESTERLY, NORTHERLY AND WESTERLY ALONG THE NORTHERLY BOUNDARY OF SAID CITY LIMITS AS ESTABLISHED BY ORDINANCE NUMBER 3839 TO THE NORTHEAST CORNER OF THAT PORTION OF LAND ANNEXED TO THE CITY OF AUBURN BY CITY OF AUBURN ORDINANCE NUMBER 4449, THENCE WEST ALONG THE NORTHERLY BOUNDARY OF SAID CITY LIMITS AS ESTABLISHED BY ORDINANCE NUMBER 4449 TO THE SOUTHEAST CORNER OF THAT PORTION OF LAND ANNEXED TO THE CITY OF AUBURN BY CITY OF AUBURN ORDINANCE NUMBER 4518, THENCE NORTH ALONG THE EASTERLY BOUNDARY OF SAID CITY LIMITS AS ESTABLISHED BY ORDINANCE NUMBER 4518 TO THE NORTHEAST CORNER OF THAT PORTION OF LAND ANNEXED TO THE CITY OF AUBURN BY CITY OF AUBURN ORDINANCE 4518, THENCE WEST ALONG THE NORTHERLY BOUNDARY OF SAID CITY LIMITS AS ESTABLISHED BY ORDINANCE NUMBER 4518 TO THE EAST MARGIN OF "A" STREET SE AND THE EAST BOUNDARY OF THAT PORTION OF LAND ANNEXED TO THE CITY OF AUBURN BY CITY OF AUBURN ANNEXATION 1171, THENCE NORTH ALONG THE EASTERLY BOUNDARY OF SAID CITY LIMITS AS ESTABLISHED BY ORDINANCE NUMBER 1171 TO THE SOUTHWEST CORNER OF THAT PORTION OF LAND ANNEXED TO THE CITY OF AUBURN BY CITY OF AUBURN ORDINANCE NUMBER 3726; THENCE EAST ALONG THE SOUTHERLY BOUNDARY OF SAID CITY LIMITS AS ESTABLISHED BY ORDINANCE NUMBER 3726 TO THE POINT OF BEGINNING

SITUATE IN KING COUNTY, WASHINGTON

EXHIBIT "B"

TERMS AND CONDITIONS APPLICABLE TO UTILITIES FRANCHISES GRANTED BY KING COUNTY

THIS FRANCHISE is subject to the following terms and conditions:

1 DEFINITIONS

References to any County official or office also refers to any office that succeeds to any or all of the responsibilities of the named office or official. References to laws or "applicable laws" include federal, state, and local laws and regulations adopted pursuant to those laws; unless otherwise stated, references to laws include laws now in effect, as the same may be amended from time to time during the operation of this franchise. In addition, the following definitions shall apply·

Cable Services The term "Cable Services" is used as defined in 47 United States Code 522 (5), as amended

Cable System The term "Cable System" is used as defined in 47 United States Code 522 (6), and King County Code 6.a 010 (J) as amended

County Road Rights-of-Way. The term "County Road Rights-of-Way" includes any road, street, avenue, or alley located within the area described in the attached Exhibit "A", it does not include recreational or nature trails except where the trails intersect or are within roads, streets, avenues or alleys

Director. The term "Director" refers to the chief executive of the King County Department of Transportation.

Grantee. The term "Grantee" refers to the City of Auburn, its successors and those assignees approved pursuant to paragraph 16 herein

Utility. The term "utility" refers either to the Grantee or, depending on the context, to any other person, firm, or corporation, public or private, which may hold a franchise to maintain and operate similar facilities in, under, over, across, and along any of the County property described in Exhibit "A"

Council. The term "Council" refers to the King County Council, acting in its official capacity.

Other Governing Body The term "Other Governing Body" refers to any public official or other public board or body as may have the power and jurisdiction to permit or regulate the installation and maintenance of utilities and other facilities in, under, over, across, and along any of the county property described in Exhibit "A"

2 ACCEPTANCE BY GRANTEES OF TERMS AND CONDITIONS

The full acceptance of this franchise and all of its terms and conditions shall be filed with the Clerk of the Council within thirty (30) days from ________________, 20____, by the Grantee. Full acceptance of this franchise is a condition precedent to its taking effect, and unless this franchise is accepted within the time specified, this grant will be null and void and have no force or effect.

3 NON-EXCLUSIVE FRANCHISE

This franchise is not exclusive. It does not prohibit King County from granting franchises for other public or private utilities, in, under, over, across, and along any County property, including County road rights-of-way.

This franchise does not prevent or prohibit King County from constructing, altering, maintaining or using any County road rights-of-way covered by this franchise. King County retains full power to make all changes, relocations, repair, maintenance, etc as it may deem fit.

4. JURISDICTION

This franchise is intended to convey limited rights and interest only as to those roads and rights-of-way in which King County has an actual interest It is not a warranty of title or of interest in County road rights-of-way.

Whenever any of the County road rights-of-way as designated in this franchise, by reason of the subsequent incorporation of any Town or City or extension of the limits of any Town or City, shall later fall within the City or Town limits, this franchise shall continue in force and effect until such time as the incorporation and/or annexation is complete according to applicable State law, after which time the County will no longer have any responsibility for maintenance of any County roads, rights-of-way or other County property within the area of annexation/incorporation.

None of the rights granted to the Grantee shall affect the jurisdiction of King County over County road rights-of-way or the County's power to perform work upon its roadways, rights-of-way or appurtenant drainage facilities including by constructing, altering, renewing, paving, widening, grading, blasting or excavating

All of the rights herein granted shall be subject to and governed by this franchise; provided, however, that nothing in this franchise may be construed in any way as limiting King County's rights to adopt ordinances which are necessary to protect the health, safety and welfare of the general public

5. REGULATION OF USE AND CONTROL

This franchise does not deprive King County of any powers, rights, or privileges it now has or may later acquire in the future to regulate the use of and to control the County road rights-of-way covered by this franchise

This franchise authorizes the use of County rights-of-way solely for the delivery by the Grantee of sewer service to it customers. Additional uses of County rights-of-way by the Grantee, including for cable communication services, shall first require a separate franchise from King County, which conforms to the requirements of K.C.C 6.27 as amended, or K C C. 6.27A as amended, and other applicable law.

Any use of the Grantee's equipment of facilities in County rights-of-way by others, including for telecommunication or cable communication services, is prohibited unless separately authorized and approved in writing by King County. The Grantee agrees that prior to authorizing any person to use the Grantee's equipment or facilities located in County rights-of-way, the Grantee will require the user to provide the Grantee with an affidavit that it has obtained the necessary franchise or other approval from the County to operate and provide the proposed service in County rights-of-way. At least thirty (30) days prior to executing any agreement with a potential user for the use of the Grantee's equipment or facilities, the Grantee shall fax the affidavit to the King County Office of Cable Communication at 206-296-0842.

6 EMINENT DOMAIN

This franchise and the limited rights and interests for the operation, maintenance, repair, and construction of Grantee's transmission and service lines and appurtenances are subject to the exercise of eminent domain In the event of an exercise of eminent domain by King County, the value to be attributed to all the rights and interests granted under this franchise shall not exceed the actual amount the Grantee paid to King County in obtaining this franchise.

7 ENFORCEMENT

Failure of King County, on one or more occasions to exercise a right or to require compliance or performance under this franchise or any applicable law, shall not be deemed to constitute a waiver of such right or a waiver of compliance or performance, unless such right has been specifically waived in writing Failure of King County to enforce or exercise its rights under any provision of this franchise or applicable law does not constitute a waiver of its rights to enforce or exercise a right in any other provision of this franchise or applicable law.

8 INDEMNITY AND HOLD HARMLESS

The Grantee agrees to indemnify and hold harmless King County as provided herein to the maximum extent possible under law Accordingly, the Grantee agrees for itself, its successors, and assigns to defend, indemnify and hold harmless King County, its appointed and elected officials, and employees from and against liability for all claims, demands, suits, and judgments, including costs of defense thereof, for injury to persons, death, or property damage which is caused by, arises out of, or is incidental to Grantee's exercise of rights and privileges granted by this franchise The Grantee's obligations under this section shall include:

(a) Indemnification for such claims whether or not they arise from the sole negligence of the Grantee, the concurrent negligence of both parties, or the negligence of one or more third parties.

(b) The duty to promptly accept tender of defense and provide defense to the County at the Grantee's own expense

(c) Indemnification of claims made by the Grantee's own employees or agents.

(d) Waiver of the Grantee's immunity under the industrial insurance provisions of Title 51 RCW, which waiver has been mutually negotiated by the parties.

In the event it is necessary for the County to incur attorney's fees, legal expenses, or other costs to enforce the provisions of this section, all such fees, expenses and costs shall be recoverable from the Grantee.

In the event it is determined that RCW 4 24.115 applies to this franchise agreement, the Grantee agrees to defend, hold harmless and indemnify King County to the maximum extent permitted thereunder, and specifically for its negligence concurrent with that of King County to the full extent of Grantee's negligence Grantee agrees to defend, indemnify and hold harmless the County for claims by Grantee's employees and agrees to waiver of its immunity under Title 51 RCW, which waiver has been mutually negotiated by the parties.

King County shall give the Grantee timely written notice of the making of any claim or of the commencement of any such action, suit, or other proceeding covered by the indemnity in this section. In the event any such claim arises, the County or any other indemnified party shall tender the defense thereof to the Grantee and the Grantee shall have the duty to defend, settle, or compromise any claims arising hereunder and the County shall cooperate fully therein

Notwithstanding the above, the County shall have no obligation to tender a defense as a condition of the indemnity where there is a material conflict between the interests of the Grantee and King County.

9 VACATION

If at any time King County vacates any County road rights-of-way covered by this franchise, King County will not be held liable for any damages or loss to the Grantee by reason of such vacation King County may, after giving thirty (30) days written notice to the Grantee, terminate this franchise with respect to any County road rights-of-way vacated

10. REPAIR, REMOVAL OR RELOCATION

The Grantee hereby covenants, at its own expense, to repair, remove, or relocate existing facilities including all appurtenant facilities and service lines connecting its system to users, within King County road rights-of-way if such repair, removal, or relocation is required by King County for any County road purpose Such repair, removal, or relocation shall not be unreasonably required

The grantee shall, at no expense to the County, adjust, remove or relocate existing facilities within County road rights-of-way, including all appurtenant facilities and service lines connecting its system to users, if the County determines such adjustment, removal or relocation is reasonably necessary to allow for an improvement or alteration planned by the County in such road right-of-way The County shall give the Grantee written notice of such requirement as soon as practicable, at the beginning of the pre-design stage for projects that are part of the County's capital improvement program, including such available information as is reasonably necessary for the Grantee to plan for such adjustment, removal or relocation

For projects that are a part of the County's capital improvement program, in addition to any other notice given to the Grantee, the County shall provide a vertical and horizontal profile of the roadway and drainage facilities within it, both existing and as proposed by the County, and the proposed construction schedule; notwithstanding any permit conditions that may later be applied to the County project, this initial design information shall be given at least 180 days before construction is scheduled to begin, except in cases of urgent construction or emergencies The Grantee shall respond to this notice, and to any later notices of revised designs based on permit conditions, within no more than thirty (30) days by providing to the County the best available information as to the location of all of the Grantee's facilities, including all appurtenant facilities and service lines connecting its system to users and all facilities that it has abandoned, within the area proposed for the public works project

The County shall offer the Grantee the opportunity to participate in the preparation of bid documents for the selection of a contractor to perform the public works project as well as all required adjustments, removals or relocations of the Grantee's facilities Such bid documents shall provide for an appropriate cost allocation between the parties The County shall have sole authority to choose the contractor to perform such work The Grantee and the County may negotiate an agreement for the Grantee to pay the County for its allocation of costs, but neither party shall be bound to enter into such an agreement Under such an agreement, in addition to the Grantee's allocation of contractor costs, the Grantee shall reimburse the County for cost, such as for inspections or soils testing, related to the Grantee's work and reasonably incurred by the County in the administration of such joint construction contracts Such costs shall be calculated as the direct salary cost of the time of County professional and technical personnel spent productively engaged in such work, plus overhead costs at the standard rate charged by the County on other similar projects, including joint projects with other County agencies

11. REQUIREMENT OF CONSTRUCTION PERMITS

The Grantee, its successors or assigns, has the right, privilege, and authority to enter the County road rights-of-way for the purpose of operating, maintaining, repairing or construction its transmission and service lines and appurtenances on the condition that it obtains permits approved by the Director and Property Services Division and, when applicable, by the Department of Development and Environmental Services. Applications for work permits shall be presented to the Property Services Division, which may require copies of plans, blueprints, cross-sections, or further detailing of work to be done In the event of an emergency, the Grantee may immediately commence the necessary work and shall apply the next business day for the work permit Any work done, whether by Grantee, its contractors, or third parties will include necessary paving, patching, grading and any other reasonably necessary repair or restoration to the County road rights-of-way. All work shall be done to the satisfaction of the Director.

All equipment, lines and appurtenances which are used in the operation, maintenance, repair or construction of the Grantee's service and which are located within the County road rights-of-way shall be considered to be part of the Grantee's system and shall be the responsibility of the Grantee. All permits for the operation, maintenance, repair or construction of said system shall be applied for and given in the name of the Grantee, who will be responsible for all work done under the permit The Grantee remains responsible whether the work is done by the Grantee, its contractors, or by third parties

The Grantee shall post a bond to King County in the amount necessary for road restoration. The amount of the bond shall be set by the Department of Transportation, Roads Services Division and shall be filed with the Property Services Division before the issuance of any permit.

The Grantee shall, at no expense to the County, assume the following obligations with respect to the facilities connected to its system that are within County road rights-of-way and which it does not own, including appurtenant facilities and service lines connecting its system to users

(a) The Grantee shall apply for, upon request and on behalf of the owner of the facilities, a County right-of-way construction permit for any repairs required for such facilities; provided such owner agrees to reimburse the Grantee for all costs incurred by the Grantee and any other reasonable conditions the Grantee requires as a precondition to applying for the permit All work to be performed in the County right-of-way shall comply with all conditions of the County permit and all applicable County requirements. The Grantee may at its option perform any part of the repair with its own forces or require the owner to employ a contractor for that purpose, provided such contractor is approved by the County;

(b) In the event that the County determines emergency repair of such facilities is necessary to halt or prevent significant damage to County road rights-of-way or significant threats to the health, safety and welfare of parties other than the owner or the occupants of the building served by such facilities, the Grantee shall take prompt remedial action to correct the emergency to the County's approval, which the County shall not unreasonably withhold,

(c) When the County or its contractor provides notice to the Grantee, pursuant to RCW 19.122, of its intent to excavate within County road rights-of-way, the Grantee shall provide to the County or its contractor the best information available from the Grantee's records or, where reasonable, from the use of locating equipment as to the location of such facilities, including surface markings where these would reasonably be of use in the excavation. If the Grantee fails to make good faith efforts to provide the above information within the deadlines provided by RCW 19 122, the Grantee shall hold the County harmless for all reasonable costs that result from damage to such facilities if such damage occurs as a result of the failure to provide such information. Nothing in this subsection is intended or shall be construed to create any rights in any third party or to form the basis for any obligation or liability on the part of the County or the Grantee toward any third party, nor is anything in this subsection intended to be construed to alter the rights and responsibilities of the parties under RCW 19.122, as amended

12. RESTORATION OF COUNTY ROAD RIGHTS-OF-WAY

After work on, under or adjacent to County road rights-of-way, the Grantee is responsible for and will leave all County road rights-of-way in as good a condition as they were in before any work was done. In the event that the Grantee, its contractors, or third parties working under permit should fail to restore County road rights-of-way to the satisfaction of the Director, King County may make such repairs or restorations as are necessary to return the County road rights-of-way to its pre-work condition. Upon presentation of an itemized bill for repairs or restorations, including the costs of labor and equipment, the Grantee will pay the bill within thirty (30) days If suit is brought upon the Grantee's failure to pay for repair and restoration, and if judgment in such a suit is entered in favor of King County, then the Grantee shall pay all of the actual costs, including interest from the date the bill was presented, disbursements, and attorney's fees and litigation related costs incurred.

13 PERFORMANCE OF WORK

The Grantee covenants that in consideration for the rights and privileges granted by this franchise, all work performed by the Grantee on County road rights-of-way shall conform to all County requirements including, but not limited to, the requirements of the current edition of the County Road Standards in force when the work is performed and all traffic control shall also conform to the current edition of the Manual of Uniform Traffic Control Devices in force when the work is performed.

14 BLASTING REQUIREMENTS

The right to operate, maintain, repair and construct Grantee's distribution and service lines and appurtenances granted by this franchise does not preclude King County, its agents or contractors from blasting, grading, or doing other road work to the Grantee's lines and appurtenances Except in the case of an emergency, the Grantee will be given ten (10) business days written notice of any blasting so that the Grantee may protect its lines and appurtenances If the Grantee notifies the County within ten (10) business days that the facilities will have to be relocated to protect them from blasting, the County will defer the blasting for up to ninety (90) days from the date of the original notice. In no event will the Grantee be given less than two (2) business days written notice of any blasting Notification of any excavation shall be provided through the One-Call System as provided by RCW 19.122, as hereinafter amended.

15 SURVEY MARKERS AND MONUMENTS

It shall be the responsibility of the Grantee performing any construction work in the County road rights-of-way to restore any survey markers or monuments disturbed by such construction in accordance with RCW 58.09.130, and as hereinafter amended

16. ASSIGNMENT

The Grantee shall not have the right to assign this franchise without the consent of the Metropolitan King County Council given by Ordinance No assignment shall be effective unless an acceptance by the assignee of all rights, conditions, terms, provisions, and responsibilities contained within the franchise, as well as surety bonds, which the Council deems necessary to be posted, are received. Council approval of the assignment may be made subject to the assignee's acceptance of new or modified terms of the franchise

17. EXPIRATION AND RENEWAL

To the extent described in Exhibit "A", all rights granted by this franchise to County road rights-of-way outside incorporated Towns and Cities apply to all existing County road rights-of-Way improved and unimproved and to all County road rights-of-way acquired by King County during the term of this franchise

If the Grantee has initiated a renewal of this franchise before it expires, the County may, at its sole discretion, extend the term of the franchise on a month to month basis for up to one year. Should the County elect to extend the franchise, written notice shall be provided to the Grantee before the franchise expiration date

If the Grantee has not applied for a renewal of this franchise before it expires, King County has the right to remove or relocate any lines and appurtenances of the Grantee as is reasonably necessary for the public's health, welfare, safety, or convenience including, but not limited to, the safe operation of County roads, franchise holders, or for the construction, renewing, altering, or improving of any County road right-of-way, or for the installation of lines and/or facilities of other franchise holders Grantee shall be liable for the costs incurred in any removal or relocation of its lines and appurtenances under this section Costs include the expense of labor and equipment

Upon expiration of this franchise, the Grantee shall continue to be responsible for the operation and maintenance of existing facilities in the County road rights-of-way until removed, assigned to another franchised utility or abandoned; however, the Grantee shall not have the right to provide additional services or construct new facilities. King County will issue permits required for the repair and maintenance of the existing facilities in accordance with K.C.C. 14.44 055 as amended and Section 11 of this franchise. This section and sections 8, 10-13 and 15 of this franchise shall continue in force until such time as the lines are removed from County road rights-of-way, assigned to another franchised utility, or abandoned in place with the approval of the Manager of the Department of Transportation, Road Services Division.

18. RESERVATION OF RIGHTS

King County specifically reserves for itself the right to impose a utility tax on the Grantee if State of Washington grants such taxing authority and the local option is exercised by the King County Council

King County also specifically reserves the right to exercise authority it has or may acquire in the future to secure and receive fair market compensation for the use of its property, pursuant to an ordinance If King County elects to exercise such authority, the fair market compensation requirement for Grantee shall be imposed by ordinance not less than one hundred eighty (180) days after written notice ("Compensation Notice") is delivered to the Grantee, said Compensation Notice identifying with specificity the definition, terms and/or formula to be used in determining such fair market compensation. Acceptance of King County's definition terms and/or formula identified in the Compensation Notice will occur if the Grantee accepts in writing within thirty (30) days of receipt of the Compensation Notice, or, if Grantee takes no action in writing within thirty (30) days of receipt of the Compensation Notice, in which case the applicable ordinance that the King County Council passes will be determinative

Nothing in this section shall be construed as an agreement by the Grantee of King County's right to exercise authority it has or may acquire in the future to secure and receive fair market compensation for the use of property Nothing in this section shall be construed to prohibit the Grantee from challenging, in King County Superior Court or a court of competent jurisdiction, the legality of such right

Grantee's rejection of the definition, terms, and/or formula identified in the Compensation Notice will only occur if such rejection is in written form, identifying with specificity the grounds for such rejection, and delivered to King County within thirty (30) days after receipt of the Compensation Notice, in which case the below identified arbitration terms will apply.

(a) The Grantee and King County will select one arbitrator each, and the two selected arbitrators will select a third arbitrator. If the two arbitrators have not selected a third arbitrator within thirty (30) days after the selection of the last selection of the two, either the Grantee or King County may apply to the presiding judge of the King County Superior Court for the appointment of a third arbitrator. The three arbitrators will determine the method for determining the fair market compensation for the County property used by the Grantee The arbitration procedure employed shall be consistent with the rules and procedures of the American Arbitration Association The decision of a majority of the arbitrators will bind both the Grantee and King County. At the conclusion of the arbitration, the arbitrators will submit written reports to the Grantee and King County, which shall contain all pertinent evidence that, led to their conclusion together with an explanation of their reasoning for such conclusion.

(b) The fees of the arbitrators selected by each party shall be paid by that party and the fees of the third arbitrator shall be paid one-half by the County and the Grantee. The County and the Grantee shall share the other costs of the proceeding equally

(c) In event that the question of fair market compensation is not resolved prior to the effective date specified by the ordinance authorizing said compensation, the arbitration decision will be applied retroactively to the effective date in the ordinance The Grantee will pay the retroactive sum plus interest in the amount of twelve percent (12%) per annum

Nothing in this franchise may be construed to limit the exercise of authority now or later possessed by the County or any other governing body having competent jurisdiction to fix just, reasonable and compensatory rates or other requirements for services under this franchise. Nothing in this section shall be construed to prohibit the Grantee from challenging, in King County Superior Court or a court of competent jurisdiction, the authority of the County or any other governing body to fix rates or other requirements for services.

19. COMPLIANCE WITH LAWS

Grantee shall conform to all applicable federal, state and local laws and regulations including, but not limited to, the State Environmental Policy Act and King County environmental standards and ordinances.

20 NON-DISCRIMINATION CLAUSE

In all hiring or employment made possible or resulting from this franchise agreement, there shall be no discrimination against any employee or applicant for employment because of sex, sexual orientation, age, race, color, creed, national origin, marital status or the presence of any sensory, mental, or physical handicap, unless based upon a bona fide occupational qualification, and this requirement shall apply to but not be limited to the following employment, advertising, lay-off or termination, rates of pay or other forms of compensation, and selection for training, including apprenticeship

No person shall be denied, or subjected to discrimination in receipt of the benefit of any services or activities made possible by or resulting from this agreement on the grounds of sex, sexual orientation, race, color, creed, national origin, age except minimum age and retirement provisions, marital status, or the presence of any sensory, mental or physical handicap

Any violation of this provision shall be considered a violation of a material provision of this agreement and shall be grounds for cancellation, termination or suspension in whole or in part, of the agreement by the County and may result in ineligibility for further County agreements.

The Grantee shall make the best efforts to make opportunities for employment and/or contracting services available to women and minority persons The Grantee recognizes that King County has a policy of promoting affirmative action, equal opportunity and has resources available to assist Grantee in these efforts.

21. PENALTY FOR VIOLATION OF CONDITIONS

If the Grantee shall violate or fail to comply with any of the material terms, conditions, or responsibilities of this franchise through neglect or failure to obey or comply with any notice given the Grantee under the provisions of this franchise or if the Grantee abandons its franchise, the Council may revoke this franchise King County shall give written notice of its intent to revoke this franchise. A public hearing shall be scheduled within forty-five (45) days following the notification. The decision to revoke this franchise will become effective ninety (90) days following the public hearing if the County, by ordinance, finds·

A That the Grantee has not substantially cured the violation or failure to comply which was the basis of the notice; or

B. that the violation or failure to comply which was the basis of the notice is incapable of cure, or

C that the Grantee has repeatedly violated or failed to comply with any of the material terms, conditions, or responsibilities of the franchise, even though the individual violations have been cured, and

D. that the revocation of the franchise is in the public interest.

During the forty-five (45) days following the notification, the Grantee shall have the opportunity to remedy the failure to comply

22 RIGHT OF APPEAL

Decisions, requirements, or approvals of the Director are binding on the parties to this document Appeals from the Director's determinations will be made by filing a complaint with the King County Superior Court

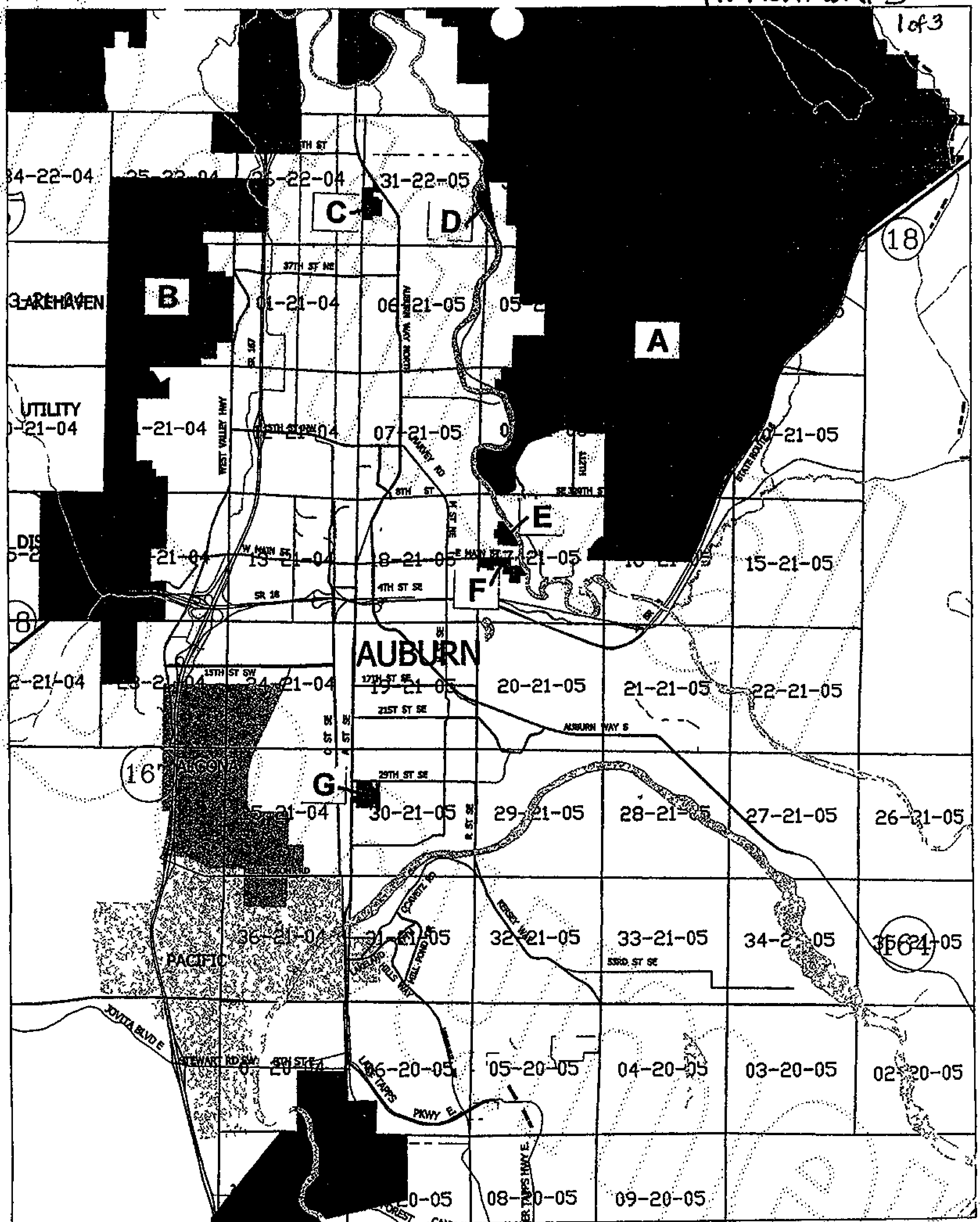
23 SEVERANCE

This franchise gives effect to purposes and uses, which are consistent with economical and efficient services rendered in the public interest. If any provision of this franchise, or its application is determined to be invalid by a court of law, then the remaining provisions of this franchise shall continue and remain valid unless the dominant purpose of the franchise would be prevented or the public interest is no longer served

ATTACHMENT B

1 of 3

2002 100 1001676



14458

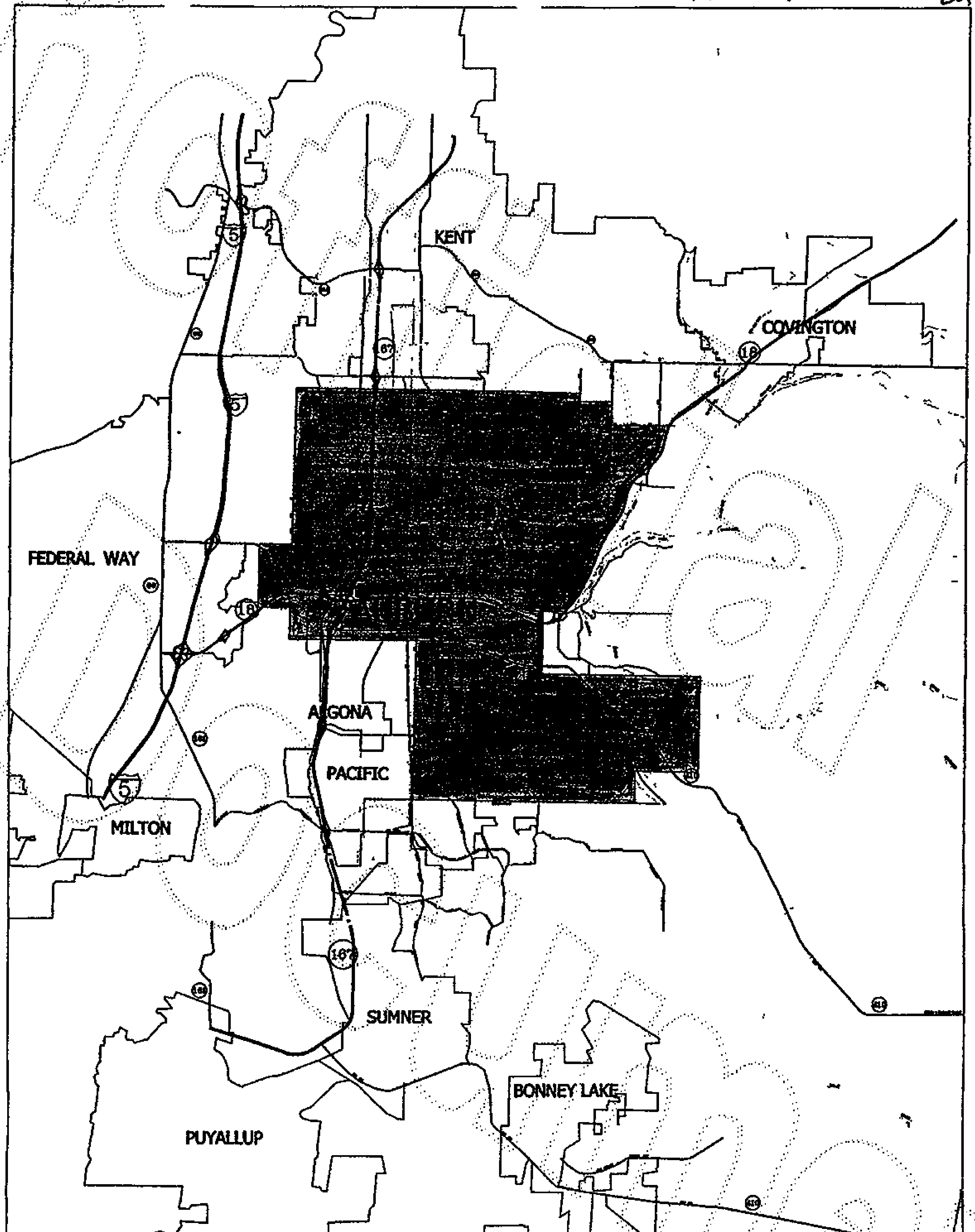
AUBURN'S REQUEST
TO KING COUNTY FOR A
SANITARY SEWER FRANCHISE

PROPOSED FRANCHISE AREA

JUNE 2002

14458

ATTACHMENT B 2of3



VICINITY MAP

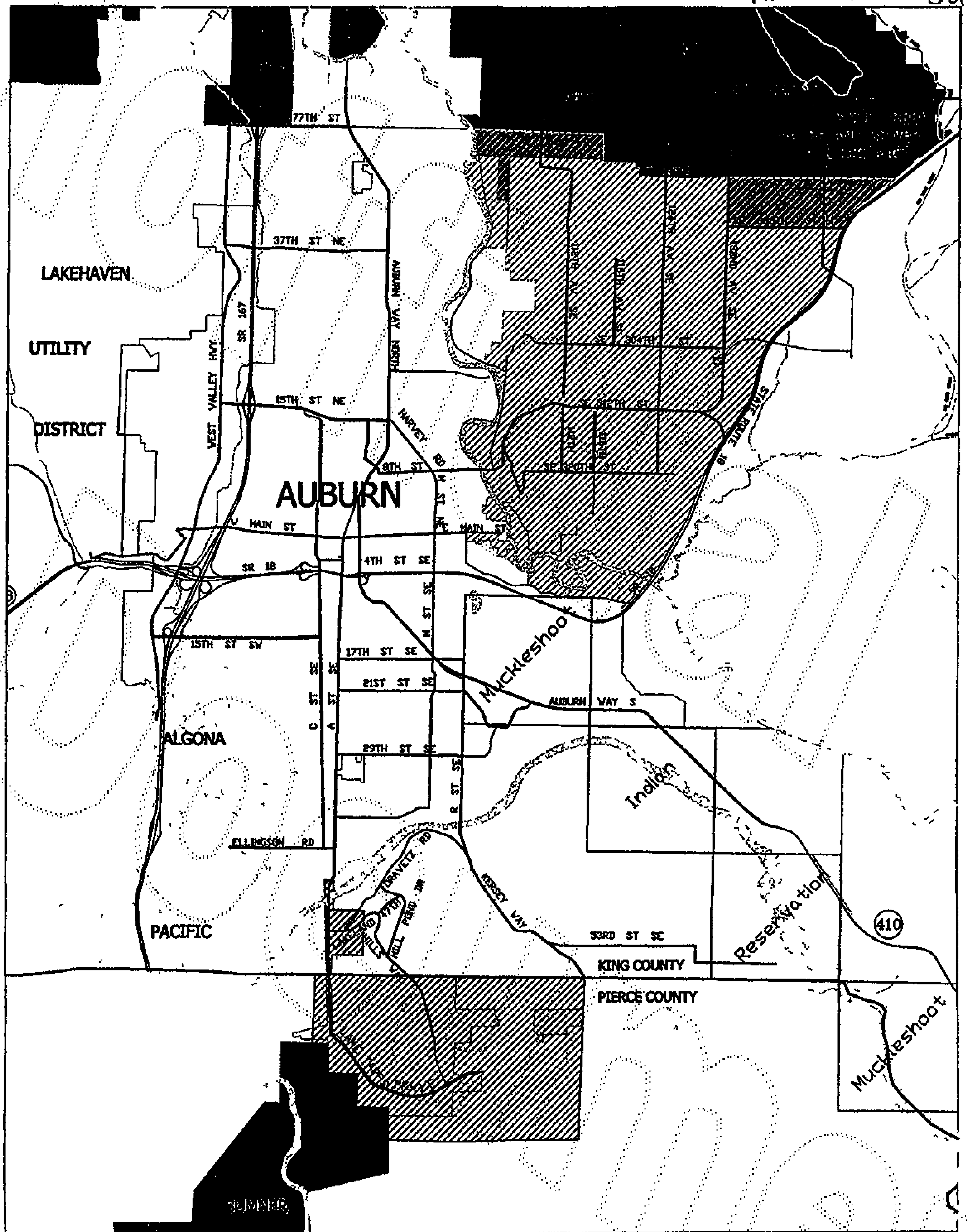
SCALE 1" = 2 MILES

Plotted DECEMBER 2001

2002 100 1001676

14458

ATTACHMENT B 3 of 3



SCALE 1" = 1 MILE

EXISTING AUBURN SANITARY SEWER FRANCHISES

1. PIERCE COUNTY FRANCHISE
2. PACIFIC FRANCHISE
3. WSDOT FRANCHISE
4. KING COUNTY FRANCHISE

Plotted: DECEMBER 2001

RESOLUTION NO. 3 6 5 1

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF AUBURN, WASHINGTON, AUTHORIZING THE MAYOR TO EXECUTE AN INTERLOCAL AGREEMENT ESTABLISHING SANITARY SEWER SERVICE BOUNDARIES BETWEEN THE LAKEHAVEN UTILITY DISTRICT AND THE CITY OF AUBURN

WHEREAS, pursuant to RCW 35.A.11.040, Auburn has the legal authority to exercise its powers and perform any of its functions as set forth in RCW 39.34; and

WHEREAS, pursuant to RCW 39.34, the Interlocal Cooperation Act, Auburn has the legal authority to cooperate with other localities and utilities on the basis of mutual advantage and the efficient provision of municipal services; and

WHEREAS, pursuant to RCW 35A.21.150, Auburn has the legal authority to maintain a sewerage system; and

WHEREAS, pursuant to RCW 57.08.044, Lakehaven has the legal authority, whether by contract or otherwise, to provide sewer service to property owners in areas outside existing district boundaries; and

WHEREAS, the parties recognize the responsibility of public sanitary sewer utilities to provide efficient and reliable service to their customers at reasonable cost; and

WHEREAS, Lakehaven's 1999 Draft Comprehensive Wastewater System Plan notes a region within Auburn's Potential Annexation Area (hereinafter referred to as "Auburn's PAA") to which Lakehaven intends to provide sanitary sewer service; and

WHEREAS, Lakehaven is currently providing sanitary sewer service within Auburn's PAA; and

WHEREAS, portions of the Lakehaven sanitary sewer system have been sized and are situated so as to be capable of affording sewer service to a portion of Auburn's PAA; and

WHEREAS, Auburn has evaluated sewer service issues and determined that it is not cost feasible to provide direct sewer service within its PAA adjacent to Lakehaven's sanitary sewer infrastructure; and

WHEREAS, Lakehaven's delivery of sewer service to these areas will provide the maximum efficiency in the use of existing and future facilities and sanitary sewer planning;

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF AUBURN, WASHINGTON, HEREBY RESOLVES as follows:

Section 1. The Mayor is hereby authorized to execute an Interlocal Agreement Establishing Sanitary Sewer Service Boundaries between the Lakehaven Utility District and the City of Auburn in substantial conformity with the agreement attached hereto, marked as Exhibit "A" and incorporated herein by this reference.

Section 2. The Mayor is hereby authorized to implement such administrative procedures as may be necessary to carry out the directives of this legislation.

Section 3. This resolution shall be in full force and effect upon passage and signatures hereon.

DATED this 20th day of January, 2004.

CITY OF AUBURN

PETER B. LEWIS
MAYOR

ATTEST:

Danielle E. Daskam,
City Clerk

APPROVED AS TO FORM:

Daniel B. Heid,
City Attorney

20041129000249
PACIFIC NW TIT AG 31.00
PAGE001 OF 013
11/29/2004 10:09
KING COUNTY, WA

Return Address:
Auburn City Clerk
City of Auburn
25 West Main St.
Auburn, WA 98001

RECORDER'S COVER SHEET

Document Title(s) (or transactions contained therein):

13/31 PNWT
W9278-12

Interlocal Agreement (RES 3651)

Reference Number(s) of Documents assigned or released:
☐Additional reference #'s on page ______ of document

Grantor(s)/Borrower(s) (Last name first, then first name and initials)
Auburn, City of

Grantee/Assignee/Beneficiary: (Last name first)
1. Lakehaven Utility District

Legal Description (abbreviated: i.e. lot, block, plat or section, township, range)

PER RCW 39.34

☐ Additional legal is on page of document.

Assessor's Property Tax Parcel/Account Number
N/A

☐ Assessor Tax # not yet assigned

EXHIBIT "A"

LAKEHAVEN UTILITY DISTRICT and CITY OF AUBURN INTERLOCAL AGREEMENT ESTABLISHING SANITARY SEWER SERVICE BOUNDARIES

THIS AGREEMENT, made and entered into this 2nd day of February, 2004, by and between **LAKEHAVEN UTILITY DISTRICT**, a Washington municipal corporation (hereinafter referred to as "Lakehaven"), and the **CITY OF AUBURN**, a Washington municipal corporation, (hereinafter referred to as "Auburn"), both being duly organized and existing under and by virtue of the laws of the State of Washington,

WITNESSETH:

WHEREAS, pursuant to RCW 35.A.11.040, Auburn has the legal authority to exercise its powers and perform any of its functions as set forth in RCW 39.34; and

WHEREAS, pursuant to RCW 39.34, the Interlocal Cooperation Act, Auburn has the legal authority to cooperate with other localities and utilities on the basis of mutual advantage and the efficient provision of municipal services; and

WHEREAS, pursuant to RCW 35A.21.150, Auburn has the legal authority to maintain a sewerage system; and

WHEREAS, pursuant to RCW 57.08.005(5) and 57.08.044, Lakehaven, as a special purpose water/sewer district, has the legal authority, whether by contract or otherwise, to provide sewer service to property owners in areas outside existing district boundaries; and

WHEREAS, the parties recognize the responsibility of public sanitary sewer utilities to provide efficient and reliable service to their customers at reasonable cost; and

WHEREAS, Lakehaven's adopted and approved 1999 Comprehensive Wastewater System Plan and its Amendment No. 1 notes a region within Auburn's Potential Annexation Area (hereinafter referred to as "Auburn's PAA") to which Lakehaven intends to provide sanitary sewer service; and

WHEREAS, Lakehaven is currently providing sanitary sewer service within Auburn's PAA; and

WHEREAS, portions of the Lakehaven sanitary sewer system have been sized and are situated so as to be capable of affording sewer service to a portion of Auburn's PAA; and

WHEREAS, Auburn has evaluated sewer service issues and determined that it is not cost feasible to provide direct sewer service within its PAA adjacent to Lakehaven's sanitary sewer infrastructure; and

WHEREAS, Lakehaven's delivery of sewer service to these areas will provide the maximum efficiency in the use of existing and future facilities and sanitary sewer planning;

NOW, THEREFORE:

IT IS HEREBY AGREED by and between the parties hereto as follows:

1. **Sewer Service Area.** The parties have agreed to a mutual sewer service planning boundary as depicted on the maps attached hereto as Attachment 1 and legally described in Attachment 2, which are by this reference incorporated herein. Both parties further agree that, through this designation of the service boundary, Lakehaven shall provide sanitary sewer service to properties mutually within its sanitary sewer service area and Auburn's PAA, also depicted on Attachment 1, in accordance with and subject to the terms and conditions of this Agreement.

2. **Management, Regulation and Control of Sewer System.** Lakehaven shall have the sole responsibility and authority to construct, maintain, manage, conduct and operate its sewerage system within the area mutually designated as Lakehaven's sanitary sewer service area and Auburn's PAA as depicted in Attachment 1, together with any additions, extensions and betterments thereto. Lakehaven shall also be responsible for obtaining all necessary governmental franchises, approvals, easements and permits for the installation of the sewerage system and improvements to be located therein.

3. **Service Rates and Connection Charges.**

   a) **Permit Required.** No connection shall be made to Lakehaven's sanitary sewer system unless the property owner first pays the associated fees and submits the proper information to obtain a Lakehaven sanitary sewer connection permit, and otherwise meets the requirements for service as provided in duly adopted Resolutions of Lakehaven. The connection shall be subject to inspection for compliance with Lakehaven's standards as adopted at the time the connection is made.

b) Rates. The rates charged to the sanitary sewer customer by Lakehaven mutually within Lakehaven's sanitary sewer service area and Auburn's PAA, as depicted on Attachment 1, shall be fixed, altered, regulated and otherwise controlled by Lakehaven pursuant to the limitation on such authority as set forth in Chapter 57 RCW, or other applicable laws.

4. Sewer Availability Certificates. Lakehaven shall continue to issue sewer availability certificates for property located both within its sanitary sewer service area and Auburn's PAA, as depicted in Attachment 1.

5. Future Annexations. Each of the parties agree that Lakehaven shall provide sanitary sewer service to the area depicted in Attachment 1 without regard to the present corporate boundaries of the parties and without regard to future corporate boundaries as they may be periodically altered through annexation.

6. Lakehaven Comprehensive Sewer Planning. The terms of this Agreement will be included as an amendment to Lakehaven's Comprehensive Wastewater System Plan. Lakehaven will submit to Auburn all Comprehensive Wastewater System Plans and amendments thereto involving areas and/or system improvements within Auburn's PAA.

7. Auburn Comprehensive Sewer Planning. The terms of this Agreement will be included as an amendment to Auburn's Comprehensive Sewerage Plan. Auburn will submit to Lakehaven all Comprehensive Sewerage System Plans and amendments thereto involving area and/or system improvements within Auburn's PAA.

8. Reliance. Each party hereto acknowledges that the terms hereof will be relied upon by the other in its comprehensive planning to meet the needs of the service area designated herein.

9. Liability. The parties agree that this Agreement shall not be a source of liability for either party for any failure or interruption of service in the service area of the other party, as designated herein.

10. Government Approvals. Auburn will give notice of the adoption of this Agreement to Metropolitan/King County, to the Department of Ecology, to the Department of Health, and to any other agency with jurisdiction over, or other interest in, the terms hereof, and the parties shall cooperate and assist each other in all reasonable manner in procuring any necessary approvals hereof by those agencies.

11. Boundary Review Board. In the event that implementation of the terms hereof results in permanent sewer service to areas that will be outside the respective service boundaries of Lakehaven or Auburn, the parties will, at the time of such service, jointly seek King County Boundary Review Board approval of such service in accordance with RCW 36.93.090.

12. Service Amendments. Any changes to the service areas described herein shall be by mutual written agreement. Each party, through Auburn's Director of Public Works and Lakehaven's General Manager respectively, may give written permission to the other, on a case-by-case basis, to provide service to the other party's adjacent or nearby sewer service area based upon considerations of economic efficiency. Such written permission(s) shall be filed with this agreement for future reference.

13. Alteration, Amendment or Modification. Any alterations, amendments or modifications to this agreement shall be by mutual consent of the parties.

14. Indemnification and Hold Harmless. Each Party hereto agrees to protect, defend, and indemnify the other Party, its officers, officials, employees and agents from any and all cost, claims judgements and/or awards of damages, arising out of or in any way resulting from the Party's default, failure of performance, or negligent conduct associated with this agreement, by the Party, its employees, subcontractors or agents. Each Party agrees that its obligations under this provision extend to any claim, demand, and/or cause of action brought by or on behalf of any of its employees, or agents. The foregoing indemnity is specifically and expressly intended to constitute a waiver of each Party's immunity under Washington's Industrial Insurance Act, RCW Title 51, as respects the other Party only, and only to the extent necessary to provide each Party with a full and complete indemnity of claims made by the other Party's employees. The Parties acknowledge that these provisions were specifically negotiated and agreed upon by them.

15. Miscellaneous. Auburn and Lakehaven agree that an area in the vicinity of 51st Avenue South and South 320th Street and depicted in Attachment 3 is currently being served by Auburn via temporary pump station and may in the future be more efficiently served by a gravity conveyance system discharging to Lakehaven's facilities. This section does not obligate Lakehaven to accept any sanitary sewer facilities in said area. This section is intended only to make Lakehaven aware of Auburn's desire to eventually adjust the sanitary sewer service boundaries to allow Lakehaven to provide sanitary sewer service to said area, and for Lakehaven to plan for this action. Auburn and Lakehaven will abide by Section 12 of this Agreement when adjusting sanitary sewer service boundaries.

16. Integration. This agreement constitutes the entire agreement of the parties regarding the subject matter hereof, and there are no other representations or oral agreements other than those listed herein, which vary the terms of this agreement. Future agreements may occur between the parties to transfer additional or future service areas by mutual agreement.

17. Obligation Intact. Nothing herein shall be construed to alter the rights, responsibilities, liabilities, or obligations of either Lakehaven or Auburn regarding provision of sewer service, except as specifically set forth herein.

LAKEHAVEN UTILITY DISTRICT

Approved by Resolution No. 2004-1006 of the Lakehaven Utility District, Federal Way, Washington, at its regular meeting held on the 8th day of January, 2004.

By:

Donald T. Perry, General Manager
Lakehaven Utility District

Approved as to form:

Steven H. Pritchett, General Counsel
Lakehaven Utility District

CITY OF AUBURN

Approved by Resolution No. **3651** of the City of Auburn, Washington, at its regular meeting held on the 20th day of January, 2004.

By:

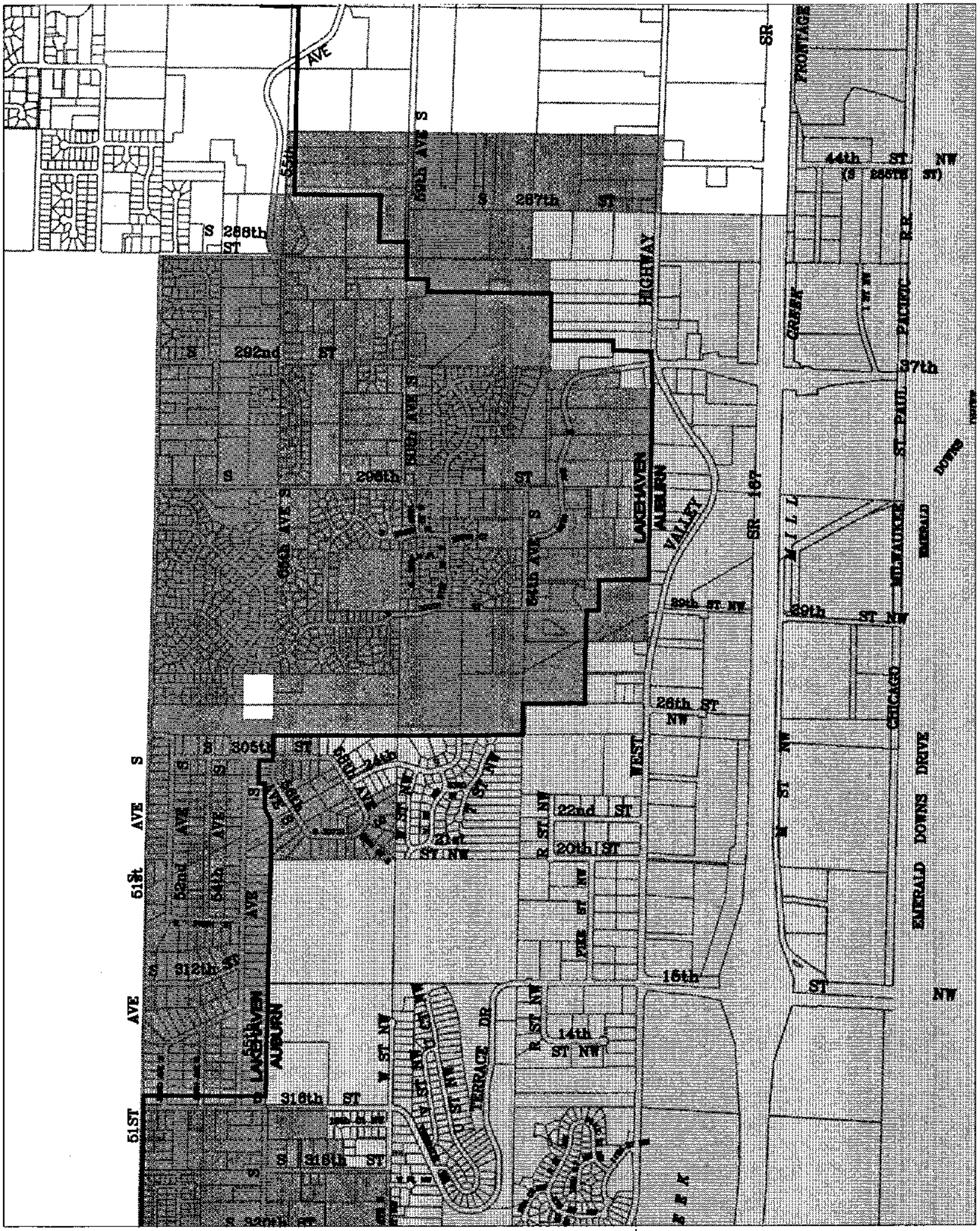
Peter B. Lewis, Mayor
City of Auburn

Attest:

Danielle Daskam, City Clerk

Approved as to form:

Daniel B. Heid, City Attorney



ATTACHMENT 1

LAKEHAVEN - AUBURN INTERLOCAL AGREEMENT ESTABLISHING SANITARY SEWER SERVICE BOUNDARIES

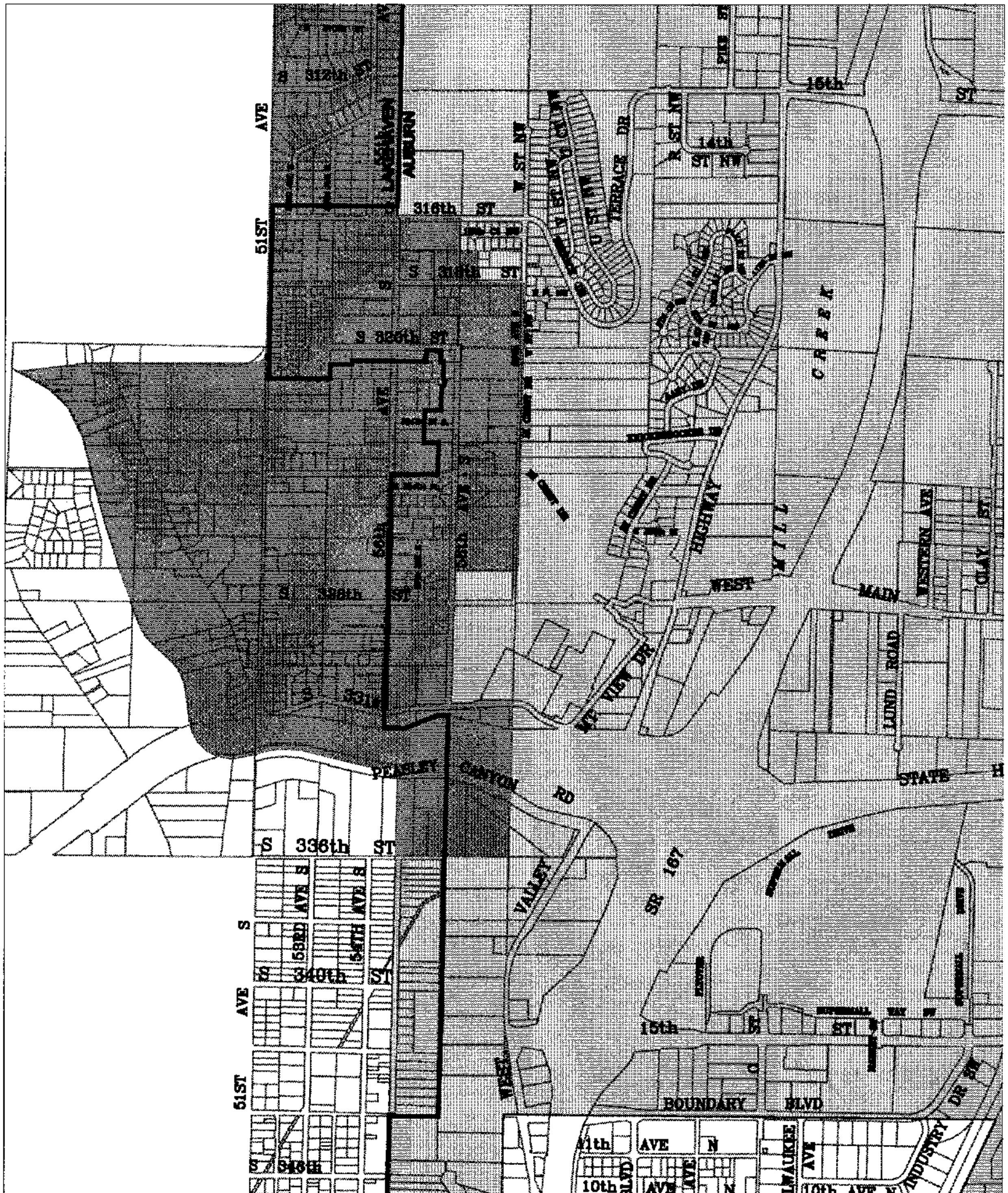
LEGEND

- AUBURN CITY LIMITS
- AUBURN PAA
- PROPOSED SEWER SERVICE BOUNDARY

SCALE: 1" = 1500'

Note: Information shown is for general reference purposes only and does not necessarily represent exact geographic or cartographic data as mapped.

PLEASE INITIAL IF APPROVED	Dec 2008
LAKEHAVEN ______ AUBURN ______	PAGE 1/2



LEGEND

- AUBURN CITY LIMITS
- AUBURN PAA
- PROPOSED SEWER SERVICE BOUNDARY

SCALE: 1" = 1500'

Note: information shown is for general reference purposes only and does not necessarily represent exact geographic or cartographic data as mapped.

ATTACHMENT 1

LAKEHAVEN - AUBURN INTERLOCAL AGREEMENT ESTABLISHING SANITARY SEWER SERVICE BOUNDARIES

PLEASE INITIAL IF APPROVED

Dec 2008

LAKEHAVEN

AUBURN

PAGE 2/2

Attachment 2

LAKEHAVEN UTILITY DISTRICT and CITY OF AUBURN INTERLOCAL AGREEMENT ESTABLISHING SANITARY SEWER SERVICE BOUNDARIES

BOUNDARY DESCRIPTION

BEGINNING at a point 170 feet east of the Northwest corner of the Southeast quarter of the Southwest quarter of Section 35, Township 22 North, Range 4 East, W.M., in King County, Washington;

THENCE south 662.54 feet, more or less, to the North line of the South half of said subdivision;

THENCE easterly along said North line to a point 300 feet west of the East line of said subdivision;

THENCE south to a point 170 feet north of the South line of said subdivision;

THENCE east 300 feet, more or less, to the East line of said subdivision;

THENCE southerly along said East line to the South line of said Section 35;

THENCE continuing southerly along the West line of the Northeast quarter of Section 2, Township 21 North, Range 4 East, W.M., in King County, Washington, a distance of 221.12 feet;

THENCE easterly, parallel with the North line of said subdivision, 220.20 feet;

THENCE southerly, parallel with the West line of said subdivision, 130 feet;

THENCE easterly, parallel with the North line of said subdivision, 1,304.44 feet;

THENCE southerly, parallel with the West line of said subdivision, 494 feet;

THENCE easterly, parallel with the North line of said subdivision, 680.8 feet;

THENCE southerly, parallel with the West line of said subdivision, 100 feet;

THENCE easterly, parallel with the North line of said subdivision, 428 feet, more or less, to the East line of said subdivision;

THENCE southerly, along said East line to the Northeast corner of the South half of the South half of the Northeast quarter of the Southeast quarter of said Section 2;

THENCE westerly, along the North line of said subdivision, 518.77 feet;

THENCE southerly, parallel with the East line of said subdivision, 328.01 feet;

THENCE westerly, along the South line of said subdivision, 130.02 feet, more or less to the Northeast corner of the West half of the Southeast quarter of the Southeast quarter of said Section 2;

THENCE southerly, along the East line of said subdivision, 964.41 feet;

THENCE westerly, parallel with the North line of said subdivision, 650 feet, more or less, to the East line of the Southwest quarter of the Southeast quarter of said Section 2;

THENCE southerly, along said East line, 328.77 feet, more or less, to the South line of said subdivision;

THENCE westerly, along said South line, to the centerline of 56th Avenue South;

THENCE southerly, along said centerline of 56th Avenue South, to the centerline of South 305th Street in Section 11, Township 21 North, Range 4 East, W.M., in King County, Washington;

THENCE westerly, along said centerline of South 305th Street, to a point of intersection with the northerly projection of the West line of Lot 2, Block 5, Auburn Heights Park Division No. 2, according to the plat thereof recorded in Volume 49, Page 99, records of King County, Washington;

THENCE southerly, 320 feet, more or less, parallel with said West line of Lot 2, to the South line of Lot 4, Block 5, of said plat;

THENCE easterly, along said South line of Lot 4, to the Northwest corner of Lot 5, Block 5 of said plat;

THENCE southerly and southeasterly, along the West lines of Lots 5 and 9, of said plat, to the Northeast corner of Block 7, Auburn Heights Park Division No. 1, according to the plat thereof recorded in Volume 49 of Plats, Page 56, records of King County, Washington;

THENCE southerly, along the East line of Block 7 of said plat, to the Southeast corner of Lot 2, Block 7, of said plat;

THENCE westerly, parallel with the South line of said plat, along the north lines of Lot 19 and Lot 1, Block 6, Lot 15 and Lot 1, Block 5, and Lot 26, Block 4, of said plat, to the centerline of 51st Avenue South;

THENCE southerly, along said centerline of 51st Avenue South, to the Southwest corner of said Section 11;

THENCE continue southerly, along the West line of Section 14, Township 21 North, Range 4 East, W.M., in King County, Washington, 329.57 feet;

THENCE east 30 feet to the Southwest corner of Lot 15, Peasley Ridge, according to the plat thereof recorded in Volume 201, Pages 66-71, records of King County, Washington;

THENCE continue easterly, along the South line of said plat, to the Southeast corner of Tract D Peasley Ridge;

THENCE northerly, along the East line of said Tract D, 150 feet, more or less, to the Northwest corner of Lot 2, King County Short Plat No. 1080026R, as recorded under Recording No. 8106080708, records of King County, Washington;

THENCE easterly, along the North line of said Lot 2, to the West line of Lot 1, King County Short Plat No. 1080027, as recorded under Recording No. 8106080709, records of King County, Washington;

THENCE northerly, along the West line of said Lot 1, to the Northwest corner thereof;

THENCE easterly, along the North lines of Lots 1, 2 and 4, of said short plat, to the Northeast corner of said Lot 4;

THENCE East 60 feet to the West line of Lot 19, West Auburn Five-Acre Tracts, according to the plat thereof recorded in Volume 15, Page 12, records of King County, Washington;

THENCE southerly, along the West line of said Lot 19, 9.43 feet;

THENCE easterly, parallel with the North line of said Lot 19, 294.8 feet;

THENCE northerly, parallel with the West line of said Lot 19, 119.43 feet, more or less, to the South margin of South 320th Street;

THENCE easterly, along said south margin of South 320th Street, 150 feet;

THENCE southerly, parallel with the West line of said Lot 19, 119.43 feet;

THENCE easterly, parallel with the North line of said Lot 19, 9.59 feet;

THENCE southerly, parallel with the West line of said Lot 19, 5 feet;

THENCE easterly, parallel with the North line of said Lot 19, 13.53 feet;

THENCE southerly, parallel with the West line of said Lot 19, 178.866 feet, more or less, to the most Northwesterly corner of Lot 4, King County Short Plat No. 278048, as recorded under Recording No. 8004030782, records of King County, Washington;

THENCE southerly, along the West line of said Lot 4, to the Southwest corner thereof and the North line of Lot 2, King County Short Plat No. 1077053, as recorded under Recording No. 7808100856;

THENCE westerly, along the North line of said Lot 2, to the Northwest corner thereof;

THENCE southerly, along the West lines of Lot 2 and Lot 4 of said short plat, to the North line of Lot 30, West Auburn Five-Acre Tracts, according to the plat thereof recorded in Volume 15, Page 12, records of King County, Washington;

THENCE easterly, along the North line of said Lot 30, 147.35 feet;

THENCE southerly, parallel with the East line of said Lot 30, to the centerline of South 324th Street;

THENCE westerly, along said centerline of South 324th Street, to the centerline of 56th Avenue South;

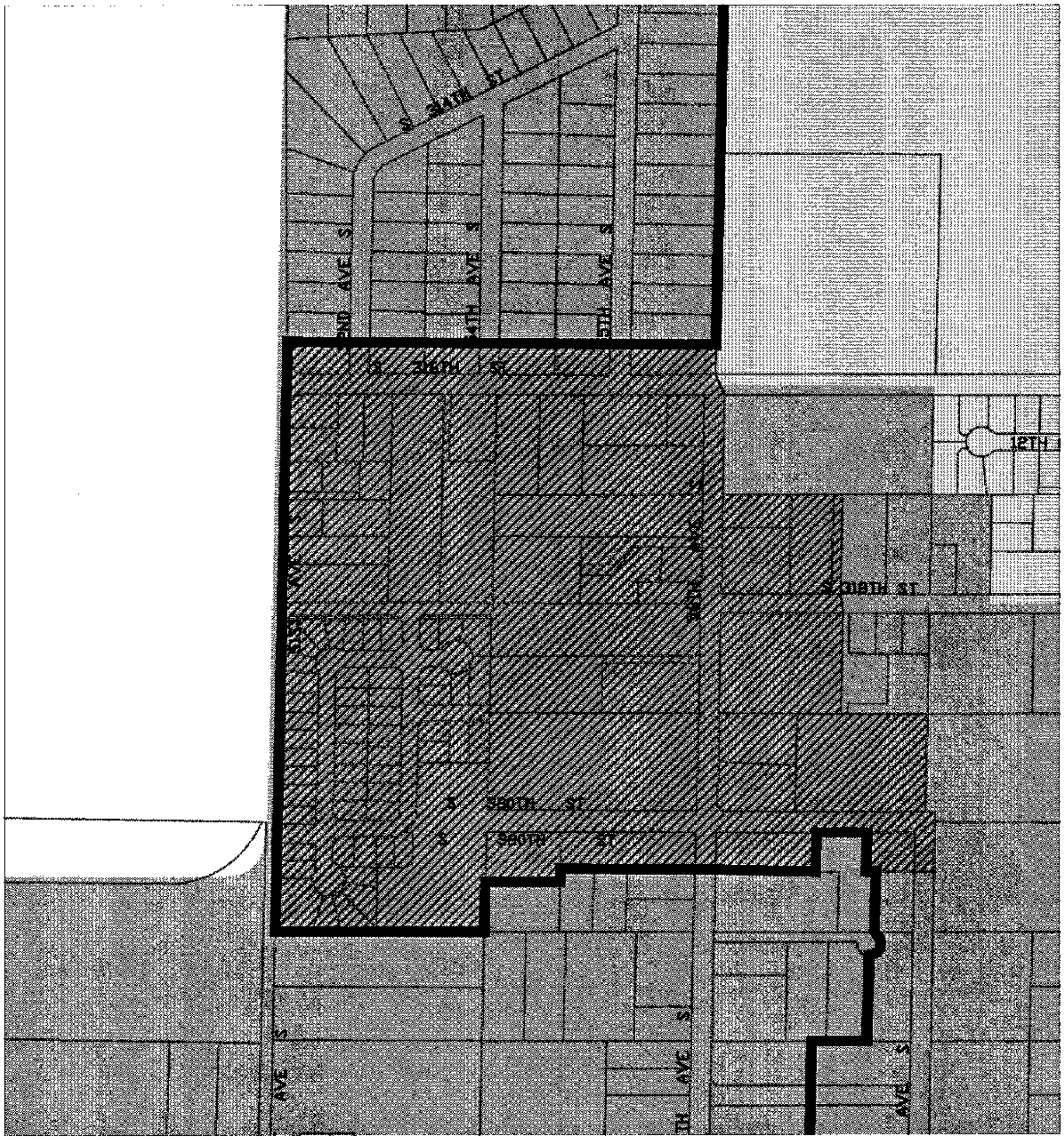
THENCE southerly, along said centerline of 56th Avenue South, to the North margin of State Highway No. 18;

THENCE easterly, along said North margin of State Highway No. 18, to the southerly projection of the centerline of 58th Avenue South;

THENCE southerly, along said centerline of 58th Avenue South, to the centerline of South 344th Street;

THENCE westerly, along said centerline of South 344th Street, to the centerline of 56th Avenue South;

THENCE southerly, along said centerline of 56th Avenue South, to the easterly projection of the South line of Lot 24, Block 27, Jovita Heights, according to the plat thereof recorded in Volume 20 of Plats, Page 12, records of King County, Washington, and the terminus of this boundary description.



LEGEND

AUBURN SERVICE AREA THAT MAY BE SERVED BY LAKEHAVEN

PAA

AUBURN CITY LIMITS

Attachment 3

Lakehaven - Auburn
Interlocal Agreement
Establishing Sanitary Sewer
Service Boundaries

Dec 2003

PAGE 1 /1

RESOLUTION NO. 3824

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF AUBURN, WASHINGTON, AUTHORIZING THE MAYOR TO EXECUTE AN INTERLOCAL AGREEMENT WITH THE LAKEHAVEN UTILITY DISTRICT FOR THE PURPOSE OF PROVIDING SANITARY SEWER SERVICE FROM AUBURN TO PROPERTY LOCATED WITHIN THE LAKEHAVEN UTILITY DISTRICT'S SANITARY SEWER SERVICE AREA

WHEREAS, pursuant to RCW 35A.11.040 Auburn has the legal authority to exercise its powers and perform any of its functions as set forth in RCW 39.34; and

WHEREAS, in January 2004 the Commissioners of the Lakehaven Utility District adopted Resolution No. 2004-1006 authorizing the General Manager to execute an interlocal agreement with Auburn, which agreement was subsequently signed by the City of Auburn as authorized under Auburn Resolution No. 3651; and

WHEREAS, the parties recognize the responsibility of public sanitary sewer utilities to provide efficient and reliable service to their customers at reasonable cost; and

WHEREAS, a single family residential development (hereinafter referred to as "Jovita Heights-West Hill") has been proposed that lies within the distinct Sanitary Sewer Service Areas of both Auburn and Lakehaven as established and described in the Original Agreement; and

WHEREAS, portions of the Auburn sanitary sewer system have been sized with sufficient wastewater conveyance capacity and are situated so as to be capable of affording sewer service to those portions of Jovita Heights-West Hill that lie within both the Auburn Sanitary Sewer Service Area and the Lakehaven Sanitary Sewer Service Area; and

WHEREAS, portions of the Lakehaven sanitary sewer system have been sized with sufficient wastewater conveyance capacity and are situated so as to be capable of affording sewer service to those portions of Jovita Heights-West Hill that lie within both the Lakehaven Sanitary Sewer Service Area and the Auburn Sanitary Sewer Service Area; and

WHEREAS, the developer of Jovita Heights - West Hill has requested that Auburn provide sanitary sewer service to the entire development to afford maximum efficiency in its use of existing and future facilities; and

WHEREAS, Auburn has evaluated sanitary sewer service issues relative to the developer's request and determined that it is feasible for Auburn to provide sanitary sewer service to the entire development.

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF AUBURN, WASHINGTON, HEREBY RESOLVES as follows:

Section 1. The Mayor is hereby authorized to execute an Interlocal Agreement with the Lakehaven Utility District in substantial conformity with the agreement attached hereto, marked as Exhibit "1" and incorporated herein by this reference

Section 2. That the Mayor is authorized to implement such other administrative procedures as may be necessary to carry out the directives of this legislation.

Section 3. That this Resolution shall take effect and be in full force upon passage and signatures hereon.

Dated and Signed this 22nd day of February, 2005.

CITY OF AUBURN

PETER B. LEWIS
MAYOR

ATTEST:

Danielle E. Daskam,
City Clerk

APPROVED AS TO FORM:

Daniel B. Heid,
City Attorney

LAKEHAVEN UTILITY DISTRICT
King County, Washington

Resolution No. 2005-1038

A RESOLUTION of the Board of Commissioners of the Lakehaven Utility District, King County, Washington, approving an amendment to the sanitary sewer service boundary with the City of Auburn, authorizing the General Manager to execute an agreement reflecting such amendment on behalf of the District and amending District Resolution No. 2004-1006.

WHEREAS, the District is authorized under state law to provide water and sanitary sewer service pursuant to adopted comprehensive plans, and

WHEREAS, under authority of existing regulatory requirements, the District and the City of Auburn have determined to establish, by interlocal agreement, service area boundaries between their respective water and sewer systems, and

WHEREAS, since the adoption of the sewer service area boundary, Auburn and the District have concluded that certain territory within the area designated for sewer service by the District would be better served by Auburn, and

WHEREAS, Auburn and the District have discussed terms for an agreement which would transfer the service jurisdiction for such area to Auburn, and

WHEREAS, the Board believing the transfer of service jurisdiction to be in the best interests of the District

NOW, THEREFORE, **BE IT RESOLVED** as follows:

1. The District hereby approves an amendment to the "Interlocal Agreement Establishing Sanitary Sewer Service Boundaries" with the City of Auburn to provide that the area referenced in Exhibit "A" shall hereinafter be included within the service area jurisdiction of the City of Auburn.
2. The General Manager is hereby directed to execute an agreement with Auburn to provide for such transfer.
3. Resolution No. 2004-1006 is hereby amended in part to reflect the transfer of service jurisdiction herein.
4. This Resolution shall be effective on the date of adoption below.

ADOPTED by the Board of Commissioners of Lakehaven Utility District, King County, Washington, at an open public meeting this 10th day of March, 2005.

ATTEST:

President and Commissioner	✓ Yea	Nay	Abstain
Vice President and Commissioner	✓ Yea	Nay	Abstain
Secretary and Commissioner	✓ Yea	Nay	Abstain
Commissioner	✓ Yea	Nay	Abstain
Commissioner	✓ Yea	Nay	Abstain

Approved as to form: ______________________
General Counsel

EXHIBIT 1

AMENDMENT NO. 1

TO THE LAKEHAVEN UTILITY DISTRICT AND CITY OF AUBURN INTERLOCAL AGREEMENT ESTABLISHING SANITARY SEWER SERVICE BOUNDARIES

THIS AGREEMENT, made and entered into this 22nd day of February, 2005, by and between **LAKEHAVEN UTILITY DISTRICT**, a Washington municipal corporation (hereinafter referred to as "Lakehaven"), and the **CITY OF AUBURN**, a Washington municipal corporation, (hereinafter referred to as "Auburn"), both being duly organized and existing under and by virtue of the laws of the State of Washington, as an amendment to the Interlocal Agreement dated February 2, 2004, between the parties and executed on the 8th day of January, 2004, and the 20th day of January, 2004, respectively (hereinafter referred to as "Original Agreement").

WITNESSETH:

WHEREAS, in January 2004 the Commissioners of the Lakehaven Utility District adopted Resolution No. 2004-1006 authorizing the General Manager to execute an interlocal agreement with Auburn, which agreement was subsequently signed by the City of Auburn as authorized under Auburn Resolution No. 3651; and

WHEREAS, the parties recognize the responsibility of public sanitary sewer utilities to provide efficient and reliable service to their customers at reasonable cost; and

WHEREAS, a single family residential development (hereinafter referred to as "Jovita Heights-West Hill") has been proposed that lies within the distinct Sanitary Sewer Service Areas of both Auburn and Lakehaven as established and described in the Original Agreement; and

WHEREAS, portions of the Auburn sanitary sewer system have been sized with sufficient wastewater conveyance capacity and are situated so as to be capable of affording sewer service to those portions of Jovita Heights-West Hill that lie within both the Auburn Sanitary Sewer Service Area and the Lakehaven Sanitary Sewer Service Area; and

WHEREAS, portions of the Lakehaven sanitary sewer system have been sized with sufficient wastewater conveyance capacity and are situated so as to be capable of affording sewer service to those portions of Jovita Heights-West Hill that lie within both the Lakehaven Sanitary Sewer Service Area and the Auburn Sanitary Sewer Service Area; and

WHEREAS, the developer of Jovita Heights-West Hill has requested that Auburn provide sanitary sewer service to the entire development to afford maximum efficiency in its use of existing and future facilities; and

WHEREAS, Auburn has evaluated sanitary sewer service issues relative to the developer's request and determined that it is feasible for Auburn to provide sanitary sewer service to the entire development; and

WHEREAS, Lakehaven has evaluated the request and determined that, conditioned on mitigation of the impacts incident thereto, Lakehaven can transfer to Auburn that portion of its Sanitary Sewer Service Area that lies within Jovita Heights-West Hill so that Auburn can provide sanitary sewer service to the entire development.

NOW, THEREFORE in consideration of their mutual covenants, conditions, and promises, **IT IS HEREBY AGREED** by and between the parties hereto as follows:

ITEM ONE REVISION TO ATTACHMENT 1 OF THE ORIGINAL AGREEMENT, Page 2 of 2:

Attachment 1 of the Original Agreement is a graphical representation of the sanitary sewer service area boundary between Auburn and Lakehaven as established in the Original Agreement. Page Two of Attachment 1, as such Attachment 1 is attached hereto and by this reference incorporated herein, revises the sanitary sewer service area shown in the Original Agreement to reflect the transfer to Auburn of certain sanitary sewer service areas originally granted to Lakehaven; more specifically, those parcels located within the City of Auburn, east of 56th Avenue South between South 336th Street and South 344th Street, together with those parcels located outside the City of Auburn, east of 55th Avenue South between South 340th Street and South 348th Street.

ITEM TWO REVISION TO ATTACHMENT 2 OF THE ORIGINAL AGREEMENT:

The legal description for the sanitary sewer service area boundary is revised to reflect the service area modification described in Item One of this Amendment. Attachment 2 is attached hereto as the legal description of the revised sanitary sewer service area boundary and by this reference is incorporated herein.

ITEM THREE REVISION TO SECTION 1: Sewer Service Area.

Section One of the Original Agreement, entitled "Sewer Service Area," is hereby amended to hereinafter read as follows:

The parties have agreed to a mutual sewer service planning boundary as depicted on the maps attached hereto as Attachment 1 and as legally described in Attachment 2, which are by this reference each incorporated herein. Both parties further agree that, through this designation of the sanitary sewer service boundary, Lakehaven shall provide sanitary sewer service to properties mutually within its revised sanitary sewer service area and Auburn's PAA, also depicted on Attachment 1, while Auburn shall provide sanitary sewer service to properties located within its revised sanitary sewer service area, including portions of Lakehaven's corporate boundary, in accordance with and subject to the terms and conditions of this Agreement.

ITEM FOUR REMAINING TERMS UNCHANGED:

That all other provisions of the Original Agreement not herein amended shall remain in full force and effect.

IN WITNESS WHEREOF the parties hereto have executed this agreement as of the day and year first below written.

LAKEHAVEN UTILITY DISTRICT

Approved by Resolution No. 2005-1038 of the Lakehaven Utility District, Federal Way, Washington, at its regular meeting held on the 10th day of March, 2005.

