2013
Water & Sewer System Plan

Prepared By:

PACE
An Engineering Services Company

"*Coal Creek Utility District's mission is to provide its rate payers the highest quality, the most cost efficient water and sewer service, both today and into the future, while meeting the overall public and regulatory approval.*"

PROJECT CERTIFICATION

The technical material and data contained in this report was prepared by PACE Engineers, Inc. under the supervision of the below listed individuals. The responsible staff includes a registered professional engineer licensed in the State of Washington.

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EXECUTIVE SUMMARY

This Comprehensive Plan is a compilation of planning and engineering studies completed by PACE Engineers, Inc. The purpose of the Plan is to determine the adequacy of Coal Creek Utility District's existing water and sewer systems to meet the existing and projected needs of the customers of the District. This Plan supersedes the District's previous Water and Sewer System Comprehensive Plan approved by DOH and King County in 2005. This document has been prepared in accordance with the rules and regulations governing the operation of public water and sewer systems as administered by the State of Washington Departments of Health and Ecology, and the codes and policies of all other agencies having jurisdiction.

Coal Creek Utility District's water and sewer service areas are approximately 5.5 and 4.7 square miles, respectively. The service areas generally extend from the City of Bellevue at Southeast 69th Street on the north, the City of Newcastle and City of Renton boundaries on the south, Cougar Mountain Regional Wildland Park on the east and Lake Washington on the west. The District serves the City of Newcastle and small portions of the City of Renton and unincorporated King County. Land use and zoning is under the jurisdiction of these agencies. Land use is primarily single-family residential (65% of the total land area). Other uses in the area include multi-family residential, small commercial and mixed use facilities, parks and open space.

Water System

Based on 2010 Census and Puget Sound Regional Council (PSRC) data, the current water service area of the District includes approximately 11,500 residents and 1,700 employees served through approximately 3,700 connections. An average of 360 million gallons has been delivered to customers over the 2007-2011 period, and approximately 188 gallons are consumed daily by a typical single family residence. Future growth is expected, with the population of the current service area reaching nearly 14,000 and the employment reaching approximately 2,750 by the year 2033.

The District's water system is divided into nine pressure zones and consists of three interties to the Seattle regional water supply system, eight interties to the City of Bellevue system, one new intertie with the City of Renton, four pump stations, five reservoirs, eighteen pressure reducing valves, and over 350,000 linear feet – the equivalent of 66 miles – of water main.

Analyses of the water system was accomplished with the aid of computer modeling performed under previous planning efforts. District engineers reviewed past modeling efforts and determined that due to the combination of minor changes that have occurred to the water system since the previous plan and a slowdown in development due to poor economic conditions, no additional modeling was deemed necessary under this Plan. Other analyses were performed according to Department of Health requirements and District standards. Existing and future development

scenarios including updated population and demand estimates were considered in the evaluation. The analyses indicate that the District's past renewal, replacement and maintenance programs have resulted in a water system that is in good condition. Therefore, the recommended improvements are limited to future pump station upgrades, potential improvements to the reservoirs to enhance water quality, reservoir improvements, and establishing an asset management fund for ongoing replacement of expiring assets.

Sewer System

The current sewer system serves approximately 11,300 residents and 1,700 employees through approximately 2,900 service connections. By 2033, it is estimated that 13,800 people and 2,800 employees will receive sewer service from the District.

Coal Creek's sewer system is divided into eleven drainage basins. Primary facilities in the sewer system include five lift stations, four direct connections to King County – Wastewater Treatment Division (WWTD) regional facilities, and approximately 250,000 linear feet of sewer main.

Analyses of the sewer system were performed according to Department of Ecology requirements and District standards. The system was analyzed under existing and future development conditions. The analyses results indicate that the sewer system is also in good condition. Recommended improvements include setting aside funding to perform Infiltration and Inflow (I/I) monitoring as means of identifying areas where I/I can be reduced. The District has worked with King County on past I/I reduction programs, and ongoing coordination with the County on these efforts is anticipated. As development occurs, other improvements include upgrades to various lift stations, a significant upgrade to Telemetry / SCADA controls, and the potential abandonment of a lift station and bridge crossing along Coal Creek Parkway.

With General Facilities Charges, Local Facilities Charges, water rates, and sewer rates all being updated within the past three years to keep up with wholesale contract increases, and with economic conditions turning around, Coal Creek will remain financially solvent. Annual review of revenues, expenses, and capital needs will continue to provide a level of detailed financial planning that enables the District to reinvest in the systems while maintaining reasonable rates. The combined Capital Improvements Plan presents recommended improvements totaling $4,165,000 over the next six years.

The level of care for the engineered systems in operation is considered superb by industry standards. District staff have developed an asset management program that tracks maintenance activities in as close to real-time as practical, and activities are stored in a database that can be accessed by staff and commissioners on a mobile platform. Coal Creek sits on the leading edge of Geographic Information Systems (GIS) data collection and management, which will continue to support the District in making effective operational and asset management decisions.

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ACRONYMS

ADD	Average Day Demand
ADWF	Average Dry Weather Flow
AWWA	American Water Works Association
ccf	One hundred cubic feet
cfs	Cubic feet per second
CIP	Capital Improvements Plan
CWSSA	Critical Water Supply Service Area
DOE	Washington State Department of Ecology
DOH	Washington State Department of Health
DOT/APWA	Standard Specifications for Road, Bridge, and Municipal Construction, Washington State Department of Transportation and the American Public Works Association, 2000 Edition
EPA	United States Environmental Protection Agency
ERU	Equivalent Residential Unit
GFC	General Facility Charge
GMA	Growth Management Act
gpad	Gallons per acre per day
gpcd	Gallons per capita per day
gpd	Gallons per day
gpm	Gallons per minute
KC WWTD	King County Wastewater Treatment Division
LFC	Local Facility Charge
MDD	Maximum Day Demand
MG	Million Gallons
MGD	Million gallons per day
mg/l	Milligrams per liter
MWL	Municipal Water Law
PHD	Peak Hour Demand
ppb	Parts per Billion
ppm	Parts per Million
PSRC	Puget Sound Regional Council
PRV	Pressure Reducing Valve
psi	Pounds per square inch
RCW	Revised Code of Washington
SDWA	Safe Drinking Water Act
SEPA	State Environmental Policy Act
SPU	Seattle Public Utilities

UGA	Urban Growth Area
ULID	Utility Local Improvement District
WAC	Washington Administrative Code
WUE	Water Use Efficiency
WWTD	King County Wastewater Treatment Division

GLOSSARY OF WATER TERMS

Annual Demand - Total water system demand for one calendar year, expressed in millions of gallons (MG), including all uses and unaccounted-for water.

Average Daily Demand (ADD) - The annual demand divided by the number of days per year, expressed in million gallons per day (MGD).

Cross Connection - A physical arrangement connecting a public water system, directly or indirectly, with anything other than another potable water system, and capable of contaminating the public water system.

Dead Storage – The volume of stored water not available to all customers at the minimum design pressure in accordance with WAC 246-290-235 (5) and (6).

Equalizing Storage - The volume of water required to meet fluctuating hourly variations in demand in excess of the available rate of supply.

Equivalent Residential Unit (ERU) – A metric created when comparing water consumption by businesses, government, irrigation, and multi-family accounts with the amount consumed by a typical single family residence. An ERU normalizes water consumption for the purpose of calculating the future demands used for system analysis and facility sizing.

Fire Flow - The rate of water flow, in gpm, required to fight fires under WAC 246-293-640 or adopted city or county standards. Fire flow is calculated at a minimum system-wide residual pressure of greater than 20psi.

Fire Suppression Storage - The reserved volume of water required for firefighting activities.

Franchise Area - A designated area within which the utility system is permitted, by franchise, to own, operate and maintain facilities within public right-of-ways.

Legal Boundary - The corporate boundary established for the District. Extension of service beyond the District's legal boundary requires annexation to the District or specific agreement for the provision of such service. (Also referred to as corporate area).

Maximum Contaminant Level (MCL) - The maximum permissible level of a contaminant in water the purveyor delivers to any public water system user.

Maximum Daily Demand (MDD) - The highest water demand anticipated for any given day, expressed in MGD.

Operational Storage – The volume of the reservoir devoted to supplying the water system while, under normal operating conditions, the source(s) are in "off" status.

Peak Hour Demand - The maximum rate of water use, excluding fire flow, which has occurred or is expected to occur within a defined service area at any instant in time.

Potable - Water suitable for drinking by the public.

Pressure Zone - A water supply or distribution subsystem operating at a uniform hydraulic gradient.

Service Area (Retail Service Area) - The recognized area within which Coal Creek Utility District maintains a duty to provide water service in a timely and reasonable manner. The Service Area is synonymous with "Retail Service Area", and is established in the East King County Coordinated Water System Planning process.

Standby Storage – The volume of water required to augment the available supply of water during a period of partially or fully restricted flow from the supply source, due to such things as pipeline or pump failure or power outages.

Usable Storage – That portion of the total available storage that is available on a continuous basis, either by gravity flow or by reliable pumping facilities.

GLOSSARY OF SEWER TERMS

Average Annual Flow (AAF) - The average day flow for the entire year.

Average Dry Weather Flow (ADWF) - ADWF is the flow for an average day during dry weather months (May-October), and represents the baseline of sewage flow for the service area. The ADWF includes sewage discharges plus the average amount of groundwater infiltration (base GWI) which occurs throughout the dry season. Peaking factors for existing flows are derived on the basis of ADWF.

Average Wet Weather Flow (AWWF) - AWWF is the flow for an average day during the wet weather months of November through April. The AWWF includes sewage discharges, groundwater infiltration and stormwater inflow which occur throughout the wet season.

Combined Sewer - A sewer which receives both wastewater and storm or surface water.

Commercial Wastewater - Wastewater generated in predominantly business or commercial areas, including both sanitary wastes and wastes from the commercial activities. Typically, commercial wastewater includes, but is not limited to, wastes from restaurants, Laundromats, and service stations.

Domestic Wastewater - Wastewater principally derived from the sanitary conveniences of residences or produced by normal residential activities.

Dry Weather Flow - Wastewater flow during periods of little or no rainfall; in the Puget Sound area, this typically occurs during the months May through October. Rates of flow exhibit hourly, daily, and seasonal variations. A certain amount of infiltration may also be present.

Dry Well - The dry compartment in a pumping station, near or below pumping level where the pumps and/or motors and controls are located.

Force main - A sewer pipeline that flows full under pressure, discharging from a pump station (as opposed to an inverted siphon).

Infiltration - The quantity of groundwater that infiltrates the collection system. Common points of entry include broken pipes and defective joints or through walls of manholes. Infiltration may result from defective sewers being located below the groundwater table or from saturation of the soil.

Inflow - Rainwater which enters the collection system through roof drain connections, catch basin connections, and holes in the tops of manhole covers in flooded streets.

Interceptor - A sewer that receives flow from a number of main or trunk sewers, force mains, etc.

King County-Waste Water Treatment Division (WWTD) - The regional wastewater treatment and disposal provider that contracts with CCUD to treat all wastewater generated within the District.

Lateral - A sewer that has no other common sewers discharging into it.

Main - A sewer that receives flow from one or more laterals. (Also referred to as "trunk").

Peak Day Flow (PDF) - The maximum flow received over a calendar day, usually occurring during the wet weather.

Peak Hour Flow (PHF) - The largest estimated flow sustained over a 60 minute period in the design year of the wastewater facility. Peak hour flow is often used as peak design flow.

Peak Month Flow (PMF) - The largest estimated flow rate sustained over a calendar month.

Sewerage - A complete system of piping, pumps, basins, tanks, unit processes, and appurtenances for the collection, transporting, treating, and discharging of wastewater. Term is declining in use, generally being replaced by sewer system or wastewater facilities.

Trunk - A sewer that receives flow from one or more sewer mains.

Washington Administrative Code (WAC) - Document which consists of regulations adopted by the State to carry out the RCW.

Wastewater - Water carried wastes from residences, businesses, institutions, and industrial establishments, together with such ground and storm waters as may be present.

Wastewater Treatment Plant (WWTP) - A water pollution control facility engineered and constructed to remove pollutants from wastewater. (Also referred to as a sewage treatment plant).

Wet Weather Flow - Wastewater flow during or following periods of moderate to heavy rainfall; in the Puget Sound area, this typically occurs during the months November through April. Infiltration and inflow may increase the wet weather flow to a rate many times greater than the dry weather flow, and unless provided for in sewerage design, can produce hydraulic overloads resulting in wastewater overflows to streets or water courses.

Wet Well - The compartment in a pump station where wastewater flow is collected and from which the pumps intake wastewater to be discharged into a force main.

PART 1
INTRODUCTION AND OVERVIEW

1.1 INTRODUCTION

This Comprehensive Water and Sewer System Plan Update (Plan) undertaken by PACE Engineers, Inc. has been developed for Coal Creek Utility District as means for meeting regulatory requirements and providing a roadmap for sustained utility system development, operations, and financing. The Plan supersedes and updates the District's previous water system and sewer system plan and provides Coal Creek with one guidebook for operation, maintenance, renewal and upgrade of the two utility systems. By addressing the water and sewer system concurrently, the District is assured that the needs of both systems are considered and efficiencies for renewal, replacement, and future development are more easily achieved. The system analyses have been accomplished using the same base data for population, employment, water demands and sewage flows, providing comprehensive analyses of the two systems under identical parameters.

The water system portion of this document has been developed in accordance with Washington State Department of Health (DOH) WAC 246-290-100, King County Code 13.24, District and local guidelines and requirements. Included are descriptions of the characteristics and policies of the water service area, the existing water system, and established minimum design criteria for the water system. This information provides the basis for analysis of the water system and ultimately, identification of system deficiencies and recommended water system improvements.

The sanitary sewer portion of the document has been prepared in accordance with Washington State Department of Ecology (DOE) WAC 173-240-050, King County Code 13.24, District and local guidelines and requirements. The sewer portion of the Plan includes identification and description of the characteristics and policies of the District's sewer service area, description of the existing sanitary sewer system, minimum design criteria for the sewer system, identification of system deficiencies, and sewer improvements required to meet the needs of current and anticipated customers.

One of the primary outcomes of the Plan is the development of a detailed capital improvements plan (CIP) that identifies and prioritizes the individual and collective needs of the water and sewer systems. In accordance with requirements and regulations, this document also includes summaries of the water use efficiency, operations and maintenance, and emergency response programs of the District and details other important elements of operation such as cross connection control, water quality monitoring, and sewer infiltration and inflow programs.

This introductory section of the Plan provides an overview of the goals of the document, regulatory requirements under which Coal Creek Utility District operates and the other planning documents which were utilized in this planning process.

1.2 AUTHORIZATION

Recognizing the need to update its existing comprehensive plan (2004 Comprehensive Plan), the Coal Creek Board of Commissioners authorized PACE Engineers, Inc. in the fall of 2011 to prepare this document in accordance with District policies and procedures and all applicable rules and regulations.

1.3 PURPOSE

The purpose of this study is to establish a comprehensive document that provides for orderly development of the District's water and sewer systems to meet the potable water system, fire flow, and sanitary sewer collection and disposal needs of the District's existing and future customers.

The purpose of this plan is to:

- Consider past studies, reports and other data concerning the water and sewer systems;
- Verify the current and future service areas of the District in conjunction with the plans and policies of neighboring water and sewer providers and local plans and policies;
- Identify land use and population trends and projections of other agencies, including King County, the City of Newcastle, City of Renton, and the Puget Sound Regional Council;
- Document historical water use trends and wastewater flows and establish realistic water demand and sewer flow projections;
- Update minimum design criteria to address the District's most current policies and practices and State Departments of Health and Ecology regulations;
- Develop a concise description of the District's existing utility systems, including recent additions, modifications and upgrades;
- Confirm the District's existing hydraulic model of the water system for use as a long range tool for evaluation of the system under various growth scenarios;
- Identify the system needs to meet existing and potential system requirements under identified growth and operational scenarios;
- Update comprehensive plan maps and utilize the geographic information system (GIS) mapping available from other jurisdictions;

- Develop a detailed Capital Improvements Plan for recommended system improvements, including cost estimates and schedules for the six and twenty-year planning horizons;
- Review, update and document supplemental documentation such as Operations and Maintenance, Water Quality Monitoring, Cross Connection Control, Water Use Efficiency, Infiltration and Inflow Reduction, and Emergency Response Programs; and
- Comply with all federal, state and local agency requirements governing provision of public water and sewer service, the Growth Management Act, and environmental protection.

1.4 OVERVIEW OF THE DISTRICT

1.4.1 Location

As indicated on Figure 1-1, Coal Creek Utility District is generally located between the cities of Renton and Bellevue east of Lake Washington, and serves the City of Newcastle and small portions of the City of Renton and unincorporated King County. The District's incorporated area is similar to boundaries of the City of Newcastle, and is bordered on the north by the City of Bellevue city limits (Southeast 69th Street), on the south by the City of Renton, on the west by Lake Washington, and on the east by Cougar Mountain Regional Wildland Park.

1.4.2 History of the District

1.4.2.1 Water District History

In November 1959, the customers of King County Water District Nos. 92 and 95 elected to consolidate and form King County Water District No. 107. In July 1960, the District adopted a comprehensive plan for water supply that included the previously approved comprehensive plans for the former Districts. At the end of that year, King County Water District No. 107 created a ULID to purchase an existing pipeline along Lake Washington Boulevard from a private water company. This pipeline provided the District with an additional connection to the City of Seattle supply line.

In September 1961, King County Water District No. 102 merged with King County Water District No. 107. The comprehensive water facilities plan was amended in August 1962 to allow connection of the King County Water District No. 102 system to the King County Water District No. 107 facilities. The District's first major storage reservoir, a 1.0 million gallon reservoir, was constructed in 1967 to

serve the higher elevations in the District. This reservoir is still used to serve the District's existing 580 Zone.

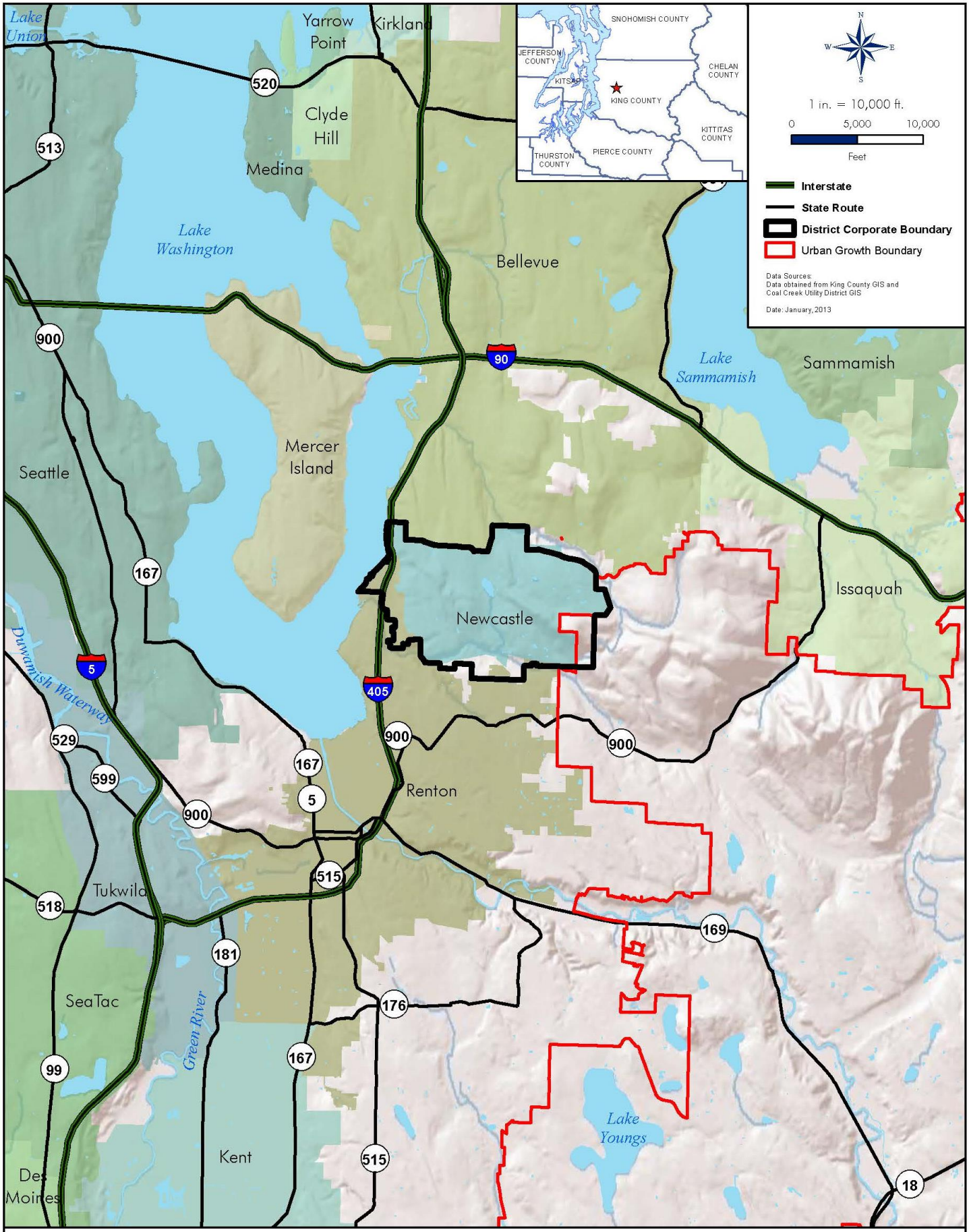
A merger of the Newport Sewer District with King County Water District No. 107 began when the two agencies agreed to a joint billing program in 1969. The actual merger occurred in 1972.

1.4.2.2 Sewer District History

The original sanitary sewer system serving what is now the Coal Creek Utility District sewer service area included a sewage treatment plant and was constructed by the developer of Newport Hills to serve homes constructed in that area. In 1958, the voters of the area elected to create a sewer district to provide for maintenance and operation of the sewer system serving the community. The first meeting of the Newport Hills Sewer District was held in January of 1959.

In June of 1959, a comprehensive plan was adopted by the Newport Hills Sewer District which called for the purchase of the existing sewer system and treatment facilities, and described a plan for providing sewer service to future development within the District. Funds were obtained and the District formally accepted title to the sewer system in accordance with the adopted plan. A contract for disposal of sewage flows from the District was signed with Metro (Municipality of Metropolitan Seattle) in 1961 and eventually allowed the District to abandon its previous treatment plant and effluent disposal field.

The territory of the Newport Hills Sewer District was within the boundaries of the King County Water District No. 107, the provider of water service in the area, when the two agencies agreed to participate in a joint billing system in 1969. In 1971, the maintenance and operation of the respective water and sewer systems was consolidated under one manager, with a single office and staff. Also in 1971, a revision of the laws governing the special purpose districts provided a method whereby a sewer district could be merged with a water district. This led to the 1972 formal merger of the Newport Hills Sewer District into King County Water District No. 107.



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An Engineering Services Company

Date: January, 2013

Comprehensive Water and Sewer System Plan
Figure 1-1
Location Map

COAL CREEK UTILITY DISTRICT

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1.4.2.3 Combined District History

In July 1995 the merged District, which had been operating under King County Water District No. 107, officially changed its name to Coal Creek Utility District.

Following the merger, several annexations brought the District to its largest size; approximately 8.5 square miles for the water service area, and approximately 7 square miles for the sewer service area. Prior to Coal Creek's 2004 Comprehensive plan, several annexations took place, including: a portion of the proposed plat of the Highlands at Newcastle, which added approximately 29 acres in the southeastern portion of the District in 1995; a 66 acre area adjacent to the Cougar Mountain Regional Wildland Park, which is part of the Golf Club at Newcastle project, was annexed in 1997; in 1998 approximately 25 acres of land in the southwestern portion of the District, which are part of a residential development known as Lacrosse (Stafford Crest); in 2002 the Windtree annexation added approximately 97 acres in the southeastern portion of the District; and 21 acres were added by the 2002 SE 91st Street Annexation also in the southern portion of the District. The District is currently contemplating annexation of an area in the vicinity of Southeast May Valley Road in direct response to petitions received from potential customers within the service area. In accordance with District policy, additional annexations will be required to extend permanent service to areas within the service area but currently outside the District's existing corporate (legal) boundaries.

In 1999, the City of Bellevue initiated an assumption of the portion of the District's sewer system that existed within the City's incorporated boundary. This assumption became effective on December 31, 2003, and ownership of all assets were transferred to Bellevue. Following the assumption, the District has accomplished improvements to physically separate the water and sewer systems from Bellevue's systems insofar as practical.

1.4.3 Authority, Management and Conduct of Business

Coal Creek is authorized by the State of Washington under the Revised Code of Washington (RCW) Title 57 (Water and Sewer Districts) to operate a public utility system. The District operates under a commissioner system, whereby three commissioners are elected by the residents within the District's incorporated area. The incorporated area is approximately 5.4 square miles and is shown in relation to the water and sewer service areas in Figure 2-1. Resolutions and motions adopted by the District make and establish the policies that govern its operation.

The District general manager has the overall responsibility of day-to-day operations. The District also employs an office manager, an operations manager, and several other office and field support staff. The present staff totals thirteen permanent employees including four office staff and nine field staff. Appendix W-1 contains documentation of the water system operators on staff and their associated professional certifications, as well as the organizational hierarchy.

Engineering, legal counsel, and finances for the District are provided by outside consultants selected by the Board of Commissioners. These consultants report to the general manager. Additionally, they attend the Board of Commissioner's meetings as required to advise the Commissioners on ongoing matters.

1.4.4 Overview of Existing Water System

The approximately 5.5 square mile designated retail water service area is served by a water system that provides domestic potable water and fire protection service for approximately 4,500 service connections. . Although the water service customer base is primarily (92%) single-family residential, multi-family residential, irrigation, and commercial connections are also served. Water supply to these customers is obtained from the City of Seattle regional water supply system. A total of five water storage reservoirs provide required standby, fire protection and equalizing storage. Four pump stations and eighteen pressure reducing valves are maintained to serve the customers in nine pressure zones.

1.4.5 Overview of Existing Sewer System

The approximately 4.8 square mile sewer service area is served by a sewer system that provides sanitary sewer service to approximately 2,870 connections. The District is divided into 11 drainage basins. Eight lift stations are used to transport wastewater flows where gravity service is not available. Coal Creek maintains an agreement with King County for wastewater conveyance, treatment and disposal.

1.5 RULES AND REGULATIONS

Coal Creek Utility District operates under a variety of rules, regulations and requirements pertaining to safe drinking water and domestic water, fire protection and sanitary sewer collection and disposal. A brief summary of key regulations impacting day-to-day operations of the District is provided in the following paragraphs. More detailed discussions regarding specific regulatory requirements can be found in appropriate subsequent Plan sections.

1.5.1 Federal Regulations

1.5.1.1 Safe Drinking Water Act

Public Law 93-523, the Safe Drinking Water Act (SDWA), directs the U.S. Environmental Protection Agency (EPA) to establish minimum national drinking water standards limiting the amount of various substances that may be present in drinking water sources. These limits are regulated by the State of Washington Department of Health and adhered to by Coal Creek. Complete details of current regulations and the District's water quality monitoring program are provided in Part 3 and the Appendices to this Plan.

1.5.1.2 Clean Water Act

The Clean Water Act puts forth regulations and requirements for restoration and maintenance of the integrity of the nation's waters in terms of physical, chemical and biological characteristics. The U.S. Environmental Protection Agency is the primary administrator of the Clean Water Act but has delegated many aspects of administration of the Act to the State of Washington Department of Ecology (DOE).

Coal Creek contracts with King County WWTD to ensure all wastewater produced within its sewer service area is conveyed to regional Wastewater Treatment Plants (WWTPs). Wastewater generated in the District is treated at these plants to meet the water quality standards established under the Federal Water Pollution Control Act (also referred to as the Clean Water Act) and under the terms of each Plant's National Pollutant Discharge Elimination System (NPDES) permits. The District's formal agreements with these wastewater treatment facilities ensure that it remains in compliance with the Clean Water Act and regional water quality management plans, such as the May Creek Basin Action Plan adopted in 2001 by King County, and the Comprehensive Basin Plan produced by King County with help from the City of Bellevue in 1987.

1.5.1.3 Endangered Species Act

Because of the listing of the Puget Sound Chinook Salmon and Bull Trout as "threatened species", rules and regulations under the authority of the Endangered Species Act (ESA) impact the District's water and sewer systems operations. The District works with agencies having jurisdiction to comply with all permit requirements associated with construction of its utility systems and exercises the

most current techniques in system construction, operation and maintenance to reduce the threat of impacting endangered species.

1.5.1.4 Capacity, Management, Operations and Maintenance

Capacity, Management, Operations and Maintenance (CMOM) Regulations are anticipated in the future as part of the Environmental Protection Agency's Sanitary Sewer Overflow (SSO) Rule under the National Pollution Discharge Elimination System (NPDES) permit program. CMOM will require sanitary sewer collection system owners to take all feasible steps to stop and/or mitigate the impact of sanitary sewer overflows. The program requires improved data management, operations and maintenance, and notification procedures for SSO events. It is not known when CMOM policies or regulations will be formalized, but it is anticipated that the EPA will delegate authority to the States, and rules will be enforced in WA by the State's Department of Ecology.

1.5.2 State of Washington Requirements

1.5.2.1 Washington Code

The rules and regulations regarding public water supplies are a part of the Washington Administrative Code (WAC) and are adopted pursuant to the provisions in the Revised Code of Washington (RCW) 43.20.050 for the protection of public health. The rules and regulations provide the minimum standards for design, construction, operations and maintenance of public water systems to conform with the Safe Drinking Water Act of 1974 and all subsequent amendments thereto.

RCW Title 57 governs the operation of Water and Sewer Districts within the State of Washington and provides the authority for Coal Creek to operate public water and sewer systems. Title 57 specifies a variety of planning and operational characteristics such as establishment of boundaries, annexations, consolidations, mergers, formation of utility local improvement districts, comprehensive planning requirements, officer elections, contracts, and system extensions.

1.5.2.2 Growth Management Act

The Growth Management Act (RCW 36.70A) has a direct impact on utility system planning by requiring a complete inventory of existing system facilities and a comprehensive effort toward determining the capability of utility systems to support anticipated growth. Although the majority of growth management activities are the responsibility of counties and cities, data and information from special purpose districts is required in order to make decisions on future growth potential and corresponding levels of service. A primary outcome of the growth management planning in King County is the delineation of an Urban Growth Area (UGA) boundary within which an urban level of service is required. Coal Creek's sewer service area is entirely within the established UGA and the majority of the water service area is also. The District is therefore able to plan for facilities appropriately sized for this designation.

1.5.2.3 State of Washington Auditor

Regulations related to accounting practices for municipalities such as Coal Creek are implemented and monitored by the State of Washington Auditor. Accepted accounting practices that impact District operations include the issuance of Government Accounting Standards Bureau statement 34 (GASB 34). While the implementation of GASB 34 is beyond the scope of this Plan and is being addressed separately by the District's financial staff and advisors, it is important to note that increased infrastructure inventory requirements and changes in reporting are elements of GASB 34.

1.5.2.4 State Environmental Policy Act

State Environmental Policy Act (SEPA) review is generally required for all District projects other than regular renewal and replacement projects involving pipe sizes of less than 10-inches. SEPA requirements and exemptions are detailed in WAC Chapter 197-11 and adopted District environmental policies are in place to insure that environmental concerns associated with construction are adequately addressed. Initiation of the SEPA process can be at the District's direction or as required for various permits. The SEPA process is required for this plan document and an environmental checklist and determination of non-significance is provided in Appendix G-1.

