

CHAPTER 8

UTILITIES ELEMENT



UTILITIES ELEMENT - TABLE OF CONTENTS

Introduction	U-1
Information Included in this Element.....	U-1
Organization of the Utilities Element.....	U-1
Relationship to the Capital Facilities Element.....	U-1
State Planning Context.....	U-2
Regional Planning Context.....	U-2
Local Planning Context	U-3
Goals and Policies.....	U-3
Utility Services and Facilities	U-8
Water	U-8
Summary of Services and Facilities.....	U-8
Facilities Inventory	U-8
Tacoma Facilities Inventory in Fircrest Area.....	U-8
Service Levels and Current Demand and Adequacy	U-11
Future Demand and Adequacy	U-12
Water Facility Issues.....	U-12
Water Facility Projects	U-12
Sanitary Sewer	U-13
Summary of Services and Facilities.....	U-13
Service Agreements	U-13
Alternative Service.....	U-15
Facilities Inventory	U-15
Service Levels and Standards	U-17
Demand and Adequacy	U-17
Stormwater Management	U-18
Summary of Services and Facilities.....	U-18
Facilities Inventory	U-20
Service Levels and Standards	U-21
Stormwater Management Issues and Projects	U-23
Electric	U-23
Summary of Services and Facilities.....	U-23
Natural Gas	U-24
Company Overview	U-24
Regulatory Environment	U-24
Integrated Resource Plan	U-26
Natural Gas Supply.....	U-26
System Overview	U-26
Future Projects	U-27
Telecommunications	U-27
Land-Based Telephone Service	U-27
Cellular Telephone Service.....	U-28
Cable Service	U-29
Solid Waste	U-31

INTRODUCTION

The purpose of this element is to ensure utilities: (1) are provided at appropriate levels to accommodate projected growth at a reasonable cost; (2) facilitate reliable service; (3) ensure public health and safety; and (4) maintain an attractive community.

INFORMATION INCLUDED IN THIS ELEMENT

To ensure that all urban services necessary for the health and well-being of the community are available in the future, this element discusses both public utilities and private (investor-owned) utilities. The City of Fircrest currently owns and operates, water, sanitary sewer, and stormwater management utilities within its corporate boundaries. A few areas adjacent to Fircrest are also served by some of Fircrest's utilities. Other public entities such as Pierce County and the City of Tacoma provide some public utilities in Fircrest and its PAA. As Fircrest contemplates the potential expansion of its corporate boundaries to the boundaries of the PAA, it must plan how these utilities' services will be provided throughout Fircrest and its PAA under Fircrest's governance.

Private utilities in Fircrest and its PAA provide natural gas and telecommunications services. In addition, solid waste services are provided by a private vendor, although there are no facilities located within Fircrest or its PAA. Information provided to Fircrest by the private utilities is included in this element.

ORGANIZATION OF THE UTILITIES ELEMENT

This Utilities Element contains the following sections:

- Introduction
- Goals and policies
- Water
- Sanitary sewer
- Stormwater management
- Electric
- Natural gas
- Telecommunications
- Solid waste

RELATIONSHIP TO THE CAPITAL FACILITIES ELEMENT

The Capital Facilities Element is concerned with the same public utilities as the Utilities Element. To improve readability of the Comprehensive Plan, all topics related to public utilities are consolidated in the Utilities Element except the capital improvement program. Cross-references between the Capital Facilities Element and Utilities Element are provided as necessary to meet GMA requirements.

STATE PLANNING CONTEXT

Section RCW 36.70A.070 (4) of the *Washington State Growth Management Act* (GMA) requires that all comprehensive plans contain:

"A utilities element consisting of the general location, proposed location, and capacity of all existing and proposed utilities, including, but not limited to, electrical lines, telecommunications lines, and natural gas lines."

Additionally, the GMA contains the following planning goal relating to public facilities and services. This goal affects utilities planning and states that the comprehensive plan must:

"Ensure that those public facilities and services necessary to support development shall be adequate to serve the development at the time the development is available for occupancy and use without decreasing current service levels below locally established minimum standards."

Finally, the Section RCW 36.70A.110 (3) states:

". . . it is appropriate that urban government services be provided by cities. . ."