By:

DONALD T. PERRY, GENERAL MANAGER
Lakehaven Utility District

Approved as to form:

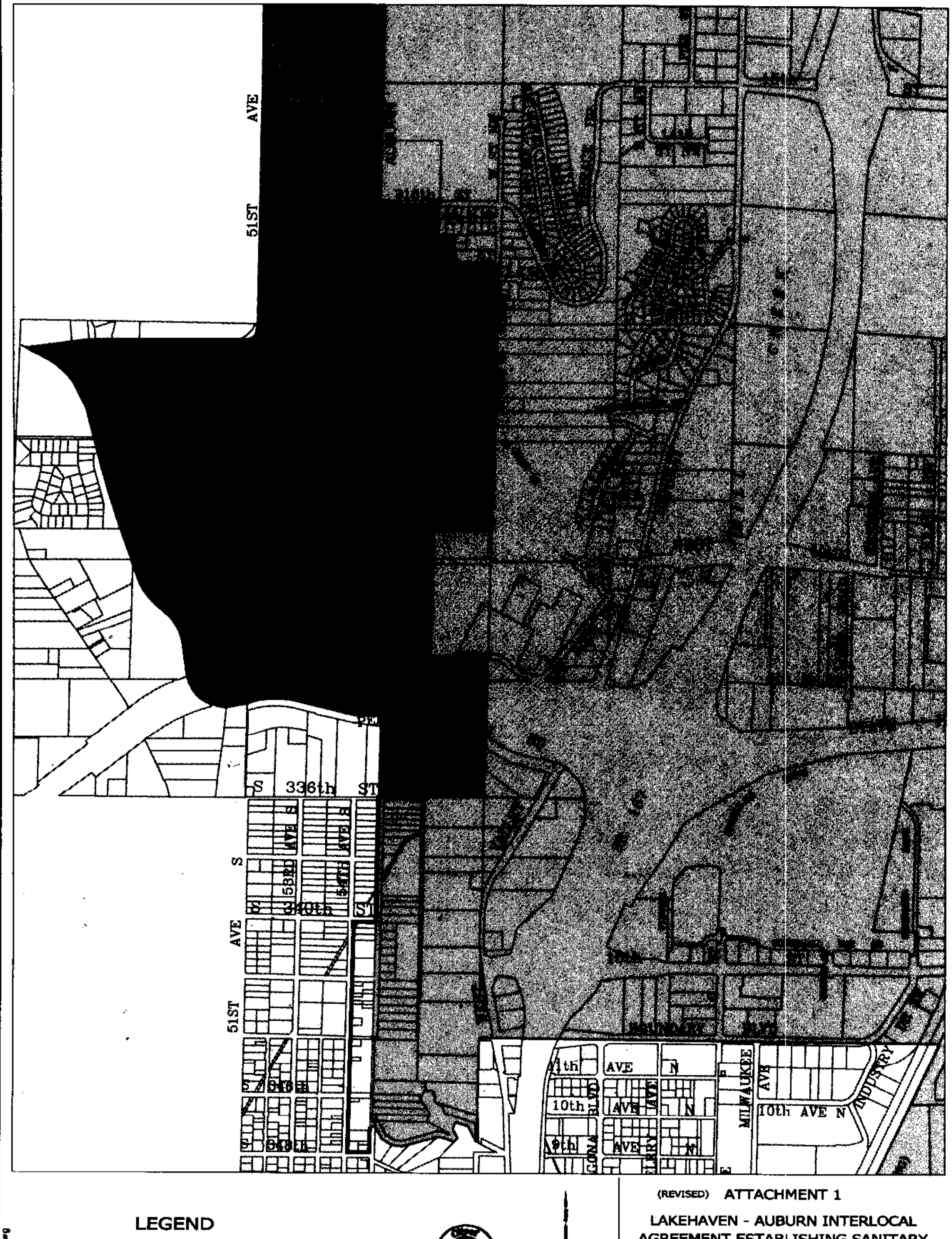
STEVEN H. PRITCHETT, GENERAL COUNSEL
Lakehaven Utility District

CITY OF AUBURN
Approved by Resolution No. 3824 of the City of Auburn, Washington, at its regular meeting held on the 22nd day of February, 2005.

By: ______________________
PETER B. LEWIS,
Mayor, City of Auburn

Attest: ______________________
DANIELLE DASKAM,
City Clerk, City of Auburn

Approved as to form: ______________________
DANIEL B. HEID,
City Attorney, ~~City~~ of Auburn



LEGEND

- AUBURN CITY LIMITS
- AUBURN PAA
- PROPOSED SEWER SERVICE BOUNDARY

SCALE: 1" = 1500'

Note: Information shown is for general reference purposes only and does not necessarily represent exact geographic or cartographic data as mapped.

(REVISED) ATTACHMENT 1

LAKEHAVEN - AUBURN INTERLOCAL AGREEMENT ESTABLISHING SANITARY SEWER SERVICE BOUNDARIES

PLEASE INITIAL IF APPROVED		Jan 2005
LAKEHAVEN	JR AUBURN	PAGE 2/2

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Attachment 2
(REVISED)

LAKEHAVEN UTILITY DISTRICT and CITY OF AUBURN INTERLOCAL AGREEMENT ESTABLISHING SANITARY SEWER SERVICE BOUNDARIES

BOUNDARY DESCRIPTION

BEGINNING at a point 170 feet east of the Northwest corner of the Southeast quarter of the Southwest quarter of Section 35, Township 22 North, Range 4 East, W.M., in King County, Washington;

THENCE south 662.54 feet, more or less, to the North line of the South half of said subdivision;

THENCE easterly along said North line to a point 300 feet west of the East line of said subdivision;

THENCE south to a point 170 feet north of the South line of said subdivision;

THENCE east 300 feet, more or less, to the East line of said subdivision;

THENCE southerly along said East line to the South line of said Section 35;

THENCE continuing southerly along the West line of the Northeast quarter of Section 2, Township 21 North, Range 4 East, W.M., in King County, Washington, a distance of 221.12 feet;

THENCE easterly, parallel with the North line of said subdivision, 220.20 feet;

THENCE southerly, parallel with the West line of said subdivision, 130 feet;

THENCE easterly, parallel with the North line of said subdivision, 1,304.44 feet;

THENCE southerly, parallel with the West line of said subdivision, 494 feet;

THENCE easterly, parallel with the North line of said subdivision, 680.8 feet;

THENCE southerly, parallel with the West line of said subdivision, 100 feet;

THENCE easterly, parallel with the North line of said subdivision, 428 feet, more or less, to the East line of said subdivision;

THENCE southerly, along said East line to the Northeast corner of the South half of the South half of the Northeast quarter of the Southeast quarter of said Section 2;

THENCE westerly, along the North line of said subdivision, 518.77 feet;

THENCE southerly, parallel with the East line of said subdivision, 328.01 feet;

THENCE westerly, along the South line of said subdivision, 130.02 feet, more or less to the Northeast corner of the West half of the Southeast quarter of the Southeast quarter of said Section 2;

THENCE southerly, along the East line of said subdivision, 964.41 feet;

THENCE westerly, parallel with the North line of said subdivision, 650 feet, more or less, to the East line of the Southwest quarter of the Southeast quarter of said Section 2;

THENCE southerly, along said East line, 328.77 feet, more or less, to the South line of said subdivision;

THENCE westerly, along said South line, to the centerline of 56th Avenue South;

THENCE southerly, along said centerline of 56th Avenue South, to the centerline of South 305th Street in Section 11, Township 21 North, Range 4 East, W.M., in King County, Washington;

THENCE westerly, along said centerline of South 305th Street, to a point of intersection with the northerly projection of the West line of Lot 2, Block 5, Auburn Heights Park Division No. 2, according to the plat thereof recorded in Volume 49, Page 99, records of King County, Washington;

THENCE southerly, 320 feet, more or less, parallel with said West line of Lot 2, to the South line of Lot 4, Block 5, of said plat;

THENCE easterly, along said South line of Lot 4, to the Northwest corner of Lot 5, Block 5 of said plat;

THENCE southerly and southeasterly, along the West lines of Lots 5 and 9, of said plat, to the Northeast corner of Block 7, Auburn Heights Park Division No. 1, according to the plat thereof recorded in Volume 49 of Plats, Page 56, records of King County, Washington;

THENCE southerly, along the East line of Block 7 of said plat, to the Southeast corner of Lot 2, Block 7, of said plat;

THENCE westerly, parallel with the South line of said plat, along the north lines of Lot 19 and Lot 1, Block 6, Lot 15 and Lot 1, Block 5, and Lot 26, Block 4, of said plat, to the centerline of 51st Avenue South;

THENCE southerly, along said centerline of 51st Avenue South, to the Southwest corner of said Section 11;

THENCE continue southerly, along the West line of Section 14, Township 21 North, Range 4 East, W.M., in King County, Washington, 329.57 feet;

THENCE east 30 feet to the Southwest corner of Lot 15, Peasley Ridge, according to the plat thereof recorded in Volume 201, Pages 66-71, records of King County, Washington;

THENCE continue easterly, along the South line of said plat, to the Southeast corner of Tract D Peasley Ridge;

THENCE northerly, along the East line of said Tract D, 150 feet, more or less, to the Northwest corner of Lot 2, King County Short Plat No. 1080026R, as recorded under Recording No. 8106080708, records of King County, Washington;

THENCE easterly, along the North line of said Lot 2, to the West line of Lot 1, King County Short Plat No. 1080027, as recorded under Recording No. 8106080709, records of King County, Washington;

THENCE northerly, along the West line of said Lot 1, to the Northwest corner thereof;

THENCE easterly, along the North lines of Lots 1, 2 and 4, of said short plat, to the Northeast corner of said Lot 4;

THENCE East 60 feet to the West line of Lot 19, West Auburn Five-Acre Tracts, according to the plat thereof recorded in Volume 15, Page 12, records of King County, Washington;

THENCE southerly, along the West line of said Lot 19, 9.43 feet;

THENCE easterly, parallel with the North line of said Lot 19, 294.8 feet;

THENCE northerly, parallel with the West line of said Lot 19, 119.43 feet, more or less, to the South margin of South 320th Street;

THENCE easterly, along said south margin of South 320th Street, 150 feet;

THENCE southerly, parallel with the West line of said Lot 19, 119.43 feet;

THENCE easterly, parallel with the North line of said Lot 19, 9.59 feet;

THENCE southerly, parallel with the West line of said Lot 19, 5 feet;

THENCE easterly, parallel with the North line of said Lot 19, 13.53 feet;

THENCE southerly, parallel with the West line of said Lot 19, 178.866 feet, more or less, to the most Northwesterly corner of Lot 4, King County Short Plat No. 278048, as recorded under Recording No. 8004030782, records of King County, Washington;

THENCE southerly, along the West line of said Lot 4, to the Southwest corner thereof and the North line of Lot 2, King County Short Plat No. 1077053, as recorded under Recording No. 7808100856;

THENCE westerly, along the North line of said Lot 2, to the Northwest corner thereof;

THENCE southerly, along the West lines of Lot 2 and Lot 4 of said short plat, to the North line of Lot 30, West Auburn Five-Acre Tracts, according to the plat thereof recorded in Volume 15, Page 12, records of King County, Washington;

THENCE easterly, along the North line of said Lot 30, 147.35 feet;

THENCE southerly, parallel with the East line of said Lot 30, to the centerline of South 324th Street;

THENCE westerly, along said centerline of South 324th Street, to the centerline of 56th Avenue South;

THENCE southerly, along said centerline of 56th Avenue South, to the North margin of State Highway No. 18;

THENCE easterly, along said North margin of State Highway No. 18, to the southerly projection of the centerline of 58th Avenue South;

THENCE southerly, along said centerline of 58th Avenue South, to the North margin of South 336th Street;

THENCE westerly, along said North margin of South 336th Street to the West margin of 56th Avenue South;

THENCE southerly, along said West margin of 56th Avenue South to the North margin of South 340th Street;

THENCE westerly, along said North margin of South 340th Street to the West margin of 55th Avenue South;

THENCE southerly, along said West margin of 55th Avenue South to the South margin of South 348th Street;

THENCE easterly, along said South margin of South 348th Street to the East margin of 56th Avenue South;

THENCE northerly, along said East margin of 56th Avenue South, to the easterly projection of the South line of Lot 24, Block 27, Jovita Heights, according to the plat thereof recorded in Volume 20 of Plats, Page 12, records of King County, Washington, and the terminus of this boundary description.

RESOLUTION NO. 3502

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF AUBURN, WASHINGTON, AUTHORIZING THE MAYOR AND CITY CLERK TO EXECUTE AN INTERLOCAL AGREEMENT BETWEEN THE CITY OF AUBURN AND THE MUCKLESHOOT INDIAN TRIBE FOR THE OPERATION OF A TEMPORARY SEWAGE LIFT STATION.

WHEREAS, the Muckleshoot Indian Tribe (Tribe), and the City of Auburn (Auburn) are authorized to enter into this Agreement under the authority of their respective enabling legislation and under the authority of Chapter 39.34 RCW, the Interlocal Cooperation Act; and

WHEREAS, the parties desire clarification on the ownership, the maintenance, and the operational responsibilities for a lift station serving the Swan Flats development; and

WHEREAS, it is in the public interest for the parties herein to enter into a sanitary sewer agreement for the operation of a sanitary sewer lift station to facilitate service from the Swan Flats plat.

NOW, THEREFORE, THE COUNCIL OF THE CITY OF AUBURN, WASHINGTON, IN A REGULAR MEETING DULY ASSEMBLED, HEREWITH RESOLVES THAT:

Section 1. Pursuant to RCW 39.34, the Interlocal Cooperation Act, Auburn and the Tribe have legal authority to cooperate with other localities on the basis of mutual advantage and provision of services.

Section 2. The Mayor and City Clerk of the City of Auburn are herewith authorized to execute the Interlocal Agreement between Auburn and the Tribe with minor administrative changes if required. A copy of said Agreement is attached hereto, denominated as Exhibit "A" and made a part hereof as though set forth in full herein.

Section 3. The Mayor is hereby authorized to implement such administrative procedures as may be necessary to carry out the directives of this legislation.

Section 4. This resolution shall be in full force and effect upon passage and signatures hereon.

DATED this 5th day of August, 2002.

CITY OF AUBURN

PETER B. LEWIS
MAYOR

ATTEST:

Danielle E. Daskam,
City Clerk

APPROVED AS TO FORM:

Daniel B. Held,
City Attorney

Return Address:
Auburn City Clerk
City of Auburn
25 West Main St.
Auburn, WA 98001

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PAGE 001 OF 008
07/14/2003 15:21
KING COUNTY, WA

RECORDER'S COVER SHEET

Document Title(s) (or transactions contained therein):

8/26 PNWT
W 6179-12

Interlocal Agreement (RES 3502) Sanitary Sewer – Swan Flats

Reference Number(s) of Documents assigned or released:
☐ Additional reference #'s on page ______ of document

Grantor(s)/Borrower(s) (Last name first, then first name and initials)
Auburn, City of

Grantee/Assignee/Beneficiary: (Last name first)
1. Muckleshoot Indian Tribe

Legal Description (abbreviated: i.e. lot, block, plat or section, township, range)

PER RCW 39.34

☐ Additional legal is on page of document.

Assessor's Property Tax Parcel/Account Number

N/A

☐ Assessor Tax # not yet assigned

EXHIBIT "A"

Interlocal Agreement
between the
Muckleshoot Indian Tribe and the City of Auburn

(Sanitary Sewer Service for Swan Flats)

THIS INTERLOCAL AGREEMENT made and entered into, pursuant to the interlocal Cooperation Act, chapter 39.34 of Revised Code of Washington, on the 5th day of, August, 2002, by and between the CITY OF AUBURN, a municipal corporation of the State of Washington (hereinafter referred to as "Auburn"), and the MUCKLESHOOT INDIAN TRIBE, a federally recognized Indian Tribe located upon the Muckleshoot Indian Reservation (hereinafter referred to as "Tribe").

WITNESSETH:

WHEREAS, the Tribe has purchased the single-family housing plat known as Swan Flats for the construction of single-family homes; and

WHEREAS, a temporary, private sewage lift station is established to facilitate the conveyance of the Swan Flats' wastewater into Auburn's public sanitary sewer system; and

WHEREAS, the lift station required by the Swan Flats plat for sanitary sewer services shall be owned, maintained, and operated by the Tribe; and

WHEREAS, once improvements have been made to the public sanitary sewer system located along Academy Drive to facilitate gravity wastewater flow from Swan Flats to the improved sewer line then Auburn shall bypass the private lift station and establish the piping required to connect Swan Flats plat with Auburn's sewer system without the use of pumps; and

WHEREAS, the property owners' responsibility to own, operate, and maintain the sanitary sewer lift station servicing the Swan Flats plat was imposed upon the plat and is not being imposed upon the Tribe as a special condition; and

WHEREAS, the Tribe and Auburn are willing to enter into this agreement which clarifies the maintenance responsibilities for the existing lift station servicing the Swan Flats plat; and

WHEREAS, the Tribe has purchased a majority of the properties within the Swan Flats plat and desires to be the responsible party for the operation and maintenance of the private sanitary sewer lift station in lieu of a homeowners association.

NOW, THEREFORE in consideration of their mutual covenants, conditions, and promises, THE PARTIES HERETO DO HEREBY AGREE as follows:

1. CONDITIONS

A. Auburn shall install sanitary sewer pipe to bypass the Swan Flats lift station concurrent with any sanitary sewer improvements done to the existing public sewer line along Academy Drive that would facilitate gravity sewer service from Swan Flats.

B. The Tribe shall own, operate, and maintain the lift station established upon Lot 1 of the Swan Flats plat until the gravity facilities are constructed and the pump station is no longer required for service.

C. The Muckleshoot Indian Tribe shall post an all weather sign with a minimum letter height of one inch that details the appropriate person and/or agency and phone number of who to contact if the sewer lift station requires service. The current contact information established by the Muckleshoot Indian Tribe for the servicing of the lift station is as follows:

DEWEY MILLER
Muckleshoot Indian Tribe
Public Works
360-802-4727

After hour phone numbers and emergency contacts shall be mentioned on the sign and supplied to Auburn 20 days prior to the effective date of this Agreement.

D. If Tribal response is delayed and the City is contacted, and a health hazard is created due to the failure of the lift station then the City may respond to contain and possibly correct the health situation until Tribal response is on-site. The Tribe agrees to reimburse the City for reasonable expenses for time and materials related to any such response.

E. No connections shall be made to Auburn's public sewer system without first obtaining the appropriate permits from the City as established within Auburn City Code 13.20.

F. Upon installation of the sanitary sewer bypass of the Swan Flats lift station by the City, the Tribe shall cap the existing eight-inch PVC sewer pipe, conveying wastewater from the City's sewer system to the lift station, at the property line to lot one. The tribe may request that the City do this work at the time of the diversion at no cost to the Tribe. After connection to the City gravity sewer system the Tribe may dispose of or retain the lift station as it deems appropriate.

2. INSURANCE

The Tribe shall maintain, at a minimum, a two million liability insurance policy as of the effective date of this agreement; the Tribe shall continue such insurance coverage during the term of this agreement unless otherwise agreed upon by the parties.

3. INDEMNIFICATION

A. The Tribe agrees to indemnify and hold the City and its agents, employees, and/or officers, harmless from and shall process and defend at its own expense any and all claims, demands, suits, at law or equity, actions, penalties, loses, damages or costs, of whatsoever kind or nature, brought against the City arising out of, in connection with, or incident to the execution of this agreement and/or the Tribe's performance or failure to perform any aspect of this Agreement; provided, however, that if such claims are caused by or result from the concurrent negligence of the City, its agents, employees, and/or officers, this indemnity provision shall be valid and enforceable only to the extent of the negligence of the Tribe; and provided further, that nothing herein shall require the Tribe to hold harmless or defend the City, its agents, employees, and/or officers, from any claims arising from the sole negligence of the City, its agents, employees, and/or officers. No liability shall attach to the City by reason of entering this agreement except as expressly provided herein.

B. The City agrees to indemnify and hold the Tribe and its agents, employees, and/or officers, harmless from and shall process and defend at its own expense any and all claims, demands, suits, at law or equity, actions, penalties, loses, damages or costs, of whatsoever king or nature, brought against the Tribe arising out of, in connection with, or incident to the execution of this agreement and/or the City's performance or failure to perform any aspect of this Agreement; provided, however, that if such claims are caused by or result from the concurrent negligence of the Tribe, its agents, employees, and/or officers, this indemnity provision shall be valid and enforceable only to the extent of the negligence of the City; and provided further, that nothing herein shall require the City to hold harmless or defend the Tribe, its agents, employees, and/or officers, from any claims arising from the sole negligence of the Tribe, its agents, employees, and/or officers. No liability shall attach to the Tribe by reason of entering this agreement except as expressly provided herein.

4. COMPLIANCE WITH REGULATIONS AND LAWS

The parties shall comply with all applicable rules and regulations pertaining to them in connection with the matters covered herein.

5. DISPUTE RESOLUTION AND LIMITED WAVIER OF SOVEREIGN IMMUNITY

A. In the event the Tribe and the City are engaged in a dispute, which relates to this Agreement, and they are unable to resolve said dispute within ninety (90) days, either party may request mediation of any dispute in any manner agreed upon by the parties.

a. Mediation shall be commenced by the party requesting it by notifying the other party in writing of its request to mediate a dispute arising between the parties which relate to sanitary sewer and sewer related services to Swan Flats. If the parties agree to enter into mediation within twenty (20) days from such request the matter shall be deemed stayed and the arbitration clause continued herein shall not be put into effect. Mediation shall continue for no more than one hundred and twenty (120) days at which point the mediation shall be deemed failed unless the parties have reached an agreement and have had such agreement approved by the governing bodies. If such agreement is not approved by the governing bodies of each respective party or is not enforceable in the United States District Court for the Western District of Washington, the Mediation shall be deemed failed and the unresolved issue shall be submitted to binding arbitration as set forth herein.

b. In the event the parties do not reach an agreement to mediate within twenty (20) days of receipt of the notice requesting mediation by the non-requesting party, the matter shall be submitted to binding arbitration as set forth herein.

c. Each party shall bear its own cost of mediation.

B. Any controversy or claim arising out of or relating to this agreement, or the breach thereof, shall be settled by arbitration administered by the American Arbitration Association in accordance with its applicable rules. Judgment on the decision rendered by the arbitrator may be entered into the United States District Court for the Western District of Washington. Each party shall bear its own costs of arbitration.

C. The Tribe hereby waives its sovereign immunity and consents to the jurisdiction of the United States District Court for the Western District of Washington concerning disputed regarding the interpretation of this Agreement and the enforcement of any rights hereunder, including other obligations or liabilities, in law or in equity, pertaining to immunity provisions of this Agreement. Such waiver of Sovereign Immunity and Consent to jurisdiction shall apply to no other court.

D. The Tribe agrees that the Muckleshoot Indian Tribal Court has no jurisdiction over the force, effect, and interpretation of this Agreement, nor the resolution of disputes that pertain to its implementation. The Tribe further agrees that it has no authority to submit the City to the jurisdiction of the Muckleshoot Indian Tribal Court with regards to any sewer-related matters or disputes which may arise between the parties.

6. ASSIGNMENT

The parties shall not assign this agreement or any interest, obligation or duty therein without the express written consent of the other party.

7. ATTORNEY'S FEES

If either party shall be required to bring any action to enforce any provision of this Agreement, or shall be required to defend any action brought by the other party with respect to this Agreement, and in the further event that one party shall substantially prevail in such action, the losing party shall, in addition to all other payments required therein, pay all of the prevailing party's reasonable costs in connection with such action, including such sums as the court or courts may adjudge reasonable as attorney's fees in trial court and in appellate courts.

8. NOTICES

All notices between the two agencies hereunder may be delivered or mailed. If mailed, they shall be sent to the following respective addresses:

The Muckleshoot Indian Tribe	The City of Auburn
Thomas Reber	Jeff Roscoe
Muckleshoot Indian Tribe	Sanitary Sewer Engineer
Assistant Tribal Operations Manager	Auburn Public Works
Community Development	Department
40320 Auburn Enumclaw Road	25 West Main Street
Auburn, WA 98092	Auburn WA 98001-4998
Phone # 360.802.1922	Phone # 253.931.4008
Fax # 360.802.4727	FAX # 253.931.3053

or to such other representative addresses as either party may hereafter from time to time designate in writing. All notices and payments mailed by regular post (including first class) shall be deemed to have been given on the second business day following the date of mailing, if properly mailed and addressed. Notices and payments sent by certified or registered mail shall be deemed to have been given on the day next following the date of mailing, if properly mailed and addressed. For all types of mail, the postmark affixed by the United States Postal Service shall be conclusive evidence of the date of mailing.

9. NONDISCRIMINATION

Each of the parties, for itself, its heirs, personal representatives, successors in interest, and assigns, as part of the consideration hereof, does hereby covenant and agree that it will comply with applicable statutes, executive orders and such rules as are promulgated to assure that no person shall on the grounds of race, creed, color, national origin, sex, age, or the presence of any sensory, mental or physical handicap be discriminated against or receive discriminatory treatment by reason thereof.

10. INTEGRATION.

This agreement constitutes the entire agreement of the parties regarding the subject matter hereof, and there are no other representations or oral agreements other than those listed herein, which vary the terms of this agreement. Future agreements may occur between the parties to transfer additional or future service areas by mutual agreement.

11. OBLIGATION INTACT.

Nothing herein shall be construed to alter the rights, responsibilities, liabilities, or obligations of either the Tribe or the City regarding provision of sewer service, except as specifically set forth herein.

12. MISCELLANEOUS

A. The captions in this agreement are for convenience only and do not in any way limit or amplify the provisions of this agreement.

B. The duration of this agreement shall be until the sanitary sewer improvements are established that will allow the City to extend a gravity sewer main to bypass the private lift station or for the period of time it reasonably takes for the performance of parties as completed herein.

C. The purpose of this agreement is to clarify the Tribe's role for the maintenance and operation of the private lift station together with the City's role in the establishment of a gravity sewer system to serve Swan Flats.

D. The performances of the duties of the parties provided hereby shall be done in accordance with standard operating procedures and customary practices of the parties.

E. No provision of this agreement shall relieve either party of its public agency obligations and/or responsibilities imposed by law.

F. If any term, provision, condition or portion of this Agreement is held to be invalid, or unenforceable by a final decision of any court having jurisdiction on the matter, the remaining of this Agreement or the application of such term or provision to persons or circumstances other then those as to which it is held invalid or unenforceable shall not be affected thereby and shall continue in full force and effect.

G. No modifications or amendments of this agreement shall be valid or effective unless evidenced in writing and signed by both parties.

IN WITNESS WHEREOF the parties hereto have executed this agreement as of the day and year first above written.

MUCKLESHOOT INDIAN TRIBE

PASSED by Resolution No. **02-235** of the Muckleshoot Indian Tribe, at its special meeting held on the 2nd day of August, 2002.

By:

11/6/02

JOHN DANIELS, JR., CHAIR — Date

CITY OF AUBURN

PASSED by Resolution No. **3502** of the City of Auburn, Washington, at its regular meeting held on the 5th day of August, 2002.

By:

11/2/02

PETER B. LEWIS, MAYOR — Date

Attest:

Danielle Daskam, City Clerk

Approved as to form:

Daniel B. Heid, City Attorney

RESOLUTION NO. 4 3 3 5

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF AUBURN, WASHINGTON, AUTHORIZING THE MAYOR AND CITY CLERK TO EXECUTE AN INTERLOCAL AGREEMENT ESTABLISHING SANITARY SEWER SERVICE BOUNDARIES BETWEEN THE CITY OF AUBURN AND THE CITY OF PACIFIC

WHEREAS, pursuant to RCW 35A.11.040 and RCW 35A.21.150 the City of Auburn ("Auburn") and the City of Pacific ("Pacific") have the authority to exercise a wide variety of municipal powers, including providing sewer service; and

WHEREAS, pursuant to RCW 39.34, the Interlocal Cooperation Act, Auburn and Pacific have the legal authority to cooperate with other localities on the basis of mutual advantage and provision of municipal services; and

WHEREAS, the parties recognize the responsibility of public sanitary sewer utilities to provide efficient and reliable service to their customers at reasonable cost; and

WHEREAS, portions of the Auburn sanitary sewer system have been sized and are situated so as to be capable of affording public sanitary sewer service to a portion of Pacific; and

WHEREAS, Pacific has evaluated and determined it is in Pacific's best interest to allow Auburn to provide sanitary sewer service to property within

Pacific's municipal boundary that lies in the vicinity of Auburn's sanitary sewer infrastructure; and

WHEREAS, Auburn has sufficient wastewater conveyance capacity within their sanitary sewer facilities to support these adjustments to the existing sanitary sewer service areas; and

WHEREAS, Auburn's delivery of sanitary sewer service to these areas will provide the maximum efficiency in the use of existing and future facilities, together with orderly and efficient sanitary sewer planning.

NOW, THEREFORE, THE COUNCIL OF THE CITY OF AUBURN, WASHINGTON, IN A REGULAR MEETING DULY ASSEMBLED, HEREWITH RESOLVES THAT:

Section 1. The Mayor and City Clerk of the City of Auburn are herewith authorized to execute an Interlocal Agreement establishing sanitary sewer service boundaries between the City of Auburn and the City of Pacific, which agreement shall be in substantial conformity with the Agreement a copy of which is attached hereto, marked as Exhibit "A" and incorporated herein by this reference.

Section 2. The Mayor is hereby authorized to implement such administrative procedures as may be necessary to carry out the directives of this legislation.

Section 3. This resolution shall be in full force and effect upon passage and signatures hereon.

DATED this 5th day of May, 2008.

CITY OF AUBURN

PETER B. LEWIS
MAYOR

ATTEST:

Danielle E. Daskam, City Clerk

APPROVED AS TO FORM:

Daniel B. ~~Heid,~~ City Attorney

INTERLOCAL AGREEMENT
between
CITY OF PACIFIC and CITY OF AUBURN
for the
THE ESTABLISHMENT OF SANITARY SEWER SERVICE BOUNDARIES

THIS AGREEMENT, made and entered into by and between the **CITY OF PACIFIC**, a Washington municipal corporation (hereinafter referred to as "Pacific"), and the **CITY OF AUBURN**, a Washington municipal corporation, (hereinafter referred to as "Auburn"), both being duly organized and existing under and by virtue of the laws of the State of Washington,

WITNESSETH:

WHEREAS, pursuant to RCW 35A.11.040 Auburn and Pacific have the legal authority to exercise their powers and perform any of their functions as set forth in RCW 39.34; and

WHEREAS, pursuant to RCW 39.34, the Interlocal Cooperation Act, Auburn and Pacific have the legal authority to cooperate with other localities on the basis of mutual advantage and provision of services; and

WHEREAS, pursuant to RCW 35A.21.150 Auburn and Pacific have the legal authority to maintain a sewerage system; and

WHEREAS, the parties recognize the responsibility of public sanitary sewer utilities to provide efficient and reliable service to their customers at reasonable cost; and

WHEREAS, portions of the Auburn sanitary sewer system have been sized and are situated so as to be capable of affording public sanitary sewer service to a portion of Pacific; and

WHEREAS, Pacific has evaluated and determined it is in Pacific's best interest to allow Auburn to provide sanitary sewer service to property within Pacific's municipal boundary that lies in the vicinity of Auburn's sanitary sewer infrastructure; and

WHEREAS, Auburn has sufficient wastewater conveyance capacity within their sanitary sewer facilities to support these adjustments to the existing sanitary sewer service areas; and

WHEREAS, the parties desire to allow Auburn to construct, reconstruct, repair and maintain sewer facilities, and to authorize connections to Pacific's sewer system for service to the areas noted in Attachment "A"; and

WHEREAS, Auburn's delivery of sanitary sewer service to these areas will provide the maximum efficiency in the use of existing and future facilities, together with orderly and efficient sanitary sewer planning.

NOW, THEREFORE:

IT IS HEREBY AGREED by and between the parties hereto as follows:

1. Sewer Service Area. The parties have agreed that Auburn will provide sanitary sewer service to a portion of Pacific as graphically depicted on the map attached hereto as Attachment "A", which is by this reference incorporated herein. Both parties further agree that Auburn, in providing sewer service to the area as shown on Attachment "A", shall be furnishing sewer service to properties within Pacific's water service area and Pacific's municipal jurisdiction in accordance with and subject to the terms and conditions of this Agreement.

2. Management, Regulation and Control of Sewer System. Auburn shall have the sole responsibility and authority to construct, maintain, manage and operate its sewerage system as installed within the areas described in Attachment "A", together with any additions, extensions and betterments thereto. Auburn shall also be responsible for obtaining all necessary governmental franchises, approvals, easements and permits for the installation, maintenance, and operation of said sewerage systems as described above.

3. Rates, Charges, Permits, and Billing Responsibilities. Through this Agreement Auburn will be responsible to own, operate, and maintain the sanitary sewer system including private side sewers within the public right of way. Auburn shall issue certificates of sewer availability when requested by the property owners.

No connection or modification shall be made to Auburn's sanitary sewer system and or private side sewer services connected to Auburn's sewer system unless the property owner first pays the associated fees and submits the proper information to obtain an Auburn sanitary sewer permit. Sanitary sewer permits shall be subject to inspection and approval for compliance with Auburn's Sanitary Sewer Standards as adopted at the time the connection is made.

The rates charged to Auburn's sanitary sewer customers shall be fixed, altered, regulated and controlled by Auburn pursuant to all applicable laws or regulations promulgated on the subject of rates and charges for sewer service. No surcharge shall be charged to the customers served under this agreement on the sole basis that those customers are outside of Auburn's city limits.

To establish a quantitative usage, Pacific shall provide to Auburn the quantity of potable water used by those properties connected to Auburn's sanitary sewer system. Pacific shall provide water usage information every other month to Auburn and Auburn shall send a bill every other month for sewer service. Pacific shall give Auburn the right to read water meters described in Attachment "A" manually if desired by Auburn. Auburn shall also have the ability to annually request water usage data from Pacific for said properties.

4. Boundary Review Board. Pacific and Auburn will, at the time of service through this agreement provide a copy of to the King County Boundary Review Board in accordance with R.C.W. 36.93.090.

5. Comprehensive Sewer Planning. The terms of this Agreement will be included as an element of Auburn and Pacific's Comprehensive Sewerage Plans.

6. Reliance. Each party hereto acknowledges that the other will rely upon the terms of this agreement in its comprehensive planning to meet the needs of the service area designated herein.

7. Indemnification. Pacific agrees to indemnify and hold Auburn and its agents, employees, and/or officers, harmless from and shall process and defend at its own expense any and all claims, demands, suits, at law or equity, actions, penalties, loses, damages or costs, of whatsoever kind or nature, brought against Auburn arising out of, in connection with, or incident to the execution of this agreement and/or Pacific's performance or failure to perform any aspect of this Agreement; provided, however, that if such claims are caused by or result from the concurrent negligence of Auburn, its agents, employees, and/or officers, this indemnity provision shall be valid and enforceable only to the extent of the negligence of Pacific; and provided further, that nothing herein shall require Pacific to hold harmless or defend Auburn, its agents, employees, and/or officers, from any claims arising from the sole negligence of Auburn, its agents, employees, and/or officers. No liability shall attach to Auburn by reason of entering this agreement except as expressly provided herein.

Auburn agrees to indemnify and hold Pacific and its agents, employees, and/or officers, harmless from and shall process and defend at its own expense any and all claims, demands, suits, at law or equity, actions, penalties, loses, damages or costs, of whatsoever king or nature, brought against Pacific arising out of, in connection with, or incident to the execution of this agreement and/or Auburn's performance or failure to perform any aspect of this Agreement; provided, however, that if such claims are caused by or result from the concurrent negligence of Pacific, its agents, employees, and/or officers, this indemnity provision shall be valid and enforceable only to the extent of the negligence of Auburn; and provided further, that nothing herein shall require Auburn to hold harmless or defend Pacific, its agents, employees, and/or officers, from any claims arising from the sole negligence of

Pacific, its agents, employees, and/or officers. No liability shall attach to Pacific by reason of entering this agreement except as expressly provided herein.

8. Assignment. The parties shall not assign this agreement or any interest, obligation or duty therein without the express written consent of the other party.

9. Attorney's Fees. If either party shall be required to bring any action to enforce any provision of this Agreement, or shall be required to defend any action brought by the other party with respect to this Agreement, and in the further event that one party shall substantially prevail in such action, the losing party shall, in addition to all other payments required therein, pay all of the prevailing party's reasonable costs in connection with such action, including such sums as the court or courts may adjudge reasonable as attorney's fees in trial court and in appellate courts.

10. Government Approvals. The parties will give notice of the adoption of this Agreement to King County's Department of Natural Resources – Wastewater Treatment Division, to the Department of Health, and to any other agency with jurisdiction or mission relevant to the terms hereof, and shall cooperate and assist in all reasonable manner in procuring any necessary approvals hereof by those agencies.

11. Service Amendments. Any changes to the service areas described herein shall be by mutual agreement. Each party may give permission to the other on a case-by-case basis to provide service by one party into the other party's adjacent or nearby service area based upon considerations of economic efficiency for providing the service with mutual consent of Auburn's Director of Public Works and Pacific's Director of Public Works.

12. Notices. All notices between the two agencies hereunder may be delivered or mailed. If mailed, they shall be sent to the following respective addresses:

City of Pacific
Director of Public Works
PO Box 250
100 3rd Avenue SE
Pacific, WA 98047
253-833-2741

City of Auburn
Director of Public Works
25 west Main Street
Auburn, WA 98001
253-931-3010

or to such other representative as either party may hereafter from time to time designate in writing. All notices and payments mailed by regular post (including first class) shall be deemed to have been given on the second business day following the date of mailing, if properly mailed and addressed. Notices and payments sent by certified or registered mail shall be deemed to have been given on the day next following the date of mailing, if properly mailed and addressed. For all types of mail, the postmark affixed by the United States Postal Service shall be conclusive evidence of the date of mailing.

13. Alteration, Amendment or Modification. Pacific and Auburn hereby reserve the right to alter, amend or modify the terms and conditions of this Agreement upon written agreement of both parties to such alteration, amendment or modification. Such written consent(s) shall be filed with this agreement for future reference.

14. Sanctity of Agreement. This agreement constitutes the entire agreement of the parties regarding the subject matter hereof, and there are no other representations or oral agreements other than those listed herein, which vary the terms of this agreement. Future agreements may occur between the parties to transfer additional or future service areas by mutual agreement.

15. Obligation Intact. Nothing herein shall be construed to alter the rights, responsibilities, liabilities, or obligations of either Pacific or Auburn regarding provision of sewer service, except as specifically set forth herein.

16. Miscellaneous.

A. The captions in this agreement are for convenience only and do not in any way limit or amplify the provisions of this agreement.

B. This agreement is established in perpetuity. Modifications can be established upon written agreement between both parties.

C. The purpose of this agreement is to clarify Pacific and Auburn's sanitary sewer responsibilities for providing service and maintaining public sewer facilities.

D. If any term, provision, condition or portion of this Agreement is held to be invalid, or unenforceable by a final decision of any court having jurisdiction on the matter, the remaining of this Agreement or the application of such term or provision to persons or circumstances other then those as to which it is held invalid or unenforceable shall not be affected thereby and shall continue in full force and effect, unless such court determines that invalidity or unenforceability materially interferes with or defeats the purposes hereof, at which time Auburn or Pacific shall have the right to terminate the Agreement.

E. No modifications or amendments of this agreement shall be valid or effective unless evidenced by an agreement in writing signed by both parties.

IN WITNESS WHEREOF the parties hereto have executed this agreement as of the day and year first above written.

CITY OF PACIFIC
Approved by Resolution No. 730 of the City of Pacific, Washington, at its regular meeting held on the 12th day of May, 2008.

By:

RICHARD HILDRETH,
Mayor, City of Pacific

Attest:

SANDY PAUL-LYLE,
City Clerk, City of Pacific

Approved as to form:

ALBERT A ABUAN,
City Attorney, City of Pacific

CITY OF AUBURN
Approved by Resolution No. 4335, of the City of Auburn, Washington, at its regular meeting held on the 5th day of May, 2008.

By:

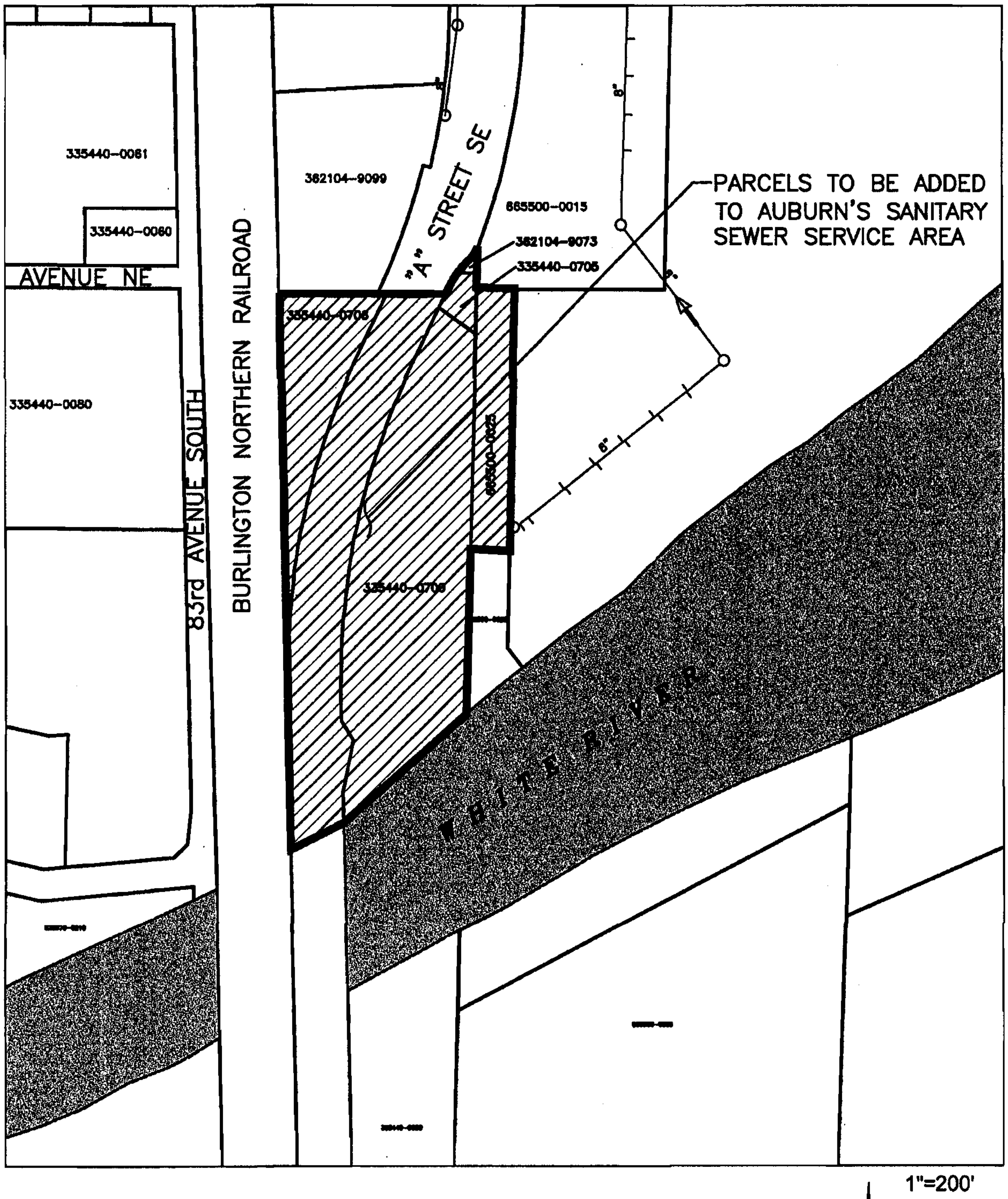
PETER B. LEWIS,
Mayor, City of Auburn

Attest:

DANIELLE DASKAM,
City Clerk, City of Auburn

Approved as to form:

DANIEL B. HEID,
City Attorney, City of Auburn



CITY OF AUBURN WASHINGTON

ATTACHMENT A

PACIFIC - AUBURN
SANITARY SEWER SERVICE AGREEMENT

CITY OF PACIFIC
WASHINGTON

COPY

RESOLUTION NO. 730

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF PACIFIC, WASHINGTON, AUTHORIZING THE MAYOR AND CITY CLERK TO EXECUTE AN INTERLOCAL AGREEMENT ESTABLISHING SANITARY SEWER SERVICE BOUNDARIES BETWEEN THE CITY OF PACIFIC AND THE CITY OF AUBURN

WHEREAS, pursuant to RCW 35A.11.040 Pacific and Auburn have the legal authority to exercise their powers and perform any of their functions as set forth in RCW 39.34; and

WHEREAS, pursuant to RCW 39.34, the Interlocal Cooperation Act, Auburn and Pacific have the legal authority to cooperate with other localities on the basis of mutual advantage and provision of services; and

WHEREAS, pursuant to RCW 35A.21.150 Auburn and Pacific have the legal authority to maintain a sewerage system.

BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF PACIFIC, WASHINGTON, AS FOLLOWS:

Section 1. The Mayor and City Clerk of the City of Pacific are herewith authorized to execute an Interlocal Agreement establishing sanitary sewer service boundaries between the City of Pacific and the City of Auburn. A copy of said Agreement is attached hereto, as Exhibit "1" and made a part hereof as though set forth in full herein.

Section 2. The Mayor is hereby authorized to implement such administrative procedures as may be necessary to carry out the directives of this legislation.

PASSED BY THE PACIFIC CITY COUNCIL AT A REGULAR MEETING THEREOF ON THE 12TH DAY OF MAY, 2008.

CITY OF PACIFIC

Mayor Richard Hildreth

ATTEST/AUTHENTICATED:

Sandy Paul CMC

Sandy Paul - Lyle, City Clerk

Approved as to form:

Albert Abuan, City Attorney

Filed with the City Clerk: May 1. 2008
Passed by the City Council: May 12, 2008
Resolution No. 730
Effective: May 12, 2008

RESOLUTION NO. 3321

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF AUBURN, WASHINGTON, AUTHORIZING THE MAYOR AND CITY CLERK TO EXECUTE AN INTERLOCAL AGREEMENT ESTABLISHING SANITARY SEWER SERVICE BOUNDARIES BETWEEN THE CITY OF AUBURN AND THE SOOS CREEK WATER AND SEWER DISTRICT.

WHEREAS, pursuant to RCW 35A.11.040, Auburn has the legal authority to exercise its powers and perform any of its functions as set forth in RCW 39.34; and

WHEREAS, pursuant to RCW 39.34, the Interlocal Cooperation Act, Auburn has the legal authority to cooperate with other localities on the basis of mutual advantage and provision of services; and

WHEREAS, pursuant to RCW 35A.21.150 Auburn has the legal authority to maintain a sewerage system; and

WHEREAS, pursuant to RCW 57.08.044, Soos Creek Water and Sewer District has the legal authority to provide sewer service to property owners in areas outside existing district boundaries; and

WHEREAS, pursuant to RCW 57.08.044, Soos Creek Water and Sewer District has the legal authority to enter into contracts with any municipal corporation for the purpose of providing sewer service to those property owners outside the existing district boundaries.

NOW, THEREFORE, THE COUNCIL OF THE CITY OF AUBURN, WASHINGTON, IN A REGULAR MEETING DULY ASSEMBLED, HEREWITH RESOLVES THAT:

Section 1. The Mayor and City Clerk of the City of Auburn are herewith authorized to execute an Interlocal Agreement establishing sanitary sewer service boundaries between the City of Auburn and Soos Creek Water and Sewer District District. A copy of said Agreement is attached hereto, denominated as Exhibit "1" and made a part hereof as though set forth in full herein.

Section 2. The Mayor is hereby authorized to implement such administrative procedures as may be necessary to carry out the directives of this legislation.

DATED this 20th day of February, 2001.

CITY OF AUBURN

Charles A. Booth

CHARLES A. BOOTH
MAYOR

ATTEST:

Danielle E. Daskam,
City Clerk

APPROVED AS TO FORM:

Michael J. Reynolds,
City Attorney

Return Address:
Auburn City Clerk
City of Auburn
25 West Main St.
Auburn, WA 98001

20010406001622
PACIFIC NW TIT AG 17.00
PAGE 001 OF 010
04/06/2001 15:37
KING COUNTY, WA

RECORDER'S COVER SHEET

Document Title(s) (or transactions contained therein):
10/17 PNWT W-8384-12

INTERLOCAL AGREEMENT BETWEEN CITY OF AUBURN AND THE SOOS CREEK WATER & SEWER DISTRICT FOR THE ESTABLISHMENT OF SANITARY SEWER SERVICE BOUNDARIES

Reference Number(s) of Documents assigned or released:
☐ Additional reference #'s on page _____ of document

Grantor(s)/Borrower(s) (Last name first, then first name and initials)

CITY OF AUBURN & SOOS CREEK WATER & SEWER DISTRICT

Grantee/Assignee/Beneficiary: (Last name first)

CITY OF AUBURN & SOOS CREEK WATER & SEWER DISTRICT

Legal Description (abbreviated: i.e. lot, block, plat or section, township, range)

PER RCW 39.34

☐ Additional legal is on page ____ of document.

Assessor's Property Tax Parcel/Account Number

PER RCW 39.34

☐ Assessor Tax # not yet assigned

Said document(s) were filed for record by Pacific Northwest Title as accommodation only. It has not been examined as to proper execution or as to its effect upon title.

2001 040 6001622

SOOS CREEK WATER AND SEWER DISTRICT and CITY OF AUBURN INTERLOCAL AGREEMENT FOR THE ESTABLISHMENT OF SANITARY SEWER SERVICE BOUNDARIES

THIS AGREEMENT, made and entered into this 21st day of March, 2001, by and between the **SOOS CREEK WATER AND SEWER DISTRICT**, a Washington municipal corporation (hereinafter referred to as "Soos Creek"), and the **CITY OF AUBURN**, a Washington municipal corporation, (hereinafter referred to as "Auburn"), both being duly organized and existing under and by virtue of the laws of the State of Washington,

WITNESSETH:

WHEREAS, pursuant to RCW 35A.11.040, Auburn has the legal authority to exercise its powers and perform any of its functions as set forth in RCW 39.34; and

WHEREAS, pursuant to RCW 39.34, the Interlocal Cooperation Act, Auburn has the legal authority to cooperate with other localities on the basis of mutual advantage and provision of services; and

WHEREAS, pursuant to RCW 35A.21.150 Auburn has the legal authority to maintain a sewerage system; and

WHEREAS, pursuant to RCW 57.08.044, Soos Creek has the legal authority to provide sewer service to property owners in areas outside existing district boundaries; and

WHEREAS, pursuant to RCW 57.08.044, Soos Creek has the legal authority to enter into contracts with any municipal corporation for the purpose of providing sewer service to those property owners outside the existing district boundaries, and

WHEREAS, the parties recognize the responsibility of public sanitary sewer utilities to provide efficient and reliable service to their customers at reasonable cost; and

WHEREAS, Auburn desires new development within it's Potential Annexation Area to complete a Pre-annexation agreement with Auburn prior to receiving a certificate of sanitary sewer availability; and

WHEREAS, portions of the Soos Creek sanitary sewer system have been sized and are situated so as to be capable of affording sewer service to a portion of Auburn's Potential Annexation Area; and

WHEREAS, Auburn has evaluated and determined it is not cost feasible to provide sewer service to those properties located within Auburn's Potential Annexation Area adjacent to Soos Creek's sanitary sewer infrastructure; and

WHEREAS, the parties desire to allow Soos Creek to construct, reconstruct, repair and maintain sewer facilities as necessary, and to authorize connections for service to noted areas, or portions thereof; and

WHEREAS, Soos Creek's sewer service to these areas will provide for maximum efficient use of existing and future facilities together with orderly and efficient sanitary sewer planning.

NOW, THEREFORE:

IT IS HEREBY AGREED by and between the parties hereto as follows:

1. **Sewer Service Area.** The parties have agreed to a permanent sewer service area boundary between them. The boundary is graphically depicted on the map attached hereto as Exhibit "A", which is by this reference incorporated herein. Both parties further agree that Soos Creek in providing sewer service to the area shown on Exhibit "A", as "Area To Be Served By Soos Creek", shall be furnishing sewer service to properties within Auburn's Potential Annexation Area. Soos Creek shall provide service in accordance with and subject to the terms and conditions of this Agreement.

2. **Service Area Responsibility.** Auburn shall have responsibility to provide sanitary sewer service to the area(s) on Auburn's side of the respective service area boundaries as delineated by this agreement, whether or not annexed to Auburn, and subject to such reasonable conditions and terms of service as Auburn deems appropriate. Soos Creek shall have responsibility to provide sanitary sewer service to the area(s) on Soos Creek's side of the respective service area boundaries as delineated by this agreement, whether or not annexed to Auburn, and subject to such reasonable conditions and terms of service as Soos Creek deems appropriate. Auburn hereby gives consent to Soos Creek for such service within Soos Creek's corporate boundaries as they presently exist, or as they may be modified in the future by annexation. Soos Creek shall be responsible for obtaining all necessary governmental franchises, approvals, easements and permits for the installation of said sewerage system within their delineated boundary.

3. **Sewer Availability Certificates.** Both parties acknowledge that Auburn may exercise planning jurisdiction over territory to which it will not provide sanitary sewer service in accordance with this agreement. Auburn hereby agrees that its planning shall be for sanitary sewer service to be provided by Soos Creek in those areas shown in Exhibit "A" as Soos Creek's service area; provided, however, that commencing on March 1, 2001, Soos Creek sewer availability certificates for all

service areas to be served by Soos Creek within Auburn and/or Auburn's Potential Annexation Area (PAA) in accordance herewith, shall be issued to applicants for sewer service only through Auburn.

4. Soos Creek Comprehensive Sewer Planning Area. The terms of this agreement will be included as an element of Soos Creek's Comprehensive Sewerage Plan. Soos Creek will submit to Auburn all Comprehensive Sewerage Plans thereto involving area and/or system improvements within Auburn's planning area. The Comprehensive Sewerage Plans and amendments shall be in compliance with Auburn's Standards for sanitary sewer service within Auburn and/or Auburn's PAA, except where preexisting facilities may differ from Auburn's standards. As facilities are replaced or as new facilities are planned and constructed within Auburn and/or Auburn's PAA, they shall conform to Auburn's service and facility standards for sanitary sewer service then in effect.

5. Auburn Comprehensive Plan. The terms of this agreement will be included as an element of the sewerage portion of Auburn's Comprehensive Plan, and Soos Creek's Comprehensive Plan.

6. Future Annexations. Each of the parties agree that Soos Creek shall provide sanitary sewer service to the areas shown in Exhibit "A" without regard to the present corporate limits of the parties, and without regard to future corporate limits as they may be amended by annexation to either party.

7. Reliance. Each party hereto acknowledges that the terms hereof will be relied upon by the other in its comprehensive planning to meet the needs of the service area designated herein.

8. Liability. Neither party to this agreement shall be liable for any failure or interruption of service in the service area of the other party, as designated herein, except as may be specifically caused by the other party.

9. Government Approvals. The parties will give notice of the adoption of this Agreement to Metropolitan/King County, to the Department of Ecology, to the Department of Health, and to any other agency with jurisdiction or mission relevant to the terms hereof, and shall cooperate and assist in all reasonable manner in procuring any necessary approvals hereof by those agencies.

10. Boundary Review Board. In the event that implementation of the terms hereof results in permanent sewer service to areas that will be outside the respective service boundaries of Soos Creek or Auburn, the parties will at the time of such service jointly seek approval of the King County Boundary Review Board in accordance with R.C.W. 36.93.090.

11. Service Amendments. Any changes to the service areas described herein shall be by mutual agreement. Each party may give permission to the other on a case-by-case basis to provide service by one party into the other party's adjacent or nearby service area based upon considerations of economic efficiency for providing the service with mutual consent of Auburn's Director of Public Works and Soos Creek's District Manager.

12. Alteration, Amendment, Modification, or Termination. Soos Creek and Auburn hereby reserve the right to alter, amend modify or terminate the terms and conditions of this Agreement upon consent of both Parties given in writing.

13. Indemnification and Hold Harmless. Each Party hereto agrees to protect, defend, and indemnify the other Party, its officers, officials, employees and agents from any and all cost, claims judgements and/or awards of damages, arising out of or in any way resulting from the Party's default, failure of performance, or negligent conduct associated with this agreement, by the Party, its employees, subcontractors or agents. Each Party agrees that its obligations under this provision extend to any claim, demand, and/or cause of action brought by or on behalf of any of its employees, or agents. The foregoing indemnity is specifically and expressly intended to constitute a waiver of each Party's immunity under Washington's Industrial Insurance Act, RCW Title 51, as respects the other Party only, and only to the extent necessary to provide each Party with a full and complete indemnity of claims made by the other Party's employees. The Parties acknowledge that these provisions were specifically negotiated and agreed upon by them.

In the event either Party incurs any costs including attorney fees to enforce the provisions of this article and prevails in such enforcement action, all such costs and fees shall be recoverable from the losing Party.

The provisions of this section shall survive the expiration or earlier termination of this agreement with regard to any event that occurred prior to or on the date of such expiration or earlier termination.

14. Dispute Resolution. In the event that any dispute arises between the Parties, either Party may request in writing that the issue in dispute be resolved by Mediation and, if necessary, binding Arbitration. In the event the matter cannot be resolved by the mediation process then it shall go promptly to binding Arbitration with no right of appeal. Arbitration shall be by the American Arbitration Association, or by such other entity as the Parties agree.

15. Sanctity of Agreement. This agreement constitutes the entire agreement of the parties regarding the subject matter hereof, and there are no other representations or oral agreements other than those listed herein, which vary the terms of this agreement. Future agreements may occur between the parties to transfer additional or future service areas by mutual agreement.

16. Obligation Intact. Nothing herein shall be construed to alter the rights, responsibilities, liabilities, or obligations of either Soos Creek or Auburn regarding provision of sewer service, except as specifically set forth herein.

SOOS CREEK WATER AND SEWER DISTRICT

Approved by Resolution No. 2141-S of the Soos Creek Water and Sewer District, Washington, at its regular meeting held on the 21st day of March, 2001.

By:

~~Ron Speer~~, President of Board
Karen L. Webster

Attest:

Secretary of Board
Philip W. Sullivan

Approved as to form:

Soos Creek Attorney
Michael M. Hanis

2001 040 6001622

CITY OF AUBURN
Approved by Resolution No. 3321 of the City of Auburn, Washington, at its regular meeting held on the 20th day of February, 2001.

By:

Charles A. Booth, Mayor

Attest:

Danielle Daskam, City Clerk

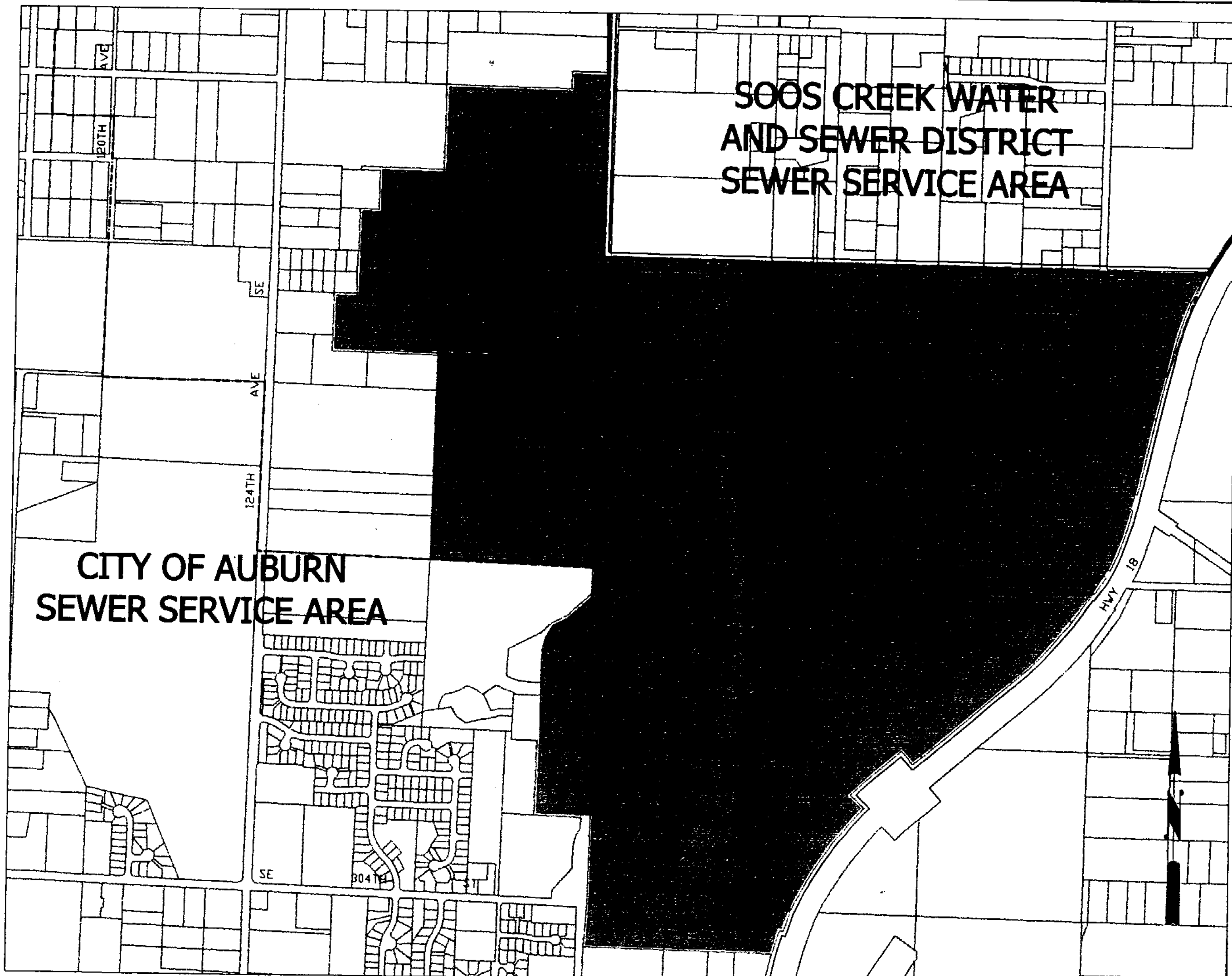
THE CITY OF AUBURN CORPORATE SEAL

Approved as to form:

Michael Reynolds, City Attorney

2001 040 6001622

February 6, 2001



PORTION OF SEC 33, 34 T22, R5 AND PORTIONS OF SEC 3, 4 T21, R5 KING COUNTY WA

LEGEND

- AUBURN POTENTIAL ANNEXATION AREA BOUNDARY
- CURRENT SCWSD SEWER SERVICE AREA
- AREA TO BE SERVED BY SOOS CREEK
- CURRENT SCWSD CORPORATE BOUNDARY

EXHIBIT A

CITY OF AUBURN AND SOOS CREEK WATER AND SEWER DISTRICT INTERLOCAL AGREEMENT FOR THE ESTABLISHMENT OF SANITARY SEWER SERVICE BOUNDARIES

PLEASE INITIAL IF APPROVED

02/06/2001

SCWSD AUBURN

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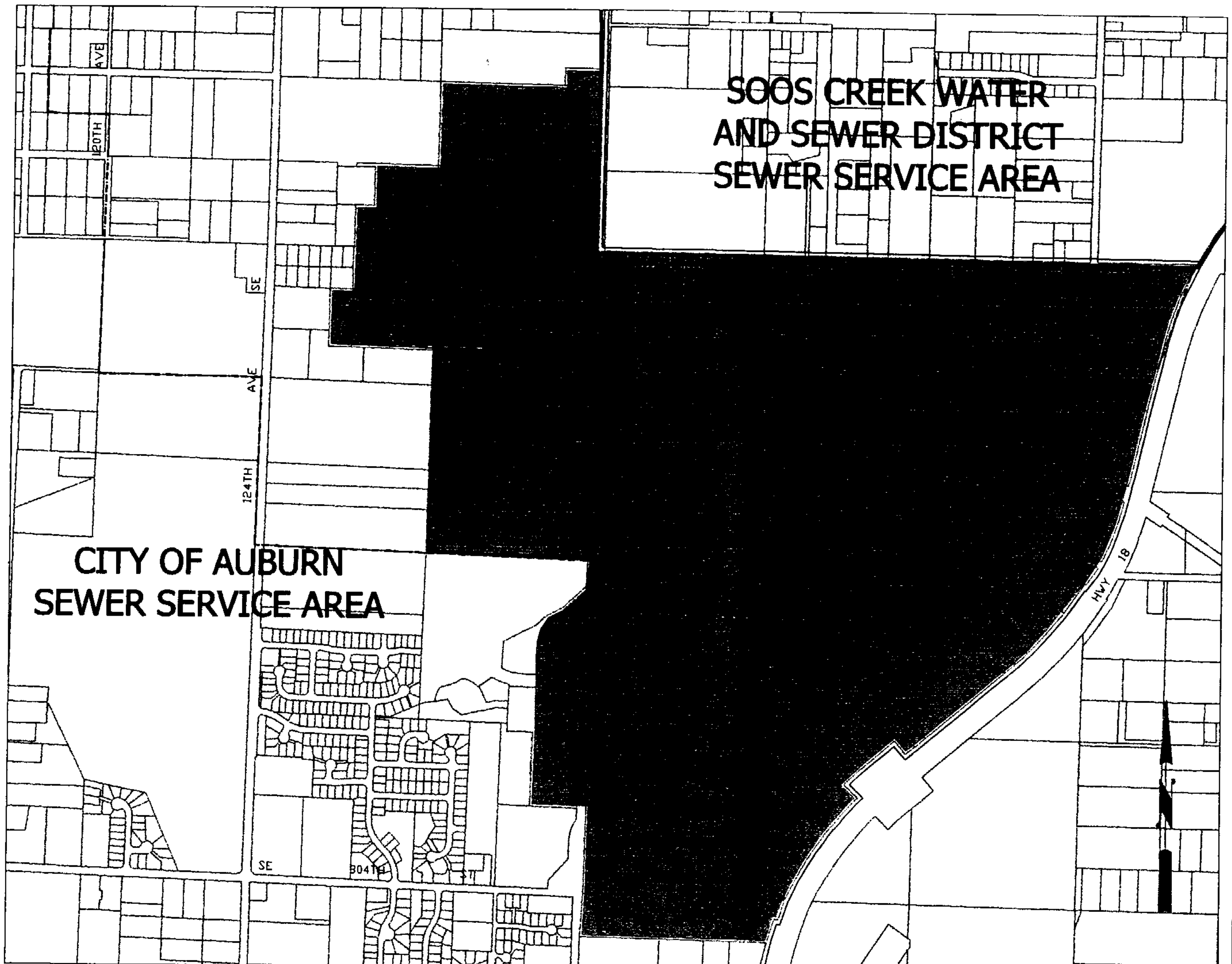

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PLEASE INITIAL IF APPROVED

SCWSD | AUBURN | 02/06/2001 | 1/1

JUNE 2000

LEGEND

- SCWSD CORPORATE BOUNDARY
- SCWSD SEWER PLANNING AREA BOUNDARY
- CITY OF KENT CORPORATE BOUNDARY
- CITY OF AUBURN SEWER SERVICE AREA BOUNDARY
- SEWER SERVICE DIVISION LINE

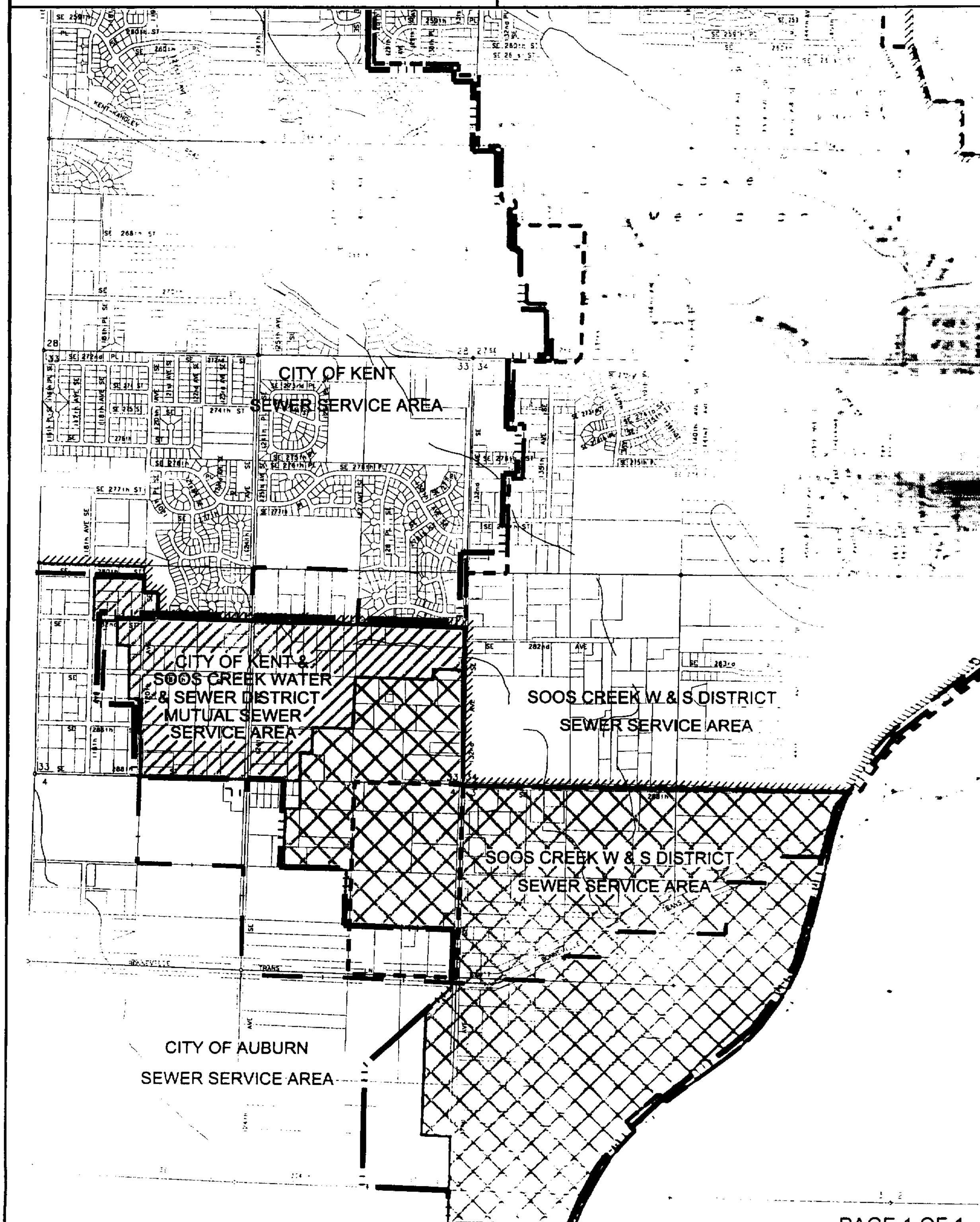
EXHIBIT "A"

CITY OF AUBURN / SOOS CREEK WATER & SEWER DISTRICT INTERLOCAL AGREEMENT

PROPOSED SEWER SERVICE PLANNING AREAS

APPROVAL

SOOS CREEK W & S DISTRICT — CITY OF AUBURN



Technical Memorandum

701 Pike Street, Suite 1200
Seattle, Washington 98101
Tel: (206) 624-0100
Fax: (206) 749-2200

Project Title: City of Auburn Sewer Phase II

Project No: 135494

Subject: Sewer Collection Systems Economic Life Model

Date: 2 December 2009

To: Robert Elwell, City of Auburn

Prepared by: Ian McKelvey

TABLE OF CONTENTS

1.0 Executive Summary

This memorandum has been prepared to document the assumptions and parameters used by Brown and Caldwell to perform an economic life analysis on the City of Auburn's sewer collections system. The economic life analysis identifies the economically optimal time to replace or refurbish each of the City's sewer segments by evaluating the probability of each segment failing and the corresponding consequence of a failure. Parameters used to identify a segment's probability of failure included age, material, length, slope, susceptibility to corrosion, frequency of maintenance activities, and sensitivity to an earthquake. Parameters used to measure the consequence of a segment failure included the cost of a spot repair; proximity to a railroad and to a water body; location with respect to zoning, street type, and critical facilities; slope; and diameter.

These parameters were used to develop a percent probability of failure (using a Weibull failure distribution) and a cost of failure in 2008 dollars. By multiplying the probability of failure by its cost, a risk cost carried for each segment was developed. Comparing the risk cost carried by each segment to the cost of either replacing or lining (when appropriate) that pipe, the economically optimal time for refurbishment and replacement (R&R) projects for each of the City's sewer segments was identified. Additionally, identifying which assets are carrying the most risk gives the City a means to prioritize future conditional assessments and optimize current maintenance practices.

The results of this analysis are that, due largely to the relatively young age of the sewer collections system, there are no projects recommended within the next 6 years. **Table ES-1** summarizes the next 10 segments identified for an intervention.

Table ES-1. Next 10 Sewer Segments Recommended for Intervention

Upstream Manhole	Downstream Manhole	Length (ft)	Diameter (in)	Age (yrs)	Pipe Material	Consequence Cost	Intervention Year	Intervention Type	Intervention Cost
907-45	907-44	48	10	99	TBD	$22,598	2014	Line	$3,500
Unknown	Unknown	1,503	6	46	Force Main	$19,873	2022	Line	$84,185
Unknown	Unknown	14	4	92	Force Main	$13,318	2024	Line	$2,800
907-47	907-45	210	10	99	TBD	$22,598	2026	Line	$14,729
509-13	509-40	113	42	11	TBD	$361,388	2028	Replace	$59,903
907-34	907-32	355	10	99	TBD	$22,598	2028	Line	$24,817
909-58	1009-44	285	10	98	TBD	$12,517	2035	Line	$19,950
707-33	607-11	369	12	25	TBD	$86,477	2035	Line	$31,013
Unknown	Unknown	4,798	8	18	Force Main	$24,843	2035	Line	$302,282
308-11	308-10	44	21	23	TBD	$84,267	2037	Replace	$15,350

The analysis also produced a prioritized list for maintenance and conditional assessment activities. **Table ES-2** summarizes the ten sewer segments currently carrying the most risk for the City and **Figure ES-1** provides a geographic representation of where the City's most critical assets are located (identified in red). The risk analysis recommends that these segments receive first priority for conditional assessments, and that the maintenance strategy for these segments should proactively identify problems rather than reactively respond to them.

Table ES-2. Top 10 Sewer Segments with the Highest Risk Cost at Present								
Upstream Manhole	Downstream Manhole	Length (ft)	Diameter (in)	Age (yrs)	Pipe Material	Consequence Cost	Probability of Failure	Risk Cost
307-17	307-16	80	72	24	TBD	$906,054	0.87%	$7,861
Unknown	Unknown	1503	6	46	FORCE MAIN	$19,873	37.46%	$7,444
508-01	508-02	128	42	11	TBD	$478,600	0.85%	$4,081
509-14	509-13	123	42	11	TBD	$361,388	0.85%	$3,081
509-13	509-40	113	42	11	TBD	$361,388	0.85%	$3,080
507-04	507-05	92	42	17	TBD	$337,120	0.86%	$2,890
508-09	508-24	123	42	8	TBD	$262,838	0.85%	$2,237
809-33	809-02	107	21	17	TBD	$231,306	0.86%	$1,986
809-66	809-69	407	18	19	TBD	$214,847	0.89%	$1,922
809-25	809-52	380	24	14	TBD	$220,062	0.87%	$1,907

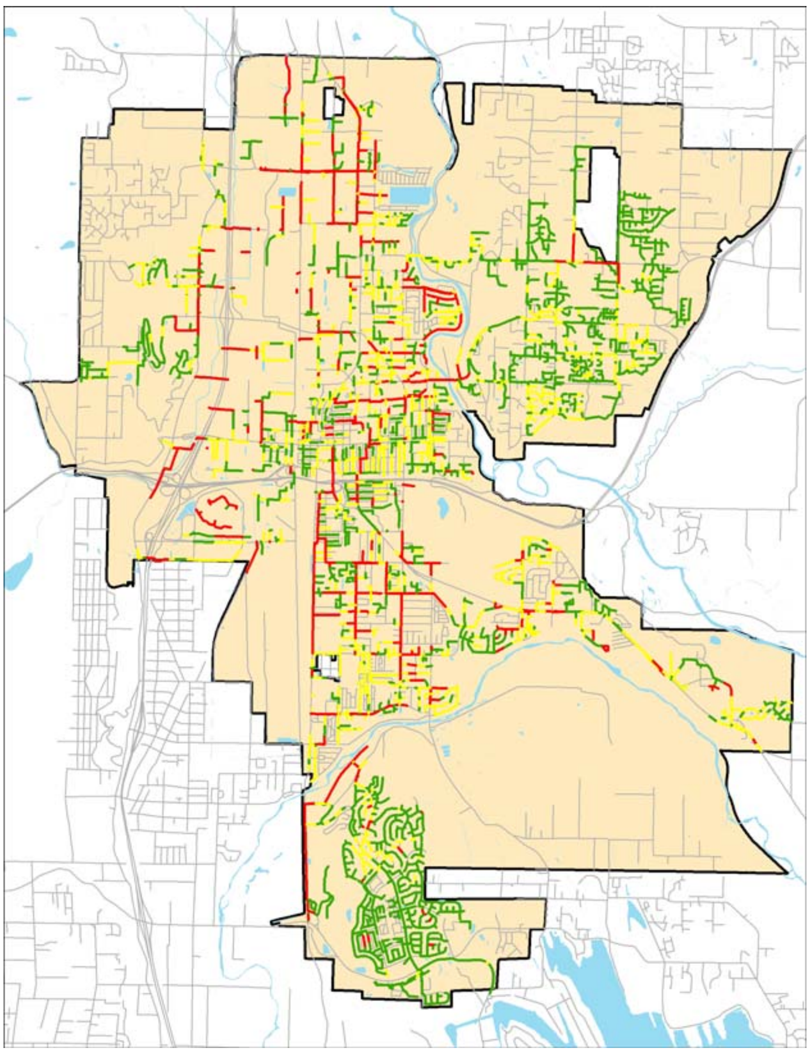


Figure ES-1. City of Auburn Sewer Collections Systems with Color Coding to Indicate Relative Criticality

Introduction

This memorandum documents the parameters and valuation Brown and Caldwell used to develop an economic life model for the City of Auburn (City) sewer collection system. The model allows the City to estimate and evaluate the risk cost associated with each of its roughly 4,500 sewer pipe segments. The model predicts a probability and a cost of failure for each segment, modified by specific parameters associated with the likelihood and consequence of failure parameters identified in conjunction with the City. The risk cost of an asset is calculated by multiplying the probability of the asset failing by the cost of the asset failing. By comparing the risk cost of each segment to the minimum annualized cost of ownership for an intervention, the optimal economic timing for either lining or replacing each segment is calculated. With this economic life information, rehabilitation and replacement (R&R) projects can be identified for consideration, R&R budget and long-term rate forecasting can be predicted, and a business case validation can be made for each segment intervention. In addition, maintenance activities can be prioritized to focus on the assets for which the City is carrying the majority of its risk.

2.0 Background and Purpose

The goal of the Sewer Phase II project is to assist the City in developing a Comprehensive Sewer Plan. As a portion of the Comprehensive Plan, Brown and Caldwell was tasked with supporting CIP development by sustainably meeting required customer service levels, effectively managing risks, and minimizing the City's costs of ownership. In addition, operations and maintenance program recommendations are to be included to assist in transitioning from a reactive maintenance environment to a proactive environment. The development of an economic life model that calculates optimal timing for asset intervention and prioritizes assets for maintenance attention was identified as an aid to meeting these goals. Key concepts of an asset economic life model are briefly defined below.

Probability of Failure

The economic life model builds upon the concept that asset failure is defined by both the likelihood and the consequence of a failure. In an economic life model, the likelihood of failure is treated as a failure rate probability generated using the industry-accepted Weibull distribution to develop a probability of failure in any future year based on an asset's age. **Figure 1** provides an example of different Weibull distributions. Modifications to the failure curves are made to capture the unique conditions of a specific segment that may indicate an increased failure rate.

Cost of Failure

The consequence of an asset failing is estimated by considering the financial, social, and environmental costs associated with an asset failing to meet its design service levels. Consequence parameters developed in conjunction with the City were assigned estimated costs to capture the impact of an asset failure. These costs and those of responding to an asset failing constitute the total cost of a failure.

Risk Cost

The product of the probability of an asset failing in a particular year and the total cost of the asset failing represent the annual risk cost carried by that asset. The risk cost represents actual costs carried by the City and the community. With accurate failure probabilities and costs that capture the financial, social, and environmental impacts of a failure, the total risk cost carried by all of the segments in the City's collection systems can be defined.

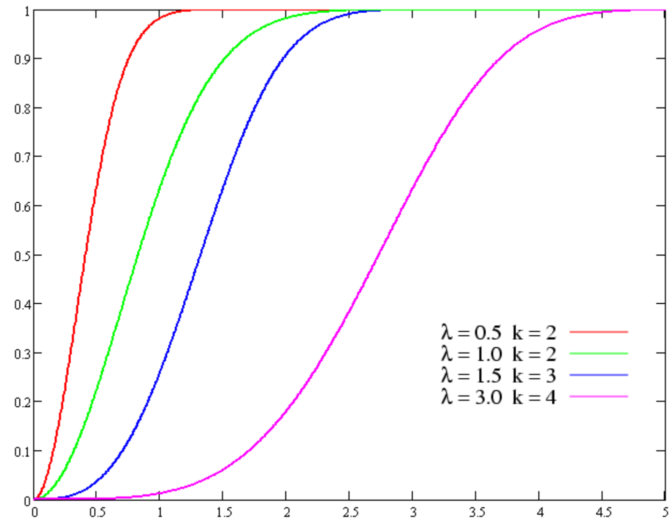


Figure 1. Example of Weibull distributions with varying shape (k) and scale (λ) parameters to represent different failure conditions

Intervention Modes

There are many ways an organization can reactively or proactively address an asset failure. For the economic life model developed here, the intervention modes include an open-cut replacement of a segment and, for segments for which it was deemed appropriate, lining of the segment. Examples of these are shown in **Figures 2** and **3**.