1.5.2.5 Department of Health

Approval of this document and operation of the District's water system is under the jurisdiction of the Washington State Department of Health (DOH). This document has been prepared, and the District is operated, in accordance with the requirements set forth in the DOH "Water System Design Manual" (December 2009). This document incorporates the policies, guidelines, and practices of the Department of Health and identifies minimum engineering requirements for design, construction and operation of a public water system.

1.5.2.6 Department of Ecology

This document has been prepared, and the District is operated, in accordance with the requirements set forth by the State Department of Ecology's "Criteria for Sewage Works Design" (Orange Book), which incorporates the policies, guidelines and practices of the State Department of Ecology and identifies the minimum engineering requirements for design, construction and operation of a public sanitary sewer system. The Orange Book is continuously updated by DOE, with the most recent update as of the development of this Plan occurring in August, 2008.

The State Department of Ecology administers a variety of regulatory requirements that have a direct impact on operation of public sanitary sewer collection systems including the following:

- Surface water quality regulations as put forth in WAC 173-201A;
- Contract document review as authorized by WAC 173-240; and,
- Shoreline management permit administration in accordance with WAC 173-27.

1.5.2.7 Public Water System Coordination Act

The Public Water System Coordination Act of 1977 (RCW 70.116) establishes procedures for adjacent water utilities and local government agencies to coordinate the planning and development of water facilities. These procedures are intended as guidelines for providing future water service in the most efficient manner with the objective of coordinating water system development by geographical areas and integrating water system development with future land use plans. The District's water service area boundary has been approved by the

Department of Health, King County, and neighboring jurisdictions through the East King County Coordinated Water System Plan.

1.5.2.8 Municipal Water Law

In 2003, the Municipal Water Supply – Efficiency Requirements Act, Chapter 5, Laws of 2003 (Municipal Water Law) was passed by the Washington State Legislature. The MWL had several objectives which included:

- Providing greater certainty to municipal water suppliers regarding the legal status and use of their certificated water rights;
- Resolving past regulatory ambiguities regarding the definition of municipal water suppliers and municipal purpose water rights;
- Revising and prescribing the manner in which municipal water supplier service areas are to be described in water system plans;
- Defining the scope of duties and obligations of municipal water suppliers within their retail water service areas;
- Providing greater flexibility to how municipal purpose water rights may be used within the service areas of municipal water supply systems; and
- Prescribing new water conservation and water use efficiency responsibilities and reporting requirements.

Subsequent to the passage of the MWL, the Washington State Department of Health (DOH) issued guidelines in 2006 to assist municipal water suppliers in complying with the new requirements. The DOH guidance documents addressed the MWL provisions cited above, including the requirement that water system plans be consistent with the applicable provisions of local government land use plans and development regulations.

In June of 2007, DOH and the State Board of Health proposed rule changes to Chapter 246-290 WAC (Group A Public Water Supplies) that revised and formalized their earlier policy guidance. This rule package was formally adopted on January 14, 2008, and became effective on February 14, 2008. These rule changes included the Rule on Water Use Efficiency (WUE), which establishes a requirement for water utility systems to set goals for conservation of water resources and establish a WUE program to support their adopted goals.

1.5.3 King County Requirements

Because a very small portion of Coal Creek Utility District, approximately 154 acres, operates within unincorporated King County, the District must operate within the rules and regulations established by King County and utilize County planning data in developing growth projections for areas within the County. Specifically, the King County Comprehensive Plan has a direct impact on the District and its planning efforts. King County Code Titles 13.24 (Sewer and Water Comprehensive Plans) and 17.08 (Fire Hydrants and Water Mains) have been utilized in the development of this document to ensure that District operations conform to King County requirements. The District must also operate within the terms of its current right-of-way franchise agreement with King County. All construction and maintenance within established King County right-of-way will be performed in accordance with the most current edition of the King County Road Standards.

King County has developed a May Creek Basin Action Plan for the purpose of minimizing the threat of flooding and damage to homes, facilitating stormwater conveyance, reducing erosion, and protecting and enhancing fish and wildlife habitat and water quality in the basin. Coal Creek Utility District was listed as a partner with the City of Newcastle for improving the water quality in Lake Boren by installing sewer service to properties adjacent to the Lake. In 2007, Coal Creek obtained a Public Works Trust Fund loan that allowed for the expansion and installation of new sewers to serve these properties and help reduce nitrogen and other pollutants in the Lake.

1.5.4 City Requirements

Coal Creek operates within the City of Newcastle, as well as small portions of the City of Renton. Requirements of King County Code and the Municipal Water Law state that the District must operate in accordance with the requirements established by local authorities and works with these cities on a regular basis to ensure coordination, compliance and consistency with local Comprehensive Planning efforts is maintained. Copies of consistency statement checklists received by King County, the City of Renton, and the City of Newcastle are provided in Appendix W-2.

1.6 CONTRACTS AND AGREEMENTS

Coal Creek Utility District currently has the following agreements with neighboring jurisdictions and water and sewer providers. Copies of these agreements are provided in Appendix W-7.

- Coal Creek Utility District and City of Renton Service Area Agreement

- King County Water District No. 107 (Coal Creek Utility District) and City of Renton Utility Franchise, dated November 2, 1987
- Coal Creek Utility District and City of Renton Joint Ownership Sewer Agreement, dated June 19, 1975
- Coal Creek Utility District and City of Bellevue Assumption Agreement
- Coal Creek Utility District Water Supply Contract with Seattle Public Utilities
- Coal Creek Utility District Sewage Disposal Agreement with King County

1.7 RELATED PLANS AND STUDIES

The recent planning and engineering studies which have been considered in the development of this Plan are listed in Table 1-1. Related plans and policies which have been prepared by others but were utilized in the development of this document are identified in Table 1-2.

Table 1-1: Previous Plans and Studies

Title	Year	Produced By
Comprehensive Water and Sewer Plan	2005	CCUD
Conservation Plan	2004	CCUD
Coal Creek Utility District and City of Bellevue Assumption Agreement	2003	Joint – CCUD and City of Bellevue
Interim Comprehensive Sewer Plan	2002	CCUD
Water Shortage Response Plan	2001	CCUD
King County-Metro Sewer Study	2001	CCUD
May Creek Basin Action Plan	2001	King County
Coal Creek Comprehensive Basin Plan	1987	King County and City of Bellevue
Comprehensive Water System Plan	1994	King County Water District No. 107
Emergency Response Plan	1993	King County Water District No. 107
High Level Pumping Study	1991	King County Water District No. 107
Telemetry Study	1991	King County Water District No. 107
Water System Operations and Maintenance Manual	1989	King County Water District No. 107
Sewer System Operations and Maintenance Manual	1989	King County Water District No. 107
Comprehensive Sewer Plan	1988	King County Water District No. 107
Comprehensive Water Plan	1986	King County Water District No. 107

Table 1-2: Relevant Plans and Studies

Title	Year Last Updated	Produced By
King County Comprehensive Plan	2008 (Draft 2012)	King County
King County Wastewater Services Plan	2003	King County
King County Regional Infiltration and Inflow Control Program Reports and Data	2001-2003	King County
Seattle Public Utilities Water System Plan	2007	City of Seattle – Seattle Public Utilities
Seattle Public Utilities Conservation Potential Assessment	2006	City of Seattle – Seattle Public Utilities
City of Newcastle Comprehensive Plan	2011	City of Newcastle
City of Renton Comprehensive Water System Plan	2012	City of Renton
City of Renton Long-Range Wastewater Management Plan	2010	City of Renton
City of Renton Comprehensive Plan	2011	City of Renton
City of Bellevue Comprehensive Water Plan	2006	City of Bellevue
May Creek Basin Action Plan	2001	King County
City of Bellevue Comprehensive Wastewater Plan	2002 (Draft 2012)	City of Bellevue
City of Bellevue Comprehensive Plan	2011	City of Bellevue
East King County Coordinated Water System Plan, Regional Supplement	1989	King County

PART 2
PLANNING DATA

2.1 INTRODUCTION

This section of the Plan discusses the primary goals of Coal Creek Utility District, provides a description of the water and sewer service areas and identifies the physical and demographic characteristics of these areas. Water system demands and sewer system flow projections are presented in Parts 3 and 4 of this Plan, respectively. Presenting an analysis of the comprehensive planning efforts underway within the District's service areas and describing projected growth are an integral part of the utility system planning process. Examining Growth Management activities and impacts on the utility system will ensure that as population and employment increase, the water and sewer systems will be adequately upsized and altered where necessary to meet increased demands.

2.2 DISTRICT POLICIES

Coal Creek Utility District's mission is to provide its rate payers the highest quality, the most cost effective water and sewer service, both today and into the future, while meeting the overall public and regulatory approval.

2.2.1 General District Policies

Coal Creek maintains general policies to ensure that it is providing a level of service consistent with the local community's expectations. To that end, the District is committed to:

- Conduct all operations in a manner that results in the provision of service at the lowest reasonable cost.
- Maintain system facilities to ensure a high level of service and maximize the useful life of the system.
- Providing a healthy, opportunity rich workplace environment and treat its employees with fairness and respect.
- Respond to water quality complaints, notifications of service failures, and billing disputes in a timely and reasonable fashion.
- Support regional water use efficiency programs to encourage efficient use of resources and promote sustainability of existing regional and local sources of

supply. This includes consideration and promotion of water reuse alternatives and opportunities.

- Working with neighboring and other regional water purveyors toward common goals of establishing uniform water system standards, developing new water sources, and coordinating efforts towards the adequate provision of water service throughout the region.

2.2.2 Service Area Policies

The District is committed to the following principles and policies in their efforts to provide a high level of water and sewer service throughout the established service area(s) at a reasonable cost and in a timely and reasonable manner. The District shall:

- Provide all residential customers within the District the opportunity to elect the Board of Commissioners.
- Ensure all properties served by the District are located within the legal (corporate) limits, except in the event of a specific interlocal agreement.
- Provide service to all properties within the established water and sewer service areas in a timely and reasonable manner, except as otherwise necessary and documented by interlocal agreement with a neighboring service provider. Procedures for the extension of service in a timely and reasonable manner are provided in Appendix W-3.
- Not pursue annexation and satellite service provided outside of established water and sewer service areas. However, Coal Creek will consider these cases individually and in cooperation with affected neighboring utility providers.
- Develop and operate a wastewater collection system that meets or exceeds environmental regulations and adequately protects public health, ground water, and surface water resources.
- Provide and maintain water and sanitary sewer facilities that provide uninterrupted service to existing and future customers without backups, overflows or excessive leakage.
- Encourage gravity service as the preferred method of extending water or sewer service to new connections, and avoid new pump stations where practical.

2.2.3 Service Request and Developer Extension Policies

The following paragraphs describe the process for obtaining service from the District.

All developments must obtain a Certificate of Water Availability. The developer is responsible for obtaining the certificate from the District. Coal Creek uses a hydraulic model of the water system to determine if sufficient capacity exists and what, if any improvements are required to provide adequate service. The Certificate of Water Availability specifies what improvements are needed to provide service. The turn-around time for obtaining a certificate is usually five to ten working days.

If the request is for a service installation, applicable fees and charges are paid and the District installs the service. The service installation usually happens within ten working days of receiving payment of the required fees and charges, depending on the time required to obtain right-of-way permits.

Developer Extension (DE) projects proceed in accordance with the guidelines and checklist in the "Agreement for Constructing Extension to the Water and/or Sewer System", which must be signed by the developer and authorized District staff. A construction schedule is agreed upon between the District and the Developer, and the extension must be completed within two (2) years of signing the agreement.

If needed, developers can request time extensions for completing water or sewer service projects. Time extension requests are reviewed and approved by the Board of Commissioners.

Disputes and appeals are also addressed by the Board of Commissioners. The District typically only denies requests for service if the area requesting service is not in the established service areas. If request denial occurs, Coal Creek works with the Developer and neighboring water purveyor(s) to determine how to best serve the area.

The District maintains the following policies in regards to orderly extension of services:

- All development within the District is required to pay costs associated with extension of service, including the costs of increased fire flow protection facilities and wastewater conveyance that may be associated with the development.
- Annexation is required for any property requesting service that is not currently within the District's incorporated boundary, per RCW 57.24.
- Developers are required to extend facilities to the furthest boundary of their property for future extension by others, unless waived by District staff.

- All extensions, alterations, replacements and upgrades of water or sewer service facilities must meet the criteria established in the District's approved design standards and the requirements of the agency having jurisdiction over road and right of way standards. Copies of the District's latest design standards are available at the District office and are kept on file with the Department of Health Office of Drinking Water.

2.3 SERVICE AREAS

As discussed in Part 1, Coal Creek provides water and sewer service within the city limits of Newcastle and Renton, and serves a small area within unincorporated King County. The retail water service area boundary was approved by King County and neighboring jurisdictions through the East King County Coordinated Water System Plan and subsequent water planning documents by adjacent purveyors. Sewer service areas are also agreed upon amongst neighboring utilities and are established in the sewer system planning processes of individual utility service providers. The District's corporate boundary is a separate boundary established by District resolution that closely resembles the established water and sewer service area boundaries. Figure 2-1 shows the geographic relationship of the District's water, sewer, and corporate boundaries to each other and the boundaries of neighboring providers. No future annexations or alterations to these boundaries are under consideration as of this Plan Update.

2.3.1 Retail Water Service Area

Coal Creek's retail water service area is consistent with the East King County Coordinated Water System Plan and approximately 5.5 square miles in size. It reaches from the boundary between the Cities of Newcastle and Bellevue on Southeast 69th Street on the north to the Renton city limits on the south, and from Lake Washington on the west to Cougar Mountain Regional Wildland Park on the east. Coal Creek serves a portion of the City of Renton in the southwestern area of the District and a small portion of unincorporated King County. With the exception of a few properties located east of 110th Ave SE north of SE 43rd Place, the City of Newcastle is entirely within the water service area of the District. Neighboring water purveyors include the City of Bellevue to the north, the City of Renton to the southwest and King County Water District No. 90 to the southeast.

Under the Municipal Water Law, a retail service area is defined as the area where a supplier has a duty to provide service to all new service connections. This area includes a water supplier's existing service area (and connections), and may also include areas where new service is proposed.

The duty to serve existing and potential future connections within a retail water service area occurs if the following criteria are met:

- Sufficient source (including water rights) and system capacity exists to serve water in a safe and reliable manner as determined by DOH;
- Service can be provided in a manner consistent with provisions of adopted land use plan(s) and development regulation(s) that relate to water service;
- Service can be provided in a timely and reasonable manner.

For purposes of this Plan, the District's designated retail service area is consistent with the service area described throughout this Plan and the terms shall be considered synonymous. The retail service area is illustrated in Figures 2-1 and 2-2. Figure 2-1 shows the service area in relation to the District's corporate and sewer service area boundaries, and Figure 2-2 depicts the current zoning within the established service area.

2.3.2 Sewer Service Area

Coal Creek's sewer service area generally extends from the boundary between Bellevue and Newcastle at Southeast 69th Street on the north, the Renton city limits on the south, Cougar Mountain Regional Wildland Park on the east, and Lake Washington on the west. The eastern boundary also coincides with the Urban Growth Area boundary established for King County. As with the water system, Coal Creek provides sanitary sewer service to a portion of the City of Renton in the southwestern area of the District and a small portion of unincorporated King County. The City of Newcastle is entirely within the sewer service area of the District. Neighboring sanitary sewer service providers include the City of Bellevue to the north and the City of Renton to the south. The sewer service area is approximately 4.8 square miles and is illustrated in Figures 2-1 and 2-2.

2.3.3 General Characteristics of the Service Areas

Because the water and sewer service areas are nearly identical, the general characteristics are discussed collectively in the following sections and are jointly referred to.

2.3.3.1 Governance

As noted in Table 2-1, the primary municipality that maintains land use authority over development within Coal Creek Utility District is the City of Newcastle. The City relies on Coal Creek for provision of water and sanitary sewer service and the City of Bellevue's Fire Department for fire protection service. Similarly, Coal Creek

provides water and sewer service to small areas of Renton and Bellevue and to a portion of King County as shown on Figure 2-1 and indicated below.

Table 2-1: Jurisdictions Served
Water and Sewer Service Area

Jurisdiction	Acreage in Water Service Area	Acreage in Sewer Service Area
City of Newcastle	2,851	2,849
City of Renton	111	121
Unincorporated King County	685	170
Total	*3,647*	*3,140*

Notes: Water Service Area includes 471 acres within King County Regional Wildland Park, which is not available for development.

2.3.3.2 Topography

Coal Creek Utility District is located in the foothills of eastern King County, east of Lake Washington. The northern portion of the District slopes northeast to Coal Creek while the southern portion of the District slopes southwest to May Creek and eventually Lake Washington. Both Creeks drain to Lake Washington.

The lowest elevations are found in the western portion of the District, along the shores of Lake Washington. The eastern portion of the District reaches elevations in excess of 1,000 feet. The land generally gains elevation from west to east until it reaches a high point on Cougar Mountain, located just east of the District.

2.3.3.3 Geology and Soils

The dominant soil association found within the District is the Beausite Alderwood Association (reference: King County Soil Survey, USDA Soil Conservation Service, 1973). This association is well drained to moderately well drained, gently rolling to very steep soils that have sandstone of shale, or dense, very permeable glacial till at a depth of 20 to 40 inches. The other soil association found within the southwest corner of the District, near the mouth of May Creek, is the Everett Association.

Bedrock on the eastern half of the District is comprised chiefly of sandstone, siltstone, and volcanic rock. These rocks are generally well lithified, and have very low rates of permeability. Except where exposed, the bedrock is usually mantled by a thin layer of soil or covering of glacial deposits. Volcanic bedrock is exposed in several small hills just north of the District.

Both recent and older non-glacial deposits occur in the western portion of the District's service areas. Glacial and non-glacial unconsolidated deposits are of the following basic types:

- Alluvium consisting of brown sand and peat has been deposited at stream deltas where Coal and May Creeks flow into Lake Washington. These deltas have been modified by grading, and have been artificially filled by material of unknown quality. The filled areas are generally used for commercial and industrial development.
- Vashon till is a poorly sorted mixture of clay, silt, sand, and gravel spread over the surface of the upland of actively moving glacial ice. Till covers most of the western half of the service areas and is dense and nearly impermeable. Till may be covered with a thin layer of silty, stony soil. A thin layer overlays some of the bedrock in the District.
- Silt and clay mapped within the service areas appears to have been deposited during an older, non-glacial episode when the climate was similar to that of today. This older silt and clay has been compacted to a dense consistency and is nearly impermeable.
- Vashon and recessional gravel was deposited along with sand by meltwater streams issuing from the retreating Vashon Glacier. This gravel was not overridden by the ice and subsequently has a consistency ranging from loose to medium dense. The gravel is usually brown and is extremely permeable.
- Older gravel with a dense consistency occurs as thin layers or discontinuous lenses within older silt and clay. This gravel is very permeable and is exposed in only a few locations along the steep valley sides bordering the uplands.

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Path: J:\Planning\Coal Creek\2012 CCUD Comp Plan\ArcMapDoc\Figure 2-1 Service Areas Map.mxd

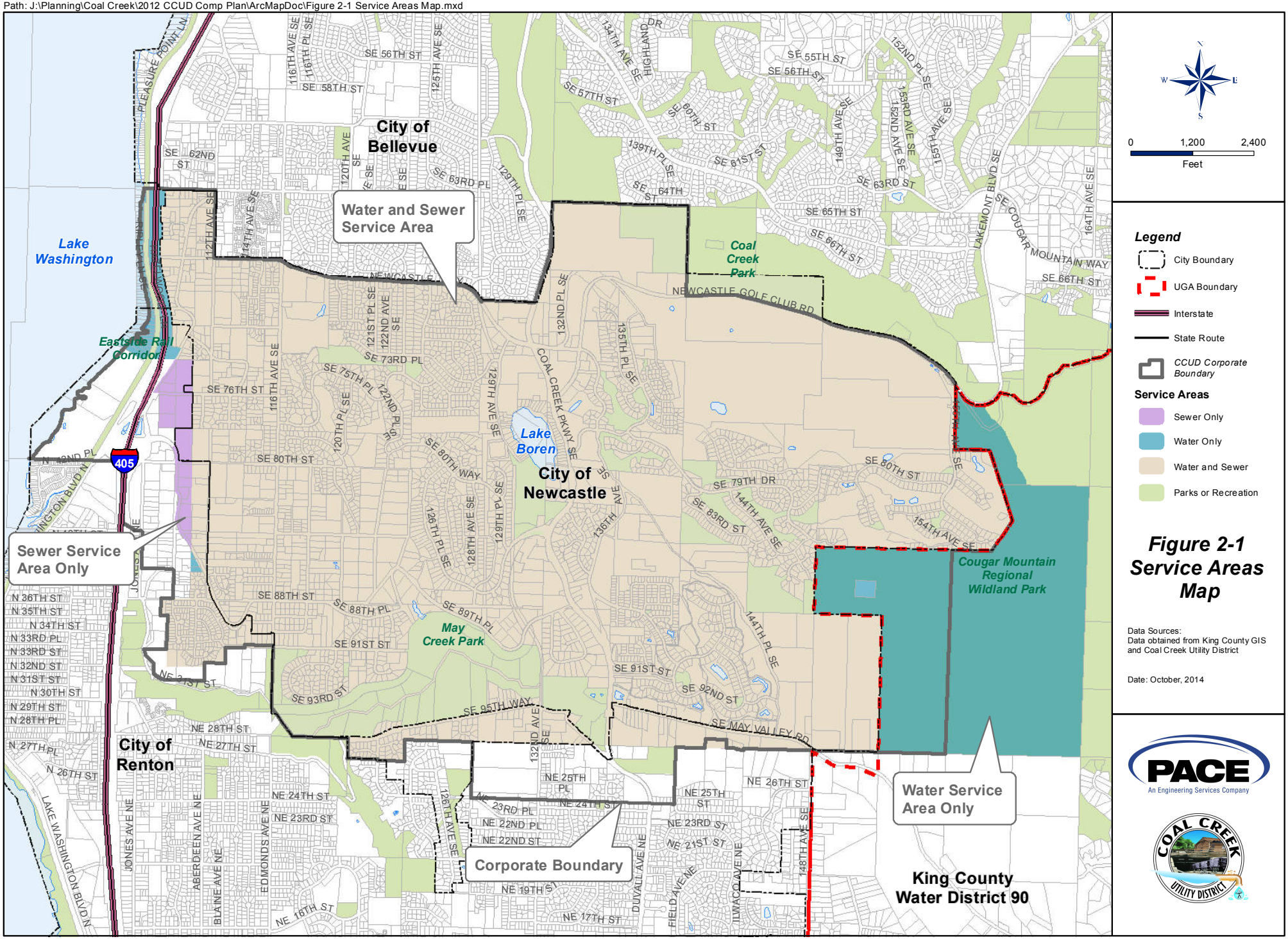

Figure 2-1 Service Areas Map

Data Sources:
Data obtained from King County GIS and Coal Creek Utility District

Date: October, 2014

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2.3.3.4 Surface Water Resources

Coal Creek Utility District is within Water Resource Inventory Area Number 8 (WRIA 8) for the Cedar / Sammamish Rivers as defined by the Washington State Department of Ecology. The District falls within three separate natural drainage basins within WRIA 8. These basins, identified as East Lake Washington, May Creek, and Coal Creek, are sub-basins to the Cedar River Drainage Basin, and are described in the following sections. Surface water resources contained within these basins are illustrated in Figures 3-2 and 5-1.

East Lake Washington Drainage Basin

The western portion of the District (west of approximately SE 119th Street) is within the East Lake Washington Drainage Basin. This portion of the District is along the eastern shore of Lake Washington and drains naturally into the Lake. No other significant surface water features are within this portion of the basin.

May Creek Drainage Basin

The southernmost portion of the District is within the May Creek Drainage Basin. Drainage from this area is southerly to May Creek then westerly to Lake Washington. In addition to May Creek and its unclassified tributaries, Lake Boren, located near the intersection of Coal Creek Parkway and SE 76th Street, is within this drainage basin.

Coal Creek Drainage Basin

The northeastern portion of the District lies within the Coal Creek Drainage Basin. This basin drains into Coal Creek and eventually Lake Washington. Coal Creek and unclassified tributaries thereof are the only surface water features in this basin.

2.3.3.5 Groundwater Resources

In the early 1980s, two groundwater studies were completed for the District. The 1980 Mackey Smith report, "Ground Water Resource Investigation for Water District No. 107", concluded that the eastern portion of the District was not suitable for development of a groundwater resource. A potential high yield well had been located in the western portion of the District along the King County-Metro Hazelwood Sewer Tunnel. In 1981, Robinson, Noble & Carr, Inc., conducted a study on the "Impacts of the Hazelwood Sewer Tunnel on Water District No. 107 Production Well No. 1." Although the study indicated that there

would not be any adverse effects from the proximity of the tunnel to the well, the Department of Health rejected use of the well.

In the early 1990s, the District did further investigation regarding the possibility of developing a new groundwater source. A well was drilled near May Creek in the southwestern portion of the District. This investigative drilling did not produce marketable quantities of water. The investigations did not lead to the construction of an alternative water source. The District is currently not pursuing the development of a groundwater source.

According to King County GIS records (April, 2012), there are five Class B water system wells located within the water service area, and approximately nine other private groundwater wells (seven current, two historic) within the District.

2.3.3.6 Sensitive Areas

Review of current King County GIS records (April, 2012) indicates that a variety of sensitive areas exist within the District. These areas are important for consideration because they may dictate development restrictions as well as limit the location and type of water and sewer system facilities that may be required or allowed. Figure 5-1 provided in Section 5 outlines the locations of various identified sensitive areas within the District. Restrictions on development in these areas are established by local authority under the critical areas ordinances of agencies having land use jurisdiction.

2.3.3.7 Climate

The climate in the region is generally mild. The annual average high temperature is around 62 degrees, with the average high month being August with temperatures reaching around 77 degrees. The annual average low temperature is around 45 degrees with the coldest month being January, with average temperatures of around 36 degrees. The average annual precipitation in the area is approximately 36 inches. Climate data is important to water and sewer system planning and has been considered in this planning process for correlation with trends in water use, sanitary sewer flows and infiltration and inflow rates into the sanitary sewer system.

2.3.3.8 Economy

Data obtained from the Puget Sound Regional Council (PSRC) indicate that there are approximately 1,750 employees within the District's corporate area in 2012. There are several retail businesses, schools and other employers within the District, most of which are located within commercial areas along Coal Creek Parkway in the northern portion of the District. In addition, the Golf Club at Newcastle is a key employer as it also has restaurants and banquet facilities in the northeastern corner of the District.

2.3.3.9 Transportation

The major transportation corridors in the District include Coal Creek Parkway, which runs north and south, Newcastle Way on the District's northern boundary, Southeast May Valley Road in the southeast, and 116th Avenue SE in the west.

2.3.3.10 Land Use and Zoning

Zoning and land use regulations within the District are administered primarily by the City of Newcastle, and to a much lesser extent by the City of Renton and King County. The District is primarily single-family residential, and is entirely within the Urban Growth Area (UGA) boundary except for the area of the water service area that is within Cougar Mountain Regional Wildland Park. Concentrations of commercial activity and multi-family development occur along Coal Creek Parkway in the northern part of the District, and a few small areas of the Sewer Service Area near the NE 44th St exit off I-405, located east of the interstate. Parks, schools and other uses related to the suburban nature of the area occur throughout the service area and the Golf Club at Newcastle is located in the northeast portion of the District. It is assumed that the existing land use development will continue as such throughout the planning period for this document. Specific zoning information should be obtained from the City of Newcastle, City of Renton, or King County as appropriate. The general zoning for the District is presented in Figure 2-2 and summarized in Table 2-2. The information presented is based on zoning information from the Cities of Newcastle and Renton and King County.

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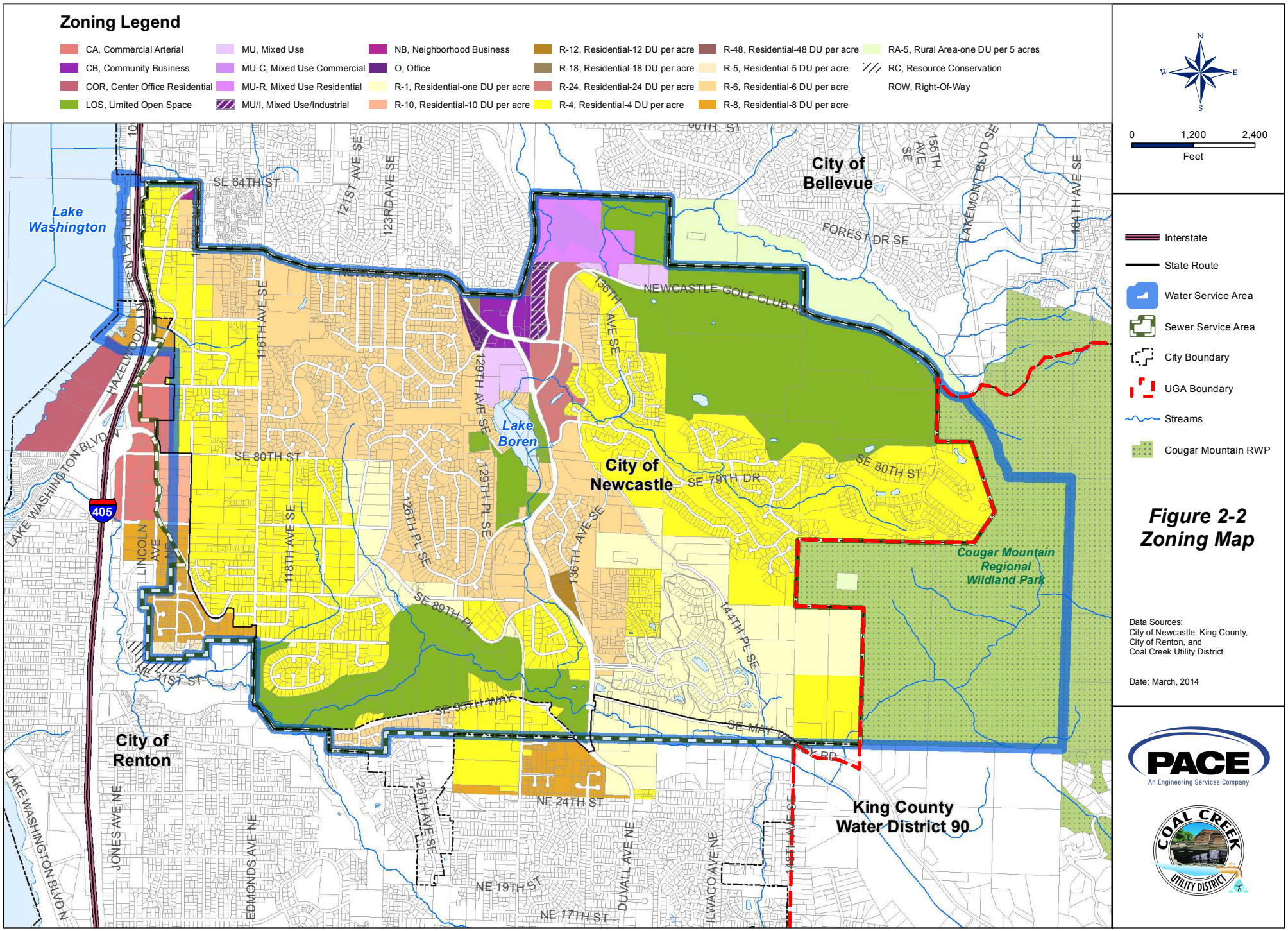

Figure 2-2 Zoning Map

Data Sources:
City of Newcastle, King County, City of Renton, and Coal Creek Utility District

Date: March, 2014

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Table 2-2: Zoning Summary
Water and Sewer Service Area

Zoning Type	Acreage	% of District
Single Family	2,656	67.6%
Multi-Family	67	1.7%
Commercial	130	3.3%
Mixed Use	106	2.7%
Parks and Open Space	584	14.8%
Roads & Other	388	9.9%
Total	*3,931*	*100%*

Notes: Based on data from City of Newcastle, City of Renton, and King County

2.4 POPULATION AND EMPLOYMENT

Tables 2-3 and 2-4 provide summaries of current (2012) and projected population and employment within Coal Creek's water and sewer service areas. Current population and employment data is based primarily on U.S. Census 2010 and PSRC data. City of Renton data was also used to estimate the population for the portion of the city served by Coal Creek. Future population and employment data was developed using PSRC's forecasting data provided in September, 2012. PSRC uses a parcel-based forecasting model to estimate growth in the Puget Sound area. These estimates provided by PSRC were then compared with anticipated housing targets established under Growth Management Act planning efforts. The King County Comprehensive Plan was updated in 2012 with adopted housing targets for each city within the county. The PSRC forecasts show a slightly higher forecast for population growth than the GMA planning forecasts estimate. The District has elected to use the PSRC forecasts in order to take a more conservative approach in the evaluation, planning, and design of future system facilities. Additional information concerning the population and employment projections developed for this Plan is provided in the Technical Memorandum on Forecasting provided in Appendix W-6.