REGIONAL PLANNING CONTEXT

The Pierce County *Countywide Planning Policies* relating to urban growth areas and urban services elaborate on these and other GMA requirements. In addition, the *Comprehensive Plan for Pierce County, Washington* may specify for municipalities a potential annexation area (PAA), formerly known as an urban service area. The PAA represents the geographic area within which the city may anticipate providing urban services in the future, either prior to or subsequent to annexation. Each city's PAA is based on input from the municipalities and on the evidence that the city is capable of providing urban services to the area.

This element includes urban service information for the 62nd Avenue West area, which was designated by the County in 1996. Fircrest's PAA is included within the Pierce County Comprehensive Urban Growth Area (CUGA) and is already characterized by urban development.

LOCAL PLANNING CONTEXT

UTILITIES VISION

Looking ahead 20 years...

Through the 2030s, the planning and placement of utilities in Fircrest has supported the community's vision for the preferred location and amount of growth.

Utility planning for higher growth areas such as the Mildred and 19th Street corridors has advanced the vision. For those utilities provided by public entities and private companies, the City has ensured sufficient area is available to locate such facilities and provided a reasonable regulatory climate.

Utility planning has contributed to a high quality of life for Fircrest residents and businesses by ensuring efficient utility delivery.

Communications facilities are keeping up with changes in technology. Conservation and protection of existing resources has ensured a continued supply of clean water and energy.

Proper utility planning has also protected Fircrest's natural environment and resources.

Upgrades to the sanitary sewer system have eliminated septic systems, thereby controlling contaminants released into the environment. The City has protected the natural environment by developing stormwater systems to prevent or reduce excess stormwater runoff that eventually makes it way to Puget Sound, by designing and upgrading systems and plans to prevent damage to the environment, by fostering conservation operationally and by implementing low-impact development practices.

GOALS AND POLICIES

This Element contains the Utilities goals and policies for the City of Fircrest. These goals reflect the general direction of the City, while the policies provide more detail about the steps needed to meet the intent of each goal. The goals and policies address the following utilities challenges:

- Ensuring that adequate public utilities and facilities are planned for, extended, and sized in a cost effective manner consistent with planned population and economic growth described in the Land Use Element and other provisions of the Comprehensive Plan;

- Locating utilities to minimize impacts on public health and safety, surrounding development, the environment and interference with other public facilities; and
- Reducing demand for new resources through support of conservation policies and strategies and the use of innovative technologies.

GOAL U1

Ensure that adequate public utilities and facilities are planned for, extended, and sized in a cost effective manner consistent with planned population and economic growth described in the Land Use Element and other provisions of the Comprehensive Plan.

Policy U1.1

Work with providers to appropriately site new utility facilities to maintain a reliable level of service, accommodate growth, minimize adverse impacts to the City, maximize efficiency, and preserve neighborhood character.

Policy U1.2

Support efforts by utilities to employ new technology to make operations and work practices safer, increase reliability, facilitate permitting, and minimize rate increases. Consider allowing utilities to develop pilot projects for innovative utility programs in Fircrest that may benefit the City's residents and businesses. Facilitate access to state-of-the-art technology.

Policy U1.3

Work with utility providers and policy makers to improve service while maintaining the lowest possible utility rates. Actively monitor services provided by each utility provider and assess these services against the applicable rate structure. Utilize the franchise negotiation process to ensure provision of quality services to residents. Support reduced service rates for low income senior and disabled householders.

Policy U1.4

Process utility permits in a fair and timely manner, consistent with development and environmental regulations, to minimize the time and cost required for a utility to provide needed services to local residents and businesses. Consider utility providers' concerns about regulations during periodic code updates and strive to balance concerns for the public health, safety, welfare, and environment with utility providers' needs.

Policy U1.5

Assist utilities with the development of accurate, long-term system facility plans that will ensure provision of adequate service capacity by sharing land use planning and growth projections and other information.

Policy U1.6

Ensure reasonable access to rights-of-way for all providers consistent with federal and state laws. Utilize the franchise negotiation process to ensure that utilities have reasonable access to use the public right-of-way while guaranteeing that utility use will not degrade the roadway or overly disrupt the traveling public.

Policy U1.7

Require proponents of development to pay for or construct the growth-related portion of utility infrastructure needs in order for utility service providers to balance capital expenditures with revenues and still maintain established service standards. Support the use of reimbursement agreements, such as latecomer agreements, as a method of employing equitable cost sharing for development costs among the original developer and subsequent developers who benefit from the increased capacity provided by the original developer.