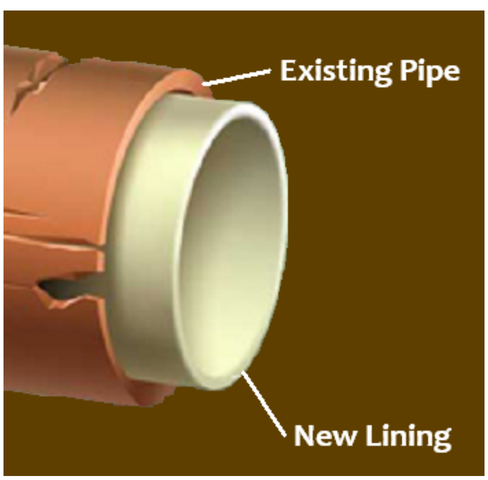


Figure 2. Example of pipe lining

Figure 3. Example of open-cut pipe installation at Melrose, MA

Minimum Annual Cost of Ownership

The optimal time for an intervention is when the risk cost of an existing asset is equivalent to the minimum annual cost of ownership of an intervention. The annual cost of ownership of an intervention is defined as the total cost of an intervention mode, including capital and risk costs, divided by the number of years the asset is owned. When the existing asset's risk cost is greater than or equal to the minimum annual cost of ownership of the intervention, the optimal time for intervention has been reached. This concept is illustrated in **Figure 4**.

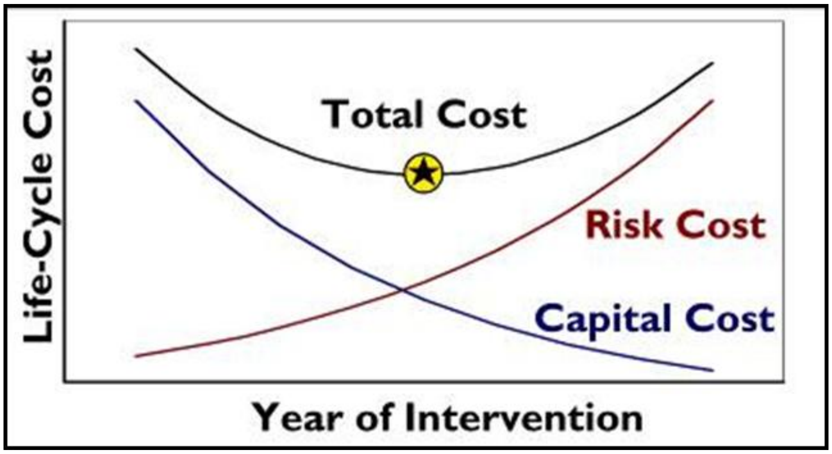


Figure 4. Sketch of the annual cost of ownership as a sum of annual risk cost and annualized capital cost

Using the concepts described above, each segment in the City's collection systems was evaluated for the risk cost it carries. Identifying the highest-risk assets allows the City to prioritize its maintenance activities and conditional assessments. In addition to maintenance prioritization, the segment's future risk costs can also be predicted. These future risk costs can be compared to the minimum annual cost of ownership for both a pipe replacement and inversion lining (when appropriate) to estimate when the pipe should be considered for the appropriate R&R project. A basis for prioritizing R&R projects in terms of benefit-cost is also provided for years in which several R&R projects are projected. By collecting the intervention costs for each year in the future, a budget for future R&R needs and projections for long-term rate adjustments can be developed.

The specifics of the fundamentals and development of the economic life model are explained in further detail below.

3.0 Economic Life Model Development

The following paragraphs describe the development of the economic life model, including detailed descriptions of the building components of economic life and the assumptions incorporated into the model.

3.1 Probability of Failure Calculation

For the economic life model developed, the failure rates of the City's segments were assumed to follow a Weibull distribution. As mentioned above, the Weibull distribution is an industry-accepted means of predicting a failure rate for an asset based on the age and expected service life of an asset. The annual failure rate of an asset (h) generated by a Weibull distribution as a function of age (x), a shape parameter (k), and the asset's expected service life (λ) is represented by the following equation.

$$h(x,k,\lambda) = \frac{k}{\lambda}\left(\frac{x}{\lambda}\right)^{k-1}$$

Modifying the service life or shape parameter will increase or reduce the failure rate to better represent the rates of failure observed by the City. **Figures 5** and **6** demonstrate the impacts of modifying the shape parameter and service life, respectively. For segments with missing installation date information, the average age of the City's collections system as a whole (17 years) was used as a placeholder. As more information becomes available, the correct install date can be included in the model.

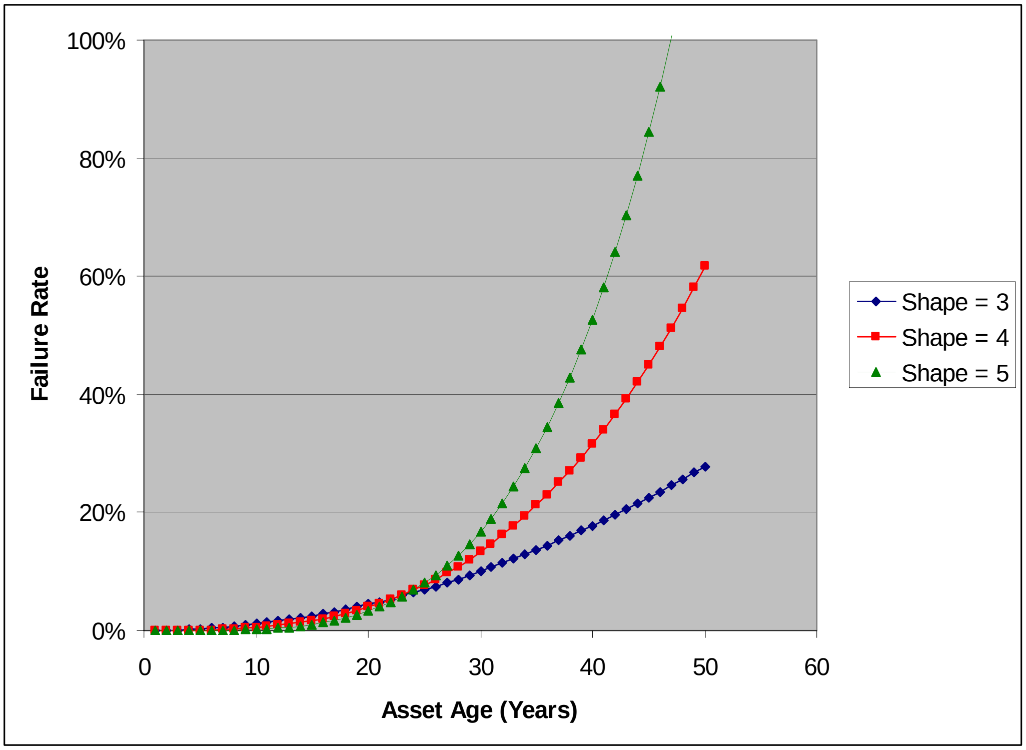


Figure 5. Failure rate with varying shape parameters (Service life is constant at 30 years)

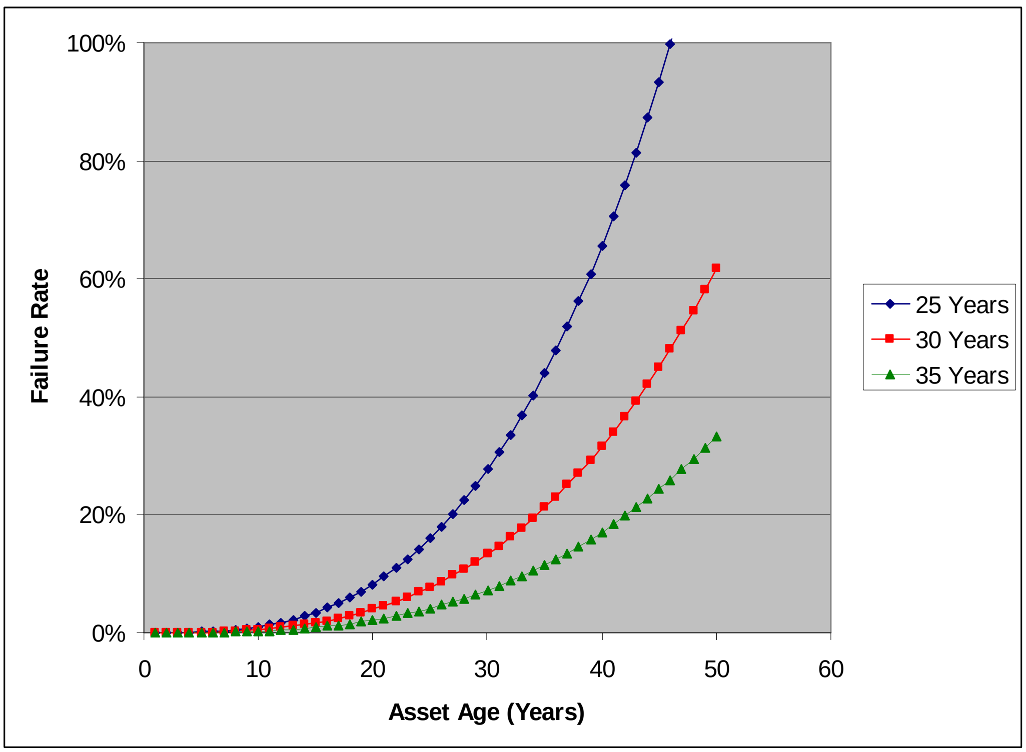


Figure 6. Failure rate with varying service life (Shape parameter is constant at 3)

The service life applied in the economic life model is based on the pipe type and was developed based on industry standards and Brown and Caldwell's experience. **Table 1** documents the service life used for each pipe type. For segments with missing material type information, a blanket assumption of an 80-year service life was used until actual material information can be included.

Table 1. Pipe Segment Service Life by Material Type		
Pipe Material	Code	Service Life
Advanced Drainage Systems	ADS	80
Concrete	CONCRETE	80
Ductile Iron Pipe	DI	80
Ductile Iron Pipe	FORCE MAIN	50
High Density Polyethylene	HDPE	100
Unknown	N/A	80
Polyethylene	PVC	100
Vitrified Clay Pipe	TBD	100
Tile	TILE	100

A shape factor of 4 was assumed based on the existing annual failure rate of the City's pipes provided by City staff. With the service life defined and a shape parameter of 4 assumed, the annual probability of failure for each segment can be calculated based on the material type and the age of the pipe. In addition, other parameters can impact the rate of failure for a pipe segment; these parameters are addressed in the following section.

3.2 Probability of Failure Modifiers

Pipe failure is more than just a function of age and material. Additional conditions, such as soil type, slope, corrosion, and other features can influence the timing of a pipe failure. To capture these additional conditions, likelihood parameters developed in conjunction with the City were used to modify the service life and shape parameter developed for each segment. Those parameters and their modification are described below.

Condition Score

A segment's condition score from recently observed data is the ideal means to identify potential failures. For those segments with an available condition score, the service life used to predict the probability of failure can be reduced depending on the severity of the condition. At present, no condition information on sewer segments has been available, but a placeholder has been included in the model to incorporate these data when condition information is available in the future. **Table 2** details how the service life can potentially be reduced based on condition.

Table 2. Condition Score Modification	
Defect Score	Service Life Reduction
Excellent or No Score	0%
Good	13%
Fair	25%
Poor	38%
Imminent Failure	50%

In this way, a pipe with a very poor condition score would appear "older" in the economic life model than it actually is. For example, we assume that a typical PVC pipe lasts 100 years, but if recent CCTV data identified a pipe condition score of fair, we would expect that pipe to only have a 75-year service life.

Maintenance Frequency

Occasional repairs are expected during the life of a pipe; however, when frequent repairs and service visits occur for one particular pipe, it may indicate that local conditions for that pipe increase the probability of failure. At present, maintenance frequency information was available for jetting and cleaning on "problem" segments. This information is a valuable surrogate for pipes with known problems with fats, oils, and greases (FOGs) and roots intrusion. The service life for these segments was reduced depending on the frequency of attention required, as shown in **Table 3**.

Table 3. Maintenance Frequency Modification	
Frequency of Maintenance Activity	Service Life Reduction
Annual or Less Frequent	0%
Semi-Annual	5%
Quarterly	10%
Monthly	15%
Weekly	20%

Slope

The backfill surrounding pipes in critical slopes is potentially less stable than backfill surrounding pipes in shallow slopes. Shifting backfill puts much more stress on pipe connections in critical slopes than on level grade. This additional stress leads to a higher likelihood of joint separation.

The slope associated with each of the City's segments was calculated using GIS information with topography contours. A slope value was calculated for the entire modeled area, and any segment that crossed a slope value exceeding 15% was marked as a steep slope segment. Steep slope segments were given a shape parameter 25% greater than segments located in shallow slopes. The increased shape parameter has the effect of aging a pipe more quickly without changing the service life (as seen in **Figure 5**).

Corrosion

Pipe corrosion is typically caused by hydrogen sulfide (H_2S) gas and can affect both cement-based and metallic pipes. Corrosion rating data are currently not available, so it was assumed that corrosion is limited to the two segments immediately downstream of a force main or segments with a downstream connection to a

Metro pipe. These segments represent discharge locations as oxygen is reintroduced into the water and the H_2S is released. For segments identified as susceptible to corrosion, the service life was reduced by 40%; the service life for all other segments was not reduced.

Sensitivity to Earthquake

City staff identified clay pipes located in the valley as being significantly more vulnerable to failure during a substantive earthquake. According to the U.S. Geological Survey, there is an 84% chance of a 6.5 magnitude or greater earthquake in the Puget Sound region within the next 50 years. Assuming an equal likelihood for each year, that equates to a 1.7% chance each year. Assuming half of the clay pipes located in the Auburn valley would fail during a 6.5 earthquake, each clay segment located in the valley was given an additional 0.85% chance of failing.

At present, there were no segments in the City inventory identified as vitrified clay pipes. With 797 segments marked as "TBD" (to be determined), Brown and Caldwell assumed that the segments with unknown material type accounted for the clay pipes known to be in the City's collections system. In the future, identifying the correct material type for each segment will improve the accuracy of the economic life model.

Segment Length

The length of a segment has a direct correlation to the probability of a failure. Intuitively speaking, it is easy to imagine that a 2,000-foot segment has much more opportunity to fail than a 10-foot segment. The Weibull failure distribution presumes a number of failures per length of a pipe. Brown and Caldwell's experience has shown that distribution can accurately predict the number of failures for a 250-foot length of pipe. Because the City of Auburn's sewer collection system has an average segment length of 200 feet, scaling the probability of failure based on a baseline length of 250 feet was assumed to be appropriate.

Once the probability of failure for each segment was calculated and adjusted based on the parameters described above, the calculated probability of failure was then multiplied by the ratio of the segment's length to a 250-foot baseline. Thus, if the Weibull distribution (after being modified by the parameters described above) calculated a 10% probability of failure for both a 500- and 125-foot segment, the final probability used in the model would be 20% for the 500-foot segment and 5% for the 125-foot segment.

With the modifications to the service life and shape parameter described above and the final adjustment based on pipe length and earthquake susceptibility, a probability of failure was generated for each segment. Because the Weibull distribution can be used for any age of pipe, the probability of failure for each segment can also be calculated to predict future risk costs in conjunction with the cost of failure information described in the following section.

3.3 Cost of Failure Calculation

The economic life model captures the total consequence of a failure with actual dollar values by considering the triple bottom line: financial, social, and environmental costs. Circumstances unique to a pipe's location and service type will impact the cost if a failure occurs and will be addressed in the following section.

In developing the baseline consequence cost, the costs identified were limited to spot repair. Because a majority of pipe failures do not result in a loss of service, additional costs (claims, regulatory fines, cleanup costs, etc.) were included only as modifiers in the next section. The spot repair costs were developed based on evaluation of the following five cost categories:

1. Labor
2. Equipment
3. Shoring
4. Dewatering
5. Bypass pumping

All costs were scaled based on either the pipe's depth of bury or its diameter. Each segment's depth of bury was estimated using the invert elevations of the segment's corresponding manhole connections. The average of the two invert elevations was then subtracted from the elevation at grade at the midpoint of the segment. This provided a rough estimate of depth of bury; however, if any of the three elevations used were missing, the depth of bury could not be calculated. For segments with missing depth of bury, the average depth of bury for the sewer collection system as a whole (14 feet) was used. **Table 4** summarizes the costs required for a spot repair scaled based only on the depth of bury. The costs presented include labor, equipment, shoring, and dewatering costs.

Table 4. Spot Repair Costs

Depth of Bury	Repair Costs
Less than 4 feet	$2,000
4 to 8 feet	$3,000
8 to 12 feet	$4,000
12 to 16 feet	$7,500
16 to 22 feet	$10,000
22 to 30 feet	$12,500
30 to 50 feet	$25,000
More than 50 feet	$50,000

Bypass pumping may be required during most spot repairs. The costs identified in **Table 5** were used to approximate the additional costs for bypass pumping as a function of the diameter of the pipe. For segments missing diameter information, the average diameter of the collection system as a whole (9 inches) was used as a placeholder.

Table 5. Bypass Pumping Costs

Pipe Diameter	Bypass Pumping Cost
Less than 12 inches	$500
12 to 24 inches	$1,250
24 to 36 inches	$2,500
36 to 48 inches	$4,000
48 to 60 inches	$6,000
More than 60 inches	$7,500

The final spot repair cost is the sum of the costs identified in **Tables 4** and **5**. As an example, this process results in a spot repair cost of $5,250 for a 15-inch pipe with a 10-foot depth of bury.

3.4 Cost of Failure Modifiers

Repair costs do not constitute the entire cost of a pipe failure. Other financial, social, and environmental costs must be included as well. The consequence parameters developed with the City were monetized in the economic life model to reflect actual failure costs. For some of the parameters this involved modifying the cost of repair to reflect extenuating circumstances. For other parameters this cost reflects social and environmental concerns. Each parameter is explained in detail below.

For the first four consequence parameters evaluated, the cost of a failure was assumed to not have any significant social or environmental impacts. Instead, these parameters were assumed to only describe circumstances that would make spot repair cost more expensive than those described in the previous section. As such, the cost of failure for each parameter below is given in terms of the additional cost for a spot repair. These four parameters are:

1. Proximity to a railroad
2. Located in an easement
3. Located underwater
4. Located in a critical slope

In addition to these parameters, a 40% markup to the total cost of a repair was assumed to account for the inherent inefficiencies involved in emergency repair work. Because not every pipe failure requires an emergency spot repair, the 40% markup was added only at a rate that represents the percentage of pipe failures that result in a loss of service. Based on experience with other agencies, this rate was assumed to be 5%, but can be modified to reflect the experience of City staff.

The following paragraphs describe each of the four parameters identified above.

Proximity to a Railroad

Segments that run under or parallel to a railroad can be significantly more difficult to access and repair than other pipes. Using GIS information provided by the City, pipes located within 50 feet of a railroad were identified. Those segments were assumed to have their repair costs doubled beyond the baseline cost for a repair.

Located in an Easement

Access difficulties and resolution of right-of-way issues make repairs of pipe segments located in an easement more costly. At present, the location of easements has not been provided, but a placeholder for that information was provided. For segments identified as being located in an easement, repair costs are assumed to increase by as much as 50%.

Underwater

Pipe segments located underwater are considerably more difficult to repair due to access difficulties and limitations in repair options. There are currently no underwater segments identified in the model. If segments are identified, a placeholder has been provided that assumes repair costs for underwater segments would be three times higher than typical costs.

Located in a Critical Slope

Segments located in critical slopes can be difficult to access and have limited repair options during a failure. Repair costs were assumed to increase by 50% for segments located within a slope greater than 15%.

For the remaining four parameters used to measure the cost of a failure (zoning, road type, distance to a water body, and serves essential facilities), the cost of a failure is assumed to include social and environmental consequence costs. The costs considered for these parameters are based on six categories:

1. Access inconvenience
2. Traffic delays
3. Surface spills/backups
4. Disruption of service
5. Negative news article/public perception
6. Regulatory pressure

The cost of failure for these six categories was assumed to account for the failure of an 8-inch sewer pipe. A multiplier based on the diameter of pipe was included as described below. The details and assumptions used to prepare these costs, detailed in **Appendix A**, were generated based on Brown and Caldwell's consulting experience and can be updated based on the City's experiences and local knowledge. Not all pipe failures result in a loss of service or a spill; therefore, a probability of occurrence (also developed based on Brown and Caldwell's experience) was added to better capture the actual costs carried.

Zoning

The type of customer a pipe serves impacts the social cost of a pipe failure. The number of customers impacted and the cost of the impact vary between residential, commercial, and industrial customers.

Zoning information was gathered in GIS from information collected by the City. Segments crossing more than one zone were assigned to the zone that is the most consequential (i.e., commercial first, industrial second, and residential third). Segments that did not cross any zones were listed as "Other" and had no zoning consequence cost associated with them. **Table 6** summarizes the costs that are associated with a failure based on the zoning assigned to each segment.

Table 6. Zoning Impact on Cost of Failure

Customer Type	Access Inconvenience		Disruption of Service		Surface Spills/Backups		Negative News Article		Regulatory Pressure		Total Cost
	$	%	$	%	$	%	$	%	$	%	
Residential	$200	100%	$400	5%	$15,560	5%	$16,240	2.5%	$28,220	1.2%	$1,742
Commercial	$6,400	100%	$3,200	5%	$21,560	5%	$16,240	2.5%	$28,220	1.2%	$8,382
Industrial	$1,400	100%	$2,400	5%	$10,780	5%	$16,240	2.5%	$28,220	1.2%	$2,803

Road Type

The type of road a pipe runs along determines the impact a pipe failure has on traffic delays, spill costs, public perception, and regulatory pressure. Segments were assigned a road type if they were located within 50 feet of a road, based on mapping information supplied by the City. Segments that were close to more than one road type were assigned the more consequential road type (i.e., highway first, arterial second, and collector third). Segments not located within 50 feet of any road were assigned as "None" and not given a consequence cost for this parameter. **Table 7** summarizes the costs associated with a failure based on road type.

Table 7. Road Type Impact on Cost of Failure									
Road Type	Traffic Delays		Surface Spills/Backups		Negative News Article		Regulatory Pressure		Total Cost
	$	%	$	%	$	%	$	%	
Collector	$1,600	100%	$5,780	2.5%	$16,240	2.5%	$28,220	1.2%	$2,489
Arterial	$6,400	100%	$5,780	2.5%	$16,240	2.5%	$28,220	1.2%	$7,289
Highway	$28,800	100%	$5,780	2.5%	$16,240	2.5%	$28,220	1.2%	$29,689

Distance to a Water Body

Pipes that run close to water bodies (lakes, streams, marshes, etc.) carry a higher risk of environmental and social impacts should a sanitary spill occur. Cleanup costs for a spill to a water body are also generally higher than typical. **Table 8** summarizes the costs associated with a failure relative to a segment's proximity to a water body.

Table 8. Water Body Impact on Cost of Failure							
Distance to Water Body	Spill to Freshwater		Negative News Article		Regulatory Pressure		Total Cost
	$	%	$	%	$	%	
Less than 50 ft	$26,336	1.2%	$16,240	2.5%	$28,220	1.2%	$1,060
50 to 150 ft	$19,224	1.2%	$16,240	2.5%	$28,220	1.2%	$965
More than 150 ft	$12,112	1.2%	$16,240	2.5%	$28,220	1.2%	$890

Essential Facilities

Segments that serve essential facilities such as hospitals, police stations, airports, and fire stations have a greater social impact during a failure. GIS was used to identify the segments within areas of critical importance identified by the City. **Table 9** summarizes the costs of a failure for pipes located near one of these essential facilities.

Table 9. Essential Facilities Impact on Cost of Failure									
Facility Type	Access Inconvenience		Disruption of Service		Negative News Article		Regulatory Pressure		Total Cost
	$	%	$	%	$	%	$	%	
Airport	$6,800	100%	$21,200	5%	$16,240	5%	$28,220	1.2%	$9,025
City Hall	$4,200	100%	$28,800	5%	$16,240	5%	$28,220	1.2%	$6,805
Justice Center	$4,200	100%	$28,800	5%	$16,240	5%	$28,220	1.2%	$6,805
Fire Dept	$2,560	100%	$3,840	5%	$16,240	2.5%	$28,220	1.2%	$3,511
Medical Center	$8,640	100%	$300,000	5%	$16,240	5%	$28,220	2.5%	$25,158

Pipe Diameter

The consequence costs developed for the previous four parameters were assumed to be for an 8-inch-diameter segment. The volume of water spilled is an indicator of the cost of a failure, with the consequence cost increasing as the volume spilled increases. To account for this, a multiplier was added to the costs presented in **Tables 6** through **9** based on the square of the diameter of the pipe. Specifically, the diameter adjustment was calculated as the pipe diameter squared divided by 64. For example, a 12-inch pipe would have the consequence costs identified above multiplied by a factor of 2.25 ($12^2 \div 8^2 = 2.25$). For segments with missing diameter information, the average diameter of the collection system as a whole (9 inches) was used.

Once all of the modifiers are added, the total cost of a failure for each segment can be calculated. This cost, multiplied by the probability of failure, establishes the risk cost of each segment and can be used to estimate the optimal time to intervene.

3.5 Optimal Intervention Timing Calculation

With the calculation of a probability of failure and a cost of failure for each segment, the annual risk cost of each segment was generated by multiplying the cost by the probability. If the assumptions built into determining the probability and cost are accurate, the risk cost should represent an actual dollar value carried (some by the utility, some by the community).

Additionally, because the conditions used to estimate the cost of failure are assumed to remain unchanged from year to year and the probability of failure is calculated based on age, a risk cost can be generated for any number of years into the future. Next year's risk cost is simply calculated by multiplying the cost of a failure by the probability of failure using next year's age. In this way, risk costs can be projected into the future, as shown in **Figure 7**.

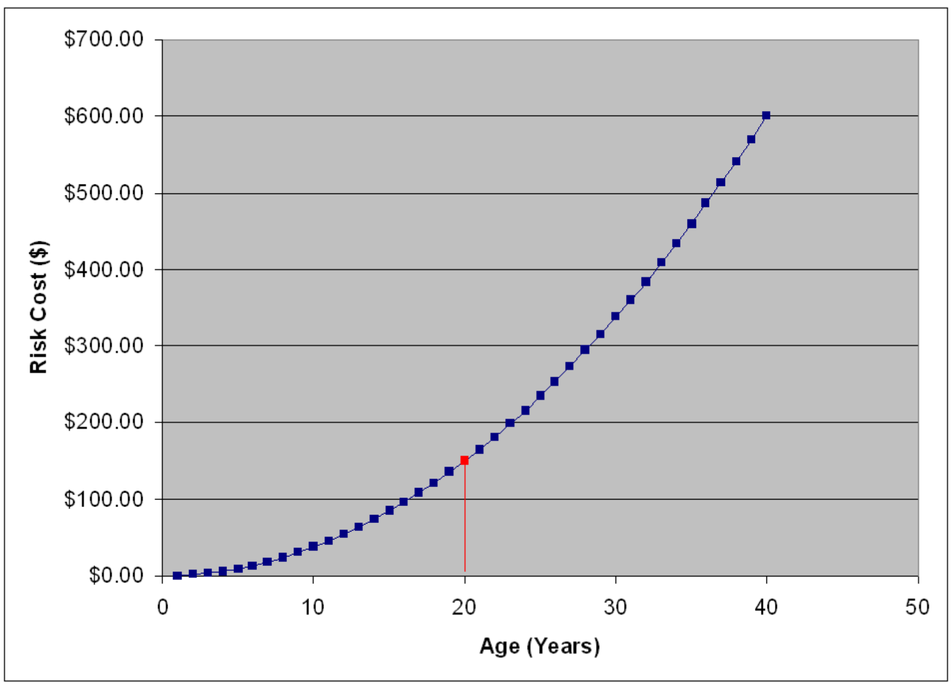


Figure 7. Example of Projecting Future Risk Costs Beyond the Current Age (20 in this example)

Even with an annual accounting of risk carried by an asset, the economically optimal time to replace the asset is still not immediately apparent. The asset's risk curve does not present an obvious age that justifies an intervention. To determine the appropriate age, the risk cost carried by an existing asset must be compared to the cost of an intervention. This cost can be determined by calculating an annualized capital cost for the intervention and the annualized risk cost carried after the intervention has been implemented. For the economic life model, two intervention modes were considered: pipe replacement and pipe lining. The capital costs for both modes are presented below.

Open-Cut Pipe Replacement

Table 10 details the construction cost per linear foot for an open-cut pipe replacement based on pipe diameter. This includes a category for pipes within a 16-foot depth of bury and a second category for deeper pipes. The costs presented below do not include a 1.35 multiplier for engineering, contingency, and permitting costs that was added into the model. Additionally, a minimum pipe length of 50 feet was assumed in order to set a minimum replacement cost and prevent very short segments from being priced too low.

Table 10. Open-Cut Pipe Replacement Construction Costs Per Linear Foot

Pipe Diameter	Construction Cost (Depth of Bury <16 ft)	Construction Cost (Depth of Bury >16 ft)
6	$193	$318
8	$198	$325
10	$204	$335
12	$226	$371
14	$246	$397
15	$256	$410
16	$264	$420
18	$278	$441
20	$297	$468
21	$307	$481
24	$338	$524
26	$355	$548
27	$363	$560
28	$378	$580
30	$407	$619
32	$429	$649
36	$474	$708
38	$493	$734
40	$511	$759
42	$530	$785
43	$548	$807
44	$567	$829
48	$636	$916
54	$764	$1,080
60	$886	$1,220
66	$1,001	$1,355

72	$1,100	$1,490

Lining

Replacing a failed pipe is not always the preferred option. Lining a pipe can extend its life much more cost effectively than an open-cut pipe replacement. For the model developed here, the effect of lining a pipe was assumed to be an extension of the pipe's life by 50 years. Additionally, consideration for lining was only given to pipes that are not already plastic (excluding HDPE, PVC, HDPP, etc.) and are 60 inches in diameter or less. In the future, additional consideration for existing capacity can be included to eliminate lining as an option for pipes that are already at peak capacity.

Table 11 details the estimated construction costs for lining (costs for lateral connections are limited to cutting an opening for the lateral connection).As with the open-cut replacement, engineering, contingency, and permitting costs are not included in the construction costs presented below, but were added to the model via a 1.35 multiplier. A minimum pipe length of 50 feet was also assumed to ensure accurate costs for very short segments.

Table 11. Inversion Lining Construction Costs Per Linear Foot

Pipe Diameter	Construction Cost
6	$43
8	$43
10	$55
12	$67
14	$82
15	$91
16	$95
18	$100
20	$104
21	$106
24	$122
26	$143
27	$153
28	$164
30	$185
32	$199
36	$215
38	$470
40	$497
42	$524
43	$537
44	$549
48	$598
54	$674
60	$751

With the cost of an intervention estimated, the annualized capital cost can be calculated. The annualized capital cost is simply the capital cost of the intervention divided by the number of years since the intervention. For example, a $100,000 pipe replacement has an annualized capital cost of $100,000/year in year 1, $50,000/year in year 2, and $33,000/year in year 3. **Figure 8** graphically demonstrates this principle. Capital costs for full pipe replacement and lining (when appropriate) were considered for each segment, and an interest rate of 5% was included in the model to account for the net cost of capital financing.

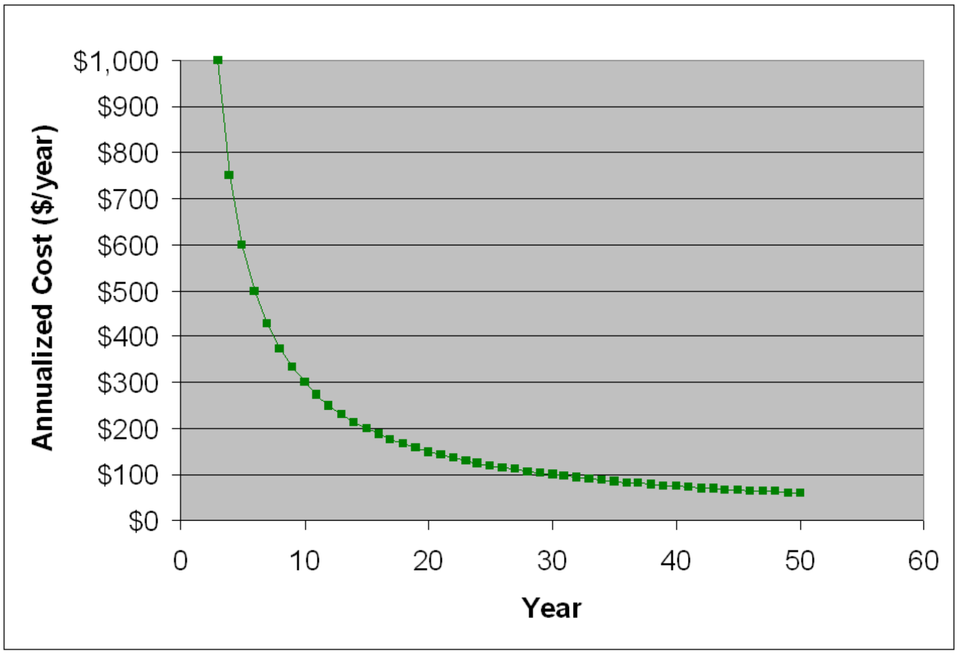


Figure 8. Example of Annualized Capital Cost for a $3,000 Intervention

The next step was to calculate the annualized risk cost of an intervention. The risk cost carried by the intervention is calculated using the same principles as the existing asset. The probability of failure is modified to represent the intervention (i.e., a 50-year younger pipe for lining, a new pipe for a replacement) and the cost of failure is the same as that for the existing asset. To calculate an annualized cost of ownership, the intervention risk cost was annualized by accumulating all of the risk costs paid by the number of years since the intervention. For example, if the risk costs for the first 3 years of a relined pipe are $100, $400, and $1,000, the annualized risk cost for the intervention is $100/1 year = $100/year in year 1, ($100+$400)/2 years = $250/year in year 2, and ($100+$400+$1,000)/3 years = $500/year in year 3.

An example of this concept is shown in **Figure 9**. The risk cost used to calculate the annualized risk cost in **Figure 9** is identical to the risk costs presented in **Figure 7**. By annualizing the costs presented in **Figure 7**, the risk curve shown in **Figure 9** maintains a similar shape, but, because the cost is distributed over several years, the curve is shallower.

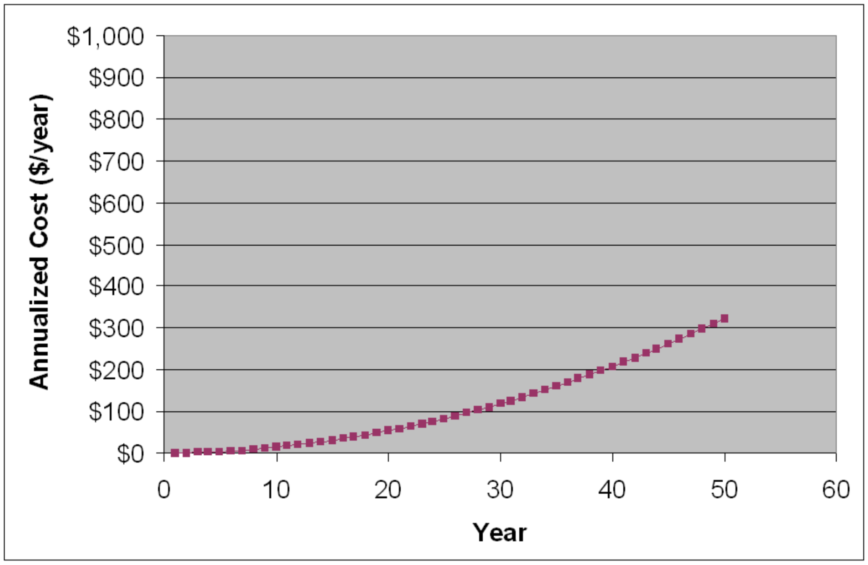


Figure 9. Example of Annualized Risk Cost

With both the annualized capital costs and the annualized risk costs of an intervention calculated, the annualized cost of ownership is simply the sum of the two. The annualized cost of ownership represents the total cost of owning the intervention on a cost per year basis. **Figure 10** demonstrates this graphically. The annualized cost of ownership of an asset is high the first few years due to the initial capital cost. As the asset ages, the capital cost is spread over more years, reducing the annualized cost of ownership. This reduction is tempered by the increasing cost of the risk carried and, at some point, the annualized cost of ownership begins to increase as the asset become more and more likely to fail. When the asset has reached its minimum annualized cost of ownership, the lowest annual cost of owning the asset has been reached and the economically optimal time to intervene has arrived. Intervening earlier or waiting any longer would cost more money per year than intervening at the minimum annualized cost of ownership.

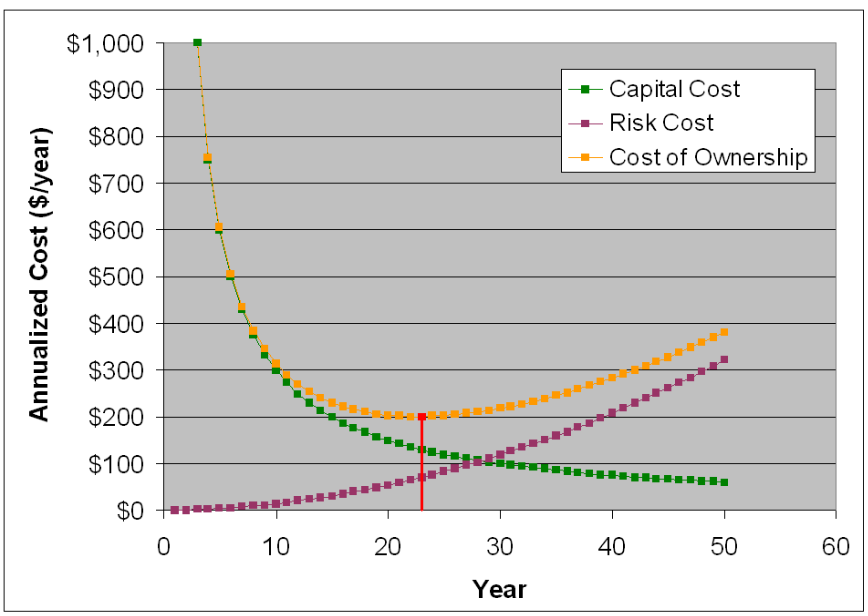


Figure 10. Example of Annualized Cost of Ownership with Minimum Highlighted in Red (Age 23)

For an existing asset, the capital cost and the previous risk costs carried are sunk costs that have already been paid. Annualizing these costs to determine the intervention timing is therefore not appropriate. To identify the optimal time to intervene for an existing asset, the minimum annualized cost of intervention ownership is compared to the risk cost carried each year by the existing asset. When an existing asset's risk cost for a given year is equal to the minimum annualized cost of intervention ownership, the optimal time to intervene has been reached.

Figure 11 provides a graphical example of this. The risk cost carried by the existing asset is shown on the right while the annualized costs for an intervention are shown on the left. In this example, the intervention is a replacement in-kind. When the risk cost being carried each year by the existing asset surpasses the minimum of the cost of ownership curve (about $200/year), the asset should be replaced. For this example, the existing asset is carrying $198 in risk at age 23 and $216 in risk at age 24. Therefore, the optimal time to replace the asset is at age 24.

It is easy to assume that because lining often costs less than replacement, the economic life model would rarely suggest replacement over lining. This is not the case, however, because the model assumes that pipe lining only reduces a pipe's age by 50 years. The lining option is therefore chosen by comparing the cost of lining to the cost savings of turning back the pipe's age 50 years. For very old pipes, the benefit of reducing a pipe's age by only 50 years may not be very worthwhile, especially compared to the benefit of having a brand new pipe. In that case, resetting the pipe age to zero by completely replacing the pipe may be the preferred option over lining. On the other hand, for a very young pipe (less than 50 years old), lining the pipe would not take full advantage of a 50-year rejuvenation and may not be worth the cost of the lining. Thus, there is a window in age for which the economic life model prefers lining a pipe over full replacement.

For assets that have not yet reached their optimal intervention age, the economic life model can predict the year at which the risk cost will justify an intervention. Combined with the intervention cost data presented above, projected spending for R&R activities can be calculated to provide the City with a framework for future CIP timing and potential funding strategies.

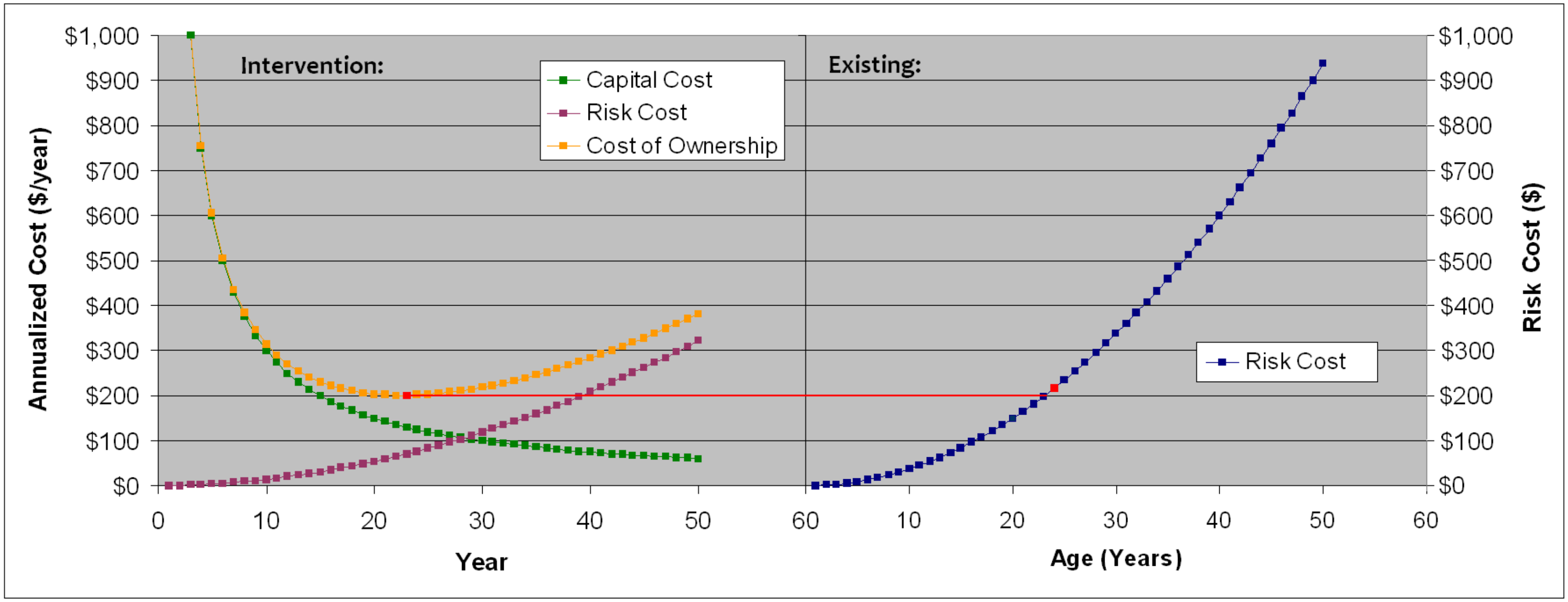


Figure 11. Example of Intervention Timing for an Existing Asset Replaced In-Kind Based on the Minimum Cost of Ownership of an Intervention

4.0 Model Outputs

With the inputs presented above, the economic life model calculates a risk cost for each pipe segment as well as the economically optimal time for an intervention, be it lining or replacement. By sorting the pipe segments based on the existing carried risk cost, it is also possible to prioritize which pipes receive the limited maintenance resources available to the City. The results from the model presented below include a graphical representation of projected R&R costs and specific identification of 10 segments recommended for a near-term intervention. A map was created with GIS that indicates the locations of all segments, with a color code indicating high (red), medium (yellow), and low (green) criticality.

4.1 Graphical Outputs

Using the ability of the model to project future intervention timing, a graph of projected spending for future years was generated. **Figure 12** shows the long-term (next 200 years) spending program for the City's sewer collection system. As shown in **Figure 12**, replacement is largely the preferred intervention option because of the high percentage of segments that are PVC (~80%). Because of the relatively young age of the City's collections system (average age of 17 years), very few R&R projects are expected in the upcoming years. As the City's system ages, however, R&R project costs will increase substantially.

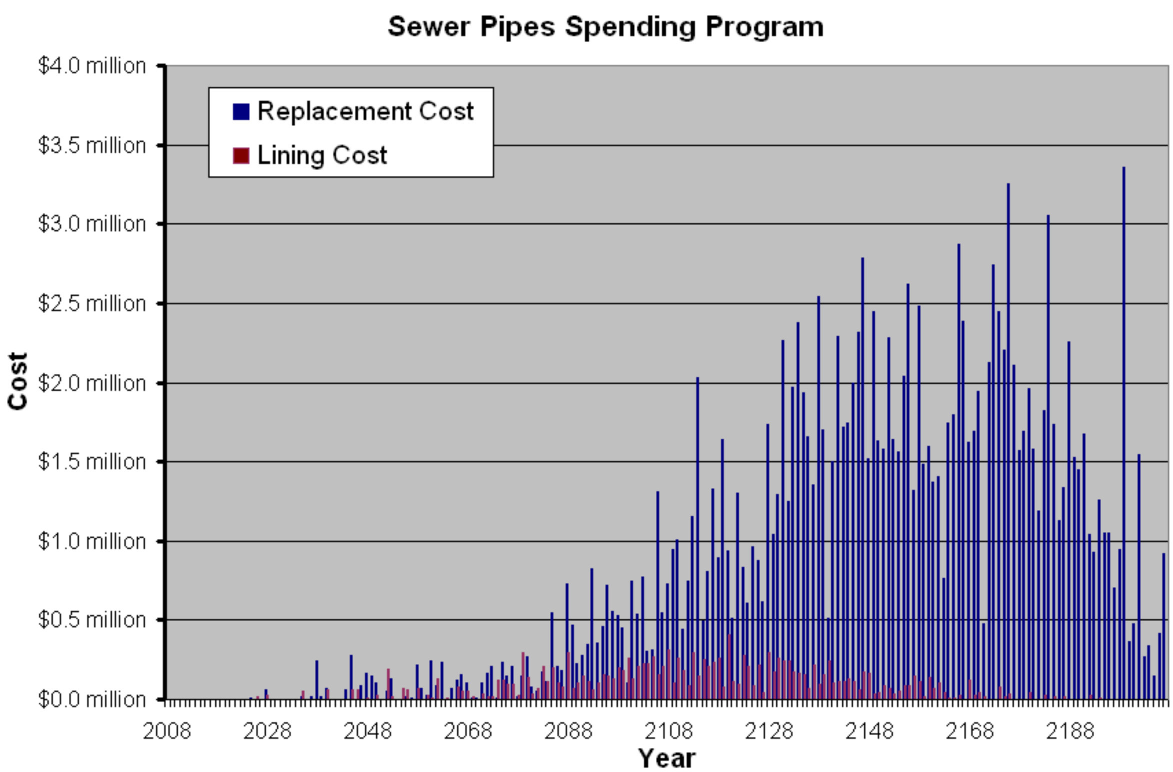


Figure 12. Sewer Collections System R&R Spending Projection

4.2 Segments Identified for Intervention

There are very few segments identified for proactive intervention in the upcoming decades. In fact, there are no segments identified as needing an intervention within 2008. The next 10 segments identified for an intervention are presented in **Table 12**, along with the suggested intervention type and date.

Table 12. Next 10 Sewer Segments Recommended for Intervention

Upstream Manhole	Downstream Manhole	Length (ft)	Diameter (in)	Age (yrs)	Pipe Material	Consequence Cost	Intervention Year	Intervention Type	Intervention Cost
907-45	907-44	48	10	99	TBD	$22,598	2014	Line	$3,500
Unknown	Unknown	1,503	6	46	Force Main	$19,873	2022	Line	$84,185
Unknown	Unknown	14	4	92	Force Main	$13,318	2024	Line	$2,800
907-47	907-45	210	10	99	TBD	$22,598	2026	Line	$14,729
509-13	509-40	113	42	11	TBD	$361,388	2028	Replace	$59,903
907-34	907-32	355	10	99	TBD	$22,598	2028	Line	$24,817
909-58	1009-44	285	10	98	TBD	$12,517	2035	Line	$19,950
707-33	607-11	369	12	25	TBD	$86,477	2035	Line	$31,013
Unknown	Unknown	4,798	8	18	Force Main	$24,843	2035	Line	$302,282
308-11	308-10	44	21	23	TBD	$84,267	2037	Replace	$15,350

These 10 segments are identified for intervention for a number of reasons. A few of them are relatively old pipes approaching the end of their expected useful life. The segments associated with manhole 509-13 service the airport and, therefore, have a high consequence of failure. Several of the segments are in commercial zoning and/or cross either an arterial or the highway. A number of these pipes are assumed to be clay pipes located in the valley (i.e., the pipe material is listed as "TBD"). Thus, the probability of failure during an earthquake is higher for these segments, driving an early intervention schedule.

As assumptions built into the model are either confirmed or revised and additional information regarding pipe age, material, and condition is included, the list of pipes listed for upcoming R&R interventions will change to more accurately reflect actual conditions.

To prioritize projects, a benefit/cost ratio was developed to identify the interventions that would result in the greatest savings for the lowest price. Benefit/cost was calculated as the ratio of the risk cost carried by the existing asset divided by the minimum annualized cost of ownership of the intervention. Therefore, segments with a benefit/cost ratio greater than or equal to 1 are appropriate for intervention (a high benefit/cost ratio indicates a greater proportion of savings per year for the cost of intervening). As segments come up for intervention, the benefit-cost ratio can be used as a means to support prioritizing where limited R&R funds are spent.

The benefit/cost ratio tends to prefer segments that are the most likely to fail (i.e., old segments with poor condition scores) and relatively inexpensive to intervene (i.e., short, small-diameter segments). Thus, high consequence, larger pipes that are expensive to replace will potentially show up too low on an R&R priority list. Because of the adjustment to the probability of failure based on pipe length and the increase in consequence cost based on diameter, the long, large-diameter segments will still be identified for intervention at an appropriate age. However, sorting by the consequence cost for segments identified for intervention instead of the benefit/cost ration would provide an alternative project priority list that prefers replacing large pipes first.

4.3 Segments Identified for Conditional Assessment

The economic life analysis also provides the City with a means to prioritize maintenance activities and conditional assessments. By sorting the City's collections system inventory based on the risk cost carried for each segment, maintenance activities can be focused on assets for which the City is spending the most money.

Using the geographic display capabilities of GIS, **Figure 13** displays the relative risk each of the City's sewer assets are carrying. Red segments are the top 20% of the City's length of pipe in terms of risk, the yellow segments are the next 30%, and the green segments are the bottom 50%.

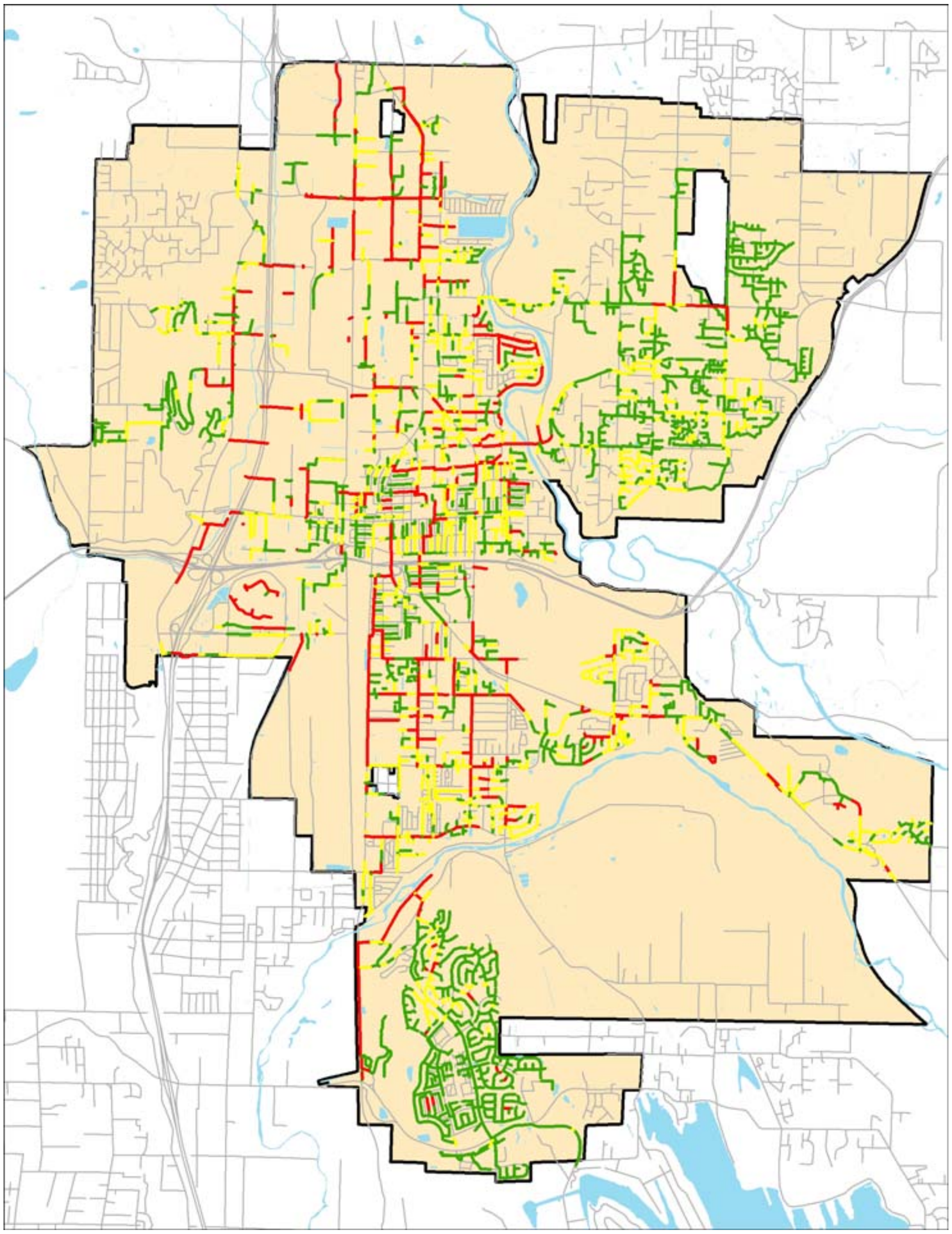


Figure 13. City of Auburn Sewer Collections Systems with Color Coding to Indicate Relative Criticality

The majority of the red segments are located outside of the City's residential areas, with many either crossing a major road or running relatively close to a water body. The size and age of each segment will also have a significant impact on the risk cost.

5.0 Next Steps

With the initial results from the model presented above, the next steps include improving the accuracy of the inputs, utilizing the results, and keeping the model updated as information changes and more data become available.

5.1 Areas for Improvements

The results from the economic life model are only as accurate as the inputs to the model. Therefore, improving the accuracy of the information on which the model is built is the main area for improvement. The data input improvements can be organized into three groups of information: cost assumptions, failure trending, and missing information. Each group is discussed below.

Cost Assumptions

Verifying the cost information for the consequence parameters identified, the spot repair costs, and the intervention costs will ensure that the model is calculating accurate intervention timings and that the cost projections represent accurate spending information. The costs presented here were generated based on Brown and Caldwell's experience with agencies similar to the City of Auburn. Therefore, continually verifying and customizing these costs to reflect the Auburn collections system are important to generating accurate results.

Failure Trending

The probability of failure used in the economic life model assumes that the Auburn pipe system will fail in a manner described by the Weibull distribution. The Weibull distribution is customizable to meet a variety of conditions that influence failure (by modifying service life and shape factor); however, verifying the parameters used in the model will require trending of actual failure rates. With this information, the probability function can be customized specifically to Auburn and will better predict optimal intervention timing

Missing Information

A number of parameters were not included in the model because information was not readily available. The addition of this missing information will help improve the granularity of the model and better capture the risk costs carried by pipe segments. Items where additional information is needed include:

- Segments with missing pipe material type and installation dates
  - Approximately 798 segments missing pipe types (mostly marked as TBD)
  - Approximately 488 segments missing install dates
- Segments with missing depth of bury information
  - Approximately 1,105 segments missing depth of bury information

- Condition assessments
  - Condition assessments may only be available at a future date once inspections have been carried out
- Segments located within an easement or underwater
- Segments that are not available for lining because they are already at peak capacity
  - Capacity information can be included once hydraulic and hydrologic modeling has been completed.

Additionally, although zoning information has been included in the model, more granularity can be added if more detailed zoning is found to be appropriate. For example, although all commercial zones are given the same consequence cost in this model, if the City feels that a failure in a particular business core would be more costly than other commercial zones, this information could be included for added granularity.

5.2 Utilizing the Model

The economic life model can provide three areas of immediate benefit to the City's R&R needs: R&R project identification, economic validation for projects, and future budget forecasting. In addition, the ranking of assets based on risk can be used to optimize and prioritize maintenance activities. These benefits are described below.

R&R Project Identification

The main utilization for the model is to identify segments that are at or beyond the economically optimal time to replace or line. Segments can be identified individually to validate that an intervention is appropriate, and intervention projects can be identified by year to help group segment projects together.

Economic Validation

The economic life model is intended to be a decision support tool. The tool should not be followed blindly; rather, the segments that the model proposes for an intervention can be examined more closely, and a business case can be made to move forward with the project. The model also provides a repeatable, clearly detailed process by which projects can be justified to governing bodies.

Budget Forecasting

Because the risk costs carried by segments can be projected into future years, the model also provides a forecast of future R&R budget needs. Using a 5- or 10-year moving average, the R&R costs can be used for future financial planning and to evaluate rate implications.

Maintenance Optimization and Prioritization

The risk currently carried by each of the City's sewer segments also provides a justification for focusing the City's maintenance activities on segments that are costing the City and the community the most amount of money. Using the information presented in **Figure 13**, the City can focus CCTV inspections and other predictive maintenance activities on the highest risk assets. As condition information becomes available and the assumptions built into the model have been either confirmed or revised, the model can be reevaluated to better prevent future failures of critical infrastructure.

For assets for which the City is not carrying as much risk (yellow and green segments in **Figure 13**), the City's CCTV and cleaning schedule can be modified to better fit the criticality of each segment. For some segments this may mean reducing the number of inspections, but for others it could mean increasing the frequency of maintenance activities. Using the risk-based approach allows the cost of maintaining and inspecting assets to be compared to the cost the City carries for potential failures.

5.3 Updating the Model

The City's sewer pipe economic life model is designed to be a "living document," with yearly updates of the internal data. As more information becomes available and the existing information can be verified, the model can better predict accurate results. The next section explains how to update the model annually.

Instructions

The following section gives general guidelines on how to update the model. It should be noted that manual verification that the data are being processed properly (i.e., spot check) will be required.

1. Open the latest version of the model. Save the model as a new name to prevent unwanted changes to the previous year's model.
2. Change the current year in the "Cost Streams" tab.
3. Add any new pipe segments as necessary. Include the TempID #, installation date, pipe type, and length.

   NOTE: If additional lines of data are added to the model, equations must be copied to those cells.
4. Input or revise the likelihood data into the model in the appropriate columns. Condition data, maintenance history, and slope scores are located in the Computation tab. The scoring should be based on the parameters discussed above.

   NOTE: When replacing/deleting data, do not delete equations within the spreadsheet. Cells with equations in them are marked with a grey background and cells for input have a white background.
5. Input or revise the consequence data into the model in the appropriate columns. Scores should be based on the parameters discussed above.

   NOTE: A helpful equation when trying to match up different sources of data is the VLOOKUP function. The function searches for a value in the first column of a table array and returns a value in the same row from another column in the table array. The equation is explained in the following manner:

   VLOOKUP(lookup_value, table_array, col_index_num, range_lookup)

   If you are unfamiliar with this function, the Microsoft Excel help function should be used.
6. Press the "Calculate All" button, and a macro will update the new intervention timings. The results can be viewed graphically in the "Spending Program" tab. A year-by-year spending summary is given in the "Program Summary" tab. Inspecting individual segments is best done in the "Computation" tab.

6.0 Conclusions

Brown and Caldwell's economic life model for the City of Auburn sewer collections system allows the City to identify and evaluate the risk cost associated with each of its roughly 4,500 sewer pipe segments. By comparing the risk cost of each segment to the minimum annualized cost of an intervention, the optimal economic timing for either lining or replacing each segment has been calculated.

With this economic life information, R&R projects can be identified for consideration, budget and long-term rate forecasting can be predicted, and a business case validation can be made for each segment. In addition, maintenance activities can be prioritized to focus on the City's highest-risk priorities.

APPENDIX A: DETAILED DESCRIPTION OF COST ASSUMPTIONS

Note: All assumptions presented below are assumed to be for an 8 inch wastewater segment. Estimates have been made based on Brown and Caldwell's consulting experience with similar types of consequences and agencies. These assumptions should be updated regularly to better fit the City's experiences with local conditions.

Access Inconvenience

This is the cost to the customers based on their inconvenience because of repair work being done. In all cases, it was assumed that this inconvenience would be incurred for every failure (100% probability of occurrence) and that customers would be delayed 15 minutes in reaching their destination.

Residential: 10 residents impacted for 15 minutes twice a day for two days at $20 per hour.

Commercial: 80 customers each hour impacted for 15 minutes over 16 hours at $20 per hour

Industrial: 60 employees per day impacted for 15 minutes for two days at $20 per hour and 32 deliveries per day impacted for 15 minutes for two days at $50 per hour

Airport: 8 flights per hour, 2 people per flight impacted for 15 minutes over 16 hours at $75 per hour and 25 general public impacted for 15 minutes over 16 hours at $20 per hour

Fire Dept: Four firefighters per hour impacted for 30 minutes over 16 hours at $80 per hour

Medical Center: Twelve hospital staff per hour impacted for 15 minutes over 16 hours at $80 per hour and 60 patients per hour impacted for 15 minutes over 16 hours at $20 per hour

City Hall: 50 City officials impacted for 15 minutes twice a day at $120 per hour and 15 general public per hour for 16 hours impacted for 15 minutes at $20 per hour

Justice Dept: 50 City officials impacted for 15 minutes twice a day at $120 per hour and 15 general public per hour for 16 hours impacted for 15 minutes at $20 per hour

Disruption of Service

This is the cost to the customers because of the loss of wastewater service. In all cases, it was assumed that the time for which the customer would experience a loss of service would only last four hours. Because only 5% of failures were assumed to result in a loss of service, a 5% probability of occurrence was used.

Residential: 5 residents with loss of service for 4 hours at $20 per hour

Commercial: 40 customers with loss of service for 4 hours at $20 per hour

Industrial: 30 employees with loss of service for 4 hours at $20 per hour

Airport: 8 flights per hour, 2 people per flight with loss of service for 4 hours at $75 per hour and 25 general public with loss of service for 4 hours at $20 per hour

Fire Dept: 12 fire fighters with loss of service for 4 hours at $80 per hour

Medical Cost derived from example of loss of service at Seattle's Virginia Mason Hospital

Center:

City Hall: 50 City officials with loss of service for 4 hours at $120 per hour and 15 general public per hour with loss of service for 4 hours at $20 per hour

Justice Dept: 50 City officials with loss of service for 4 hours at $120 per hour and 15 general public per hour with loss of service for 4 hours at $20 per hour

Surface Spills/Backups

This is the cost incurred for claims and cleanup both outside and inside a customer's property. Claims costs were estimated based on claims information provided by the City of Tacoma. A 5% probability of occurrence was used for spills based on zoning; spills on roadways were assumed to be half as likely.

Residential: 2 homes impacted, 6 hours of cleanup per home for two crew members at $71 per hour, 6 hours of equipment per home (vactor truck and sweeper) at $500 per hour, average claim of $2,000 per customer with 8 hours of legal at $79 per hour and 16 hours of management at $81 per hour

Commercial: 2 businesses impacted, 6 hours of cleanup per business for two crew members at $71 per hour, 6 hours of equipment per business (vactor truck and sweeper) at $500 per hour, average claim of $5,000 per business with 8 hours of legal at $79 per hour and 16 hours of management at $81 per hour

Industrial: 1 industry impacted, 6 hours of cleanup per industry for two crew members at $71 per hour, 6 hours of equipment per industry (vactor truck and sweeper) at $500 per hour, average claim of $5,000 per industry with 8 hours of legal at $79 per hour and 16 hours of management at $81 per hour

Roads: 6 hours of cleanup for two crew members at $71 per hour, 6 hours of equipment at $500 per hour, 8 hours of legal at $79 per hour and $16 hours of management at $81 per hour

Traffic Delays

Traffic delays represent the lost time for commuters because of repair crew work. As every failure requires a repair whether there is a loss of service or not, a probability of occurrence of 100% was used.

Collector: 16 hours of repair work, 2 lanes disrupted, 30 vehicles per lane per hour delayed for 5 minutes at $20 per hour

Arterial: 16 hours of repair work, 2 lanes disrupted, 60 vehicles per lane per hour delayed for 10 minutes at $20 per hour

Highway: 16 hours of repair work, 2 lanes disrupted, 180 vehicles per lane per hour delayed for 15 minutes at $20 per hour

Spill to Fresh Water

Spills to a water body require additional cleanup cost. Costs are scaled based on an anticipated cleanup time needed based on the distance to a water body; the crew cost per hour was provided based on information provided by similar agencies. The probability of occurrence represents an average of 1 in 4 spills reaching a water body.

Greater than 150 feet: 8 hours of cleanup required from crew at $239 per hour and equipment at $650 per hour, $5,000 for mobilization

150 to 50 feet: 16 hours of cleanup required from crew at $239 per hour and equipment at $650 per hour, $5,000 for mobilization

Less than 50 feet: 24 hours of cleanup required from crew at $239 per hour and equipment at $650 per hour, $5,000 for mobilization

Negative News Article

The potential for a negative news article and the associated public perception can impact a utilities relationship with its customers. For this evaluation, the costs of a news article were confined to management meetings, answering customer questions, and a general loss of productivity. The probability of occurrence was based on an assumption that, for the most part, one half of failures resulting in a loss of service (i.e. 2.5% of failures) would induce a negative news article. For critical facilities, it was assumed that all failures resulting in a loss of service (i.e. 5% of failures) would result in negative news.

Negative News: 40 hours of internal management meetings at $81 per hour, 80 hours of council meetings at $107 per hour, 40 hours of answering customer questions at $71 per hour, and a 2% loss of productivity for 8 hours at $10,000 per hour

Regulatory Pressure

Pressure from regulatory bodies can result in significant changes for the utility and will require substantial management attention. Costs were assumed to include management meetings, legal review, and the generation of a special report. The probability of occurrence presumes 1 out of 4 failures resulting in a loss of service results in an instance of regulatory pressure per year. This rate was doubled for failures at the medical center.

Regulatory Pressure: 40 hours of internal management meetings at $81 per hour, 80 hours of council meetings at $107 per hour, 100 hours of legal review at $79 per hour, and 120 hours for the preparation of a special report at $71 per hour

Technical Memorandum

To: Chris Thorn, Water Quality Programs Coordinator, City of Auburn
Dann Repp, Project Manager, City of Auburn
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Prepared by: Doug Schneider, Mechanical/Hydraulic
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Date: July 23, 2009

Subject: Condition Assessment of City of Auburn Wastewater Pumping Stations

TABLE OF CONTENTS

Introduction

This Technical Memorandum documents the results of Brown and Caldwell's Condition Assessment of the City of Auburn's wastewater pumping stations. The Condition Assessment is a key step in development of a Comprehensive Sewer Plan, authorized by the City under the 2007 Agreement for Professional Services AG-C-301.

Brown and Caldwell is also concurrently preparing a Comprehensive Stormwater Plan under City of Auburn 2007 Agreement for Professional Services AG-C-302. The Condition Assessment for existing stormwater facilities will be addressed in a separate Technical Memorandum. This technical memorandum documents Condition Assessment results for wastewater pumping stations in the City of Auburn's treatment system.

There are 19 existing and planned pump stations in the City's wastewater treatment system. Table 1 lists these pumping stations and provides additional identifying data to confirm their location.

Table 1. City of Auburn
Sewer Pump Station Inventory

	Pump Station	Year Constructed	Cross Streets	Approximate Address
	Sanitary Sewer			
1	Area 19	2006	Lake Tapps Pkwy E & West of 72nd St. SE	TBD
2	B Street NW (private system)		B Street NW & South of 49th Street NW	
3	D Street NE	1971	'D' Street NE & Auburn Way N.	4750 D Street NE
4	Dogwood	1967	Dogwood St. SE 1500 & 15th St. SE	1435 Dogwood Street SE
5	Ellingson	1968	41st St. SE, East of 'A' St. SE	40 41st Street SE
6	F Street SE	1980	'F' St. SE & 17th St. SE	510 17th Street SE
7	North Tapps**	2007	Lake Tapps Pkwy E & West of 176th Ave. E	TBD
8	Peasley Ridge	2001	S. 320th St. & 53rd Ave. S.	On a King Co. Drainage Tract
9	R Street NE	1977	'R' St. NE & 6th St. NE	1603 5th Street SE
10	Rainier Ridge	1980	125th Pl. SE & South of SE 318th Way	31818 125th Place SE
11	Rainier Shadows	1991	124th Ave. SE & SE 306th Place	30700 124th Avenue SE
12	Riverside	1981	8th St. NE & 104th Ave. SE	31902 104th Ave. SE
13	Terrace View	2007	E Valley Hwy E & North of Terrace View Dr. SE	TBD
14	Valley Meadows	1992	4th St. SE & 'V' St. SE	2022 4th Street SE
15	White Mountain Trails*	2007	SE 292nd St. & West of 118th Ave. SE	
16	8th Street NE	1974	'J' St. NE & 8th St. NE	820 8th Street NE
17	22nd Street NE	1967	22nd St. SE & Riverview Drive	1741 22nd Street NE
	Future			
18	Verdana		[Note 1]	
19	Auburn 40		[Note 2]	

** Called Mountain View Trails on Auburn's GIS.*

*** Newly constructed and not yet shown on Auburn's GIS map. The completion of this station allowed the Eastpoint station (which does show up on Auburn's GIS) to be removed.*

Note 1: This pump station will be constructed midway between Rainier Shadows and White Mountain Trails Pump Stations and will replace them both.

Note 2: This pump station will be constructed as part of a new development known as Auburn 40 located south of South 277th Street, east of Auburn Way North, and west of the Green River.

Objective

Comprehensive plans determine facility needs to meet the current and future Level of Service (LOS). Existing facilities are always incorporated to the maximum extent possible to reduce costs. A Condition Assessment evaluates the apparent physical condition of existing stations and equipment. The purpose is to predict future serviceability, and anticipated longevity.

Pump stations must meet the LOS adopted by regulatory agencies and do so in a safe and reliable manner. Upgraded stations must meet current code conditions that may differ from the time of the stations' original construction. Therefore, our assessment identifies:

- Requirements necessary to meet the City's LOS
- Requirements necessary for the health and safety of staff and the public
- Suggestions that might increase reliability or reduce cost of operations or maintenance

Process

For this Condition Assessment, equipment check lists were prepared for mechanical/hydraulic and electrical/control systems (Exhibit A), site visits were made to all stations, as-built information and O&M manuals were reviewed, and operators and maintenance personnel were asked about known issues at each location. Station operation was observed, but no detailed physical testing of equipment, wiring, controls, or structures was included.

Evaluation of certain electrical equipment was excluded from Brown and Caldwell's scope because it was already being evaluated by others. The engineering firm Casne has two contracts with the City of Auburn for engineering services associated with the wastewater and stormwater pump stations.

One contract is for evaluation and recommendations associated with possible upgrades to the pump stations' SCADA system. This includes possible upgrades to each station's local SCADA/PLC hardware, firmware, software, and telemetry equipment and requirements. The second contract is to verify, evaluate, and recommend backup power system requirements for each pump station. This includes sizing for permanent, portable, and possible rented equipment.

Discussions are also expected to include transfer switch requirements and equipment selections. Therefore, Brown and Caldwell did not evaluate the details of the SCADA system and backup power systems for the pump stations. A general discussion of backup power is provided below to address possible flow and storage capacity issues.

Two general system-wide observations can be made. First, Auburn's wastewater pump stations are highly uniform and standardized; most are pre-fabricated underground stations constructed by two manufacturers. Second, the City of Auburn has done an excellent job of maintaining all of its stations, many of which are now more than 40 years old.

Level of Service

Capacity

The primary purpose of a pumping station is clearly to pump. However, a basis has to be selected to determine needed capacity. Wastewater flows arriving at pumping stations consist of base diurnal sanitary flows plus precipitation-driven clean water intrusion into the sanitary sewers that gets there through inflow (from the surface) or infiltration (through cracks or openings in the collection system piping and manholes). Peak flows may be from two to six times base sanitary flows depending upon how "tight" the system is. Therefore, wastewater pumping station capacity definitions, even for fully separated systems, still have a rainfall event basis. Design storms are derived from historical weather data and generally presented as storms of specific recurrence intervals (e.g., the 5-year, 20-year, or 100-year storm).

The Washington State Department of Ecology (WDOE) requires wastewater pump stations to have redundant pumping equipment such that "firm" capacity with one pump out of service passes the station's design flow. That station's design flow may be based on a statistical storm basis, as approved with WDOE. Just as there are negative consequences to sizing a station too small, there can also be negative consequences from designing a station to pass, for instance, the 100-year storm influenced flow if the city has a high peaking rate. Pumping units may be way oversized and extremely inefficient for where they operate 99% of the time. They may also be prone to plugging if run at low speeds because they are oversized. The sizing criteria negotiated by King County is that pumping stations will pass the 5-year storm with the largest pump out of service and the 20-year storm with all pumps operating. The City of Auburn's capacity LOS matches King County's.

Adequacy of current and future station capacity would usually be presented within the discussion for each individual station. However, run times (hours per day) were examined for all wastewater stations, and none were excessive nor resulted in so many starts per hour that motor winding life would be impacted. Collection system modeling was performed as part of the Comprehensive Sewer plan. Capacity of pump stations for current and future conditions is discussed in the collection system modeling documentation.

Planning Period

The comprehensive planning period assumption used for this memorandum is 23 years. Current flows refer to the year 2007 and design year flows refer to projected flows in the year 2030.

Standby Power

WDOE requires wastewater pumping stations be provided with standby power such that station operation can resume quickly enough that overflows are prevented. Alternative means of power provision include:

- Dual-utility power supply sources where each power source can be proven to be truly independent (not share any common lines or substations)
- On-site generation with automatic load transfer
- Mobile power units located such that they can be brought quickly to the site utilizing an existing station manual transfer switch and plug-in receptacle(s)
- Mobile or secondary pumping equipment that is engine-powered
- A combination of the above

Acceptable transition times to the new power source are influenced by the amount of storage volume that exists at the station under worst conditions. However, providing too much storage capacity can cause wastewater septicity and odor problems.
Station standby power systems are being evaluated under a concurrent study by Casne Engineers. From the standpoint of this assessment, the point to remember is that each station is indeed required to have an effective means of standby power that is regularly tested for reliable operation. When standby power is provided through on-site generation with diesel generators, it is critical that units be exercised periodically under load or else the cylinders and valves will "carbon up" and the system will fail to operate. For pumping stations in Auburn's size range, future permanent generator installations should have a load bank installed in-line with the radiator fan. Although this should not be considered mandatory, it would allow ease of generator testing should live load testing not be desired.

Another issue that needs to be considered is fuel spill containment during filling operations. Although fuel dispensing into various pad-mounted generator fuel tanks is not expected to be completed by City of Auburn staff, the City should ensure that the providing vendor follows International Fire Code 3403.4 and 2704.2. During fuel dispensing operations where there are nearby storm drains, the Code requires that the drains be sealed and absorbent containment bags creating a dike be installed to prevent fuel from migrating away from the engine. There are other engineered spill control systems that may take the form of a specialized vessel that surrounds the fuel tank's filling tube, preventing fuel from reaching grade.

Each Auburn wastewater pumping station, in addition to whatever form of standby power it may have, already has piping provision to allow submersible or self-priming pumps to pump from the wet well, bypass the station, and discharge directly into the station force main. This is an excellent feature that facilitates station maintenance.

Overflows

Auburn's wastewater collection system is fully separated. Sanitary sewer overflows (SSOs) are not permitted by WDOE. Most of the City's wastewater pumping facilities, either within the pumping facility or in the upstream collection system, have a station protection relief point at which overflows will occur if station operation fails. WDOE requires that relief points be monitored and overflows reported.

Good Neighbor Criteria

Some municipalities have noise or odor ordinances that set acceptable limits. Auburn currently has no noise or odor ordinances applicable to pumping stations; however, the City's wastewater pumping stations are mostly buried and very quiet, and the collection system does not include particularly long force mains that might generate septic sewage odors. There is a minimal history of odor or noise complaints regarding Auburn's pumping facilities which the City can usually resolve.

Health and Safety

Special Health and Safety Issues Associated with Pre-Packaged Underground Pumping Stations

A total of 15 out of 16 of the City's wastewater pumping stations are pre-fabricated, underground units, commonly called "canned" stations because the structural shell is often made of plate steel, although it may be formed in concrete. This type of station uses a separate manhole-like structure for the wet well, while the pumping station drywell consists of a very compact prefabricated underground chamber with a narrow vertical access tube and ladder. This configuration is commonly used for deep stations to minimize need for excavation and structures, and where sewer depth is too deep to allow use of surface-mounted vertical column pumps or self-priming pumps.

There have been an alarming number of fatalities in this type of station. Accident reports indicate that:

- While some fatalities have been caused by flooding, most have been by asphyxiation – oxygen deficiency or toxic gas such as hydrogen sulfide.
- Access tube dimensions make rapid exit or emergency rescue difficult if not impossible.
- Factory-installed ventilation systems are often inadequately sized; often operate only when the station's access lid is open; have no redundancy; and are of lightweight commercial or residential quality.
- It is rare to find ventilation ducting situated to adequately scavenge the space of both lighter than air and heavier than air toxic gases such as methane and hydrogen sulfide, respectively.

Though not generally causing fatalities, there are other general deficiencies associated with this type of station:

- The single, small-capacity sump pump normally provided is non-redundant and not large enough to handle pumping sewage solids from a pipe break or leaky fitting.
- Many of the stations have lighting fixtures that are not breakage protected (spark and eye hazard). The fixtures are typically bare two-tube fluorescent bulb fixtures.

- There are potential arc flash hazards at the canned stations when making control system changes on pump stations that cannot be de-energized. The problem is inherent to "packaged" control enclosures that also contain the station's power distribution equipment while the system is still energized.

It is uncertain if the City of Auburn has addressed arc flash hazards. Though the term "arc flash" is not new to the electrical industry, the industry as a whole is behind the curve in taking action at understanding mitigation requirements and reduction of arc flash hazards and risks. An arc flash hazard will occur at any location likely to require evaluation, adjustment, servicing, or maintenance while the equipment is energized.

The danger is in the amount of incident energy that is released when energized and exposed electrical conductors and equipment come in contact with another phase or ground. The sound and thermal energy are enough to cause serious injury to the technician working at the equipment. In addition to this energy is shrapnel from the blast. The 2005 National Electrical Code (NEC), NFPA 70; the 2004 Edition of the Standard for Electrical Safety in the Workplace, NFPA 70E; and the 2002 revision to ANSI-IEEE Standard 1584, the IEEE Guide for Performing Arc Flash Hazard Calculations, have only recently brought the dangers of arc flash to the work place.

The dangers over potential arc flash hazards can be mitigated by either of two methods:

1. Evaluate, adjust, service, or conduct maintenance on the packaged control panels only when the panels are completely de-energized. This is Brown and Caldwell's recommended method for mitigating potential arc flash hazards. This method can be accomplished by one of the following means when used concurrently with the City's electrical lockout/tagout procedures.

    a. Opening the utility breaker upstream of the station's utility meter. If the breaker is not accessible follow options b. or c. below.
    b. For stations that are set up for a portable generator but a generator is not connected, manually place the upstream transfer switch to its generator position.
    c. For stations with permanent backup generators, open up the generator breaker and manually place the upstream transfer switch to its generator position.

    Note that opening the main breaker located in the packaged control panel is not listed here. This is because the breaker's line side lugs and exposed cables are accessible when the control panel door is opened. If the line side cables come in contact with any tool or the lugs or connections fail for any reason, this main breaker will not prevent the fault energy from releasing into the panel and the immediate vicinity. It is not known if a suitable barrier could be fashioned to surround the line side lugs within the panel or the design details required to remove the panel's main breaker and place it in a separate enclosure potentially alongside the packaged control panel. This would then isolate the upstream electrical hazards from the packaged control panel. Brown and Caldwell recommends that the grade level breakers be opened and locked and tagged out before working on the packaged control panels. The NEC simply states that the panels shall be labeled to indicate that there's a danger from arc flash. These simple labels tied to written procedures and training would meet the standards for labeling.

2. Wear the required personal protective equipment for the available incident energy.

   The second means of mitigation requires that each site undergo an arc flash analysis. This would require review of the current short circuit study or a new study for each site. The short circuit information would then be used by a software program to identify the incident energy and the required personal protective equipment required when working on the packaged control panels energized. Each panel would then be labeled for the type of personal protective equipment required to work in the panel when energized.