2.4.1 Water Service Area Population and Employment

The existing (2012) and projected water service area population and employment figures are summarized in Table 2-3. The average annual growth rate in population over the next 20 years is approximately one percent a year and the average annual growth rate for employment is estimated to be nearly three percent a year.

Table 2-3: Water Service Area Demographics
Based on PSRC Forecasts

Water Service Area	2010[1]	2012	2018	2025	2032
Population	11,116	11,528	12,766	13,838	14,807
Employment	1,695	1,673	1,605	1,622	1,765

Notes: [1] Source: US Census 2010

2.4.2 Sewer Service Area Population and Employment

The sewer service area population and employment figures are summarized in Table 2-4. Because the sewer and water service areas are similar in zoning and land use makeup, the average annual growth rates in for population and employment over the next 20 years similar to the rates described in Section 2.4.1 (1% for population, and 3% for employment).

Table 2-4: Sewer Service Area Demographics
Based on PSRC Forecasts

Sewer Service Area	2010[1]	2012	2018	2025	2032
Population	10,971	11,278	12,198	13,026	13,776
Employment	1,624	1,724	2,025	2,390	2,771

Notes: [1] Source: US Census 2010

PART 3
WATER SYSTEM

3.1 WATER SYSTEM OVERVIEW AND SUMMARY

Coal Creek Utility District delivers domestic water and fire protection service to approximately 3,300 service connections over a 5.7 square mile service area that, as described in Section 2.3.1 of this Plan, covers the City of Newcastle as well as small portions of unincorporated King County and the City of Renton. A key event in the history of the water system and for consideration in analyses performed in past planning efforts is the assumption of approximately half of the District's service connections by the City of Bellevue in 2003. This assumption did not have a significant impact on the hydraulics of the system but did necessitate metering connections with Bellevue along the dividing line of Newcastle Way to account for water wheeled through District sources and facilities to Bellevue customers. The two-way meters at each Bellevue intertie also measures flow back into the CCUD system as pressure drops or during emergency conditions. This division of the system is referred to throughout this Plan to provided important historic narrative for defining the parameters of the system's evaluation. Several joint-use facilities need to account for the District's share of resources, and the source and storage analyses performed meet both contractual obligations and reflect current operational characteristics.

Coal Creek customers consume approximately 360 million gallons per year or just under 1 million gallons per day. The service area is best characterized as a suburban bedroom community that also includes typical associated community facilities and commercial retail. To that end, the majority of the service area is single family residential, with multi-family residential development surrounding the, commercial area near the center of the service area. School, house of worship, government, and recreational properties are also present throughout the service area. More detailed information about the land use and development characteristics of the District is provided in Section 2.3.3.

The water distribution system is fully metered, with a source of supply delivered by contract through three connections with Seattle Public Utilities (SPU) regional water supply. A network of approximately 67 miles of transmission and distribution piping in nine pressure zones is owned by the District. In addition, Coal creek maintains five ground level reservoirs, four pump stations, eight interties with the City of Bellevue, and one intertie with the City of Renton. A hydraulic schematic of the District's existing water system is shown in Figure 3-1 and the existing water system map is provided as Figure 3-2. As detailed in the system analyses paragraphs located in Section 3.5, the system is in good condition and is sufficient to meet the needs of existing and anticipated customers. System renewals and replacements and potential extensions to accommodate specific development proposals are outlined in Section 3.6.

Combined with supporting documentation provided in the Water Appendices, this Section provides information regarding water demands, the existing water system, minimum design criteria, an analysis of the system under current and proposed conditions, and recommend system improvements.

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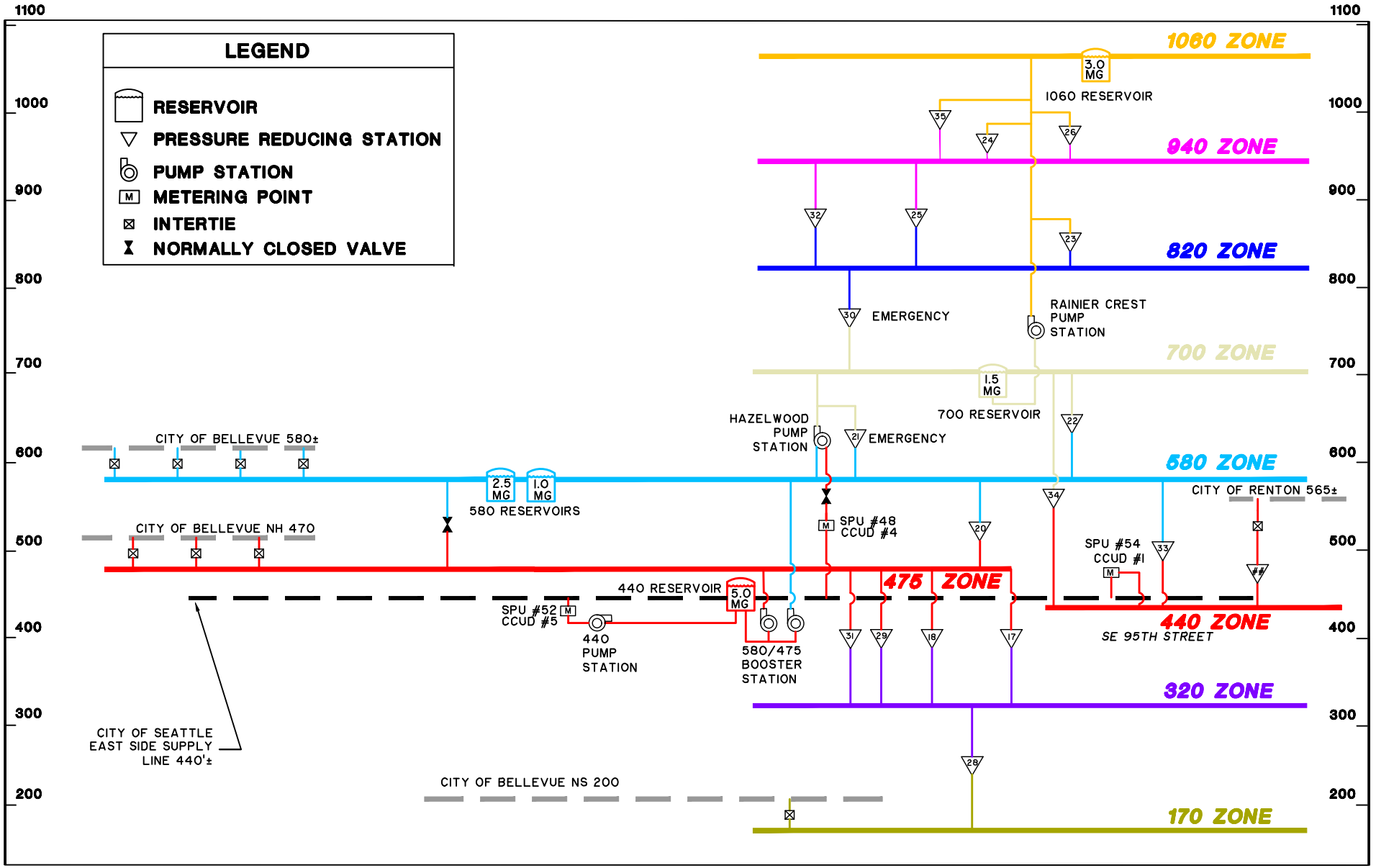

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FIGURE 3-1
EXISTING HYDRAULIC PROFILE

Coal Creek Utility District Comprehensive Plan

COAL CREEK UTILITY DISTRICT

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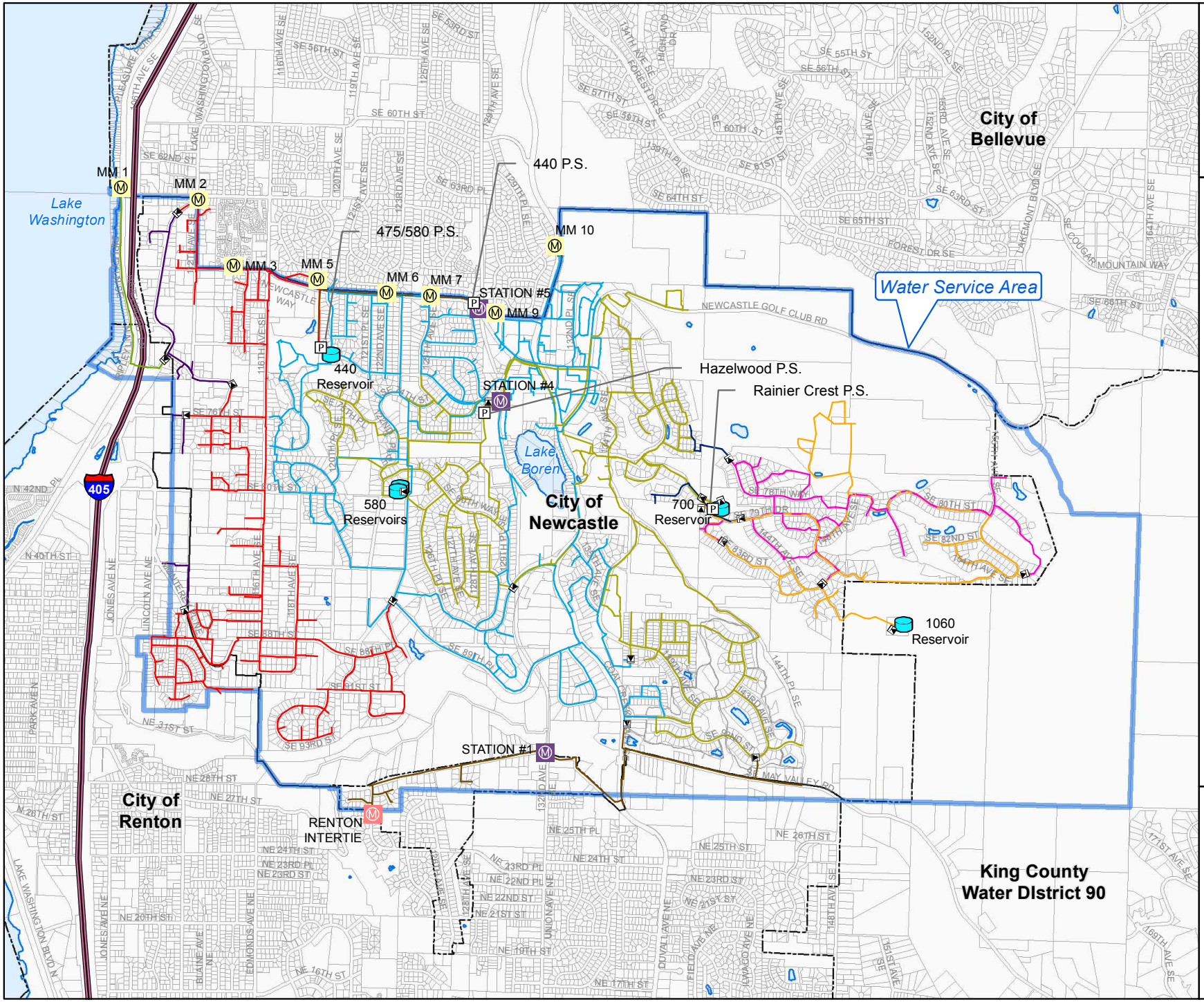

Figure 3-2 Existing Water System Map

Data Sources:
Data obtained from King County GIS and Coal Creek Utility District

Date: March, 2014

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Path: J:\Planning\Coal Creek\2012 CCUD Comp Plan\ArcMapDoc\Figure 3-2 Existing Water System v4.mxd

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3.2 WATER SYSTEM DEMANDS

Identification of historical and projected water system demands is critical in evaluation of the water system's ability to meet the needs of current and future populations of the water service area and provides the basis for water system modeling and analysis. The following paragraphs outline the methodology used for assessing historical water use and developing future water demand projections. Please note that although this planning process has had the benefit of the most current (2010 Census population and employment) data available at a high level of detail (blocks and block groups), water demands are extremely vulnerable to influences such as weather patterns and water use efficiency programs. In addition, the types of water users (commercial versus residential) will have a significant impact on seasonal variations in demands and peaking factors. These factors are discussed in greater detail later in the Plan.

3.2.1 Historical Water Demands

In order to calculate future water system demands and associated source of supply and distribution system requirements, two steps are required: comparison of water purchases to actual water sales and determination of historical water use characteristics of the various types of connections served.

A comparison of water purchases and customer sales is provided in Table 3-1. This information provides the basis for estimating non-revenue water. Non-revenue water is essentially the amount of water the District cannot bill to customers for consumption. All systems experience water loss through leaks, breaks and unmetered use, and all systems use water for operational purposes and for fire protection events and training. Non-revenue water must be accounted for when properly sizing new or replacement facilities. Additional information about non-revenue water and system leakage is provided in Appendix W-3

The District's non-revenue water as a percentage of overall purchases has averaged approximately 8.4% over the past five years, which is below the State's requirement of maintaining a system leakage rate of under 10%. The average non-revenue amount calculated for all of Seattle and SPU's wholesale utility customers is forecasted to be 5.7% of total water production (*2013 Water System Plan Public Review Draft*, Seattle Public Utilities, April 2012).

Table 3-1: Historical Water Purchase and Sales
Coal Creek Utility District

	2007	2008	2009	2010	2011
Water Purchased (mg)	393.79	386.29	447.30	363.45	369.19
Water Sold (mg)	367.67	353.89	414.93	328.71	331.73
Non-revenue water (mg)	26.12	32.40	32.37	34.74	37.46
% Non-revenue of total system	6.63%	8.39%	7.24%	9.56%	10.15%

Evaluation of water use by customer class is accomplished by expressing multi-family and commercial customers in Equivalent Residential Units, or ERUs. To determine ERUs, historical water demand data for a single-family connection is analyzed to arrive at an average daily demand per ERU expressed in gallons/ERU/day. Dividing the total use for each customer class by this average daily demand determines the estimated ERUs per customer class. The average use per single-family connection is always equal to the average use per ERU.

Table 3-2 presents historical water sales data by customer class for the District's service area. The residential water sales constitute the bulk of water sales in the District with single-family connections accounting for approximately 66% of the total water demand, with multi-family connections accounting for approximately 11% and commercial and irrigation accounting for approximately 23% of total water use.

Table 3-2: Historical Water Sales by Customer Class
Coal Creek Utility District

	Single-Family	Multi-Family	Commercial & Irrigation	Total
2007				
Demand (mg)	242.19	38.75	86.73	367.67
Connections	3,417	97	141	3,655
Estimated ERUs	3,417	547	1,224	5,187
Average Use (gal/ERU/day)	194			
2008				
Demand (mg)	235.73	40.54	77.63	353.89
Connections	3,426	103	151	3,679
Estimated ERUs	3,426	589	1,128	5,143

Table 3-2: Historical Water Sales by Customer Class

Coal Creek Utility District

	Single-Family	Multi-Family	Commercial & Irrigation	Total
Average Use (gal/ERU/day)	188			
2009				
Demand (mg)	261.99	40.15	112.79	414.93
Connections	3,445	94	148	3,686
Estimated ERUs	3,445	528	1,483	5,455
Average Use (gal/ERU/day)	208			
2010				
Demand (mg)	223.25	39.80	65.67	328.71
Connections	3,498	93	152	3,743
Estimated ERUs	3,498	624	1,029	5,151
Average Use (gal/ERU/day)	175			
2011				
Demand (mg)	219.26	40.46	72.0	331.73
Connections	3,482	93	150	3,725
Estimated ERUs	3,482	643	1,144	5,268
Average Use (gal/ERU/day)	173			
Average, 2007-2011				
Demand (mg)	236.48	39.94	82.96	359.39
Connections	3,453	96	148	3,697
Estimated ERUs	3,453	586	1,201	5,240
Average Use (gal/ERU/day)	188			

Notes: Data from District records.

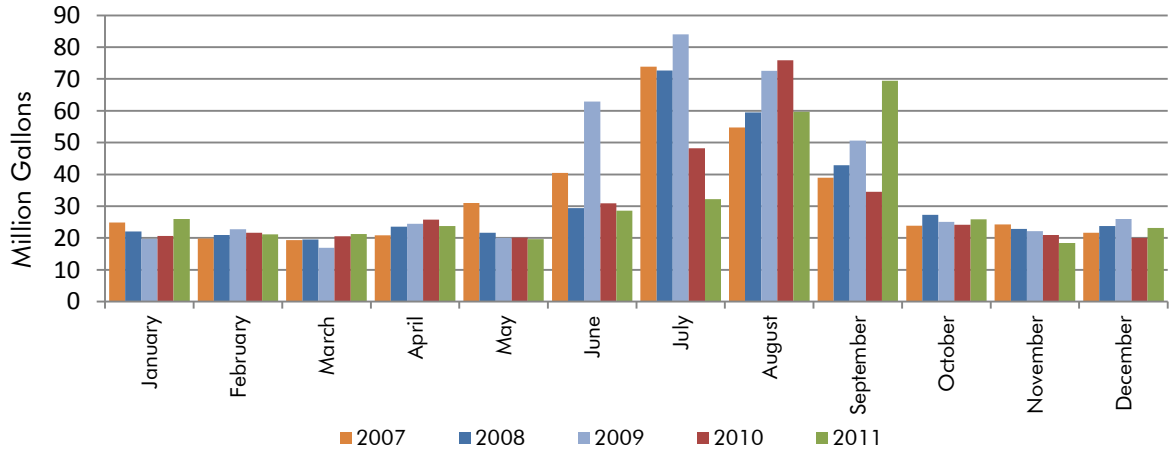
The average household size in the District, based on adopted Puget Sound Regional Council (PSRC), Census 2010, King County and City data, is 2.6 persons per household. Multi-family units in the service area are estimated to have approximately 1.7 persons. The average use per capita over the past five years has been 73 gallons per day.

Figure 3-3 shows peak demands have occurred in the months of July (2007-2009), August (2010), and September (2011). The highest month from 2007-2011 occurred in

July 2009, when total purchases were approximately 83 million gallons. Past trends have shown the District purchases 2.4 times more water during peak season months (June-September) than they do for winter months (October-May), as indicated in Figure 3-3.

Based upon 2011 historical data, , the maximum day demand (MDD) peaking factor is estimated at 2.65. The peaking factor is calculated by dividing the average day demand (ADD) into the MDD. After calculating the MDD peaking factor, the Department of Health formula is used to calculate the peak hour demand (PHD) peaking factor, estimated to be 4.38. Note that future Water Use Efficiency (WUE) goals aimed at reducing summer peaks and may warrant adjustment of peaking factors. It is recommended that the District work with SPU to review this information as part of annual assessment of WUE program effectiveness and progress.

Figure 3-3: Historical Monthly Supply



3.2.2 Projected Water Demands

Water system demands have been developed based on documented past water use and historical growth trends identified in Part 2 of this document. The projections assume no major land use changes (although household size and employment density may change) or changes associated with typical seasonal water consumption patterns. Based on the population and employment growth discussed in Section 2.4.1, it is estimated that there will be an average of 87 new ERUs added to the system each year through 2020, and an average of 71 ERUs from 2020-2033. This estimate is based on applying the population and employment growth percentage estimates derived from PSRC, County and City data, to the existing number of residential and commercial ERUs, respectively.

Projected demands were calculated with and without reductions resulting from SPU's regional Water Use Efficiency (WUE) program, which Coal Creek will participate in

between 2012-2020. The assumed savings resulting from WUE measures include a system-wide 0.75 mgd annual reduction in ADD through 2020. After 2020, it is assumed the average day demand per ERU will remain constant. Future demands without assumed WUE program savings are projected to remain constant through 2032. Additional information about the WUE program and goal that Coal Creek is adopting for the period 2013-2018 can be found in the Water Use Efficiency Appendix W-3.

From 2007 - 2011 the ADD was calculated to be 188 gallons per ERU per day, based on the water sales data for the connections in the District's service area, not including non-revenue water. Adding the District's average non-revenue water percentage for the respective time frame (approximately 8.39%) to the ADD, results in a total of approximately 204 gallons per ERU per day. The MDD was calculated using the 2.65 peaking factor and peak hour demand was calculated using the peaking factor of 4.38, as discussed in Section 3.2.1.

Table 3-3 presents the projected water demands, with and without savings from WUE programs, through 2033. For a more conservative evaluation, the subsequent water system analyses are all based on the projected demands without WUE savings. Although the District will continue its conservation efforts, the higher, more conservative demand rates have been used to analyze and size future system facilities.

Table 3-3: Projected Water Demands, 2013-2033
Coal Creek Utility District

	Demands without WUE savings				Demands with WUE savings			
Year	Annual Demand (mg)	Average Day Demand (mgd)	Maximum Day Demand (mgd)	Peak Hour Demand (mgd)	Annual Demand (mg)	Average Day Demand (mgd)	Maximum Day Demand (mgd)	Peak Hour Demand (mgd)
2011[1]	331.73	0.91	2.41	3.99	331.73	0.91	2.41	3.99
2012	397.22	1.09	2.88	4.76	396.36	1.09	2.88	4.75
2013	401.92	1.10	2.92	4.82	399.23	1.09	2.90	4.79
2014	406.62	1.11	2.95	4.88	401.75	1.10	2.92	4.82
2015	411.33	1.13	2.99	4.93	404.24	1.11	2.93	4.85
2016	416.03	1.14	3.02	4.99	404.83	1.11	2.94	4.86
2017	420.73	1.15	3.05	5.05	403.82	1.11	2.93	4.84
2018	425.43	1.17	3.09	5.10	409.88	1.12	2.97	4.92
2019	430.13	1.18	3.12	5.16	414.41	1.14	3.01	4.97
2020	434.83	1.19	3.16	5.22	418.94	1.15	3.04	5.03
2021	438.23	1.20	3.18	5.26	422.22	1.16	3.06	5.06
2022	441.64	1.21	3.21	5.30	425.50	1.17	3.09	5.10

2023	445.04	1.22	3.23	5.34	428.78	1.17	3.11	5.14
2027	458.65	1.26	3.33	5.50	441.89	1.21	3.21	5.30
2033	479.53	1.31	3.48	5.75	462.02	1.27	3.35	5.54

Notes: [1] 2011 demands are actual demand based on the District's billing records. MDD and PHD are estimated.

3.3 EXISTING WATER SYSTEM

Coal Creek's water system consists of supply connections and metering points, storage reservoirs, pump stations, pressure reducing stations, and approximately 60 miles of transmission and distribution mains. Figure 3-1 presents a hydraulic profile of the current (2012) water system as it has been constructed, and District facilities are shown geographically in Figure 3-2 and described in detail in the following sections.

3.3.1 Source of Supply

Coal Creek Utility District purchases all of its water supply from the Seattle Public Utilities (SPU) regional water system. Coal Creek normally receives water from the Cedar River Watershed. Water from the Cedar River Watershed is conveyed to the Lake Youngs Reservoir, where it is pumped to the south end of the District from SPU's Maplewood Pump Station, located at Maplewood Golf Course in east Renton. Water is pumped via a 36-inch water main, which connects to the East Side Supply Line (ESSL). By contract, Seattle maintains a minimum hydraulic gradient of 445 feet at the District's boundary and at the three metered connections to the ESSL.

The District has a long-term purveyor's contract with the SPU until the year 2062 for the wholesale purchase of water. SPU rates charged to the District are set as described in Full Requirements Contract with SPU.

3.3.2 Treatment

SPU's Cedar and Tolt River supplies yield exceptional water quality due to the protected watersheds located in the Cascade Mountains. . The Tolt Treatment Facility, which was brought on-line in the year 2001, consists of ozonation, chlorination, coagulation, flocculation, filtration, fluoridation, and mineral additives for corrosion control. Seattle Public Utilities' Cedar Treatment Plant was brought on line in 2004, and is equipped with ozonation and ultraviolet light disinfection. The plant adds chlorination for disinfection and mineral additives for corrosion control. Fluoridation for the Cedar supply occurs at Landsburg.

3.3.3 Interties

Various sources of supply are provided to the District through a number of metered intertie connections. These interties are connected to Seattle, Renton or the City of Bellevue.

3.3.3.1 Seattle Interties

Coal Creek currently maintains three metered supply connections to Seattle. Table 3-4 presents information regarding these interties including District and Seattle station numbers, locations, meter size, pipe line source, minimum head (for planning purposes), District pressure reducing features, and flow control capabilities.

Table 3-4: Seattle Interties
Coal Creek Utility District

CCUD Station No. and Location	Seattle Station No.	Meter Size (inches)	Seattle Supply Main	Capacity (gpm)	Minimum Head (feet)	District Zone Served	District Control
Station 1 132nd Ave SE & SE 95th Way	54	4	ESSL	40	445	440	No
Station 4 129th Ave SE & SE 73rd St	48	8	ESSL	1,600	440	580, 700	Yes
Station 5 128th Ave SE & SE 70th St	52	12	ESSL	2,645	440	440	Yes

Note: Capacities based on existing (2004) CCUD/SPU wholesale agreement.

3.3.3.2 City of Bellevue Interties

Due to the transfer of existing Coal Creek Utility District water facilities to the City of Bellevue, eight interties meter water between the two systems. The two-way flow meters are generally located along the boundary between the cities of Newcastle and Bellevue. The addition of the interties with Bellevue has not changed how the water system operates hydraulically. Table 3-5 summarizes meter information for the interties with the City of Bellevue. The meter numbers used were taken from Coal Creek Utility District's Master Meter Project plan drawings and have been assigned the prefix B.

Table 3-5: City of Bellevue Interties
Coal Creek Utility District

CCUD Station No.	Meter Size (inches)	Capacity (gpm)	District Zone Served
Station B1 - 6200 block of Hazlewood Ln	4	1,000	170
Station B2 - 112th Ave SE & SE 64th St	4	1,200	475
Station B3 - 114th Ave SE & SE 68th St	6	2,800	475
Station B4	Valve only, no meter		
Station B5 - 119th Ave SE & SE 68th Pl	6	2,800	475
Station B6 - 123rd Ave SE & SE 69th Way	6	2,800	580
Station B7 - 125th Ave SE & SE 69th Way	6	2,800	580
Station B9 - 128th Pl SE (cul-de-sac)	4	1,250	580
Station B10 - Coal Creek Parkway SE & SE 66th St	(2) 1-inch meters	50	580

Note: Approximate capacities
Station B4 is a permanently closed intertie.
Station B10 has two one-way meters, all other meters are two-way.

3.3.3.3 City of Renton Intertie

Coal Creek has one intertie with the City of Renton, which was constructed in 2007. The one-way intertie provides the District's 440 Zone with emergency supply from Renton's 565 Zone through a PRV station.

3.3.4 Pump Stations

Due to the topography of the area, Coal Creek relies on four pump stations to serve customers within its service area. The pump stations are described in the following sections with more information provided in Table 3-7. The District water supply from Seattle Metering Point 5 (Seattle Meter 52) is pumped from the 440 reservoir to the upper gradient pressure zones and pump stations. Pressure reducing valves (PRV) reduce pressures from higher gradients and supply water to the lower gradient zones. The pumped zones are the 475, 580, 700, and 1060, while the 170, 320, 440, 820, and 940 Pressure Zones receive water through pressure reducing valves from higher gradient pressure zones.

3.3.4.1 440 Pump Station

The 440 Pump Station, constructed in 1994, is located just west of Seattle Metering Point 5 along Newcastle Way. This pump station, addressed in the "1991 High Level Pumping Study", was constructed to provide enough water to the 440 Reservoir in instances when the Seattle supply pressures are low. Currently the pump station houses three pumps. Future upgrades to the station will require replacement of the existing pumps. This station is the District's main source of supply and typically provides the majority of water demand in the District. This station is also a joint serving facility with the City of Bellevue, which has an agreement with the District for 33 percent of the capacity of the facility.

3.3.4.2 Rainier Crest Pump Station

The Rainier Crest Pump Station, which is located at Southeast 79th Drive and 140th Avenue Southeast, was originally constructed in 1986 as a constant pressure pump station to deliver flow from the 700 Pressure Zone to the 820, 940, and 1060 Pressure Zones. The pump station was renovated in 1990 to enable the pumps to deliver flow to the 1060 Reservoir. This pump station consists of one triplex pump system with a diesel engine backup pump as standby. The existing pump station is in good condition.

3.3.4.3 Hazelwood Pump Station

The Hazelwood Pump Station, located at 129th Avenue Southeast and Southeast 73rd Street, houses four pumps which pump from the 580 Pressure Zone to the 700 Pressure Zone, and has a backup power hook-up for a portable generator in case of power outages. Two of the pumps are 500 gpm pumps and the other two are 1,100 gpm capacity models. The Hazelwood Station has the capacity to pump water from the SPU ESSL pipeline through opening a valve at CCUD Supply Station 4 (SPU Tap #48) when supplies from the 580 Pressure Zone are not available. In emergency situations, this station can pump from Supply Station 4 (440 gradient) to the 700 Zone. The piping is configured in such a way as to allow the pumps to operate in series, thereby producing twice the head of normal operations. The pump station was upgraded in 1994 and again in the year 2003 and remains in good condition.

3.3.4.4 475/580 Booster Station

Constructed in 1995, the 475/580 Booster Station is located on the 440 Reservoir site, just south of 119th Court Southeast cul-de-sac at Southeast 71st Place. This pump station has two functions: two pumps pump water from the 440 Reservoir to the 580 Pressure Zone, and a Paco triplex constant pressure system pumps water to serve the 475 Pressure Zone. The District constructed this pump station due to the need to increase the pressure in the 440 gradient zone to a 475 pressure gradient zone. This station is also a joint serving facility with the City of Bellevue. The City has an agreement with the District for 33 percent of the facility. The District has recently (2011) upgraded the 475 zone triplex pumping system and plans to add a third 580 zone pump as indicated in the Capital Improvements Plan (CIP).