GOAL U2

Locate utilities to minimize impacts on public health and safety, surrounding development, the environment and interference with other public facilities.

Policy U2.1

Encourage sharing of utility corridors to save time and expense associated with the cost of utility installation and repairs to the City right-of-way, reduce traffic disruptions, extend pavement life, and minimize required monitoring of repair quality. When permits are requested, the City should require the utility to notify other providers for possible coordination.

Policy U2.2

Coordinate the design and timing of utilities siting, installation and repair with street improvements whenever possible. The City should share plans for street construction or overlay with utilities in order to identify opportunities for simultaneous construction projects and provide timely resolution of conflicts.

Policy U2.3

Promote high quality designs for utility facilities to minimize aesthetic impacts and integrate these facilities into neighborhoods. Use architecturally compatible designs for above ground utilities, landscape screening, buffers, setbacks, and other design and siting techniques to minimize impacts. Mitigate the visual impact of transformers and associated vaults through measures such as the use of varied and interesting materials, use of color, additions of artwork, and superior landscape design.

Policy U2.4

Minimize negative siting impacts associated with siting personal wireless telecommunication facilities through the administration of regulations consistent with applicable State and federal laws. Regulate the placement, construction and maintenance of such facilities to minimize their obtrusiveness by ensuring

appropriate screening of facilities and encouraging collocation to lessen the number of towers or structures needed to support telecommunications equipment.

Policy U2.5

Apply regulations and franchise agreement provisions that encourage the use of smaller telecommunication facilities that are less obtrusive and can be attached to existing utility poles or other structures without increasing their visual impact.

Policy U2.6

Design, locate and construct facilities to minimize adverse impacts to the environment and to protect environmentally sensitive areas, including critical areas. When no viable alternative exists to constructing facilities in critical areas, the environmental review process and critical areas regulations should identify and, if appropriate, mitigate negative impacts. Mitigation should take into account both individual and cumulative impacts. Impacts should be minimized through actions such as:

- Using construction methods and materials to prevent or minimize the risk of overflows into watercourses and water bodies;
- Locating utility corridors in existing cleared areas;
- Locating utility facilities and corridors outside of wetlands;
- Minimizing crossings of fish-bearing watercourses;
- Using biostabilization, riprap or other engineering techniques to prevent erosion where lines may need to follow steep slopes; and
- Minimizing corridor widths.

Policy U2.7

Avoid utility impacts to public health and safety, consistent with current research and scientific consensus. Monitor scientific research and adopt regulatory measures if research concludes that a proven relationship exists between electric utility or wireless communication facilities and adverse health impacts. Monitor improvements in the natural gas industry and require gas pipeline utilities to upgrade their facilities to implement the best available technology with respect to leak detection devices and other components.

Policy U2.8

Protect the City's rights-of-way from unnecessary damage and interference and ensure restoration to pre-construction condition or better. Ensure that trenching for the installation, repair, or maintenance of facilities; installation of poles and streetlights; boring; or patching or restoring streets where work has just been completed are performed in accordance with City standards that apply to construction or repair of utility facilities in the right-of-way. Require bonds or other financial guarantees to ensure that restoration is performed properly and that failed repairs will be corrected.

Policy U2.9

Promote undergrounding of existing utility lines to reduce visual clutter, minimize inappropriate pruning of trees and shrubs to accommodate maintenance of overhead lines, and enhance reliability of power and telecommunication facilities. Consider new technologies, such as wireless transmission, as they become available in order to minimize aboveground utilities.

Policy U2.10

Require undergrounding of utility distribution lines or provisions for future undergrounding as a condition for development projects. Underground existing utility distribution lines or provide for future undergrounding as street projects occur. Fund undergrounding through a capital improvement program or through formation of a local improvement district. Require individual service lines to be underground when significant site improvements are made. Require undergrounding except where underground installation would cause greater environmental harm than alternatives or where it is demonstrated that such installation will be economically infeasible.

Policy U2.11

Support efforts by utility providers to enhance the security of their infrastructure and protect critical systems from natural environmental forces and intentional acts of vandalism and terrorism. Coordinate with utility service providers in advance planning efforts as well as during or following an event that threatens critical infrastructure and public health and safety.