   The nature of arc flash hazards is such that even defining a worst-case yet sensible condition requires calculations. As can be readily seen at the packaged control panels, there are a number of different breakers and sizes employed. Each one changes the amount of incident energy available. The degree of incident energy is a function of the upstream transformer and the available fault energy from the utility, which is different at each site.

Brown and Caldwell understands that the City employs a contractor whenever control system repairs, modifications, testing, etc. are required. We recommend that the NEC label requirement be followed here as well. The labels would indicate that there's a danger from arc flash. Any contractor hired by the City would be notified of the arc flash hazards and that the contractor is responsible for the safety of its personnel. This information exchange could be part of a contract or part of a project's kick-off meeting. These simple equipment and panel labels tied to written procedures and training would meet the NEC standards for labeling.

A discussion session on this topic with City staff is currently set for December 18, 2007

Auburn's wastewater personnel have policies in place to maximize safety and minimize potential for accidents. Additionally, maintenance personnel are in the process of working through each of the wastewater stations and making physical safety improvements.

Auburn's policies and procedures include:

- Buried stations with narrow access tubes are all recognized, and physically labeled as confined spaces in accordance with Occupational Health and Safety Act (OSHA) definitions for non-permit required confined spaces.
- Staff procedures include regularly (weekly) checking the calibration and batteries of portable hazardous gas detectors (flammables/oxygen deficiency/toxic substances) and lowering such detectors into the dry well to test the atmosphere prior to entry.
- Entry procedures include mandatory training and use of safety harnesses with an engineered fall protection system
- Rescue, if needed, is through a 911 call to the Auburn fire department

Auburn's ongoing station projects include:

- Replacing electrical outlets that have worn insulation and grounding concerns. These circuits are located under the removable bottom ladder stair and above the drain sump subject to flooding. These circuits are being replaced with ground fault interrupting (GFI) outlets at higher locations.
- Replacing the original mercury type level switches for pressure transducers that do not use hazardous materials.
- Installing a more powerful discharge fan in the dry well (located at base of entry tube), which at some reworked stations have controls set to run when the access lid is open, and at others are set to operate when open the lid is open and to cycle on/off at 15 minute intervals throughout the day.
- Staff have reworked and greatly improved the original bubbler level control systems using redundant air compressors without storage and pressure switches double checked against an in-station tubing manometer
- Installing higher quality de-humidifiers to reduce condensation and electrical corrosion.
- The prepackaged stations were originally provided with buried sacrificial anodes to protect the steel shells and flooring from external corrosion. The anodic protections systems were later replaced with active impressed current cathodic protection systems. A few of the cathodic systems were not working properly during the station visits (see electrical notes under the individual stations). We do not know how long the stations were unprotected between when the first anode packs were used up and the new systems installed. We do not know if there are thin spots in the shells or floors of the stations, and if the level of reduced wall thickness is such that repairs should be made.
- An emergency button has been added to each station. Currently that button activates a call to the maintenance manager, which is very likely the same person pushing the button.

Although we have listed safety concerns for this type of station, it should be noted that functionally the City has been very well served by these stations and the distributors that support them. The two major suppliers used by Auburn for this type of station are Smith & Loveless and Cornell. While there is a strong push and wastewater industry trend toward providing lighter duty, higher speed, less robust equipment, both of these suppliers manufacture their own pumping equipment and motors specifically for their packaged stations. For example, a 15 horsepower motor supplied for one of these stations is much heavier and more robust than a standard NEMA B 15 horsepower motor. Although the City has needed a few impeller and pump repairs, most all pumping equipment is original with an excellent repair history.

National Electrical Code and Safety

The National Electrical Code, NFPA 70, is the fundamental standard for ensuring that electrical equipment installations meet minimum safety standards to ultimately prevent the loss of life and property. The following items were noted during Brown and Caldwell's site inspections. Specific discussions surrounding each NEC concern follow each listed item.

- There are non-ground fault circuit interrupter (GFI) receptacles in use below grade in the canned pump stations.

Primarily these receptacles are for the sump pumps. As noted above, the City has a replacement process and is subsequently replacing these receptacles with GFI receptacles. These GFI receptacles also supply power to 120V dehumidifiers located in the dry wells.

- The motor's disconnecting means does not have the ability to be locked out in accordance with NEC Article 430 and applicable OSHA standards for lockout/ tagout procedures.

  At all below-grade pump stations the dry well's packaged control panel houses the pump's motor starter and the required overcurrent device for the motor. In all instances the overcurrent device is a circuit breaker. There are no disconnects or other such disconnecting means, besides the breakers, for the motors. Although separate disconnects are not required, there must be a means of locking out the motor's power source. The motor circuit's circuit breakers are not equipped with devices or constructed such that they can be locked out to meet NEC and OSHA requirements. There are after-market devices that are UL listed as suitable locking means for circuit breakers; however, there were no devices found at the stations.

- There are instances where the conduit seal-offs that isolate the wet well's Class I Division I space from the dry well are improperly installed or compromised.

  In most cases the wet well level control circuits enter the dry well through the steel wall of the dry well's access tube. The NEC states that any conduit originating in a classified space must be internally sealed within 18 inches of the non-classified boundary and that the conduit before the seal off be Class 1 Division 1 rated. At the point of penetration, and on the inside of the access tube, the stations typically have an electrical conduit called an "LB" mounted to the incoming conduit to the wet well. This device allows electrical conduit to make a pure 90 degree bend where the wires are able to leave (L) out the back (B) of the device, and therefore an "LB." However, the "LBs" used are not listed as classified devices. In addition, in some instances the covers of the LBs are missing, so there is a direct path of hazardous gases from the wet well to potentially enter the dry well. Raceway changes and new seal-offs are required.

- There are instances where temporary extension cords are feeding permanent odor control equipment. This is a violation of the NEC.

  There are a number of locations where a station's odor control equipment is powered via an extension cord that is plugged into the station's "hot box" GFI receptacle. Power feeders to permanent equipment need to be routed via a permanent installation. This may take the form of either extending the existing hot-box receptacle circuit to another GFI receptacle mounted near the odor control equipment for plug application or providing a new 15A circuit routed from the packaged control panel in the dry well up the access tube, out the tube's side wall, and underground to the odor control's power termination point.

Ventilation Rates and Safety

When a room's air supply or exhaust fan is first turned on, it takes a very long time for a complete air exchange to occur because of mixing within the room (an exponential exchange function). If there is hazardous gas in the dry well, it will still be there after the few minutes an operator might typically wait before entering. For this reason it is far safer to have continuous or at least regular ventilation, and better still to both power air into the space and out of the space (separate, redundant fans).

NFPA 820 – Standard for Fire Protection in Wastewater Treatment and Collection Facilities (Exhibit B, Table 4.2, Item 17) indicates that below-grade dry wells ventilated continuously at 6 air changes per hour or greater are electrically unclassified, while those ventilated at less than that rate are electrically rated as Class I, Division 2. A Division 2 rating would result in the complete elimination of panels and controls inside Auburn's underground stations. Although most of the stations' dry well access tubes allow space for conduits and cabling required to move panels to the surface, there are some older stations where the access tubes are smaller and the ladder's mounting may prevent all of the required conduits to run up the tube's interior. In addition, many of the station sites do not have the physical space for above-grade stanchions and concrete bases to support the panels. There is also the concern over vandalism of the exposed panels. Moving the panels above grade is not a viable option at many sites. Therefore, continuous ventilation at 6 air changes per hour or greater must be provided.

We do not know the ventilation rate of fans recently installed by the City. However, using the Peasley Ridge Pumping Station as a representative example, the dry well volume is approximately 483 cubic feet, the access tube volume is approximately 97 cubic feet, and therefore a fan rate of only 60 cubic feet per minute (cfm) is needed to ensure 6 air changes per hour. The original factory fan had a rating closer to 300 cfm, which equates to a much higher air exchange rate. However, even at 300 cfm, the motor horsepower is only a 1/6 horsepower and therefore uses very little power even if run continuously.

NFPA 820 also requires that station dry wells have a portable fire extinguisher.

Health and Safety Based Recommendations

Based on both the excellent functional history and the inherent safety issues with this type of station, it is recommended that the City:

- Continue to train personnel and use confined space procedures.
- Continue to train personnel and use fall protection entry procedures and equipment for City staff and other visitors to the stations.
- Continue the program to replace unsafe non-code electrical outlets with relocated GFI outlets and to replace mercury-type level transducers.
- Replace the light fixtures with suitable impact-resistant light fixtures or provide Lexan or other break-resistant clear tubes that can be slid over the existing tubes for station lighting. These tubes are already in use in at least one station.
- Provide continuous ventilation at a minimum flow rate of 6 air changes per hour. Ductwork and balancing dampers should be provided with balancing dampers adjusted to take half of the air from the pump room ceiling and half from near the floor. Recommend installing a

loss of ventilation air alarm sent to SCADA. At time of commissioning, verify actual flow rate and balancing through air balancing measurement. Continuous operation, whether occupied or unoccupied, is necessary because of electrical hazardous area classification and the type of equipment that is required for such areas.

- Install portable fire extinguishers in each dry well.
- Use non-destructive metal thickness detectors (requires removing paint) and survey the stations wall, floor, and tubing thickness. Provide the thickness data to the package station vendor, who will have programs to determine whether structural integrity has been compromised based on depth and original design criteria. Repeat these measurements every 5 years.
- Develop a safety contact team so that the emergency button results in contacting more than one person, with at least one of those being an individual not likely to be inside the station (perhaps the fire department).
- Address issues found in separate standby power study.
- Ensure through the City's electrical work practice documentation and training that any work in the packaged control panel's interior is completed when the panels are completely de-energized. The panels need to be de-energized by the device(s) mounted at grade or move the panel's main breaker out of the packaged control panel to a separate and adjacent enclosure.
- In the event that City personnel need to work on energized station equipment, the City needs to perform an arc flash study to determine the incident energy and the required personal protective equipment necessary to work on or near the energized equipment. Subsequent to the study's completion, the City should provide the required personal protective equipment and training in the equipment's use. (The City may wish to expand arc flash awareness across all City-conducted electrical maintenance and operation procedures.)
- Provide each motor circuit with a listed lockout means. This can be accomplished with various after-market UL listed devices that, when applied to the circuit breakers in their off position and then locked, would prevent the breaker from being operated. A device for each motor must be kept at the station. It is recommended that each station be equipped with a minimum of three devices in the event of a device failure or loss. It is also recommended that service vehicles be equipped with a couple of selected lockout devices. (It should be noted that one lockout device's style could cover a possible range of breakers from 15A to 200A if the breakers are the same fundamental type.)

Condition Assessment and Recommendations

In addition to the health and safety based recommendations above that apply to all stations, the Condition Assessment resulted in other observations or recommendations that apply to multiple stations. The following section identifies system-wide observations and associated recommendations. This is followed by a site-by-site discussion of our Condition Assessment at individual stations, including station-specific recommendations.

Multiple Station Issues

Multiple station issues are identified in the following paragraphs.

- A number of stations include chemical storage and injection equipment. The chemical currently being used is Bioxide. The purpose is to reduce odors at the discharge end of a station's force main. It appears that the chemical systems may have been added after the station's original construction. Power for chemical metering pumps was taken from an electrical outlet inside the insulated "hot box" surrounding the station's backflow preventer and run to the pumps with an extension cord. It is illegal to permanently power equipment using extension cords. This is also a tripping safety hazard. Example photos below are from the White Trails Pumping Station. Power feeds should be put in conduit.

Power Source

Extension Cord

- For reasons explained under Standby Power above, the provision of in-line load banks on all new standby power units would increase standby power reliability. By being able to exercise under load (60-70%) for a minimum of 4 hours each month, carbon buildup in engines would be prevented and the units would be in a better state of readiness. Brown and Caldwell recommends that the City load test their engine installations once a month, running the engines approximately 4 hours. There should be an annual test where the engine runs over 6 hours.

- Operations reported that there were several situations where they identified deficiencies in delivered pre-packaged stations or equipment that were ignored by City Construction Management. Further they report that ultimately, changes were required after the stations were installed, resulting in lost time and increased cost. Whether these instances are reality or perception, it is recommended that management investigate means to improve inter-department cooperation and communication.

- It is our understanding that the City relies on outside firms for many routine activities, including electrical/instrumentation & control troubleshooting and maintenance and sewer cleaning/vactoring. While City storm and wastewater services might not require a full time electrician or instrument technician, we believe that the City of Auburn would benefit overall by having this expertise available in-house.

- Any future pre-packaged stations that the city purchases could incorporate simple improvements that would save time for Operations staff. In the City's existing stations, piping from the dry well penetrates horizontally straight into the side of the wet well hopper bottom. If a cleaning cycle is initiated by pumping down to the crown of the suction pipe, suction is broken before scum and floatable debris are pumped away. Operations personnel report that they have station wet wells pumped with vacuum trucks (vactors) to remove both grit and solids that settle and scum, grease, and floatables that ride on top of the fluid about once every 2 months. With the use of downward facing bells and sump bottoms dimensioned to conform to the recommendations of ANSI/HI 9.8 Pump Intake Design, it may be possible to pump away all materials, resulting in elimination or at least a reduction in the need for vactor cleaning.

- Any future pre-packaged stations that the city purchases should be bid with specifications that pay special attention to bonding of station floor steel to the foundation and avoidance of pockets under the floor. These stations typically have several beams that run under the floor, whose depth is partially established by the need to allow space for the sump pump well. If voids are left in this space, the floor will "oil can" and the pumps will vibrate, reducing equipment life. Pressure grouting each cell, providing grout relief holes, and using epoxy grout is preferred. If any existing stations are known to have vibration or oil canning, grout injection holes should be drilled in the floor and the space pressure grouted. Painting must be completed after the setting or grouting operation.

- Smith and Loveless pumps are constructed with extra thick volute and impellers. However, they have no replaceable wear rings, nor is there a standard means to adjust impellers to volute clearance after equipment has worn. Some users report they can extend pump life by substituting thinner gaskets as a means to reset impeller clearance and restore efficiency after the pump has worn.

- Is there an age limit to buried metal shelled stations? A search found that there were many stations similar to Auburn's installed as far back as 1940, with the structures still intact as long as external anodic or cathodic protection and internal coatings were maintained. Therefore, we can make no recommendations for station replacement simply on the basis of age.

- Plant Operators asked if heat and vibration sensors should be added to the main pumps and motors of the pump stations. Discussions with operations staff revealed that, due to limited access afforded the pump stations, it may prove worthwhile to add sensors that could alert operators that the equipment is experiencing abnormal conditions. Based on our review of the City's O&M records, there were several instances where overtime was used to reset motor starters. These motors may have become overheated because sticking level control devices or sticking motor contactors caused the wet well to be pumped down too far, resulting in a loss of cooling. Another instance where excessive run time may occur is when a pump loses suction and therefore the controls continue to call for a pump to run.

These heat and vibration signals could ultimately be relayed via the station's SCADA equipment back to the City's central monitoring point. Heat and vibration sensors are discussed in the following paragraphs.

Heat Sensors: It is uncertain whether a heat sensor would be effective in identifying an abnormal pump condition. Pumps do not traditionally get overheated without undue vibration being a weighted factor showing up first. The heat sensor should be embedded in the motor stator windings, so a simple addition to the existing motors is not possible. The motors would have to be pulled and a motor shop would have to install the heat sensor. The option of adding a sensor to the motor's casing would not be effective due to the time it would take the motor casing to reach a temperature of concern. The option of just putting a "high-high" temperature sensor on the motor casing is not recommended either. Again, the run time doesn't allow the motor casing to heat up before the control sensor turns the motor(s) off.

Brown and Caldwell is not certain that the capital costs for pulling the motors just to have a heat sensor installed can be justified. Heat sensors are typically installed on very large motors (250 hp and above) or as required by code when the motor operates in a hazardous National Electrical Code Class 1 space. One might believe that any new pump motor could be supplied with a heat sensor, but this is not an option for every manufacturer on their full range of motor models.

Vibration Sensors: If the City has had vibration problems on their pumps/motors in the past, then vibration monitoring could warn the City of pending failures. This places the City in an action versus a reaction state. Top and bottom accelerometers could be placed on each pump and motor. Many vibration monitoring control systems have modules that take three or six inputs. These modules then translate the accelerometer signals to an output signal to a PLC denoting a vibration alarm set point has been reached. Baseline vibrations would have to be taken with the subsequent range and alarm setpoints programmed into the vibration alarm system. This system would be relatively easy to install at all sites with a PLC and telemetry back to the central monitoring point. Given the location of the motors and ease of general observation, the addition of this system should be considered if experience has shown vibration to be an issue. It should be noted that the vibration system will not save on repair or replacement costs.

Station-by-Station Assessment

Our Condition Assessment included a field visit to each of the City's 19 pump stations in the wastewater treatment system. The previous sections of this memorandum listed recommendations applicable to multiple stations. This section covers items found to apply only at individual stations. Following are our observations and recommendations resulting from these site visits, with each station listed in alphabetical order.

Area 19 Pumping Station


Area 19 Pumping Station

The Area 19 Pumping Station is a new station.

Mechanical Recommendations

None that are specific to just this site.

Electrical Recommendations

- Recommend adding protective tubes over the light fixture's bare bulbs.
- Recommend providing a lockout means for the breakers that feed the packaged panel's motor starters. (Strict NEC violation)
- Recommend having arc flash labels installed on electrical panels in accordance with the NEC.

See mechanical, National Electrical Code, and safety recommendations common to multiple pre-packaged wastewater pumping stations.

B Street NW (private)

Not visited; no comments.

D Street NE Pumping Station


D Street NE Pumping Station

D Street NE Pumping Station is 36 years old, functioning well, but showing its age. Vehicle access to the station is through fields and bushes; large patches of floor coating have spalled off; and electrical gear, while scheduled for improvements associated with raising unsafe power outlets, is currently a hazard.

Mechanical Recommendations

- Recommend providing access driveway from street.
- Interior paint and coating repairs

Electrical Recommendations

- Recommend adding protective tubes over the light fixtures' bare bulbs.
- Recommend providing a lockout means for the breakers that feed the packaged panel's motor starters. (Strict NEC violation)
- Recommend replacing the sump pump's receptacle with a GFI. (Strict NEC violation)
- Recommend having arc flash labels installed on the electrical panels in accordance with the NEC.
- Fan system is very old, in very poor condition, and needs to be placed on a priority list for change-out.
- Recommend replacing wet well conduit's seal-off and associated "LB" for an installation that meets the NEC. (Strict NEC violation) One option is a 90 degree seal-off, then a box with an "LR" (Leaving to the Right). New circuit wiring to wet well from control panel is required.

See mechanical, National Electrical Code, and safety recommendations common to multiple pre-packaged wastewater pumping stations.

D Street NE Pumping Station, Floor Coating is Spalling

D Street NE Pumping Station, Limited Access to Station

D Street NE Pumping Station, Hazardous Wiring

Dogwood Pumping Station

The Dogwood Pumping Station was constructed in 1967 and is 40 years old. Outwardly, it is situated in a picturesque location, but inside there are safety and reliability problems. While access to most all of the City's underground stations is limited, access to the Dogwood Pumping Station is the worst (see photo). Not everyone is able to fit through the access way into the station.

Dogwood Pumping Station

The station has flooded twice. Once was from surface ponding that found its way through an unsealed conduit. Personnel have since sealed that leakage point. The second time was leakage from a check valve bonnet.

There is a new ventilation fan but its output seems restricted and not functioning properly. The sump pumps have failed and attempted repairs caused further leakage into the station. The station arrangement makes it quite difficult for a user to first transfer on to the ladder. Head room within the station is limited. Holding time is less than at other stations and overflows have occurred. The station is unsafe and should be replaced.

<u>Mechanical Recommendations</u>

- For health and safety reasons it is recommended that the City plan on replacing this station as soon as is reasonably possible. In the meantime, make the ventilation repairs described under improvements to all stations.

Access at Dogwood Pumping Station is Significantly More Limited than at Other Stations

<u>Electrical Recommendations</u>

- Recommend adding protective tubes over the light fixtures' bare bulbs.
- Recommend providing a lockout means for the breakers that feed the packaged panel's motor starters. (Strict NEC violation)
- Recommend having arc flash labels installed on the electrical panels in accordance with the NEC.
- Inadequate signage for the breakers. Recommend adding signage depicting loads.

- Recommend replacing wet well conduit's seal-off and associated "LB" for an installation that meets the NEC. (Strict NEC violation) One option is a 90 degree seal-off, then a box with an "LR" (Leaving to the Right). New circuit wiring to wet well from control panel is required.

Also see mechanical, National Electrical Code, and safety recommendations common to multiple pre-packaged wastewater pumping stations.

Ellingson Road Pumping Station

Ellingson Road Pumping Station

Ellingson is one of the oldest stations in the City (1968) and although reportedly functioning satisfactorily, is significantly showing its age. Interior paint coating is in bad shape, with floor and wall corrosion evident.

The pumps were short cycling, indicating that on/off levels are perhaps set closer than they need to be. One pump sounded like it had a bearing about to fail and the clear tubing manometer used to double check wet well level settings was disconnected. Ellingson Road is the only pre-packaged station to have variable-frequency drives installed in the dry well, although they appeared to be bypassed. Humidifier and other controls have not yet been moved from under the ladder stair to a less damage and moisture prone area.

<u>Mechanical Recommendations</u>

- Check pump bearings
- Repair tube manometer
- Reset level controls to avoid short cycling
- Remove unused equipment (VFDs?)
- Complete interior paint and coating -- At this and at all stations where painting is recommended, it is important that specifications dictate, and construction management enforces, proper surface preparation and priming prior to painting.

Ellingson Road Pumping Station, Humidifier Electrical Controls in Wet Area

<u>Electrical Recommendations</u>

- Recommend replacing fixture. The fixture is missing the ballast cover as well as bulb protection.
- Recommend replacing the sump pump's receptacle with a GFI. (Strict NEC violation)

- Recommend providing a lockout means for the breakers that feed the packaged panel's motor starters. (Strict NEC violation)
- Inadequate signage for the breakers. Recommend adding signage depicting loads.
- Recommend having arc flash labels installed on the electrical panels in accordance with the NEC.
- Recommend replacing wet well conduit's seal-off and associated "LB" for an installation that meets the NEC. (Strict NEC violation) One option is a 90 degree seal-off, then a box with an "LR" (Leaving to the Right). New circuit wiring to wet well from control panel is required.
- Cathodic protection system was found to be greater than "redline" in terms of applied voltage to the cathodic system. Lowered voltage to normal operating range.

Ellingson Road Pumping Station, Corrosion of Floor

For this station, be especially sure to survey wall thickness.

Also see mechanical, National Electrical Code, and safety recommendations common to multiple pre-packaged wastewater pumping stations.

Ellingson Road Pumping Station, Corrosion in Sump

F Street SE Pumping Station

F Street SE Pumping Station

<u>Mechanical Recommendations</u>

- None that are specific to just this site.

<u>Electrical Recommendations</u>

- Recommend providing a lockout means for the breakers that feed the packaged panel's motor starters. (Strict NEC violation)
- Recommend having arc flash labels installed on the electrical panels in accordance with the NEC.
- Inadequate signage for the breakers. Recommend adding signage depicting loads.
- Though field notes do not indicate that there is a NEC violation concerning wet well conduits entering the dry well, the City should verify the installation does not match the noted problem areas at the other stations.

Also see mechanical, National Electrical Code, and safety recommendations common to multiple pre-packaged wastewater pumping stations.

North Tapps Pumping Station

North Tapps Pumping Station

The North Tapps Pumping Station is newly constructed and in good mechanical condition.

<u>Mechanical Recommendations</u>

- None that are specific to just this site.

<u>Electrical Recommendations</u>

- Recommend adding protective tubes over the light fixtures' bare bulbs.
- Recommend providing a lockout means for the breakers that feed the packaged panel's motor starters. (Strict NEC violation)

- Recommend having arc flash labels installed on the electrical panels in accordance with the NEC.

Also see mechanical, National Electrical Code, and safety recommendations common to multiple pre-packaged wastewater pumping stations. Especially note comment on Operations/Construction Management teamwork.

Peasley Ridge Pumping Station

The Peasley Ridge Pump Station is fairly new and in relatively good condition.

Mechanical Recommendations

- None that are specific to just this site.

Electrical Recommendations

- Recommend having arc flash labels installed on the electrical panels in accordance with the NEC.
- Recommend adding protective tubes over the light fixtures' bare bulbs.

Peasley Ridge Pumping Station

Also see mechanical, National Electrical Code, and safety recommendations common to multiple pre-packaged wastewater pumping stations. Especially note comment on Operations/Construction Management teamwork.

Peasley Ridge Pumping Station, Newly Constructed and in Good Condition

R Street NE Pumping Station


R Street NE Pumping Station

The R Street Pumping Station is 30 years old and described by Operations as reliable and trouble free. It underwent an electrical upgrade in 1995.

Mechanical Recommendations

- None that are specific to just this site.

Electrical Recommendations

- Recommend adding protective tubes over the light fixture's bare bulbs.
- Recommend providing a lockout means for the breakers that feed the packaged panel's motor starters. (Strict NEC violation)
- Recommend having arc flash labels installed on the electrical panels in accordance with the NEC.
- Recommend replacing the sump pump's receptacle with a GFI. (Strict NEC violation)
- Recommend replacing wet well conduit's seal-off and associated "LB" for an installation that meets the NEC. (Strict NEC violation) One option is a 90 degree seal-off, then a box with an "LR" (Leaving to the Right). New circuit wiring to wet well from control panel is required.
- Cathodic protection system was found to be tripped with the variac set for 100%. Reset the system and lowered voltage to normal operating range.

Also see mechanical, National Electrical Code, and safety recommendations common to multiple pre-packaged wastewater pumping stations.

Rainier Ridge Pumping Station

The mobile generator serving the Rainier Ridge station is stored in the wooden building shown in the adjacent photo. Typically a "structure" housing an engine generator would be required to be of fireproof construction. With the mobile generator having its own enclosure, code requirements become unclear. It is suggested that requirements for this structure be discussed with the City's fire marshal.


Rainier Ridge Pumping Station

Interior equipment is in relatively good shape, but painting touch-up is needed.

Mechanical Recommendations

- Discuss generator structure with fire marshal
- Interior paint and coating repairs.

Electrical Recommendations

- Recommend adding protective tubes over the light fixtures' bare bulbs.
- Recommend providing a lockout means for the breakers that feed the packaged panel's motor starters. (Strict NEC violation)
- Recommend having arc flash labels installed on the electrical panels in accordance with the NEC.
- Could not locate the conduits from the level control in the wet well because there were no conduits with the required seal-offs from such a location either inside or outside the access tube. We suspect these circuits may not have seal-offs in them. Recommend further investigation into which conduits are associated with the wet well's level controls and verify that there are seal-offs located in these circuits as required by the NEC.
- Inadequate signage for the breakers. Recommend adding signage depicting loads.
- There are temporary power circuits being fed from a non-GFI receptacle. (Strict NEC violation) Recommend those receptacle(s) be replaced with GFI protection.

Also see mechanical, National Electrical Code, and safety recommendations common to multiple pre-packaged wastewater pumping stations.

Rainier Ridge Pumping Station, Engine-Generator Storage

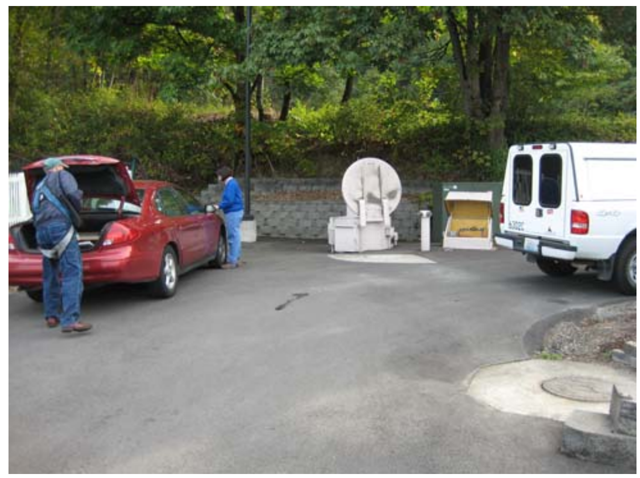
Rainier Shadows Pumping Station

The Rainier Shadows Pumping Station is due to be de-commissioned when the Verdana Pumping Station is operational. It was therefore not evaluated.

Rainier Shadows Pumping Station

Riverside Pumping Station

Operations indicate that this station was constructed in an area of poor soils and near-grade water table. There have been settlement and breakage problems both with the sewers coming to the station and the force main leaving the station. When the force main broke, it took several attempts to replace it because piping continued to wash away.



Riverside Pumping Station

This is a very deep station. The reason for this depth is not apparent upon first examination because the service area is either up the hill from the station, or very nearby, meaning that influent sewers could be set quite shallow. When development of the Comprehensive Plan work is in the collection system modeling phase, we will check whether station depth was established for a service area greater than currently connected. The station does not have on-site generation; it has plug connectors for a mobile generator.

Operators report that storage time has been sufficient that mobile generators have been brought to the site quickly enough to avoid overflows. Pumps and equipment require touch-up paint.

For this station it is recommended that sewers and force mains be put on a regular TV inspection schedule; equipment be painted; and that Brown and Caldwell confirm the requirement for depth of station and piping. If repairs on the station or piping are required in the future, geotechnical soil consolidation and improvement measures should be incorporated.

Mechanical Recommendations

- Interior paint and coating repairs.
- Regular force main and sewer TV inspection both for condition and settlement

Electrical Recommendations

- Recommend adding protective tubes over the light fixtures' bare bulbs.
- Recommend providing a lockout means for the breakers that feed the packaged panel's motor starters. (Strict NEC violation)
- Recommend having arc flash labels installed on the electrical panels in accordance with the NEC.
- Receptacle circuit has a receptacle in the dry well that has an "in-use" cover. Could not determine if the receptacle was a GFI as required. Recommend removing all plugs and verifying that each receptacle is in fact a GFI and, if not, replace it.

Also see mechanical, National Electrical Code, and safety recommendations common to multiple pre-packaged wastewater pumping stations.

Terrace View Pumping Station

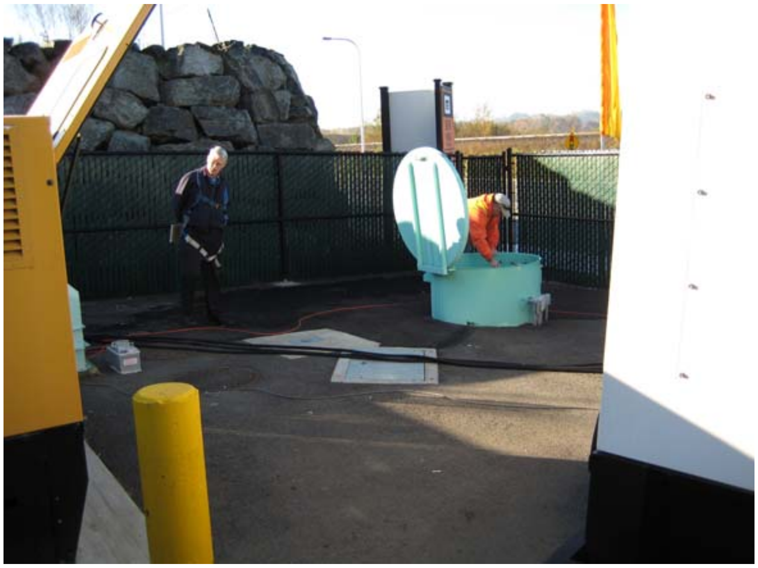
The Terrace View Pumping Station is a new station (2007). During the site visit, the engine-generator set was out of commission, and temporary cabling had been installed to hook up a mobile generator. There had been an overflow event.

Electrical equipment above grade was isolated and tarped off because of the portable generator leads. Therefore, the above-ground electrical distribution equipment was not evaluated.

Although new, there appeared to be some unfinished punch list items such as exterior valve boxes that had been paved over, and rust on stored equipment (see photo). We recommend completing these punch list items.

Mechanical Recommendations

- Uncover buried valve boxes
- Complete construction punch list items
- Interior equipment touch up painting



Terrace View Pumping Station

Terrace View Pumping Station, Rust on New Pumps

Electrical Recommendations

- Recommend adding protective tubes over the light fixtures' bare bulbs.
- Recommend providing a lockout means for the breakers that feed the packaged panel's motor starters. (Strict NEC violation)
- Recommend having arc flash labels installed on the electrical panels in accordance with the NEC.
- Cathodic protection system was found to be disconnected. It appears that the system was never operational. Recommend getting the system on-line as soon as possible.
- Could not determine what control circuits came from the wet well. Missed the required seal-offs that were expected on the conduits coming into the access tube. Recommend further investigation into which conduits are associated with the wet well's level controls and verify that there are seal-offs located in these circuits as required by the NEC.

Also see mechanical, National Electrical Code, and safety recommendations common to multiple pre-packaged wastewater pumping stations.

Valley Meadows Pumping Station

Similar to the 8th Street Pumping Station, Valley Meadows is a pre-packaged underground station that differs from many of the others in the Auburn system in that it is shallower; the wet well is in a chamber below the dry well; and with the pumps above the liquid level, they are primed through a vacuum priming system. However, unlike 8th Street, Valley Meadows has not reported frequent problems with losing prime or being able to prime its pumps.

Valley Meadows Pumping Station

This station serves an area that has seen a lot of new construction during the life of the station. Large quantities of rock, gravel, and debris have made it to the station and required special callouts for wet well cleaning.

There is no on-site generation at this location, and storage upon loss of power is about 2 to 3 hours. There have been issues getting mobile power to the site during storm periods when power has been out at several locations simultaneously. It is not known whether this is because of lack of mobile generators or lack of staff to service multiple stations. We recommend that management review issues related to provision of power in emergency situations.

Mechanical Recommendations

- Review ability to bring mobile generator to site during large storms when generators may be needed in multiple locations.

Electrical Recommendations

- Recommend adding protective tubes over the light fixtures' bare bulbs.
- Recommend providing a lockout means for the breakers that feed the packaged panel's motor starters. (Strict NEC violation)
- Recommend having arc flash labels installed on the electrical panels in accordance with the NEC.
- There's a 2-inch LB near the access ladder with its cover missing. Recommend replacing the cover.
- Adjacent to the above 2-inch LB there's a seal-off that has a water pipe elbow connecting to the wall penetration and the seal-off.
- There is an electrical working clearance problem here due to the Siemens telemetry unit's installation. Electrical equipment is required to have 42 inches of free and clear space between the front of the equipment and grounded equipment of structural members. The Siemens telemetry unit only affords 28.5 inches of clearance. Recommend evaluating possible solutions at relocating the telemetry unit.
- This installation is set up for a portable generator to feed the pump station first through a 240V delta/208-120V wye step-down transformer. The utility equipment side is grounded at its meter by a grounding electrode conductor and the service neutral is grounded at the double-pole transfer switch downstream of the utility and the portable generator's step-down transformer. Could not determine if the transformer enclosure for portable generator operations is grounded in accordance with the NEC. (Strict NEC violation) Recommend further investigation to determine if enclosure is tied to an equipment ground connection in accordance with the NEC.
- The noted grounding electrode conductor above appears to be a solid bare copper #8 AWG conductor. A #6 AWG is the smallest ground electrode conductor allowed by the NEC. Recommend further investigation to determine the bare conductor's outside diameter to determine AWG size.

Also see mechanical, National Electrical Code, and safety recommendations common to multiple pre-packaged wastewater pumping stations.

White Mountain Trails Pumping Station

Sewers at this location are shallow enough that a surface-mounted, self-priming station could be installed. Its equipment is easily accessible and operation is quiet. Operators report that this station may be replaced when the new Verdana station comes on line. The only reported problems are blockages in custom-made very short radius elbows. Because of the compact arrangement of this equipment, these elbows cannot be replaced with standard radius units.


White Mountain Trails Pump Station

Mechanical Recommendations

- None that are specific to just this site.

Electrical Recommendations

- Recommend providing a lockout means for the breakers that feed the packaged panel's motor starters. (Strict NEC violation)
- Recommend having arc flash labels installed on the electrical panels in accordance with the NEC.

Also see mechanical, National Electrical Code, and safety recommendations common to multiple pre-packaged wastewater pumping stations.


White Mountain Trails Pump Station, Custom-made Shot Radius Elbows that Plug

8th Street NE Pumping Station

8th Street NE Pumping Station

The 8th Street Pumping Station is a pre-packaged underground station, but differs from many of the others in the Auburn system in that it is shallower; the wet well is in a chamber below the dry well; and with the pumps above the liquid level, they are primed through a vacuum priming system.

Operators indicate this is one of their most troublesome stations because the pumps keep losing their prime and become unable to pump. Pump priming can be implemented in different ways: through self-priming pumps with a built-in priming water reservoir (pumps become quite large) or through a separate priming system such as is installed here. Vacuum pumps evacuate air from the suction piping, drawing water up into the pumps prior to pump start. If the suction piping is not completely sealed, vacuum conditions cannot be developed and the pumps won't prime.

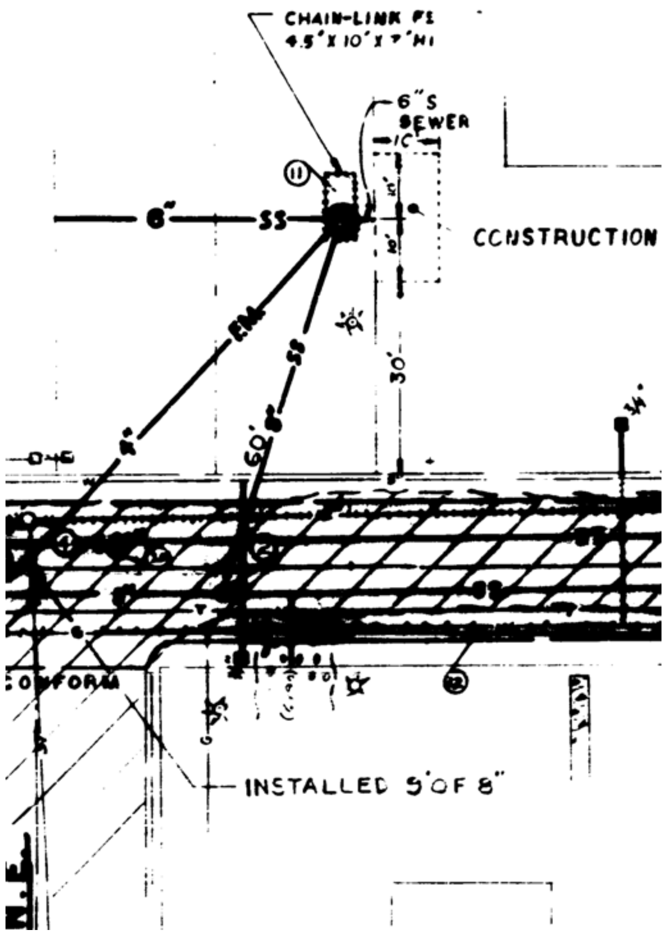
<u>Mechanical Recommendations</u>

- The 8th Street NE Pumping Station uses double resilient seated check valves on the discharge side in case one check valve closes on a string or solid and won't seal. Additionally, the station's O&M Manual (Exhibit C) includes very specific instructions on force main installation to ensure there is sufficient water back pressure on the check valves so that they will seat tightly. As-builts provided to Brown and Caldwell only show the force main in plan view, see below. If the City has construction photos or as-built force main profile sheets, we will check the profile against the criteria in Exhibit C and include findings in the final Technical Memorandum.

<u>Electrical Recommendations</u>

- Recommend providing a lockout means for the breakers that feed the packaged panel's motor starters. (Strict NEC violation)
- Recommend having arc flash labels installed on the electrical panels in accordance with the NEC.
- Electrical equipment is plugged into non-GFI receptacles. Recommend installing GFI receptacles.
- There is an electrical working clearance problem here due to the dehumidifier's installation. Electrical equipment is required to have 42 inches of free and clear space between the front of the equipment and grounded equipment of structural members. The dehumidifier unit only affords 27 inches of clearance. Recommend evaluating possible solutions at relocating the dehumidifier.

Also see mechanical, National Electrical Code, and safety recommendations common to multiple pre-packaged wastewater pumping stations.



Excerpt from 8th Street Sewer Installation Drawing Sheet 4 of 8, As-built 1974

22nd Street NE Pumping Station

22nd Street NE Pumping Station

The 22nd Street NE Pump Station was built in 1967 and is in need of painting for corrosion control. This station experiences flow peaks in the range of 6:1. Rehabilitation work is underway on local sewers but not house laterals. Collection system modeling for this comprehensive plan will incorporate work currently underway.

Mechanical Recommendations

- Complete interior paint and coating

Electrical Recommendations

- Recommend providing a lockout means for the breakers that feed the packaged panel's motor starters. (Strict NEC violation)
- Recommend having Arc flash labels installed on the electrical panels in accordance with the NEC.
- Electrical equipment is plugged into non-GFI receptacles. Recommend installing GFI receptacles. (Strict NEC violation)
- Recommend replacing wet well conduit's seal-off and associated "LB" for an installation that meets the NEC. (Strict NEC violation) (One option is a 90 degree seal-off, then a box with an "LR" (Leaving to the Right). New circuit wiring to wet well from control panel is required.

Also see mechanical, National Electrical Code, and safety recommendations common to multiple pre-packaged wastewater pumping stations.

22nd Street NE Pumping Station, Ongoing

22nd Street NE Pumping Station, Damage from Corrosion

Verdana (Future)

No comments.

Auburn 40 (Future)

No comments.

Summary Recommendations and Preliminary Costs

As mentioned before, the City's existing stations have provided excellent reliability and are in generally good condition. After a preliminary review of this document by the City, all system-wide and individual station recommendations were considered to still be valid. The majority of the recommendations can be funded through annual maintenance and operations or repair and replacement budgets. These are accounted for in the capital improvement program (CIP) via the general "Repair and Replacement/System Improvement Projects" and are divided up based on their priority. Recommendations that will be specifically identified in the City's Comprehensive Sewer Plan are identified in Table 2 below with preliminary cost information.

Table 2. City of Auburn Preliminary Cost Estimates for Recommendations

	Recommendation	Preliminary Cost Estimate
1	Dogwood Pump Station Replacement	$1,800,000
2	Ellingson Pump Station Replacement/Upgrade	$1,800,000
3	Emergency Power Generators	$1,500,000

EXHIBIT A

STATION CHECKLISTS

Pump Station Electrical Evaluation Check List

Location:	
1.	**Service equipment status… (Age/condition/maintainability)** **Note Ratings and Manufacturer**
2.	**Distribution equipment… (Age/condition/ maintainability)** **Note Ratings and Manufacturer**
3.	**Service grounding (Ground rods, ground electrode conductor(s), etc.)**
4.	**Equipment grounding**

5.	**NEMA ratings on site equipment (Indoor/Outdoor)**
6.	**Variable frequency drives (Age/condition/maintainability)**
7.	**General motor starters… Individual/packaged/ motor control center (Age/condition/maintainability)**
8.	**Unsafe lighting at stairs/ladders (Age/condition of lighting)**
9.	**Light Trespass issues with outdoor fixtures**
10.	**Electrical working clearance issues (National Electrical Code 110.26)**
11.	**Condition of electrical aspects of HVAC**
12	**Other:**

PUMP STATION CHECK LIST - HYDRAULIC/MECHANICAL

Updated 9/24/07

General sizing

- ☐ Hydraulic profile--adequacy of influent/effluent sewers
- ☐ Style/configuration
- ☐ Architecture
- ☐ Current and future expansion requirements
- ☐ Redundancy of equipment
- ☐ Landscaping
- ☐ Types of tools they use here/use elsewhere
- ☐ Access-roads/stairways/equipment
- ☐ Catastrophic failure--fire/earthquake/flood
- ☐ General, heavy-duty, long-life municipal construction
- ☐ Space if new station on existing site required.
- ☐ Neighbor concerns or physical constraints
- ☐ Fencing
- ☐ Roadways and access
- ☐ Confined spaces

Wet well

- ☐ Grit issues - removal method
- ☐ Ragging issues - removal method

- ☐ Floatables issues - removal method
- ☐ Influent velocity/quiescence
- ☐ Air entrainment
- ☐ Vortexing
- ☐ Wet well suction conditions
- ☐ Submergence
- ☐ Corrosion
- ☐ Atmosphere day of visit
- ☐ Isolation
- ☐ System relief point
- ☐ Hazardous atmosphere monitoring
- ☐ Grinding or screening included

Raw Sewage or Stormwater Pumps

- ☐ Name tag data
- ☐ Redundancy/capacity
- ☐ Drive type
- ☐ Mech seal/packing
- ☐ Seal history
- ☐ Wear ring history
- ☐ Adequacy of installed instrumentation to determine pump performance

- ☐ Heavy-duty, long-life municipal construction
- ☐ Base mounting and foundation
- ☐ Connected piping - size, support, anchorage and anchorage location
- ☐ 5D prior spacing from last disturbance fitting
- ☐ Air relief or venting
- ☐ Surge suppression
- ☐ Valve type and operability
- ☐ Seismic support and bracing
- ☐ Other - indication of damage or poor performance

Force main

- ☐ Drainage at station and on run
- ☐ TV inspection access
- ☐ Cleaning launch/retrieval
- ☐ Air venting
- ☐ Adequacy for operating and surge pressures- plastic hysterysis

Standby generation

- ☐ Fuel storage--size/safety
- ☐ Capacity

- ☐ Secondary containment
- ☐ Ventilation adequacy/quality
- ☐ Means to exercise

HVAC

- ☐ General air flow schematic and today's regulations
- ☐ Capacity
- ☐ Humidity control
- ☐ Powered both in and out
- ☐ Louvers

Auxiliary systems

- ☐ Instrument air
- ☐ Service Air
- ☐ Potable Water
- ☐ Process Water
- ☐ Bathrooms/Janitor/Cleanup/Office
- ☐ Lighting
- ☐ Seal water/cooling water

☐ Air storage

☐ Sump pumps

Other equipment and miscellaneous

☐ Equipment access

☐ Hydraulic Transient Equipment

☐ Asbestos

☐ Fire suppression

☐ Chemical storage

☐ H2S Control

☐ Housekeeping curbs

☐ Motive force for actuators

☐ Odor control

☐ Noise control

☐ Air break or backflow preventer

☐ Isolation/sluice gates

☐ Controlled emergency relief

☐ Seismic

☐ Freeze protection

☐ Thrust restraint

- ☐ Vandalism
- ☐ Explosive gases
- ☐ Finishes and coatings
- ☐ Cranes/lifting/hoisting
- ☐ Stairwells

Electrical and Controls -- Only if EIC is not assessed by separate discipline staff

- ☐ Electrical classification
- ☐ Telemetry and alarm systems
- ☐ Flood plane avoidance
- ☐ Separate HVAC panels
- ☐ Location of electrical and controls relative to flood level
- ☐ Level monitoring
- ☐ Flow metering
- ☐ Hazardous atmosphere monitoring
- ☐ Phase protection
- ☐ Instantaneous electric reclosure
- ☐ Alarm instruments separate form operations instruments
- ☐ SCADA
- ☐ Flow metering existence and application accuracy
- ☐ MCCs
- ☐ Switchgear

EXHIBIT B

NFPA 820 STANDARD FIRE PROTECTION IN WASTEWATER TREATMENT FACILITIES AND COLLECTION SYSTEMS -2008

EXCERPT FROM TABLE4.2

Table 4.2 ***Continued***

Row	Line	Location and Function	Fire and Explosion Hazard	Ventilation	Extent of Classified Area	*NEC* Area Electrical Classification (All Class I, Group D)	Material of Construction for Buildings or Structures	Fire Protection Measures
16	a	WASTEWATER PUMPING STATION WET WELLS Liquid side of a pumping station serving a sanitary sewer or combined system	Possible ignition of flammable gases and floating flammable liquids	A	Entire room or space	Division 1	NC, LC, or LFS	CGD
	b			B		Division 2		
17	a	BELOWGRADE OR PARTIALLY BELOWGRADE WASTEWATER PUMPING STATION DRY WELL Pump room physically separated from wet well; pumping of wastewater from a sanitary or combined sewer system through closed pumps and pipes	Buildup of vapors from flammable or combustible liquids	C	Entire space or room	Unclassified	NC, LC, or LFS	FE
	b			D		Division 2, or unclassified, if space provided with pressurization in accordance with NFPA 496		
18		ABOVEGRADE WASTEWATER PUMPING STATION Pump room physically separated with no personnel access to wet well; pumping of wastewater from a sanitary or combined sewer system through closed pumps and pipes	NA	NR	NA	Unclassified	NC, LC, or LFS	FE

Notes:

(1) The NR designation in the ventilation column indicates that no ventilation requirements are established for the space, and, therefore, Table 9.1.1.4 also has no requirements.

(2) Row and Line columns are used to refer to specific figures in A.4.2 and specific requirements for each location and function.

(3) The following codes are used in this table:

A: No ventilation or ventilated at less than 12 air changes per hour.

B: Continuously ventilated at 12 changes per hour or in accordance with Chapter 9.

C: Continuously ventilated at six air changes per hour or in accordance with Chapter 9.

CGD: Combustible gas detection system.

D: No ventilation or ventilated at less than six air changes per hour.

FDS: Fire detection system.

FE: Portable fire extinguisher.

LC: Limited-combustible material.

LFS: Low flame spread material.

NA: Not applicable.

NC: Noncombustible material.

NEC: In accordance with NFPA 70.

NNV: Not normally ventilated.

NR: No requirement.

(continues)

EXHIBIT C

FORCE MAIN PROFILE REQUIREMENTS FROM O&M MANUAL FOR 8TH AVENUE NE PUMPING STATION

ENGINEERING DATA

Smith & ® Loveless, Inc.

14040 W. Santa Fe Trail Dr.
Lenexa, Kansas 66215

Constant Flow
Pump Station
Wet Well Mounted
Notes on Force Main Design
Page 1
March, 1983

WET WELL MOUNTED PUMP STATION FORCE MAIN

1 Under certain unusual conditions the wet well mounted pump station force main requires special provisions to prevent loss of prime of the station. The station has two rubber-seated check valves in the discharge piping. These valves must be seated airtight when the vacuum pump comes on or the vacuum pump will suck air through the check valves and the station will not prime. For most installations, this is not a problem, if we have a force main, such as shown in Fig. 1, where the force main is

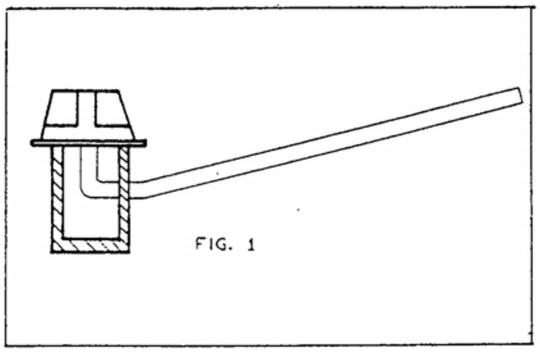


FIG. 1

of considerable length, (approximately 150 feet), there is a static head on the check valves, and a large volume of sewage in the force main. Since the force main runs uphill, the sewage cannot flow out of the force main, and there is a static head on the check valves to keep them seated. If there is some seepage back through the check valve, the length of the force main creates enough capacity that it takes a considerable length of time for the sewage to flow back through the check valve and create a loss of prime condition. Since the force main is long, we also have the advantage that the sewage flowing back through the check valve into the wet well will bring the pump on before the force main is empty. Therefore, when we have a long force main, running uphill as shown in Fig. 1, we do not have a priming problem because of air being sucked through the check valves.

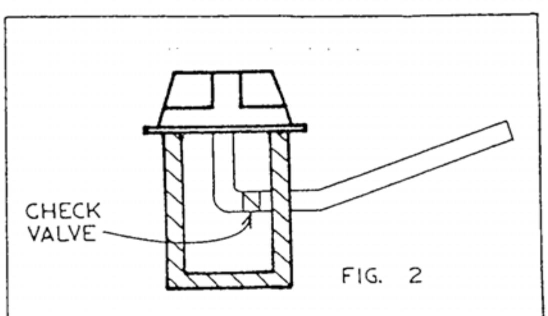


FIG. 2

When we have a short force main running uphill from the station, as shown in Fig. 2, we can have a priming problem. If the force main is less than approximately 150 feet long, there is not much reserve capacity in the force main. If one of the discharge check valves is allowing the sewage in the force main to seep back into the wet well, it is possible that the force main will empty back into the wet well before the level in the wet well raises to bring a pump on. Since the check valves do not seat against air, the pump loses it's prime, and when the vacuum pump comes on to prime the pump, it sucks air through the check valve and cannot prime the pump.

To prevent this problem, we recommend installing a third check valve in the common discharge from the station. This check valve should be installed in the horizontal run of pipe inside the wet well. The check valve is shipped loose, and is installed in the force main by the installing contractor. The reason for the third check valve is that this gives a double checking action on both pumps. It is very unlikely that both check valves will be hung up on a mop string or piece of paper, thus creating a loss of prime.

2 We can also have a priming problem if we have a long force main running downhill from the station as shown in Fig. 3. In this type of installation, after the pump shuts off, the force main empties out by gravity, allowing air to get on the force main side of the check valve. Here again, the pump loses prime, and when the vacuum pump comes on and tries to prime the pump, it sucks air through the check valve. To prevent this from happening, we recommend that the force main be installed with the last 50 feet of pipe running uphill, as shown in Fig. 3. The invert of the outfall should be at least two pipe diameters above the low point in the force main. This creates a water trap, and when the pump shuts off, air cannot get into the force main and allow the contents to empty out by gravity. If it is not possible to run the last 50 feet of force main uphill, as shown in Fig. 3, then an elbow can be installed on the end of the force main to create the same water trap effect.

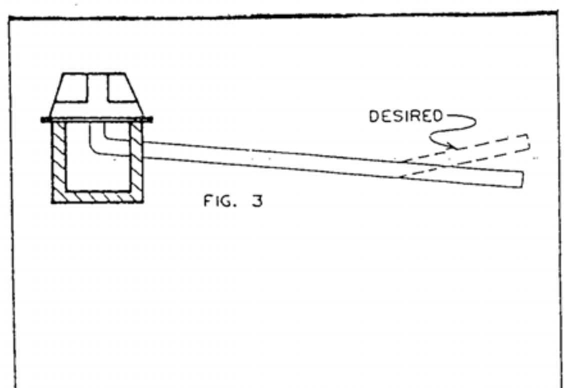


FIG. 3

Constant Flow
Pump Station
Wet Well Mounted
Notes on Force Main Design
Page 2
March, 1983

ENGINEERING DATA

Smith & Loveless, Inc.
14040 W. Santa Fe Trail Dr.
Lenexa, Kansas 66215

The installation shown in Fig. 4, a short force main (less than 100 feet) running downhill from the station, also creates a possible priming problem. Here we have the possibility of both the force main emptying out by gravity, and the check valve allowing sewage to seep back into the pump. If at all possible, the force main should be extended down into the wet well, and exit at an elevation so that the force main can run uphill from the station. Refer to the dotted line on Fig. 4 which shows the recommended force main installation. Here again, if it is not possible to run the force main uphill from the station, an elbow can be installed at the end of the force main. This creates a water trap effect, and does not allow air to enter the force main. If air cannot enter the force main, the sewage cannot flow out by gravity. Once this has been done, we have the same condition that we have in Fig. 2. A third check valve must now be installed in the horizontal run of force main in the wet well. This check valve gives a double checking action and prevents the contents of the force main from seeping back through the pump, causing a loss of prime.

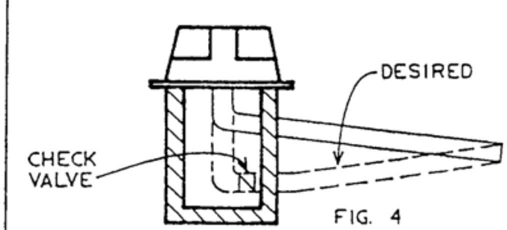


FIG. 4

The following information is given for general guidelines:

The force main is considered to run uphill from the station if the invert of the outfall is at least two pipe diameters above the low point of the force main. This creates the air-trap effect, so that the sewage will not flow out of the force main by gravity.

The force main is considered to be a short force main, and requires a third check valve if the contents of the force main are less than the design capacity of the pump. For example, if the station has a design capacity of 100 gallons per minute and the force main is four inches, then the capacity of the force main must be 100 gallons. The capacity of four inch pipe is approximately seven-tenths gallon per foot. Therefore, the force main would have to be approximately 150 feet long to have a capacity of 100 gallons. The reasoning behind this particular design requirement is that if the check valve should seep and allow the sewage to run back through the pump and into the wet well, there will be enough contents in the force main to bring the wet well back up to the "ON" position, and the pump will start before the force main empties. This is assuming the elevation between the "low-level off" float switch and the "low-level on" float switch is such that the volume between switches is equal to the pump capacity. If the switches are set closer together, less capacity is required in the force main. Less capacity is also required in the force main if it is known that the flow into the wet well is fairly consistent so that the pumps do not sit idle for long periods of time (8 hours).

Of course, in all cases, the outfall must be at a higher elevation than the low water level in the wet well. Otherwise, siphoning the wet well dry will cause loss of prime through the suction lines.

ALTERNATE SOLUTIONS

The installation of a storage manhole as shown in Fig. 5 with force main exit at the top of the manhole creates the necessary water trap in a short downhill force main. The extra check valve may or may not be required, depending on the volume in the storage manhole.

As an alternate to Fig. 2, some consulting engineers install a riser pipe in the discharge manhole to create the necessary water trap as shown in Fig. 6. A water main tee is installed on the end of the gravity line with a one or two foot pipe looking up from the branch side and a shear gate with a chain installed on the end of the tee. The force main terminates on the bottom of the manhole. Normal pump station discharge will surcharge the receiving manhole until it can enter the vertical pipe. This leaves enough volume to cycle a pump if the check valve fails. It allows the operator to pull the chain and flush out any accumulation of solids in the manhole.

The above examples should cover every installation for a wet well mounted pump station. If you have an unusual condition that is not covered by the examples given above, consult the factory, and we will give you a special recommendation for your application.

SHORT DOWNHILL FORCE MAIN

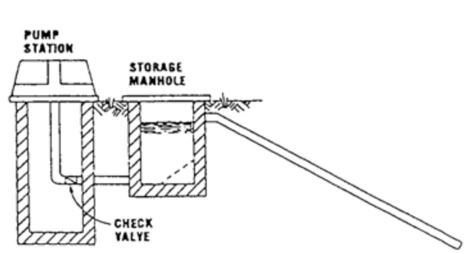


FIG. 5

BROWN AND CALDWELL

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Prepared for: City of Auburn, WA

Project Title: City of Auburn Comprehensive Sewer Plan Update

Project No: 133347

Technical Memorandum

Subject: Sewer Hydraulic Capacity Assessment

Date: April 10, 2009

To: Bob Elwell, Sewer Utility Engineer

From: Vicky Zeledon, Project Engineer, Brown and Caldwell
Mike O'Neal, P.E., Project Manager, Brown and Caldwell

Copy to:

Prepared by: ___________________________________

Vicky Zeledon, Environmental Engineer, Brown and Caldwell

____

Tony Dubin, Senior Engineer, Brown and Caldwell

Reviewed by: ___________________________________

Mike O'Neal, P.E., Project Management, Brown and Caldwell

Limitations:

1. INTRODUCTION

This Technical Memorandum describes the methods and assumptions for the City of Auburn (City) wastewater conveyance system hydraulic capacity assessment. The assessment was conducted by Brown and Caldwell (BC) in support of the Comprehensive Sewer Plan update, authorized by the City under the 2007 Agreement for Professional Services AG-C-301.

The objectives of the wastewater conveyance system hydraulic capacity assessment was to a) simulate the wastewater flows through the conveyance system under base flow and large storm flow conditions, b) identify existing and future capacity shortfalls relative to the City's proposed level of service for wastewater conveyance, b) evaluate proposed solutions for capacity shortfalls, and c) identify capital improvement projects (CIP) for the Comprehensive Sewer Plan update.

2. MODEL CONSTRUCTION AND ASSUMPTIONS

The hydraulic model of the Auburn sewer system was built in MikeUrban 2007, which is a GIS-based hydrologic and hydraulic modeling platform produced by DHI (formerly known as the Danish Hydraulic Institute). MikeUrban contains several models and hydraulic engines that are applicable in urban settings. For this project, we selected the Mouse hydraulic engine, because Mouse has built-in tools for estimating rainfall-dependant infiltration and inflow (RDII or I/I) and because Mouse utilizes the full Saint Venant equations to solve for both water levels and velocities in pipe systems. The Saint Venant equations provide more accurate solutions in complicated hydraulic environments that include changing flow rates, pipe surcharging, and back water effects.

The MikeUrban model was based on a Mouse model that was developed by King County for the City of Auburn in 2001, as part of King County's Regional I/I Program. The King County-developed model included all public pipes owned by Auburn and King County within the city limits and estimates of base flow entering specific manholes (i.e., model flow loading nodes).

The King County Mouse model was revised as follows:

1. The model network was simplified by eliminating pipes smaller than 10-inches in diameter, with the exception of those pipes connecting larger size pipes to the main network and force mains. The original model prepared by King County contained more than 3,500 pipe segments. This generated excessively long model simulation times and limited our ability to conduct capacity assessment and alternatives analysis simulations. Removing pipes smaller than 10-inch diameter does not impact the accuracy or usefulness of the model (because the smaller pipes are not likely to be over capacity). The simplified model contains 1280 pipe segments and generates runtimes that are 75 percent less than the original model without a loss of accuracy.
2. Infrastructure that was installed after 2001 was added to the MikeUrban model. A total of 875 sewer catchments, 16 pump stations and approximately 11,715 feet of pipe were added to the model.
3. Pump stations were simulated as using "ideal" pumps, which are characterized by their start/ stop water levels and capacity curves. Ideal pumps have no force main at the discharge but rather connect the pump station wetwell to the discharge manhole as dictated by their capacity-head curves.

The following sections describe the model construction method in detail. Section 2.1 describes key wastewater infrastructure included in the model. Section 2.2 describes methods used to generate population forecasts. Section 2.3 discusses base flow projections. Section 2.4 describes the method used to estimate peak I/I flow rates. Section 2.5 discusses how wastewater flows were allocated to specific manholes in the sewer network.

2.1 Model Infrastructure

Figure 2-1 shows the layout of the Auburn sewer network after the modeling simplification process. The modeled sewer system contains about 60 miles of pipe out of the City's total 65 miles of sewer lines. The modeled pipes have diameters ranging from 8 inches to 72 inches. Table 2-1 lists the approximate distribution of pipe lengths by size. The diameters and invert elevations of all pipes in the system were obtained either from the King County MOUSE model or from as-built drawings and research by Auburn city staff. All pipes were simulated using a Manning's friction coefficient (i.e., "n" value) of 0.013.

Table 2-1 Length of Auburn Sewer Pipe by Diameter

Pipe Diameter (inches)	Pipe Length (feet)
8	22,635
10	81,166
12	82,718
14	3,250
15	17,766
16	255
18	30,322
20	191
21	4,748
24	20,685
30	21,808
36	8,190
42	8,587
54	652
72	12,050

In addition to the City of Auburn pipes, King County's Lakeland Hill Trunk, Auburn West Interceptor and the M-Street Trunk run through the city. The locations of these interceptors are also shown in Figure 2-1.

Auburn currently has 17 pump stations in operation (including 1 private station, B-street NW), including 5 stations that were added since the completion of the 2001 Sewer Comprehensive Plan. These pump stations are Area 19, North Tapps, Peasley Ridge, Terrace View and White Mountain Trails pump stations. B-Street NW and Verdana were not added to the model, but the flows generated in their service area were transferred to the nearest downstream junction with a gravity sewer line.

Two pump stations, Verdana and Auburn 40, are proposed for construction. The future scenarios of the model include the Verdana pumps station, which replaces two existing pump stations, White Mountain Trails and Rainier Shadows. Table 2-2 lists the pump station characteristics, including the capacity information inserted in the MikeUrban model.

Table 2-2 Wastewater Pump Station Locations and Characteristics

Pump Station	Location	Number of Pumps	Rated Capacity (per pump, gpm)	Added Since 2001 Plan?
22nd St	22nd St. SE & Riverview Drive	2	550	No
8th St	'J' St. NE & 8th St. NE	2	150	No
Area 19	Lake Tapps Pkwy E & West of 72nd St. SE	2	100	Yes
B-Street NW (private system)[1]	B Street NW & South of 49th Street NW	N/A	N/A	N/A
Dogwood	Dogwood St. SE 1500 & 15th St. SE	2	200	No
D-Street	'D' Street NE & Auburn Way N.	2	400	No
Ellingson	41st St. SE, East of 'A' St. SE	2	1050	No
F-Street	'F' St. SE & 17th St. SE	2	600	No
North Tapps[2]	Lake Tapps Pkwy. E & West of 176th Ave. E.	2	507	No
Peasley Ridge	S. 320th St. & 53rd Ave. S.	2	100	Yes
Rainier Ridge	125th Pl. SE & South of SE 318th Way	2	200	No
Rainier Shadows	124th Ave. SE & SE 306th Place	2	100	No
Riverside	8th St. NE & 104th Ave. SE	2	400	No
R-Street	'R' St. NE & 6th St. NE	2	100	No
Terrace View	E Valley Hwy E & North of Terrace View Dr. SE	2	625	No
Valley Meadows	4th St. SE & 'V' St. SE	2	125	Yes
White Mtn. Trails	SE 292nd St. & West of 118th Ave. SE	2	100	Yes
Verdana[3]	TBD	2	1,600	Yes

1. No information available on B-Street Pump Station.

2. The North Tapps Pump Station was constructed recently and it replaced the Eastpoint. This pumps station was not included in the model, but its flows are accounted for.

3. The Verdana Pump Station was added to the 2028 projected network. It will be constructed in between White Mtn. Trails and Rainier Shadows to replace them both and to convey the sewer from the Verdana neighborhood in the City of Kent.

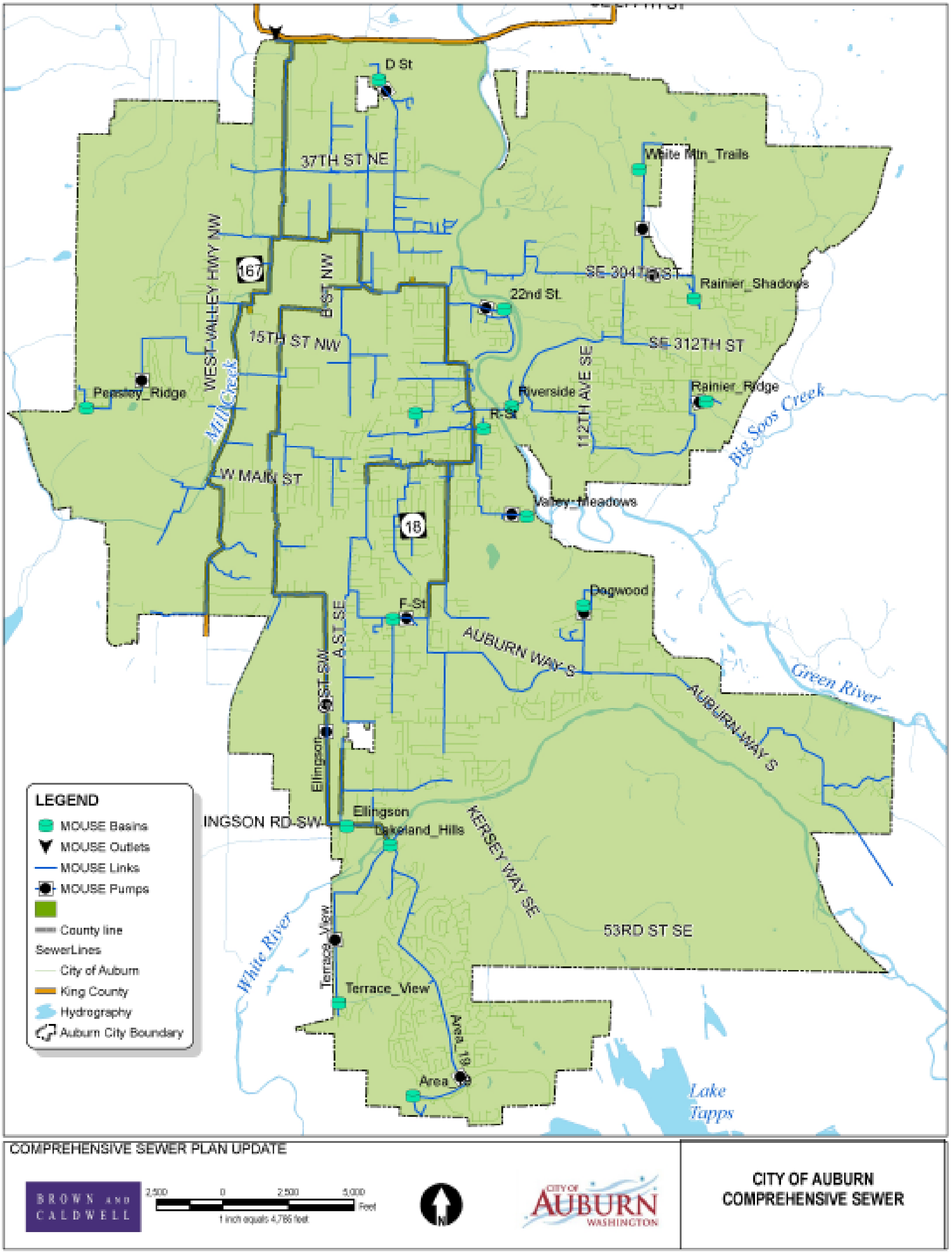


Figure 2-1 Overview of Auburn Wastewater Collection and Conveyance System.

2.2 Population Forecasts

Wastewater flows are composed of base wastewater flows and I/I components. Base flows are generated through domestic, commercial and industrial uses among the city's sewer customers. The rate of base wastewater flow was computed by multiplying the residential population and commercial and industrial employment forecasts by unit wastewater generation rates for current and future scenarios. The same unit wastewater generation rate was used for the current and future scenario. I/I flows enter the sewer system through direct connections and defects (e.g., cracked sewers, misaligned joints) in response to rainfall (see Section 2.4).

2.2.1 Citywide Population and Employment Forecasts

The City of Auburn contains a mixture of single-family residential, multi-family residential, commercial, and industrial development. Population and employment data provided by the City of Auburn for water service areas show moderate population growth in the coming decades, averaging 2.0, 3.8, and 1.8 percent annually for residential population, commercial employment, and industrial employment, respectively. The population and employment forecasts are listed here in Table 2-3 and shown graphically in Figure 2-2. Use of water service area population and employment data for sewer modeling is discussed later in this memo.

Table 2-3. City of Auburn Population and Employment Forecasts

Year	Residential Population	Commercial Employment	Industrial Employment
2007	49,894	15,522	14,757
2008	50,940	14,958	15,263
2014	58,679	20,371	17,955
2018	63,356	22,798	18,757
2028	70,440	28,018	20,253
Avg. Annual Growth Rate:	2.0%	3.8%	1.8%

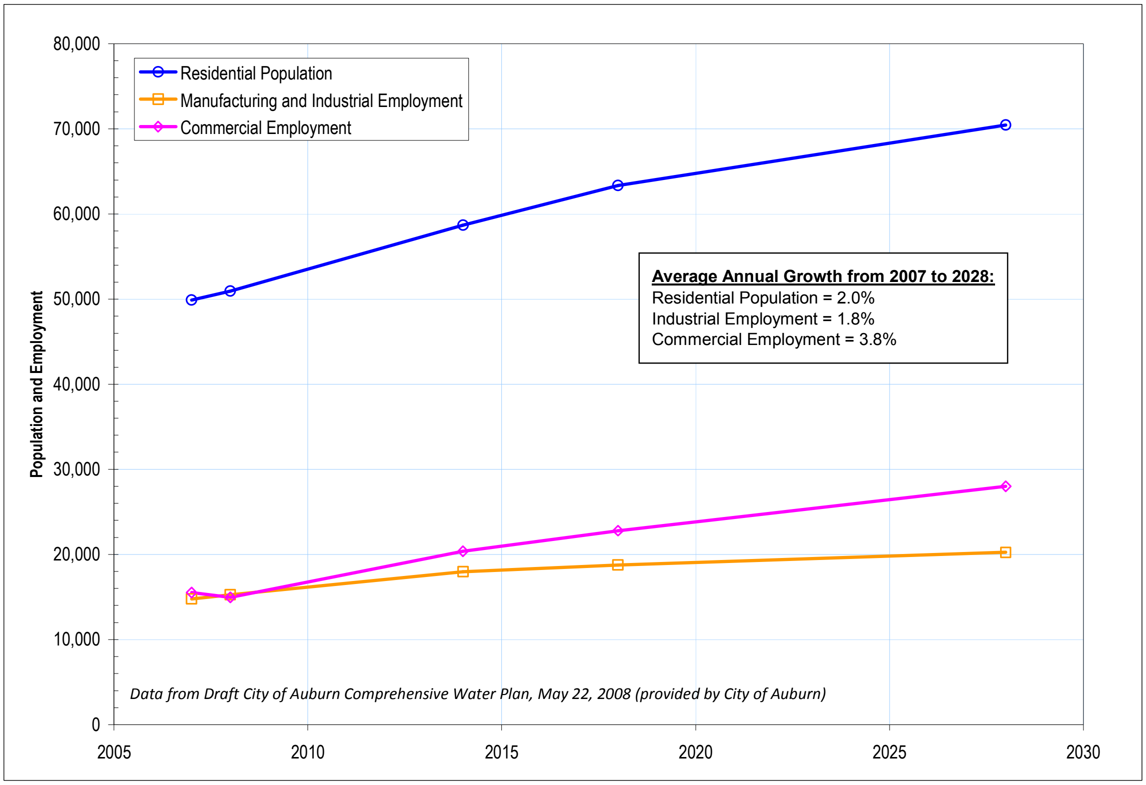


Figure 2-2. City of Auburn Residential Population, Commercial and Industrial Employment Forecasts

2.2.2 Service Area Population and Employment Forecasts

Brown and Caldwell received population and employment forecasts from the City divided into its four water service areas (Academy, Lakeland, Lea Hill and Valley; see Figure 2-3). The population and employment data is from estimates developed by regional planning agencies, which forecast growth according to many factors including land use. Table 2-4 lists the forecasted annual population and employment growth rate for each service area. The steps required to adequately distribute the population data across the sewer service areas are presented in Section 2.3 of this memo.

The service area-level population and employment forecasts indicate the growth is expected to continue throughout the City, with higher growth concentrations occurring in the Valley and Lea Hill service areas.

Table 2-4 Annual Rate of Population and Employment Growth Forecasts by Area

Area	Residential Growth	Commercial Growth	Industrial Growth
Academy	1.4%	1%	3.1%
Lakeland Hill	1.45%	4%	-0.6%
Lea Hill	2.7%	5.9%	3.8%
Valley	1.8%	3.7%	1.6%

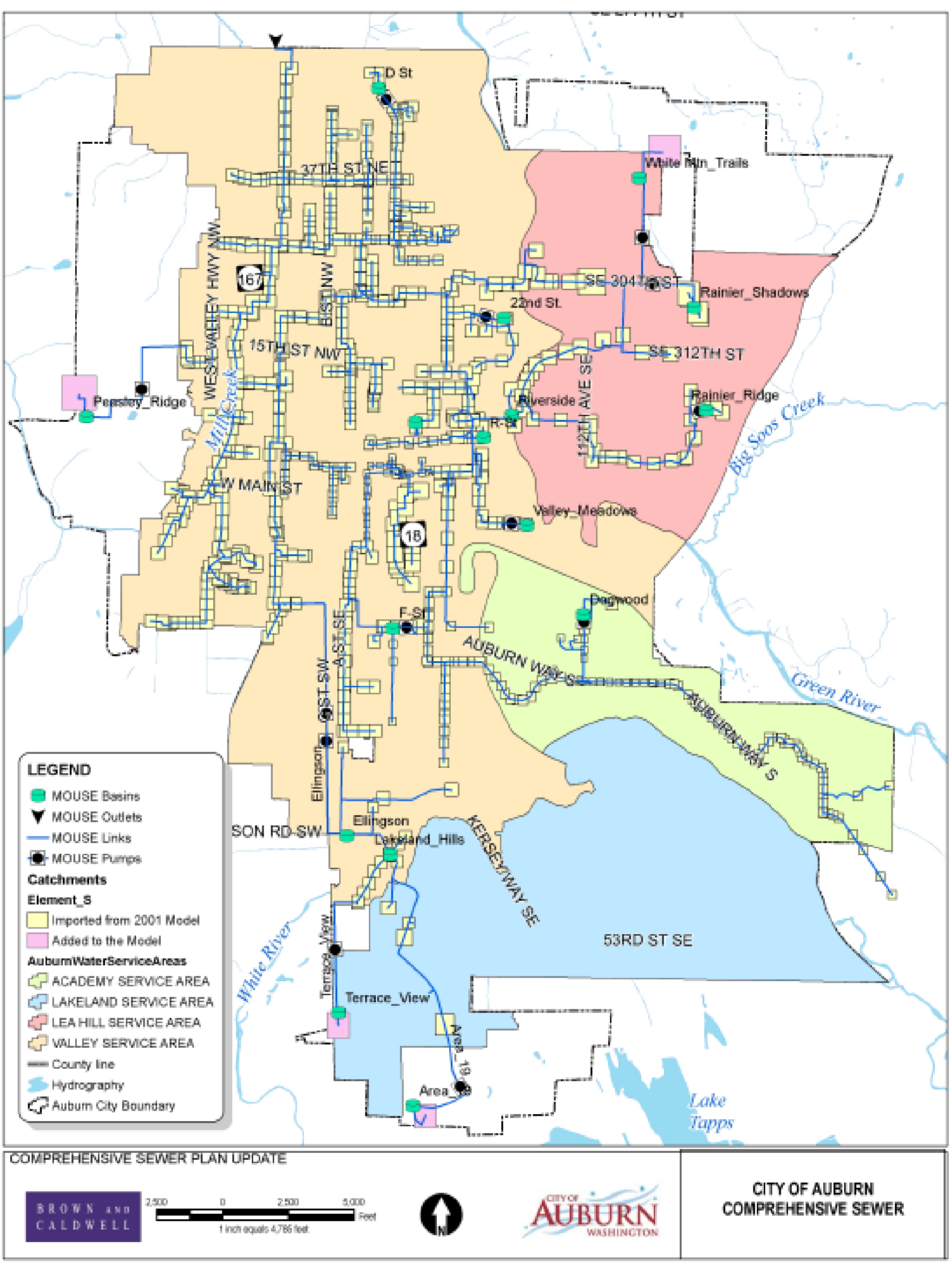


Figure 2-3 Service Areas used by the City to allot population/employment forecasts.

2.3 Base Flow Projections

2.3.1 MikeUrban Catchments

When received from the City, the Mouse model contained three catchments being loaded into a single node. Each of these graphical representations contained a different diurnal curves and unit flowrate, which accounted for weekdays, Saturday and Sunday flow fluctuations. Catchments are an essential component of the MikeUrban model. A catchment acts as the geographical representation of a sewered area holding a specific number of inhabitants, as well as a hydrological unit capable of generating storm water runoff and infiltration.

As part of the data management simplification, the number of catchment loads, representing base flow loading was reduced as follows:

1. All three diurnal patterns loaded into a single node were combined into one catchment and the largest unit flowrate was selected to achieve conservative results.
2. After the model collection system was cleaned, the catchment areas of the deleted nodes were merged into the catchment of the nearest downstream node.
3. Further simplification consisted in reducing the number of catchments within a *mini-basin* by merging the areas and population and evenly distributing the remaining across the network.

As part of the Regional I/I program, King County installed dozens of portable flow monitors in the City of Auburn and delineated 35 sub-basin areas, referred to as *mini-basins*. MikeUrban catchments were given a unique id that references their location within a specific *mini-basin*. Figure 2-4 displays the distribution of the KC's *mini-basins* across the City's sewered areas and the graphical representation of the catchments.