Table 3-6: Pump Stations
Coal Creek Utility District

Station Name and Location	Pump Model	GPM at Head	RPM	Motor Hp	Zone Served
440 128th Ave SE & SE 69th St	Paco 8015-4 Type KPVS	2,250 @ 60	1,200	50	475
	Paco 8015-4 Type KPVS	2,250 @ 60	1,200	50	475
	Paco 6012-4 Type KPVS	1,500 @ 18	1,200	50	475
Rainier Crest 140th Ave SE & SE 79th Dr	Paco UTN-3 Pump Unit	1,100 @ 405	3,500	30, 75, 75	1060
	John Deere 400 Series (Diesel Backup)	1,100 @ 420	1,800	200	1060
Hazelwood 129th Ave SE & SE 73rd St	Paco 3070-7 Type LC	500 @ 140	3,500	25	700
	Paco 3070-7 Type LC	500 @ 140	3,500	25	700
	Cornell 4HHvm50-4	1,100 @ 150	1,750	50	700
	Peerless H135	1,100 @ 150	1,750	50	700
475/580 Booster[1] 119th Ct SE & SE 71st Pl	Paco 12.5" KPS 5015-9[2]	1,200 @ 165	1,750	75	580
	Paco 12.5" KPS 5015-9[2]	1,200 @ 165	1,750	75	580
	Paco Triplex Booster SO17-976	3,000 @ 50	1,750	15, 25, 25	475

Notes: [1] If the 475 booster pump fails, the 475 Pressure Zone can operate at a HGL of 440. A few properties will temporarily experience low pressure as a result.
[2] The 580 is served by only two pumps in this pump station. Maximum reliable pumping capacity is 1,200.

3.3.5 Storage Facilities

Coal Creek has five reservoirs to provide storage in the water system. Water is pumped to all of the reservoirs and then gravity fed to lower pressure gradients through pressure reducing valves. The general reservoir characteristics are presented in Table 3-8 with more detailed information provided in the following sections.

3.3.5.1 440 Reservoir

The 5.0 million gallon 440 Reservoir is located immediately to the southwest of Southeast 71st Place and 119th Place Southeast. The welded steel cylindrical tank water level operates between the 428 foot and 440 foot elevations and is refilled by the 440 Pump Station. Under normal operations, all of the water utilized in the 475 and higher zones runs through this reservoir and is subsequently gravity fed to lower zones or pumped to higher zones. The bottom of this 206-foot diameter and 20-foot high reservoir is at elevation 420 feet and the tank has an overflow elevation of 440 feet. This is a joint serving facility with 33 percent allocated to the City of Bellevue. The exterior coating system on the 440 Reservoir has deteriorated and is therefore scheduled for replacement, as indicated in the CIP.

3.3.5.2 1.0 Million Gallon 580 Reservoir

The 1.0 million gallon 580 Reservoir is located at the intersection of Southeast 80th Street and 124th Avenue Southeast. The water level in this welded steel cylindrical tank operates from an elevation of 549 feet to elevation of 580 feet, and has a bottom elevation of 540 feet. The 66-foot diameter tank is approximately 40 feet tall, and serves as a joint use facility, with 40 percent of its storage allocated to the City of Bellevue.

3.3.5.3 2.5 Million Gallon 580 Reservoir

The 2.5 million gallon 580 Reservoir is also located at the intersection of Southeast 80th Street and 124th Avenue Southeast, adjacent to the 1.0 million gallon 580 Reservoir. The water level in the welded steel cylindrical tank operates between the elevations of 549 feet and 580 feet. The bottom elevation of this 104-foot diameter and 40-foot high storage tank is 540 feet. Both 580 Reservoirs gravity feed water to the 580 Pressure Zone and to the 475/440 Pressure Zone through two pressure reducing valves. This reservoir is also a joint serving facility with 40 percent allocated to the City of Bellevue.

3.3.5.4 700 Reservoir

The 1.5 million gallon 700 Reservoir is located at the intersection of Southeast 79th Drive and 140th Avenue Southeast. The water level of this 85-foot diameter and 35-foot high cylindrical concrete tank operates between the elevations of 674 and 700 feet, and has a bottom elevation of 665 feet. The 700 Reservoir gravity feeds water to the 700 Pressure Zone as well as the 580 and 440 Pressure Zones through pressure reducing valves. These PRVs open under emergency conditions only, such as fire flows, and are normally closed to prevent pumping water in a circle.

3.3.5.5 1060 Reservoir

The 3.0 million gallon 1060 Reservoir is located at the end of 146th Place Southeast with an access drive in the southeast direction leading to the tank. The cylindrical welded steel tank water level operates between elevations 1026.5 feet and elevation 1030 feet in the winter and between elevation 1026.5 feet and elevation 1060 feet in the summer. The continuous demand from the Golf Club at Newcastle in the summer causes the reservoir to continuously fill, with monitoring by District operators to prevent overflow at 1060 feet elevation. The bottom of this 116-foot diameter and 38-foot high reservoir is at elevation 1022 feet. This reservoir gravity feeds to the 1060 Pressure Zone, as well as the 940 and 820 Pressure Zones through pressure reducing valves.

Table 3-7: Reservoirs
Coal Creek Utility District

Name and Location	Date Built	Dimensions	Capacity/ District Share	Construction Type	Zone Served
440 Reservoir 19000 SE 73rd Pl	1987	206' Dia. 20' High	5.0 MG 3.35 MG	Welded Steel	170, 320, 475
1.0 MG 580 Reservoir 12400 SE 80th St	1967	66' Dia. 40' High	1.0 MG 0.60 MG	Welded Steel	580
2.5 MG 580 Reservoir 12400 SE 80th St	1971	104' Dia. 40' High	2.5 MG 1.5 MG	Welded Steel	580
700 Reservoir 14000 SE 79th Dr	1977	85' Dia. 35' High	1.5 MG 1.5 MG	Concrete	700
1060 Reservoir 8750 146th Pl SE	1990	116' Dia. 38' High	3.0 MG 3.0 MG	Welded Steel	820, 940, 1060

Note: The 440 Reservoir, 1.0 MG 580 Reservoir and 2.5 MG 580 Reservoir are joint serving facilities with the City of Bellevue.

3.3.6 Transmission and Distribution System

Coal Creek's transmission and distribution system consists of approximately 350,000 lineal feet of 4-inch to 18-inch diameter pipe. Of this total length, approximately 67 percent is 8-inch and approximately 26 percent is 12-inch transmission main. Table 3-9 below shows the total lineal footage of water mains by size and material.

Table 3-8: Water Main Inventory
All figures in Lineal Feet

Diameter	Cast Iron	Ductile Iron	Other[1]	Unknown	Total
Unknown				1,178	*1,178*
1"-3"		86		1,528	*1,614*
4"	138	944	170	301	*1,553*
6"	1,503	2,835	429	360	*5,128*
8"	11,010	216,337	16	5,812	*233,175*
10"	84	18			*102*
12"	2,985	84,007		1,095	*88,087*
14"		154			*154*
16"		16,281		1	*16,282*
18"		4,830			*4,830*
Total	**15,721**	**325,578**	**615**	**11,804**	***353,718***

Note: [1] Other includes PVC and Steel.

Most of the transmission and distribution system is in good condition due to a concerted effort by the District to upgrade and replace deficient and/or aging pipes on a continual basis. All water mains in the District are either cast iron or ductile iron piping.

3.3.6.1 Pressure Zones

Due to the undulating topography of the area, the District has nine pressure gradients or pressure zones, interconnected through 18 pressure reducing valves. Pressures in pressure zones are controlled by either a combination of reservoir levels and pump stations, or by pressure reducing valves. In general, the District maintains pressure to its customers between 40 and 90 psi. The pressure zones are described below in more detail.

1060 Pressure Zone

The 1060 Pressure Zone is located in the eastern portion of the District, generally south of the Golf Club at Newcastle. The hydraulic gradient in this zone is determined by the 1060 reservoir water level as well as the water pumped from the Rainier Crest Pump Station to the 1060 reservoir. All of the connections in this zone are single-family residential.

940 Pressure Zone

The 940 Pressure Zone is also located in the eastern portion of the District, in the same vicinity as the 1060 Pressure Zone. Three pressure reducing valves flowing water from the 1060 Pressure Zone control the hydraulic gradient in the 940 Pressure Zone. The connections in this zone are all single-family residential except for the Golf Club at Newcastle connection.

820 Pressure Zone

The 820 Pressure Zone consists of approximately 3,000 lineal feet of pipe located generally on SE 79th Drive between 144th Avenue Southeast and 139th Avenue Southeast and also at the intersection of 142nd Way Southeast and SE 77th Street continuing in a northwest direction for approximately 1,000 lineal feet. This pressure zone serves only single-family residential connections and is controlled by two pressure reducing valves flowing water from the 940 Pressure Zone and one pressure reducing valve flowing water from the 1060 Pressure Zone.

700 Pressure Zone

The 700 Pressure Zone is controlled by the water elevation of the 700 Reservoir and by the water pumped from the Hazelwood Pump Station. The 700 Pressure Zone serves single-family and multi-family residential connections and is generally located in the center of the District, to the west, east, and southeast of Lake Boren. The 700 Pressure Zone is interconnected to the 820 Pressure Zone by one pressure reducing valve, but this has little to no affect on the hydraulic gradient in the 700 Pressure Zone, as it opens under emergency conditions only.

580 Pressure Zone

The 580 Pressure Zone is also generally located in the center of the District, to the north, south, and west of Lake Boren and serves single-family, multi-family and commercial accounts. The hydraulic gradient in the 580 Pressure Zone is controlled by the 580 Reservoirs as well as the pumps in the 475/580 Booster

Station. Water can flow to the 580 Pressure Zone from the 700 Pressure Zone through two emergency pressure reducing valves.

475 Pressure Zone

The 475 Pressure Zone is maintained by the constant pressure pump station located near the 440 Reservoir. Water is distributed to the pumps from the reservoir, where it is then pumped to a constant hydraulic grade of 475 feet to water mains generally located in the western portion of the District. The 475 Pressure Zone is interconnected to the 580 Pressure Zone through one emergency pressure reducing valve.

440 Pressure Zone

The 440 Pressure Zone serves primarily single-family residential connections and is located in the southern portion of the District, generally south of May Creek and on SE May Valley Road. The hydraulic gradient is controlled by the hydraulic grade line of Seattle Metering Point 1 (Seattle Meter 54). Two pressure reducing valves, one connecting to the 700 Pressure Zone and the other to the 580 Pressure Zone, provide supplemental flow and backup under emergency conditions.

320 Pressure Zone

The 320 Pressure Zone serves single-family residential connections located in the western portion of the District, in close proximity to Lake Washington. The hydraulic gradient for the 320 Pressure Zone is controlled by flow through four pressure reducing valves interconnecting with the 475 Pressure Zone.

170 Pressure Zone

The 170 Pressure Zone runs along the eastern shore of Lake Washington, beginning from the District north boundary and continuing southerly to approximately NE 50th Street and serves only single-family residential connections. The hydraulic grade for this pressure zone is controlled by one pressure reducing valve flowing water from the 320 Pressure Zone, as well as the hydraulic gradient established by the City of Bellevue and flowing through City of Bellevue Meter B1.

3.3.6.2 Pressure Reducing Valves

Because of the steep terrain in some areas of the District and high cost of pressure reducing valve stations, some customers receive their water at slightly higher or lower pressures than the stated preferred range. All customers with static pressures in excess of 80 psi are required to install and maintain individual pressure reducing valves on their water service lines in accordance with the Uniform Plumbing Code.

The elevations of all District pressure reducing valves is known, enabling the District to properly set the upstream and downstream pressures so as to provide uniform flows and pressures throughout each zone. Table 3-10 provides a list of the District's pressure reducing valves and their recommended settings.

Table 3-9: Pressure Reducing Valves
Coal Creek Utility District

No.	Location	Elev.	Down Zone	Up Zone	Upstream Static Pressure (psi)	Downstream Setting (psi)	Comments
17	SE 74th St & 114th Ave SE	220.6	475	320	110	52	
18	SE 86th Pl &112th Ave SE	176	475	320	129	60	
20	SE 89th St & 124th Ave SE	323.5	580	475	102	72	Opens only under low pressure
21	Hazelwood Pump Station	405.7	700	580	Closed	Closed	Emergency situations only
22	SE 80th Way & 129th Pl SE	412.4	700	580	125	63	Opens only under low pressure
23	700 Reservoir	651.4	1060	820	177	71	
24	141st Ave SE & SE 81st Pl	828.2	1060	940	89	48	
25	144th Ave SE & SE 79th Dr.	716.1	940	820	97	45	
26	SE 146th Pl & SE 84th St	863	1060	940	72	33	
28	5032 Lake Wash. Blvd	76.5	320	170	112	54	
29	6412 Lake Wash. Blvd	232.6	475	320	110	47	
30	700 Reservoir	659	820	700	70	19	Emergency situations only
31	SE 76th St & 111th Pl SE	108.7	475	320	134	74	

Table 3-9: Pressure Reducing Valves
Coal Creek Utility District

No.	Location	Elev.	Down Zone	Up Zone	Upstream Static Pressure (psi)	Downstream Setting (psi)	Comments
32	9206 Coal Creek Pkwy.	329	580	440	99	66	Opens only under low pressure
33	14343 SE 92nd	407	700	440	125	38	
34	7700 142nd Way	740	940	820	94	30	Opens only under low pressure
35	SE 83rd Ct & 155th Ave SE	865	1060	940	78	47	
36	8828 137th Ave SE	467	700	580	100	54	

3.3.7 Projects Completed or Underway

The following projects have been completed since previous Water and Sewer System Planning efforts, or are currently underway:

- Construct 440 Zone Booster Station at Metering Point No. 5 with 4,500 gpm capacity (6,000 gpm future capacity)
- Construct new metering Point No. 5 on East Side Supply Line
- Install new SCADA system throughout the District
- Rehabilitate Metering Points 1, 8, and 10 and PRVs 7, 8, 9, 10, and 20
- Construct District Maintenance Facility
- Ground Water Development Evaluation
- 580 Zone Pump Station and 440 Zone Booster with 2,400 gpm capacity (4,800 gpm future capacity for the 580 Zone and 3,000 gpm future capacity for the 440 Zone)
- Abandon SE 56th Street Pump Station
- Install PRV for 320 Zone Improvements
- 700 Reservoir Repair and Sealing
- Upgrade Hazelwood Pump Station

- Replacement of approximately 50,000 linear feet of asbestos cement mains throughout the District
- Construction of approximately 48,000 linear feet of 12-inch and approximately 10,000 linear feet of 8-inch ductile iron water mains through various developer extensions and District improvements
- An emergency Intertie with the City of Renton has been constructed
- Updated Cross Connection Control Program and Policies
- Updated Design Standards and Specifications Manual
- Replacement of the constant pressure pump system at the 475/580 Booster Station

3.4 MINIMUM DESIGN CRITERIA

Minimum design criteria for the Coal Creek Utility District's water system is in accordance with the standards and requirements put forth by the U.S. Environmental Protection Agency, the Washington State Department of Health, King County, and the cities of Newcastle and Renton.

Minimum design criteria addressed in this Section include water supply requirements, storage volume, pump station capacities, distribution system and transmission main capacities, and water quality standards. These criteria are used to determine deficiencies in the existing water system and establish design requirements for the future water system within the planning area.

3.4.1 State Agency Regulations

The Washington State Department of Health's (DOH) "Water System Design Manual" (December, 2009) is the primary document governing the sizing and design of Group A public water systems in the state of Washington. This publication sets forth the minimum design guidelines and planning requirements for the supply, storage, distribution, and quality of potable water within Group A public water systems.

3.4.2 County Regulations

All system design and sizing for public water systems located in King County must comply with the standards and requirements provided in King County Code Title 17.08, which are based on the International Fire Code (IFC) 2006 Edition, as published by the International Code Council. In many cases, the District's design criteria exceed the minimum provisions provided in the 2006 IFC.

3.4.3 Reference Datum

The datum used for planning of facilities in this study and for District design work is based on NAVD 88 (vertical datum) and NAD 27 (horizontal datum).

3.4.4 Design Planning Period

In planning water facilities, it is necessary for the design to be adequate over a specific period of time. The period of design for this study is approximately 20 years. This means that in the year 2033, some of the facilities proposed in this study may have reached their maximum supply capacity, assuming that the population projections are reached. Many of the components of the water system, however, have a much longer useful life than 20 years, and will continue to serve the community far beyond the design period. For these facilities, sizing is based on buildout scenarios. This would include water and sewer mains, reservoirs, and other facilities that can function for 50 to 75 years.

3.4.5 Standard Details and Specifications

Incorporated as a part of the "Agreement for Constructing Extensions to the Water and Sewer Systems" for the District are standard construction details and specifications which include the current requirements of all appropriate agencies. A copy of the District's water system standard details and specifications are updated on an on-going basis, and were last updated in 2012. These standards are available at the District office, and are also kept on file at DOH to allow for an exemption of individual review of all water system extensions.

3.4.6 Planning Considerations

- Initial system construction and additions should conform to the comprehensive plan.
- Public water systems should be designed to provide firefighting capability in accordance with the requirements of the local Fire Marshal.
- Phased development is permitted where full development will take several years.
- The District requires developers to extend facilities to the furthest boundary of their property for future extension by others.

3.4.7 Reliability Considerations

- Multiple water sources are recommended in combination with adequate emergency reserve in gravity storage to allow for interruption of supply at one point, while still maintaining water supply to the system at the design rate.
- Looping of the water mains to improve circulation quality and fire flow is an on-going goal of the District.
- Pumping stations are to contain multiple booster pumps of sufficient capacity to meet the maximum day demands with the largest pump out of service.
- Auxiliary power is required where adequate gravity and standby storage is not provided.

3.4.8 Water Supply

- Source capacity should meet the maximum day demand while concurrently replenishing the fire suppression storage volume within 72 hours of its depletion.
- Water sources should be capable of providing the maximum day demand for the system with 18 hours of pumping.

3.4.9 Water Pressure

- Water systems shall be designed to provide peak hourly demand with a minimum positive pressure of 30 psi at every connection.
- For fire flow, the distribution system shall be designed to provide the required fire flow and maximum daily demand at a residual pressure of 20 psi throughout the system. Required fire flow shall be established by the local Fire Marshal.
- Maximum pressures in the distribution system shall not exceed 100 psi, and individual pressure reducing valves shall be provided for service connections that exceed 80 psi.

3.4.10 Pipe Sizing and Material

- As a design criterion, maximum velocity in distribution pipelines shall not exceed 8 feet per second (fps) under peak hour demand conditions, with minimum velocities of 2.5 fps. Flow velocities during fire events may exceed this maximum limit, but shall remain below 10 fps.
- Minimum pipe diameter is 8-inches nominal inside diameter, except for looping and dead-end mains beyond hydrants as approved by the District, and all

pipelines shall be designed and constructed to ultimate domestic and fire flow conditions as determined by the District.

- Dead-end mains are generally not accepted by the District, except in phased development projects or where no potential for future interconnection of facilities exists. Approved dead-end mains located beyond fire hydrants may be 6-inches in diameter in residential areas and 8-inches in commercial areas or as hydraulically justified and approved by the District.
- New water mains shall be constructed of cement mortar lined, ductile iron pipe conforming to AWWA C 151 and C 104, minimum thickness Class 52 with polyethylene encasement conforming to ANSI/APWA C 105-72, as required by the District.
- All water main fittings are to be cement mortar lined, ductile iron conforming to AWWA C 110 or C 153, with 250 psi minimum working pressure.
- All push-on and mechanical joints are to conform to AWWA C 111, and restrained joints shall conform to District requirements.
- All water system pipelines shall be constructed of "lead-free" materials (less than 8% lead content).
- Cover over pipes 12-inches in diameter and smaller shall be 36 inches minimum, and 48 inches minimum cover over pipes greater than 12-inches in diameter. Maximum cover over pipe shall be 60 inches.
- Transmission and distribution pipelines shall be at least 10 horizontal feet from any existing or proposed sanitary sewer utilities and 5 horizontal feet from other utilities, measured edge-to-edge. At least 18 inches of vertical separation (measured edge-to-edge) shall be maintained between the top of a sanitary sewer main and the bottom of a water line. A minimum vertical separation of 6 inches, measured edge-to-edge, is required between all other utilities. Exceptions to these minimum standards must meet the special requirements set forth by the Washington State Department of Ecology or Health and must be approved by the District.

3.4.11 Valves

- Valves shall be ductile iron and shall be installed in a configuration that permits isolation of lines.
- Valves should be installed at intersections, and with normal maximum spacing at 500 feet in commercial, industrial and multi-family areas, 800 feet in residential areas, and 1/4 mile in transmission mains. Additional isolation valving may be required by the District and will be determined on a case-by-case basis.
- Air entrainment, air, or combined air-vacuum relief valves are to be installed at appropriate points of high elevation in the system. All piping in the system shall be sloped to permit escape of any entrained air.
- Zone isolation valves shall be installed at zone boundaries to permit future pressure zone realignment without the need for pipe realignment.
- A blow-off assembly or fire hydrant shall be installed on all dead end runs and at designated points of low elevation to provide a means for adequate flushing of the system. The blow-off assembly shall be installed in a utility right-of-way, except where a written access and construction easement is provided to the water utility. In no case shall the location be such that a possibility of back-siphonage into the distribution system exists. The blow-off assembly shall be sized to achieve a minimum flow velocity of 2.5 feet per second in the main.

3.4.12 Fire Hydrants

Fire hydrants shall comply with the minimum requirements established by the local Fire Marshal having jurisdiction and meet the type, location and spacing requirements of the agency having jurisdiction in the project area. In general, maximum spacing for District hydrants located in commercial and multi-family areas shall be 300 feet on center and 500 feet on center in single-family residential areas.

3.4.13 Cross Connection Control

Where possibility of contamination of potable water exists, water services shall be equipped with appropriate cross connection control assemblies in accordance with DOH requirements and the District's Cross Connection Control Program. The need, size, tracking and location of cross connection assemblies shall be determined by the District, and is detailed in Appendix W-5.1.

3.4.14 Storage

Storage requirements are based on five components; operational storage, equalizing storage, standby storage, fire suppression storage and dead storage. The minimum requirements for each of the components of the total storage requirement are summarized below. The minimum amount of storage required shall be adequate to provide for equalizing storage plus the larger of standby or fire suppression storage. The recommended storage volume is equal to the sum of the equalizing, standby and fire suppression storage components.

3.4.14.1 Effective Storage

The total volume of a reservoir or storage tank, as measured between the overflow elevation and the outlet elevation, may not necessarily equal the effective volume available to the water system. Effective volume is equal to the total volume less any dead storage built into the reservoir. Dead storage is defined as the volume of water stored not available to all customers at the minimum design pressure in accordance with WAC 246-090-230 (5) and (6). The dead storage volume is excluded from the volumes provided to meet the operational, equalizing and fire suppression storage requirements.

3.4.14.2 Operational Storage

The operational storage is the volume of water available to supply the system under normal operating conditions while the source is considered "off". This volume varies according to the sensitivity of the water level sensors controlling the source pumps and the configuration of the tanks designed to provide the required volume while preventing excessive cycling of the pump motor(s). The volume of operational storage is therefore dependent upon pump design parameters, and is not impacted by the minimum design parameters set forth by DOH.

3.4.14.3 Equalizing Storage

Equalizing storage is the volume of water required to supplement source pumping capacity when system demands exceed the source pumping capabilities. The volume of equalizing storage must be sufficient to meet hourly water system demands in excess of the rate of supply and must be at an elevation sufficient to meet these demands at a minimum delivery pressure of 30 psi. The amount of required equalizing storage is to be calculated in accordance with the DOH "Water System Design Manual".

3.4.14.4 Standby Storage

Standby storage is required in order to augment the available supply of water during a period of restricted flow from the supply source. Restriction of flow may be caused by a pumping equipment failure, supply line failure, maintenance or repair, or other conditions that may cause interruption in supply. For single source systems, standby storage requirements are twice the average day demand for a system, deliverable at 20 psi. For a multiple source system, the standby storage is calculated as twice the average day demand, less the flow available with the largest source out of service, multiplied by the amount of time the remaining sources will be pumped each day. It is recommended that standby storage not be less than 200 gallons per ERU.

3.4.14.5 Fire Suppression Storage

Fire suppression storage must be equal to the amount of water required to accommodate fire demand while maintaining a minimum system pressure of 20 psi. Fire flow requirements are determined by the Fire Marshal having jurisdiction, the most currently approved East King County Coordinated Water System Plan, King County Code Chapter 17.08, and/or the International Fire Code..

3.4.14.6 Dead Storage

Dead storage is the amount of water not available to all customers at the minimum design pressure. Dead storage is not considered when determining volumes to provide operational, equalizing, standby or fire suppression storage.

3.4.15 Pump Stations

- Pump stations shall be provided with a minimum of 20 pounds per square inch (psi) at the intake of the pumps under peak hour demand or fire flow plus maximum day demand conditions.
- Pump stations shall have an automatic shut-off in place for when the intake pressure drops below 10 psi.
- Pump stations shall have power connections available to two independent primary public power sources or provision for in-place auxiliary power if the pumps provide fire flow, or are pumping from ground level storage.
- Open system Booster Pump Stations (BPS), which transfer water to a higher pressure zone governed by an atmospheric storage tank, shall be capable of providing source capacity as established for water supply sources.

- Closed system BPS, which transfer water to a higher pressure zone closed to the atmosphere, shall provide peak hourly demand with a minimum of 30 psi of pressure at all connections. It is recommended that this capability be provided with the largest pump off-line.
- Closed system BPS shall provide fire flow in conjunction with maximum daily demand with 20 psi of residual pressure. Additionally, since this system is located in an area governed by the Public Water System Coordination Act of 1977 (PWSCA), this capability must be provided with the largest pump off-line.

3.4.16 General Facility Placement

All piping, pumping, source, storage and other facilities shall be located in public right-of-way, dedicated utility easements or on District-owned property. Utility easements must be a minimum of 15 feet in width, and piping shall be installed no less than 5 feet from the easement's edge. Any exceptions to this minimum easement will be at the discretion of the District. Unrestricted access by District Staff shall be provided to the public water system lines, appurtenances and fire hydrants.

The location of utilities shall be in accordance with the standards and guidelines established by local jurisdiction criteria. Where existing utilities or storm drains are in place, new facilities shall conform to these standards as nearly as practicable and yet be compatible with the existing installations.

3.5 REQUIREMENTS, ANALYSIS, AND RECOMMENDATIONS

3.5.1 Source of Supply

Water supply requirements for the District are based on guidelines established by the Washington State Department of Health's (DOH) "Water System Design Manual". Based on these requirements, the District's water supply should be able to replenish lost reservoir capacity due to equipment or facility failure within 72 hours (Standby Supply) while being able to supply water at a rate equal to the maximum day demand for the system with 18 hours of pumping (Equalization Supply). The 475/580 Booster Station pumps water from the 440 joint-use reservoir into the 475 and 580 zones, and ultimately to the entire system. CCUD Station 5, the District's primary source meter, was analyzed to determine if it could meet minimum supply requirements for all pressure zones combined. Because the Hazelwood Pump Station at CCUD Station 4 (SPU Tap #48) serves as a back-up source pumping facility in the event that Station 5 (Tap #52) is inoperable, this additional source was also analyzed to see if it could meet the minimum required supply for all

higher pressure zones. The current capacity of Station 4 is 1,600 gpm, which is not enough to sustain MDD for the system. However, the system has ample stand-by storage that can be used to supplement the source while Station 5 is repaired and brought back online. Additional information about storage facilities and the analyses performed for storage is provided in Section 3.5.4.

Table 3-10: Source Analysis
Coal Creek Utility District

Year	CCUD Station No.	SPU No.	Zone(s) Supplied	Existing Capacity (gpm)	ERUs	District MDD (gpm)	Bellevue MDD[1]	Surplus / Deficit (gpm)
2013	5	52	All	2,645	5,403	2,026	1,186	
	1	54	440	40	134	50	0	
	4	48[1]	All	1,600	5,403	2,026	1,186	
			All	4,285	5,403	2,026	1,186	1,186
2018	5	52	All	2,645	5,719	2,145	1,270	
	1	54	440	40	142	53	0	
	4	48[1]	All	1,600	5,719	2,145	1,270	
			All	4,285	5,719	2,145	1,270	870
2033	5	52	All	2,645	6,447	2,418	1,458	
	1	54	440	40	162	61	0	
	4	48[1]	All	1,600	6,447	2,418	1,458	
			All	4,285	6,447	2,418	1,458	410

Note: [1] CCUD Station 4 (SPU Tap #48) is not normally used and serves as a back-up in the event that Station 1fails.
Stations 5 and 4 are capable of supplying the entire system. Station 1 can only serve Pressure Zone 440.
All sources contain back-up power.
Bellevue MDD accounts for properties assumed by City of Bellevue but still served by shared CCUD facilities

The source analysis also considered the amount of water the District supplies to the City of Bellevue through the interties/meters with the City. Table 3-11 demonstrates that through 2033, the District maintains adequate supply for both their own customers and the customers in Bellevue that continue to rely upon supply through interties. The projected demands for Bellevue customers receiving water from Coal Creek are based on historic water demand data established in previous planning efforts. ERUs in this area of Bellevue were assumed to have similar growth rates to ERUs in CCUD's service area.

3.5.2 Water Quality and Treatment

Water purchased from Seattle is treated for water quality prior to entering the District. The District does not directly treat the water; however, monitoring is performed to ensure water quality meets DOH standards. It is the responsibility of the District to immediately contact Seattle Public Utilities if any divergence from water quality standards is noted during water quality monitoring.

Coal Creek participates in the regional Lead and Copper Monitoring Program. Regional monitoring was last performed in 2011. Monitoring is also required on a local level within the District. The District's last monitoring for Lead and Copper was conducted in 2011 and the next is scheduled for 2014.

The District routinely tests for chlorine residuals in the reservoirs and at the furthest points in the water system. During the winter months, when demand is reduced, the chlorine residuals have the potential to drop. In order to prevent water quality issues associated with low chlorine residuals and long turnover times, the District reduces the volume of storage in its reservoirs seasonally to allow for consistent water turnover. These recommendations were made in the previous Plan Update.

The District's current water quality information is provided in the Appendices and the status of water quality monitoring is published annually in the District's CCR. Additional detail is on file with the District and HO for interested parties.

3.5.3 Pump Stations

As mentioned previously, there are four pump stations in the District. Three of the pump stations pump water to storage reservoirs in the 580, 700, and 1060 Pressure Zones. The exception is the 475 constant pressure triplex pump system in the 475/580 Booster Station, which pumps directly to serve the 475 Pressure Zone. The pump stations generally provide adequate daily supply and are in good working condition.

3.5.3.1 440 Pump Station

Capacity at the 440 Pump Station has increased over time and provides up to 3,750 gpm with the largest pump out of service. Analyses indicate the station is currently sufficient for meeting the minimum required source of supply for both the short term (2018) and long term planning periods (2033).

3.5.3.2 Rainier Crest Pump Station

The Rainier Crest Pump Station provides adequate supply from its Paco 3-pump unit that provides 1,100 gpm, and it contains a back-up pump that is also capable of 1,100 gpm. No upgrades are planned or required in the near future.