GOAL U3**Reduce demand for new resources through support of conservation policies and strategies and the use of innovative technologies.****Policy U3.1**

Encourage resource saving practices and procedures in facilities and services used by the City. Conduct operations in a manner that leads by example through activities such as recycling, water conservation, energy conservation and low- impact development processes whenever possible. Encourage coordination with utility providers to identify and implement resource saving procedures in City facilities and services. Use City facilities as demonstration sites for innovative resource conservation techniques.

Policy U3.2

Cooperate with utility providers and other agencies in encouraging resource conservation by local residents, employees, citizens and businesses. Support efforts to disseminate educational materials and other information regarding resource conservation programs.

Policy U3.3

Encourage the use of innovative technologies to provide and maintain utility services, reduce the negative impacts of additional utility service demands, improve the existing service, and reduce, where appropriate, the overall demand on utility systems.

UTILITY SERVICES AND FACILITIES

Water

SUMMARY OF SERVICES AND FACILITIES

Water services are provided in Fircrest and its PAA within the context of federal, state, regional, and county regulatory acts, plans, and programs. A host of agencies is responsible for implementing and overseeing programs ensuring water quality and supply, allocating rights, controlling distribution, and promoting conservation. The Fircrest Public Works Department, which provides water service within Fircrest, conforms to regulations through the ongoing implementation of its *Comprehensive Water System Plan*. Tacoma Public Utilities, which provides water service to portions of the areas annexed to the City in the 1990s and the PAA, conforms through the ongoing implementation of its *Water System Plan*. The delineation of service area boundaries is contained in a May 27, 2014 service area agreement as part of the Comprehensive Water System Plan.

FIRCREST FACILITIES INVENTORY

Figure U-1 shows Fircrest's major water facilities and their capacities. Fircrest relies on five existing ground water wells located within its municipal boundaries for its entire water supply. Fircrest has ground water rights and pumping capacity projected to be sufficient to serve a population of 10,000-15,000 (depending on consumption levels). The system also includes reservoir storage capacity of 1.8 million gallons and 26 miles of transmission and distribution piping. Descriptions of the current service area and customer base, consumption patterns, and service levels are provided in Fircrest's *Comprehensive Water System Plan*. The water system plan also contains a detailed inventory of facilities (including locations and capacities), projections of demand through 2033, system adequacy to meet projected demand, and a list of capital improvement projects and costs.

TACOMA FACILITIES INVENTORY IN FIRCREST AREA

Tacoma Public Utilities provides water service to 24 parcels in the northwest corner of the City, properties within the 1300 blocks of Buena Vista Avenue, Berkeley Avenue, and Contra Costa Avenue, the Valley Firs Condominiums and the PAA. Tacoma Public Utilities is governed by a five-member board, appointed by the Tacoma City Council.

The primary water supply to this area comes from the Green River in King County and local wells. During high demand periods, mostly in the summer, well water from the south Tacoma aquifer and other local aquifers supplements the river water. Tacoma Water's Green River First Diversion water right can supply up to 73 million gallons of water each day. Tacoma Water's Green River Second Diversion water right can provide up to 65 million gallons of water each day. This second diversion is subject to minimum streamflow standards and is a resource shared with Tacoma Water and its Regional Water Supply System partners. Tacoma Water's share of the second diversion equals 27 million gallons of water per day. In addition to the Green River, Tacoma Water owns wells located in and around the City of Tacoma. Tacoma Water's wells have a short-term combined pumping capacity of approximately 60 million gallons per day.