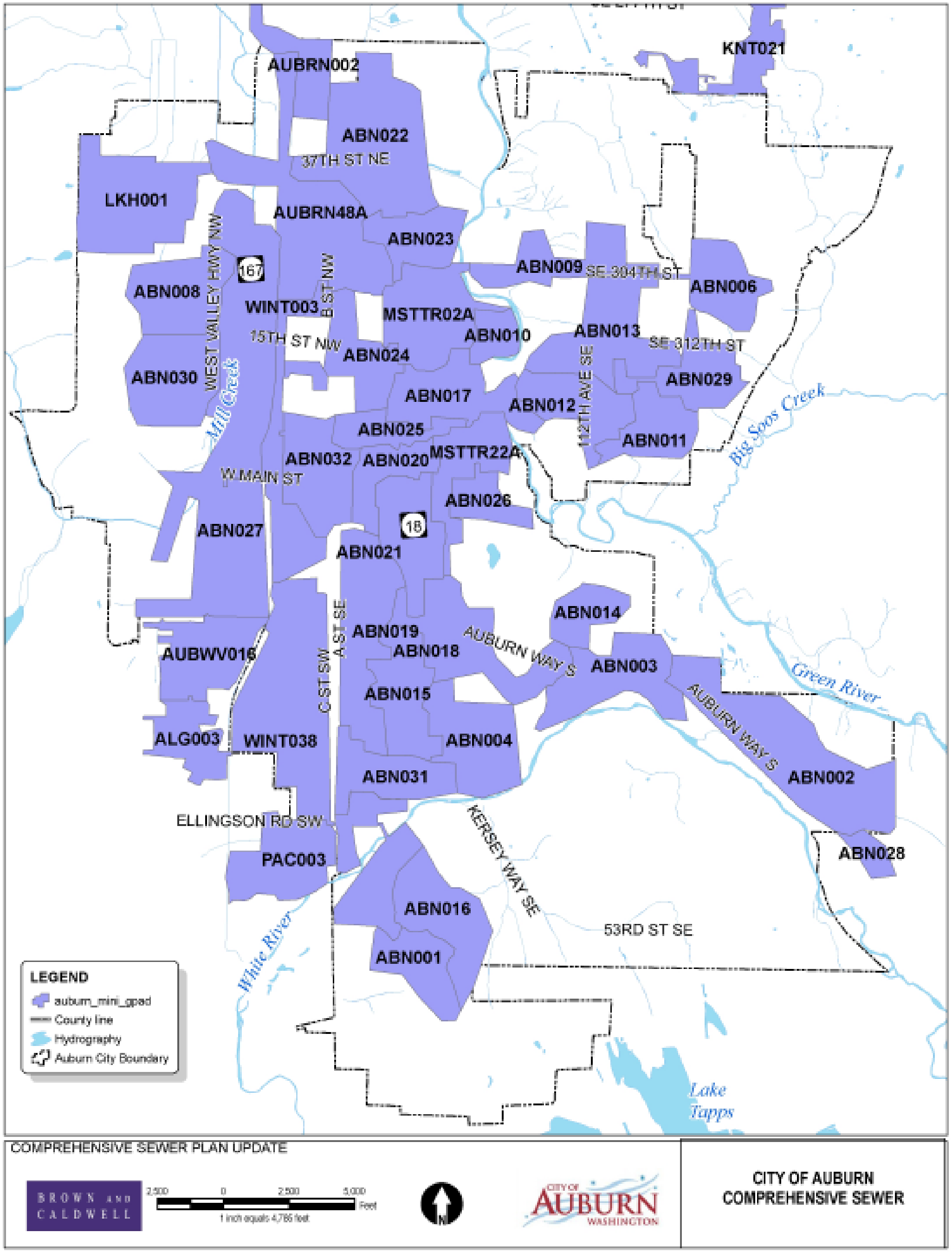


Figure 2-4 King County minibasins delineation for the City of Auburn during the 2001/2002 Wet Weather Monitoring Program.

As observed in Figure 2-4, four newly defined catchments, which drain directly into the new pumps stations, fall outside of the KC's *mini-basins*. New *mini-basins* identified as AR001, TV001, PR001 and LH001 were created for the areas draining into Area 19, Terrace View, Peasley Ridge and White Mtn.

Trails pump stations, respectively. Table 2-5 presents a data summary for the KC's *mini-basins* and the *mini-basins* defined by Brown and Caldwell.

Table 2-5 **Mini-basin *total area and number of MikeUrban catchments per* mini-basin**

Minibasin ID	Area (acres)	Number of catchments	Minibasin ID	Area (acres)	Number of catchments
ABN001	80.72	2	ABN023	106.87	31
ABN002	157.43	52	ABN024	100.95	39
ABN003	180.23	18	ABN025	77.16	14
ABN004	152.02	8	ABN026	80.99	9
ABN006	84.46	4	ABN027	313.81	121
ANB008	187.47	4	ABN028	50.00	3
ABN009	57.88	13	ABN029	141.16	5
ABN010	66.28	7	ABN030	112.66	9
ABN011	95.67	11	ABN031	136.29	3
ABN012	92.92	11	ABN032	187.47	35
ABN013	116.84	10	AUBRN48A	233.14	72
ABN014	79.62	7	AR001[(1)(2)]	115.00	1
ABN015	170.14	3	KNT021[(1)(2)]	680.00	1
ABN016	139.99	1	LH001[1]	330.00	1
ABN017	191.93	27	MSTTR02A	237.75	27
ABN018	169.52	43	MSTTR22A	154.73	25
ABN019	294.09	37	PR001[(1)(2)]	225.72	1
ABN020	111.98	38	TV001[1]	154.73	1
ABN021	181.99	19	WINT003	117.87	42
ABN022	347.78	93	WINT038	607.08	54

1. *Mini-basins defined by Brown and Caldwell. Area was obtained using ArcGIS 9.2.*
2. *Mini-basin falls outside of the Water Service Areas.*

2.3.2 Population Distribution and Cyclic Values

The population data presented in Table 2-3 was first apportioned to each *mini-basin* based on the percentage of the Service Area it occupied. Secondly, the total *mini-basin* area and population was distributed evenly among the MikeUrban catchments contained within its boundary (Table 2-6).

Exception was taken for *mini-basins* AR001, LH001 and KNT021, which are outside of the Service Area, as can be observed in Figure 2-3. The existing and 20-year population projection for those areas was estimated based on their sewered area and information made available by the City, summarized in Table 2-7.

Table 2-6 Population distribution and 20-year build out projection per mini-basin

Mini-basin	Area			2008 Population		2028 Population	
ID	Total (acres)	%	per catchment	Total	per catchment	Total	per catchment
ABN001	80.724	9.18	40.36	504	252	651	326
ABN002	157.429	24.72	3.03	1937	37	3108	60
ABN003	180.225	28.30	10.01	2217	123	3558	198
ABN004	152.016	3.65	19.00	2065	258	2975	372
ABN006	84.455	9.19	21.11	1028	257	1601	400
ABN008	187.473	4.50	46.87	2546	637	3669	917
ABN009	57.881	6.30	4.45	705	54	1097	84
ABN010	66.283	1.59	9.47	900	129	1297	185
ABN011	95.671	10.41	8.70	1165	106	1813	165
ABN012	92.923	10.11	8.45	1131	103	1761	160
ABN013	116.839	12.71	11.68	1423	142	2215	221
ABN014	79.62	12.50	11.37	980	140	1572	225
ABN015	170.138	4.08	56.71	2311	770	3330	1110
ABN016	139.986	15.92	139.99	874	874	1129	1129
ABN017	191.926	4.60	7.11	2607	97	3756	139
ABN018	169.517	26.62	3.94	2085	48	3347	78
ABN019	294.089	7.05	7.95	3995	108	5756	156
ABN020	111.983	2.69	2.95	1521	40	2192	58
ABN021	181.991	4.36	9.58	2472	130	3562	187
ABN022	347.778	8.34	3.74	4724	51	6807	73
ABN023	106.874	2.56	3.45	1452	47	2092	67
ABN024	100.951	2.42	2.59	1371	35	1976	51
ABN025	77.159	1.85	5.51	1048	75	1510	108
ABN026	80.993	1.94	9.00	1100	122	1585	176
ABN027	313.809	7.52	2.59	4262	35	6142	51
ABN028	50	7.85	16.67	615	205	987	329

Mini-basin	Area			2008 Population		2028 Population	
ID	Total (acres)	%	per catchment	Total	per catchment	Total	per catchment
ABN029	141.158	15.36	28.23	1719	344	2676	535
ABN030	112.663	2.70	12.52	1530	170	2205	245
ABN031	136.29	3.27	45.43	1851	617	2667	889
ABN032	187.473	4.50	5.36	2546	73	3669	105
AUBRN48A	233.139	5.59	3.24	3167	44	4563	63
LH001(1)	330	35.91	330.00	4018	4018	6255	6255
MSTTR02A	237.752	5.70	8.81	3229	120	4653	172
MSTTR22A	154.725	3.71	6.19	2102	84	3028	121
TV001(1)	51.46	5.85	51.46	321	321	415	415
WINT003	117.867	2.83	2.81	1601	38	2307	55
WINT038	607.078	69.05	46.70	3792	292	4898	377

1 Area was determined using ArcGIS 9.2. The model was superimposed on the 2007 aerial view of the City.

Table 2-7 Population distribution and 20-year build out projection for newly defined mini-basins

Minibasin ID	Units/acres	2008 Population			2028 Population		
		Area (ac)	Total	per catchment	Area (ac)	Total	per catchment
AR001(1)(2)	8.6	57.80	1242	1242	115.00	2483	2483
PR001(1)(2)	6	112.90	1693	1693	225.72	3386	3386
KNT021(1)(2)	-	N/A	N/A	N/A	680.00	1245	1245

1 Area was determined using ArcGIS 9.2. The model was superimposed on the 2007 aerial view of the City.

2 Population was not included within the Water Service Areas

**** The number of residents per residential unit was assumed to be 2.5.*

2.3.3 Dry Weather Verification

Dry Weather Flow (DWF) calibration was performed for those mini-basins that contained Mike Urban catchments located upstream of a Pump Station. In the process of DWF calibration it was necessary to modify the cyclic profiles for each mini-basin until the modeled pump discharge hydrograph was in agreement with the measured pump discharge hydrograph developed from the pump flow data received from the City (Figure 2-5). The calibration was performed over a one week period to assure that the selected cyclic value was adequate for all three Diurnal Patterns (weekdays, Saturday, Sunday). Please refer to Appendix C for the remainder of the calibration hydrographs.

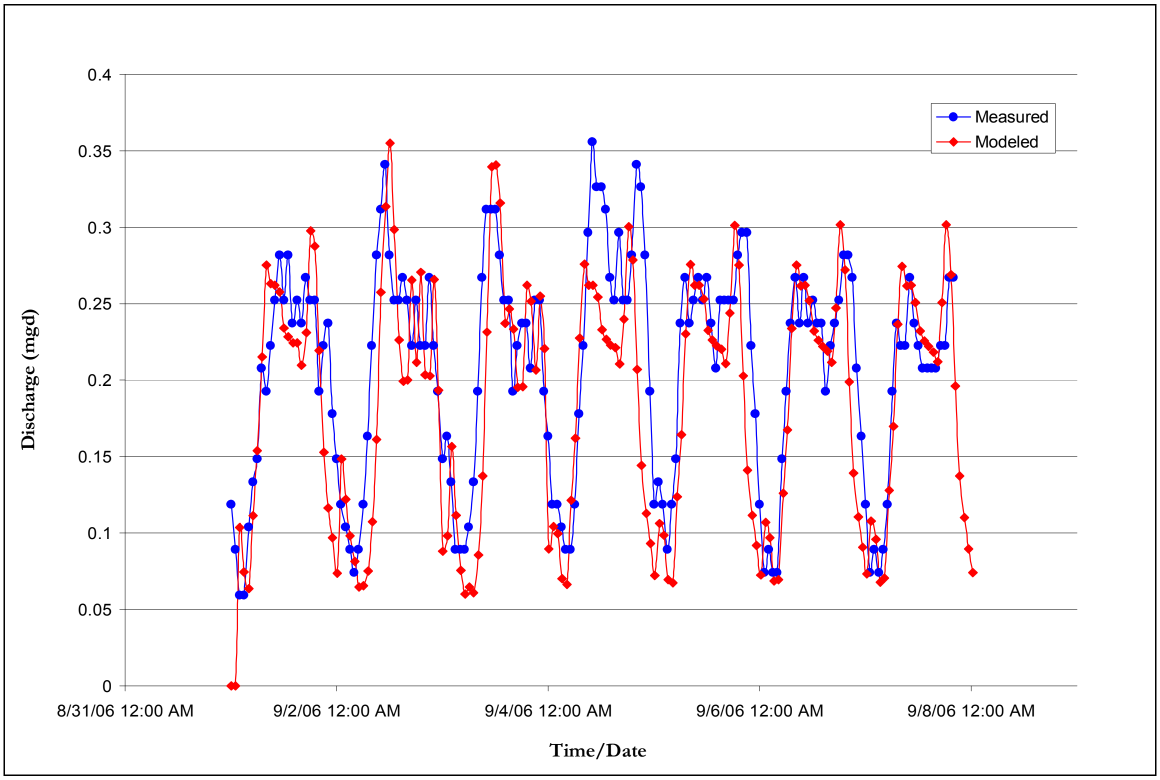


Figure 2-5 Measured and Modeled Discharge Hydrographs for the Ellingson Pump Station.

The cyclic profiles that we were not able to calibrate were left as obtained from the City. Table 2-8 contains a summary of the cyclic values as obtained from the City and those resulting from the calibration process.

Table 2-8 Resulting cyclic values per mini-basin after DWF calibration by pump stations discharge

Mini-basin ID	Calibrated to Pump Station	Cyclic Value (ft³/PE-d)	
		Initial	Calibrated
ABN001		10.15	10.15
ABN002		12.40	12.40
ABN003		8.81	8.81
ABN004		9.46	9.46
ABN006	Rainier Shadows	20.07	6.00
ABN008		6.55	6.55
ABN009		8.49	8.49
ABN010	22nd Street	10.29	20.07
ABN011	Riverside	15.37	9.41
ABN012	Riverside	12.87	15.37
ABN013	Riverside	12.97	12.87
ABN014	Dogwood	14.52	11.89
ABN015	F-Street	8.73	1.20
ABN016		23.86	23.86
ABN017	8th Street	7.02	8.69
ABN018		16.38	16.38
ABN019		9.45	9.45
ABN020		8.69	8.70
ABN021		12.29	12.29
ABN022	D-Street	8.32	10.13
ABN023		6.72	6.72
ABN024		34.76	34.76
ABN025		14.57	14.57
ABN026	Valley Meadows	8.49	13.37
ABN027		8.49	8.49
ABN028		2.91	2.91
ABN029	Rainier Ridge	12.40	10.03
ABN030		20.72	20.72
ABN031	Ellingson	20.05	19.38
ABN032		20.07	20.07
AUBRN48A		9.36	9.36
AR001	Area 19	43.32	2.00
LH001	White Mtn. Trails	N/A	2.50
MSTTR002A		9.87	9.87
MSTTR022A	R-Street	N/A	10.00

Mini-basin ID	Calibrated to Pump Station	Cyclic Value (ft^3/PE-d)	
		Initial	Calibrated
PR001	Peasley Ridge	N/A	3.00
TV001	Terrace View	N/A	1.00
WINT003		20.96	20.96
WINT038		20.96	20.96
KNT021	Verdana	N/A	6.00

2.4 Wet Weather Flow Projections

Peak wet weather flow and the conveyance system's capacity largely determine the need and timing of future upgrades. This section addresses wet weather flow in the City of Auburn by estimating the peak 20-year flow projections. The peak 20-year flow rate corresponds to the flow that is equaled or exceeded on average once per 20 years. This flow rate corresponds to Auburn's proposed level of service for wastewater conveyance.

Due to a lack of measured flowrates for the City's sewer system, the calibration of the runoff models parameter sets was not possible. As an alternative, a constant unit rate method was used to account for estimated RDII relative to a catchment area.

King County provided BC with constant 20 year I/I rates determined from data collected during the Regional Infiltration and Inflow (I/I) program (King County, 2002). The data were reported in terms of unit wastewater generation by area, expressed in gallons per acre per day (gpad). One I/I rate is used for each flow monitoring *mini-basin* delineated by King County for the Regional I/I program. There was no decade-to-decade increase in I/I from 2008 to 2028. This assumptions is reasonable considering I/I is actively being addressed by continual repair/replacement of facilities by the City. In addition, active asset management, as proposed in the most recent planning process, is aimed to control I/I rates to existing levels.

2.4.1 Wet Weather Flow Verification

As part of the model validation process the BC team examined King County's I/I rates to determine their applicability to the current conditions. Using the pump run time records collected from October 2006 through May 2008, the dry weather base flowrate and the wet weather peak flowrates for the six largest pumps was determined (Ellingson, F-Street, D-Street, Riverside, Dogwood, and D-Street).

The peak 5-year I/I rates were estimated using the pump runtime records for the pump stations for the November 6, 2006 event. BC's analysis of King County's long-term precipitation records at the Lower Green River station suggests this event has about a 5-year recurrence. We compared the observed 5 year peak I/I rates at the pump stations to the 20-year peak I/I rates obtained from King County.

The results of the verification process identified minibasins ABN010 and ABN031 as presenting higher observed 5-year I/I rate than the 20-year peak I/I rates estimated by King County. Instead of relying on the King County estimate, we assumed the 20-year peak I/I rate should be 30% higher than the observed 5-year peak I/I for these mini-basins. Table 2-9 presents the constant unit flowrates entered into the Mike Urban model to account for 20-year Peak I/I.

Table 2-9. RDII Constant Unit Flowrates Developed by King County

Pump Station	Associated *mini-basin*	Peak Flow (mgd)A	Base Flow (mgd)A	Sewered Area (ac)	Observed Peak 5-yr I/I		King County Peak 20-yr I/I
					(mgd)	(gpad)	(gpad)
22nd Street	ABN010 (1)	0.81	0.087	66.28	0.72	10,871	14,132
F-Street	ABN015	0.22	0.0003	170.14	0.20	1,181	8,326
Dogwood	ABN014	0.14	0.032	79.62	0.11	1,356	1,969
D-Street	ABN022	0.22	0.045	347.78	0.16	451	4,466
Ellingson	ABN031	1.35	0.200	136.29	1.15	8,438	10,969
Riverside	ABN011 ABN012 ABN013	0.09	0.036	305.43	0.06	183	4,289

2.5 Wastewater Flow Allocation

The input or loading nodes are distributed throughout the sewer network (Figure 2-6). Our objective in selecting input node locations was to produce a smooth and realistic representation of the general increase in flows in the downstream portions of the sewer network, while limiting the data management requirements of the model to manageable levels. Wastewater flows were added to 876 of 1,296 total manholes in the model.

The *mini-basin* delineation was used to allocate flow (base and wet weather) to input manholes. Using the delineated *mini-basins*, the BC project team determined the general drainage direction and contributing area to each input manhole. After computing the total area contributing to each manhole, the peak flow projections were allocated to each manhole proportionally.

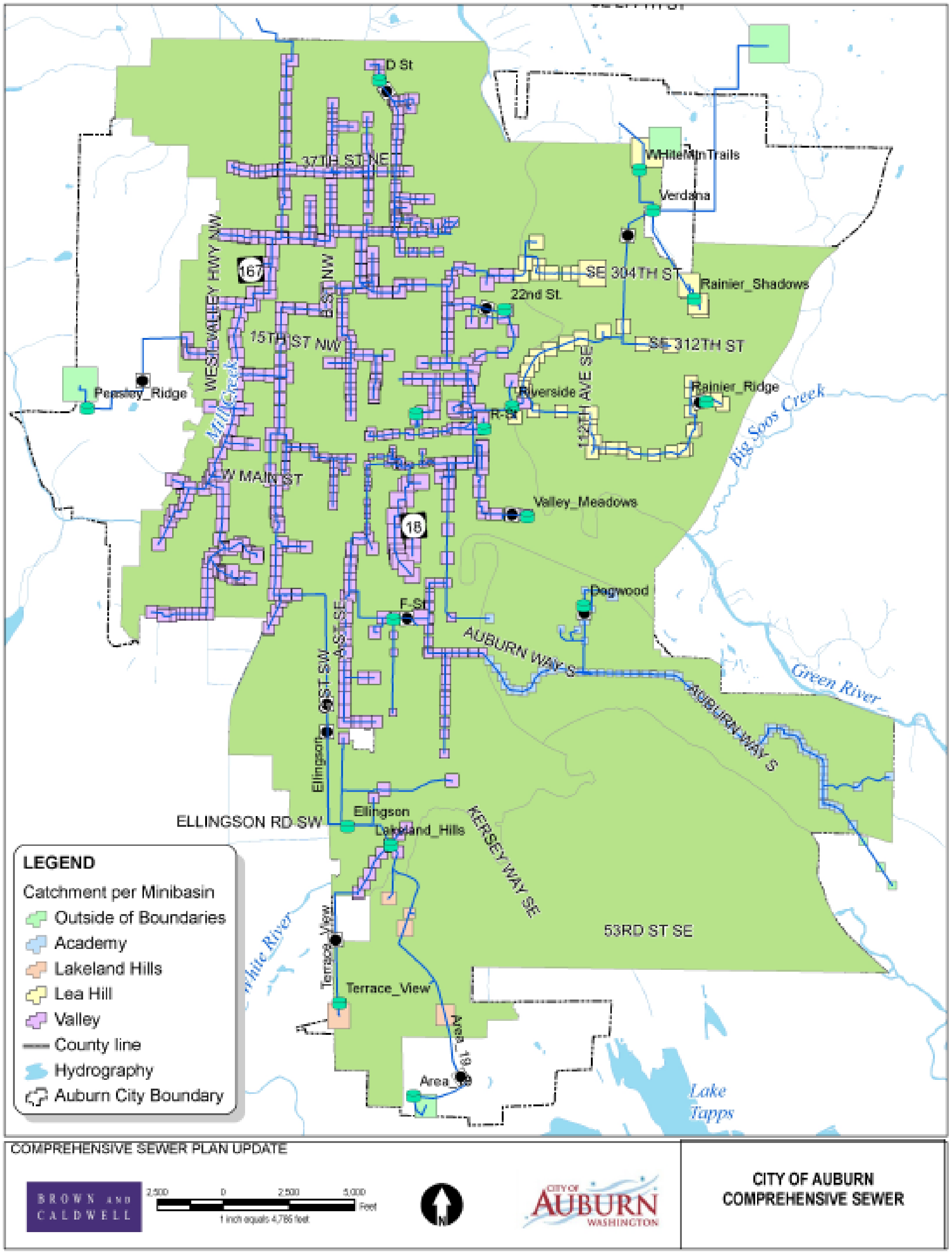


Figure 2-6. Overview of Flow Allocation Nodes in MikeUrban Model.

3. RESULTS

After the model was structurally completed and calibrated, three distinct 1-week simulations were carried out to evaluate different scenarios. The difference between the scenarios is briefly described below: All simulations were run for a period of one (1) week and the result recorded at fifteen (15) minute intervals.

Scenario 1: This scenario represents the City's sewer network and population at its existing condition during 2008. The wastewater flow generated during this simulation is composed by the baseflow resulting from the population and the peak 20-year I/I rates obtained from the County.

Scenario 2: This scenario represents the City's sewer network and population projection for year 2028. The wastewater flow generated during this simulation is composed by the baseflow resulting from the population and the peak 20-year I/I rates obtained from the County.

The pipes identified as over capacity will be further evaluated in the following sections. For a pipe to be considered over capacity, the water level elevation must exceed the elevation of its crown. In addition, for those pipe segments reaching alarming water level elevations, the capacity at its upstream and downstream nodes will also be evaluated. In addition to the water level relative to pipe crowns, the water surface elevations at the nodes were examined to discover potential spilling nodes.

In addition to the scenarios described above, the model was used to evaluate site specific questions and provide information for sewer utility planning. These analyses are described below:

Lea Hill alternative conveyance: This analysis used the City's population projection for year 2028. Most of the network infrastructure remains intact from Scenario 2, except that the flows from Lea Hill are split and transported across the Green River and into the County's South 277th Interceptor.

Proposed Jovita annex: This analysis evaluated year 2028 estimated flows for an area proposed for annexation by the City. Specifically, the existing City conveyance downstream of the proposed annexation area was evaluated for capacity to accept the additional flows.

Pump station capacity for future conditions: This analysis evaluated the capacity of City pump stations for year 2028 conditions.

3.1 Scenario 1- Existing Population with 20-year I/I

A total of fifty-three (53) pipe segments were identified as surcharging for the existing scenario simulation.

The surcharging pipes directly affected by King County sewer pipes were flagged and removed from further review. The City is actively working with the County on conveyance system improvements (CSI) to address these surcharges and the CSI trunk line will alleviate many of these. In addition, pipes with negative slopes (i.e., inverted) were excluded from review as simulated model profiles showed the surcharging to be caused by the inverted pipe. After exclusion of certain pipes as described above, the following conclusions were made in regards to Scenario 1 simulation results:

1. Five (5) pipes were simulated to be surcharging for the existing scenario.

2. The simulated water surface in all nodes was more than 6-ft below the ground surface. Only one pipe was simulated to exceed the pipes normal flow capacity (i.e., Qmax/Qfull > 1).
3. The existing scenario simulation indicates no capacity issues with the City of Auburn wastewater conveyance.

Simulated flow and elevation for the surcharging pipes is shown in Table 3-1. The 59 surcharging pipes are shown in Figure 3-1. Profiles for the pipe segments are shown in Appendix B.

Table 3-1. Simulated surcharging pipes – projected scenario

MUID	FROMNODE	TONODE	Qfull (cfs)	Hmax (ft)	Qmax (cfs)	Hmax Over Pipe Diameter	Qmax Over Qfull	Max Water Surface to Ground (ft)
506-53AI1	506-53A	506-06	5.091	52.92	0.134	1.437	0.026	6.3
606-08I1	606-08	606-10	2.417	55.13	0.71	2.255	0.294	7.2
1013-14I1	1013-14	1013-13	1.853	303.01	0.94	1.397	0.507	7.98
606-11I1	606-11	606-10	0.66	52.88	0.099	2.819	0.15	9.45
606-10I1	606-10	606-09	0.639	52.63	0.899	2.468	1.406	9.65

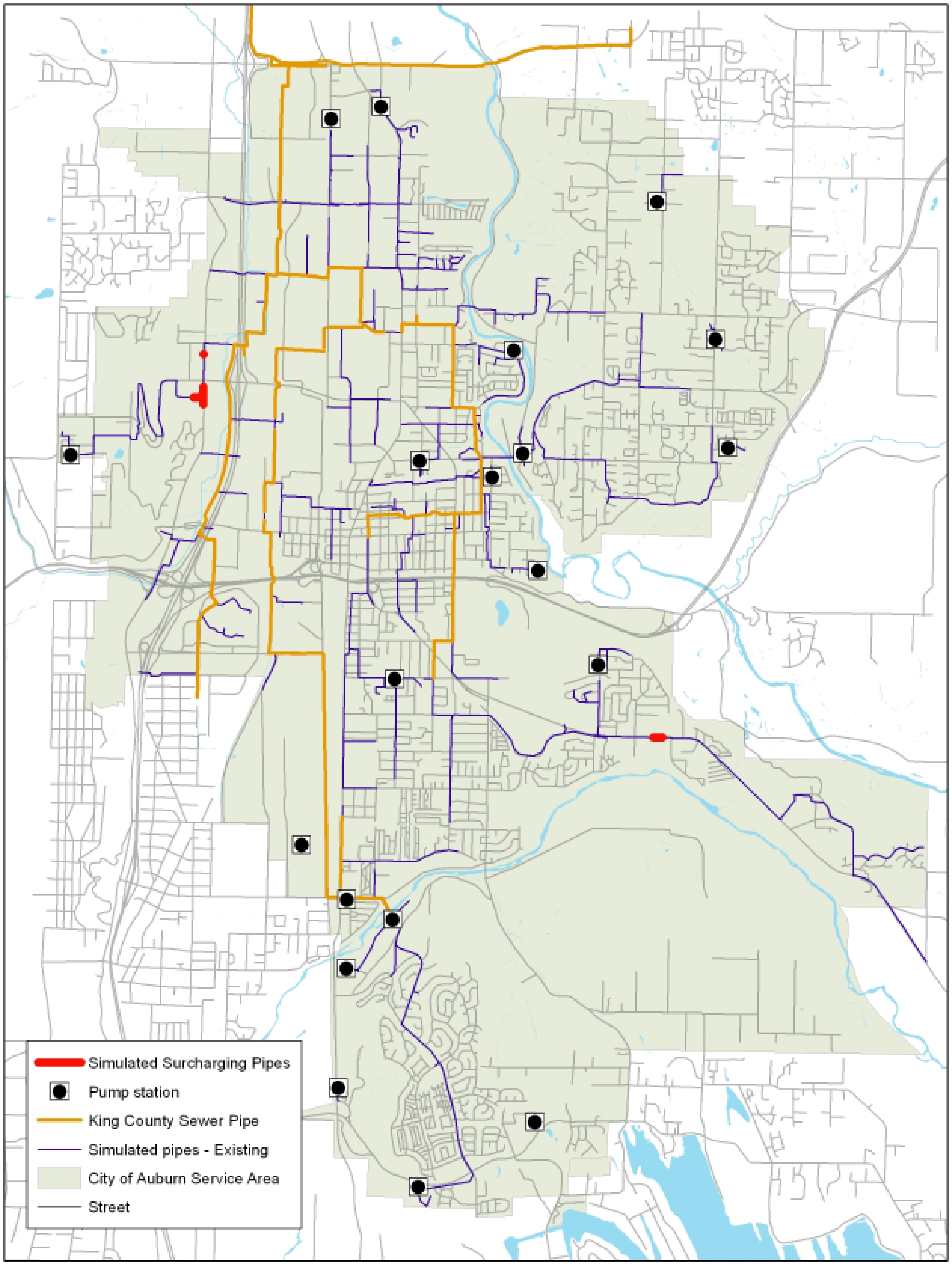


Figure 3-1 Scenario 1 simulation results showing City of Auburn surcharging pipes

3.2 Scenario 2 – 2028 Population Projection with 20-year I/I

A total of seventy-nine (79) pipe segments were identified as surcharging with one node having a simulated water surface above the ground surface (i.e., spilling).

The surcharging pipes directly affected by King County sewer pipes were flagged and removed from further review. In addition, pipes with negative slopes (i.e., inverted) were excluded from review as simulated model profiles showed the surcharging to be caused by the inverted pipe. After exclusion of certain pipes as described above, the following conclusions were made in regards to Scenario 2 simulation results:

1. Fifty-nine (59) pipes were simulated to be surcharging for the projected scenario. These nodes are identified in the table below.
2. The simulated water surface in all nodes was more than 4-ft below the ground surface, and the simulated water surface in all but 4 nodes was 5-ft or more below the ground surface. The depth of the simulated water surface below the ground surface suggests basement backups are not likely to occur.
3. One node was simulated to be spilling, or the simulated water surface was higher than the ground surface. This node was in close proximity to the White Mountain Trails pump station. Simulation of the pump station may affect the simulated water surface at the spilling node. This node should be monitored in the future to validate the model simulation results. If overflows do in fact occur in the future after growth, then the problem should be addressed by a capital project.
4. The projected scenario indicates some pipes in the Auburn conveyance system are surcharging, but decreased service to customers is not evident.

Simulated flow and elevation for the surcharging pipes is shown in Table 3-2. The 59 surcharging pipes are shown in Figure 3-2. Profiles for the pipe segments are shown in Appendix B.

Table 3-2. Simulated surcharging pipes – projected scenario

MUID	FROMNODE	TONODE	Qfull (cfs)	Hmax (ft)	Qmax (cfs)	Hmax Over Pipe Diameter	Qmax Over Qfull	Max Water Surface to Ground (ft)
1012-20l1	1012-20	1012-21	3.709	259.9	1.966	1.172	0.53	4.32
1012-21l1	1012-21	1011-10	3.156	249.47	1.971	1.029	0.624	4.32
1011-06l1	1011-06	1111-46	5.621	198.47	2.003	1.282	0.356	4.71
1011-07l1	1011-07	1011-06	4.725	211.45	1.998	1.002	0.423	4.71
606-06l1	606-06	606-08	1.196	57.95	0.927	3.133	0.775	5.16
606-05l1	606-05	606-06	1.306	58.29	0.795	2.77	0.609	5.16
606-08l1	606-08	606-10	2.417	57.31	1.06	6.724	0.439	5.19
606-04l1	606-04	606-05	1.04	58.44	0.66	2.282	0.634	5.2
1115-25l1	1115-25	1115-07	1.486	384.97	1.075	1.138	0.723	5.37
606-11l1	606-11	606-10	0.66	56.61	0.136	8.405	0.205	5.71
606-10l1	606-10	606-09	0.639	56.06	1.328	7.618	2.077	5.93
606-03l1	606-03	606-04	1.25	58.65	0.526	2.157	0.421	6.14

MUID	FROMNODE	TONODE	Qfull (cfs)	Hmax (ft)	Qmax (cfs)	Hmax Over Pipe Diameter	Qmax Over Qfull	Max Water Surface to Ground (ft)
1013-20l1	1013-20	1013-19	1.985	316.91	1.376	1.029	0.693	6.17
1013-19l1	1013-19	1013-09	1.7	315.68	1.385	1.014	0.815	6.17
506-53Al1	506-53A	506-06	4.943	52.93	0.189	2.047	0.038	6.28
1012-44l1	1012-44	1011-10	6.372	257.79	0.01	1.029	0.002	6.49
1014-21l1	1014-21	1013-20	2.334	322.09	1.363	1.016	0.584	7.05
1013-14l1	1013-14	1013-13	1.853	303.57	1.543	2.005	0.832	7.47
1013-25l1	1013-25	1013-14	2.048	304.01	1.514	1.439	0.739	7.54
1013-15l1	1013-15	1013-25	2.114	305.99	1.486	1.387	0.703	7.54
606-02l1	606-02	606-03	3.714	63.08	0.426	1.224	0.115	7.55
1013-46l1	1013-46	1013-12	1.86	301.3	1.601	1.09	0.86	7.58
1115-07l1	1115-07	1115-23	1.435	384.1	1.078	1.41	0.751	7.84
1114-02l1	1114-02	1114-23	6.787	329.46	1.284	1.017	0.189	7.93
1115-06l1	1115-06	1115-05	1.198	382.78	1.104	1.868	0.921	8.36
1115-22l1	1115-22	1115-06	1.469	383.18	1.095	1.802	0.745	8.36
1115-05l1	1115-05	1115-04	1.249	381.82	1.113	1.85	0.891	8.44
1115-04l1	1115-04	1115-03	0.922	381.36	1.122	1.657	1.218	8.44
1115-23l1	1115-23	1115-22	1.614	383.57	1.086	1.649	0.673	8.64
1013-16l1	1013-16	1013-18	3.168	312.56	1.427	1.085	0.451	8.64
1012-36Al1	1012-36A	1012-35	4.63	293.88	1.657	1.07	0.358	8.93
1111-46l1	1111-46	1111-01	3.847	187.06	2.003	1.021	0.521	8.93
1012-35l1	1012-35	1012-34	3.19	280.17	1.686	1.283	0.529	9.23
1012-34l1	1012-34	1012-33	2.37	274	1.714	1.239	0.723	9.23
1114-17l1	1114-17	1114-15	0.94	377.45	1.186	1.438	1.262	9.36
1012-33l1	1012-33	1012-32	2.484	273.31	1.743	1.265	0.702	9.39
506-07l1	506-07	506-06	1.841	49.38	1.507	1.695	0.818	9.42
506-08l1	506-08	506-07	1.75	50.05	1.461	1.461	0.835	9.42
710-85l2	710-85	710-87	1.123	67.48	0.399	1.34	0.356	9.49
710-87l1	710-87	710-43	0.128	67.28	0.399	1.296	3.126	9.49
1013-18l1	1013-18	1013-15	3.976	307.28	1.456	1.12	0.366	9.8
606-09l1	606-09	506-08	1.232	51.77	1.461	2.096	1.186	10.07
1014-02l1	1014-02	1014-21	1.394	323.38	1.35	1.079	0.968	10.7
1115-01l1	1115-01	1115-18	1.139	379.14	1.15	1.603	1.01	10.72
1115-18l1	1115-18	1115-27	1.675	378.45	1.15	1.593	0.687	10.72
1115-02l1	1115-02	1115-01	1.286	379.89	1.141	1.722	0.887	10.76
1115-26l1	1115-26	1114-17	1.49	378.2	1.177	1.565	0.79	10.96
1115-28l1	1115-28	1115-27	3.404	378.36	0.014	1.327	0.004	11.17
1115-27l1	1115-27	1115-26	4.392	378.33	1.168	1.153	0.266	11.17
1115-03l1	1115-03	1115-02	1.28	380.79	1.131	1.626	0.884	11.23
1014-01l1	1014-01	1014-02	1.312	324.08	1.323	1.18	1.008	11.71

MUID	FROMNODE	TONODE	Qfull (cfs)	Hmax (ft)	Qmax (cfs)	Hmax Over Pipe Diameter	Qmax Over Qfull	Max Water Surface to Ground (ft)
1014-22l1	1014-22	1014-02	4.374	324.71	0.014	1.171	0.003	11.71
1012-32l1	1012-32	1012-17	2.492	269.83	1.773	1.049	0.712	11.88
506-06l1	506-06	506-05	1.229	48.62	1.841	1.57	1.498	12.08
1114-23l1	1114-23	1014-01	2.028	325.01	1.31	1.337	0.646	12.3
1114-03l1	1114-03	1114-23	1.011	325.23	0.014	1.017	0.014	12.3
1012-25l1	1012-25	1012-54	1.434	264.31	-0.023	1.18	-0.016	12.72
1009-04l1	1009-04	1009-03	1.165	94.62	0.946	1.095	0.812	14.35
513-13l1	513-13	512-33	2.469	421.64	2.779	1.07	1.126	16.22

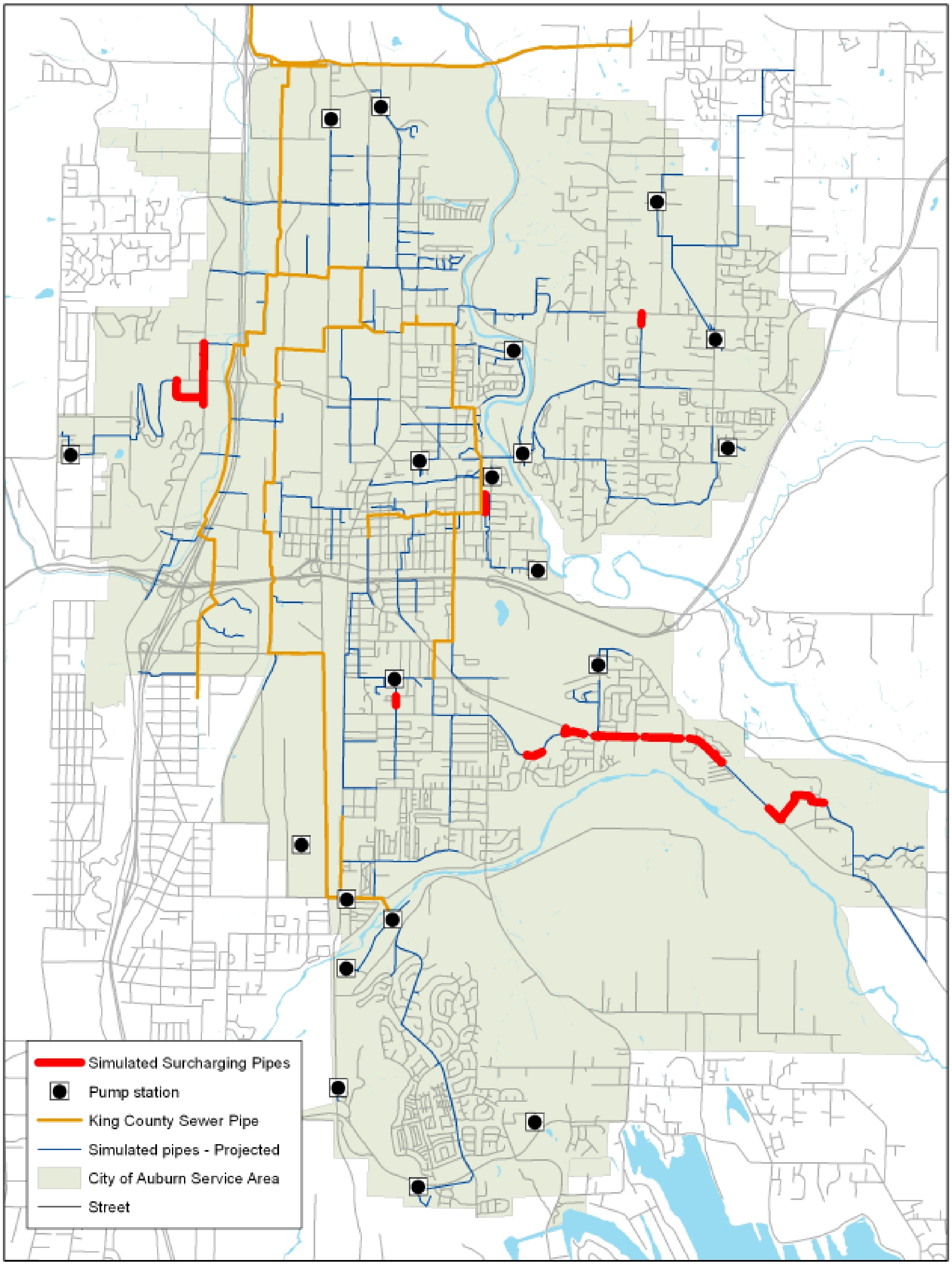


Figure 3-2 Scenario 2 simulation results showing City of Auburn surcharging pipes

3.3 Lea Hill Conveyance Alternatives – 2028 Population Projection with 20-year I/I

The City is anticipating future development in the Lea Hill service area. The new Verdana pump station is also being installed in this area. For planning purposes, the hydraulic model was used to simulate conveyance alternatives for the mostly undeveloped, unsewered portion of Lea Hill for future conditions. Two alternatives were simulated using the model.

3.3.1 Alternative 1

The flows expected from the north Lea Hill build out conditions were conveyed into the new Verdana pump station, which was added to replace the White Mountain Trails and Rainier Shadow pump stations. Conveyance added to the model to convey flow to the Verdana pump station are shown in Figure 3-3. The outflow from the Verdana pump station was simulated to enter the City's collection system at the same location the force mains from the White Mountain Trails and Rainier Shadows pump stations discharged. Therefore, this alternative directed estimated future flows to the existing Green River crossing at 26th Street NE.

Simulation results indicated the existing model node downstream of the Verdana pump station was flooding for the future scenario. This suggests the outflow from the Verdana pump station exceeded the capacity of the downstream conveyance at the first existing node. No other capacity shortfalls were simulated.

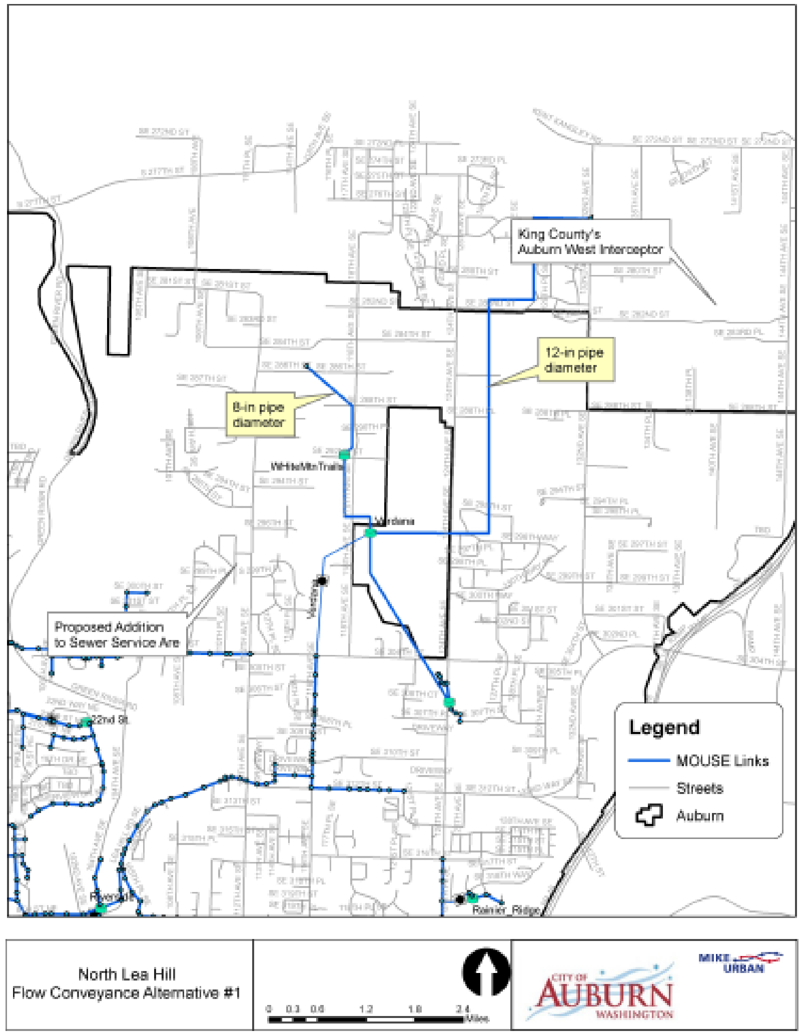


Figure 3-3. North Lea Hill Flow Conveyance Alternative 1

3.3.2 Alternative 2

A second alternative was modeled in which the expected future flows from north Lea Hill were conveyed directly to King County's 277th Street Interceptor. Two 18 inch pipes were added to the model to convey the additional flow to two discharge locations at the King County interceptor. The pipe alignment was derived from the 2001 Sewer Comprehensive Plan. Figure 3-4 shows the layout of the proposed pipes.

The simulation results indicated no capacity shortfall for the proposed pipes.

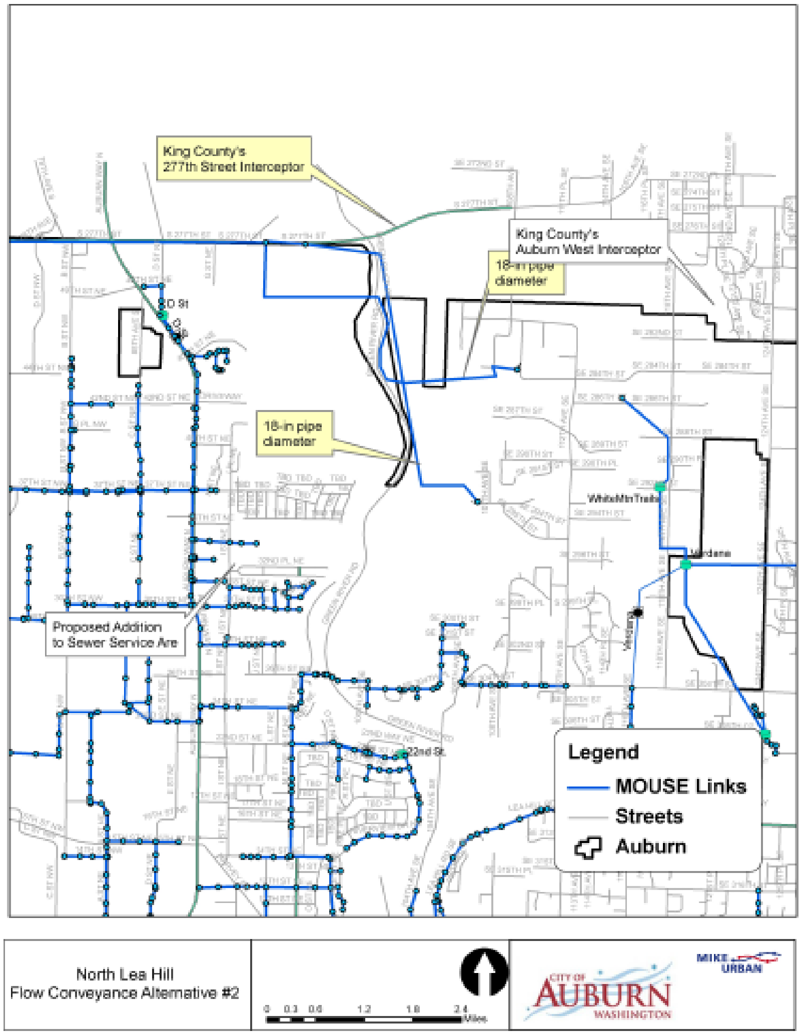


Figure 3-4. North Lea Hill Flow Conveyance Alternative 2

3.4 Proposed Jovita Annexation

An area in West Auburn (referred to as the "Jovita Annex") approximately 195 acres in size was not included in the Mike Urban model because it is not currently in the City's service area. However, this area is a proposed annexation area for the City and the impact flows generated in this area have on the downstream sewer conveyance is of interest. Therefore, the estimated flows from Jovita Annex area were evaluated.

The following assumptions were made for the Jovita Annex analysis:

1. Based on the current zoning information, the Jovita Annex area was identified as a predominantly single residential zone.
2. Estimated flow is based on an estimated 8.6 units per acre and 250 gallons per unit per day for the 20-year build-out scenario.

3. Estimated contribution from peak wet weather flow of 2,200 gallons per acre per day

The assumptions resulted in an additional flow from Jovita Annex of 0.67 cfs for peak, 20-year build out. This flow was combined with model results for analysis of impacts associated with providing sewer service to the Jovita Annex area. The analysis included downstream modeled pipes from Jovita to King County's Auburn West Interceptor. Results of the analysis are shown in Table 3-3. The proposed Jovita Annex area and the pipes included in the capacity analysis are shown in Figure 3-5.

Table 3-3. Summary of Jovita Annex Capacity Analysis

Link ID	Owner	Diameter (in)	Qmodel (cfs)[1]	Qnew (cfs)[2]	Qfull (cfs)[3]	Qnew/Qfull
1006-01I1	Auburn	12	0.023	0.70	1.709	0.41
1006-02I1	Auburn	12	0.034	0.71	1.503	0.47
906-08I1	Auburn	12	0.102	0.77	3.545	0.22
906-09I1	Auburn	12	0.09	0.76	1.744	0.44
906-10I1	Auburn	12	0.079	0.75	1.713	0.44
906-11I1	Auburn	12	0.068	0.74	1.732	0.43
906-12I1	Auburn	12	0.057	0.73	1.748	0.42
906-13I1	Auburn	12	0.045	0.72	2.048	0.35
906-14I1	Auburn	12	0.011	0.68	1.431	0.48
906-06I1	King County	24	3.634	4.31	8.711	0.49

[1]20-year build out plus 20-year I/I scenario results obtained with the Mike Urban model.

[2]Flow rates including dry and wet weather flows generated by Jovita Annex area.

[3]Maximum pipe flow capacity.

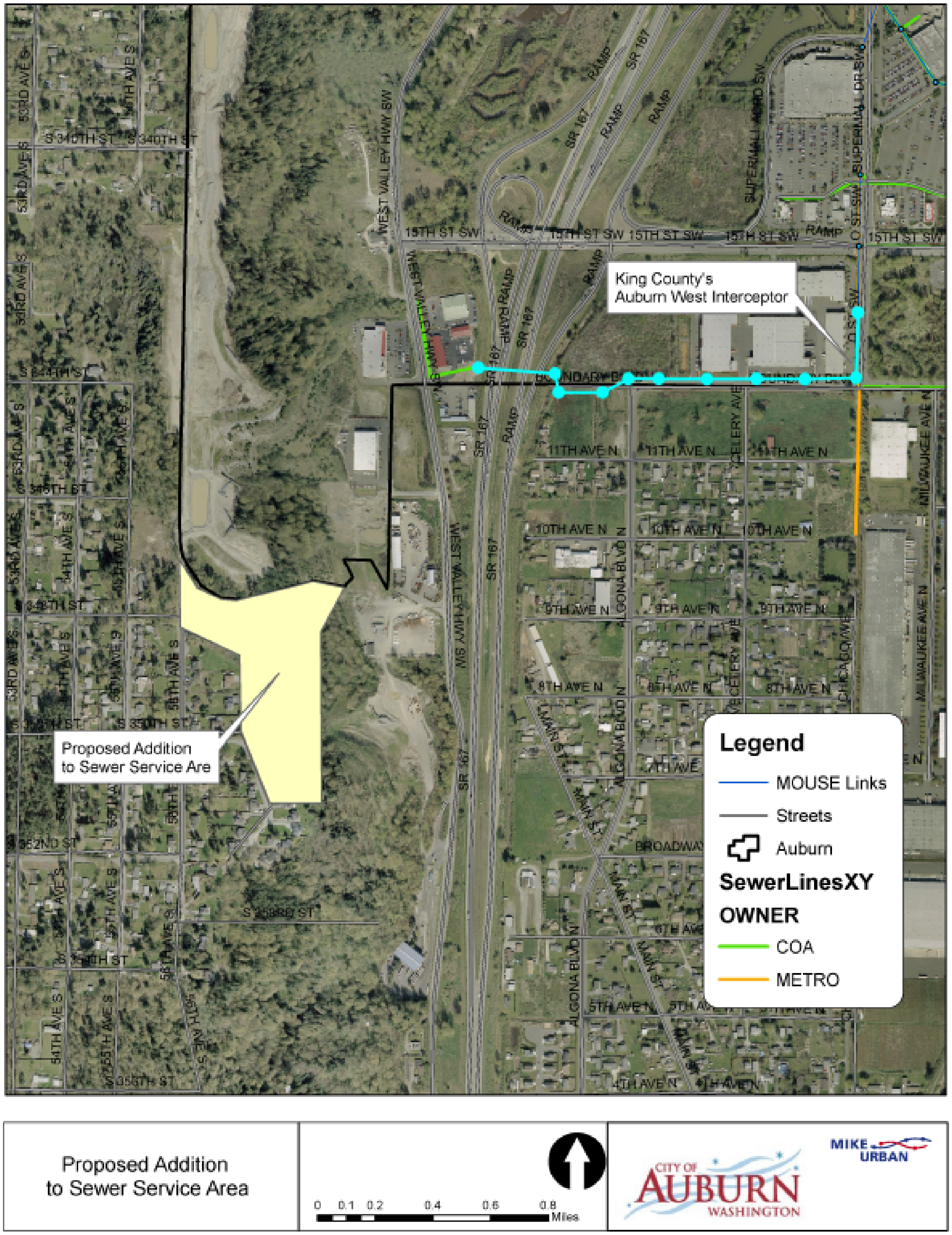


Figure 3-5. Proposed Jovita Annex area and downstream sewer pipes included in capacity analysis.

3.5 Pump Station Capacity for 2028 Flows

The pump station capacity for build out conditions was estimated to assess pump stations for planning purposes. In the Mike Urban model, the capacity of the pump stations for the 20-year build out plus 20-year I/I scenario (Scenario 2) did not differ from the capacity of the existing conditions (Scenario 1). In addition, the pump stations were modeled so that when two pumps are running, the capacity is doubled (i.e. both pumps running at full capacity). In reality, the second pump will only operate at 50-70% of its capacity depending on static and friction headloss characteristics.

The maximum simulated inflow rate into each pump station (as obtained by the Mike Urban model) was compared to the corrected pump stations capacity (one pump at full capacity and the second pump at 50% of its capacity). No pump stations were identified that could potentially present capacity problems. A summary of the results is presented in Figure 3-5.

Table 3-4. Pump station capacity for future build out summary

Pump ID	Capacity [1 pump running] (cfs)	Capacity [2 pumps running] (cfs)	Peak Predicted Flowrate (cfs)[1]
22nd-Street	1.23	1.84	0.404
8th-Street	0.34	0.51	0.026
Area_19	0.22	0.33	0.128
Dogwood	0.45	0.675	0.006
D-St	0.89	1.335	0.172
Ellingson	2.23	3.345	1.348
F-Street	1.34	2.01	1.419
Peasley_Ridge	0.22	0.33	0.284
RainierRidge	0.45	0.675	0.638
Riverside	0.89	1.335	0.091
R-Street	0.22	0.33	0.039
Terrace_View	1.39	2.09	0.024
Valley Meadows	0.28	0.42	0.125
Verdana	3.56	5.34	4.474

[1] Mike Urban model results for Scenario 2 in flow rates into each pump station.

4. CONCLUSIONS

The MikeUrban model was set up using the best available data. Assumptions made during the completion of the model included margins of safety.

For the existing scenario, the hydraulic model shows minimal surcharging, and no flooding. Therefore, the model indicates the City of Auburn wastewater facilities have no capacity issues for the existing simulation.

The projected scenario simulation showed approximately 50 pipes with surcharging conditions. One node was simulated to be "spilling" or flooding. The simulated water surface of the remaining surcharging pipes were at least 4-ft below ground surface. Therefore, the majority of surcharging pipes for the projected scenario are simulated to not to flood. Observation of these surcharging pipes is recommended as growth occurs.

For a complete view of all profiles examined, please refer to Appendix B. Several appendices are made available for documentation of the MikeUrban model. These include:

1. Appendix A – Model Definition And Simplification
2. Appendix B- Technical Memo Tables And Figures
3. Appendix C- Model Verification

REFERENCES

King County, 2002. *2001/2002 Wet Weather Flow Monitoring*; Regional Infiltration/ Inflow (I/I) Control Program. King county Department of Natural Resources and Parks, Wastewater Division. June 2002.

APPENDIX A - MODEL DEFINITION AND SIMPLIFICATION

BACKGROUND

Brown and Caldwell received two previous DHI's Mouse models for existing and future conditions from the City, which contained all sewers within the City at the time of the model's construction (2001). The inclusion of all the pipes resulted in a model that ran very slowly with huge data storage requirements. We revised the Mike Urban model to contain a 'backbone' of the sewer system that preserved overall accuracy but permits reasonable runtimes and data management. Two different scenarios were looked at when performing the assessment; these consisted on the existing conditions of the network and the 20 year population/employment and build-out projection. The model was updated to include pump stations that were brought online after 2001 and those that will be active within 20 years. Furthermore, the model boundaries were updated to reflect any updates to the City's service area.

As part of the scope of work for the City of Auburn Comprehensive Plan update, a computer hydraulic model was created in order to assess the existing and potential future capacity shortfalls within the City's wastewater collection system. In addition, a few scenarios were tested to determine the best course of action where capacity problems were found. The modeling results were used to update the City's CIP.

Brown and Caldwell will make the following items available for the City:

- A functioning model of the City's current and 20 year build out condition.
- Documentation of the modeling approach and data input.
- Baseflow calibration results for all modeled Pump Stations, including diurnal patterns and cyclic values.
- RDII data summary, as obtained from King County and as used for the Mike Urban model.
- Modeling results and recommendations.

PHYSICAL COMPONENTS

Manholes

Invert elevations in the City's MOUSE model appeared to have been entered using two different horizontal datums as reference. The invert elevations were updated to the North American Datum of 1983 (NAD83) in accordance to the City's GIS model.

All manholes were modeled as 4 feet diameter circular pipes with normal cover type. The entrance and exit of the manholes were modeled as sharp edged with a typical head loss resistance coefficient (K) equal to 1 (Crane, 1988).

Outlet

One outlet was defined for the City's sewer network. The outlet was located at the most downstream manhole (107-01), where all generated flows drain into King County's South 277th Interceptor.

Links

Network pipes were modeled as standard circular links. Pipe inverts were set at the same elevation as the upstream and downstream manhole inverts. Length and diameter sizes were updated to coincide with the City's GIS database. Pipes with diameter sizes 8" or less were removed from the model to decrease simulation run times. Exceptions were made for force mains and gravity sewer lines directly discharging into a pump station or connecting larger pipes.

Materials of construction for the City's sewer network were carefully revised to assure accurate model calculations. MIKE URBAN allows the modeler to define local friction coefficients or use default coefficients associated to each material selection.

MIKE URBAN also allows the user to select between four different friction loss formulas (Manning Explicit, Manning Implicit, Colebrook-White, or Hazen-Williams). For this project the Manning's implicit formula was used. Manning's implicit formula is obtained by differentiation of the friction coefficient (*f*) with respect to the water height in the pipe (*h*) and has the form:

$$\frac{\partial f}{\partial h} = -2\frac{f}{M}\frac{\partial M}{\partial h} - 2\frac{f}{A}\frac{\partial A}{\partial h} - \frac{4}{3}\frac{f}{R}\frac{\partial R}{\partial h}$$

Equation 1

Where M is the Manning's number equal to 1/n, A is the cross-sectional area and R is the hydraulic radius.

Assumptions:

PVC pipes were modeled as "Plastic MOUSE":

Manning's n = 0.0118

Concrete pipes were modeled as "Concrete MOUSE (Smooth)":

Manning's n= 0.0125

Wet Wells

Wet wells were modeled as storage basins. As-built drawings and reference documents obtained from the City were used to create elevation vs. area tables. A summary for each storage basin is presented in **Table A.1**. **Figure A.1** displays a typical cross-sectional view of the City's wet wells.

Table A.1. Wet well Geometry

Basin ID	Elevation (ft)	Area$_{cross}$ (ft)	Area$_{surface}$ (ft)	Basin ID	Elevation (ft)	Area$_{cross}$ (ft)	Area$_{surface}$ (ft)
22nd-Street	41.40	0.00	7.07	8th-Street	60.25	0.00	7.07
	50.00	45.60	28.70		70.25	60.00	28.27
	57.40	90.00	28.70		78.25	108.00	28.27
Area 19	522.81	0.00	28.27	Dogwood	172.63	0.00	6.00
	524.21	12.00	28.27		175.63	13.50	28.26
	540.81	108.00	28.27		190.23	78.60	28.26
D-Street	34.39	0.00	3.14	Ellingson	69.5	0.0	3.1
	40.00	33.66	28.27		78.0	54.4	50.3
	47.80	80.46	28.27		87.5	78.9	7.1
F-Street	79.9	0.0	3.1	Lakeland Hills	66.8	0.0	80.0
	88.9	15.8	28.3		74.8	75.0	400.0
	102.3	78.6	28.3		105.0	610.0	400.0
Peasley Ridge	454.6	0.0	3.1	Rainier Ridge	384.6	0.0	28.3
	459.0	27.0	28.3		389.8	10.0	28.3
	474.3	91.5	28.3		405.0	73.0	28.3
Rainier Shadows	374.7	0.0	3.1	Riverside	40.9	0.0	3.1
	377.8	15.8	50.2		45.0	8.8	28.3
	403.8	208.0	50.2		71.2	157.3	28.3
R-Street	54.0	0.0	28.3	Terrace View	60.0	0.0	1.8
	58.5	27.3	28.3		68.5	75.0	28.3
	71.0	75.1	28.3		77.8	130.7	28.3
Valley Meadows	47.0	0.0	5.6	White Mtn. Trails	380.0	0.0	3.1
	58.7	14.0	28.3		385.0	15.2	28.3
	72.5	82.7	28.3		394.0	54.0	28.3
Verdana[1]	380.0	0.0	3.1				
	385.0	15.2	28.3				
	394.0	54.0	28.3				

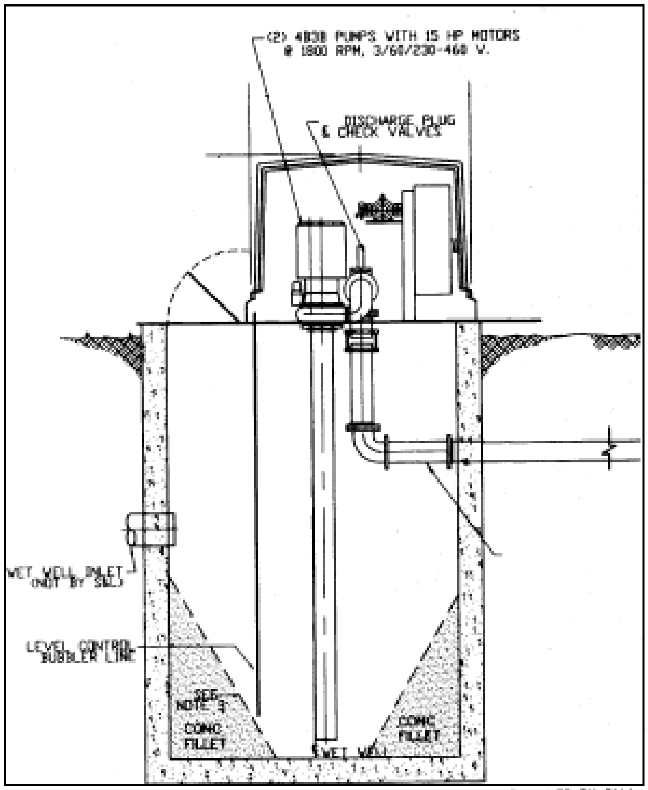


Figure A. 1- Typical Wetwell Cross Section for City of Auburn Pump Stations

Pumps

The pumps are characterized by their start/ stop water levels and capacity curves. These inputs were revised and updated, when necessary, using the reference documents obtained from the City. Capacity curve offset was set to zero and acceleration and deceleration times set at the model's default values of 10 seconds.

Further updates to the 2001 model included the addition of 4 pump stations (Area 19, Terrace View, Peasley Ridge and White Mtn. Trails), which were added to the City's network after 2001. For the 20 year future projection, two pump stations were eliminated (Rainier Shadows and White Mtn. Trails) and one pump station was added (Verdana). The inflow to both eliminated pumps was routed to the Verdana pump station, as anticipated by the City. **Table A.2** summarizes the model input data for each pump.

Table A.2. Pump Control Data			
Pump ID	Capacity [1 pump running] (cfs)	Capacity [2 pumps running] (cfs)	Peak Predicted Flowrate (cfs)[1]
22nd-Street	1.23	1.84	0.404
8th-Street	0.34	0.51	0.026
Area_19	0.22	0.33	0.128
Dogwood	0.45	0.675	0.006
D-St	0.89	1.335	0.172
Ellingson	2.23	3.345	1.348
F-Street	1.34	2.01	1.419
Peasley_Ridge	0.22	0.33	0.284
RainierRidge	0.45	0.675	0.638
Riverside	0.89	1.335	0.091
R-Street	0.22	0.33	0.039
Terrace_View	1.39	2.09	0.024
Valley Meadows	0.28	0.42	0.125
Verdana	3.56	5.34	4.474

The pumps were modeled as ideal. Ideal pumps have no force main at the discharge but rather connect the pump station wetwell to the discharge manhole as dictated by the capacity-head curves. **Table A.3** presents the Q-H curve data for each pump.

Table A.3. Pumps Capacity Curves					
Pump ID	Elevation (ft)	Flowrate (ft^3/s)	Pump ID	Elevation (ft)	Flowrate (ft^3/s)
22nd-Street	43.00	0.00	8th-Street	61.50	0.00
	45.50	0.23		62.75	0.34
	46.25	0.46		63.75	0.67
	57.40	0.46		78.25	0.67
Area 19	526.01	0.00	Dogwood	179.63	0.00
	527.55	0.22		174.63	0.45
	528.05	0.45		175.23	0.89
	540.81	0.45		190.23	0.89
D-Street	37.00	0.00	Ellingson	73.50	0.00
	37.50	0.89		74.90	2.23
	38.25	1.79		75.40	4.46
	47.80	1.79		84.50	4.46

F-Street	83.20	0.00	Lakeland Hills	73.00	0.00
	85.30	1.34		74.00	1.34
	86.30	2.68		77.00	2.68
	102.30	2.68		105.00	2.68
Peasley Ridge	458.54	0.00	Rainier Ridge	388.50	0.00
	459.40	0.22		390.50	0.45
	461.00	0.45		391.50	0.89
	474.25	0.45		405.00	0.89
Rainier Shadows	378.67	0.00	Riverside	42.70	0.00
	379.50	0.22		45.70	0.89
	380.50	0.45		46.20	1.79
	403.80	0.45		71.21	1.79
R-Street	58.35	0.00	Terrace View	64.35	0.00
	58.48	0.22		64.50	0.22
	58.80	0.45		65.25	0.45
	71.00	0.45		77.79	0.45
Valley Meadows	50.10	0.00	White Mtn. Trails	383.50	0.00
	50.39	0.28		384.50	0.28
	50.89	0.56		385.75	0.56
	72.50	0.56		394.00	0.56
Verdana[1]	366.96	0.00			
	367.46	3.56			
	372.46	7.13			
	396.00	7.13			

Mike Urban Catchments

Catchments are an essential component of the Mike Urban model. A catchment acts as the geographical representation of a sewered area holding a specific number of inhabitants, as well as a hydrological unit capable of generating storm water runoff and infiltration.

The number of catchments was reduced by half from those contained in the previous Mouse model in order to reduce simulation time and facilitate model management and data input.

Catchments were given a unique id that references their location within a specific mini sub-basin. These mini sub-basins represent areas within a drainage basin that were further delineated by geographical related variations in I/I during King County's (KC's) 2001/2002 Wet Weather Flow Monitoring program (King County, 2002).

MODELING APPROACH

Baseflow

Population Data

Brown and Caldwell received population/employment projections from the City divided into four service areas (Academy, Lakeland, Lea Hill and Valley). The population data received from the city is presented in the Appendix B. No data was received for the West Hill service area (west of Valley).

Current Conditions

Each catchment was assigned a fraction of the total number inhabitants provided, according to the service area in which it was located. The number of inhabitants entered accounted for City residents and employed personnel.

Three of the four newly defined catchment areas, fall outside of the Water Service Areas. The existing population for those catchments was determined based on the existing landuse.

* Using ArcGIS 9.2 the City's model was superimposed on the 2007 aerial view layer of the City and the sewered area was estimated to be 1/3 of the overall area for both catchments.

** Units per acres were based on typical values used in build-out calculations.

*** The number of persons per residential unit was assumed to be 2.5.

Future Projections

Per Brown and Caldwell and City discussions, the number of residents/employees for each catchment was linearly increased to meet the estimated growth for the 20 year projection. In the case of the new catchments, the sewered area was expanded to cover 2/3 of the overall areas. For KNT021 draining into the Verdana PS, a report was received from the City containing build-out projections for the neighborhood. All other assumptions remained unchanged.

* Population estimates for KNT021 were extracted from the Verdana PS report.

A summary of each minibasin containing areas and population information, as included in the model, is presented in **Table A.4.**

Wet Weather Flow

Time-Area Runoff Model

The Time-Area (T-A) surface runoff model is governed by the size of the drainage area and initial and continuous hydrological losses due to antecedent moisture conditions, evapotranspiration and imperfect imperviousness. The resulting hydrographs are regulated by the T-A curve, which is defined by the shape of the catchment and the time of concentration.

RDI Model

Mike Urban RDI provides continuous modeling of the runoff processes that account for water infiltration and inflow as a result of snow, surface, root-zone and groundwater storage. RDI is composed of two hydrological responses to precipitation:

1. The Fast Response Component (FRC), which is regulated by the Moisture Antecedent Conditions of the catchment area.
2. The Slow Response Component (SRC), which consists of the remaining runoff as it is routed into the network, as well as the Dry Weather Flow (DWF) I/I.

Boundary Conditions

Meteorological Data

Rainfall and Evapotranspiration records were collected from the City. Timeseries files were created for the available years (Dec 2006 to Dec 2007) and uniformly applied to all catchments in the model.

Network Loads

There are three different water loads applied to the City's hydraulic network. In this section we describe what each load represents and how it enters the network.

1. Water Load.Resident DWF: This type of boundary condition represents the flow generated by the residents associated with a catchment. The flow is then passed directly to the network via the single node catchment connection.
2. Catchment Water Load. Resident DWF: The *Water Load.Resident DWF* described in the previous section contributes the majority of the DWF to the network. The flows are directly passed to the network through its connecting node.
3. External Loads: Three external inflows were provided by the City. Algona inflow has 15 minutes data from April 2000 to December 2003 with missing data between March 18 to October 31 during 2001, 2002 and 2003. Lakehaven inflow has 15 minutes data input from November 2000 to December 2003 with missing data between January 16 to October 31 each year. Muckelshoot tribe is allowed a maximum discharge of 7.85 cubic feet per second into

the City's sewer network. A hydrograph was created to match this peak flow.

All hydrographs were extrapolated to extend until 2008 assuming equal volume over time. The intervals were reduced to show flowrates every 45 minutes and entered into the model at the most upstream node (MH 1317-01) located in the Academy sub-basin.

APPENDIX B- TECHNICAL MEMO TABLES AND FIGURES

Table B.2. Allocation of total population across minibasin and catchments						
Minibasin ID	Area (acres)	Number of catchments	2008 Population		2028 Population	
			Total	per catchment	Total	per catchment
ABN001	80.72	2	489	245	631	316
ABN002	157.43	52	1587	31	2041	39
ABN003	180.23	18	1816	101	2337	130
ABN004	152.02	8	1023	128	1391	174
ABN006	84.46	4	1006	251	1552	388
ABN009	57.88	13	689	53	1064	82
ABN010	66.28	7	446	64	606	87
ABN011	95.67	11	1139	104	1759	160
ABN012	92.92	11	1106	101	1708	155
ABN013	116.84	10	1391	139	2148	215
ABN014	79.62	7	802	115	1032	147
ABN015	170.14	3	1145	382	1557	519
ABN016	139.99	1	849	849	1095	1095
ABN017	191.93	27	1291	48	1756	65
ABN018	169.52	43	1709	40	2198	51
ABN019	294.09	37	1979	53	2691	73
ABN020	111.98	38	753	20	1025	27
ABN021	181.99	19	1225	64	1665	88
ABN022	347.78	93	2340	25	3182	34
ABN023	106.87	31	719	23	978	32
ABN024	100.95	39	679	17	924	24
ABN025	77.16	14	519	37	706	50
ABN026	80.99	9	545	61	741	82
ABN027	313.81	121	2112	17	2871	24
ABN028	50.00	3	504	168	648	216
ABN029	141.16	5	1681	336	2595	519
ABN030	112.66	9	758	84	1031	115
ABN031	136.29	3	917	306	1247	416
ABN032	187.47	35	1261	36	1715	49
ABN48A	187.47	72	1261	18	1715	24
ANB008	187.47	4	1261	315	1715	429
LH001(1)	330.00	1	3929	3929	6066	6066
MSTT02	233.14	27	1569	58	2133	79
MSTT22	233.14	25	1569	63	2133	85
TV001(1)	51.46	27	312	12	402	15
WINT003	117.87	42	793	19	1078	26
WINT038	607.08	27	4085	151	5555	206

(1) Newly added catchments. Area was determined using ArcGIS 9.2. The model was superimposed on the 2007 aerial view of the City.

Table B.3. Population across new Mike Urban catchments

Minibasin ID	Number of catchments	2008 Population Sewered Area (ac)	2008 Population Total	2008 Population per catchment	2028 Population Sewered Area (ac)	2028 Population Total	2028 Population per catchment
AR001(1)(2)	1	57.80	1242	1242	115.00	2483	2483
PR001(1)(2)	1	112.90	1693	1693	225.72	3386	3386
KNT021(1)(2)	1	N/A	N/A	N/A	680.00	1245	1245

(1) Newly added catchments. Area was determined using ArcGIS 9.2. The model was superimposed on the 2007 aerial view of the City.

(2) Population was not included within the Water Service Areas.

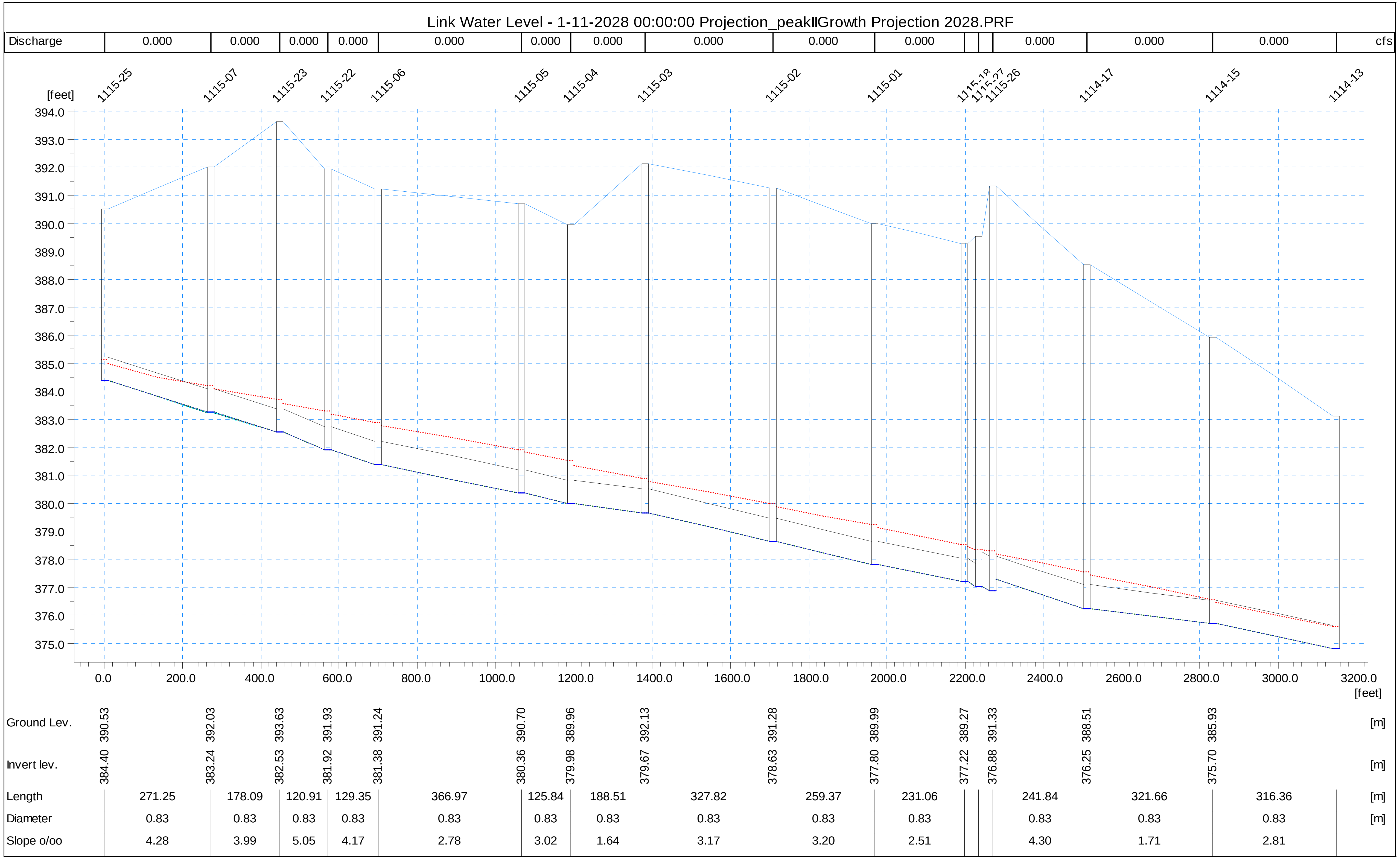
Table A.2. RDII Constant Unit Flowrates Developed by King County*			
Minibasin ID	Minibasin Peak II (mgd)	Sewered Area (ac)	Minibasin Peak II (gpad)
ABN001	0.204	80.72	2,527
ABN002	2.000	157.43	12,702
ABN003	0.307	180.23	1,703
ABN004	0.274	152.02	1,800
ABN006	0.132	84.46	1,561
ABN008	0.175	138.56	1,264
ABN009	0.066	57.88	1,144
ABN010	0.167	66.28	2,523
ABN011	0.413	95.67	4,313
ABN012	0.578	92.92	6,220
ABN013	0.319	116.84	2,729
ABN014	0.157	79.62	1,969
ABN015	1.417	170.14	8,326
ABN016	0.149	139.99	1,065
ABN017	0.724	191.93	3,770
ABN018	0.399	169.52	2,356
ABN019	0.342	294.09	1,163
ABN020	1.821	111.98	16,265
ABN021	0.612	181.99	3,361
ABN022	1.553	347.78	4,466
ABN023	2.362	106.87	22,097
ABN024	0.119	100.95	1,174
ABN025	0.408	77.16	5,286
ABN026	0.135	80.99	1,667
ABN027	0.406	313.81	1,295
ABN028	0.423	50.00	8,452
ABN029	0.625	141.16	4,428
ABN030	0.159	112.66	1,414
ABN031	0.211	136.29	1,548
ABN032	1.580	187.47	8,425
AUBRN48A	1.380	233.14	5,918
MSTTR002A	0.270	237.75	1,134
MSTTR022A	0.629	154.73	4,068
WINT003	0.772	117.87	6,546
WINT038	1.290	607.08	2125

- I/I rates were determined during King County's 2001/2002 Wet Weather Monitoring Program.

Table B.3displays the 20-year peak I/I rates for new model minibasins.