3.5.3.3 Hazelwood Pump Station

Hazelwood Pump Station serves two purposes. The first is to pump water from the 580 Zone to the 700 Zone. The station has been upgraded over the past few decades and contains four pumps that have a total capacity of approximately 3,000 gpm when pumping from the 580 Zone to the 700 Zone. The second purpose is to pump approximately 1,600 gpm from Supply Station 4 (SPU Tap #48) to the 700 Zone in the event that the 580 Booster station is unavailable. The Hazelwood Pump Station will be able to meet demands up to and beyond the 2033 planning horizon.

3.5.3.4 475/580 Booster Station

The 475 Zone constant pressure pump system at the 475/580 Booster Station was replaced in 2011. The addition of a third pump brings the total station capacity with the largest pump out of service to 2,400 gpm, which is adequate to meet system-wide MDD through 2018. In 2033, MDD for District customers is expected to reach 2,418 gpm. The additional capacity needed to meet MDD in 2033 can be drawn from Supply Station's 1, and 4. Therefore, no upgrades to the 475/580 Booster Station are recommended in this Plan.

3.5.4 Storage

The recommended storage capacity for a water system is equal to the sum of the equalizing, standby, and fire suppression storage. The minimum amount of storage required shall be adequate to provide for equalizing storage plus the larger of standby or fire suppression storage. Each of the existing District storage components is described below. Table 3-12 shows the existing storage requirements for each pressure zone, the storage requirements in the year 2033, and the current and future surplus/deficit capacities. Based on the storage analysis, the District will have sufficient storage capacity well into the future for the current District boundary, as shown in Table 3-12.

Table 3-11: Storage Analysis
Coal Creek Utility District

Reservoir	Zones	Year	ERUs	Required Minimum (MG)				Existing[1] (MG)	Surplus (MG)
				ES	SB	FSS	Total		
440	170, 320, 475	2013	1,146	0.00	0.23	0.54	0.77	3.32	2.55
		2018	1,222	0.00	0.24	0.54	0.78		2.54
		2033	1,389	0.00	0.28	0.54	0.82		2.50
580	580	2013	2,010	0.02	0.40	0.54	0.96	2.14	1.18
		2018	2,159	0.03	0.43	0.54	1.00		1.14
		2033	2,512	0.07	0.50	0.54	1.11		1.03
700	700	2013	989	0.00	0.20	0.54	0.74	1.49	0.75
		2018	1,062	0.00	0.21	0.54	0.75		0.74
		2033	1,232	0.00	0.25	0.54	0.79		0.70
1060	820, 940, 1060	2013	1,259	0.00	0.25	0.54	0.79	3.0	2.21
		2018	1,276	0.00	0.26	0.54	0.80		2.20
		2033	1,313	0.00	0.26	0.54	0.80		2.20
	District Total	2013	5,403	0.02	1.08	0.54	1.64	9.95	8.31
		2018	5,719	0.03	1.14	0.54	1.71		8.24
		2033	6,447	0.07	1.29	0.54	1.90		8.05

Notes: [1] Existing storage does not consider Bellevue portion of joint serving facilities (the 440 and 580 Reservoirs). Total capacity of joint use storage tanks has been adjusted according to the percentage of the tank that is reserved for District system use.

ES = Equalizing Storage, SB = Standby Storage, FSS = Fire Suppression Storage

3.5.4.1 Effective Storage

Because there is no dead storage in any of the District's reservoirs, the effective storage of each reservoir is its maximum storage capacity, from the outlet to the overflow elevation.

3.5.4.2 Operational Storage

Operational storage levels for the reservoirs vary as District operators establish reservoir control elevations as desired. Current operating levels for the reservoirs

are listed in Table 3-12. Operational storage levels vary in the 1060 Reservoir due to the seasonal operations of the Golf Club at Newcastle; however, all other controls can be assumed to be set in proximity to the range of elevations listed in Table 3-12.

Table 3-12: Reservoir Operating Levels
Coal Creek Utility District

Reservoir	Base Elevation (ft)	Normal Operating Elevatio2s		Overflow Elevation (ft)
		Pump on Elevation (ft)	Pump off Elevation (ft)	
440 Reservoir	420	428	434	440
10 MG 580 Reservoir	540	549	564	580
2.5 MG 580 Reservoir	540	549	564	580
700 Reservoir	665	674	685	700
1060 Reservoir (Summer)	1022	1026.5	1057.5	1060
1060 Reservoir (Winter)	1022	1026.5	1030	1060

The District is currently not utilizing the full capacity of its reservoirs due to long turnover times and the associated water quality concerns. In order to use more of the available storage capacity, the District may want to consider the installation of separate inlet and outlet piping to promote better mixing of the water and alleviate any short circuiting and also the addition of rechlorination equipment at specific reservoirs to maintain acceptable chlorine residuals in the system.

3.5.4.3 Equalizing Storage

The 580 Zone requires a small amount of equalizing storage to accommodate the fact that MDD exceeds the 580 pump station's capacity when the largest pump is out of service. This is the only zone in the system that requires equalizing storage.

3.5.4.4 Standby Storage

It has been determined that the District maintains adequate Standby storage at all reservoirs throughout the system. The minimum requirement for Standby Storage is recommended by DOH to be approximately 200 gallons / ERU, and currently the District maintains a surplus of storage that equates to approximately 1,700 gallons / ERU. This amount is reflected in Table 3-12.

3.5.4.5 Fire Suppression Storage

The minimum fire flow requirement for any school facility in the District is 3,000 gpm for a period of three hours. As a conservative measure, this fire flow rate was utilized throughout the District in all pressure zones. Since fire flow demands will remain constant, a consistent volume of 540,000 gallons was used as the requirement for current and future fire suppression storage.

3.5.4.6 Dead Storage

Since minimum design pressures can be reached for customers even in instances of low water levels in the reservoir, dead storage is not a component of the total volume in the reservoirs. The reservoirs in the District will continue to drain until their respective pump stations eventually refill them.

3.5.5 Transmission and Distribution System

3.5.5.1 Hydraulic Modeling Software

As an aid in the identification and analysis of present and future demands and recommended improvements, the water system was modeled on computer using the H2O Net hydraulic model software developed by MW Soft, Inc. This particular software allows graphical representation of the water system within AutoCad software applications. With this analysis tool, various modifications, parameter changes, and improvements can be easily evaluated. Thus, the identification of problem areas and the development of possible solutions are expedited. By maintaining a model of the water system, developer extensions and other improvements can be modeled as they occur, allowing design and construction of the most effective and cost efficient system.

Due to the lack of any substantive changes to the water system's configuration since the previous planning effort, previously performed hydraulic modeling efforts were reviewed, and have been verified by District engineers as providing an accurate representation of existing system conditions. Moreover with the economic recession that occurred from 2007 through 2011, the community's growth projections have been delayed such that previously determined future demand scenarios are relatively consistent with the 20-year planning horizon for this plan (2033). The 2023 hydraulic modeling scenario from previous plan efforts was verified as a sufficient representation of the 2033 demand scenario for

this Plan, therefore additional modeling of the transmission and distribution system was deemed unnecessary.

The hydraulic model has been updated and used periodically by consultants that operate the model on behalf of the District, and adequate flow and pressure improvements identified in previous planning efforts have been adopted by the District.

The modeling program has the capability to simulate all components of a water system, including pipes, pumps, pressure reducing valves, and reservoirs. The District's water system involved the use of approximately 745 pipes and 630 nodes. Nodes serve as connection points for pipes and can be assigned external demands to simulate water uses within the District. All metering points, pumps, pressure reducing valves, and reservoirs were also included in the model. Output reports from the model indicate high or low node pressures or pipe velocities.

To express flow in pipes, the Hazen-Williams equation for turbulent flow as a function of pipe length, diameter, head loss, and roughness was used. H2O Net software allows the user to enter all necessary attributes needed to model the system's water mains. In addition to assigning external demand data for each node, exponential three-point curves for pumps, pressure reducing valve downstream pressures, and tank elevations during District fire flow testing provided input to setting the model's parameters.

3.5.5.2 Hydraulic Model Calibration

With the District's H2O Net model, all water facility items and attribute data were checked for consistency with the physical system.

After all water facility items were accounted for in the model, demands for each pressure zone were evenly distributed between nodes in their associated pressure zone. A point demand was established from water use data for the Golf Club at Newcastle, the only significant high water user in the District. These demands were reviewed based on updated (2012) forecasts, and it has been verified that previously determined demand allocations under the previous Plan (2003) were sufficient for modeling purposes for this Plan.

To verify that the hydraulic model was accurate and closely reflected the current operation of the existing system, several fire flow tests were conducted by District operators in various areas of the District under the previous planning effort (2003). The District's engineer has verified that no significant changes to the

system have occurred to warrant further calibration and fire flow testing. During the tests, reservoir water levels, pump station flows, and pressure reducing valve settings were noted to record a "snapshot" of the existing water system during fire flow testing. With this data, scenarios were created in the hydraulic model with water system facility parameters set to the reservoir levels, pump station flows, and pressure reducing valve settings during the fire flow tests.

Tested static pressures and modeled static pressures calibrated to approximately 10 percent in all instances. Inconsistencies may be attributed to slightly incorrect elevation data or approximate reservoir SCADA elevation data. Tested fire flows and modeled fire flows correlated in seven out of nine instances.

The District's engineer has verified that no significant changes to the system have occurred since the previous calibration efforts, so the District has elected not to calibrate the model as part of this Planning effort.

3.5.5.3 Hydraulic Modeling Analysis

The model is used to determine areas where system deficiencies may exist, or are likely to develop, under various flow conditions. These deficiencies include areas of high or low pressure, areas with high flow velocities in the pipelines, and areas with low available fire flow. The system was analyzed using the District's minimum design criteria, which are based on recommended Department of Health and King County Fire Code criteria. Present and future computer simulations were analyzed using the following pertinent design criteria:

- An acceptable pressure range of 40 psi to 80 psi for domestic flows.
- A minimum system pressure of 30 psi throughout the District under peak hour demand conditions.
- A minimum system pressure of 20 psi under maximum day demand plus required fire flow conditions.
- A maximum pipeline velocity of 10 feet per second under fire flow conditions.
- In pressure zones being supplied directly by pump stations, all design criteria is to be maintained with the largest pump out of service.
- System modeling was completed with the reservoir elevations set at the bottom of the operational storage component, so only the effective storage

was considered. The reservoir operating levels are presented in Table 3-12.

3.5.5.4 Fire Flow Improvements

Once the hydraulic model was properly calibrated, fire flow simulations were performed for several areas in the District under Peak Hour Demand (PHD) conditions. The model tests were run with all pumps turned off to assess the ability of the system to operate with supply only from storage reservoirs. Residual pressures of 20 psi were used to simulate future fire flow conditions. Figure 3-4 provided at the back of this Part of the Plan shows available fire flows throughout the District under PHD conditions.

As a minimum requirement, fire flows below 1,500 gallons per minute for residential areas and 3,000 gallons per minute for commercial areas were identified as areas for improvement. Improvements to the fire flow to meet future demand conditions consist of replacing existing undersized pipe, looping water mains, and installing interties to connect to the water system of adjacent water purveyors.

General areas identified for fire flow improvements include the southern portion of the District, specifically the 440 pressure zone (SE 95th Way), and the residential development south of the intersection at Southeast 91st Street and 120th Avenue Southeast.

In the 2004 Plan, a fire flow deficiency was identified in the area of Paradise Estates in the 440 Zone (122nd Avenue SE and SE 96th Place). With the installation of the new intertie with the City of Renton water system, the District is now able to provide the targeted minimum of 1,500 gpm in the area.

The residential development to the south of the intersection at Southeast 91st Street and 120th Avenue Southeast also does not have adequate fire flow. To increase flow, it is recommended that the existing 8-inch cast iron piping be replaced by 12-inch ductile iron piping. This improvement will increase fire flow to the area to at least 1,500 gpm. This project is identified in the CIP as project W-9 and is scheduled to occur as further development or redevelopment in that area occurs.

3.5.5.5 Low Pressure Area Improvements

Areas of low and high pressure were also determined under pervious modeling efforts. Due to the hilly terrain of the District, pressures can vary dramatically when compared to the close proximity of services. Areas of low pressure, below the minimum 40 psi that Coal Creek tries to maintain, include areas in proximity of reservoirs, which are the high points in the District.

The pressure zones within the system are well established and provide the proper pressure to the majority of the District's service area, and have not been altered since the previous Plan (2004). Coal Creek Staff keep a map on file at the District office that outlines areas of low and high pressure, and periodically references the map when investigating customer complaints. Periodic monitoring of the few existing services in these areas and reservoir levels in the general vicinity of reservoirs for low pressure will ensure adequate pressures to those customers. No improvements are recommended for the current planning period (2012-2033).

3.5.5.6 High Pressure Area Improvements

Eighteen pressure reducing valves control downstream pressures to ensure customers receive water at pressures that generally do not exceed 80 psi. In some instances, customers have water pressure exceeding this maximum static pressure and are required to install and maintain individual pressure reducing valves on their water service lines in accordance with the Uniform Plumbing Code. Generally, the areas of high pressure above 80 psi in the District include:

- Southwest corner of the District south of the intersection of 112th Avenue Southeast and Monterey Place Southeast also known as Stafford Crest and Whitehawk developments.
- General western portion of the District delineated by 116th Avenue Southeast and continuing westerly to Lake Washington.
- Southeastern portion of the District generally identified as the Highlands at Newcastle development. Individual PRVs were installed at the time of home construction to control pressures in this isolated area.

Areas of high pressure previously identified have already been alleviated by installing pressure reducing valves between zones, installing a parallel water main flowing water from a lower pressure zone, or installing individual pressure reducing valves on service lines.

The District will continue monitoring the water system for high pressures and maintain its policy of requiring individual pressure reducing valves on services with pressures above 80 psi. High water pressures for future developments will be examined during design and adequate solutions to alleviate high pressures will be proposed on an individual case basis.

3.5.5.7 Small Main Replacements

It is recommended that the District analyze and replace as necessary all water mains smaller than 6-inches in diameter to improve flow and accommodate for future demand capacity. The 4-inch diameter water main located in Southeast 73rd Place is the only remaining water main under 6-inches in the District. There are no fire hydrants located at the end of this dead end main. Flows are not an issue at this time but the District may wish to replace this main at some future time.

In the event of property rezoning, the system may not be capable of meeting the increased fire flow requirements. If this is the case, the water mains will require re-examination to determine necessary improvements.

3.6 WATER SYSTEM CAPITAL IMPROVEMENTS PLAN

Table 3-14 presents the proposed water system capital improvements plan for the next six years. A more comprehensive CIP that includes costs estimated for 2019-2033 is provided in Part 5 of this Plan.

The planning level cost estimates include administrative, engineering, legal fees, taxes, and overhead and are based on a variety of factors, including: documented costs of performing similar kinds of work in the recent past; engineering judgment; the availability of labor; the time of year of construction; competitive conditions; and other intangibles affecting construction costs at the time that the work is performed. The planning level estimates are intended to be conservative estimates that will be refined during the design process. Prior to the initiation of the projects shown in the Plan, any changes should be reviewed and the cost estimate should be updated to reflect current conditions.

The recommended schedules are based on project priority. The proposed schedules may need to be adjusted at a later date to reflect changes such as development timing and actual future system conditions.

Table 3-13: 6-Year Water System Capital Improvements Plan

Coal Creek Utility District

No.	Description	Function	Estimated Cost[1]	Schedule[2]	Recommended Financing[3]
W-1	System SCADA/Telemetry Improvements	Upgrade Telemetry and SCADA equipment system-wide	$150,000[5]	2013	PWTF, GFC, Rates
W-2	580 Booster Station Pump Improvements	Add a third pump to 580 Booster Pump station to increase reliability	$110,000[4]	2014	PWTF, GFC, Rates, City of Bellevue
W-3	Key Facility Security Improvements	Install security improvements at 580 Reservoir, 700 Reservoir, and 1060 Reservoir (fencing, cameras, etc.)	$20,000[4]	2014	PWTF, GFC, Rates, City of Bellevue
W-4	440 Reservoir Interior and Exterior Painting –	Extend the useful life of the 440 Reservoir by preventing rust and corrosion	$1,000,000[4]	2014	PWTF, GFC, Rates, City of Bellevue
W-5	700 Reservoir Improvements	Seismic analysis, cost/benefit analysis of maintaining vs. replacing, interior coating	$75,000	2016	PWTF, GFC, Rates
W-6	Reservoir Circulation Improvements	Install facilities that will improve water circulation at reservoirs	$25,000	2017	GFC, Rates
W-7	Meter Replacement Program	Replace approximately 200 meters per year with meters capable of drive-by AMR	$150,000 ($25K Annual)	2013-2018	GFC, Rates
W-8	Asset Management Replacement Fund	Build a fund for asset replacement as assets expire	$300,000 ($50K Annual)	2013-2018	GFC, Rates
W-9	120th Avenue and SE 91st Street Main Replacement	Replace approximately 750 linear feet of 8-inch main with 12-inch main to provide fire flow required in Windtree Area	$210,000	ARBD	DE, GFC, Rates
W-10	440 Pump Station Upgrade	Replace existing pump(s) in station to meet supply requirements	$100,000	ARBD	DE, GFC, Rates, PWTF
W-11	Rainier Crest Pump Station Improvements	Rebuild the triplex pump system and add Variable Frequency Drive (VFD) controller.	$100,000	2013	GFC, Rates
W-12	1060 Reservoir Exterior Painting	Extend useful life of storage reservoir by preventing corrosion and rust.	$400,000[6]	2016	GFC, Rates
W-13	580 Reservoirs Exterior Painting	Extend useful life of two 580 Zone storage reservoirs by preventing corrosion and rust.	$800,000[6]	2017	GFC, Rates

Notes:
[1] Costs are in 2012 dollars and include total 6-year costs of construction, engineering, survey, inspection, taxes, administration, etc.
[2] ARBD = As Required by Development
[3] PWTF = Public Works Trust Fund Low Interest Low Financing
[4] . Surface preparation of both interior and exterior surfaces is assumed. Confirmation of interior tank condition is pending. Disposal of hazardous waste material from exterior surface preparation is also assumed. City of Bellevue will be responsible for a portion of the total cost indicated for improvements to this Joint Use Facility. Details provided in CIP (Part 5)
[5] Project split with Sewer Facility SCADA/Telemetry improvements
[6] Reservoir painting estimates are for exterior tank painting only. Confirmation of interior coating condition is recommended prior to project start.
GFC = General Facility Charge
DE = Developer Extension

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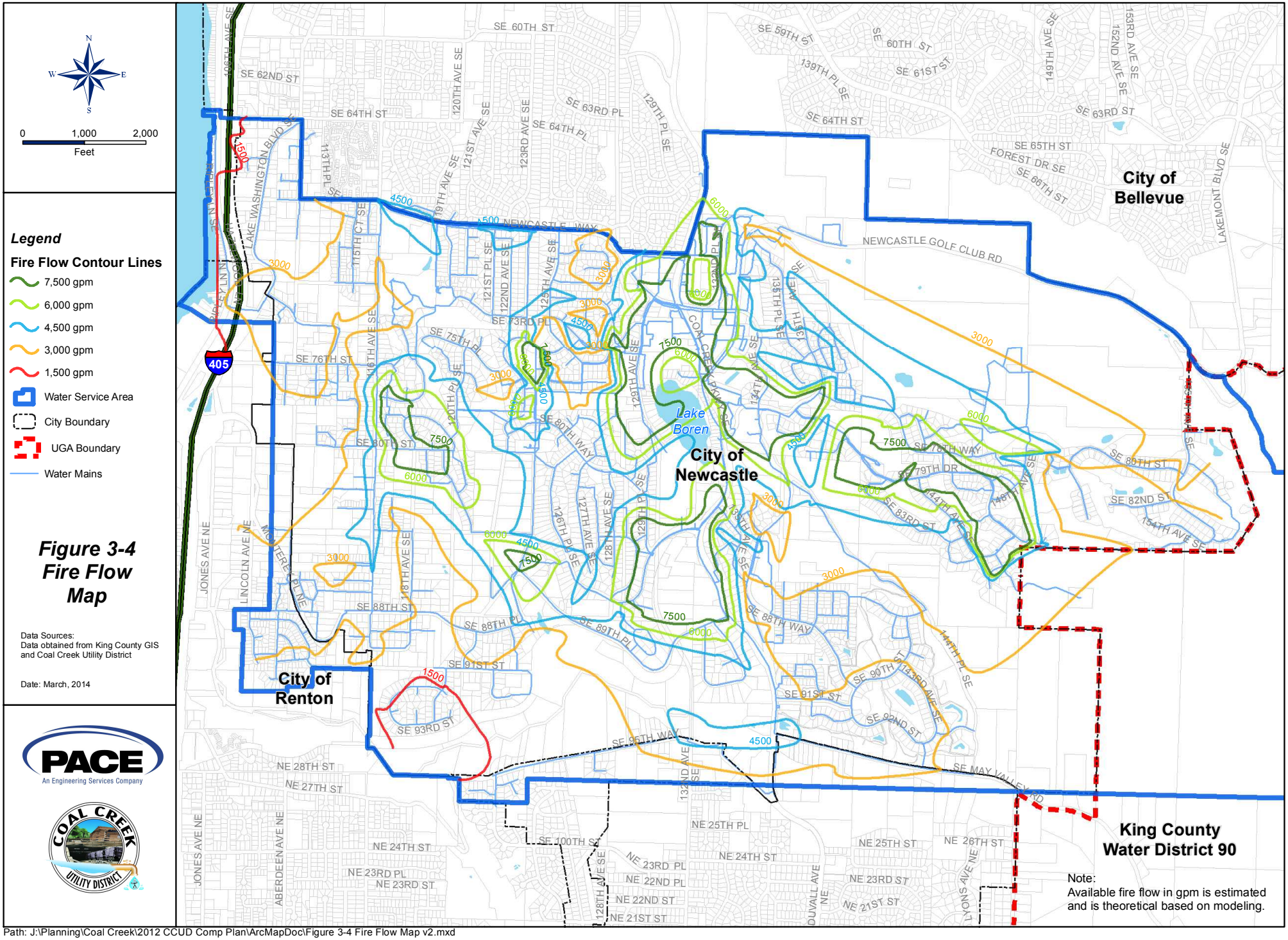

Path: J:\Planning\Coal Creek\2012 CCUD Comp Plan\ArcMapDoc\Figure 3-4 Fire Flow Map v2.mxd

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PART 4
SEWER SYSTEM

4.1 SANITARY SEWER SYSTEM OVERVIEW AND SUMMARY

Coal Creek Utility District provides sanitary sewer service to approximately 2,870 service connections. Approximately 94% of the District's connections are single-family homes, which collectively produce nearly 75% of the total wastewater flow generated in the service area. Coal Creek maintains more than 45 miles of 8-inch diameter or greater sewer mains with eight lift stations. Sewage from the service area is treated downstream at the King County Wastewater Treatment Division's (WWTD) South Treatment Plant located in the City of Renton. Similar to the water system maintained by Coal Creek, a significant portion of the sewer system was purchased and assumed by the City of Bellevue in 2003. The three primary drainage basins located within the service area are all ultimately served by King County's regional system, and Coal Creek has four direct connections to the King County system. The District also has two connections with Renton and five connections with Bellevue that also ultimately convey flow to King County interceptors. Similar to the water system, a substantial portion of Coal Creek's sewer system located within the city limits of Bellevue was transferred to the City's ownership in 2003.

The purpose of this Part of the Plan is to provide information regarding sewage flow, the existing sewer system, minimum design criteria, and analysis of the system under current and proposed conditions. The existing system has been analyzed in accordance with all applicable requirements including DOE, King County, City and District guidelines. Recommended system improvements are discussed in Section 4.6.

4.2 SEWAGE FLOWS

Identification of historical and projected wastewater flows is important in evaluation of the sewer system's ability to meet the current and future needs of the population within the District's sewer service area. The wastewater flow projections provide the basis for the sewer system modeling and analysis. It should be noted that although this planning process has had the benefit of the most current (2010) Census population and employment) data available at a high level of detail (Census Blocks for residents, Block Groups for employment), wastewater flows are vulnerable to influences such as weather patterns and the effectiveness of water conservation programs. Seasonal variations in flows and peaking factors are also influenced by the types of connections. These factors are discussed in greater detail later in this Part of the Plan.

4.2.1 Historical Wastewater Flows

Wastewater flows consist of a combination of domestic flow and infiltration and inflow that enters the system from illegal connections and aging infrastructure. Domestic flow is

generated by single-family residential, multi-family residential and commercial customers of the District. Approximately 74% of the domestic sewage flow is generated by single-family accounts while the multi-family and commercial accounts produce the remaining 26% of total flow. Table 4-1 presents estimated historical domestic flow data for 2009 through 2011. This information is derived from water use data and is calculated according to King County WTTD criteria.

Table 4-1: Historical Sewage Flow by Customer Class
Coal Creek Utility District

	Single-Family	Multi-Family & Commercial	Total
2009			
Sewage Flow (mg)	45.14	14.39	59.53
Connections	2,682	139	2,821
Estimated ERUs	2,682	855	3,537
2010			
Sewage Flow (mg)	45.53	16.44	61.97
Connections	2,705	138	2,843
Estimated ERUs	2,705	977	3,682
2011			
Sewage Flow (mg)	46.28	17.03	63.31
Connections	2,750	139	2,889
Estimated ERUs	2,750	1,012	3,762

Notes: Assumes a flow rate of 750 ccf per month per ERU.
Data from District's quarterly Metro reports

4.2.2 Infiltration and Inflow

Infiltration and Inflow (I/I) are significant elements of any sanitary sewer system analysis and are particularly critical in wet weather climates, such as the Pacific Northwest, where they can cause overloading, or surcharging of the sanitary sewer system, compromise system capacity, result in unnecessary treatment costs, and in extreme cases, pose a risk of environmental damage.

Infiltration occurs as a result of groundwater entering the wastewater system through joints and cracks in pipes and manholes. Inflow is the water that enters the sanitary system directly. As an example, inflow might occur due to excessive groundwater flows or illegal

connections from outside of right-of-way limits (i.e. area, roof, or footing drains). The volume of infiltration is mainly influenced by age and condition of the system, soil conditions, previous construction techniques, and underground water table levels. Infiltration is also affected by system proximity to larger bodies of water and by tidal influences near low-lying shores, which influence groundwater fluxes.

Coal Creek, in conjunction with the King County Regional Infiltration and Inflow Control Program, completed flow monitoring throughout the District by Sub-basins in the winters of 2000-2001 and 2001-2002. Based on the flow and rainfall data collected for the ten biggest rainfall events in the fall and winter of 2001, the calculated 30-minute peak total I/I for the District ranged from 825 gallons per acre per day (gpad) to 2,194 gpad. The overall District average for the ten events was 1,487 gpad. Since this is based on the ten worst events for one particular year and is presented as the peak 30-minute I/I, the values are suspected of being higher than the overall average for the District over an extended period of time. This figure seems higher than the typical 1,100 gpad assumed and planned for in King County's regional system, and it could be attributed to several reasons. For instance, the monitoring did not include the entire District. In addition, some of the more recently developed areas and newer parts of the system were not monitored. For planning purposes, the District uses a standard of 1,100 gpad to account for I/I projections in the design of the system. Additional discussion regarding I/I in the District is located in Section 4.5.2.

4.2.3 Projected Wastewater Flows

Sewage flow projections have been developed by major Sub-basin and assume that no changes will occur in the direction of flow or its ultimate destination and disposal. The projections also assume an expansion of the service area to include currently unsewered areas within the District's service area boundary. As a means of developing a conservative design basis, the projections assume that the infiltration and inflow rates will remain constant.

Table 4-2 presents ultimate flow projections for each sub-basin in the District under build-out conditions. The sub-basins are described in more detail in Section 4.3.4, and delineated on the Sewer System Plan Map located at the back of this Plan. The ultimate flow projections have been calculated based on the current zoning within the sewer service area. The projections assume that all undeveloped property within the District will be developed to maximum capacity in accordance with its existing zoning designation. No considerations were made for possible property rezones. The flow projections are based on an estimated average flow of 61 gallons per capita per day and an average household size of 2.6. The 61 gallons per day was derived by looking at average

household winter use for the District's water customers from 2007-2011. Flow from non-residential property is estimated at 2,800 gallons per acre per day. I&I is assigned a varying value using KC I&I monitoring as a baseline and achieving and overall I&I rate of 1,500 gallons per acre day. A peaking factor of 2.5 has been used to estimate peak flows in accordance with the Department of Ecology's Criteria for Sewage Works Design (Orange Book). This peaking factor is used for area-wide flow projections only. Peaking factors used in the design of various individual facilities are discussed in Section 4.4.4.1.

Table 4-2: Wastewater Flows by Drainage Basin

Coal Creek Utility District

		2010			2015			2020			2030		
Basin	Acres	Peak Base Flow (gpm)	I&I (gpad)	Total Peak Flow (gpm)	Peak Base Flow (gpm)	I&I (gpad)	Total Peak Flow (gpm)	Peak Base Flow (gpm)	I&I (gpad)	Total Peak Flow (gpm)	Peak Base Flow (gpm)	I&I (gpad)	Total Peak Flow (gpm)
3	67	50	2200	153	54	2200	157	57	2000	151	65	1500	135
4	224	125	1400	342	134	1400	351	143	1500	376	163	1500	396
5	7	8	1900	18	9	1900	18	9	1500	17	10	1500	18
7	273	257	2600	749	276	2600	768	296	1800	636	338	1800	679
8	99	61	1100	136	66	1500	168	71	1500	173	73	1500	176
9	744	311	1100	879	335	1500	1110	358	1500	1133	366	1500	1141
10	308	145	1600	487	155	1600	498	165	1500	487	269	1500	590
11	373	85	1100	370	91	1500	480	97	1500	486	158	1500	547
12	34	14	1100	41	15	1500	51	16	1500	52	19	1500	55
13	312	170	1100	408	183	1500	508	197	1500	521	202	1500	527
14	532	132	1100	539	142	1500	696	152	1500	706	221	1500	775
			Total	4122	1459		4806	1561		4739	1885		5039

Assumptions are based on DOE Orange Book, District knowledge and WWTD data::

61 gallons per resident per day of indoor water use.

2,800 gallons per acre per day for non-residential property.

Varying I&I rates as indicated and ultimately 1,500 gpad.

2.5 peaking factor.

Average Household Size of 2.6 People per household.

4.3 EXISTING SANITARY SEWER SYSTEM

Coal Creek's sewer system consists of eight lift stations, approximately 45 miles of collection system mains, and a discharge connection to King County facilities. The existing District facilities are shown on Figure 4-1 and the Sewer System Plan Map located at the back of this Plan, and described in detail in the following sections.

4.3.1 King County Wastewater Treatment Division Facilities

Coal Creek Utility District relies on the WWTD regional wastewater conveyance and treatment system for conveyance, treatment and disposal of all flows from the District's customers.

WWTD owns and operates an extensive regional sewer collection and treatment system, which provides for the transport, treatment and disposal of sewage generated throughout the greater Seattle and Eastside areas. The regional facilities that collect the flows from the District are: the Eastside Interceptor, which runs north to south, parallel to Interstate 405 in the western portion of the District; the Coal Creek Trunk-Section 1, a 36-inch concrete line which begins north of the District and east of Coal Creek Parkway, runs along the eastern boundary of the District and along Coal Creek and empties into the Eastside Interceptor; the May Creek Interceptor-Section 1, a short section of 36-inch pipe that begins at the southwest corner of the District and runs westerly, across Interstate 405, to empty into the Eastside Interceptor near the mouth of May Creek; and the Coal Creek Interceptor, a 16-inch and 18-inch main that runs along Coal Creek Parkway from SE 72nd Street north to the WWTD connection. The Coal Creek Interceptor currently serves Sub-basins No. 7, 8, 9, 12, 13 and 14. At 16 to 18 inches in diameter, the Coal Creek Interceptor is adequately sized to transport all flows from the east and southeastern portions of the District. The portion of the Eastside Interceptor that runs through the District is the Hazelwood Tunnel, which varies in size from 78 to 96-inches and runs anywhere from 35 feet to 270 feet below the ground surface.