**Figure U-1
Existing Water Facilities**

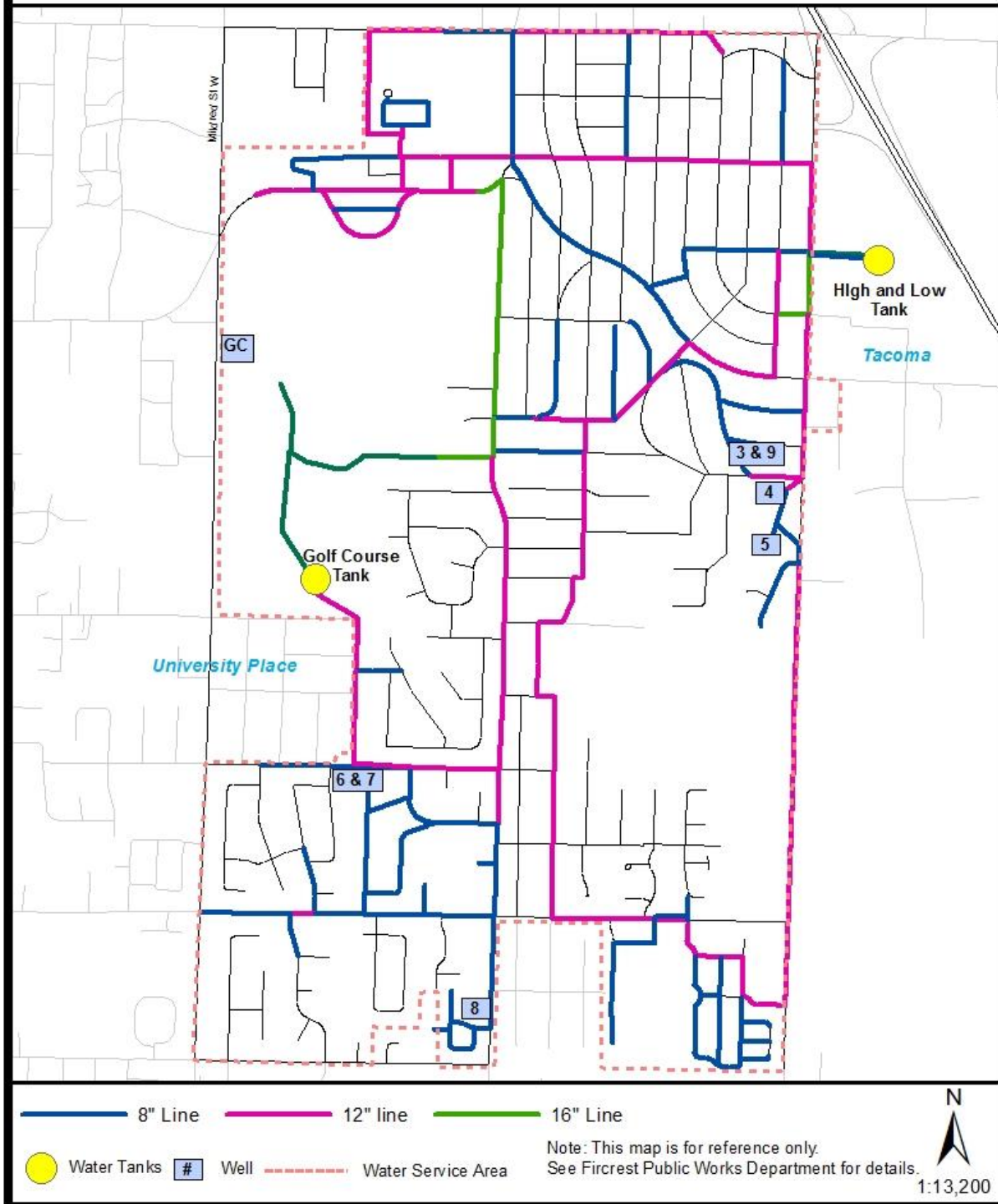
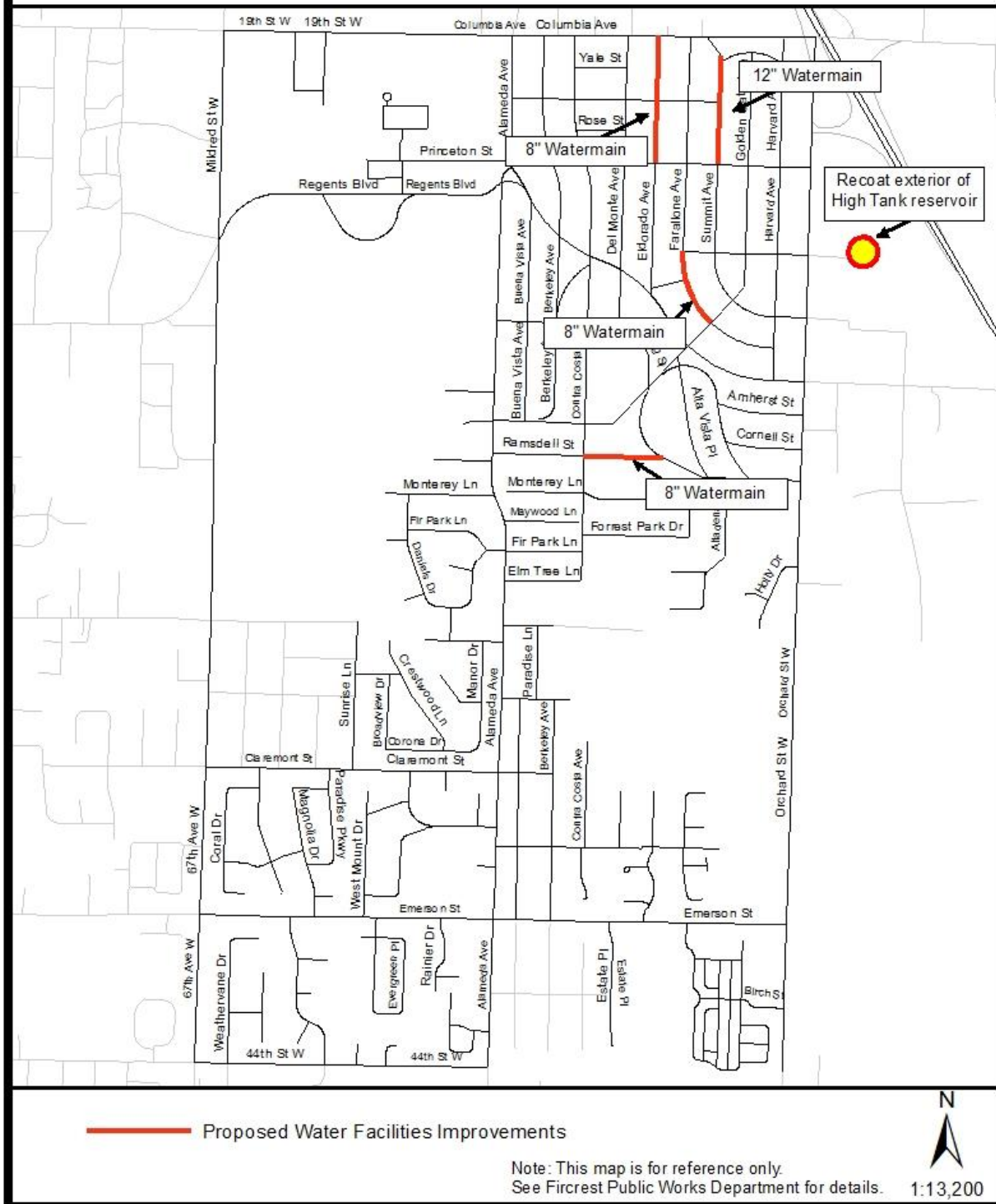