Table A.4 RDII Constant Unit Flowrates for New Minibasins			
Minibasin ID	**Minibasin Peak II (mgd)**	**Sewered Area (ac)**	**Minibasin Peak II (gpad)**
AR001	0.190	173.00	1,100
KNT021	0.206	187.00	1,100
LH001	0.783	712.00	1,100
PR001	0.248	225.50	1,100
TV001	0.136	124.00	1,100

Results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Discharge 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 cfs
1115-25 1115-07 1115-23 1115-22 1115-06 1115-05 1115-04 1115-03 1115-02 1115-01 1115-26 1114-17 1114-15 1114-13
[feet]
394.0 393.0 392.0 391.0 390.0 389.0 388.0 387.0 386.0 385.0 384.0 383.0 382.0 381.0 380.0 379.0 378.0 377.0 376.0 375.0
0.0 200.0 400.0 600.0 800.0 1000.0 1200.0 1400.0 1600.0 1800.0 2000.0 2200.0 2400.0 2600.0 2800.0 3000.0 3200.0
[feet]
Ground Lev. 390.53 392.03 393.63 391.93 391.24 390.70 389.96 392.13 391.28 389.99 389.27 391.33 388.51 385.93 [m]
Invert lev. 384.40 383.24 382.53 381.92 381.38 380.36 379.98 379.67 378.63 377.80 377.22 376.88 376.25 375.70 [m]
Length 271.25 178.09 120.91 129.35 366.97 125.84 188.51 327.82 259.37 231.06 241.84 321.66 316.36 [m]
Diameter 0.83 0.83 0.83 0.83 0.83 0.83 0.83 0.83 0.83 0.83 0.83 0.83 0.83 [m]
Slope o/oo 4.28 3.99 5.05 4.17 2.78 3.02 1.64 3.17 3.20 2.51 4.30 1.71 2.81

Figure 1

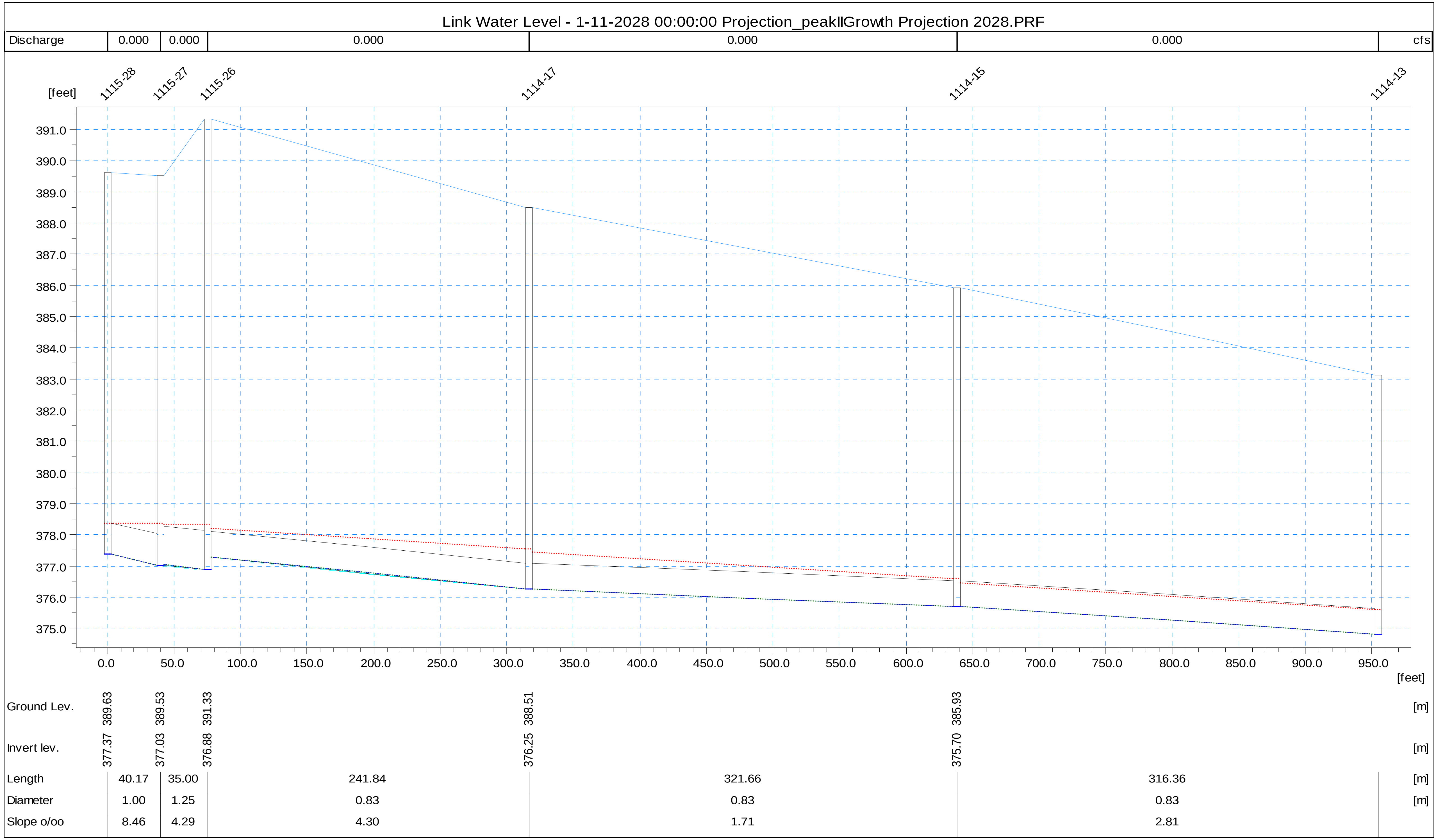

Link Water Level - 1-11-2028 00:00:00 Projection_peakIIGrowth Projection 2028.PRF
Discharge
0.000
0.000
0.000
0.000
0.000
cfs
1115-28
1115-27
1115-26
1114-17
1114-15
1114-13
[feet]
391.0
390.0
389.0
388.0
387.0
386.0
385.0
384.0
383.0
382.0
381.0
380.0
379.0
378.0
377.0
376.0
375.0
0.0
50.0
100.0
150.0
200.0
250.0
300.0
350.0
400.0
450.0
500.0
550.0
600.0
650.0
700.0
750.0
800.0
850.0
900.0
950.0
[feet]
Ground Lev.
389.63
389.53
391.33
388.51
385.93
[m]
Invert lev.
377.37
377.03
376.88
376.25
375.70
[m]
Length
40.17
35.00
241.84
321.66
316.36
[m]
Diameter
1.00
1.25
0.83
0.83
0.83
[m]
Slope o/oo
8.46
4.29
4.30
1.71
2.81

Figure 2

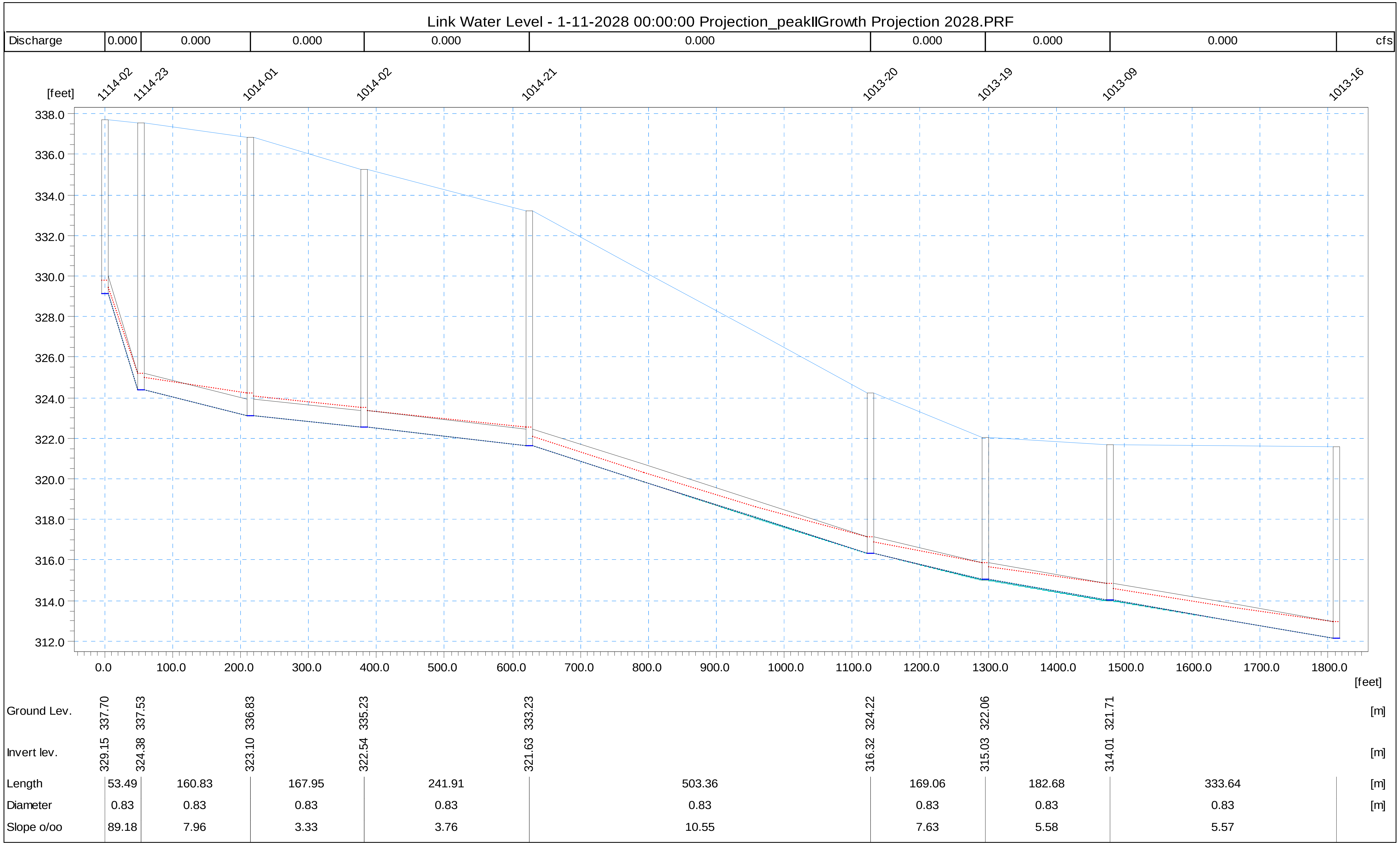

Link Water Level - 1-11-2028 00:00:00 Projection_peakIIGrowth Projection 2028.PRF
Discharge 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 cfs
1114-02 1114-23 1014-01 1014-02 1014-21 1013-20 1013-19 1013-09 1013-16
[feet]
338.0 336.0 334.0 332.0 330.0 328.0 326.0 324.0 322.0 320.0 318.0 316.0 314.0 312.0
0.0 100.0 200.0 300.0 400.0 500.0 600.0 700.0 800.0 900.0 1000.0 1100.0 1200.0 1300.0 1400.0 1500.0 1600.0 1700.0 1800.0
[feet]
Ground Lev. 337.70 337.53 336.83 335.23 333.23 324.22 322.06 321.71 [m]
Invert lev. 329.15 324.38 323.10 322.54 321.63 316.32 315.03 314.01 [m]
Length 53.49 160.83 167.95 241.91 503.36 169.06 182.68 333.64 [m]
Diameter 0.83 0.83 0.83 0.83 0.83 0.83 0.83 0.83 [m]
Slope o/oo 89.18 7.96 3.33 3.76 10.55 7.63 5.58 5.57

Figure 3

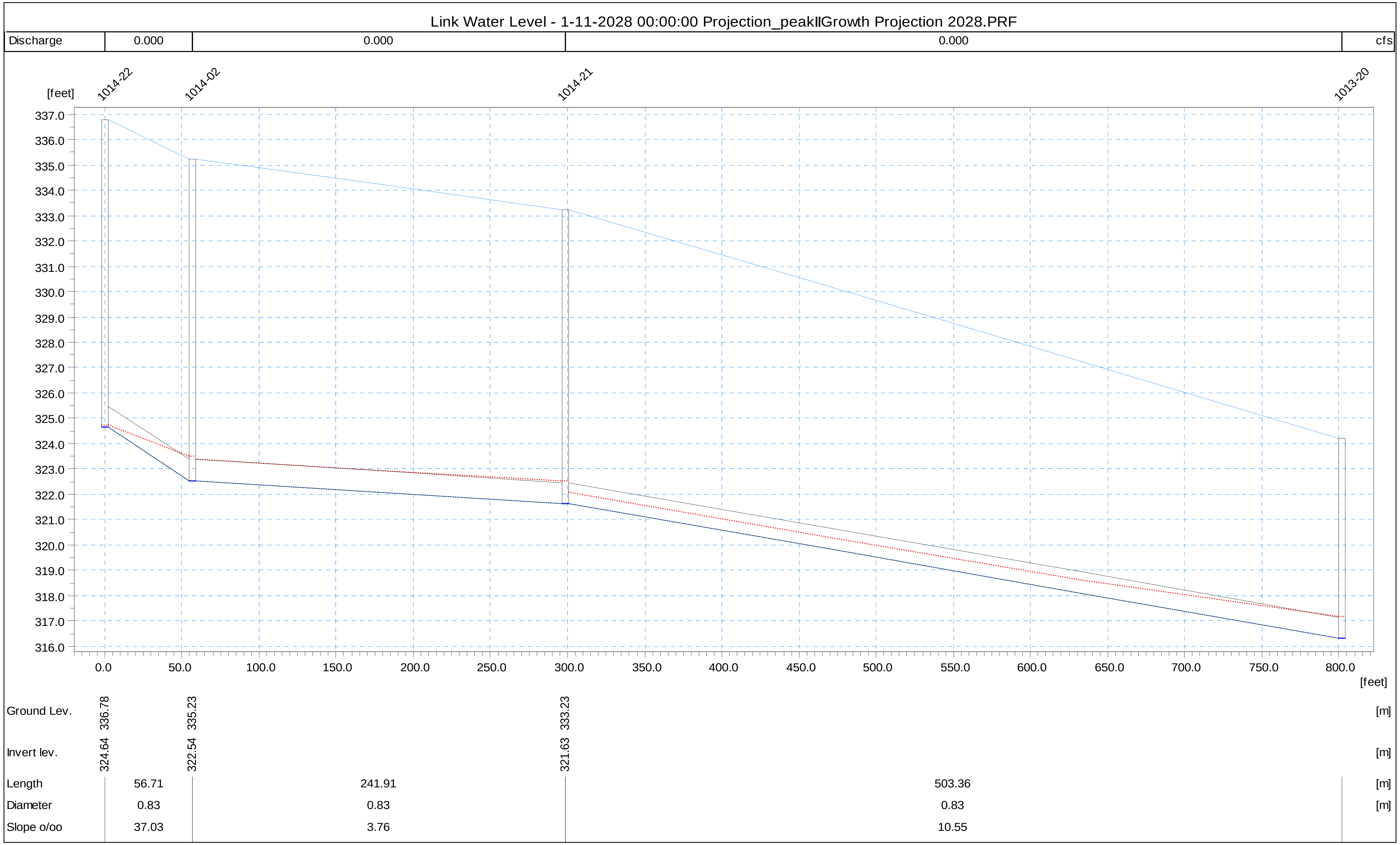
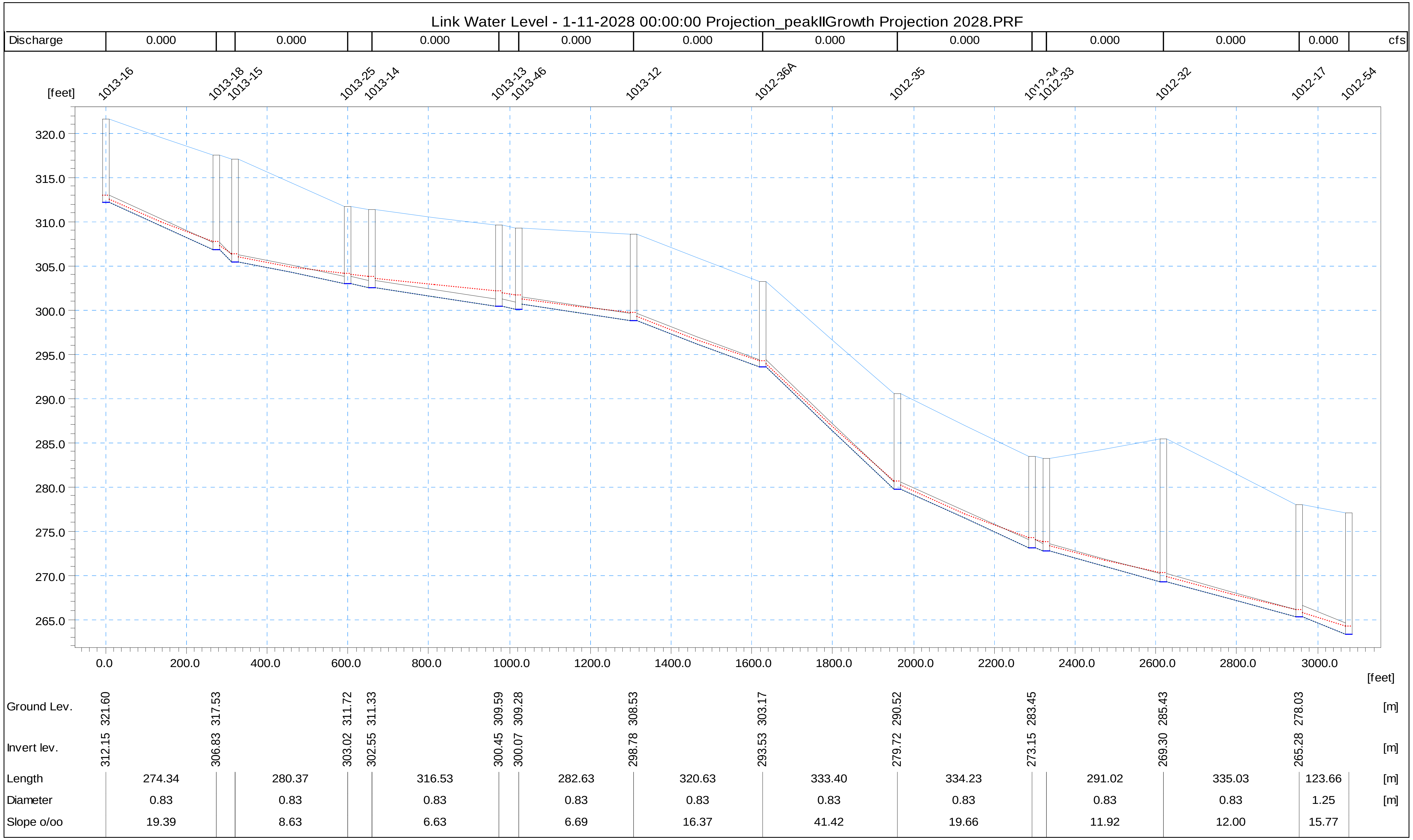
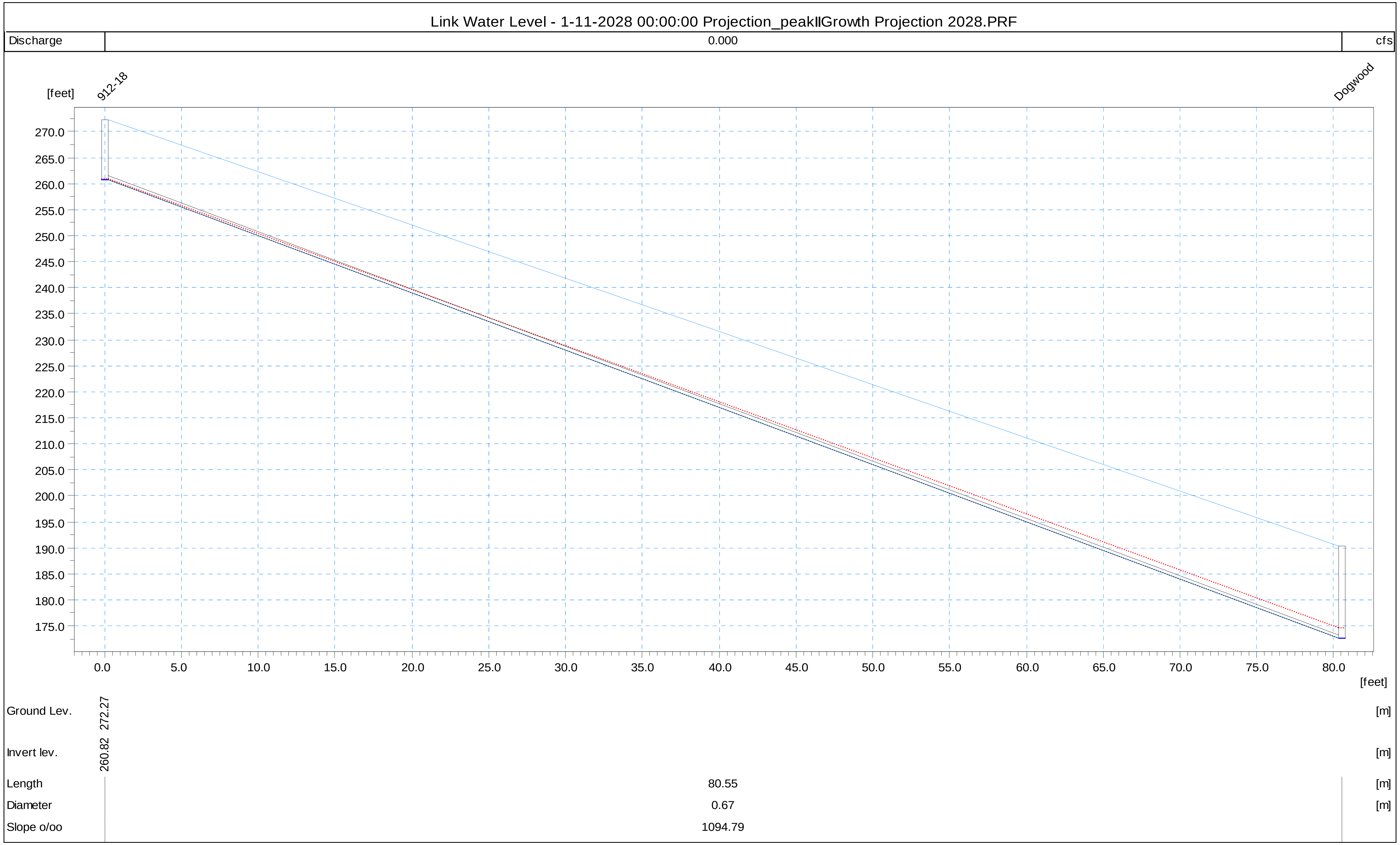

Link Water Level - 1-11-2028 00:00:00 Projection_peakIIGrowth Projection 2028.PRF
Discharge
0.000
0.000
0.000
cfs
[feet]
1014-22
1014-02
1014-21
1013-20
[feet]
Ground Lev.
336.78
335.23
333.23
[m]
Invert lev.
324.64
322.54
321.63
[m]
Length
56.71
241.91
503.36
[m]
Diameter
0.83
0.83
0.83
[m]
Slope o/oo
37.03
3.76
10.55

Figure 4



Link Water Level - 1-11-2028 00:00:00 Projection_peakIIGrowth Projection 2028.PRF
Discharge 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 cfs
1013-16
1013-18
1013-15
1013-25
1013-14
1013-13
1013-46
1013-12
1012-36A
1012-35
1012-33
1012-32
1012-17
1012-54
[feet]
320.0
315.0
310.0
305.0
300.0
295.0
290.0
285.0
280.0
275.0
270.0
265.0
0.0 200.0 400.0 600.0 800.0 1000.0 1200.0 1400.0 1600.0 1800.0 2000.0 2200.0 2400.0 2600.0 2800.0 3000.0
[feet]
Ground Lev. 321.60 317.53 311.72 311.33 309.59 309.28 308.53 303.17 290.52 283.45 285.43 278.03 [m]
Invert lev. 312.15 306.83 303.02 302.55 300.45 300.07 298.78 293.53 279.72 273.15 269.30 265.28 [m]
Length 274.34 280.37 316.53 282.63 320.63 333.40 334.23 291.02 335.03 123.66 [m]
Diameter 0.83 0.83 0.83 0.83 0.83 0.83 0.83 0.83 0.83 1.25 [m]
Slope o/oo 19.39 8.63 6.63 6.69 16.37 41.42 19.66 11.92 12.00 15.77

Figure 5



Link Water Level - 1-11-2028 00:00:00 Projection_peakIIGrowth Projection 2028.PRF
Discharge
0.000
cfs
[feet]
912-18
Dogwood
270.0
265.0
260.0
255.0
250.0
245.0
240.0
235.0
230.0
225.0
220.0
215.0
210.0
205.0
200.0
195.0
190.0
185.0
180.0
175.0
0.0
5.0
10.0
15.0
20.0
25.0
30.0
35.0
40.0
45.0
50.0
55.0
60.0
65.0
70.0
75.0
80.0
[feet]
Ground Lev.
272.27
[m]
Invert lev.
260.82
[m]
Length
80.55
[m]
Diameter
0.67
[m]
Slope o/oo
1094.79

Figure 6

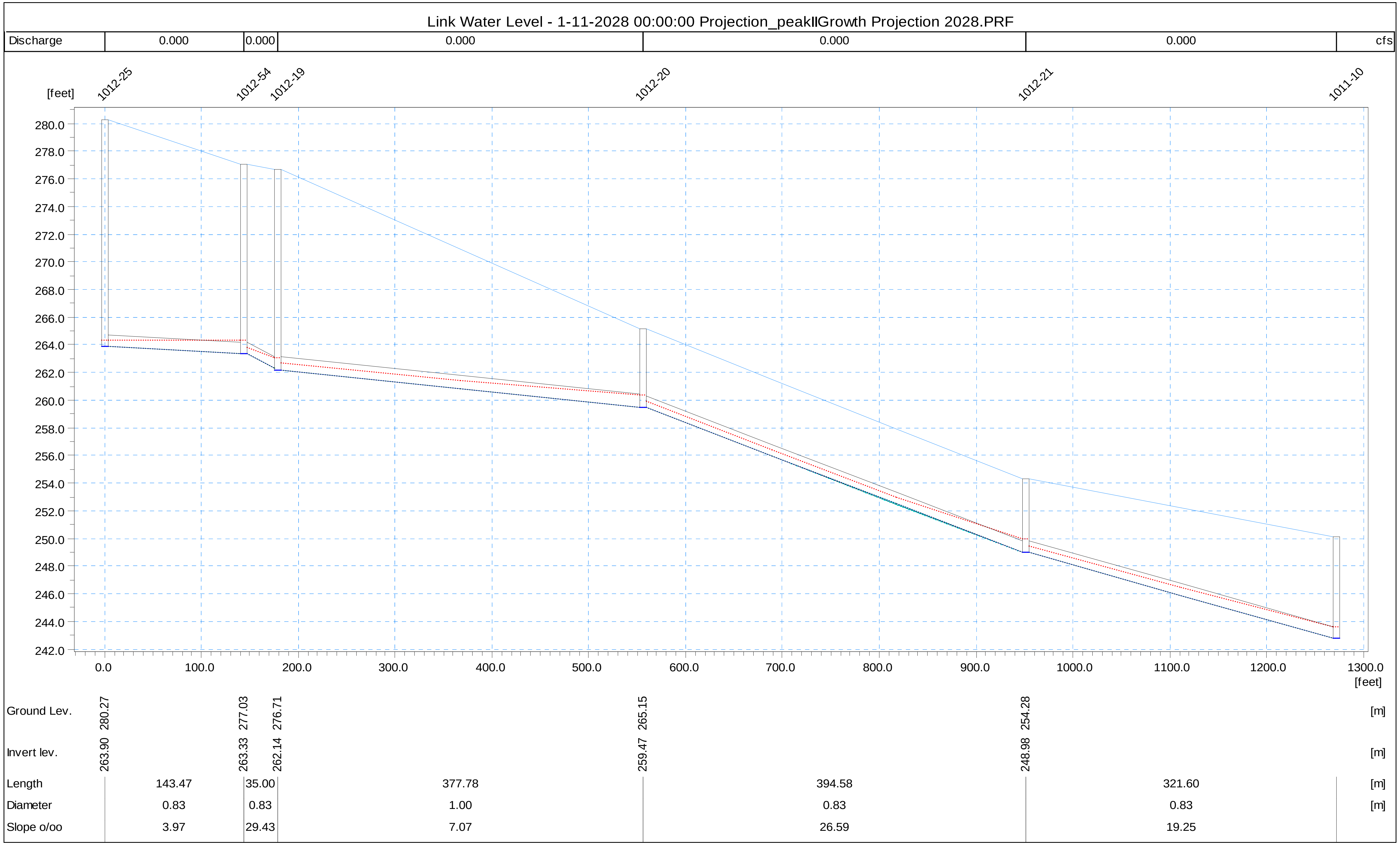

Link Water Level - 1-11-2028 00:00:00 Projection_peakIIGrowth Projection 2028.PRF
Discharge
0.000
0.000
0.000
0.000
0.000
cfs
[feet]
1012-25
1012-54
1012-19
1012-20
1012-21
1011-10
280.0
278.0
276.0
274.0
272.0
270.0
268.0
266.0
264.0
262.0
260.0
258.0
256.0
254.0
252.0
250.0
248.0
246.0
244.0
242.0
0.0
100.0
200.0
300.0
400.0
500.0
600.0
700.0
800.0
900.0
1000.0
1100.0
1200.0
1300.0
[feet]
Ground Lev.
280.27
277.03
276.71
265.15
254.28
[m]
Invert lev.
263.90
263.33
262.14
259.47
248.98
[m]
Length
143.47
35.00
377.78
394.58
321.60
[m]
Diameter
0.83
0.83
1.00
0.83
0.83
[m]
Slope o/oo
3.97
29.43
7.07
26.59
19.25

Figure 7

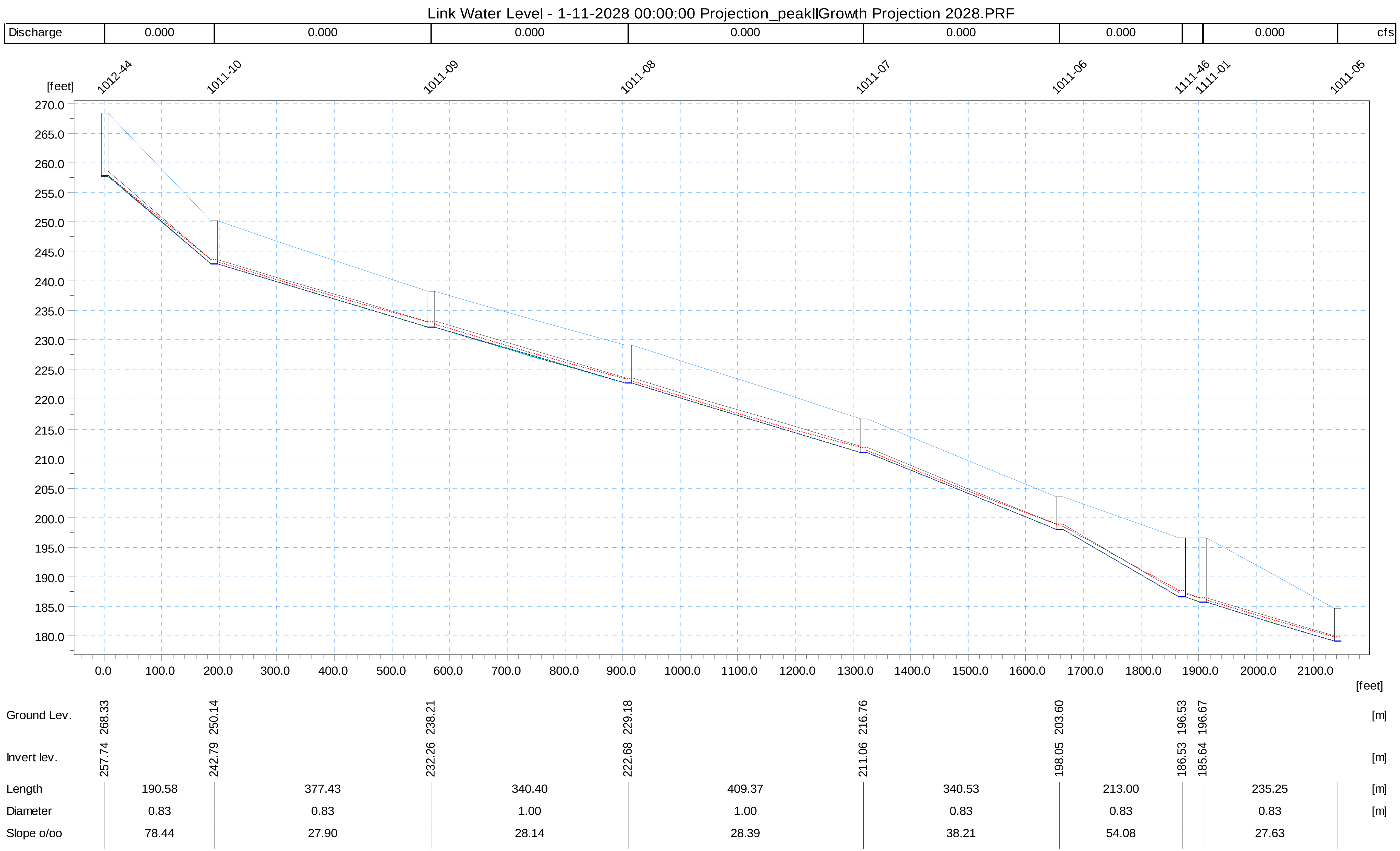
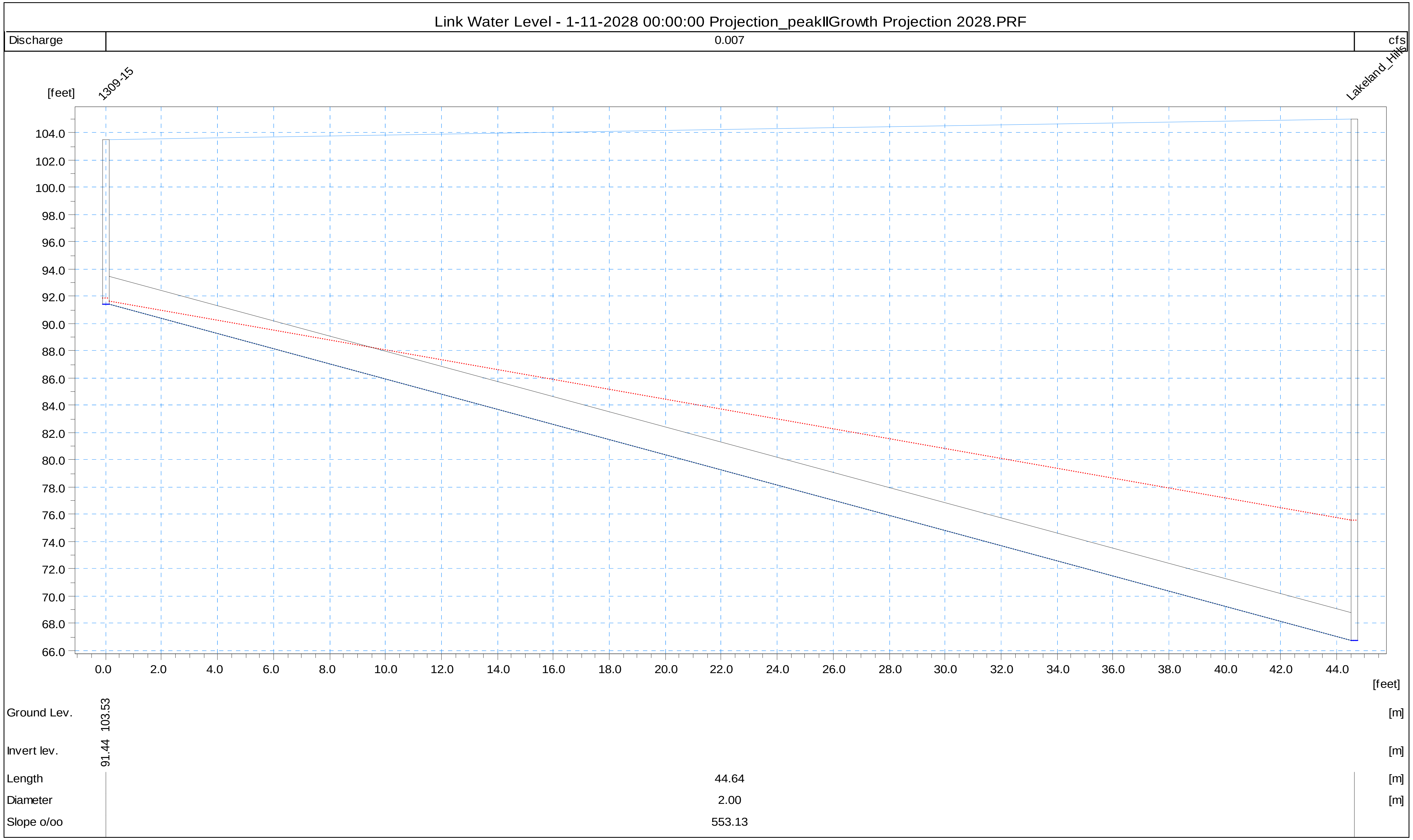

Link Water Level - 1-11-2028 00:00:00 Projection_peakIIGrowth Projection 2028.PRF
Discharge 0.000 0.000 0.000 0.000 0.000 0.000 0.000 cfs
1012-44
1011-10
1011-09
1011-08
1011-07
1011-06
1111-46
1111-01
1011-05
[feet]
270.0 265.0 260.0 255.0 250.0 245.0 240.0 235.0 230.0 225.0 220.0 215.0 210.0 205.0 200.0 195.0 190.0 185.0 180.0
0.0 100.0 200.0 300.0 400.0 500.0 600.0 700.0 800.0 900.0 1000.0 1100.0 1200.0 1300.0 1400.0 1500.0 1600.0 1700.0 1800.0 1900.0 2000.0 2100.0
[feet]
Ground Lev. 268.33 250.14 238.21 229.18 216.76 203.60 196.53 196.67 [m]
Invert lev. 257.74 242.79 232.26 222.68 211.06 198.05 186.53 185.64 [m]
Length 190.58 377.43 340.40 409.37 340.53 213.00 235.25 [m]
Diameter 0.83 0.83 1.00 1.00 0.83 0.83 0.83 [m]
Slope o/oo 78.44 27.90 28.14 28.39 38.21 54.08 27.63

Figure 8



Link Water Level - 1-11-2028 00:00:00 Projection_peakIIGrowth Projection 2028.PRF
Discharge
0.007
cfs
1309-15
Lakeland_Hills
[feet]
104.0
102.0
100.0
98.0
96.0
94.0
92.0
90.0
88.0
86.0
84.0
82.0
80.0
78.0
76.0
74.0
72.0
70.0
68.0
66.0
0.0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
20.0
22.0
24.0
26.0
28.0
30.0
32.0
34.0
36.0
38.0
40.0
42.0
44.0
[feet]
Ground Lev.
103.53
[m]
Invert lev.
91.44
[m]
Length
44.64
[m]
Diameter
2.00
[m]
Slope o/oo
553.13

Figure 9

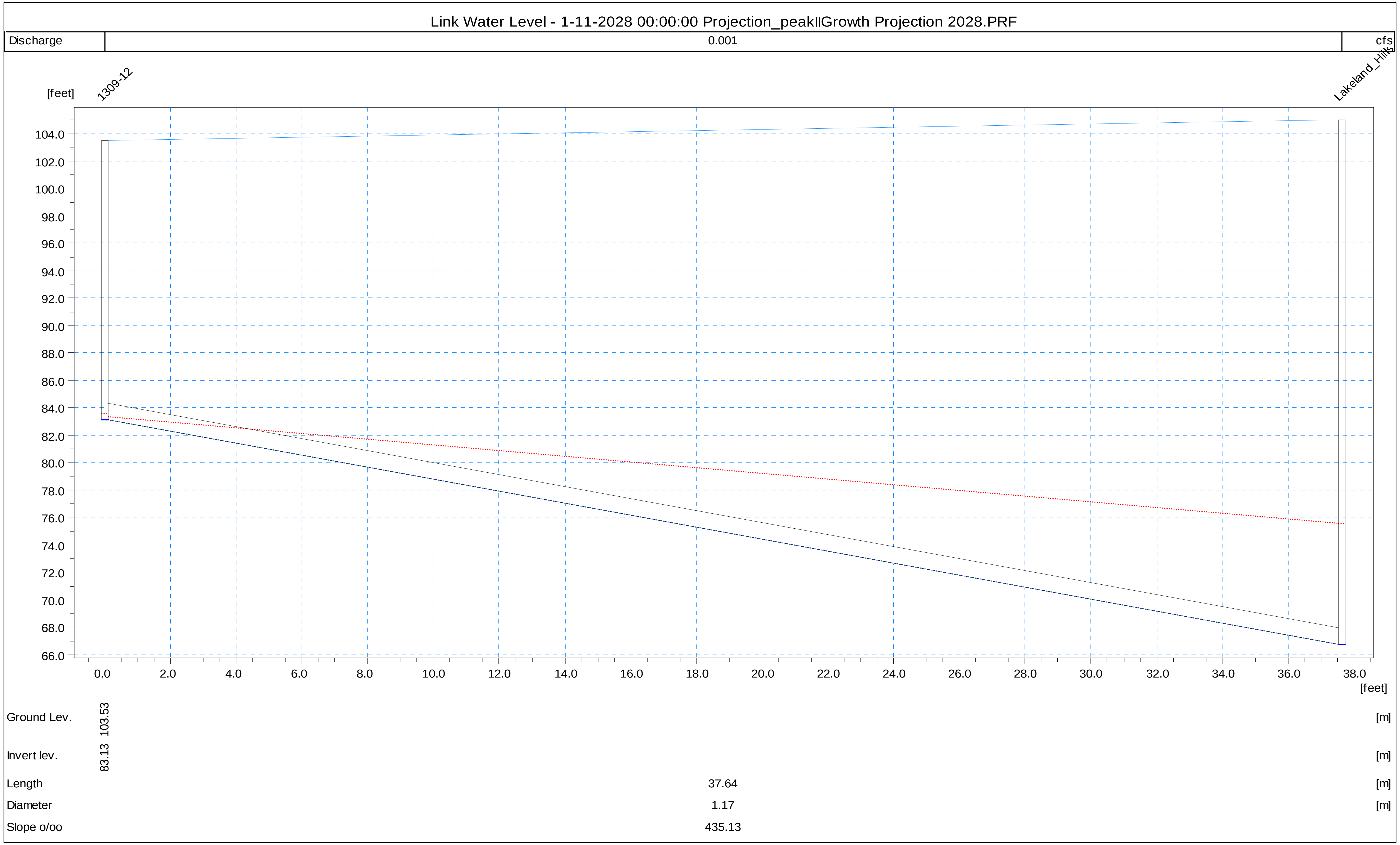

Link Water Level - 1-11-2028 00:00:00 Projection_peakIIGrowth Projection 2028.PRF
Discharge
0.001
cfs
[feet]
1309-12
Lakeland_Hills
104.0
102.0
100.0
98.0
96.0
94.0
92.0
90.0
88.0
86.0
84.0
82.0
80.0
78.0
76.0
74.0
72.0
70.0
68.0
66.0
0.0 2.0 4.0 6.0 8.0 10.0 12.0 14.0 16.0 18.0 20.0 22.0 24.0 26.0 28.0 30.0 32.0 34.0 36.0 38.0
[feet]
Ground Lev. 103.53 [m]
Invert lev. 83.13 [m]
Length 37.64 [m]
Diameter 1.17 [m]
Slope o/oo 435.13

Figure 10

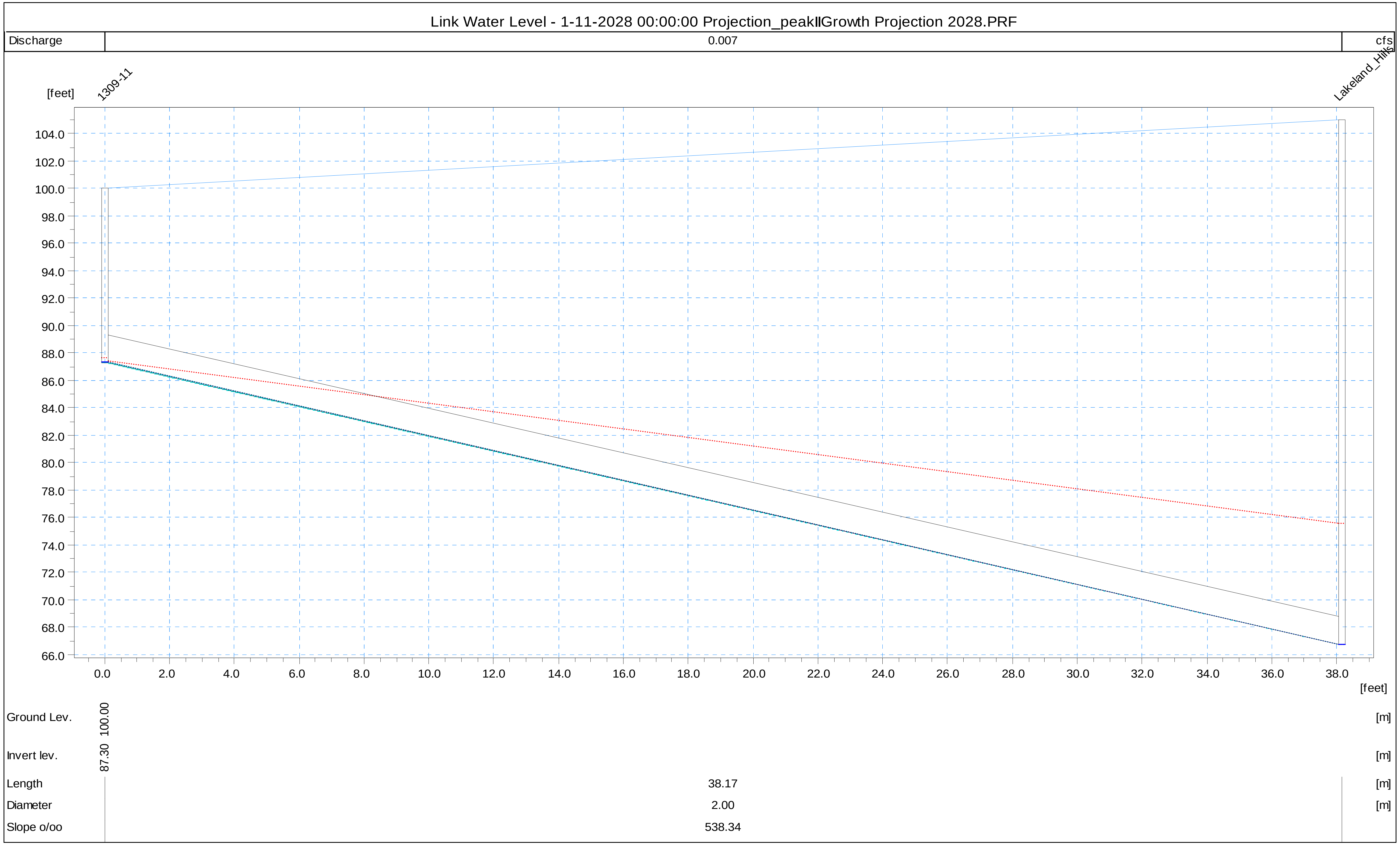

Link Water Level - 1-11-2028 00:00:00 Projection_peakIIGrowth Projection 2028.PRF
Discharge
0.007
cfs
[feet]
1309-11
Lakeland_Hills
104.0
102.0
100.0
98.0
96.0
94.0
92.0
90.0
88.0
86.0
84.0
82.0
80.0
78.0
76.0
74.0
72.0
70.0
68.0
66.0
0.0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
20.0
22.0
24.0
26.0
28.0
30.0
32.0
34.0
36.0
38.0
[feet]
Ground Lev.
100.00
[m]
Invert lev.
87.30
[m]
Length
38.17
[m]
Diameter
2.00
[m]
Slope o/oo
538.34

Figure 11

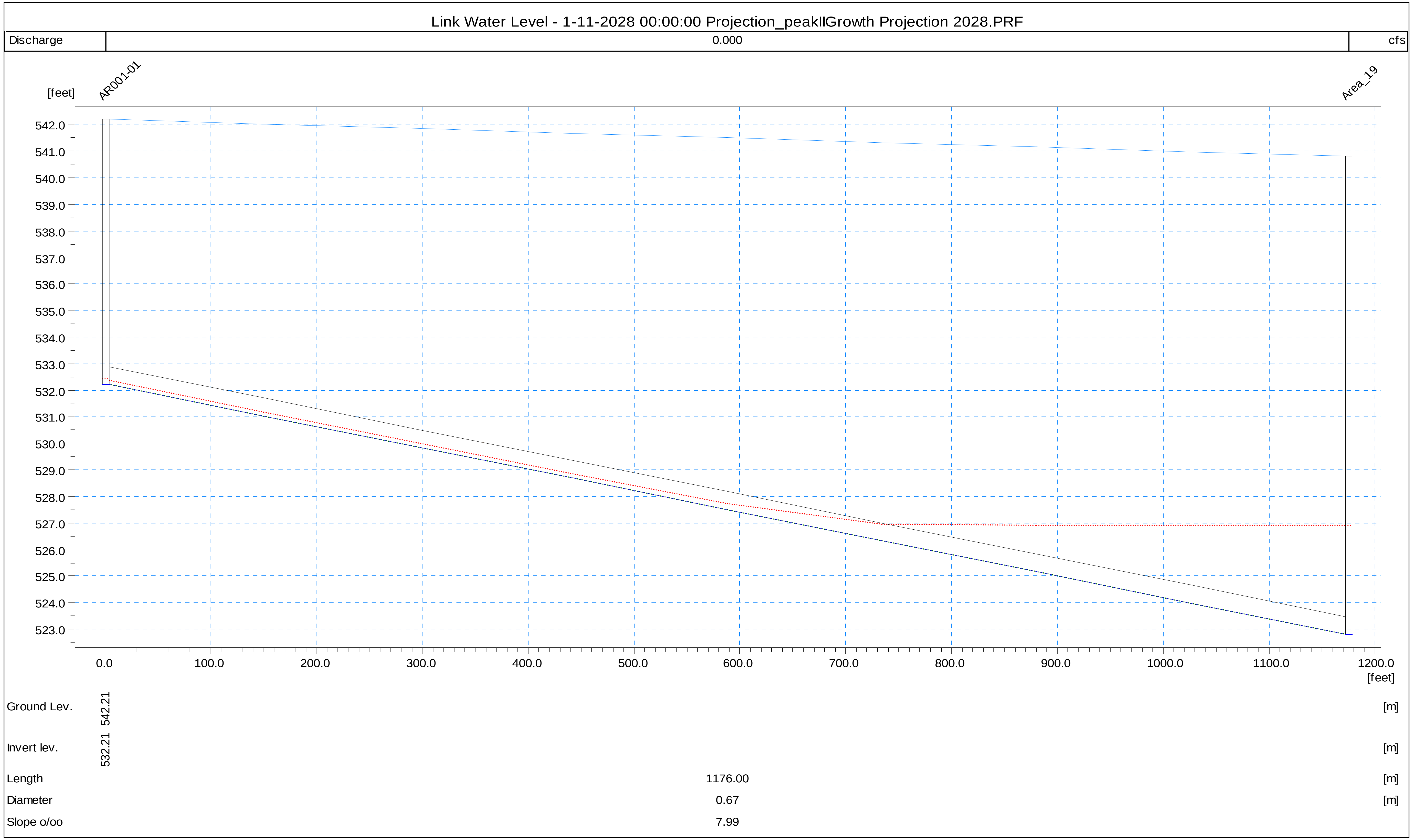
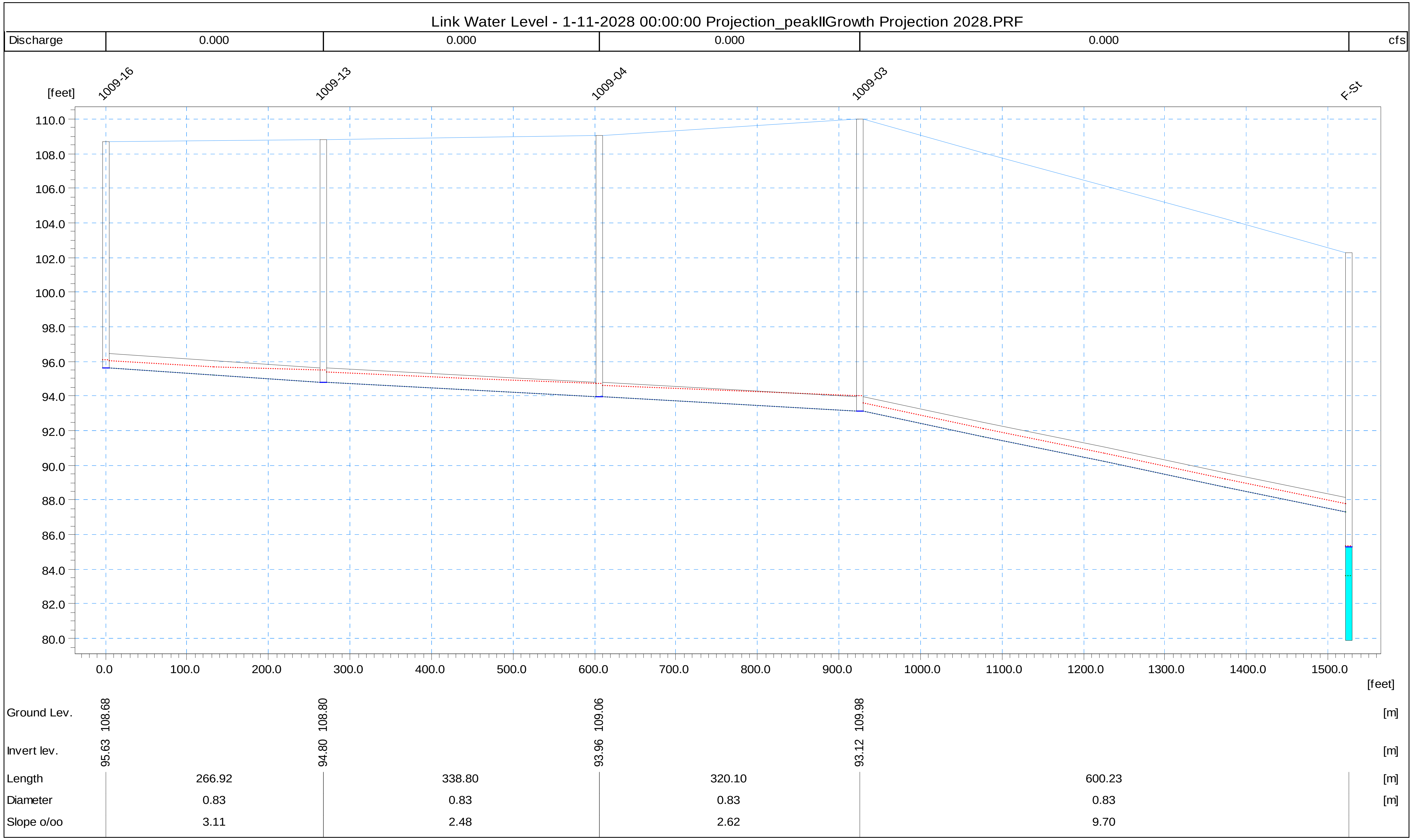

Link Water Level - 1-11-2028 00:00:00 Projection_peakIIGrowth Projection 2028.PRF
Discharge
0.000
cfs
AR001-01
Area_19
[feet]
542.0
541.0
540.0
539.0
538.0
537.0
536.0
535.0
534.0
533.0
532.0
531.0
530.0
529.0
528.0
527.0
526.0
525.0
524.0
523.0
0.0
100.0
200.0
300.0
400.0
500.0
600.0
700.0
800.0
900.0
1000.0
1100.0
1200.0
[feet]
Ground Lev.
542.21
[m]
Invert lev.
532.21
[m]
Length
1176.00
[m]
Diameter
0.67
[m]
Slope o/oo
7.99

Figure 12



Link Water Level - 1-11-2028 00:00:00 Projection_peakIIGrowth Projection 2028.PRF
Discharge
0.000
0.000
0.000
0.000
cfs
[feet]
1009-16
1009-13
1009-04
1009-03
F-St
110.0
108.0
106.0
104.0
102.0
100.0
98.0
96.0
94.0
92.0
90.0
88.0
86.0
84.0
82.0
80.0
0.0
100.0
200.0
300.0
400.0
500.0
600.0
700.0
800.0
900.0
1000.0
1100.0
1200.0
1300.0
1400.0
1500.0
[feet]
Ground Lev.
108.68
108.80
109.06
109.98
[m]
Invert lev.
95.63
94.80
93.96
93.12
[m]
Length
266.92
338.80
320.10
600.23
[m]
Diameter
0.83
0.83
0.83
0.83
[m]
Slope o/oo
3.11
2.48
2.62
9.70

Figure 13

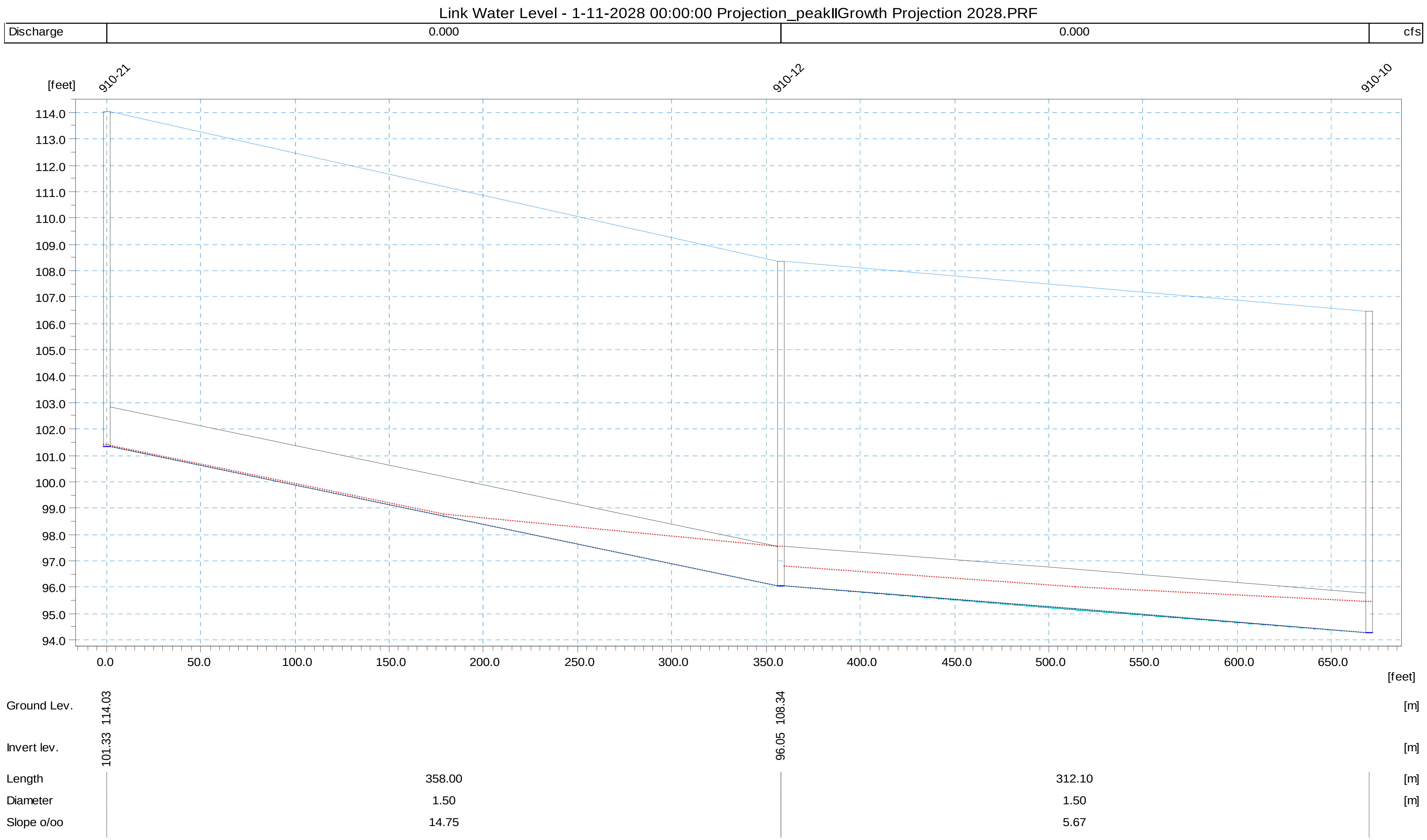
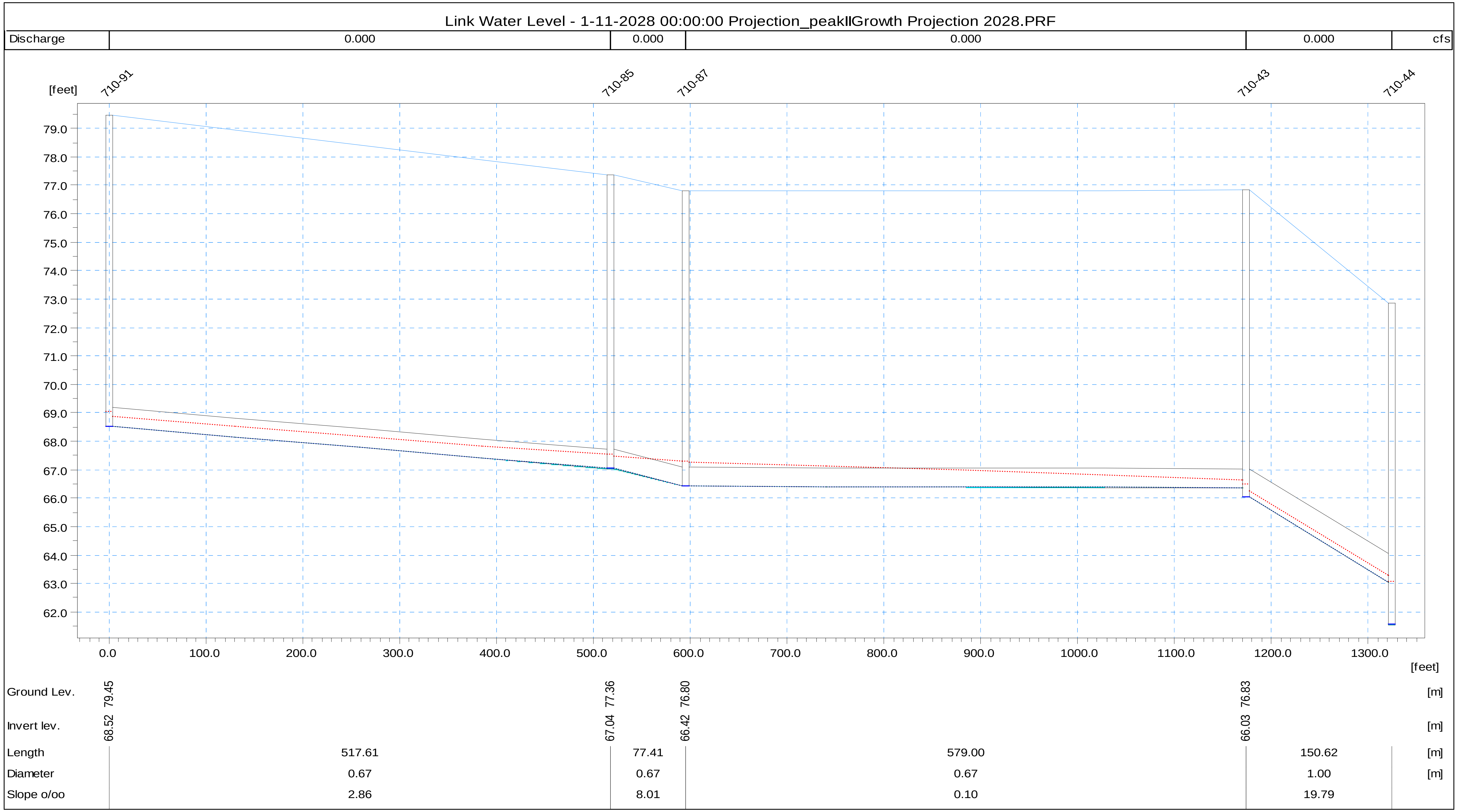
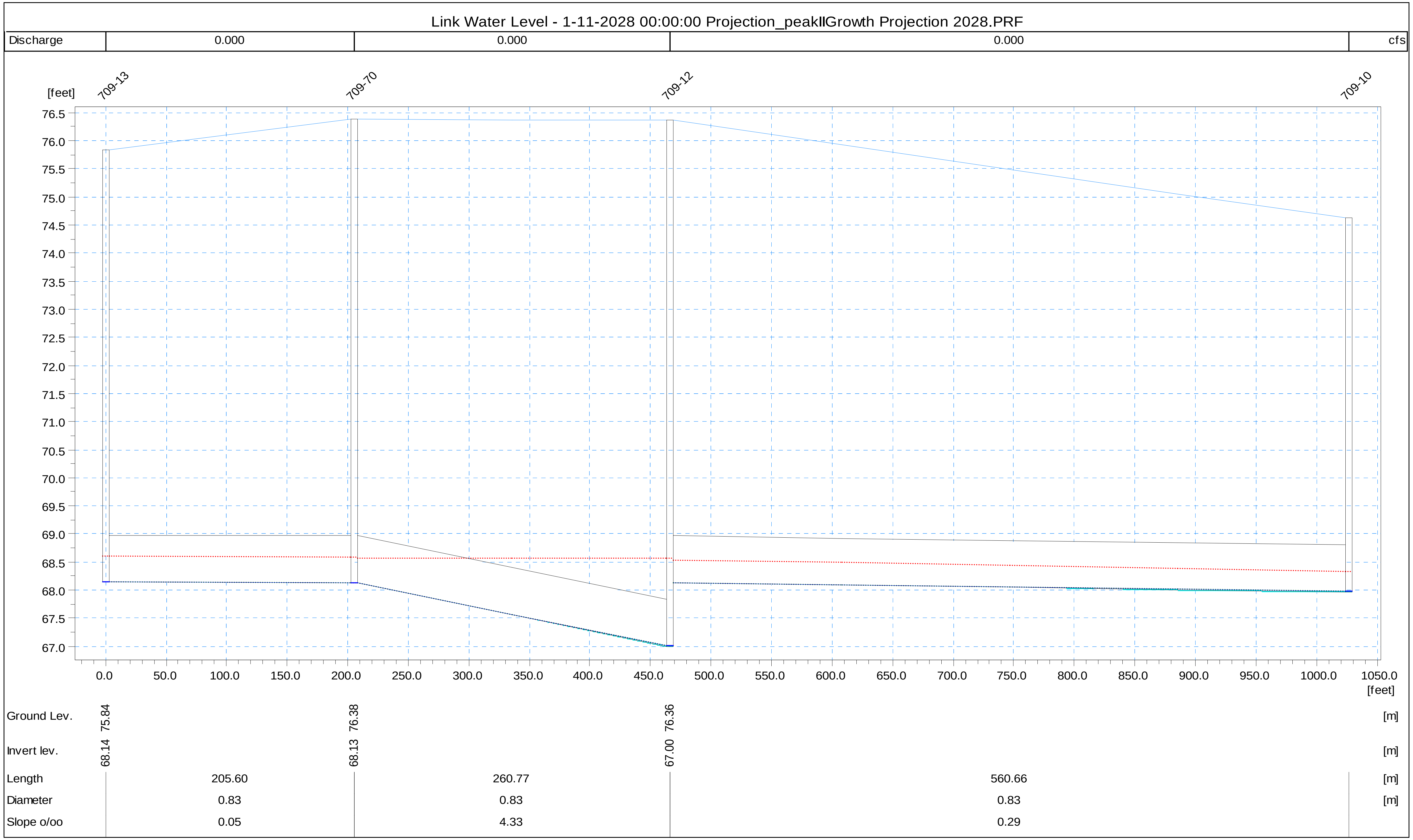

Link Water Level - 1-11-2028 00:00:00 Projection_peakIIGrowth Projection 2028.PRF
Discharge
0.000
0.000
cfs
[feet]
910-21
910-12
910-10
114.0
113.0
112.0
111.0
110.0
109.0
108.0
107.0
106.0
105.0
104.0
103.0
102.0
101.0
100.0
99.0
98.0
97.0
96.0
95.0
94.0
0.0
50.0
100.0
150.0
200.0
250.0
300.0
350.0
400.0
450.0
500.0
550.0
600.0
650.0
[feet]
Ground Lev.
114.03
108.34
[m]
Invert lev.
101.33
96.05
[m]
Length
358.00
312.10
[m]
Diameter
1.50
1.50
[m]
Slope o/oo
14.75
5.67

Figure 14



Link Water Level - 1-11-2028 00:00:00 Projection_peakIIGrowth Projection 2028.PRF
Discharge
0.000
0.000
0.000
0.000
cfs
[feet]
710-91
710-85
710-87
710-43
710-44
79.0
78.0
77.0
76.0
75.0
74.0
73.0
72.0
71.0
70.0
69.0
68.0
67.0
66.0
65.0
64.0
63.0
62.0
0.0
100.0
200.0
300.0
400.0
500.0
600.0
700.0
800.0
900.0
1000.0
1100.0
1200.0
1300.0
[feet]
Ground Lev.
79.45
77.36
76.80
76.83
[m]
Invert lev.
68.52
67.04
66.42
66.03
[m]
Length
517.61
77.41
579.00
150.62
[m]
Diameter
0.67
0.67
0.67
1.00
[m]
Slope o/oo
2.86
8.01
0.10
19.79

Figure 15



Link Water Level - 1-11-2028 00:00:00 Projection_peakIIGrowth Projection 2028.PRF
Discharge
0.000
0.000
0.000
cfs
709-13
709-70
709-12
709-10
[feet]
76.5
76.0
75.5
75.0
74.5
74.0
73.5
73.0
72.5
72.0
71.5
71.0
70.5
70.0
69.5
69.0
68.5
68.0
67.5
67.0
0.0
50.0
100.0
150.0
200.0
250.0
300.0
350.0
400.0
450.0
500.0
550.0
600.0
650.0
700.0
750.0
800.0
850.0
900.0
950.0
1000.0
1050.0
[feet]
Ground Lev.
75.84
76.38
76.36
[m]
Invert lev.
68.14
68.13
67.00
[m]
Length
205.60
260.77
560.66
[m]
Diameter
0.83
0.83
0.83
[m]
Slope o/oo
0.05
4.33
0.29

Figure 16

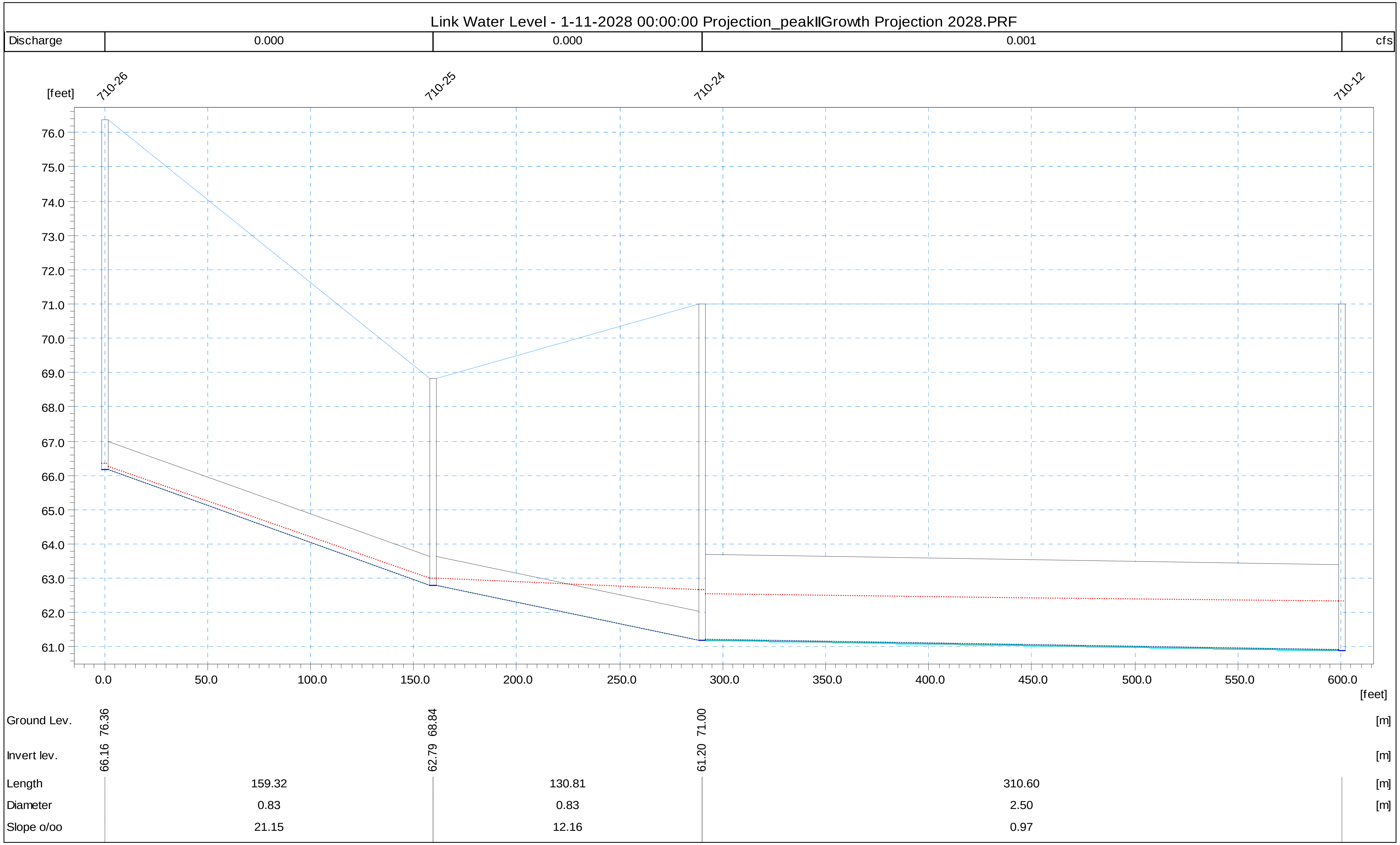
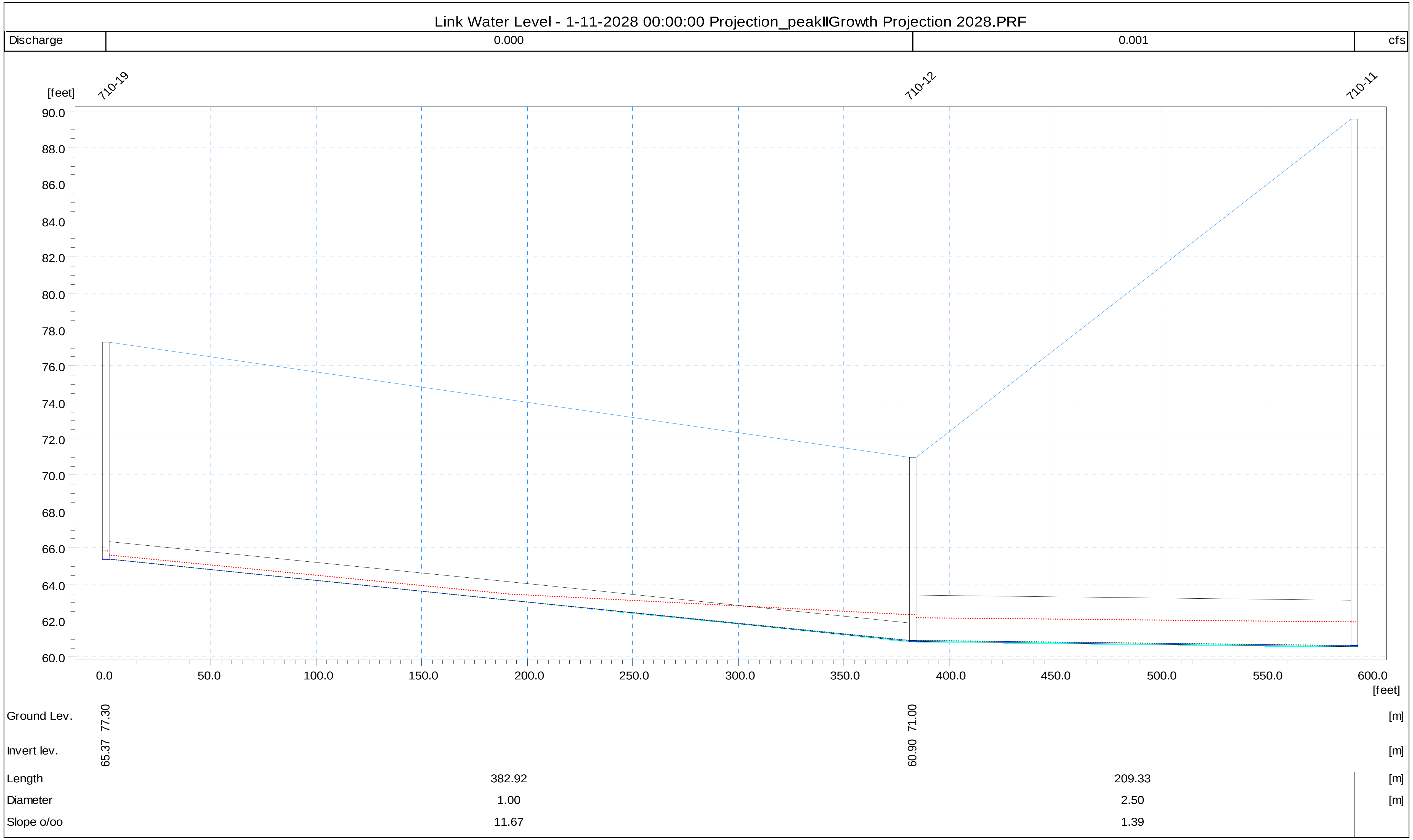

Link Water Level - 1-11-2028 00:00:00 Projection_peakIIGrowth Projection 2028.PRF
Discharge
0.000
0.000
0.001
cfs
[feet]
710-26
710-25
710-24
710-12
76.0
75.0
74.0
73.0
72.0
71.0
70.0
69.0
68.0
67.0
66.0
65.0
64.0
63.0
62.0
61.0
0.0
50.0
100.0
150.0
200.0
250.0
300.0
350.0
400.0
450.0
500.0
550.0
600.0
[feet]
Ground Lev.
76.36
68.84
71.00
[m]
Invert lev.
66.16
62.79
61.20
[m]
Length
159.32
130.81
310.60
[m]
Diameter
0.83
0.83
2.50
[m]
Slope o/oo
21.15
12.16
0.97

Figure 17



Link Water Level - 1-11-2028 00:00:00 Projection_peakIIGrowth Projection 2028.PRF
Discharge
0.000
0.001
cfs
[feet]
710-19
710-12
710-11
90.0
88.0
86.0
84.0
82.0
80.0
78.0
76.0
74.0
72.0
70.0
68.0
66.0
64.0
62.0
60.0
0.0
50.0
100.0
150.0
200.0
250.0
300.0
350.0
400.0
450.0
500.0
550.0
600.0
[feet]
Ground Lev.
77.30
71.00
[m]
Invert lev.
65.37
60.90
[m]
Length
382.92
209.33
[m]
Diameter
1.00
2.50
[m]
Slope o/oo
11.67
1.39