The District currently has one primary connection to King County's May Creek Interceptor, and three smaller connections for properties located downstream of the District's primary connection. The location of these connections are shown on the Sewer System Plan Map included at the back of this document.

4.3.2 Collection System

The pipes in the collection system are constructed of a variety of materials, including concrete, asbestos-cement (AC), vitrified clay, cast iron, ductile iron and polyvinyl chloride (PVC). The majority of the original District system, that part constructed in the 1950's and 60's, is constructed of concrete and AC pipe. Pipes that have been constructed within the

last twenty years, mostly as developer extensions, are almost exclusively ductile iron and PVC. An inventory of the District's collection system is presented in Table 4-3. The District's system also includes approximately 1577 manholes.

Table 4-3: Collection System Inventory
Coal Creek Utility District

Size of Pipe	Linear feet of Pipe
6-inch[1]	4,575
8-inch	227,830
10-inch	8,830
12-inch	6,985
Total	248,220

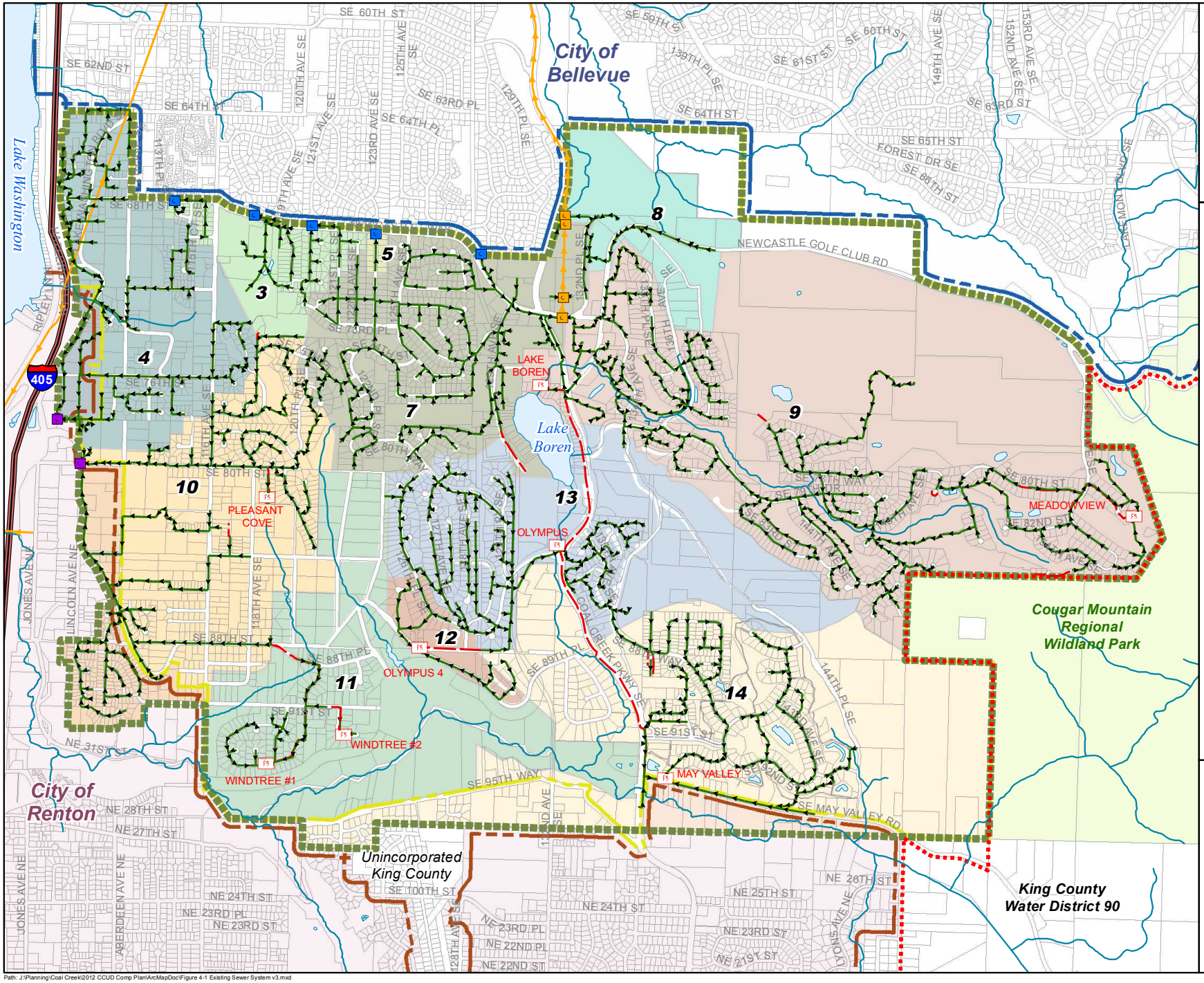
Note: Lengths are approximate and obtained from District GIS records.
[1] All 6-inch mains are side sewer connections and are not primary collection facilities.

4.3.3 Lift Stations

Coal Creek Utility District serves properties with gravity sewers whenever possible. However, some areas of the District are too low in elevation to be served (either physically or economically) by the gravity system. In these cases, sewer lift stations are constructed. The lift stations are located at the low point of the area to be served and pump to the nearest gravity sewer line.

There are two types of lift stations in the District: wet well/dry well stations and submersible stations. In a wet well/dry well station, the sewage is collected in a chamber called the wet well. The pumps, controls and electrical equipment are located in an adjacent chamber, the dry well. The pumps are connected to the wet well by suction lines and pump the sewer through a force main to the discharge point. In a submersible station, pumps specially designed for submersion in liquid are placed directly in the wet well and pump the contents through the force main.

The District has two wet well/dry well stations and six submersible stations, three of which have been installed in the past 5 years to serve unsewered areas of the District. The wet well/dry well stations are the Olympus and May Valley Lift Stations. The submersible stations include the Olympus 4 Station, Meadowview, Pleasant Cove, Windtree One, Windtree Two and Lake Boren Lift Station.



Legend

- Lift Stations
- Bellevue Connection
- KCWTD Connection
- Renton Connection
- Force Main
- Gravity Main
- KCWTD Trunk Line
- Stream
- Urban Growth Area
- Sewer Service Area
- Bellevue
- Newcastle
- Renton

Sub-Basins

3, 4, 5, 7, 8, 9, 10, 11, 12, 13, 14

Figure 4-1 Existing Sewer System

Data Sources:
Data obtained from King County GIS and Coal Creek Utility District

Date: March, 2014

PACE
An Engineering Services Company

COAL CREEK UTILITY DISTRICT

Path: J:\Planning\Coal Creek\2012 CCUD Comp Plan\ArcMapDoc\Figure 4-1 Existing Sewer System v3.mxd

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The Olympus and May Valley Lift Stations have permanent on-site diesel generators that operate the pumps during a power outage. The other six stations allow for hookup of a portable generator to run the pumps. The District owns a 100-kilowatt trailer-mounted generator for this purpose. The following sections describe the existing lift stations and detailed information is provided in Table 4-4.

4.3.3.1 Olympus Lift Station

The Olympus Lift Station is a wet well/dry well station that was originally constructed in 1986 for the Olympus residential development and totally replaced in 2004. The service area of the Olympus station lies within the May Creek Sub-basin. However, since there are no WWTD sewage interceptor lines in the May Creek Basin beyond the east side of Interstate 405, sewage generated in the Olympus service area is pumped to the Coal Creek Basin. Sewage flows resulting from future development in the Newcastle and May Creek areas will also be diverted to the Coal Creek Basin via the Olympus Lift Station. The station was therefore designed and constructed to accommodate these anticipated flows. The Olympus Lift Station has an on-site generator for emergency power.

4.3.3.2 Olympus 4 Lift Station

The Olympus 4 Lift Station is a submersible station that contains grinder pumps. The station was constructed in 1992 and was upgraded in 2012. The Olympus 4 station currently serves that portion of the Olympus development that lies too low to be served by gravity to the Olympus Lift Station. It has the capacity to serve further potential development within Sub-basin No. 12.

4.3.3.3 May Valley Lift Station

The May Valley Lift Station was constructed in 2001 to serve the Highlands at Newcastle development in the southeastern portion of Basin 14. The wet well/dry well station has an on-site generator for emergency power. The station and force main were sized for future flows of up to 1,100 gpm. This can be accomplished by replacing the existing 500 gpm pumps with larger ones.

4.3.3.4 Pleasant Cove Lift Station

The Pleasant Cove Lift Station, like the Olympus 4 station, is a submersible station with grinder pumps. It was constructed in 1997 to serve the plat of Pleasant Cove, a 14-lot single family development. In 2011, the pumps were replaced and electrical improvements were made to bring the station up to current standards. At the time of development, the developer of the property was unable to obtain the necessary easements from adjoining properties to provide gravity sewers.

Therefore, through a special agreement with the District, a temporary lift station to serve the 14 lots in the plat was permitted to be constructed. As downstream properties develop and gravity sewers become available, the Pleasant Cove Lift Station will ultimately be abandoned.

4.3.3.5 Meadowview Lift Station

The Meadowview Lift Station was constructed in 2001 and serves the southeastern corner of Basin 9. The station has two submersible grinder pumps and is equipped to accept a portable generator for emergency power.

4.3.3.6 Windtree Lift Stations 1 & 2

These two submersible lift stations were constructed in 2008 to serve one of the larger unsewered areas of the District south of SE 88th St. and west of 124th Ave. SE. Both stations are submersibles and have hookups for portable generator use during power outages.

4.3.3.7 Lake Boren Lift Station

The Lake Boren Lift Station was constructed in 2011 to serve the properties north of Lake Boren and south of Newcastle Way. It incorporates submersible grinder pumps and has an emergency generator hookup. This lift station allows for properties along Lake Boren that previously maintained private septic systems to connect to CCUD's sewer system.

Table 4-4: Sewer Lift Stations
Coal Creek Utility District

Name and Location	Type	Built/ Rebuilt	Pump Make	Gpm @ head	Pump HP	RPM Volts/ Phase	Controls	Force Main
Olympus Lift Station Coal Creek Prkwy & SE 83rd St	Wet Well/ Dry Well	1986 2004	Cornell 4NHTA Fairbanks 5433C	925 gpm @ 80 FT 950 gpm @ 120 ft	30 40	1800 480/3	Pressure Transducer	12" DI
Olympus 4 Lift Station SE 88th St & SE 89th Pl	Submersible Grinder	2012	Flygt 3127	85 gpm @ 120 ft	7.5	1750 208/3	PT	3" DI
May Valley Lift Station SE May Valley Rd & SE 92nd St	Wet Well/ Dry Well	2001	Cornell 4NHTA	500 gpm @ 88 ft	20	1770	Pressure Transducer	10" DI
Pleasant Cove Lift Station SE 80th St & 118th Ave SE	Submersible Grinder	1997	Hydromatic G2HX300	50 gpm @ 54 ft	3.0	3500 480/3	Mercoid Switch	2" HDPE

Table 4-4: Sewer Lift Stations
Coal Creek Utility District

Name and Location	Type	Built/ Rebuilt	Pump Make	Gpm @ head	Pump HP	RPM Volts/ Phase	Controls	Force Main
Meadowview Lift Station SE Note: Locations are approximate 70th Pl & 155th Ave SE	Submersible Grinder	2001	Flygt MP-3127	75 gpm @ 142 ft	7.5	1750 208/3	Pressure Transducer	3" HDPE
Lower May Creek #1 12000 SE 93rd St.	Submersible	2008	Flygt NP-3171	500 gpm @ 110'	30	1760 230/3	Pressure Transducer	6" HDPE
Lower May Creek #2 9120 122nd Pl. SE	Submersible Grinder	2008	Flygt FP-3068	80 gpm @ 40'	2.7	3315 230/3	Pressure Transducer	3" HDPE
Lake Boren 13038 SE 76th St.	Submersible Grinder	2011	Flygt MP-3102	70 gpm @ 45'	5.4	3490 230/1	Pressure Transducer	3"HD PE

Note: Locations are approximate

4.3.4 Sub-basins

Coal Creek Utility District's sanitary sewer service area lies within three major natural Sub-basins: East Lake Washington, Coal Creek and May Creek. Like the East Lake Washington basin, the Coal Creek and May Creek basins naturally flow to Lake Washington.

For analysis purposes, these major basins are broken up into 11 smaller basins, or sub-basins. The boundaries of these sub-basins are delineated according to the direction of sewer flow within each basin. Most of the sub-basins are irregularly shaped and cannot be accurately described based on surrounding streets, physical features, etc. However, the characteristics of each basin, along with very general boundary descriptions, are described in the following sections. Figure 4-1 shows the 11 sub-basins currently served by Coal Creek. The District once maintained facilities in sub-basins 1, 2 and 6 prior to 2003, but these basins are now served by Bellevue as a result of the City's purchase of facilities.

4.3.4.1 Sub-basin No. 3

Sub-basin No. 3 is bounded on the north by approximately SE 69th Street, on the west by 116th Avenue SE; on the east by 121st Avenue SE; and on the south by SE 74th Street.

Basin No. 3 contains only single-family residences. Sewage from this basin flows northward through Bellevue to a drop connection located at the intersection of

114th Place SE and SE 56th Street. This drop connection is an 8-inch diameter vertical shaft, approximately 125 feet deep, that empties into the top of the Hazelwood Tunnel, which is a portion of WWTD's Eastside Interceptor.

4.3.4.2 Sub-basin No. 4

Sub-basin No. 4 is located along the western edge of the District. It is bounded on the north by SE 69th Street; on the west by Interstate 405; on the east by approximately 116th Avenue SE; and on the south by SE 80th Street.

The Lake Washington Boulevard Interceptor was constructed in the southwestern part of Sub-basin No. 4 in 1989 to provide future service to the entire basin. This interceptor flows southward into an 18-inch, Coal Creek Utility District/City of Renton joint use main (see Joint Use Agreement in Appendices). The joint use main was constructed in 1975. It flows south to a connection with the WWTD May Creek Interceptor at Jones Avenue NE and North 40th Street. Flows in this basin also include some wastewater from the City of Bellevue.

4.3.4.3 Sub-basin No. 5

Sub-basin No. 5 is irregularly shaped and is only 7 acres in size. It is generally bounded on the north by SE 69th Street, on the east by 123rd Avenue SE; and on the west by 121st Avenue SE. The southern boundary is very non-uniform but is at approximately SE 70th Street.

Flows from Basin No. 5 travel north, through Bellevue and within the Newport Hills Interceptor, to empty into the WWTD East Side Interceptor at a connection point located at approximately Coal Creek Parkway and 119th Avenue SE.

4.3.4.4 Sub-basin No. 7

Sub-basin No. 7 is bounded on the north by the Bellevue/Newcastle City limits; on the west by 121st Place SE and 120th Avenue SE; on the east by the District boundary and the east line of Section 28; and, on the south by SE 80th Street.

The main collection facility for Sub-basin No. 7 is the Coal Creek Interceptor. The Coal Creek Interceptor serves as the major collector for the entire south and eastern portions of the District, and was acquired from the District by King County in September 2003.

Sub-basin No. 7 is comprised mostly of residential development. The Coal Creek Business Area, at the intersection of Coal Creek Parkway and SE 72nd Street, has

commercial and light industrial development with several multi-family complexes directly to the south.

4.3.4.5 Sub-basin No. 8

Sub-basin No. 8 is a small basin in the vicinity of Newcastle Road, just east of Coal Creek Parkway. It is bounded by the District's service area on the north, by the Golf Club at Newcastle on the east, and approximately 132nd Place SE on the west and SE 70th Street extended on the south. Flows from this basin are directed to the Coal Creek Interceptor via an 8-inch main that crosses the District's maintenance facility property.

4.3.4.6 Sub-basin No. 9

Sub-basin No. 9 is generally bounded on the north by Newcastle Road; on the west by Coal Creek Parkway; on the south by SE 84th Street; and on the east by the eastern boundary of the District. Although Basin No. 9 actually includes portions of the May Creek and Coal Creek natural drainage basins, all flows are served by gravity within the Coal Creek Basin.

Basin No. 9 contains several large single-family developments and a few multi-family residential properties, but the majority of the basin's acreage includes the Golf Club at Newcastle. Sewage from Sub-basin 9 is conveyed by gravity northwest to the Coal Creek Interceptor at SE 72nd Street, just east of Coal Creek Parkway. Improvements in Sub-basin 9 were constructed to install sewers to properties along the north side of Lake Boren. By allowing these properties the ability to connect to the sewer system, Coal Creek has successfully partnered with the City of Newcastle to improve the water quality of Lake Boren, as recommended in King County's adopted May Creek Basin Action Plan.

4.3.4.7 Sub-basin No. 10

Sub-basin No. 10 is located in the southwest corner of the District. It is partially bounded on the north by SE 80th Street; on the south and west by the District boundary; and on the east by 118th Avenue SE. The existing sewers in this basin include those that serve the western halves of the Lake Washington Ridge and Lake Washington Crest developments. These sewers lie in the northern portion of the basin and flow west from the developments, along SE 80th Street, to a connection with the previously mentioned Coal Creek Utility District and City of Renton joint use main.

The major collector for the southern portion of the basin, the 110th Place Interceptor, was constructed in 1997 as part of the Whitehawk development. As

future flows from the southern portion of Basin No. 10 develop, they will travel northwest along the 110th Place Interceptor, towards the May Creek Interceptor near the intersection of I-405.

Basin No. 10 also includes an area lying within the City of Renton and outside the District's current service area boundary. This area, adjacent to the southwest corner of the District and encompassing those properties lying above the 200-foot contour, is served by the District through an agreement between the District and the City of Renton. Properties lying in this area must be annexed into the District prior to being provided sanitary sewer service.

4.3.4.8 Sub-basin No. 11

Sub-basin No. 11 is bounded on the north by SE 80th Street; on the west by 118th Avenue SE; on the east by 124th Avenue SE; and on the south by the District's southern boundary along the edge of May Creek.

Sub-basin No. 11 is served by gravity sewers and by the two Windtree Lift Stations which pump flow to the north. These flows eventually head next to Sub-basin No. 10 and the 110th Place Intercept.

The remainder of Sub-basin No. 11 is unsewered and much of it undeveloped. The basin is entirely zoned for single-family residential. Natural drainage from the basin flows south to May Creek.

4.3.4.9 Sub-basin No. 12

Sub-basin No. 12 is a small basin bounded on the north by SE 84th Street, on the west by 124th Avenue SE, on the south by SE 89th Place and on the east by 129th Avenue SE. It lies southwest of the Olympus Lift Station service area, as indicated on Figure 4-1.

The Olympus 4 Lift Station is located in Sub-basin No. 12. This station transfers sewage from Sub-basin 12 through a three-inch force main along SE 88th Street to the gravity system served by the Olympus Lift Station.

4.3.4.10 Sub-basin No. 13

Sub-basin No. 13 is bounded on the north by SE 80th Street and the north end of Lake Boren; on the west by 124th Avenue SE; on the south by approximately SE 88th Street; and on the east by SE 83rd Street. This basin includes the Olympus Lift Station and its service area, and also includes most of Lake Boren and its surrounding properties. The zoning in Sub-basin No. 13 is entirely residential,

and existing development includes mostly single family, with some new multi-family development.

Sub-basin No. 13 is located entirely within the May Creek Sub-basin and flows naturally south toward May Creek. However,

A 1985 amendment to the District's Sewer Comprehensive Plan allowed for the diversion of approximately 1,000 acres from the May Creek Basin to the Coal Creek Basin. Thus, the Olympus Lift Station pumps to the Coal Creek Interceptor at SE 72nd Street just east of Coal Creek Parkway. The Coal Creek Interceptor has undergone staged improvements to accommodate the increased existing and anticipated future flows.

4.3.4.11 Sub-basin No. 14

Sub-basin No. 14 is bounded on the north by SE 88th Street extended; and on the east, west and south by the District's sewer service area boundary. The basin is zoned for single-family development and is approximately 40 percent developed. Sewer facilities in Sub-basin No. 14 were constructed in 2001 to serve the Highlands at Newcastle development just north of SE May Valley Road. The May Valley Lift Station was also constructed to serve this development and other future development in Basin 14.

4.3.5 Treatment and Disposal

King County is the regional sewage authority and provides sewage treatment and disposal as well as sewage transmission from various sewer agencies. The District has a contract in place with King County for wastewater treatment and disposal. Wastewater generated in the District is treated at the South Treatment Plant to meet the water quality standards established under the Federal Water Pollution Control Act (also referred to as the Clean Water Act) and under the terms of the Treatment Plant's National Pollutant Discharge Elimination System (NPDES) permit. The contract with King County ensures that Coal Creek remains in compliance with the Clean Water Act and any other regional water quality management plans.

The District currently maintains four direct connections to King County's Coal Creek Interceptor, and two connections to a shared-use interceptor with Renton that sends flows to the May Creek Interceptor. Two of the connections with the Coal Creek Interceptor serve only a few adjacent properties. The largest connection is located at SE 72nd Street, just east of Coal Creek Parkway SE, and accounts for approximately The connections are described in Table 4-5 and is shown on the Sewer System Plan Map located at the back of the Plan.

Table 4-5: King County Connections
Coal Creek Utility District

Location	Description
NE 44th St and Lake Washington Blvd NE	One Connection with Joint Use (with City of Renton) interceptor that flows to May Creek Interceptor
NE 43rd Place and 110th Ave SE	One Connection with Joint Use (with City of Renton) interceptor that flows to May Creek Interceptor
Cao Creek Parkway and Newcastle Way	One major and one minor connection with Coal Creek Interceptor
Coal Creek Parkway and SE 68th St.	Two minor connections with Coal Creek Interceptor

Note: Location is approximate.

4.3.6 Agreements

As mentioned previously, the District has an agreement with WWTD for treatment and disposal. The District also sold the Coal Creek Interceptor to the County in 2003. Copies of these agreements are included in the Appendices.

In addition to agreements with WWTD, Coal Creek has a service area agreement and joint use agreement with the City of Renton. Copies of these agreements are also provided in the Sewer Appendices.

4.4 MINIMUM DESIGN CRITERIA

This section of the Plan identifies minimum design criteria and system flow projections for the purpose of analyzing the existing system and planning future improvements to the system. Minimum design criteria include: Domestic sewage quantities generated by various land use categories; capacity requirements of sewer interceptors, collectors, laterals and pump stations; and, I/I rates and peaking factors to be utilized in design of improved or new facilities. Projected flow rates have been determined by use of historical flow rates, water system demand information and land use and population projections identified previously in this document.

4.4.1 State Agency Requirements

Minimum design criteria and projected flows will be used to determine existing system deficiencies and project future sewer system requirements for the planning area and identified growth scenarios. Coal Creek Utility District's sewer system design criteria are based on Department of Ecology's Orange Book. The design criteria have been established to govern all future improvements to the system and provide for uniformity in designing pipes and pump stations. Adherence to these criteria will ensure that future

system improvements can be economically maintained by District staff and will function efficiently for the design life of the improvements.

4.4.2 Reference Datum

Reference datum for sewers within the scope of the study area should be based on a vertical datum that uses NAVD 88 and a horizontal datum that uses NAV 27.

4.4.3 General Design Criteria

The "Criteria for Sewage Works Design", as published by the State Department of Ecology (DOE) in cooperation with the State Department of Health (DOH) and the U.S. Environmental Protection Agency (EPA), sets forth guidelines, standards and minimum requirements for sanitary sewer systems operating within the State of Washington. This guideline, in conjunction with the District's minimum requirements, establishes the design criteria and construction standards to be used for extensions, upgrades and additions to the Coal Creek Utility District sanitary sewer system.

4.4.3.1 Design Period

In planning sewage facilities it is necessary to evaluate both present conditions and future service needs, and to design a system compatible with variable demands over a given length of time, or period of design. A 20-year minimum period of design for mechanical facilities and 50 years for collection facilities is recommended for developing an asset management and maintenance plan for the sewer system. These recommended design periods should not dictate the precise timing of facility replacement, but should be used as an indicator of when facilities may require more frequent inspection, maintenance and/or rehabilitation schedules.

4.4.3.2 Standard Details and Specifications

Incorporated as a part of the "Agreement for Constructing Extensions to the Water and Sewer Systems" for the District are standard construction details and specifications which include the current requirements of all appropriate agencies. A copy of Coal Creek's sewer system standard details and specifications are updated on an on-going basis, and were last updated in 2012. These standards are available at the District office.

4.4.3.3 Planning

The District maintains the following planning policies for the sewer system:

- Initial system construction and additions should conform to the comprehensive plan.
- Phased development is permitted where full development will take several years.
- The District requires developers to extend facilities to the furthest boundary of their property for future extension by others.

4.4.4 Flow Rates

Flow in a sanitary sewer system is composed of domestic, commercial and industrial waste, groundwater infiltration and surface water inflows. All portions of the sewer system must be capable of carrying the peak volumes from these sources. Table 4-6 identifies the estimated quantities of flow associated with various land uses within the District. Flows for specific land uses should be based on actual water consumption data and/or DOE Design Criteria.

Table 4-6: Estimated Sewage Generation Rates by Land Use
Coal Creek Utility District

Land Use	Population Equivalents	Building Area/Gross Area Average Daily Flow
Single Family	2.6 persons per household	Per Zoning - 61 gallons/capita
Multi-Family	1.8 persons per household	Per Zoning - 61 gallons/capita
Non Residential Uses	-	2,800 gallons/acre

Note: Estimated flows do not include infiltration and inflow (estimated per King County standards at 1,500 gallons per acre per day (average) for future flow projections and adjusted for older areas of the District to reflect KC flow monitoring by mini-basin).
1.8 persons per household for Multi-family based on ERU conversion ratio of 0.7 for MF/SF. Census Blocks in the District Service Area that contain only multi-family zoning averages 1.7 per occupied HH.

4.4.4.1 Peaking Factors

Sanitary sewers and associated collection facilities shall be designed to carry peak hour flows. A specific minimum peaking factor for laterals and local sewers is 4.0, or as specified by the District. A peaking factor of 2.5, or as specified by the District, is applicable for trunks and interceptors. This peaking factor is used as a

multiplier to determine peak flows and is based on a population of 10,000 for trunks and interceptors. The peaking factor for lift stations is 2.0, or as specified by the District. If the peaking factors set by the District differ from the DOE requirements then the more stringent factor is required. Standard peaking factors are presented in Table 4-7.

Table 4-7: Peaking Factors
Coal Creek Utility District

Type of Facility	DOE Standard	King County Standard	Coal Creek Standard
Lateral and Local Sewer	4.0	-	4.0
Trunks and Interceptors	2.5	-	2.5
Heavy Industry	-	2.0	3.0
Light Industry	-	3.0	3.0
Commercial	-	-	3.0
Pump Stations	-	-	2.0

Notes: Peaking factors indicate the multiplier to be used to determine peak flow.
Peaking factors do not apply to infiltration and inflow.

4.4.4.2 Infiltration and Inflow

Infiltration is groundwater which enters the system through pipe joints, manhole joints, or porous pipe. Inflow is surface water which enters the sewer through manhole covers or illegal connections such as footing drains, roof drains and area drains.

Infiltration and Inflow is expressed in units of gallons per acre per day (gpad). Although new sewers are constructed with materials and methods to eliminate infiltration and inflow, some allowance must be made for the future deterioration of facilities and potential illegal connections. Typical values utilized for infiltration and inflow in evaluation and/or design of sewer systems are 600 gpad for infiltration and 500 gpad for inflow, although these values may vary according to local conditions.

4.4.5 Collection Facilities

Collection sewers and pump stations should be designed for the ultimate development of the tributary areas based on the design factors outlined in Tables 4-6 and 4-7 and allowable infiltration and inflow rates.

4.4.5.1 Gravity Sewers

Gravity sewers are to be utilized whenever possible and designs should consider at least the following:

- Peak sewage flows from residential, commercial, and industrial sources;
- Infiltration and inflow;
- Topography;
- Soil conditions;
- Flow impacts from upstream pump station(s);
- Maintenance;
- Surface conditions; and
- Potential surcharge to downstream sewers.

Sewer mains shall be designed to allow for a minimum velocity of 2 feet per second. Pump station design is to be decided only with approval from the District and shall follow the District construction and design standards.

4.4.5.2 Trunk and Interceptor Sewers

Trunk and interceptor sewers must be designed with sufficient capacity to carry peak flows from the ultimate development of the tributary area based on criteria established in Tables 4-6 and 4-7. This flow represents the sum of several loadings calculated separately for each section of sewer or tributary area. The loadings consist of the peak flows of sanitary sewage, groundwater infiltration, surface water inflow and any special quantities, which must be considered.

4.4.5.3 Side Sewers

Side sewers shall be at least 6-inches in diameter and shall be installed at a minimum slope of 2%. No joint sewer service connections are allowed without District approval.

4.4.5.4 Alternative Systems

Low pressure sewers, inverted siphons and other alternative methods of wastewater collection may be allowed at the sole discretion of the District, and only when no other feasible and cost-effective alternatives exist.

Low pressure sewers or vacuum collection systems may be required in areas where the size of the area to be served is not sufficient to warrant the expense of a pump station, or where physical limitations make it impractical to otherwise serve an

area. Minimum pipe sizes and system configurations shall be calculated on a case-by-case basis to ensure a minimum velocity of 2 feet per second is achieved.

Inverted siphons may be required to accommodate severe grade changes and will only be allowed when no other feasible alternative exists. Minimum pipe size for inverted siphons is 6-inches in diameter and a minimum velocity is 3 feet per second. Siphons must be equipped with at least two barrels with air relief valves as well as adequate facilities for cleaning and maintaining the facilities.

4.4.5.5 Combined Sewers

No combined sanitary and storm sewers are permitted.

4.4.5.6 Overflows

No overflows or new overflow structures are permitted.

4.4.6 Pipe Sizing and Material

The minimum pipe sizes, material specifications, system configurations and crossings with other utilities shall be reviewed on a case-by-case basis by the District and in accordance with District construction standards.

4.4.6.1 Pipe Slope

All sewers shall be designed with slope requirements as provided in the Orange Book (summarized in Table 4-8 below). In side sewers, flows less than super-critical depths are to be avoided because the shallow water depths often leave solids in the pipe. Oversizing sewers with respect to capacity in order to allow the use of flatter slopes should be avoided as this may result in operational capacities below sedimentation velocity (2 fps).

Table 4-8: Minimum Slope Requirements

Sewer Main Size (inches)	Minimum Slope per 100 feet
8	0.50
10	0.28
12	0.22
15	0.15
16	0.14
18	0.12

Notes: Sewers shall be laid with uniform slope between manholes.
Sewers on a 20% slope or greater shall be anchored securely with concrete anchors or other approved means.
Suggested minimum anchorage spacing as follows:
Not over 36' center to center on grades of 20% and up to 35%.
Not over 24' center to center on grades of 35% and up to 50%.
Not over 16' center to center on grades of 50% and more.