Figure U-2
Water Facilities Improvements



A water system consists of a transmission supply and distribution system made up of various sized mains (transmission and distribution), reservoirs, standpipes, wells, and pump stations. **Figure U-2** identifies Tacoma Water facilities inside the City of Fircrest. Tacoma Water supplies water to Fircrest's PAA, some properties located in the northwestern corner of the city, and a small area in the southeastern corner of the City.

The City of Tacoma Capital Facilities Plan (CFP) establishes a level of service of 442 gallons per day per equivalent residential unit (ERU) and/or as contained in Tacoma Water's current Washington State Department of Health approved water system plan. 442 gallons per day per ERU represents a 4-day peak period demand, with a peak factor of 2.01 times the actual average daily residential water consumption of 220 gpd per ERU. Based on Tacoma Water current demand forecast, Tacoma Water has excess supplies when taking into account peak day requirements looking out to year 2060.

Tacoma Water will complete construction and initiate operations of a new Green River filtration facility in 2015. Filtration of the supply will meet regulatory requirements and provide enhanced reliability for the supply.

SERVICE LEVELS AND CURRENT DEMAND AND ADEQUACY

As with all other aspects of water supply, service levels and standards applicable in Fircrest and the PAA are determined by federal, state, regional, and county regulations. Fircrest's *Comprehensive Water System Plan Update* plan is being implemented in conformance with all applicable regulations.