Figure 18

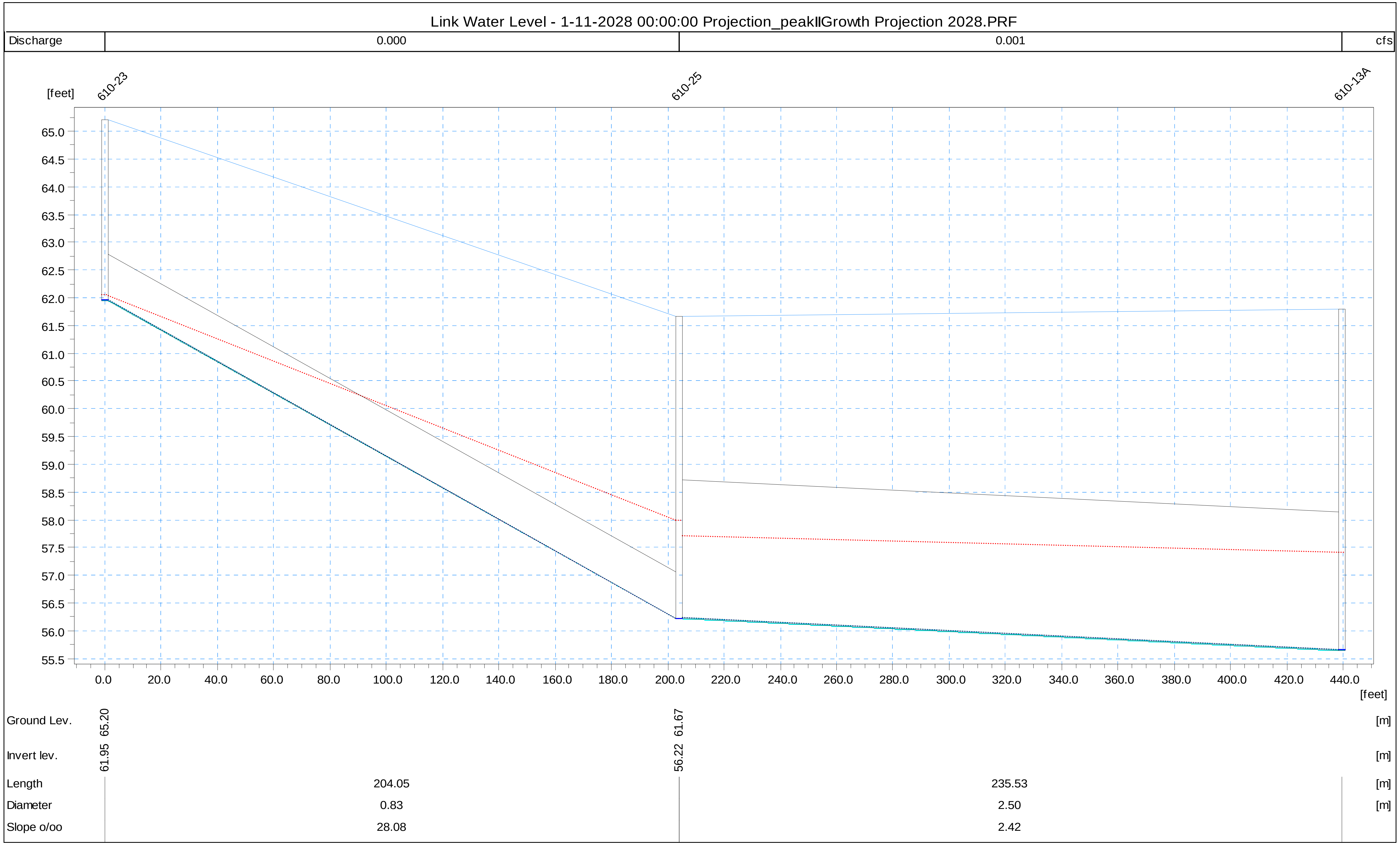

Link Water Level - 1-11-2028 00:00:00 Projection_peakIIGrowth Projection 2028.PRF
Discharge
0.000
0.001
cfs
610-23
610-25
610-13A
[feet]
65.0
64.5
64.0
63.5
63.0
62.5
62.0
61.5
61.0
60.5
60.0
59.5
59.0
58.5
58.0
57.5
57.0
56.5
56.0
55.5
0.0 20.0 40.0 60.0 80.0 100.0 120.0 140.0 160.0 180.0 200.0 220.0 240.0 260.0 280.0 300.0 320.0 340.0 360.0 380.0 400.0 420.0 440.0
[feet]
Ground Lev. 65.20 61.67 [m]
Invert lev. 61.95 56.22 [m]
Length 204.05 235.53 [m]
Diameter 0.83 2.50 [m]
Slope o/oo 28.08 2.42

Figure 19

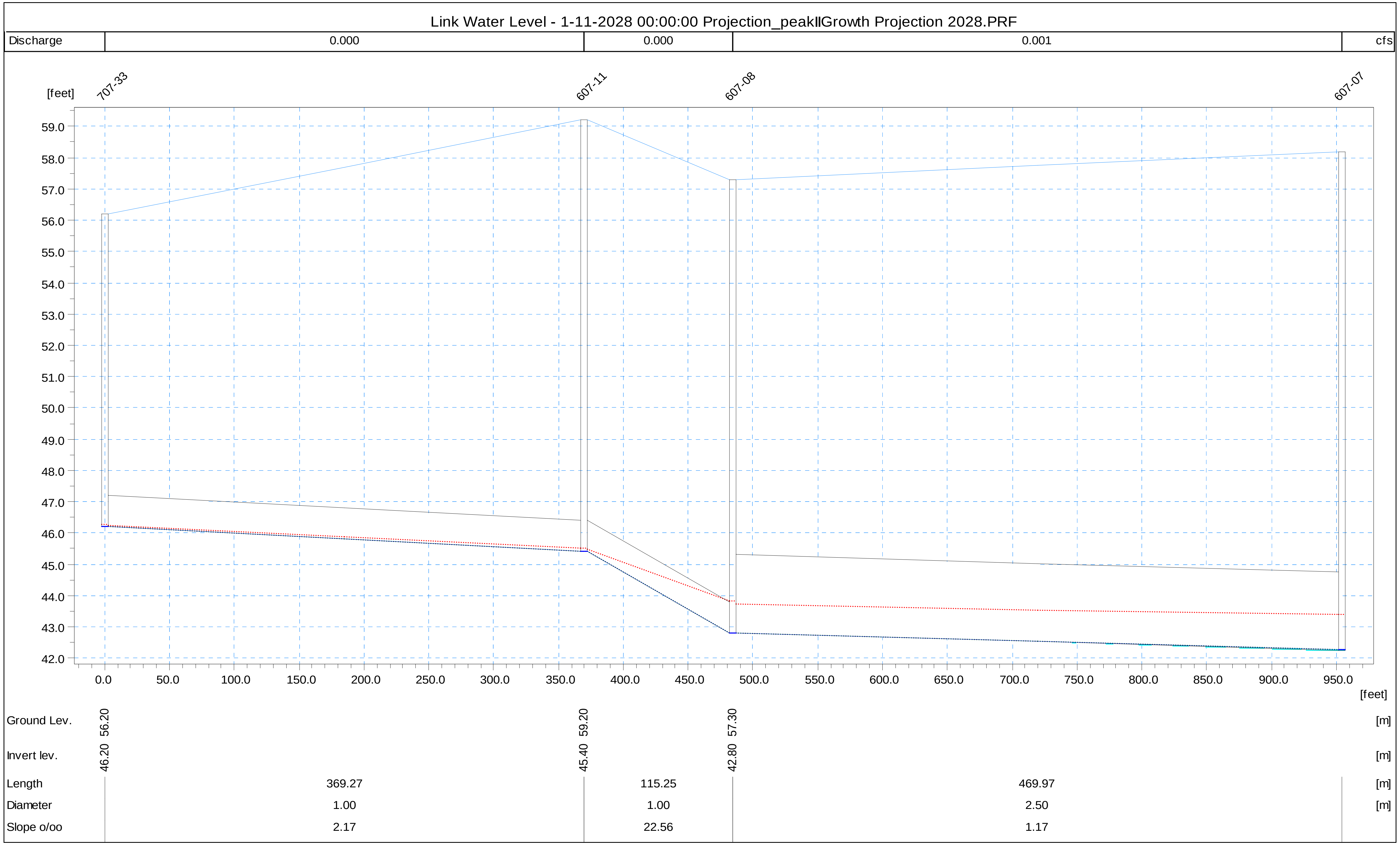
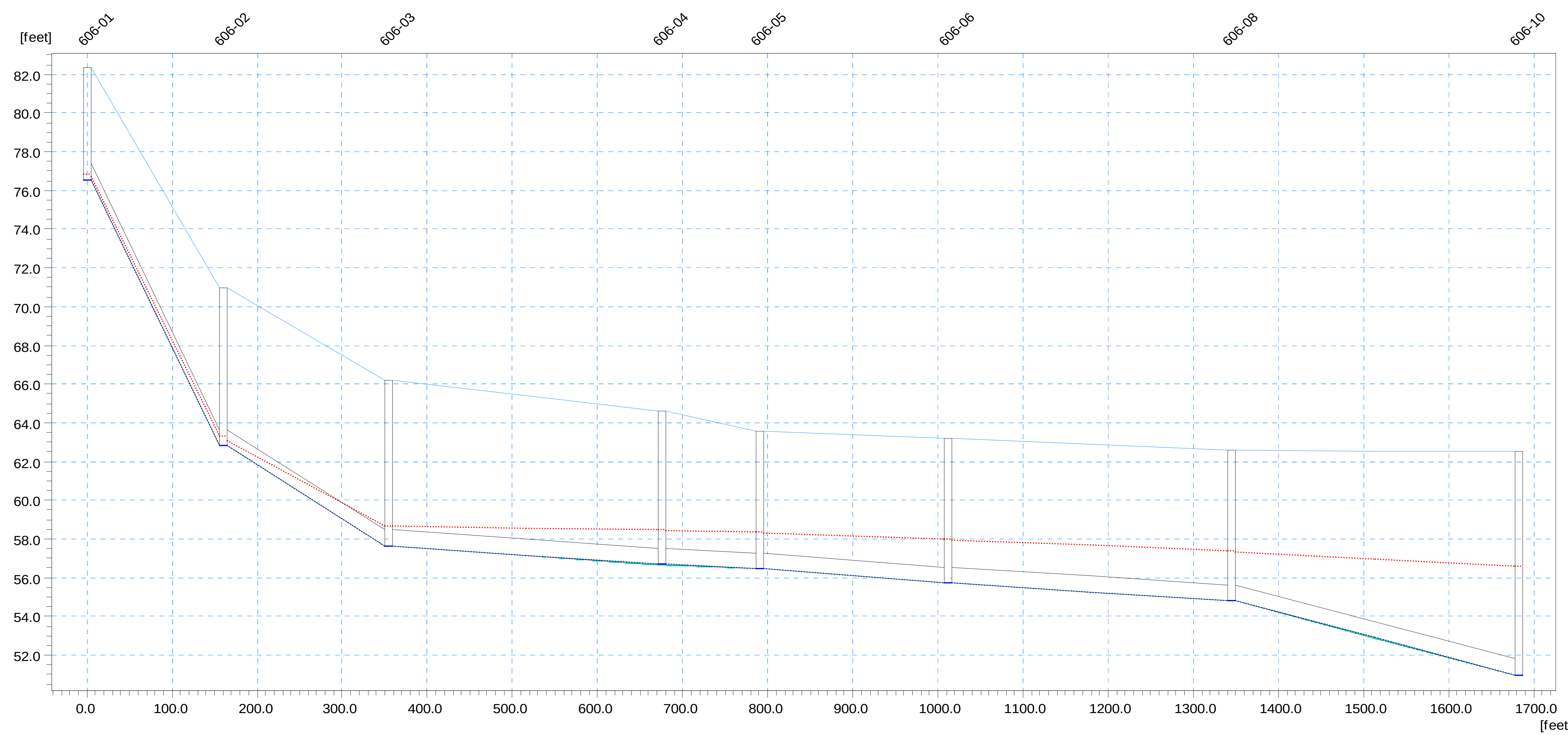

Link Water Level - 1-11-2028 00:00:00 Projection_peakIIGrowth Projection 2028.PRF
Discharge
0.000
0.000
0.001
cfs
707-33
607-11
607-08
607-07
[feet]
59.0
58.0
57.0
56.0
55.0
54.0
53.0
52.0
51.0
50.0
49.0
48.0
47.0
46.0
45.0
44.0
43.0
42.0
0.0
50.0
100.0
150.0
200.0
250.0
300.0
350.0
400.0
450.0
500.0
550.0
600.0
650.0
700.0
750.0
800.0
850.0
900.0
950.0
[feet]
Ground Lev.
56.20
59.20
57.30
[m]
Invert lev.
46.20
45.40
42.80
[m]
Length
369.27
115.25
469.97
[m]
Diameter
1.00
1.00
2.50
[m]
Slope o/oo
2.17
22.56
1.17

Figure 20

Link Water Level - 1-11-2028 00:00:00 Projection_peakIIGrowth Projection 2028.PRF

Discharge	0.000	0.000	0.000	0.000	0.000	0.000	0.000	cfs



	606-01	606-02	606-03	606-04	606-05	606-06	606-08	606-10	
Ground Lev.	82.33	70.98	66.22	64.62	63.54	63.18	62.59		[m]
Invert lev.	76.54	62.82	57.65	56.68	56.44	55.71	54.79		[m]

Length	160.80	194.00	321.16	114.90	221.56	333.20	337.49	[m]
Diameter	0.83	0.83	0.83	0.83	0.83	0.83	0.83	[m]
Slope o/oo	85.32	26.65	3.02	2.09	3.29	2.76	11.29	

Figure 21

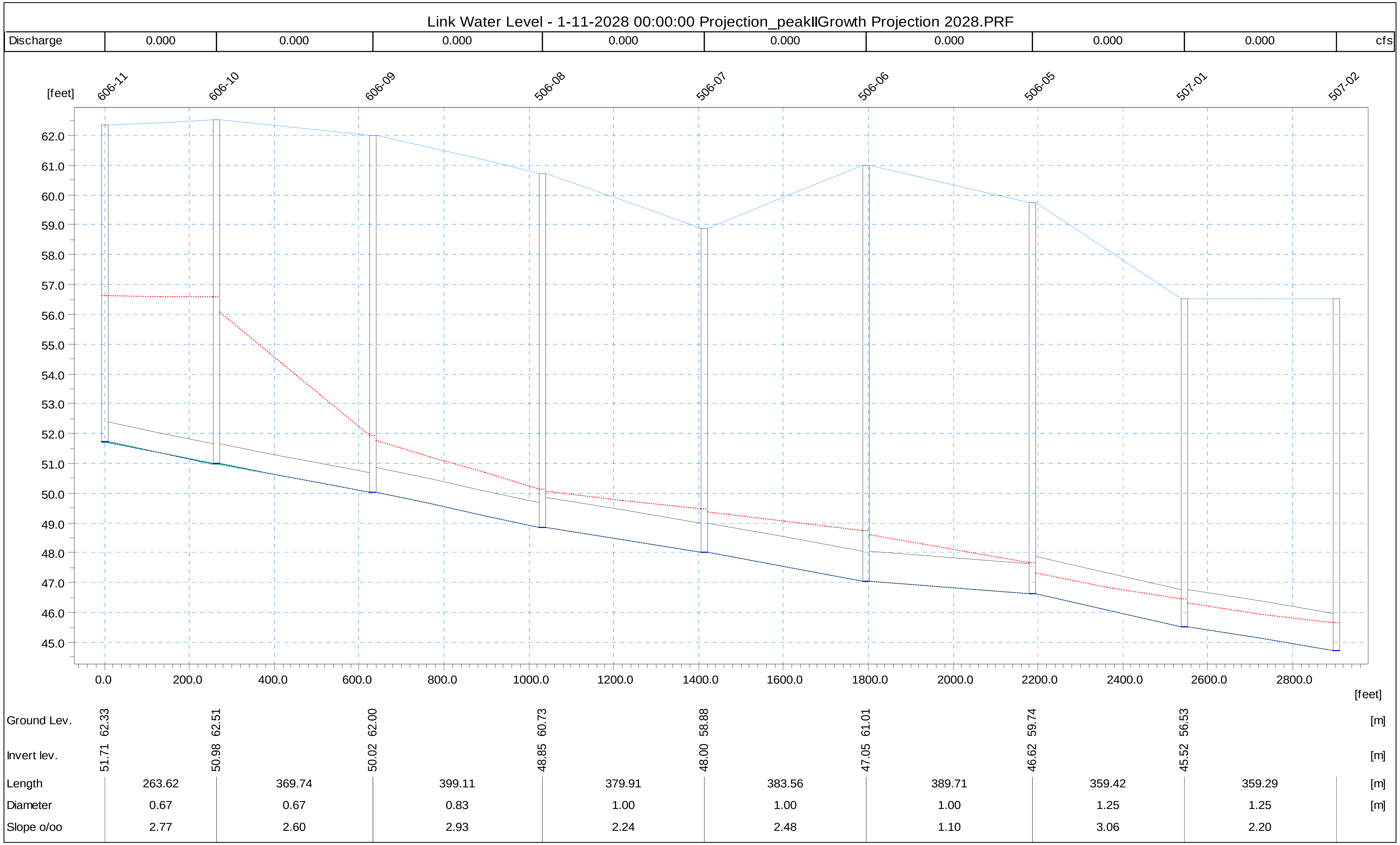

Link Water Level - 1-11-2028 00:00:00 Projection_peakIIGrowth Projection 2028.PRF
Discharge 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 cfs
[feet]
606-11
606-10
606-09
506-08
506-07
506-06
506-05
507-01
507-02
62.0
61.0
60.0
59.0
58.0
57.0
56.0
55.0
54.0
53.0
52.0
51.0
50.0
49.0
48.0
47.0
46.0
45.0
0.0 200.0 400.0 600.0 800.0 1000.0 1200.0 1400.0 1600.0 1800.0 2000.0 2200.0 2400.0 2600.0 2800.0
[feet]
Ground Lev. 62.33 62.51 62.00 60.73 58.88 61.01 59.74 56.53 [m]
Invert lev. 51.71 50.98 50.02 48.85 48.00 47.05 46.62 45.52 [m]
Length 263.62 369.74 399.11 379.91 383.56 389.71 359.42 359.29 [m]
Diameter 0.67 0.67 0.83 1.00 1.00 1.00 1.25 1.25 [m]
Slope o/oo 2.77 2.60 2.93 2.24 2.48 1.10 3.06 2.20

Figure 22

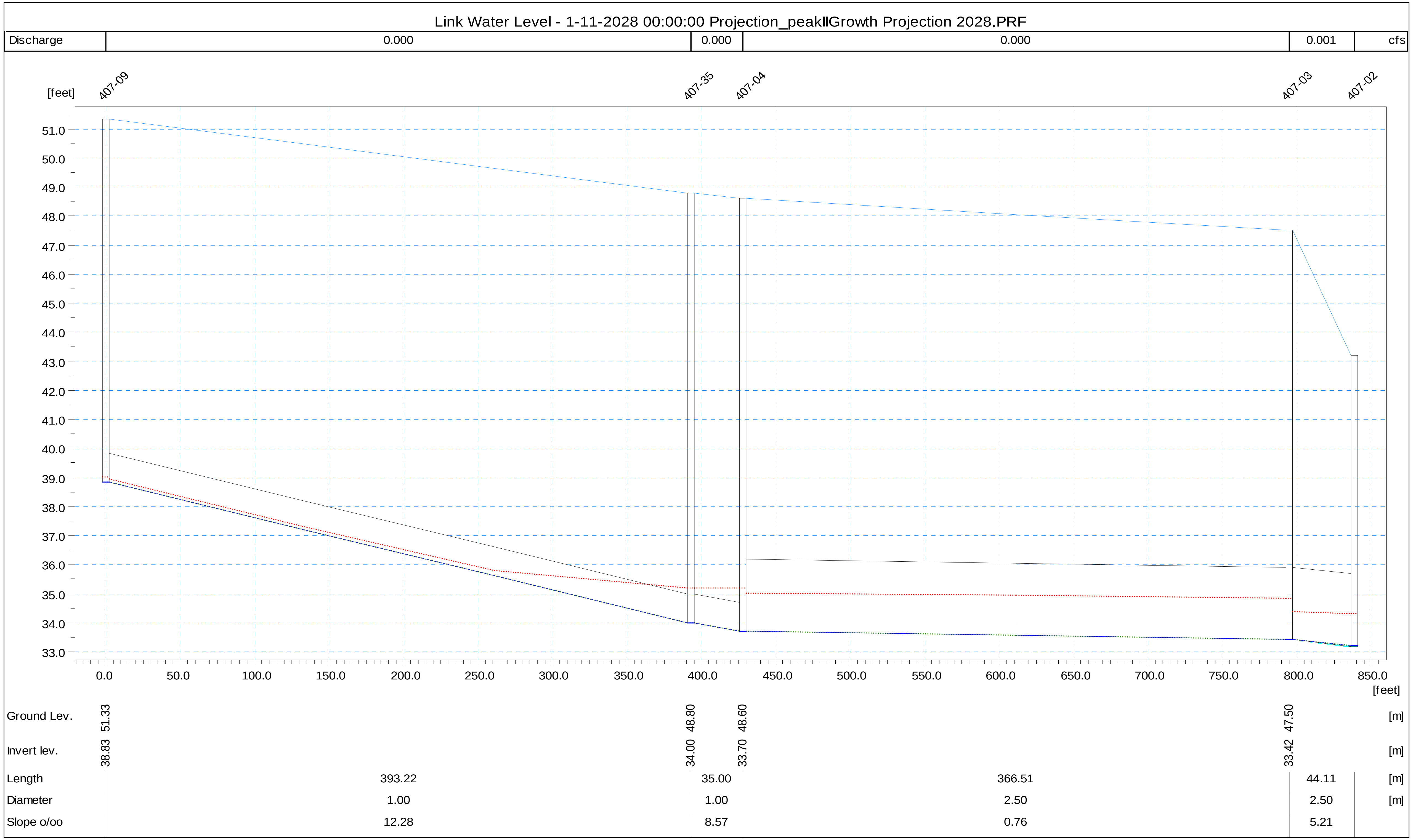

Link Water Level - 1-11-2028 00:00:00 Projection_peakIIGrowth Projection 2028.PRF
Discharge
0.000
0.000
0.000
0.001
cfs
[feet]
407-09
407-35
407-04
407-03
407-02
51.0
50.0
49.0
48.0
47.0
46.0
45.0
44.0
43.0
42.0
41.0
40.0
39.0
38.0
37.0
36.0
35.0
34.0
33.0
0.0
50.0
100.0
150.0
200.0
250.0
300.0
350.0
400.0
450.0
500.0
550.0
600.0
650.0
700.0
750.0
800.0
850.0
[feet]
Ground Lev.
51.33
48.80
48.60
47.50
[m]
Invert lev.
38.83
34.00
33.70
33.42
[m]
Length
393.22
35.00
366.51
44.11
[m]
Diameter
1.00
1.00
2.50
2.50
[m]
Slope o/oo
12.28
8.57
0.76
5.21

Figure 23

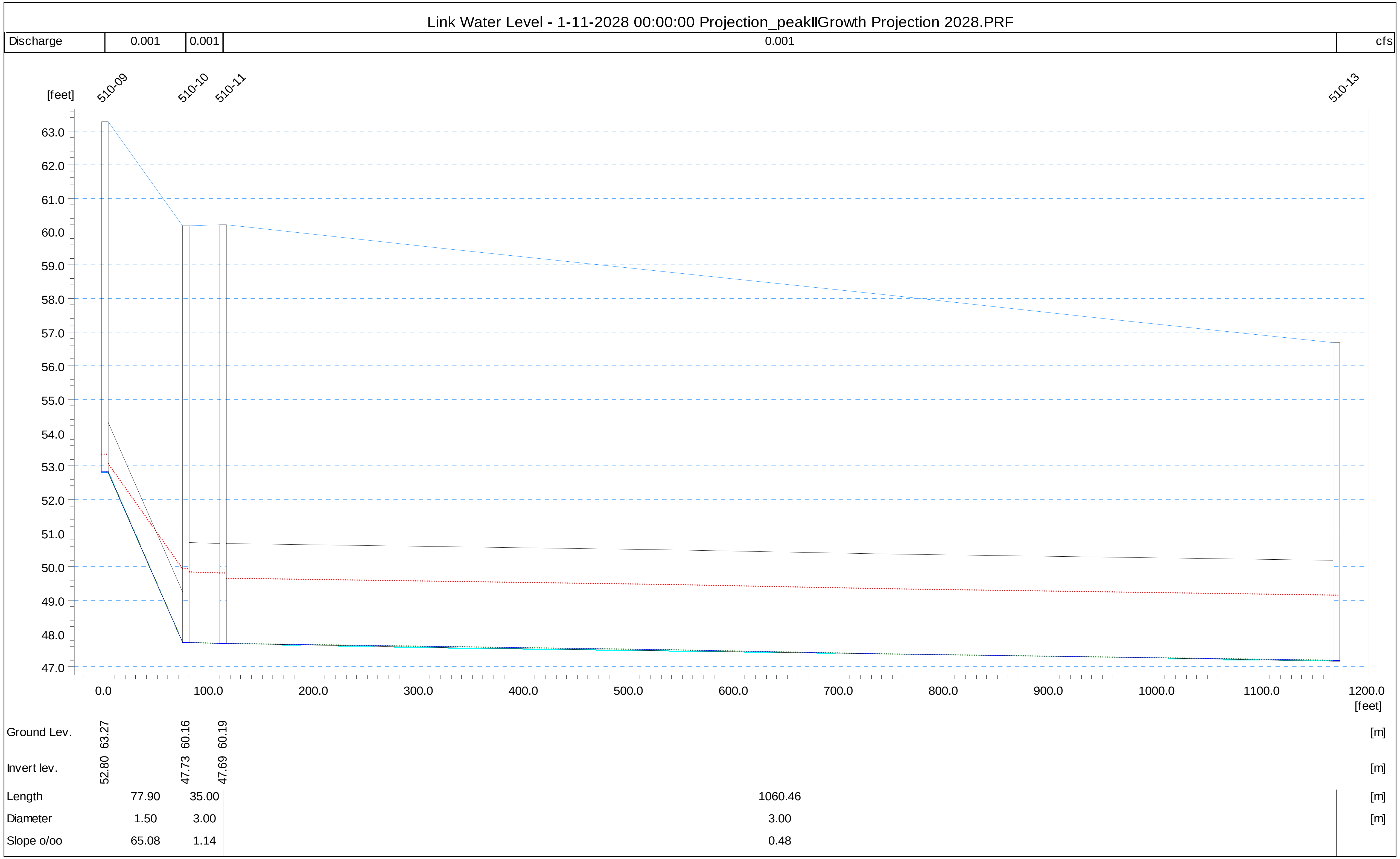

Link Water Level - 1-11-2028 00:00:00 Projection_peakIIGrowth Projection 2028.PRF
Discharge
0.001
0.001
0.001
cfs
[feet]
510-09
510-10
510-11
510-13
63.0
62.0
61.0
60.0
59.0
58.0
57.0
56.0
55.0
54.0
53.0
52.0
51.0
50.0
49.0
48.0
47.0
0.0
100.0
200.0
300.0
400.0
500.0
600.0
700.0
800.0
900.0
1000.0
1100.0
1200.0
[feet]
Ground Lev.
63.27
60.16
60.19
[m]
Invert lev.
52.80
47.73
47.69
[m]
Length
77.90
35.00
1060.46
[m]
Diameter
1.50
3.00
3.00
[m]
Slope o/oo
65.08
1.14
0.48

Figure 24

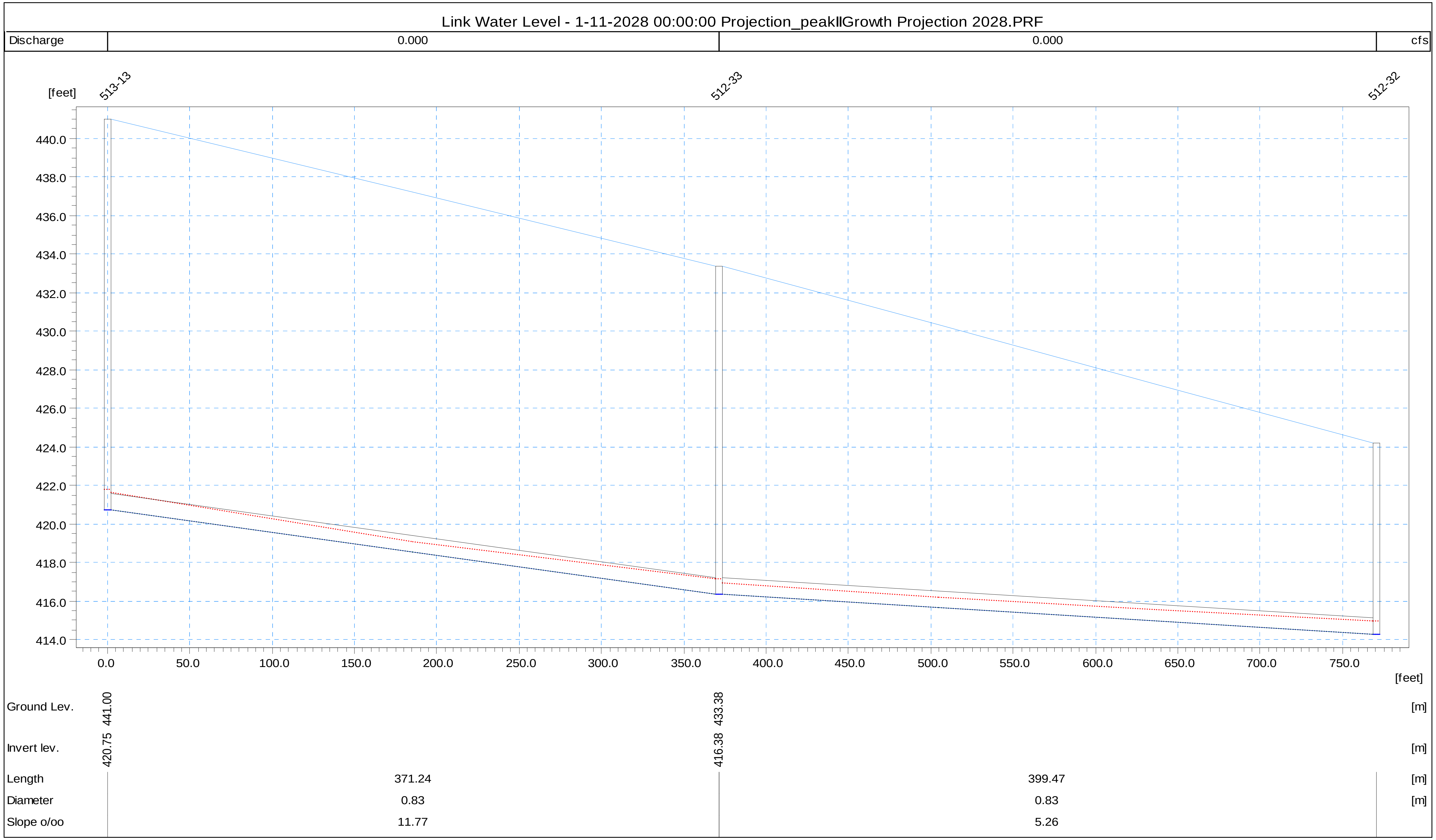

Link Water Level - 1-11-2028 00:00:00 Projection_peakIIGrowth Projection 2028.PRF
Discharge
0.000
0.000
cfs
[feet]
513-13
512-33
512-32
440.0
438.0
436.0
434.0
432.0
430.0
428.0
426.0
424.0
422.0
420.0
418.0
416.0
414.0
0.0
50.0
100.0
150.0
200.0
250.0
300.0
350.0
400.0
450.0
500.0
550.0
600.0
650.0
700.0
750.0
[feet]
Ground Lev.
441.00
433.38
[m]
Invert lev.
420.75
416.38
[m]
Length
371.24
399.47
[m]
Diameter
0.83
0.83
[m]
Slope o/oo
11.77
5.26

Figure 25

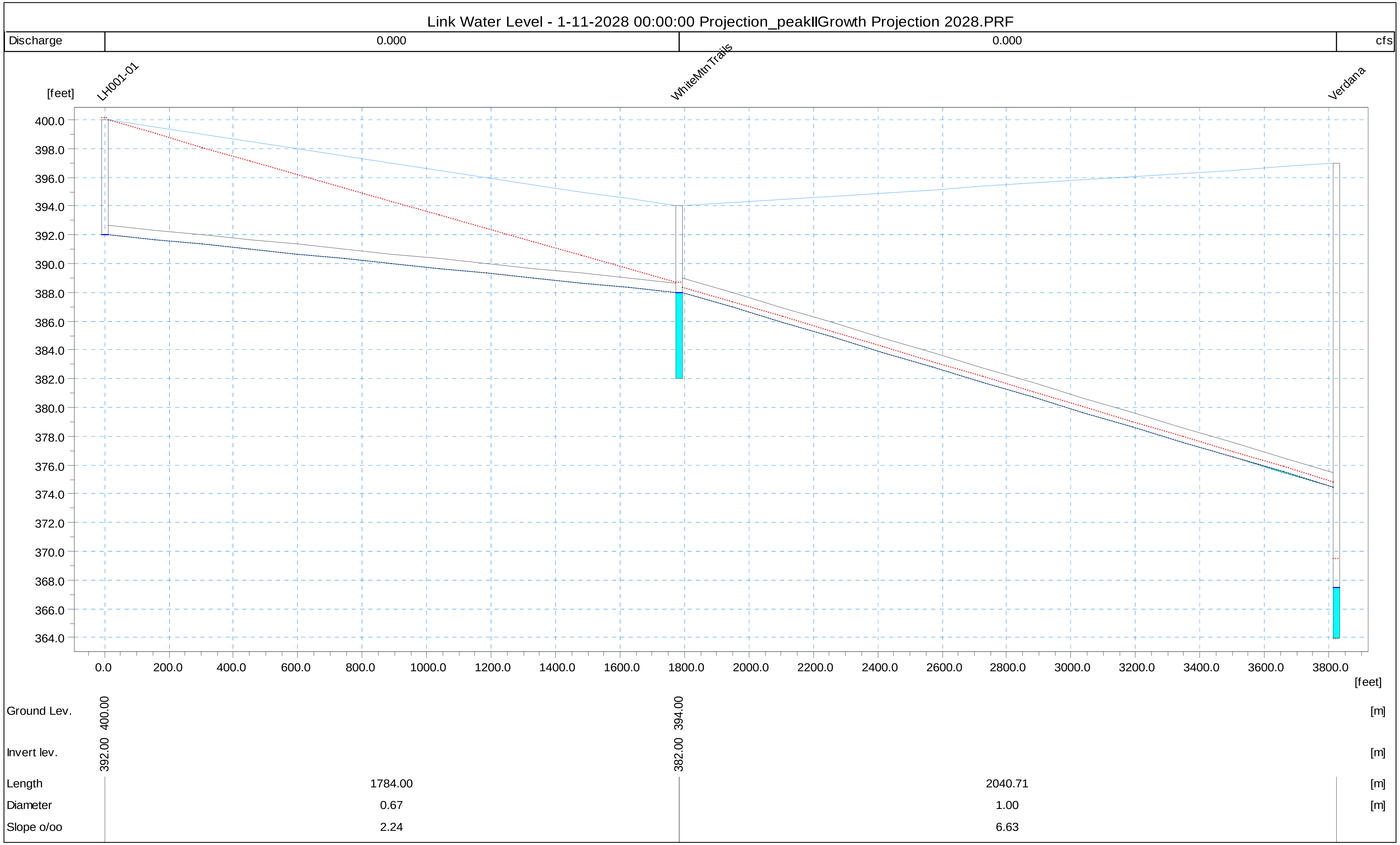

Link Water Level - 1-11-2028 00:00:00 Projection_peakIIGrowth Projection 2028.PRF
Discharge
0.000
0.000
cfs
LH001-01
WhiteMtnTrails
Verdana
[feet]
400.0
398.0
396.0
394.0
392.0
390.0
388.0
386.0
384.0
382.0
380.0
378.0
376.0
374.0
372.0
370.0
368.0
366.0
364.0
0.0
200.0
400.0
600.0
800.0
1000.0
1200.0
1400.0
1600.0
1800.0
2000.0
2200.0
2400.0
2600.0
2800.0
3000.0
3200.0
3400.0
3600.0
3800.0
[feet]
Ground Lev.
400.00
394.00
[m]
Invert lev.
392.00
382.00
[m]
Length
1784.00
2040.71
[m]
Diameter
0.67
1.00
[m]
Slope o/oo
2.24
6.63

Figure 26

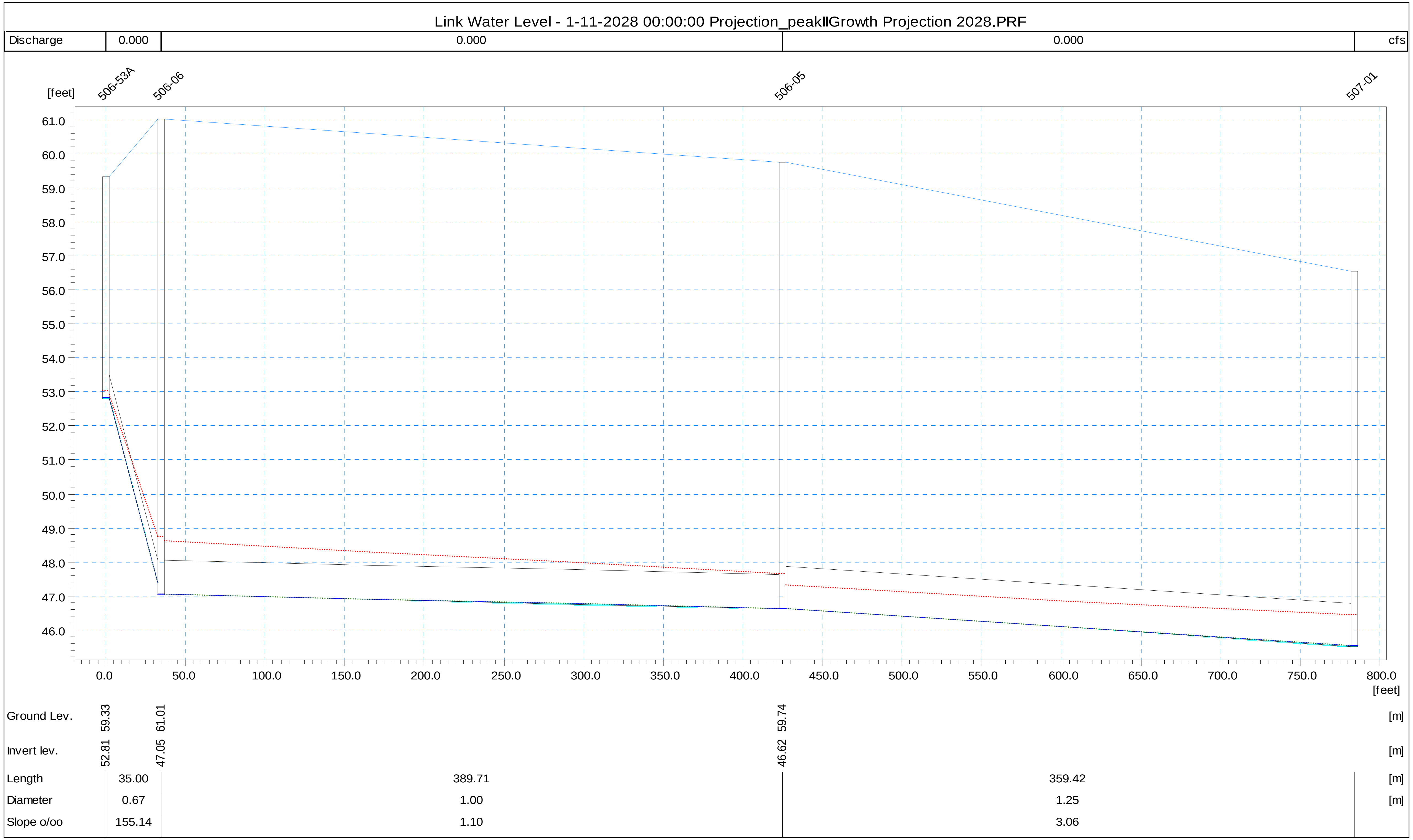

Link Water Level - 1-11-2028 00:00:00 Projection_peakIIGrowth Projection 2028.PRF
Discharge 0.000 0.000 0.000 cfs
[feet]
506-53A
506-06
506-05
507-01
61.0
60.0
59.0
58.0
57.0
56.0
55.0
54.0
53.0
52.0
51.0
50.0
49.0
48.0
47.0
46.0
0.0 50.0 100.0 150.0 200.0 250.0 300.0 350.0 400.0 450.0 500.0 550.0 600.0 650.0 700.0 750.0 800.0
[feet]
Ground Lev. 59.33 61.01 59.74 [m]
Invert lev. 52.81 47.05 46.62 [m]
Length 35.00 389.71 359.42 [m]
Diameter 0.67 1.00 1.25 [m]
Slope o/oo 155.14 1.10 3.06

Figure 27

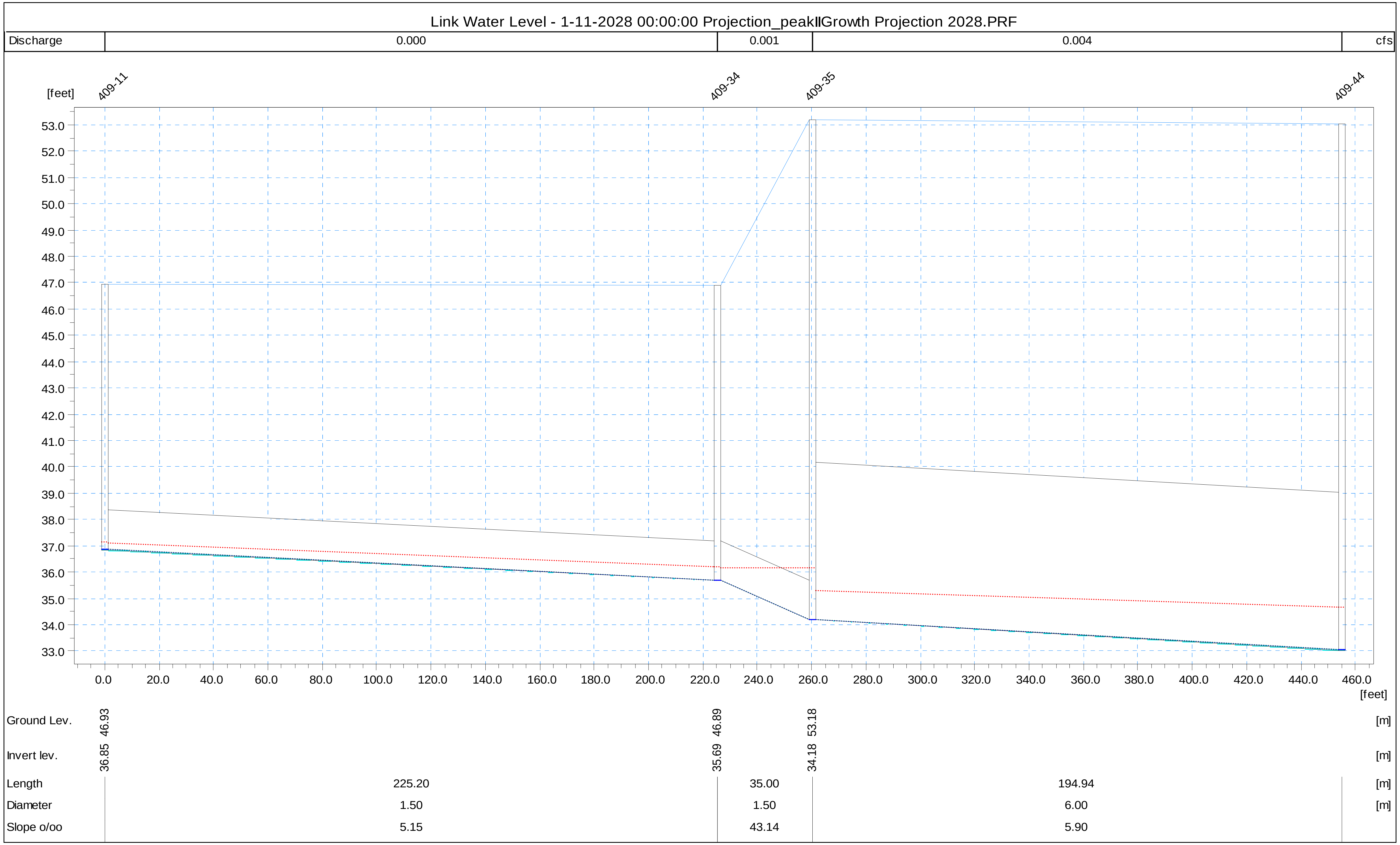

Link Water Level - 1-11-2028 00:00:00 Projection_peakIIGrowth Projection 2028.PRF
Discharge
0.000
0.001
0.004
cfs
[feet]
409-11
409-34
409-35
409-44
53.0
52.0
51.0
50.0
49.0
48.0
47.0
46.0
45.0
44.0
43.0
42.0
41.0
40.0
39.0
38.0
37.0
36.0
35.0
34.0
33.0
0.0
20.0
40.0
60.0
80.0
100.0
120.0
140.0
160.0
180.0
200.0
220.0
240.0
260.0
280.0
300.0
320.0
340.0
360.0
380.0
400.0
420.0
440.0
460.0
[feet]
Ground Lev.
46.93
46.89
53.18
[m]
Invert lev.
36.85
35.69
34.18
[m]
Length
225.20
35.00
194.94
[m]
Diameter
1.50
1.50
6.00
[m]
Slope o/oo
5.15
43.14
5.90

Figure 28

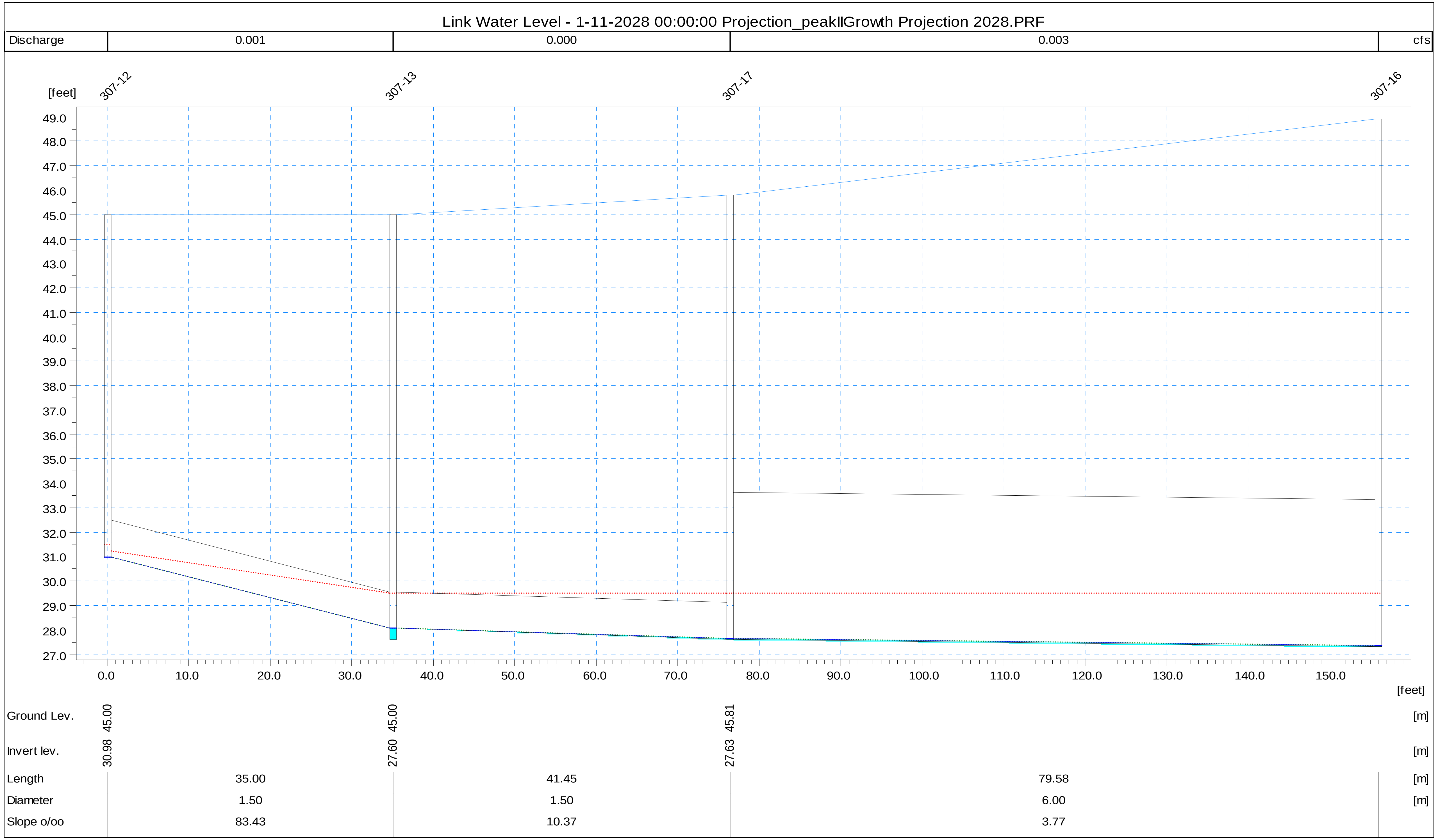

Link Water Level - 1-11-2028 00:00:00 Projection_peakIIGrowth Projection 2028.PRF
Discharge
0.001
0.000
0.003
cfs
307-12
307-13
307-17
307-16
[feet]
49.0
48.0
47.0
46.0
45.0
44.0
43.0
42.0
41.0
40.0
39.0
38.0
37.0
36.0
35.0
34.0
33.0
32.0
31.0
30.0
29.0
28.0
27.0
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
110.0
120.0
130.0
140.0
150.0
[feet]
Ground Lev.
45.00
45.00
45.81
[m]
Invert lev.
30.98
27.60
27.63
[m]
Length
35.00
41.45
79.58
[m]
Diameter
1.50
1.50
6.00
[m]
Slope o/oo
83.43
10.37
3.77

Figure 29

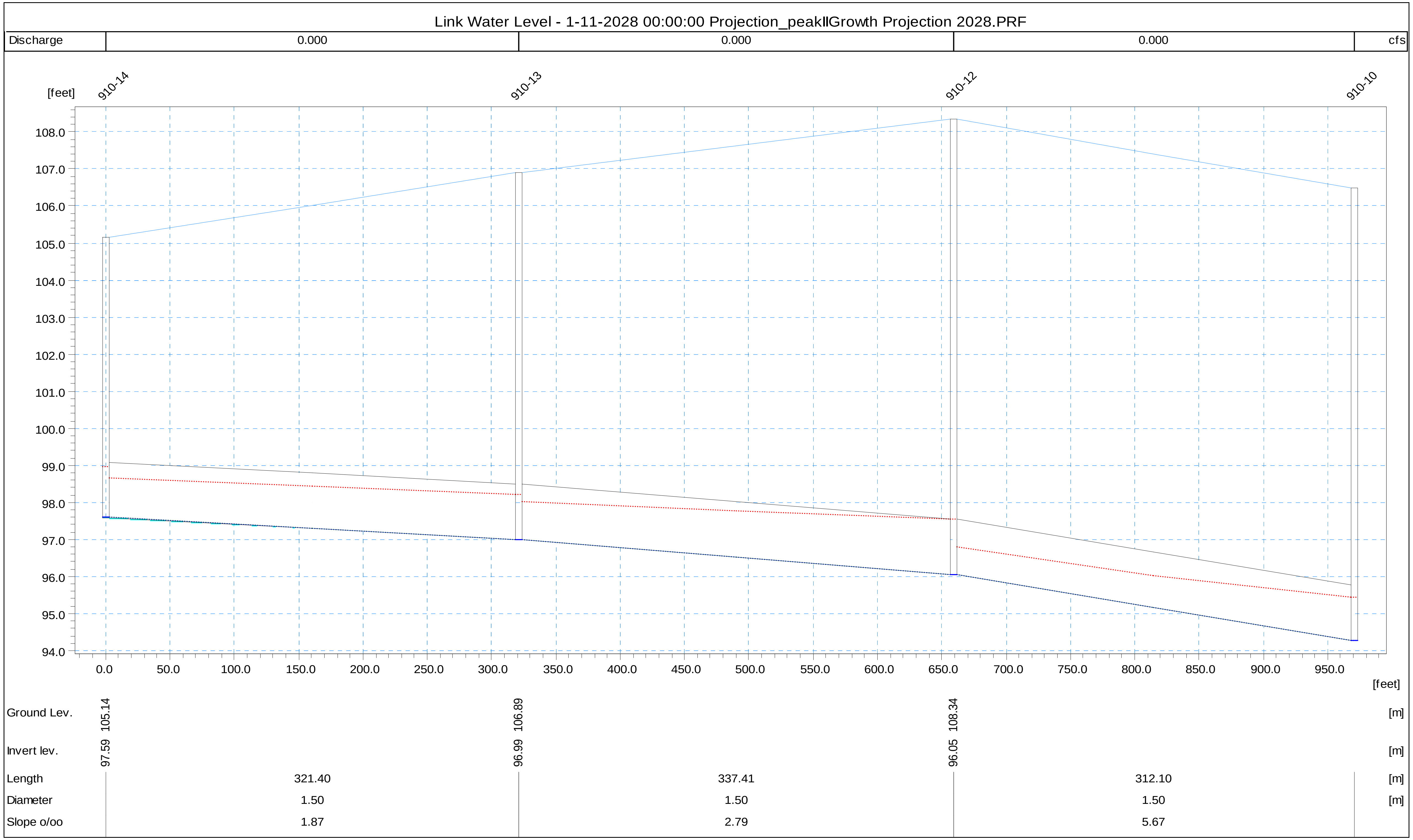

Link Water Level - 1-11-2028 00:00:00 Projection_peakIIGrowth Projection 2028.PRF
Discharge
0.000
0.000
0.000
cfs
[feet]
910-14
910-13
910-12
910-10
108.0
107.0
106.0
105.0
104.0
103.0
102.0
101.0
100.0
99.0
98.0
97.0
96.0
95.0
94.0
0.0
50.0
100.0
150.0
200.0
250.0
300.0
350.0
400.0
450.0
500.0
550.0
600.0
650.0
700.0
750.0
800.0
850.0
900.0
950.0
[feet]
Ground Lev.
105.14
106.89
108.34
[m]
Invert lev.
97.59
96.99
96.05
[m]
Length
321.40
337.41
312.10
[m]
Diameter
1.50
1.50
1.50
[m]
Slope o/oo
1.87
2.79
5.67

Figure 30

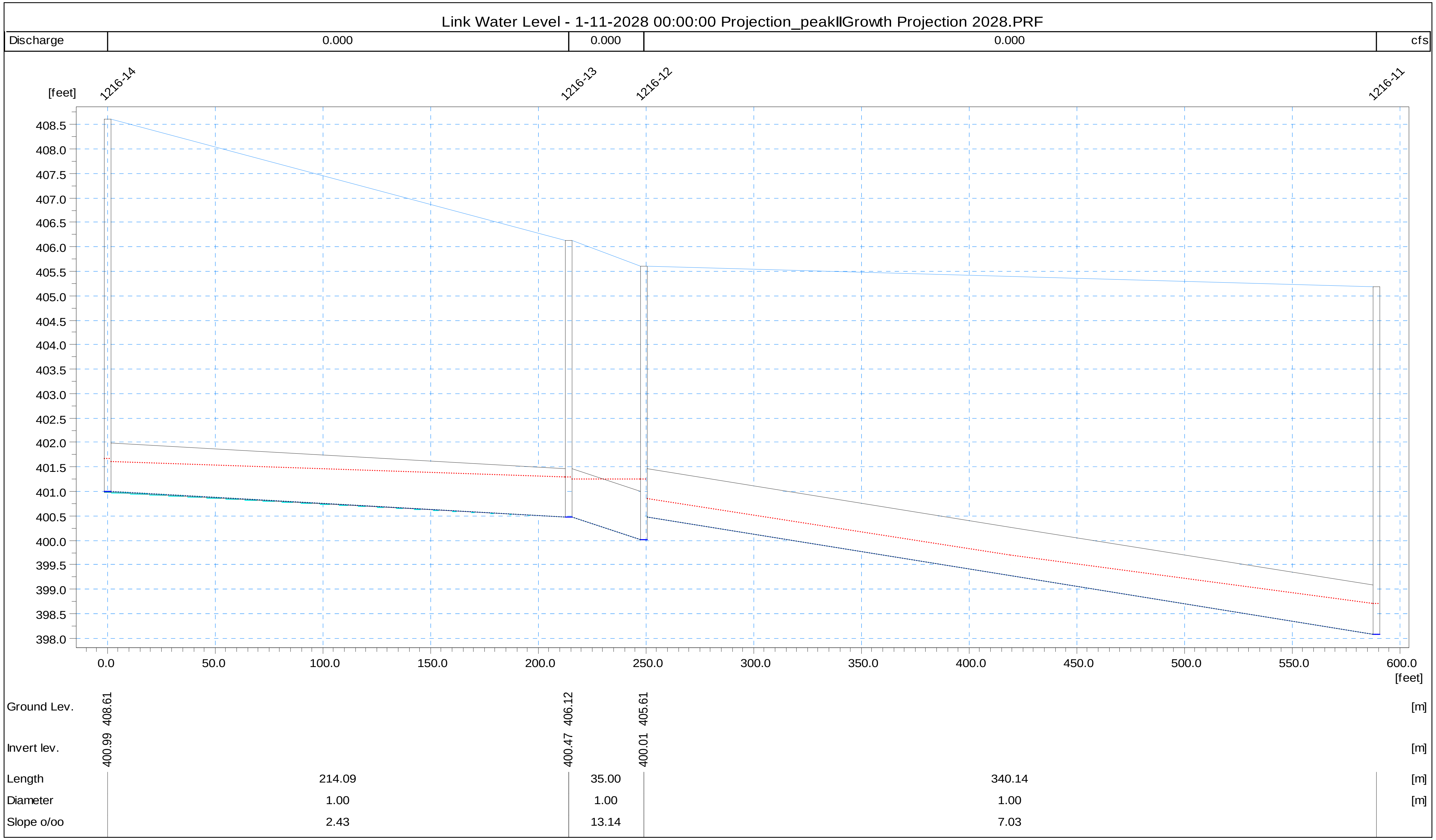

Link Water Level - 1-11-2028 00:00:00 Projection_peakIIGrowth Projection 2028.PRF
Discharge
0.000
0.000
0.000
cfs
[feet]
1216-14
1216-13
1216-12
1216-11
408.5
408.0
407.5
407.0
406.5
406.0
405.5
405.0
404.5
404.0
403.5
403.0
402.5
402.0
401.5
401.0
400.5
400.0
399.5
399.0
398.5
398.0
0.0
50.0
100.0
150.0
200.0
250.0
300.0
350.0
400.0
450.0
500.0
550.0
600.0
[feet]
Ground Lev.
408.61
406.12
405.61
[m]
Invert lev.
400.99
400.47
400.01
[m]
Length
214.09
35.00
340.14
[m]
Diameter
1.00
1.00
1.00
[m]
Slope o/oo
2.43
13.14
7.03

Figure 31

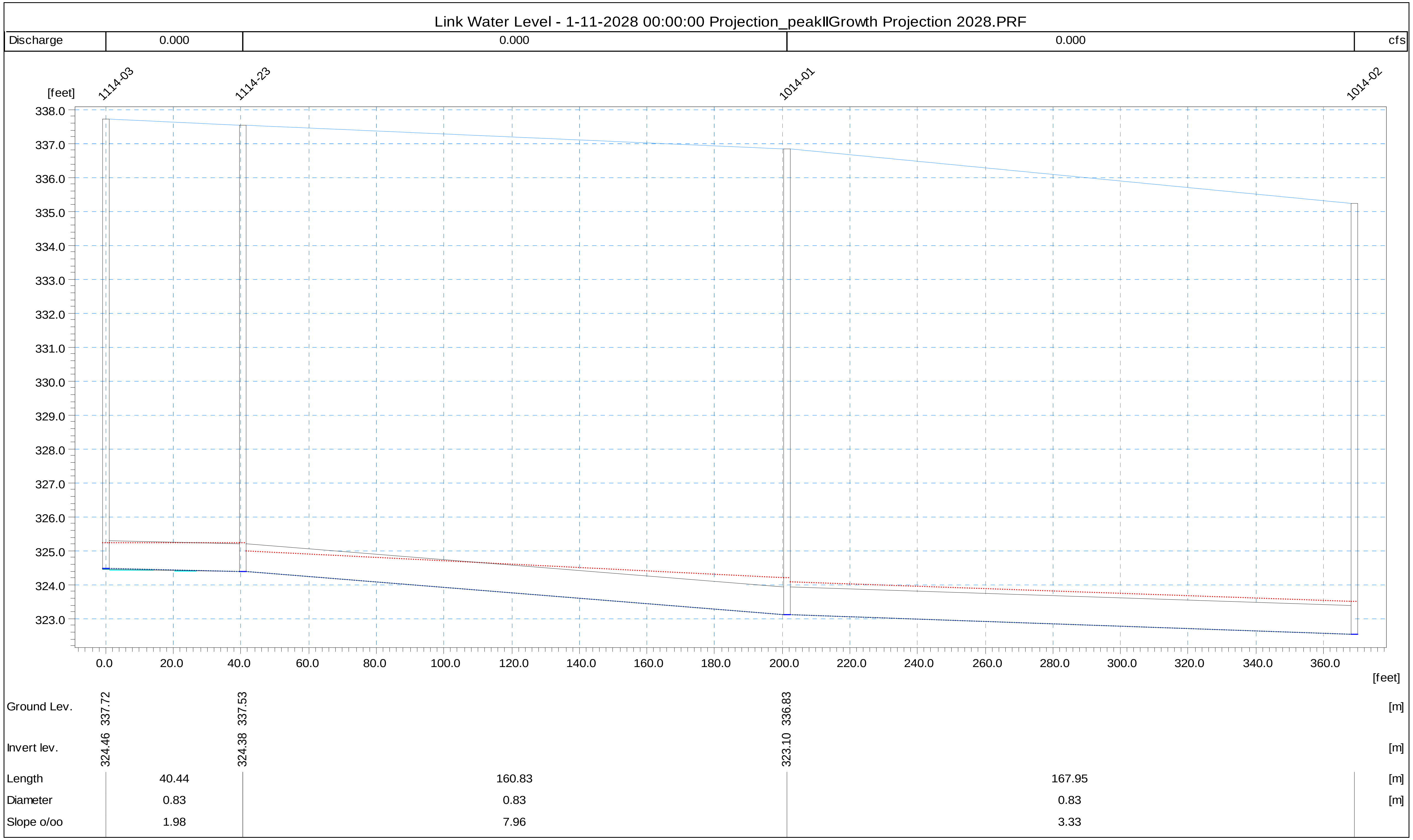

Link Water Level - 1-11-2028 00:00:00 Projection_peakIIGrowth Projection 2028.PRF
Discharge
0.000
0.000
0.000
cfs
1114-03
1114-23
1014-01
1014-02
[feet]
338.0
337.0
336.0
335.0
334.0
333.0
332.0
331.0
330.0
329.0
328.0
327.0
326.0
325.0
324.0
323.0
0.0
20.0
40.0
60.0
80.0
100.0
120.0
140.0
160.0
180.0
200.0
220.0
240.0
260.0
280.0
300.0
320.0
340.0
360.0
[feet]
Ground Lev.
337.72
337.53
336.83
[m]
Invert lev.
324.46
324.38
323.10
[m]
Length
40.44
160.83
167.95
[m]
Diameter
0.83
0.83
0.83
[m]
Slope o/oo
1.98
7.96
3.33

Figure 32

APPENDIX C- MODEL VERIFICATION

Baseflow Calibration Results

Table C.1 presents the resulting unit flowrates after calibration was completed for those minibasins containing or draining into a pump station. Following this table, the calibrated hydrographs are presented with its associated diurnal curves (**Figure C.1 to Figure C.32**)

Table C.1 DWF Unit Flowrate per Capita

Mini Sub-basin ID	Calibrated to Pump Station	Cyclic Profile ID	Cyclic Value (ft^3/PE-d) Initial	Cyclic Value (ft^3/PE-d) Calibrated
ABN001		001AllWK	10.15	10.15
ABN002		002AllWK	12.40	12.40
ABN003		003AllWK	8.81	8.81
ABN004		004AllWK	9.46	9.46
ABN006	Rainier Shadows	006AllWK	20.07	6.00
ABN008		007AllWK	6.55	6.55
ABN009		008AllWK	8.49	8.49
ABN010	22nd Street	009AllWK	10.29	20.07
ABN011	Riverside	010AllWK	15.37	9.41
ABN012	Riverside	011AllWK	12.87	15.37
ABN013	Riverside	012AllWK	12.97	12.87
ABN014	Dogwood	013AllWK	14.52	11.89
ABN015	F-Street	014AllWK	8.73	1.20
ABN016		015AllWK	23.86	23.86
ABN017	8th Street	016AllWK	7.02	8.69
ABN018		017AllWK	16.38	16.38
ABN019		018AllWK	9.45	9.45
ABN020		019AllWK	8.69	8.70
ABN021		020AllWK	12.29	12.29
ABN022	D-Street	021AllWK	8.32	10.13
ABN023		022AllWK	6.72	6.72
ABN024		023AllWK	34.76	34.76
ABN025		024AllWK	14.57	14.57
ABN026	Valley Meadows	025AllWK	8.49	13.37
ABN027		026AllWK	8.49	8.49
ABN028		027AllWK	2.91	2.91
ABN029	Rainier Ridge	028AllWK	12.40	10.03
ABN030		029AllWK	20.72	20.72
ABN031	Ellingson	030AllWK	20.05	19.38
ABN032		031AllWK	20.07	20.07
AUBRN48A		48A_AllWK	9.36	9.36

AR001	Area 19	AR001_AllWK	43.32	2.00
LH001	White Mtn. Trails	LH001_AllWK	N/A	2.50
MSTTR002A		MSTTR02_AllWK	9.87	9.87
MSTTR022A	R-Street	MSTTR22A_AllWK	N/A	10.00
PR001	Peasley Ridge	PR001_AllWK	N/A	3.00
TV001	Terrace View	TV001_AllWK	N/A	1.00
WINT003		WINT003_AllWK	20.96	20.96
WINT038		WINT038_AllWK	20.96	20.96
KNT021	Verdana	KNT021_AllWK	N/A	6.00

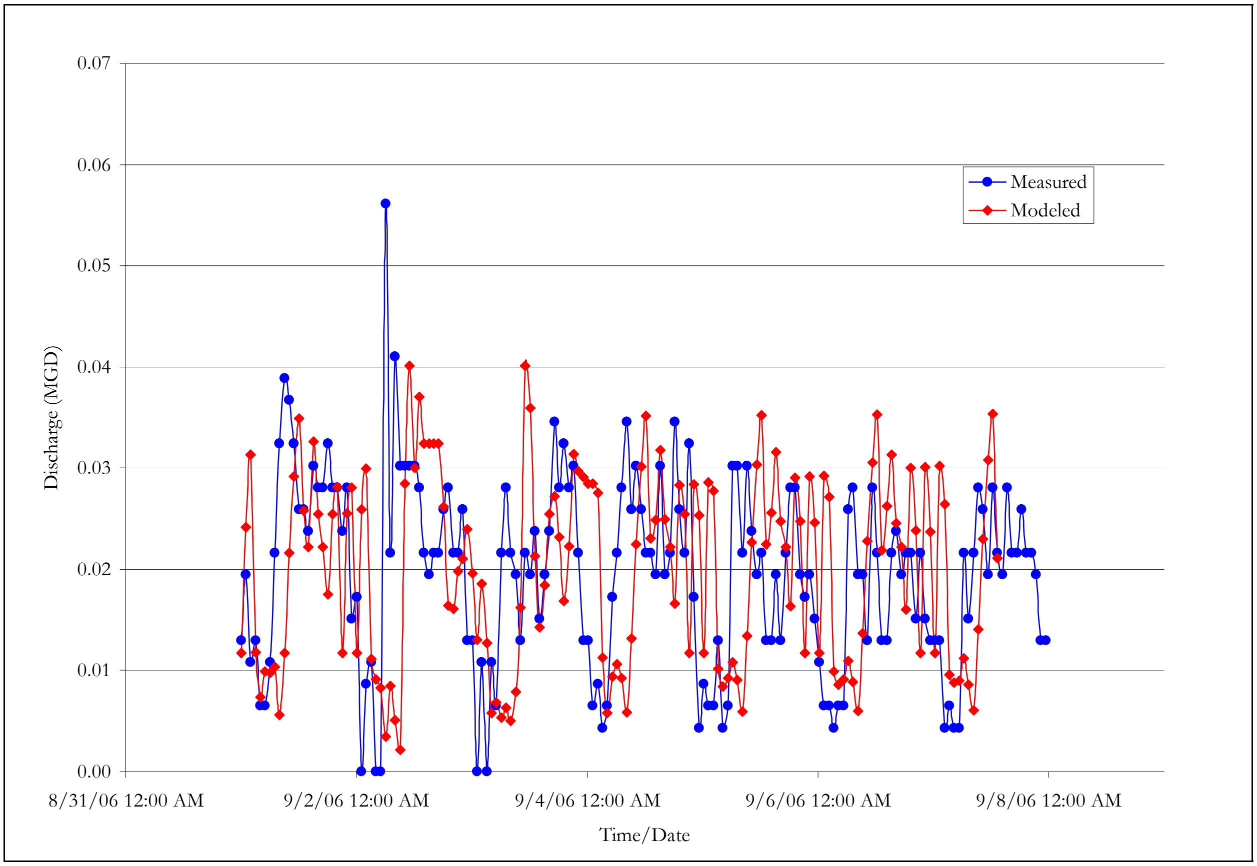


Figure C. 1- Calibration results for ABN017 minibasin using 8th-street PS measured and predicted discharge flowrates

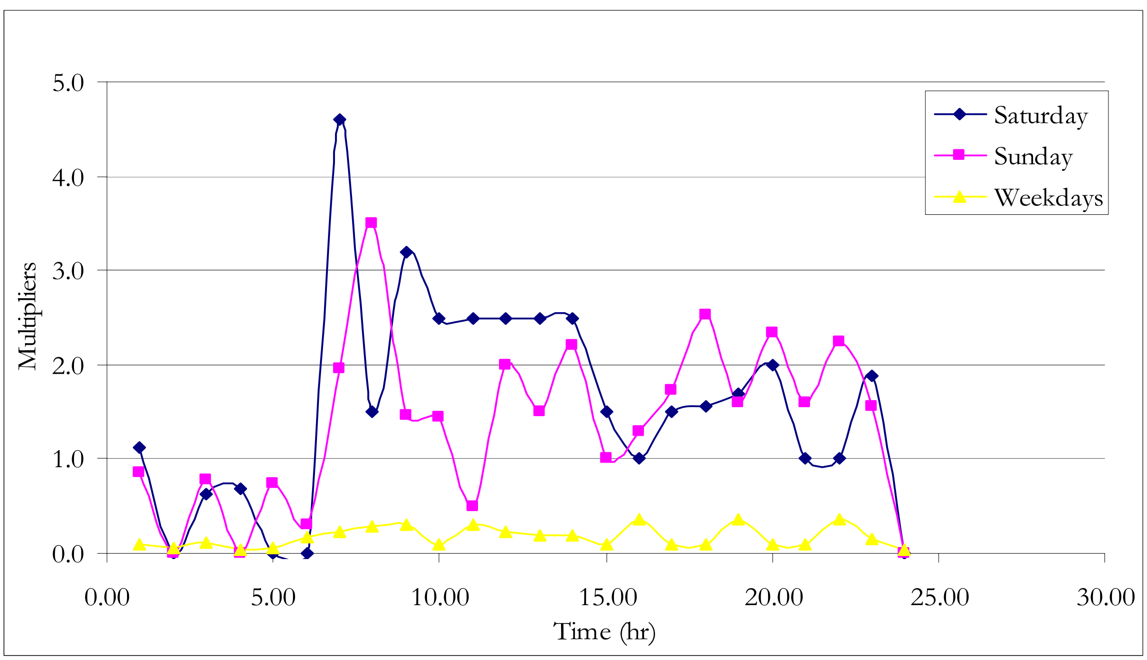


Figure C. 2 - Diurnal Patterns for ABN017 minibasin after calibration

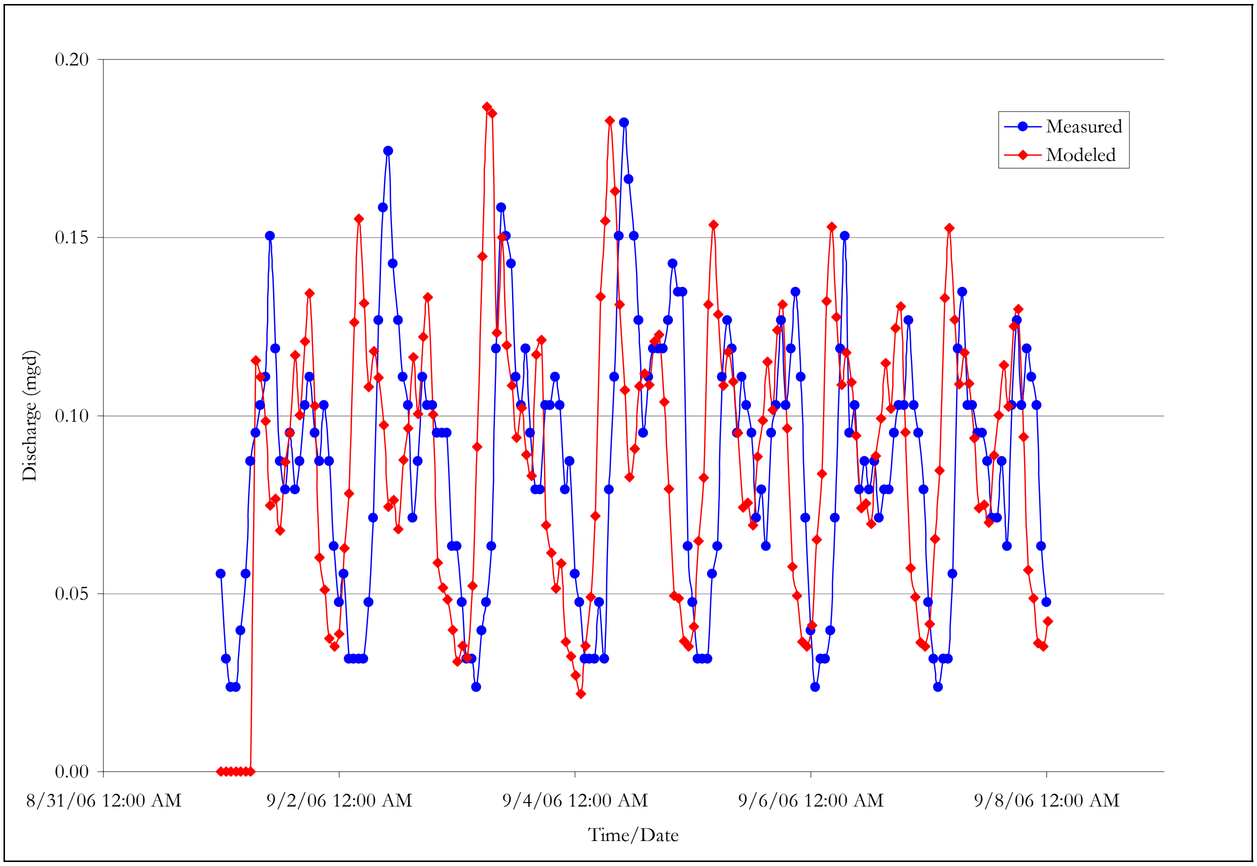


Figure C. 3- Calibration results for ABN010 minibasin using 22nd -street PS measured and predicted discharge flowrates

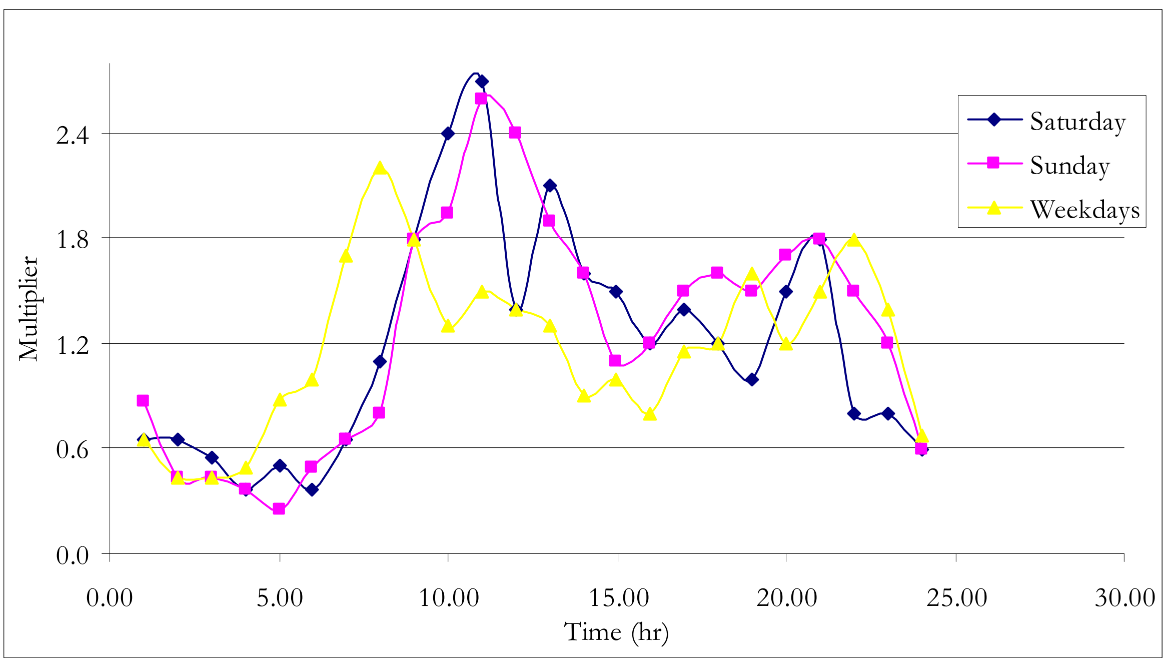


Figure C. 4- Diurnal Patterns for ABN010 minibasin after calibration

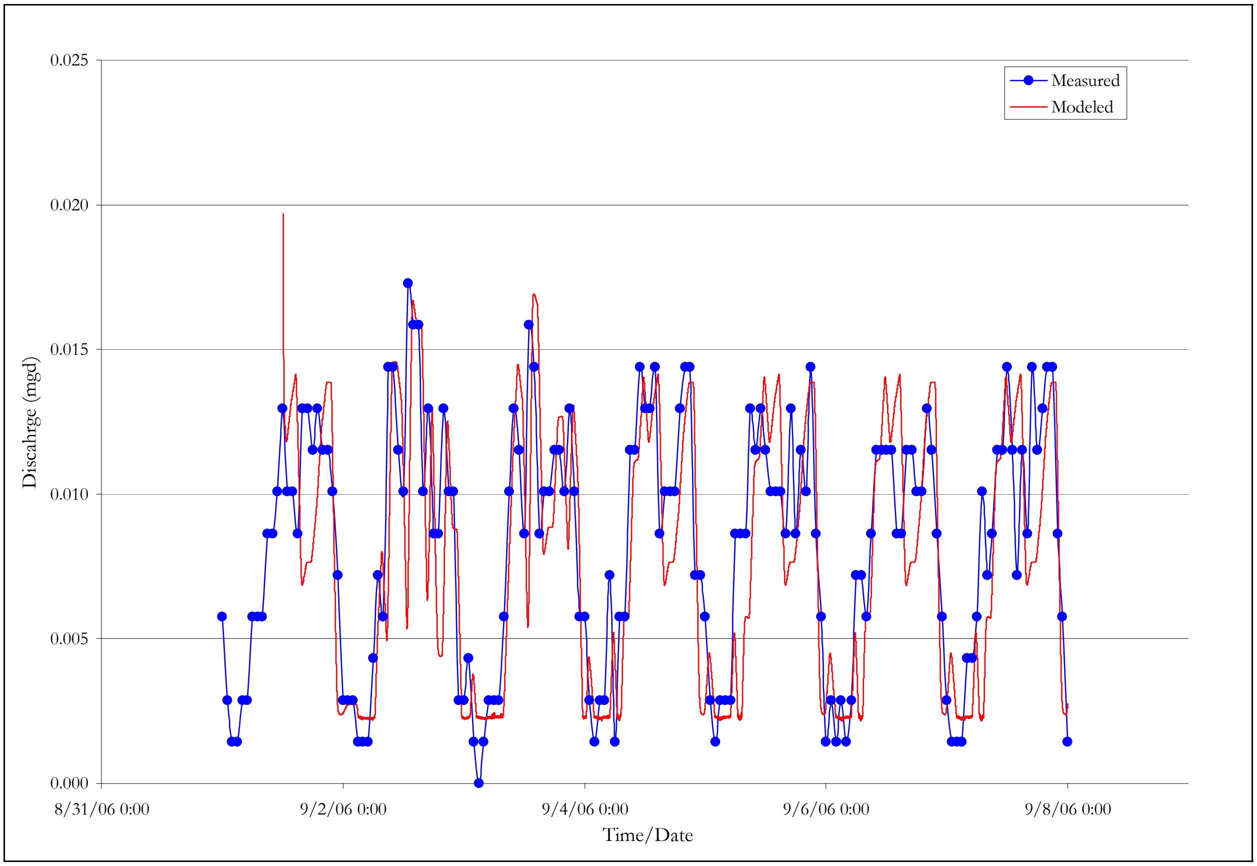


Figure C. 5- Calibration results for AR001 minibasin using Area 19 PS measured and predicted discharge flowrates

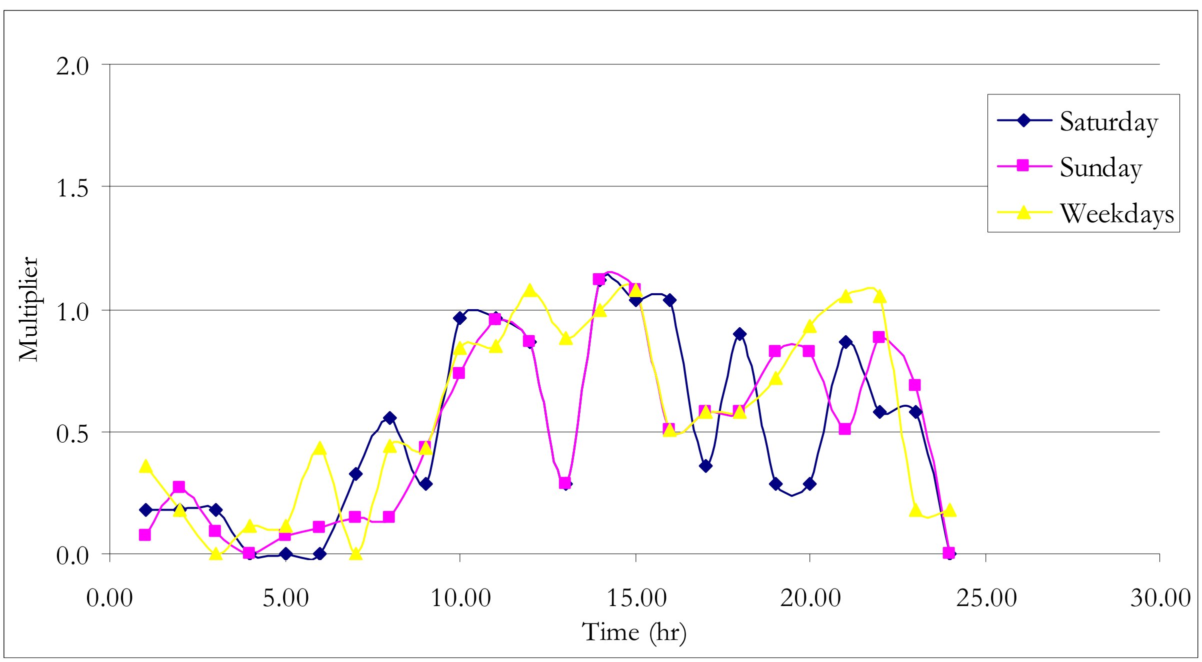


Figure C. 6- Diurnal Patterns for AR001 minibasin after calibration.