4.4.6.2 Pipe Sizing

No sewer shall be less than 8-inches in diameter except that, in special cases, 6-inch diameter sewer lines may be accepted and approved by the District if the 6-inch lines meet the following criteria per DOE manual section C1-4.1:

- The probable maximum number of services will not exceed 30 persons. (For this purpose, computed on the basis of not less than three persons per residence.)
- Running lengths of 6-inch pipe in excess of 150 feet will be allowed only at the discretion of the District.
- A manhole shall be provided where the 6-inch pipe connects to an 8-inch or larger line.
- Manholes shall be provided at a maximum 300 foot interval and at changes in direction or grade. Cleanouts are not acceptable as substitutes for manholes. This does not include a 6-inch side sewer to serve a single-family dwelling.
- A manhole or cleanout shall be provided at the end of the 6-inch line. If a cleanout is provided, the first manhole shall be placed within 150 feet of the end of the line.
- No extension of the 6-inch line shall be possible at a later date.

The minimum cover for all sewer mains from top of pipe to finish grade shall be 72 inches unless otherwise approved. If the pipe is offset to the edge of the road, the actual roadway cross grade shall be projected out and used to measure cover to top of pipe. This will require more fill over the pipe in a fill section but allows the pipe adequate cover in the event of future roadway cuts or widening.

4.4.6.3 Pipe Material

Plastic (PVC) pipe may be used for gravity sewer lines where soil foundation conditions are adequate, and for slopes greater than one percent and less than fifteen percent, with depths less than 12 feet.

Cement-lined ductile iron pipe is required in all other areas, and may be appropriate for force mains. Alternatively, HDPE may also be used for force mains. Ductile iron pipe placed in peat soils or potentially corrosive areas shall be polyethylene-encased.

All rigid pipes must pass standard crushing, flexural and fill tests to ensure that the installation will be watertight and able to withstand earth loads after being placed in the trench.

Sewer pipes shall be connected by flexible rubber-gasket type joints, or other methods specifically approved by the District.

4.4.7 Sewer Locations

Sewer trunks and interceptors shall be maintained within the street right-of-way. In the event sewer mains must be outside of right-of-way boundaries, easements shall be granted to and pre-approved by the District.

During design and construction of the sanitary mains, the minimum depth of cover is 72 inches per District standards, unless otherwise shown on the contract drawings and approved by the District. Gravity sewers shall be designed and constructed with straight alignment between manholes. The trench shall be kept clear of standing water in order to provide a clean, dry, joint seal. Pumping equipment shall be provided in order to keep the trench dry and clear. The trench shall be cut out 6 inches below invert of the pipe and kept clear of roots, boulders, and other obstructions. Compaction is to be provided per the modified proctor test ASTM D1557.

Crossings with water mains shall maintain a minimum of 18 inches of vertical separation between sanitary sewers and water pipes with water passing above the sanitary sewer pipe. Sewer joints are required to fall equidistant from any water crossing, and in some

cases when separation cannot be maintained, it may be necessary to encase the water and sewer service in pipe approved by the District. No concrete will be allowed unless specifically directed and approved by the District. Cross connection control shall be done in accordance with State requirements and coordinated with the District or the local water service provider.

4.4.8 Manholes

Manholes are to be installed at the end of each line, at all changes in grade, size, or alignment, at all intersections and at distances not greater than 300 feet.

The minimum diameter of manholes is 54 inches. The minimum clear entrance opening in manholes shall be 23 inches. Larger size manholes may be required to accommodate deep installation or other special requirements.

Outside drop connections are not allowed in the District. An inside drop of up to 24 inches may be allowed and should be accommodated in the manhole channel in order to prevent deposition of solids.

4.4.9 Sewer Lift Stations

This section covers the design and construction of sewage pump stations and force mains.

4.4.9.1 Location and Flood Protection

Sewage pump stations shall be located as far as practical from present or proposed built-up residential areas, and an all weather road shall be provided for access to all pump stations. Noise control, odor control, and station architectural design must be considered in the locating and design of lift stations. Sites for lift stations must be of sufficient size to accommodate expansion of facilities to meet projected build-out conditions.

Operational components must be at elevations above the established 100-year flood plain or adequately protected against such action. Lift stations must be designed to remain fully operational during 100-year storm events.

4.4.9.2 Pumping Rate and Number of Units

At least two pumps must be provided at each pump station and each must be capable of handling the anticipated maximum flow. Where three or more pumps are provided, they shall be designed to fit actual flow conditions and have the capacity to handle anticipated maximum flow with the largest pump out of service.

4.4.9.3 Pump Cycle Ratios

A pump cycle ratio represents the percentage of time during which a pump can be expected to run. Recommended pump replacement sizes are based on cycle ratios of 70% for theoretical peak day flows as generated for the design period conditions. Pump station peaking factors of 2.0 are used to arrive at peak flows from average day figures. Conversely, average day flows represent approximately 50% of peak design flows, so that pumps sized according to recommendations operate approximately 35% of the time. These cycle ratios were selected to provide a margin of safety against pump overheating and subsequent wet well flooding that might occur if mechanical problems were to occur at or near peak flow conditions. In addition, lower cycle ratios imply less running time and, therefore, longer pump life.

4.4.9.4 Pumps

Pumps shall be capable of passing spheres of at least 3 inches in diameter. Pump suction and discharge openings shall be at least 4 inches in diameter. Under certain low flow/high head circumstances, grinder pumps, with smaller discharge openings, may be approved in accordance with District requirements for ownership, operation and maintenance.

Pumps shall be placed so that they will operate under a positive suction head under normal operating conditions (unless otherwise approved).

4.4.9.5 Controls

The method of pump station control shall be submitted to the District for approval at the time of design. Provisions shall be made to automatically alternate pumps in use. Pump stations with motors and/or controls below-grade should be equipped with a secure external disconnect switch.

4.4.9.6 Site Water

Water service with a required backflow prevention device is required at each pump station.

4.4.9.7 Bypass and Storage

On-site or portable power units shall be incorporated into station design. Small stations may require a plug-in device for a portable generator; however, permanent standby power is required for larger stations. Where portable generators are used, storage must be provided to permit time for the generator to be delivered and connected.

4.4.9.8 Alarm System

An alarm system to monitor the following is a minimum for all District-owned and operated sewage pump stations: Intrusion; Power failure; Wet dry well; High or low wet well; Smoke; Operator in trouble; Pump failure; and, Line failure.

Test circuits should be provided to enable the alarm system to be tested and verified as in good working order.

4.4.10 Cross Connection Control

Protection of public water supplies is an important health concern related to the design of sanitary sewer facilities. There shall be no physical connection between a public and private potable water supply system and a sanitary sewer system which would permit the passage of the cross connection with the potable water supply system.

4.4.11 Standard Plans and Details

Coal Creek Utility District maintains standard plans and details on file at the District's office. These standards address construction requirements for such things as: the installation of gravity mains, force mains, manholes and cleanouts, lift and pump station design, and system maintenance. The District uses the current version of the APWA/WSDOT specifications and corresponding APWA specifications.

4.5 REQUIREMENTS, ANALYSIS, AND RECOMMENDATIONS

The purpose of this section is to evaluate all existing sewer facilities (interceptors, collectors and lift stations) in each sub-basin previously identified with regard to current sewage flows and the ultimate flows that would be expected when the District is fully developed and to develop alternatives for providing sewer service to those areas within the District that are not currently sewered and to analyze the impacts of these future facilities on the existing facilities in the downstream sub-basins.

It is difficult to predict how or when vacant property will be improved or developed. Collection facilities will consist of trunk lines and collectors designed at the time the land development occurs. The precise location and size of the facilities is determined by engineering design in accordance with the design and construction standards described in this Plan.

The ultimate flow projections for each Sub-basin are presented in Section 4.2 of this Plan. A peaking factor of 2.0 was applied to the average flows to determine the maximum flows generated by customers. Estimated Infiltration and Inflow (I/I) was added to the projected average and peak flows to arrive at projected flows under wet weather conditions.

4.5.1 Sub-basin Analysis

The sewer system for each Sub-basin has been analyzed for its ability to accommodate both the existing and future peak flows generated within the basin. When the analysis shows the current system to be inadequate to handle either the existing or anticipated future flows, recommendations are made for improvements to that system.

The District's sanitary sewer collection system was modeled using a computer spreadsheet method of analysis. The spreadsheet model was used to calculate existing average and peak flows through each major pipe segment and pipes with minimal slope throughout the collection system. The analysis uses Manning's equation to calculate the flow capacity within each main segment. Existing pipe information such as pipe size and slope was established from available District grid maps and recent as-builts on file at the District. No backwater simulations were calculated to determine aggregated effects of surcharged pipes. The analysis results identify pipes that may not be able to accommodate maximum flow projections identified earlier in this section.

Sewer pipelines 8-inches and larger were modeled. Flow depths of 80% of pipe diameter were used as the maximum pipe capacity because surges under these conditions would be expected to reach 100% of the pipe depth based upon pulsating flow. When capacity is reached, backwater may result causing tailwater control conditions within the system. As previously mentioned, for this analysis backwater simulations are not modeled.

The sewage flows established for each basin and presented earlier in this section were used in the modeling analysis. The total flows were divided by the number of acres in each basin to calculate average flows per acre (gpm/acre) for each basin. Then, the major collection mains in each basin were identified and divided into analysis segments. The contributing area and corresponding flow (contributing area multiplied by the average basin flow) for each segment was then determined. The base flows were multiplied by a peaking factor of 2.5 to establish peak base flows. The peak base flows were added to the infiltration and inflow rate to determine the total contributing flow for each segment analyzed. These flow rates were compared to the available pipe capacity (assuming 80% full) to complete the analysis.

4.5.1.1 Sub-basin No. 3

The capacity of the facilities in Basin 3 is easily sufficient to handle all development within that basin. The development of Asbury Crest, which lies within the Sub-basin 4 boundary, is currently being served by Basin 3 facilities through an agreement with the District. It will be transferred to Basin 4 when facilities in that basin become available to serve it.

4.5.1.2 Sub-basin No. 4

Sub-basin 4 drains toward the Coal Creek Utility District and City of Renton joint use main, which is large enough to handle all anticipated future flows. The analysis shows that the existing 8-inch main along Lake Washington Boulevard NE from south of SE 73rd Street (manhole A9-16) to north of SE 76th Street (manhole A9-14) may become undersized at ultimate development due to its minimal slope. At full development this line may experience some surcharging and should be monitored. Other proposed future facilities are depicted on the Plan Map. As mentioned above, the Asbury Crest development, which is currently being served by Basin 3 facilities, will be transferred to Basin 4 as appropriate facilities are constructed.

4.5.1.3 Sub-basin No. 5

Only a small portion of the original Sub-basin No. 5 is now served by the District. The area includes that portion of Hazelwood Terrace Division 1 that flows to the north. Sewage from this basin flows to City of Bellevue facilities north of Newcastle Way.

4.5.1.4 Sub-basin No. 7

There are two small segments of main in the basin that may be inadequately sized to accommodate ultimate buildout projected flows. The existing main along 127th Place SE from SE 73rd Street (manhole C9-25) to north of SE 73rd Place (manhole C9-22) has limited capacity due to its minimal slope. At full development, this main could surcharge and ongoing monitoring is recommended. The other segment of potentially undersized main is located along Newcastle Way from just west of Coal Creek Parkway SE to just west of 132nd Place SE was constructed with minimal slope. During Coal Creek Parkway Road Improvements, a portion of the flows previously directed to this system was been diverted east and then reenters the system downstream of the area containing minimal slope. It is believed this diversion has minimized the risk of surcharging, and the District continues to monitor the area.

New gravity and low pressure mains and a lift station were constructed on the north and west sides of Lake Boren as the result of Coal Creek's Public Works Trust Fund loan award in 2007. The new system allows for properties along the west side of Lake Boren, which previously maintained private septic systems, to connect to the gravity system in Sub-Basin 7 that flows to Coal Creek Interceptor. Fulfilling a recommendation in King County's May Creek Basin Action Plan, this new portion

of the system will help reduce nitrogen, phosphorus, and other nutrient loading into Lake Boren and improve the Lake's water quality over the long term.

4.5.1.5 Sub-basin No. 8

The southern portion of Sub-basin No. 8 is partially developed and consists of a mix of single-family and multi-family projects. The northern portion of the basin consists of an abandoned brick manufacturing plant. Various development schemes are currently being proposed for this property, however, nothing has yet been finalized. It is expected that the eight-inch sewer main that serves Basin No. 8 will be adequate to provide service under buildout conditions in the basin.

4.5.1.6 Sub-basin No. 9

The sewer collection system for Basin No. 9 is fairly new. Most of the system has been constructed within the last twenty years. Service to currently unsewered portions of the basin will simply require extension of the existing facilities.

The northern portion of Basin 9 consists of the Golf Club at Newcastle. The domestic sewage from the golf course facilities is transported by gravity to the residential developments to the south.

The easterly most portion of this property lies too low to be served by gravity and construction of a small lift station, the Meadowview Pump Station, was completed in 2001. The lift station is adequately sized to handle sewage from the low lying lots. An additional Lift Station was constructed to serve the properties north of Lake Boren in 2011. This project was completed in partial fulfillment of the District's 2007 Public Works Trust Fund award, and aims to help improve the water quality in Lake Boren as part of the May Creek Basin Action Plan. Additional related work on this project is discussed in Section 4.5.1.4.

Another issue that must be considered in Basin 9 is disposal of the leachate from the abandoned Newcastle Landfill. The District has an interlocal agreement with WWTD and the property owners which allows the District to accept flows into the District's local facilities for transport to the South Treatment Plant for treatment and disposal. Leachate from the landfill is pumped via a private lift station to the gravity sewer system at the Golf Club at Newcastle. A copy of this agreement is on file at the District office.

4.5.1.7 Sub-basin No 10

The northeast and western portions of Sub-basin No. 10 are currently sewered. The whitehawk and windtree developments have extended service other parts of

the basin, but there are dozens of properties within the basin that remain unsewered.

For Sub-basins 11 through 14, which drain south towards May Creek, normal recommendations would be to construct gravity sewers that would connect to the WWTD May Valley Interceptor. However, the May Valley Interceptor does not exist beyond the western edge of Interstate 405. This proposed facility was intended to serve the May Creek basin, and be constructed directly adjacent to May Creek. It was initially conceived in the 1960's at a time when Federal State Grant funding was plentiful and when environmental regulations were much less restrictive. The interceptor was intended to serve the entire May Valley Sub-basin.

Development and growth pressures in the Honey Creek sub-basin of May Valley prompted King County to initiate several that looked at the alternatives and feasibility of extending service up the valley. Due to political, environmental and construction issues, and to the fact that the City of Renton has made other provisions for service to the Honey Creek sub-basin, the provision of gravity service along May Creek to the existing May Creek Trunk was determined to be impractical. The remaining options identified consisted of collecting flows from the upper portion of the May Valley basin and pumping them north through a Coal Creek Trunk or to the South through the Cedar River Trunk in the City of Renton. The Olympus 4, Olympus, and May Valley Lift Stations are designed to pump flows from Sub-basins 12, 13, and 14, respectively to the Coal Creek Interceptor. More details on these areas of the system are provided in subsequent sections.

4.5.1.8 Sub-basin No. 11

Sub-basin 11 is currently served by the Lower May Creek Lift Stations 1 and 2, which are located in the south end of the Basin. These two stations were constructed to pick up the dry sewers that were installed in the WindTree plat when it was developed in the 1970's, and also other properties that naturally drain towards that plat. Individual lots within the plat are not required to transfer service from their septic systems to the public sewer but have that option should they desire to or wish to subdivide. Other properties will connect as development occurs. The two lifts stations and other associated sewer improvements were completed in 2008 and constructed with the necessary capacity to handle the ultimate flows from the Sub-basin.

4.5.1.9 Sub-basin No. 12

The Olympus 4 Lift Station was constructed in 1992 as part of the Olympus Division IV plat. The basin serves by gravity for approximately 35 acres and then pumps directly to the gravity system served by the Olympus Lift Station (located in Sub-basin No. 13). The Olympus 4 station was designed and constructed to accommodate the saturation conditions of Basin 12. This lift station was upgraded to meet District standards in 2012.

4.5.1.10 Sub-basin No. 13

The Olympus Lift Station, which serves Basin No. 13, has a capacity of approximately 1,850 gpm when utilizing 2 of its 3 pumps. The estimated peak flow generated by Basins 12 and 13 is approximately 580 gpm under full buildout conditions. Also, the May Valley Lift Station in Basin 14 pumps directly to the Olympus Lift Station for subsequent pumping further north to the Coal Creek Interceptor. The station is therefore sized to handle all flows from Basins 12, 13 and 14.

4.5.1.11 Sub-basin No. 14

Sub-basin No. 14 is served by the May Valley Lift Station located at the approximate intersection of SE May Valley Road and Coal Creek Parkway to serve the southeastern portion of the basin. Effluent from the lift station is pumped north, approximately 4,000 feet along Coal Creek Parkway, to the Olympus Lift Station, and then continues north from the Olympus Lift Station to the Coal Creek Interceptor.

The peak flow ultimately generated in Basin 14 is estimated to be approximately 720 gpm. Also, there is a potential future flow contribution from the area southeast of the District from either the City of Renton or King County Water District 90. Flows from the southeast of the District have been estimated at 350 gpm. Therefore, the total flow that will eventually need to be accommodated by the May Valley Lift Station is about 1,100 gpm. It is expected that a significant portion of Basin 14 will not be provided with sewer service in the near term, the pumps installed in the station have a capacity of 500 gpm, which is high enough to provide at least 2 feet per second in the 10-inch force main. The capacity of the lift station has been designed to be increased up to the maximum 1,100 gpm as further development occurs.

As mentioned previously, any pumping capacity constructed for Sub-basin No. 14 must be accommodated in the capacity of the Olympus Lift Station. The maximum

capacity requirement for the Olympus Lift Station would be the combined saturation flows from Sub-basins 12, 13 and 14, which is about 1,300 gpm, plus the potential 350 gpm contribution from the area southeast of the District for a total of 1,650 gpm, which is the current capacity of the station.

4.5.1.12 Unsewered Areas

Portions of Coal Creek Utility District are currently unsewered for a variety of reasons. Some areas are undeveloped and potentially sewerable while others cannot be feasible served by the sewer system. Proposed facilities to serve the sewerable areas are presented on the Sewer System Plan Map at the end of this document.

Long term sewer system planning is challenged by the timing and intensity of development over time. Coal Creek has experienced upstream development more quickly than downstream development, and as such, the system design met the immediate needs of the District's standards and developer's desires without compromising long-term schematic planning or development. As unsewered areas develop, the District is committed to analyzing the system to take advantage of long term efficiency gains and ongoing cost reductions for its rate payers. Where ever practical and cost-effective, the District will continue seeking solutions that minimize the need for lift stations and utilize gravity for conveyance of flows to WWTD inceptors and regional treatment facilities. As development scenarios do materialize, the requirements of those developments must be analyzed and provided for with sufficient additional capacity to accommodate the expected development over the ensuing five to ten or more years.

4.5.2 Infiltration, Inflow and TV Inspection

The District has been an active participant in King County's Regional Infiltration and Inflow Control Program, as mentioned in Section 4.2.2. This program included flow monitoring throughout the District in the winters of 2000-2001 and 2001-2002. Based on the flow and rainfall data collected for the ten biggest rainfall events in the fall and winter of 2001, the average calculated 30-minute peak total I/I for the District was 1,487 gallons per acre per day. Although it was assumed that I/I would be maintained at 1,100 gallons per acre per day in the system analysis, the results from the King County monitoring do indicate that some locations may require more attention than others. The calculated I/I rates for the basin monitored by King County ranged from 643 to 2,653 gallons per acre per day. The basins with higher I/I rates are generally located in the sewered areas north of SE 80th Street and west of 129th Avenue SE.

The results of the King County I/I study released in 2005 included several cost-effective rehabilitation projects for the County to pursue in its regional interceptors, as well as projects to partner with utilities such as Coal Creek. The District worked with King County in 2004 to rehabilitate approximately 20 manholes and re-grade covers in an attempt to reduce inflow from the streets during storm events. The manholes that were rehabilitated in the District are located in the area generally bounded by 129th Avenue SE on the east, 121st Place SE on the west, SE 70th Place on the north and SE 75th Place on the south. The results of this project proved to be inconclusive, but the District continues to seek ways to limit I/I to its system where cost-effective opportunities exist.

Over the past twenty years, the District has been carrying out a sewer flushing and TV inspection program in order to maintain efficiency in the system and control any potential sources of infiltration and inflow. The program started in 1988 with the oldest portions of the sewer system being inspected first. Since that time, all pipes in the District that are more than 10 years old are regularly inspected. The information gathered by this program provided the ability to perform a physical analysis of the piping system. The majority of the system is in very good condition. There are some areas however that require moderate amounts of grouting and repair work to minimize I/I and rehabilitate the pipes to meet current, acceptable standards. Although I/I control is specifically identified in the CIP at the end of this section, additional budgeting to address specific maintenance and repair projects will likely be required for inclusion in the District's annual operation and maintenance budget to maintain this proactive program.

It is recommended that the District continue its flushing and TV inspection program on a continuous and rotating basis. This entire TV inspection process is in addition to normal operation and maintenance programs identified in the Sewer Operations Program (provided in Appendix S-1) and will serve to identify problem areas which may otherwise go undetected and aid in controlling infiltration and inflow.

4.5.3 Reclaimed Water and Water Reuse

Coal Creek has received inquiries regarding construction of water reclamation facilities that would allow for reclaimed water use at the Golf Club at Newcastle, or other individual facilities which currently receive potable water service from the District. A copy of King County's water reclamation checklist, with potential reclaimed water users within the District's water service area, has been provided in Appendix W-6.2. The District supports these efforts and recognizes the importance of developing alternative resources for certain types of potable water use. The District also recognizes that any such undertakings would be coordinated with WWTD and the appropriate property owners.

4.5.4 Telemetry System

The District has a telemetry system that provides a reliable means of monitoring system operation and control from the District office. Each pump station is equipped with overflow alarms as well as pump start/stop, pump fail, high/low wet well, intrusion, etc. The District has the capability of monitoring and controlling each station either on site, at the District office, or by laptop computer by the on-call technician from remote locations. The telemetry system is nearing the end of its useful life and has proved difficult to maintain in recent years. The District is therefore planning to replace the system in the near future, as described in the CIP table at the end of this section.

4.5.5 Design and Construction

As the population increases, both new development and infill redevelopment will occur, resulting in the continued need for sewer improvements. Construction should proceed in an orderly fashion, with facilities built in accordance with this Comprehensive Plan. Interim facilities should be designed so that they may be converted to or included in the ultimate permanent facilities. It is not possible to accurately predict when or where development will occur; therefore, such interim facilities will be designed to account for both immediate and long term needs. If land use or population densities vary from the projections provided in this Plan, the actual size and location of the facilities must be re-evaluated.

In the actual design of the proposed facilities, attention is given to the location of the sewer lines. Interceptors, and collectors, where possible, should be placed in rights-of-way. Sewers that are constructed on private land must be within easements that meet District standards. In the case of Developer Extensions, sewer facilities should be extended upstream, or to the far end of the developer's property, for future service to adjacent properties.

4.6 SEWER SYSTEM CAPITAL IMPROVEMENTS PLAN

Table 4-9 presents the proposed sewer system capital improvements plan.

The planning level cost estimates include such things as administration, engineering, legal fees, taxes, and overhead and are based on a variety of factors, including: documented costs of performing similar kinds of work in the recent past; engineering judgment; the availability of labor; the time of year of construction; competitive conditions; and other intangibles affecting construction costs at the time that the work is performed. The planning level estimates are intended to be conservative estimates and should be refined during the design process. The actual design of the improvements and possible changes made during that design could significantly alter the cost of the project from the estimate shown. Prior to the initiation of the

projects shown in the Plan, any changes should be reviewed and the cost estimate should be updated to reflect current conditions.

The recommended schedules are based on project priority. The proposed schedules may need to be adjusted at a later date to reflect changes such as development timing and actual future system conditions.

Project costs, scheduling, prioritization and possible funding sources are discussed in more detail in Parts 5 and 6 of the Plan.

Table 4-9: 6-Year Sewer System Capital Improvements Plan

Coal Creek Utility District

No.	Description	Function	Estimated Cost[1]	Schedule[2]	Recommended Financing
S-1	Infiltration and Inflow Control Projects	Reduce I/I	$300,000 ($50K Annually)	Ongoing	Rates
S-2	System Telemetry Improvements	Replace and upgrade existing telemetry equipment at lift stations	$50,000[3]	2013	PWTF, Rates
S-3	May Valley Lift Station Upgrade	Provide ultimate capacity for Basin No. 14	$150,000	ARBD	DE, GFC
S-4	Abandon Pleasant Cove Lift Station	Transfer customers to gravity service when available	$50,000	ARBD	GFC

Notes:
[1] Costs are in 2012 dollars and include construction, engineering, survey, inspection, taxes, administration, etc.
[2] Schedule may vary as development may dictate timing of some projects
[3] Project split with Water Facility SCADA/Telemetry improvements
ARBD = As Required by Development
PWTF = Public Works Trust Fund Low Interest Low Financing
GFC = General Facility Charge
DE = Developer Extension
RD = Rural Development

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PART 5
CAPITAL IMPROVEMENTS PLAN

5.1 OBJECTIVES

Previous Parts of the Plan have discussed projected demands and flows within the District, evaluation of existing facilities in relation to these projections, and recommended systems improvements. This Part presents, in summary form, the recommended water system and sewer system improvements.

The objectives of the improvements plan is to organize and prioritize the recommended improvements for implementation by the District, as outlined in Table 5-1. The District revisits the CIP on an annual basis to verify projects are on schedule or make changes to the implementation schedule as necessary.

5.2 PROJECT COST ESTIMATES AND SCHEDULES

In order to provide long range planning of proposed water and sewer system improvements, detailed cost estimates are required. These cost estimates are based on a variety of factors, including: documented costs of performing similar kinds of work in the recent past; engineering judgment; the availability of labor; the time of year of construction; competitive conditions; and other intangibles affecting construction costs at the time that the work is performed. The planning level estimates provided in this Plan are intended to be conservative estimates which will be refined during the design process. It is important to realize that the actual design of the improvements and possible changes made during that design could significantly alter the cost of the project from the estimate shown in Table 5-1. Prior to the initiation of the projects shown in the Plan, any changes should be reviewed and the cost estimate updated to reflect current conditions.

The cost estimates presented in the Capital Improvements Plan are based on 2012 prices (Engineering News Record Index of 9424) and reflect total project costs. These costs include construction costs plus a contingency of 10 percent and overhead costs such as District administration, engineering, legal fees, taxes, etc. Overhead costs have been computed at 35 percent of construction cost.

5.3 COMBINED CAPITAL IMPROVEMENTS PLAN

The combined Capital Improvements Plan for the District is presented in Table 5-1. Specifics on the water and sewer system improvements are located in Parts 3 and 4, respectively.

5.4 RECOMMENDED CAPITAL IMPROVEMENTS

The recommended Capital Improvements provided in Part 5 primarily assist the District with preventative maintenance, asset management, improved management of key facilities, meeting regulatory requirements, and continued promotion of regional cooperative efforts. Some recommendations provided in this Plan are included in Sections 3.5 and 4.5. A brief description of the need for projects identified in the CIP is provided in the following paragraphs according to project type.

5.4.1 Data Collection and Remote Management

CIP items No. W-1 and S-1 are for improved SCADA and Telemetry Improvements for both the water and sewer systems. The projects will be accomplished at the same time by the same contractor, and funding has been split according to the proportion of needed upgrades for the two systems. Needed system-wide SCADA and Telemetry upgrades will improve the District's ability to both collect data from key remote facilities, such as storage reservoirs, sewer lift stations, and water pump stations, and control pump/lift stations from the District's operations center.

5.4.2 Pump Station Improvements

Project W-2 will add a third pump to the 580 Booster Pump Station in order to increase reliability and to ensure the station can remain fully operational in the event a pump is out of service for maintenance purposes or due to unforeseen failures.

Project W-11 will rebuild the triplex pump system and add Variable Frequency Drive (VFD) controllers to improve the performance and reliability of the station.

5.4.3 Security Improvements

Coal Creek has budgeted to increase security at remote facilities, including the installation of fencing and/or cameras at the 580, 700, and 1060 water reservoirs. This added level of security will ensure tampering of the system is minimized and help reduce costs incurred from vandalism.

5.4.4 Asset Management

Coal Creek has several CIP items that will ensure the system remains highly functional and sustainable. Project W-6 is a meter replacement program that ensures new meters provide accurate readings and allow the District to recoup the full cost of water delivery. As older meters age, their ability to accurately read water consumption declines, and the meters often record less water than actually passes through. Installing new meters not only ensures accurate readings can continue, they are built with the latest read technology

that allows for faster meter reading and the ability to detect leaks that may be occurring at individual properties. The second project established in the CIP that concerns asset management is W-7, the Asset Management Replacement Fund. This is an established fund that is designed to help the District build reserves for ongoing pipe replacement. As pipes near the end of their useful life, the District will be prepared to replace pipes, pumps, and other key assets without having large, unanticipated fluctuations in rates.

5.4.5 Reservoir Improvements

Projects W-5 and W-8 are projects designed to examine the functionality and efficiency of two of the District's reservoirs. The 700 Reservoir Improvements project will examine any needs for seismic upgrades and will evaluate the overall condition of the tank to determine if it should be replaced. The 700 Reservoir is the District's only concrete tank, and it was built in 1977. Project W-8 Circulation Improvements will examine the potential need for improvements that would improve circulation at the 700 reservoir.

Project W-4 is painting the 440 Reservoir interior and exterior, although confirmation of the interior tank condition may determine that full recoating is not required. The cost estimate shown includes surface preparation and assumes that hazardous waste disposal practices and precautions will be required. Although the interior coating has not been inspected, no hazardous material is expected in the existing coating. In that the 440 Reservoir is a joint use facility, projects costs Projects W-12 and W-13 are for exterior painting of the 1060 and two 580 Zone reservoirs. Inspection of the interior condition of the storage tanks is recommended prior to project start.

5.4.6 Infiltration and Inflow Monitoring

Coal Creek is committed to ensure infiltration and inflow rates do not exceed the recommended threshold of 1,100 gallons per acre per day within its various basins. Monitoring for and reducing I/I ensures facilities will maintain adequate capacity to carry wastewater to the South Treatment Plant in Renton and avoid overflows that can damage local ecosystems and surface water resources.