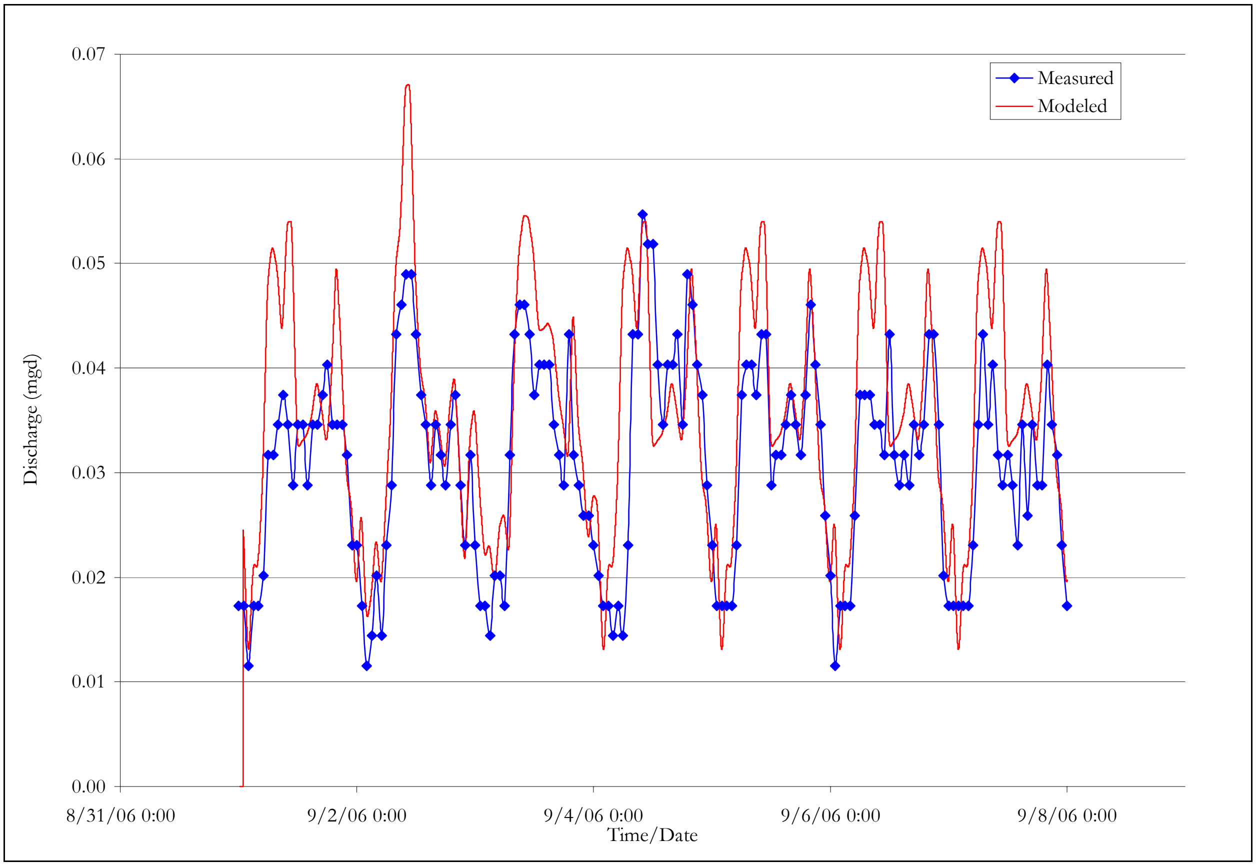


Figure C. 7- Calibration results for ABN014 minibasin using Dogwood PS measured and predicted discharge flowrates

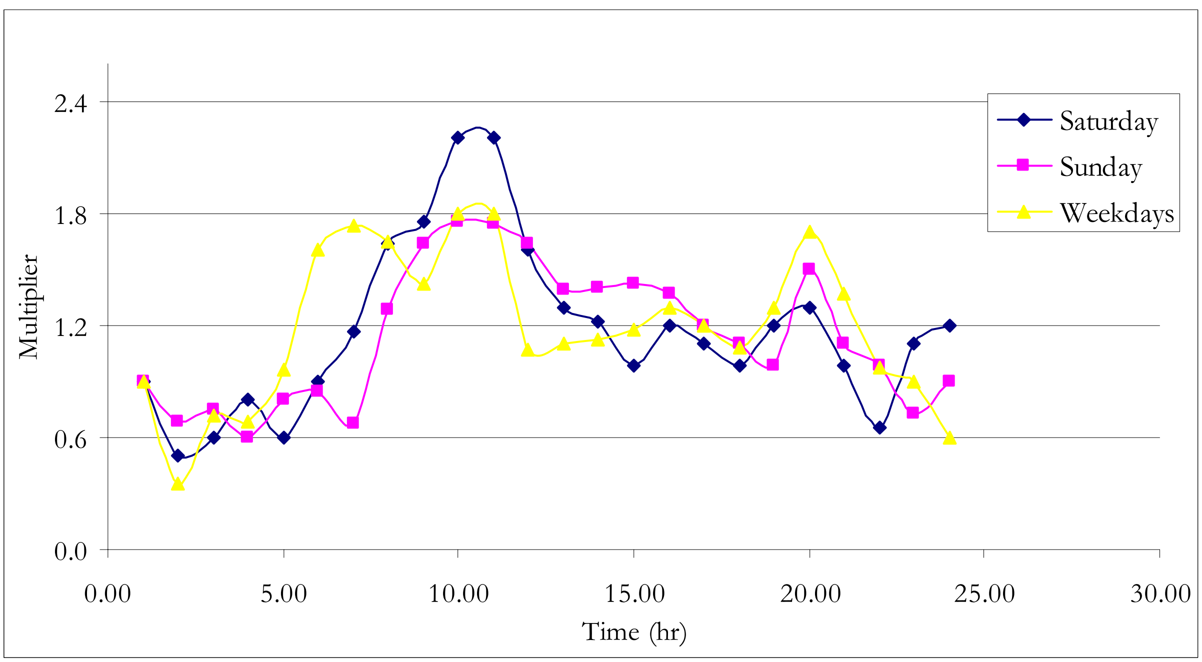


Figure C. 8- Diurnal Patterns for ABN014 minibasin after calibration.

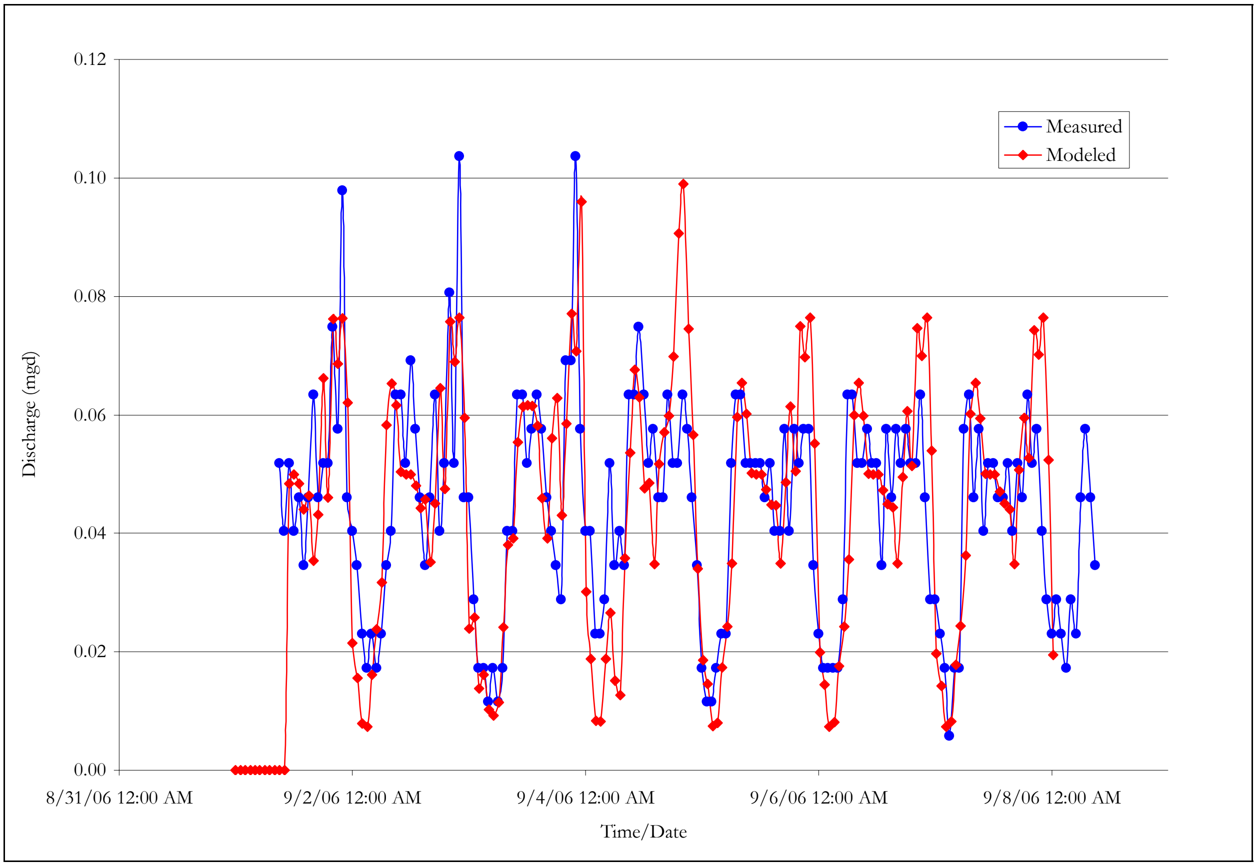


Figure C. 9- Calibration results for ABN022 minibasin using D- Street PS measured and predicted discharge flowrates

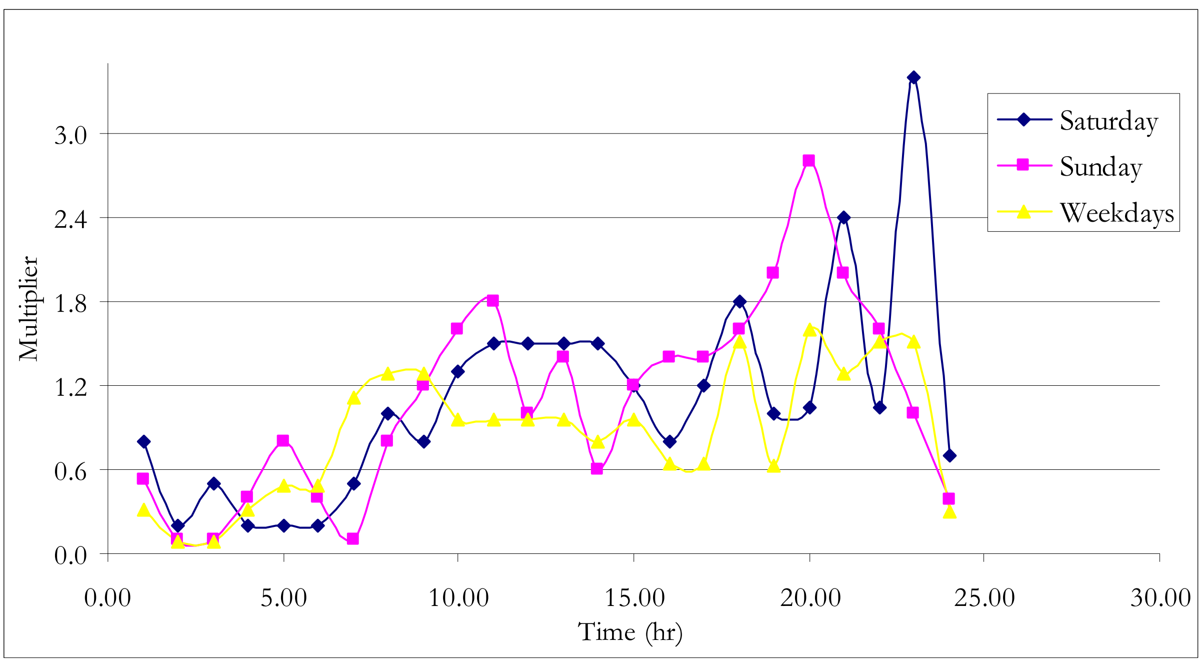


Figure C. 10- Diurnal Patterns for ABN022 minibasin after calibration.

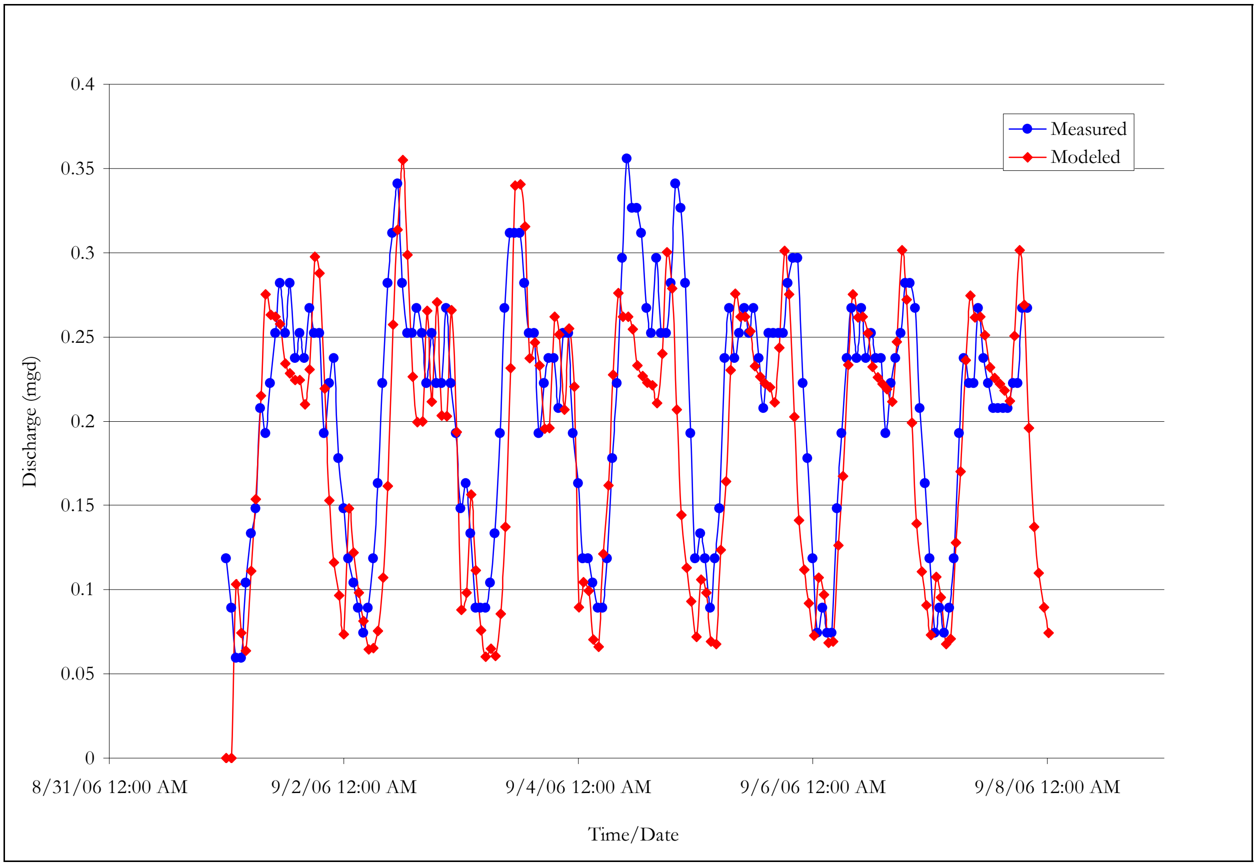


Figure C. 11- Calibration results for ABN031 minibasin using Ellingson PS measured and predicted discharge flowrates

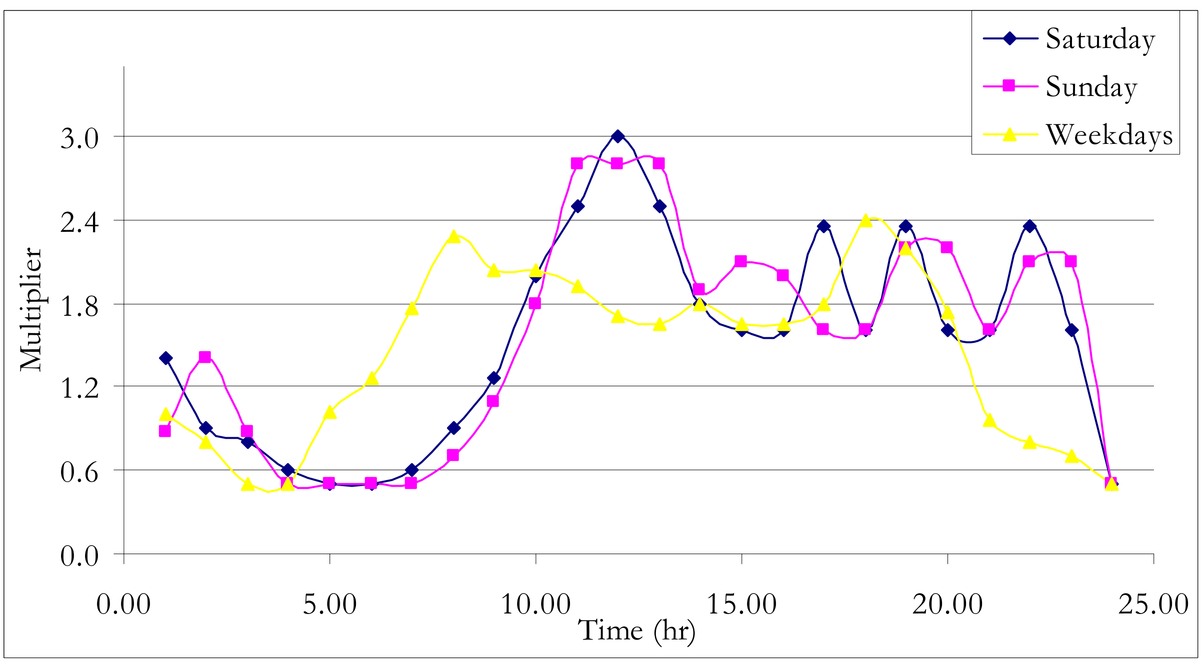


Figure C. 12- Diurnal Patterns for ABN031 minibasin after calibration.

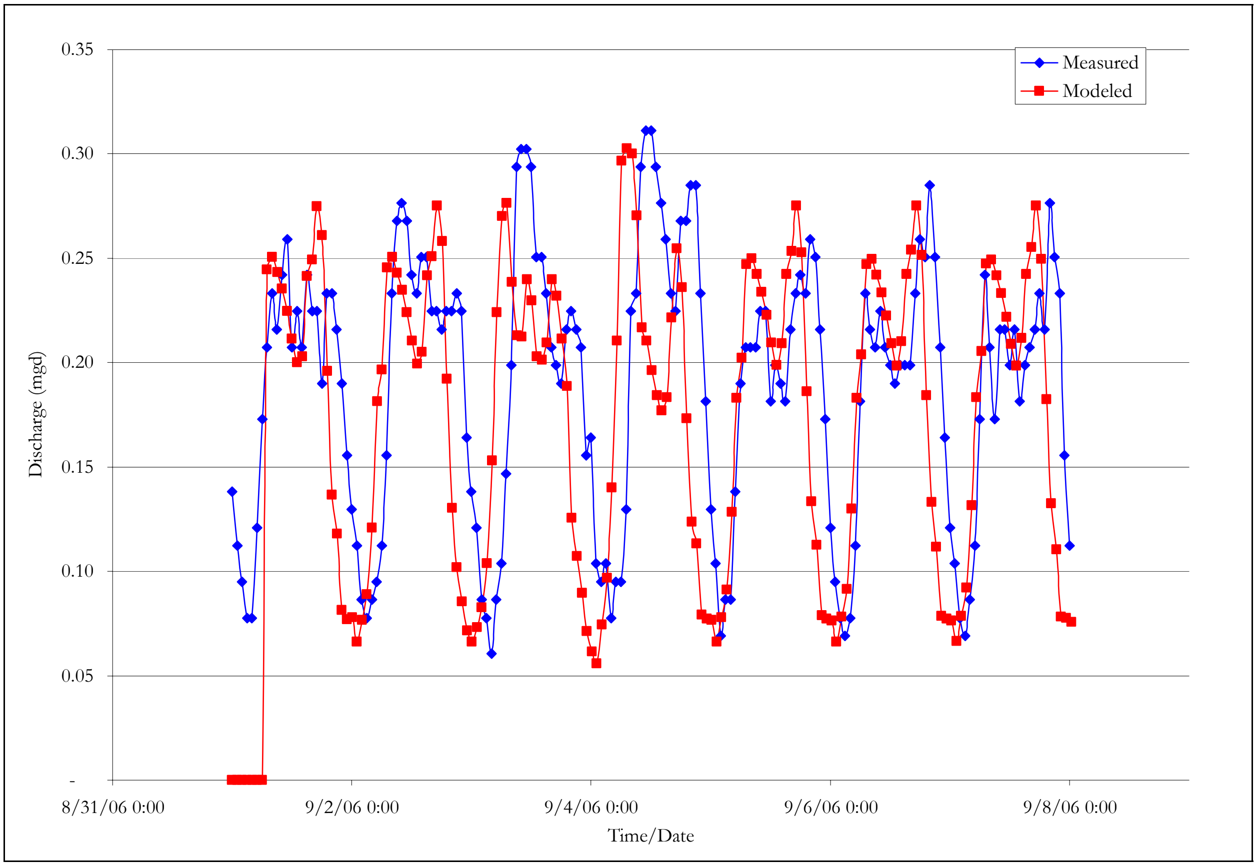


Figure C. 13 - Calibration results for ABN015 minibasin using F-Street PS measured and predicted discharge flowrates

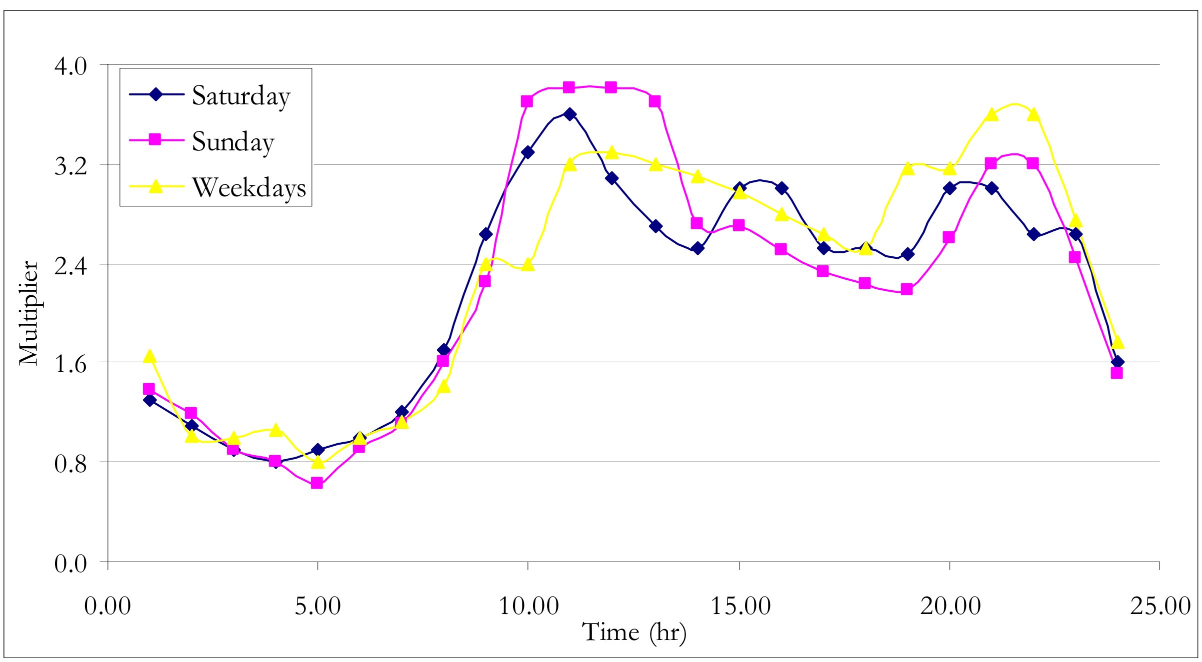


Figure C. 14- Diurnal Patterns for ABN015 minibasin after calibration.

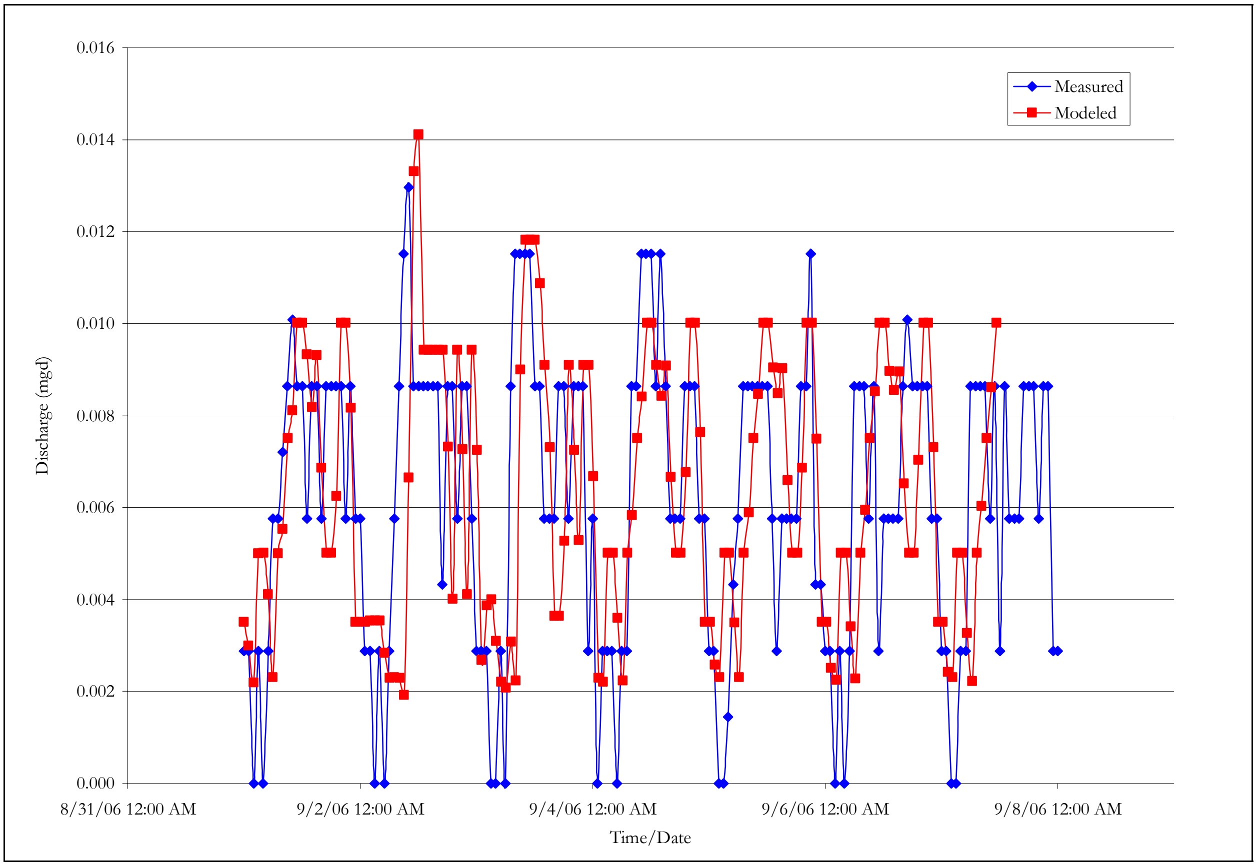


Figure C. 15- Calibration results for PR001 minibasin using Peasley PS measured and predicted discharge flowrates

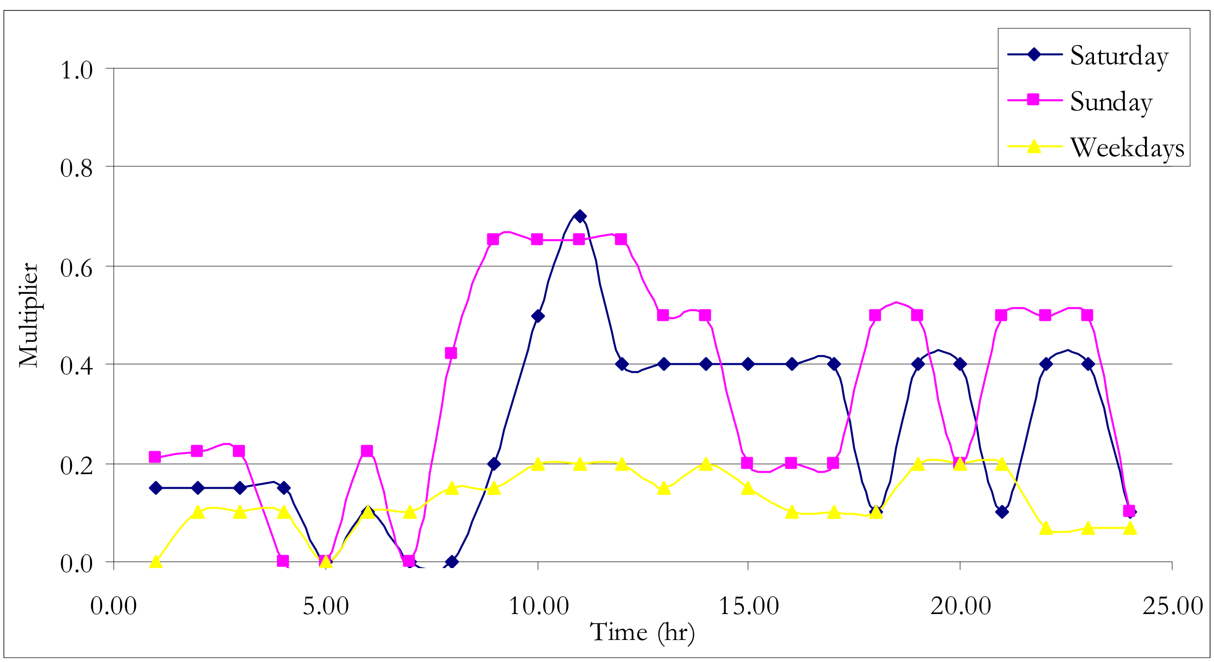


Figure C. 16 - Diurnal Patterns for ABN015 minibasin after calibration.

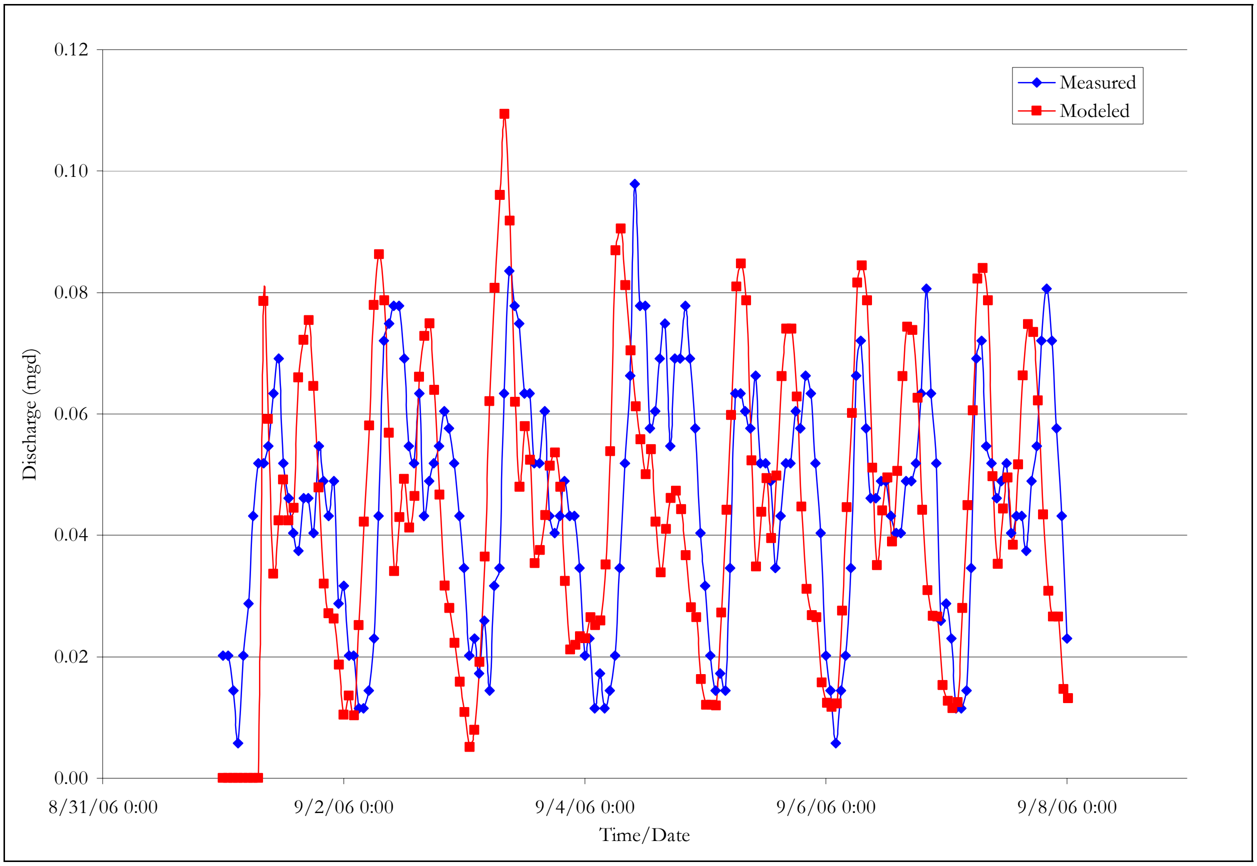


Figure C. 17- Calibration results for ABN029 minibasin using Rainier Ridge PS measured and predicted discharge flowrates

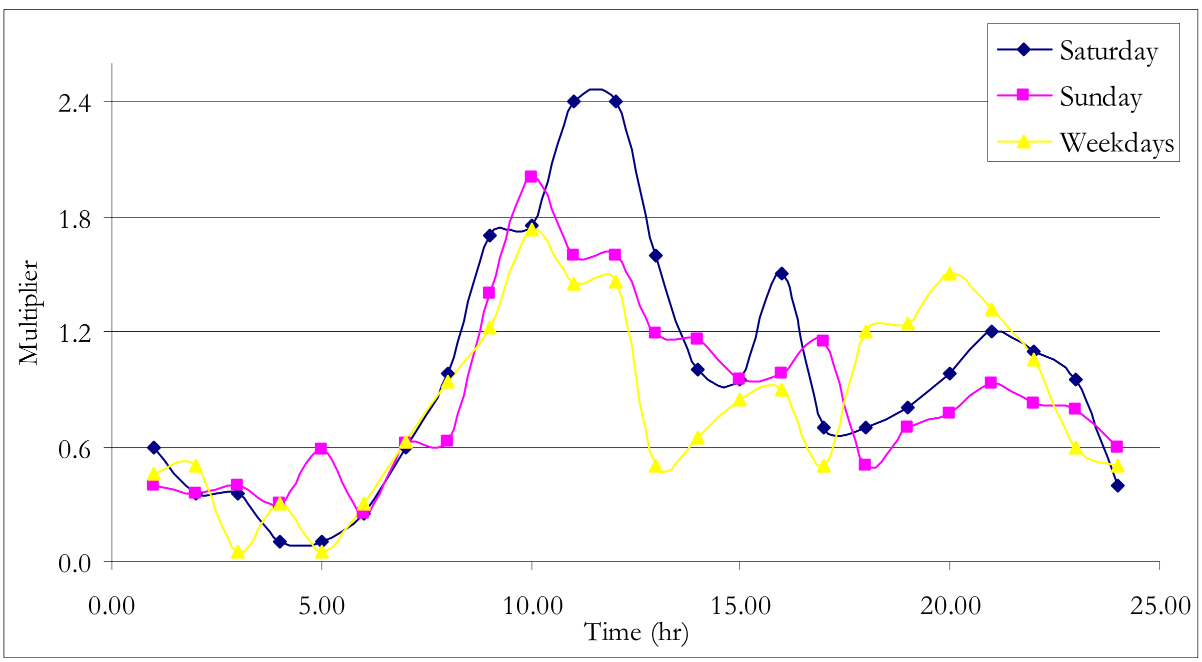


Figure C. 18- Diurnal Patterns for ABN029 minibasin after calibration.

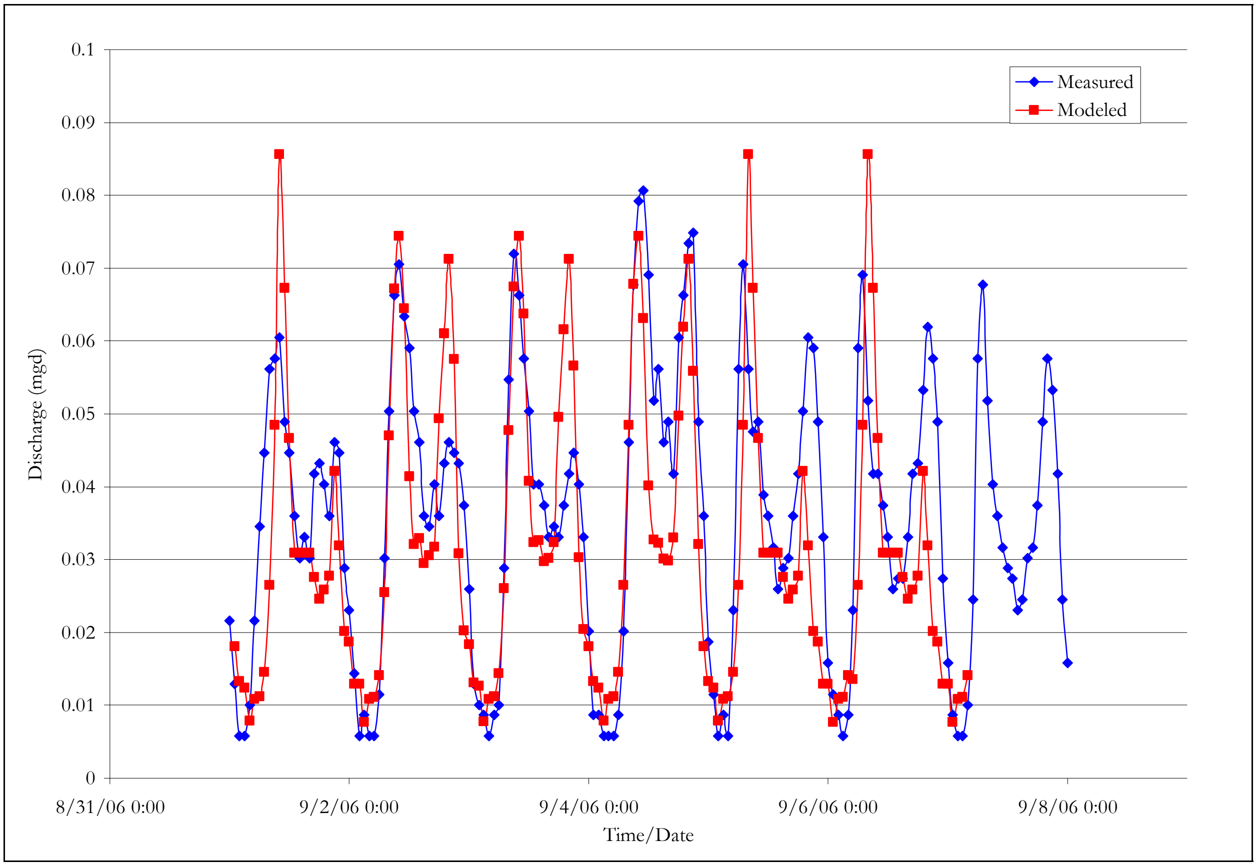


Figure C. 19- Calibration results for ABN006 minibasin using Rainier Shadows PS measured and predicted discharge flowrates

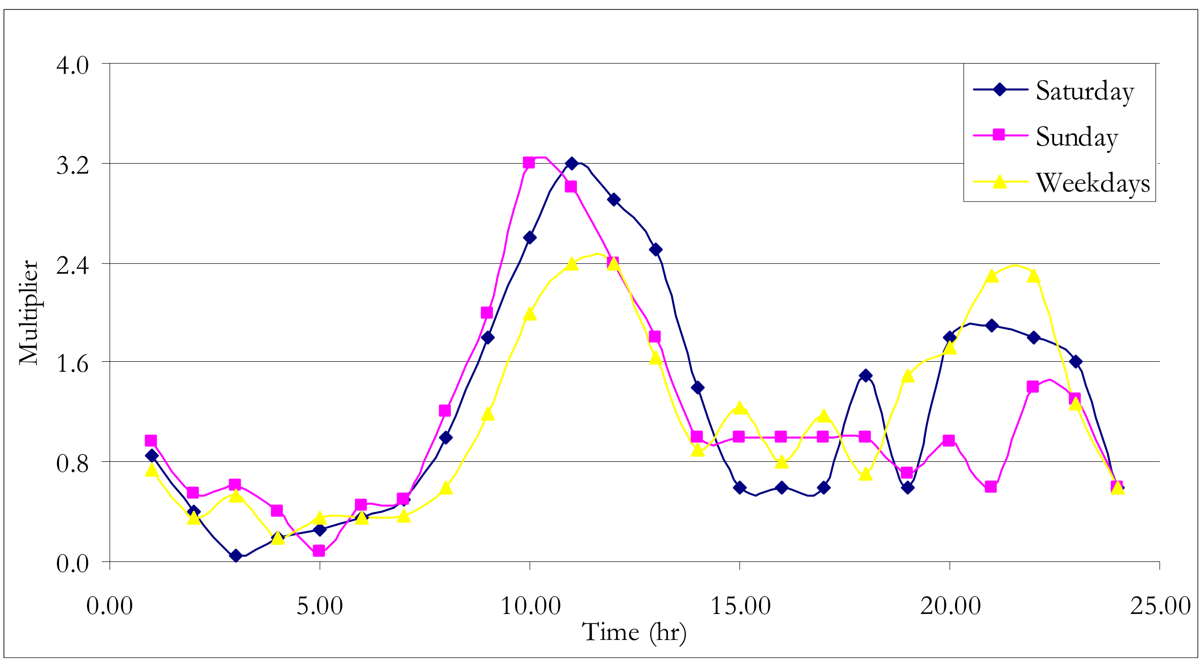


Figure C. 20- Diurnal Patterns for ABN006 minibasin after calibration.

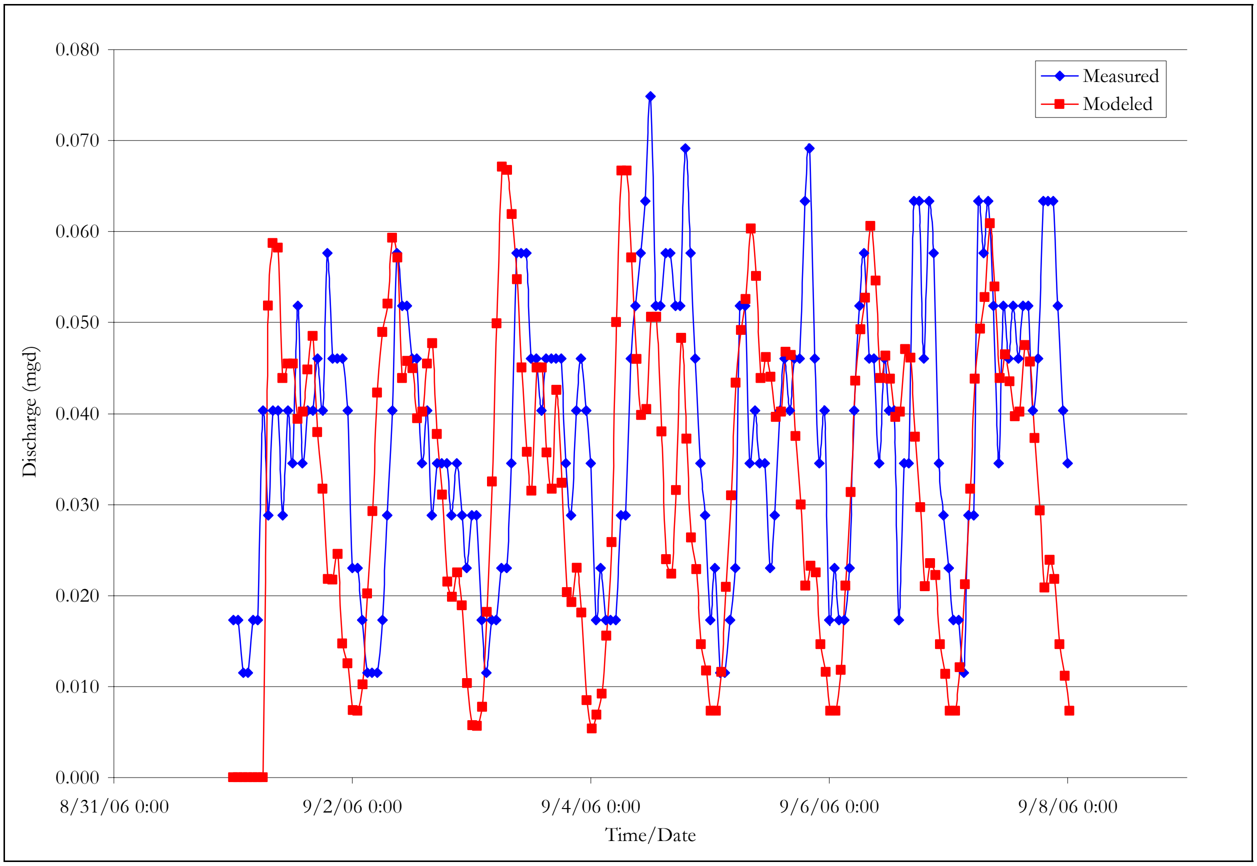


Figure C. 21 - Calibration results for ABN011, ABN012 and ABN013 minibasins using Riverside PS measured and predicted discharge flowrates

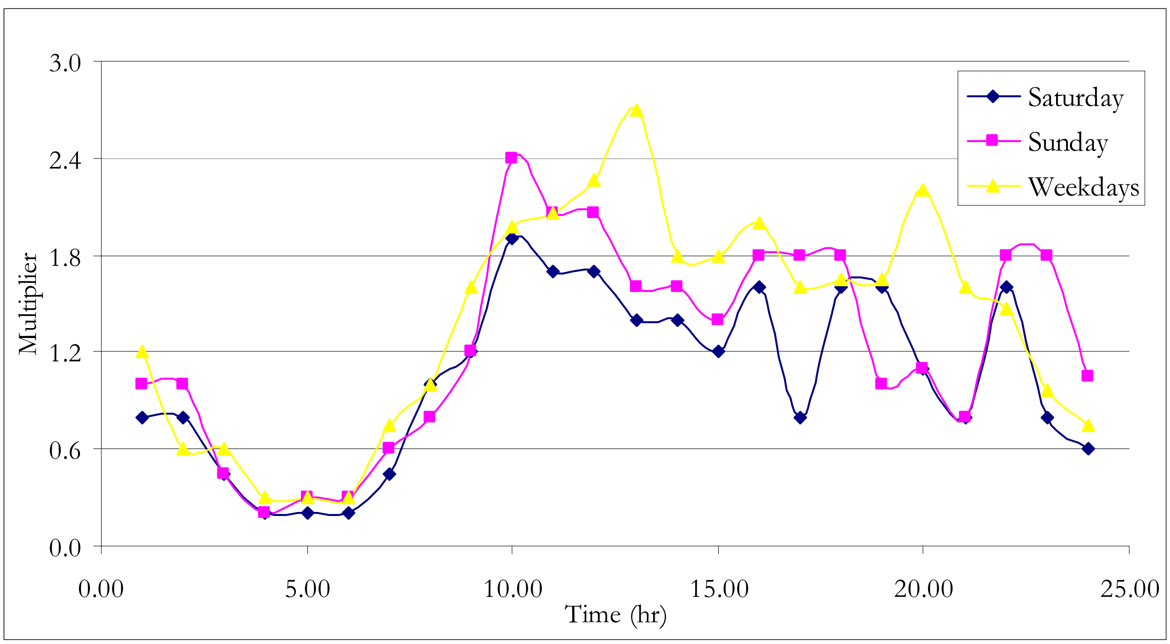


Figure C. 22- Diurnal Patterns for ABN011 minibasin after calibration.

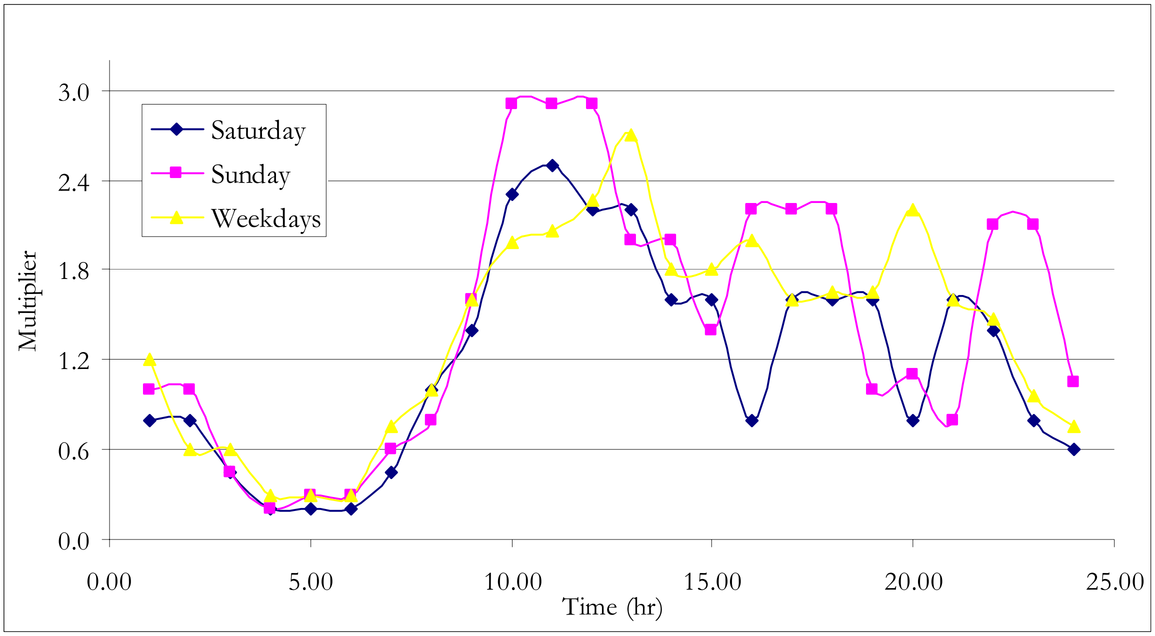


Figure C. 23- Diurnal Patterns for ABN012 minibasin after calibration.

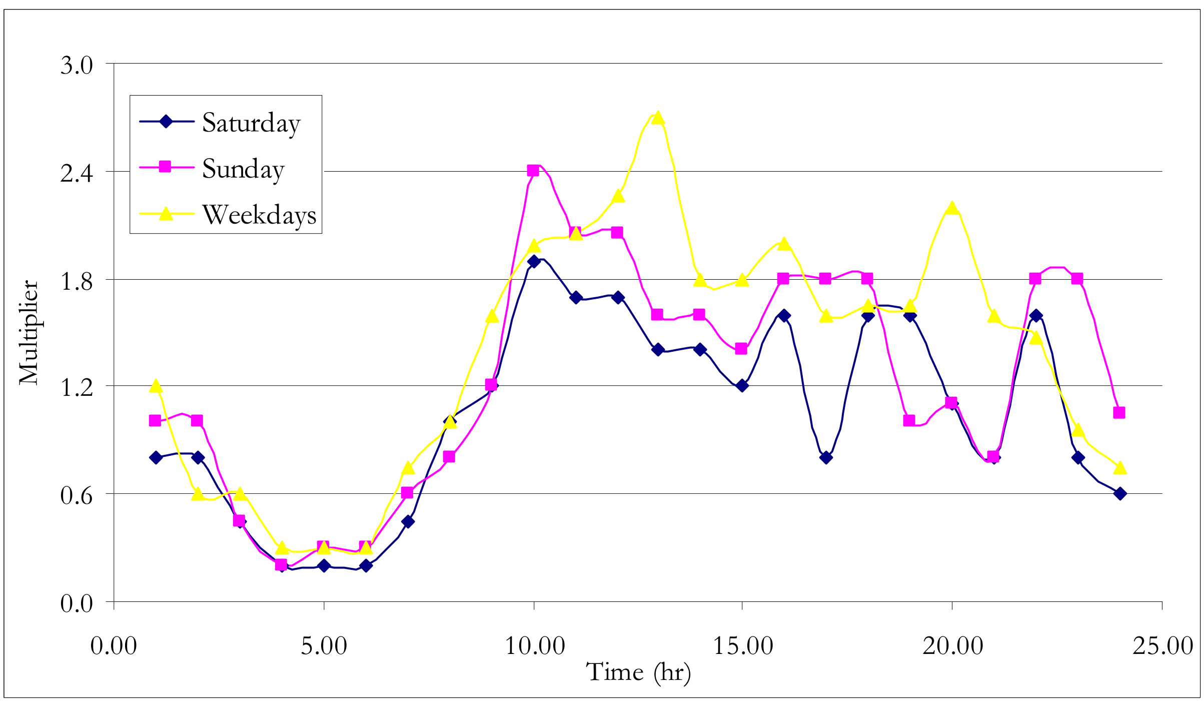


Figure C. 24- Diurnal Patterns for ABN013 minibasin after calibration.

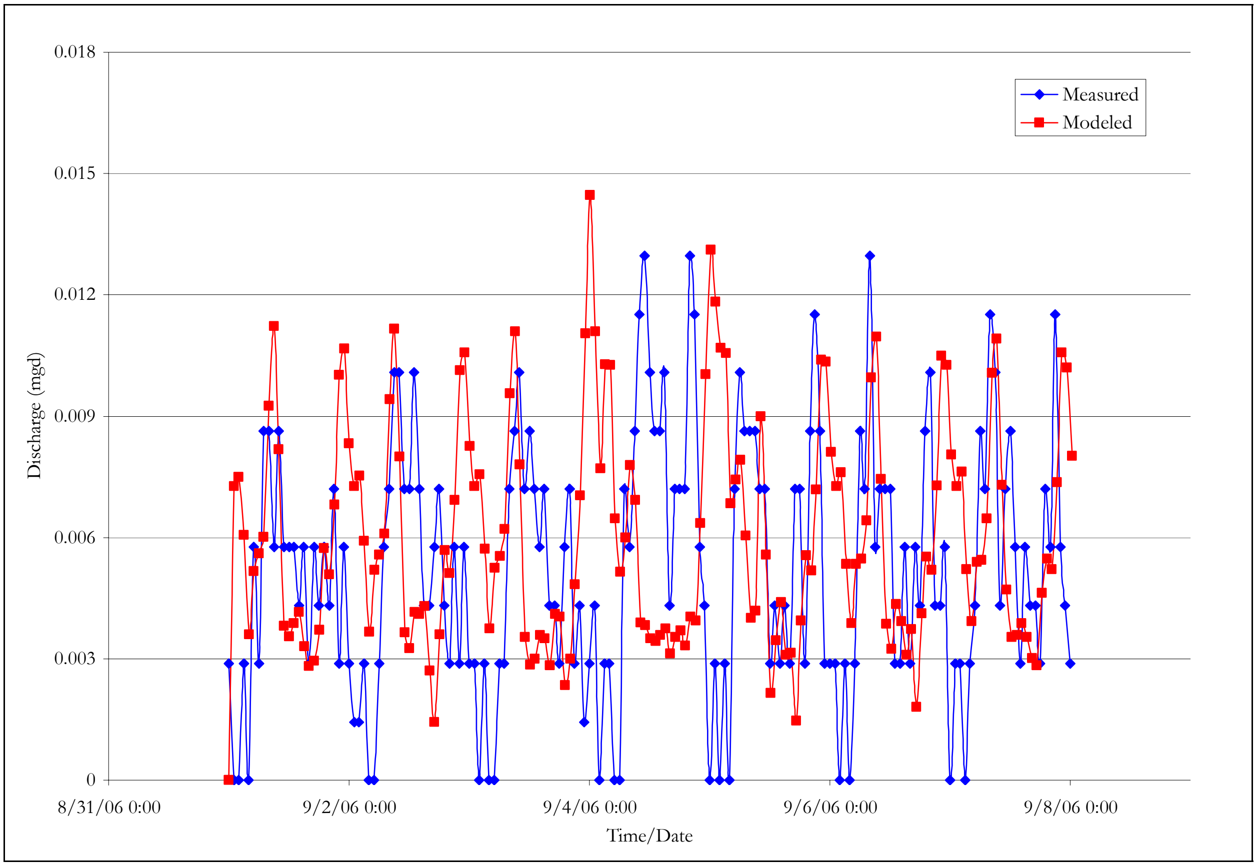


Figure C. 25- Calibration results for MSTT22A 3 minibasin using R-Street PS measured and predicted discharge flowrates

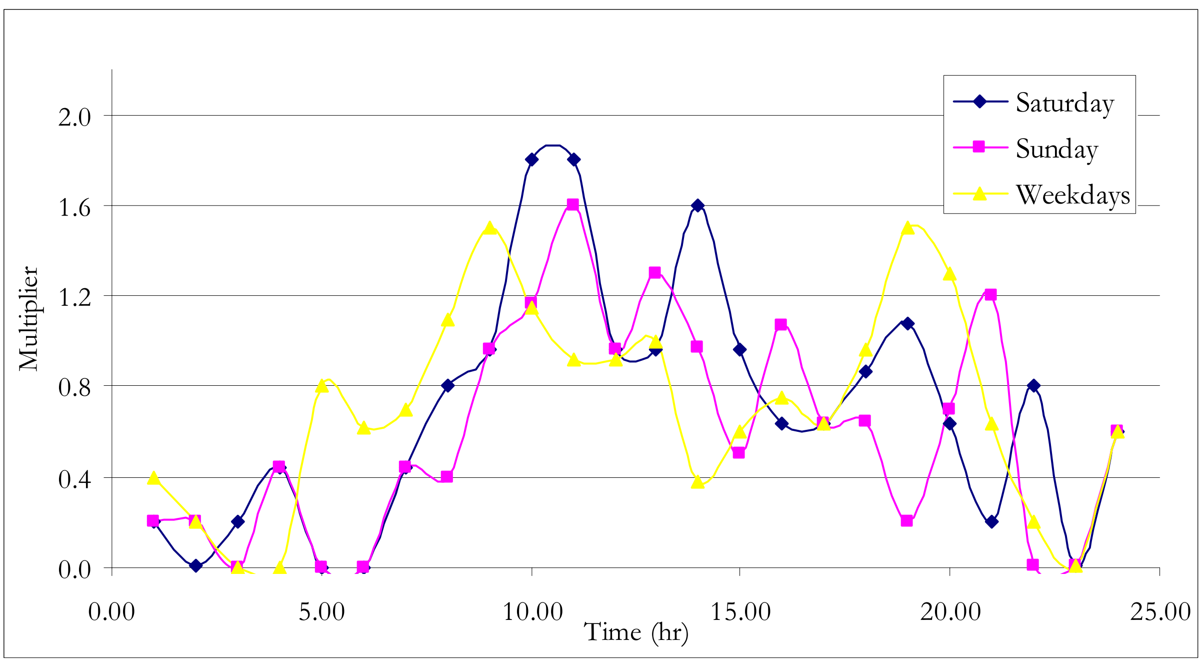


Figure C. 26- Diurnal Patterns for MSTT22A minibasin after calibration.

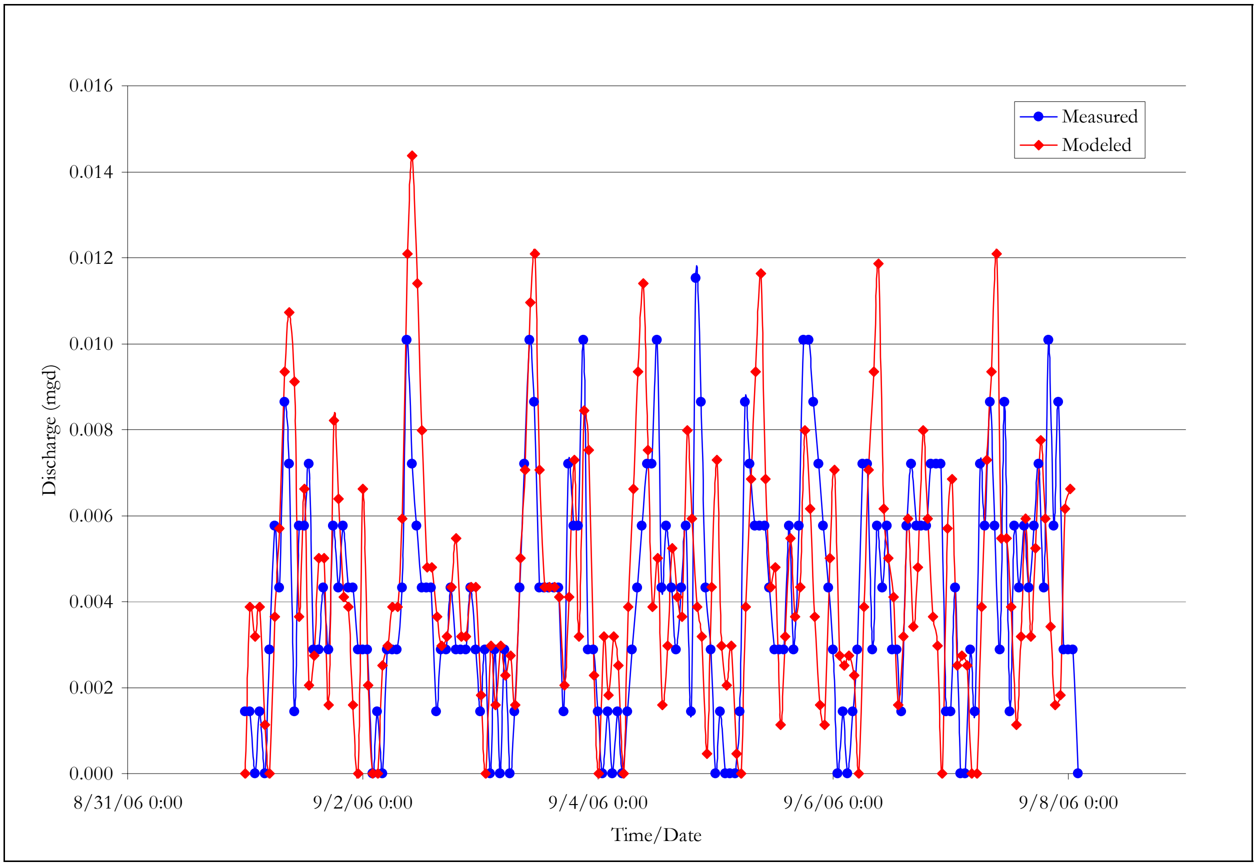


Figure C. 27- Calibration results for TV001 3 minibasin using Terrace View PS measured and predicted discharge flowrates

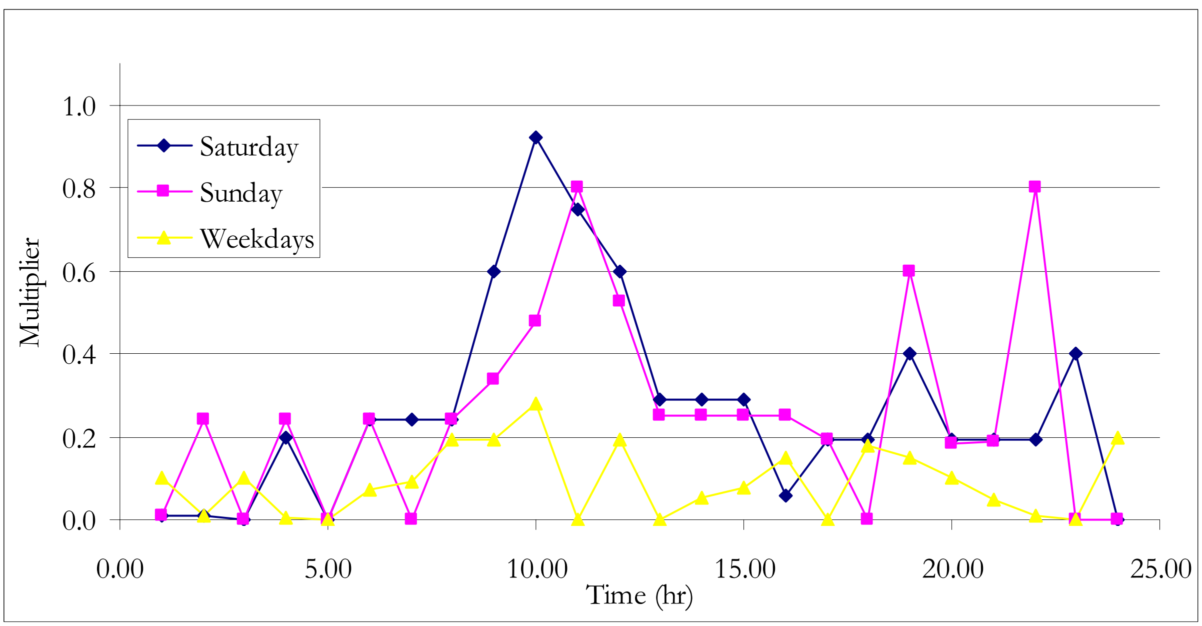


Figure C. 28- Diurnal Patterns for TV001 minibasin after calibration.

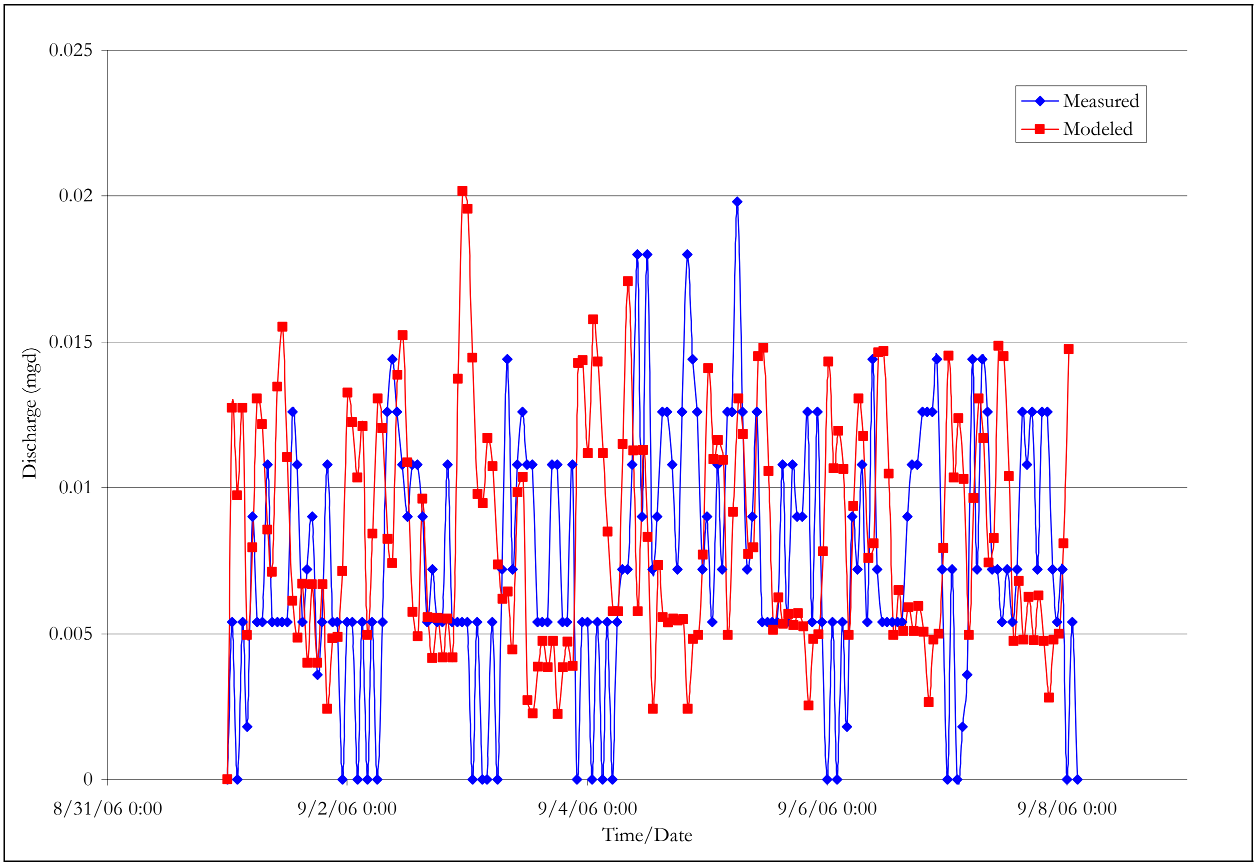


Figure C. 29- Calibration results for ABN026 3 minibasin using Valley Meadows PS measured and predicted discharge flowrates

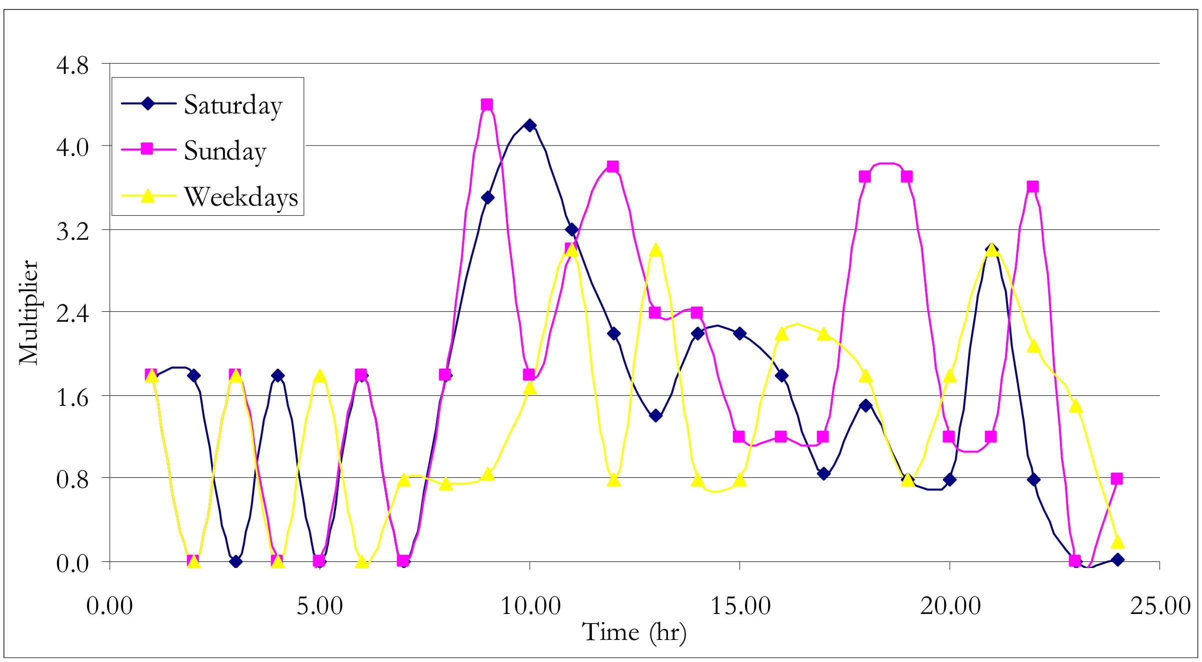


Figure C. 30- Diurnal Patterns for ABN026 minibasin after calibration.

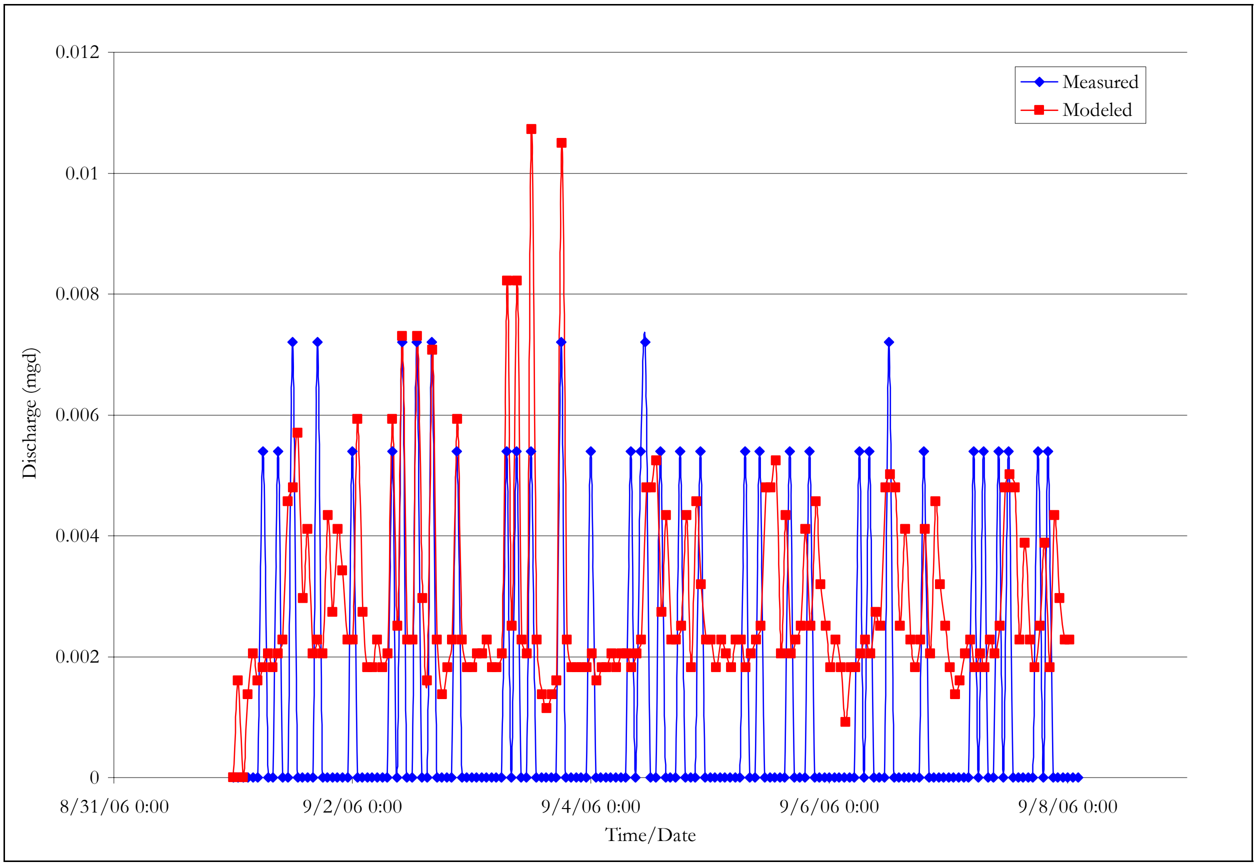


Figure C. 31- Calibration results for LH001 minibasin using White Mtn. Trails PS measured and predicted discharge flowrates

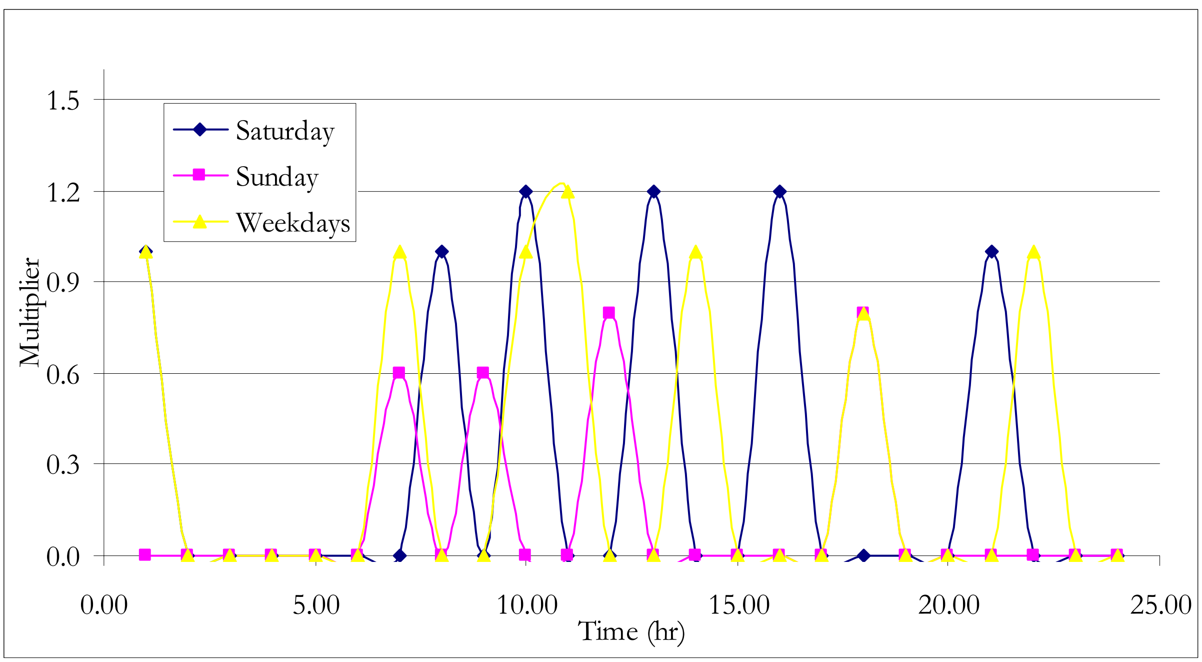


Figure C. 32- Diurnal Patterns for LH001 minibasin after calibration.

CITY OF AUBURN WASHINGTON

Peter B. Lewis, Mayor

25 West Main Street * Auburn WA 98001-4998 * www.auburnwa.gov * 253-931-3000

Determination of Non-Significance
SEP09-0031

Description of Proposal: City of Auburn's 2009 Sewer Comprehensive Plan Update

Proponent: City of Auburn Public Works Department, Sanitary Sewer Utility

Location: City's sewer service area – includes majority of the city limits and portion of the City's potential annexation area.

Lead Agency: City of Auburn

The lead agency for this proposal has determined that it does not have probable significant adverse impact on the environment. An environmental impact statement (EIS) is not required under RCW 43.21C.030(2)(c). This decision was made after review of a completed environmental checklist and other information on file with the lead agency. This information is available to the public on request.

This DNS is issued under 197-11-340(2); the lead agency will not act on this proposal for 14 days from the date issued below. Comments must be submitted by 5:00 p.m. on **October 1, 2009.**

Any person aggrieved of the City's determination may file an appeal with the Auburn City Clerk within 14 days of the close of the comment period, or by 5:00 p.m. on **October 15, 2009**.

Responsible Official: Cynthia Baker, AICP
Position/Title: Director of Planning, Building, and Community Department
Address: 25 West Main Street
Auburn, Washington 98001
253-931-3090

Date Issued: **September 17, 2009** Signature: Cindy Baker

Note: This determination does not constitute approval of the proposal. Approval of the proposal can only be made by the legislative or administrative body vested with that authority. The proposal will be required to meet all applicable regulations.

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