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Table 5-1: Combined Capital Improvements Plan

Coal Creek Utilities District

No.	Project Name	2013	2014	2015	2016	2017	2018	Future (2019-2033)	Total
Water System Projects									
W-1	System SCADA/Telemetry Improvements	$150,000							$150,000
W-2	580 Booster Station Pump Improvements		$110,000						$110,000
W-3	Key Facility Security Improvements		$20,000						$20,000
W-4	440 Reservoir Painting		$1,000,000						$1,000,000
W-5	700 Reservoir Improvements				$75,000				$75,000
W-6	Reservoir Circulation Improvements					$25,000			$25,000
W-7	Meter Replacement Program	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	TBD	$150,000
W-8	Asset Management Replacement Fund	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	TBD	$300,000
W-9	120th Ave and SE 91st St Main Replacement						$210,000		$210,000
W-10	440 Pump Station Upgrade						$100,000		$100,000
W-11	Rainier Crest Pump Station Upgrades		$125,000						$125,000
W-12	1060 Reservoir Exterior Painting			$400,000					$400,000
W-13	580 Reservoirs Exterior Painting (Two Tanks)				$400,000	$400,000			$800,000
	Water Subtotal	**$225,000**	**$1,330,000**	**$475,000**	**$550,000**	**$500,000**	**$385,000**		**$3,465,000**

Table 5-1: Combined Capital Improvements Plan

Coal Creek Utilities District

No.	Project Name	2013	2014	2015	2016	2017	2018	Future (2019-2033)	Total
Sewer System Projects									
S-1	Infiltration and Inflow Control Projects	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	TBD	$300,000
S-2	System Telemetry Improvements	$50,000							$50,000
S-3	May Valley Lift Station Upgrade							$150,000	$150,000
S-4	Abandon Pleasant Cove Lift Station							$50,000	$50,000
	Sewer Subtotal	**$100,000**	**$50,000**	**$50,000**	**$50,000**	**$50,000**	**$50,000**	**$200,000**	
Combined System Projects (Non-Capital)									
	Vehicle Purchases	$45,000	$30,000						$75,000
	Billing System Upgrade		$250,000						$250,000
	Rate Study		$25,000						$25,000
	Comprehensive Plan							$100,000	$100,000
	Combined Projects Subtotal	**$45,000**	**$305,000**	**0**	**0**	**0**	**0**	**$100,000**	**$450,000**
	TOTAL CAPITAL IMPROVEMENT PLAN	**$370,000**	**$1,685,000**	**$525,000**	**$600,000**	**$550,000**	**$435,000**	**$300,000**	**$4,465,000**

Note: * The City of Bellevue may be responsible for portion of the cost associated with improvement of joint use facilities.

PART 6
FINANCING AND IMPLEMENTATION

6.1 INTRODUCTION

The purpose of this section is to present a strategy for implementation of the recommendations and findings previously discussed in this Plan and, together with the proposed improvements identified in previous Parts, outline a definitive program for future development of the District's water and sanitary sewer system. The combined water and sewer system Capital Improvements Plan is provided in Part 5 of this Plan. The District's overall implementation program for this Plan is outlined in subsequent discussions of the following topics: financial considerations, funding sources, current rates and charges, methods of financing capital improvements, and District policies regarding extensions to the system.

6.2 FINANCIAL CONSIDERATIONS

Coal Creek Utility District maintains a rate structure and accounting standards consistent with the Government Accounting Standards Bureau and all applicable requirements of Washington State and RCW Title 57 – Water and Sewer Districts. Financial transactions are accomplished through the King County Treasurer. Annual financial statements are prepared by a certified public accounting firm and all financial records are audited annually by the Washington State Auditor's Office. The most recent audit of 2011 financial records resulted in the 22nd consecutive year in which no findings were made. Maintaining an exemplary record since 1989 is a credit to both District staff and elected officials. A copy of the Auditor's report and comparative financial statements are available at the District's office and available to the public upon request.

In addition to oversight and assistance from accountants, financial consultants and auditors, the District regularly reviews revenues and expenses to ensure that rates are appropriate to meet anticipated expenses and invest in renewal and replacements to the water and sewer systems. Through a proactive asset management program, the District strives to maintain steady rates, without rapid increases to address specific issues or emergency situations. With adoption of the Capital Improvements Plan put forth herein, demonstration of financial viability and the ability to implement the recommendations is required. This includes consideration of:

- Administration, operation, maintenance and the day-to-day expenses of operating and maintaining the water and sewer systems;
- The costs associated with wholesale water supply purchases from Seattle Public Utilities and discharging wastewater to the King County regional system for treatment and disposal;

- Projected revenues from regular rates and charges from existing water and sewer customers and new customers of the system;
- Capital requirements associated with maintaining and upgrading the existing systems in accordance with the recommendations and overall asset management strategy outlined in this Plan;
- Debt service requirements for repayment of interest and principal for all outstanding loans and bonds; and,
- Maintenance of sufficient cash reserves.

The financial records of the District have been reviewed to evaluate the District's capability to provide the level of service and recommended improvements outlined in this Plan. A summary of the District's revenues and expenses from the past three years are put forth on Table 6-1.

The majority of revenues are from bimonthly water and sewer customer billings, with more than 90% coming from these sources combined, and slightly more revenue coming from water revenues than sewer. The decrease in water consumption in 2010 was caused by an unusually wet and cool summer was tempered by a 2% rate increase that year. The number of water and sewer connections increased in 2011 and resulted in increased revenues. Non-Operating revenue has remained fairly constant in the past three years, while non-operating revenue has decreased due to reduced interest income.

The largest expense to the District is the cost of wholesale water supply and wastewater treatment provided by regional providers. These costs are dependent on the rates charged to the District coupled with seasonal weather patterns that determine water use and irrigation during summer months. While regional conservation efforts have helped mitigate peak summer uses, irrigation associated with seasonal weather patterns remains a major factor in overall water use. Other operating expenses have remained fairly constant over the past three years.

Depreciation expenses are estimated at approximately $1.2 million annually. This amount is considered the amount of reinvestment into the system that is required to maintain the system in good working condition and complete renewal and replacements required to protect the ratepayer's investment, extend the useful life of the system and avoid sharp rate increases in the future. The District takes a proactive approach to operation and maintenance of the water system to ensure a level of service consistent with the areas designation within the Urban Growth Area. In addition, Coal Creek is responsible for operating the systems in accordance with all applicable regulations governing delivery of potable water service, fire protection and public wastewater collection and disposal service. Depreciation expenses are deposited in renewal, replacement and capital improvements funds and ultimately finance projects outlined in the Capital Improvements Plan or identified during annual budgeting and planning efforts. Consideration of

depreciation as an expense results in assurances that reinvestments to the system will be made can give the appearance of a negative net income balance. It is important to note that discretion is used in contributions to capital and replacement funds and this allows the District to maintain a positive cash flow balance at all times.

Capital Contributions to the District include revenues from connection charges, as well as improvements made to the system by developer extensions. While reduced development due to economic conditions has been commonplace, Coal Creek has had an increasing demand for new sewer and water connections, albeit slower than the development rates expressed in previous District water and sewer plans. Previous sections of this Plan identify long term growth rates based on regional population and employment forecasting models. Recent development inquiries indicate that development within Coal Creek may occur sooner than anticipated in regional forecasts but within the long range and ultimate development scenarios used for system analysis.

The proposed six year budget (2013-2018) presented in Table 6-2 has been developed based on historical trends and estimated inflation factors. The estimated budget is not intended as a detailed analysis of rates and charges but demonstrates the financial viability of the District. As mentioned previously, Coal Creek has maintained an excellent history of financial performance. The overall financial position has continued to improve over the past three years with increases in net position, adequate liquid assets and positive cash follow. This has been achieved through close management of revenues and expenses and regular rate studies to ensure that rates are both reasonable and reasonable as discussed later in this section.

Table 6-1: Historical Revenues & Expenses

All figures in US Dollars

	2009	2010	2011
Revenues			
Water Sales	$2,929,198	$2,500,354	$2,610,611
Sewer Revenue	$2,432,333	$2,553,931	$2,786,453
Other Operating Revenue	$245,470	$258,451	$247,507
Non-Operating Revenue	$135,986	$85,129	$84,099
Total Revenues	**$5,742,987**	**$5,397,865**	**$5,728,670**
Expenses			
Maintenance & Operations			
Water Supply Costs	$1,067,822	$812,901	$830,027
Wastewater Treatment Costs	$1,327,742	$1,331,474	$1,526,489
Other Maintenance & Operations	$1,139,026	$1,123,125	$1,094,529
Total M & O	**$3,534,590**	**$3,267,500**	**$3,451,044**
Administrative & General	$1,281,318	$1,208,480	$1,312,844
Depreciation	$1,280,993	$1,290,199	$1,279,627
Non-Operating Expenses	$191,564	$192,503	$95,671
Total Expenses	**$6,288,465**	**$5,958,682**	**$6,139,186**
Net before Contributions	($545,478)	($560,817)	($410,516)
Capital Contributions	$571,292	$576,560	$699,355
Net Income (Loss)	**$25,814**	**$15,743**	**$288,839**

Notes:

Table 6-2: Six-Year Budget

Coal Creek Utility District

	2013 Budget	2014 Budget	2015 Budget	2016 Budget	2017 Budget	2018 Budget
Revenues						
Water Sales	$2,843,270	$2,928,568	$3,016,425	$3,106,918	$3,200,125	$3,296,129
Sewer Revenue	$2,857,723	$2,891,574	$2,924,895	$2,958,217	$2,991,539	$3,024,860
Other Operating Revenue	$260,595	$265,807	$271,123	$276,546	$282,077	$287,718
Non-Operating Revenue	$89,221	$91,897	$104,790	$89,221	$91,897	$94,654
Total Revenues	**$6,050,809**	**$6,177,846**	**$6,317,234**	**$6,430,901**	**$6,565,638**	**$6,703,361**
Expenses						
Maintenance & Operations						
Water Supply Costs	$967,941	$1,001,819	$1,036,883	$1,073,174	$1,110,735	$1,149,610
Wastewater Treatment Costs	$1,635,213	$1,692,445	$1,751,681	$1,812,989	$1,876,444	$1,942,120
Other Maintenance & Operations	$1,164,096	$1,187,378	$1,211,126	$1,235,348	$1,260,055	$1,285,256
Sub-Total M & O	***$3,767,250***	***$3,881,642***	***$3,999,689***	***$4,121,512***	***$4,247,234***	***$4,376,987***
Administrative & General	$1,318,756	$1,345,131	$1,372,034	$1,399,475	$1,427,464	$1,441,739
Depreciation	$1,288,541	$1,293,021	$1,297,517	$1,302,029	$1,306,556	$1,311,099
Non-Operating Expenses	$166,373	$169,701	$173,095	$176,557	$180,088	$183,689
Total Expenses	**$6,540,921**	**$6,689,496**	**$6,842,335**	**$6,999,572**	**$7,161,342**	**$7,313,514**
Net before Contributions	($490,112)	($511,650)	($525,102)	($568,671)	($595,705)	($610,153)
Capital Contributions	$653,234	$672,831	$693,016	$713,806	$735,221	$757,277
Net Income (Loss)	**$163,122**	**$161,181**	**$167,914**	**$145,136**	**$139,516**	**$147,125**

Notes:

6.3 REVENUE SOURCES

The following listed revenue sources are available to fund operations and maintenance expenses and capital improvements to the water and sewer systems.

6.3.1 Rates

Water and sewer rates are the primary source of revenue for the District and are collected bimonthly. Rates are utilized to finance day to day expenses such as: administration and general expenses; customer accounting and collection expenses; taxes; and operation and maintenance expenses; rates and charges associated with purchase of wholesale water supply and regional wastewater treatment and disposal; and renewal and replacement expenses.

The District reviews its revenues and expenses periodically to determine the adequacy of existing rates. Cost of Service rate studies are performed less frequently (every three to five years) and provide a detailed analysis of costs associated with providing service to various customer classes. This includes identifying the costs associated with providing higher levels of service (typically through larger pipe sizes) required to serve multi-family, commercial and public facilities and making sure that rates are commensurate with the level of service provided. A cost of service analysis was accomplished in 2011 and resulted in adoption of District Resolution 1774, which adjusts rates to ensure equity between service connection types and pass-through increases from wholesale water and wastewater treatment costs to customers.

6.3.1.1 Water Rates

Table 6-3 shows the rates established during the development of this Plan (2012) and current rates and charges. The existing water rates include a base rate charge to all customers based on meter size as well as a commodity charge. The commodity charge is a tiered, with incremental increases based on the amount of water consumed and is intended to provide incentive for customers to consume water efficiently. Commodity charges are set based on the cost of wholesale water supply from SPU's regional water system. At the writing of this plan, the wholesale cost of water is $1.53/ccf in the winter months and $2.26/ccf in summer months, or approximately 48% of the District's Single Family commodity charge at the lowest tier.

Table 6-3: Water Rates

All figures in US Dollars

Single-Family Residential Unit		
	Water Meter Size (Inches)	*Bi-Monthly Rate*
Base Rates	3/4	$40.08
	1	$68.42
	1 ½	$132.61
	2	$213.22
	3	$350.05
	4	$626.12
	6	$1,378.40
	Cubic Feet	*Per 100 Cubic Feet*
Consumption Rates	0-1000	$3.19
	1001-3000	$4.16
	3001-10,000	$5.31
	Over 10,000	$7.61
Multi-Family Residential		
	Bi-Monthly Rate	
Base Rate	$28.86	
	Cubic Feet	*Per 100 Cubic Feet*
Consumption Rates	0-1100	$3.51
	1101-1500	$3.89
	Over 1500	$4.54
Commercial and		
	Water Meter Size (Inches)	*Bi-Monthly Rate*
Base Rates	3/4	$40.08
	1	$68.42
	1 1/2	$132.61
	2	$213.22
	3	$350.05
	4	$626.12
	6	$1378.40
	Winter	*Summer (June 1st – Sept. 30th)*
Consumption Rate (/ccf)	$3.68	$4.81
Irrigation		
	Cubic Feet	*Per 100 Cubic Feet*
Consumption Rate	All Consumption	$6.16

Note: Rates and Charges established by Resolution 1774 dated December, 2012 and effective November 1, 2012.

As noted in Part 3 of this Plan, separation of the previous Coal Creek System at the boundary between Bellevue and Newcastle at Newcastle Way necessitates metering to Bellevue water customers north of the dividing line. A series of meters are in place to wheel water to Bellevue at these locations and financial agreements are in place with SPU and Bellevue. Copies of the SPU and Bellevue contracts for water supply are included in Appendix W-7.

6.3.1.2 Sewer Rates

Current (2013) sewer rates are shown on Table 6-4. Sewer Rates are established primarily by the pass through costs associated with regional wastewater treatment and disposal charges.

Table 6-4: Sewer Rates
All Figures in US Dollars

Single-Family Living Units			
	Coal Creek Bi-Monthly Charge	*King County Bi-Monthly Charge*	*Total*
Base Rate	$38.00	$79.58	
Multi-Family Living Units			
	Coal Creek Bi-Monthly Charge	*King County Bi-Monthly Charge*	*Total*
Base Rate	$38.00 (Per 1500 Cubic Feet of Water)	$79.58 (Per 1500 Cubic Feet of Water)	
Commercial Units			
	Coal Creek Bi-Monthly Charge	*King County Bi-Monthly Charge*	*Total*
Base Rate	$38.00 (Per 1500 Cubic Feet of Water)	$79.58 (Per 1500 Cubic Feet of Water)	

Notes: For each service connection to the District sewer system for industrial waste, such rate as the Board of Commissioners may establish in each instance, taking into consideration the effect of the industrial waste upon the public sewer system, but in no event less than the rate provided for commercial units.

Coal Creek collects all charges on behalf of King County and is billed by King County monthly for all accounts.

Rates and Charges established by Resolution 1774 dated December, 2012.

Sewer rates have increased steadily in recent years and currently (2013) the regional charges represent 68% of the single family residential rate. Multi-family and commercial rates are subject to similar costs but based on a monthly charge

per ERU and are based on actual water consumption records provided to KC WWTD on a quarterly basis. Similar to the arrangement for wheeling water to Bellevue, the District receives wastewater from Bellevue properties through several sewer system interties. Wastewater flows are not metered and are calculated based on the regional calculation for service per ERU. Coal Creek and Bellevue have developed an effective billing and record keeping system to accommodate this arrangement.

6.3.2 Connection Charges

Connection charges are assessed at the time of development and connection of a new customer to the water and/or sewer system. All properties within the District are required to apply to the District for extension of new service through the established Water or Sewer Availability process and the terms and conditions of service are typically established concurrently with consideration of a building permit. The cost of a new connection includes a District General Facilities Charges (GFC) and a Local Facilities Charge (LFC) in addition to meter installation and other fees.

General Facilities Charges (GFCs) are charges which are intended to provide a means for new connections in the system to pay an equitable share of District-wide capital improvements. GFCs are maintained at a level which will support the demand for new facilities placed on the District by new development. Information about the policies associated with GFCs is provided in Section 6.6. A GFC/LFC study and adjustment was adopted by District Resolution 1718 in March, 2009 with GFCs being set at $5,000/ERU for water service and $2,900/ERU for sewer service. The overall excellent condition of the water and sewer systems has been documented during this planning process and little has changed in terms of needed general facilities. This indicates that another GFC/LFC study is not necessary during the next few years.

In addition to the District's General Facilities Charge, new connections are subject to regional "growth charges" levied by Seattle Public Utilities for water connections and by King County Wastewater Treatment Division for sewer connections. These are straight "pass-through" charges to new customers of the District and are established by the regional providers. They support the Growth Management Act premise that growth must be self-financed and are determined by an established formula for determining ERU's.

A LFC is a charge to cover a connecting parties' equitable share for water or sewer facilities in the immediate vicinity of the property that the customer is seeking to connect to the system. Presently, the District requires all developer's to install all local facilities required to provide water and/or sewer service to the property being developed. Local Facility Charges are assessed on a per lot basis or per lineal foot of frontage on the water

or sewer main of the real property to be served, whichever amount is greater. A minimum of 75 feet is be used to calculate the LFC for properties that have frontage of less than 75 feet. Local Facility Charges were updated in March, 2009 with GFCs, and are presently established at $6,900 or $92 per lineal foot of frontage along the water main for water service and $10,125 or $135 per lineal foot of frontage along the sewer main for sewer service.

When local facilities have been constructed and paid for by a previous developer, a latecomer agreement may exist requiring benefited properties which connect to a water or sewer line to pay their pro rata share of the cost to install the local facilities. In many instances, however, no latecomer agreement exists. LFCs are assessed in these instances where latecomer agreements do not exist or have expired and, in accordance with state regulations, serve to require all customers of the District to pay their equitable share of system development costs. Additional information concerning the policies associated with Local Facilities is provided in Section 6.7.

6.3.3 Utility Local Improvement District (ULID) Financing

Forming a Utility Local Improvement District (ULID) is a method by which improvements can be financed by those property owners directly benefiting from the improvements. This method of financing must be supported by the majority of benefited property owners either by petition or District resolution. ULID financing is generally used for local facilities improvements and initial financing is typically by bond sales or loans. The costs of improvements are typically allocated and assessed against properties within a ULID area, although revenue from rates can also be used to repay the bonds required to finance a ULID improvement.

6.3.4 Developer Financing

Most of the new facilities constructed within the District should be financed by the developers of presently unimproved property or property that redevelops. All of the improvements required for service to property within new plats, or commercial and industrial developments will be designed and constructed in accordance with the District's Developers Extension Policies set forth in the "Agreement for Constructing Extensions to the Sewer and Water System". This document is available from the District under separate cover and by reference is hereby incorporated into this Comprehensive Plan.

6.3.5 Combination Financing by Developers and District

It may be necessary in some cases to require the developer to construct facilities which are oversized for current development in order to provide for the comprehensive development of the District's water or sewer system. The District may enter into an agreement to

reimburse the developer for the extra costs associated with increasing the size of facilities over that required to serve the property proposed for development. Oversizing should be considered when it is necessary to construct any water or sewer main over 8-inches in diameter in single-family areas for Comprehensive Plan compliance. Construction of any water or sewer main in multi-family, commercial or industrial areas that is larger than the size required to serve the current development proposal is considered oversizing.

6.3.6 Bond Financing

Bond financing can be achieved by the sale of either general obligation or revenue bonds. General obligation bonds must have majority voter support in the District and are paid off through assessments against properties within the District. Revenue bonds, however, do not require voter approval and may be financed by whatever funds are available to the District for the payment of debt service. This might include revenues from water and sewer sales, general fees, latecomer charges or other funds.

6.3.7 Grant Financing

Grant financing has become increasingly scarce for utility systems in recent years but is still available under specific circumstances. Current grant programs for sanitary sewer system facilities are highly competitive, and include the State of Washington Centennial Clean Water Fund (discussed in more detail in section 6.3.9) and the King County Community Development Block Grant (CDBG) program. These programs are aimed at eliminating pollution sources and/or correcting documented existing pollution problems, particularly in low to moderate income neighborhoods in the case of the CDBG program. Grant awards can occur in the event that particular health hazards have been identified and documented and it is determined that improvements to the District's sanitary sewer system will provide a solution to the existing pollution problems.

6.3.8 Public Works Trust Fund (PWTF) Loans

Public Works Trust Fund financing is a low interest loan program which can be used to finance utility system improvements. Interest rates range from 0.5% to 2% depending on the level of local participation and the loans must be repaid within twenty years. This type of financing has been beneficial to the District in the past and is recommended as a method of financing for future District improvement and replacement projects.

6.3.9 Centennial Clean Water Fund Program

The Centennial Clean Water Fund provides low-interest loans and grants to local governments and Indian Tribes for proposed facilities and activities designed to prevent and control water pollution in Washington State's surface water and groundwater

resources. Funds from this program can be used to finance the planning, implementation, design, acquisition, construction, and improvement of these facilities and activities. Interest rates are based on a percent of the market rate for tax-free municipal bonds and are established at the beginning of each application cycle. The Centennial Clean Water Fund is administered by the Washington State Department of Ecology.

6.4 FINANCING CAPITAL IMPROVEMENTS

The Capital Improvements Plan identified in Part 5 identifies approximately $2.57 million in water and sewer system improvements. Approximately $125,000 is estimated for on-going annual improvement and monitoring expenses between 2013-2018. Of these improvements, approximately 88% are anticipated in the next six years and the remaining improvements are to be completed as required by development. The majority of improvements are in the form of preventative renewal, replacement and maintenance activities and projects that will improve controls of remote facilities.

It is recommended that the District fund the recommended improvements in the following manner. Grants or low interest loans should be utilized to minimize impacts on rates before cash on hand from GFCs, LFCs, rates or other sources are utilized. Revenue bonds have traditionally been used to make up any short fall in these funding sources. Although bond sales carry an administrative cost, bond interest rates have been low enough to make refinancing an attractive option for many public agencies.

In addition to planned District improvements are system expansions that will take place through Developer Extensions (DEs), and those expansions of the system will be paid directly by the property owners requesting service. DEs are consistent with Growth Management Act planning and the "growth pays for growth" philosophy, and are not budgeted for by the District. Typical financing methods for new facilities are discussed in the following paragraphs and are presented for reference in responding to new development proposals.

6.4.1 General Facilities

The most difficult improvements to finance are general facilities such as reservoirs, water pump stations, transmission mains, treatment facilities, interceptors, forcemains, sewer lift stations and other facilities which will benefit a large area. This is because this type of facilities is generally needed before water or sewer service can be provided and often times before customers are available to assist in financing. In new and expanding areas where water or sewer service is not currently available, general facilities are typically financed by one of the following methods:

- Passing a general obligation bond which is approved by voters;

- Forming a ULID and assessing the benefited properties equally;
- Requiring the initial developer to pay for improvements with a pay-back arrangement as the area develops (latecomer charges);
- District financing of improvements and assessing a General Facilities Charge (GFC) to each property within the benefited area as development occurs. These charges must be sufficient to cover all costs incurred, including interest on money and an allowance at a rate that will amortize the investment; or,
- District obtained grants or low interest loans to assist in construction of these type of improvements.

General facilities are normally paid for when the system is constructed and the costs are assessed against existing customers. As the system expands and new connections are added, a charge in lieu of assessment can be levied or connection charges imposed to offset the original construction costs. This money, in addition to the funds from monthly rates for renewals and replacements, should be adequate to finance general facility improvements.

6.4.2 Local Facilities

Local facilities such as local collector sewer lines and appurtenances benefit a smaller area than general facilities. The costs for these improvements can be directly attributable to the properties within an identified area which receive direct benefit from the improvements. Methods of financing local facility improvements are summarized below:

- Formation of a ULID;
- Developer Extension Agreement and Financing;
- Local Facilities Charges (LFCs);
- Pay-back (Latecomer) Agreements; or,
- Grants and other outside assistance to reduce local costs, including District participation.

Funding local improvements through rate increases is not recommended because it would result in all customers paying for improvements which benefit only a small area.

6.4.3 Private Facilities

Private Facilities include individual water service lines and side sewers, and are typically financed by the individual customer receiving the direct benefit from such facilities.

6.5 DEVELOPER EXTENSION POLICIES

The District, as a municipal corporation, has a responsibility to the public to ensure that water and sewer mains installed in public streets and easements are constructed in accordance with currently accepted standards for public works. Therefore, the District has adopted a developer extension regulation which is set forth in "Agreement for Constructing Extensions to the Water and Sewer Systems". The requirements set forth in that document are intended by the District as a contract with the developer, incorporating minimum standards which are prerequisite to acceptance by the District of facilities which are to become part of the District's water and sanitary sewer system. As discussed in Parts 3 and 4, a copy of standard details and construction standards are maintained at the District office, and water standard details are also on file at the State DOH office.

6.6 GENERAL FACILITIES POLICIES

General facilities are, for the most part, constructed by the District as major capital improvements projects. When water transmission mains or sewer interceptors installed by developers are required to be oversized to benefit a large area, the District's policy is to pay for material costs for oversizing. GFCs are charged to new connections as an equitable means for new connections to the system to pay their fair share of District-wide capital improvements.

6.7 LOCAL FACILITIES POLICIES

Property owners or developers requesting sewer service from the District are required to pay all costs associated with the design and construction of local sewers and extensions from the existing sanitary sewer system. The typical method by which this occurs is by signing of an "Agreement for Constructing Extensions to the Water and Sewer Systems". This document establishes the procedures and requirements for constructing extensions to District facilities.

Acceptable methods of financing local facilities are: directly by the developer with latecomer's fees established for properties which may connect at a later date; formation of an ULID; low interest loans or grants which may become available from time to time; or, by assessment of Local Facilities Charges (LFC's).

The District presently has a latecomers policy which allows for a person or developer who initially installed and paid for local facilities to be reimbursed by the benefiting property owners who eventually connect to the local facilities. This policy allows for an equitable distribution of costs associated with local facilities improvements.

In areas where no latecomers agreement exists, Local Facilities Charges are assessed to cover a connecting parties equitable share for sewer facilities in the immediate vicinity of their property.

6.8 PRIVATE FACILITIES POLICIES

6.8.1 Individual Service Line Policies

Financing for individual service lines is the responsibility of the property owner, who must pay for the construction, maintenance, and replacement of the service line. Property owners are also responsible for connection fees, District inspection fees, and all other costs associated with the service line installation.

The cost of residential water service depends on whether a full water service or only a meter is required, the size of the service, and the construction difficulties encountered. This fee is updated periodically based on the following expenses:

- Cost of labor, material, and equipment for the installation of the service,
- Cost for inspection,
- Billing set-up costs,
- Cost of permits, and
- Labor, overhead and fringe benefits.

The costs for a water service connection for a commercial or multi-family development is based on the actual cost to provide the service. Since the size of the meter and service is dependent on the requirements of the facility being served, each service is individually designed and constructed by the District's field crews. Meter and service size is normally determined by the building mechanical engineer and checked by the District. The actual cost of the service is determined by the District on a case-by-case basis and includes all items identified in the previous paragraph.

The cost for fire lines for building sprinkler systems is determined on a case-by-case basis, in the same manner as service lines for multi-family and commercial connections. The District standards regarding the design or type of fire service lines do not extend beyond the meter and backflow prevention assembly. Design of the system beyond that point is the responsibility of the developer.

6.8.2 Individual Side Sewer Policies

Property owners must pay for the construction, maintenance, and replacement of side sewer lines, along with connection fees, District inspection fees and all others costs associated with side sewer installations.

The cost of new service connections is dependent on whether an existing stub can be utilized or an entire new side sewer is required, the size of the service and the difficulties

encountered in installation. In addition to the charges associated with the actual installation, the District currently charges per residential connection for inspection fees and permit. This fee is updated annually based on the following expenses: cost of labor, material and equipment for installation of service; Cost for inspection; billing and set-up costs; and, cost of permit. Residential service connection charges are in addition to any Local Facilities Charges or General Facilities charges which may be associated with the property. Local Facility Charges and General Facility Charges are identified previously in this section and dependent on the size of property and type of land use proposed.

6.9 OTHER RECOMMENDATIONS

In addition to capital improvements identified through modeling and analysis of the water and sewer systems are considerations related to District administration, management and operation. Coal Creek Utility District maintains a regional presence with several key water and sewer utility organizations and a proactive voice on legislative issues affecting Special Purpose Districts. The following paragraphs define and recommend new or continued activities by District staff and Commissioners that will benefit the public utility industry and District customers.

6.9.1 Systems Operations and Maintenance

Operation and Maintenance information for the water and sewer systems is provided in the Appendices to this Plan and document compliance with emergency response planning activities, cross connection control, water quality monitoring and public notification, infiltration and inflow monitoring, system vulnerability, and preventative maintenance. During the development of this Plan, a few areas of ongoing operations were identified to be implemented as staff time allows.

6.9.1.1 GIS Record Keeping

The District maintains an excellent GIS geodatabase of as-builts and system records, and has built an asset management program that is accessible and updated in real-time by District staff while in the field. Continued development and refinement of the GIS and coordination with county and city mapping and geodatabase products is recommended.

6.9.1.2 Emergency Response Planning

The District's Emergency Response Plan and Vulnerability Assessment are kept on file at the District office while the District's emergency contact list and chain of command is summarized in Figure 2 of Appendix W-2 of this Plan. Maintaining a current and comprehensive emergency response plan and contact lists in is recommended. Additionally, continued participation in ongoing regional emergency planning efforts with counties, cities, and special purpose districts

recommended as a means of supporting regional efforts and incorporating established regional protocols into its own Emergency Response Plan.

6.9.1.3 Infiltration and Inflow Monitoring

Coal Creek has partnered with King County and other component agencies on past projects to implement and evaluate measures designed to reduce Infiltration and Inflow. It is recommended the District continue working with King County to improve I/I monitoring in targeted areas of mutual concern. Using ongoing maintenance records that are collected by field staff, it is recommended that Coal Creek continue to monitor areas that exhibit a higher than typical level of maintenance to assist in prioritizing aging assets.

6.9.2 Rate Studies

Regular review of revenue in comparison to expenses is performed every couple of years. In addition, the District contracts with a financial consultant to accomplish complete cost of service rate analyses every five to seven years. The last cost of service analysis was performed in 2011 and connection charges were evaluated and updated in 2009. To ensure both short and long-term financial viability, it is recommended the District perform regular rate, COS, and GFC/LFC studies. In addition, annual budgeting and planning sessions are a valuable tool to ensure implementation of the CIP and provide a forum for consideration of system performance as observed by field operators.

6.9.3 Water Resource Management and Use Efficiency

The District works well with SPU and other purveyors to identify conservation strategies and is on top of reporting requirements to both DOH and its customers. Coal Creek has recognized the importance of maintaining accurate records, as evident by the District's program to replace multi-family customer meters with state of the art Omni meters that have increased metering accuracy and are able to detect household leaks that may be occurring. Moreover, SPU has been targeting its southeast wholesale customers (Coal Creek Utility District, Water District 90, Soos Creek Water & Sewer District, and Cedar River Water & Sewer District) to help identify small commercial businesses that might benefit from efficient bathroom and kitchen upgrades. To maintain its reputation and history as good stewards of regional water resources management, it is recommended the District assist SPU in these efforts.

6.9.4 Franchise Maintenance

CCUD maintains franchises with the jurisdictions that it provides service within to operate and maintain water and sewer system facilities within established right-of-way and other public easements. A copy of the City of Newcastle franchise agreement renewed in 2008 and valid through April, 2038 is provided in Appendix W-7. The District is working with King County to update its franchise agreement, and an appropriate agreement with the City of Renton is also being developed as of the submittal date of this Plan (2013).