Supply

Fircrest consumption levels conform to the assumptions used for county-wide long-term planning in Pierce County's *Coordinated Water System Plan (CWSP)*. The CWSP assumes consumption for Fircrest as 180 gallons per capita per day. Fircrest's average consumption is currently 172 gallons per day per equivalent residential unit (ERU), which is the amount consumed by a household in a single-family dwelling unit.

Storage

The available storage for the Fircrest water system is 1.8 million gallons. Based on the hydraulic analysis and the "Source and Storage" analysis in the Fircrest Comprehensive Water System Plan, the Fircrest water system has sufficient storage for the planning period.

Fire Flows

In Fircrest, the standard for fire flow in residential areas has been set at 1,000 gallons per minute and in commercial areas, 2000 gallons per minute. The engineering analysis of areas requiring improved fire flows is contained in Fircrest's *Comprehensive Water System Plan*. Projects to improve fire flows are listed in this plan.

FUTURE DEMAND AND ADEQUACY

Demand and Adequacy in Fircrest's Service Area

Details concerning future demand and facility adequacy in Fircrest's service area are available in the *Comprehensive Water System Plan*. **Table U-1** summarizes the adequacy of Fircrest's facilities to meet future demand.

**Table U-1
Demand and Adequacy**

Demand Factor	Future Adequacy
Supply	Fircrest has sufficient water rights and well and reservoir capacity to supply up to 3,959 ERUs (approximately 9,461 population). This capacity is well above the Fircrest build-out population, which is projected to be 6,950.
Storage	Adequate based on current consumption levels.
Transmission & distribution	Adequate for fire flows in most areas; older main replacement may be made to provide better flow.
Telemetry	Adequate and in good working order.
Service metering	Adequate; installation of individual service meters at all services was completed in 2001.

Demand and Adequacy in the PAA

Current residential demand, based on 14 existing residences in the PAA and 180 gallons per day, is 0.0025 million gallons per day (mgd). Future demand, based on a build-out of approximately 15 residences, is approximately the same. Tacoma's supply and distribution system has ample capacity to meet all current and projected domestic and fire protection requirements.

WATER FACILITY ISSUES

Fircrest faces issues concerning transmission and distribution piping, consumption levels, and potential contamination of Fircrest's water supply. A summary of each of these issues is provided in the *Comprehensive Water System Plan*. In the event the Fircrest water system is not capable of meeting system demands due to an emergency or unforeseen circumstances an intertie with the City of Tacoma water system will supply the needed water. This intertie was completed in 1994 and is located on the east side of Orchard Street across from Stanford Street.

WATER FACILITY PROJECTS

The capital improvements program in the 2014 *Comprehensive Water System Plan* identifies the improvements needed for the current planning period. Figure U-2 shows the proposed water system for Fircrest and includes new or updated facilities as well as existing facilities. Project schedules, costs, and financing are summarized in the Capital Facilities Element.

Sanitary Sewer

Fircrest and its PAA are part of the Chambers Creek-Clover Creek Drainage Basin, which is an aquifer recharge area providing ground water for public use. As Pierce County has developed, ensuring wastewater treatment capacity sufficient to handle increasing wastewater volumes and to protect ground water quality has increasingly become a focus of sanitary sewer facilities planning. Septic systems, which dispose of wastewater through percolation into the aquifer, are a known source of ground water pollution. Hence, Fircrest and Pierce County share the long-term goal of eventually connecting all development in the Chambers Creek-Clover Creek Drainage Basin to a sewer system. The sewer system replaces septic tanks and drain fields with wastewater collection and conveyance facilities and percolation of untreated effluent with wastewater treatment and biosolid disposal.

In August 2000, Fircrest hired a consultant to develop a Comprehensive Sewer System Plan. This plan was approved by the City and the Washington State Department of Ecology in 2002.

SUMMARY OF SERVICES AND FACILITIES

Fircrest and portions of the PAA are provided with wastewater collection services by the City of Fircrest Public Works Department. The portions of the PAA that are not served by Fircrest contain single family dwellings served by private septic systems. Refer to **Figure U-3** for service area boundaries. The majority of Fircrest's service area is on the sewer system, with the primary exceptions being a portion of the West End Addition that was annexed in 1997 and the PAA, where a number of residences use septic systems.

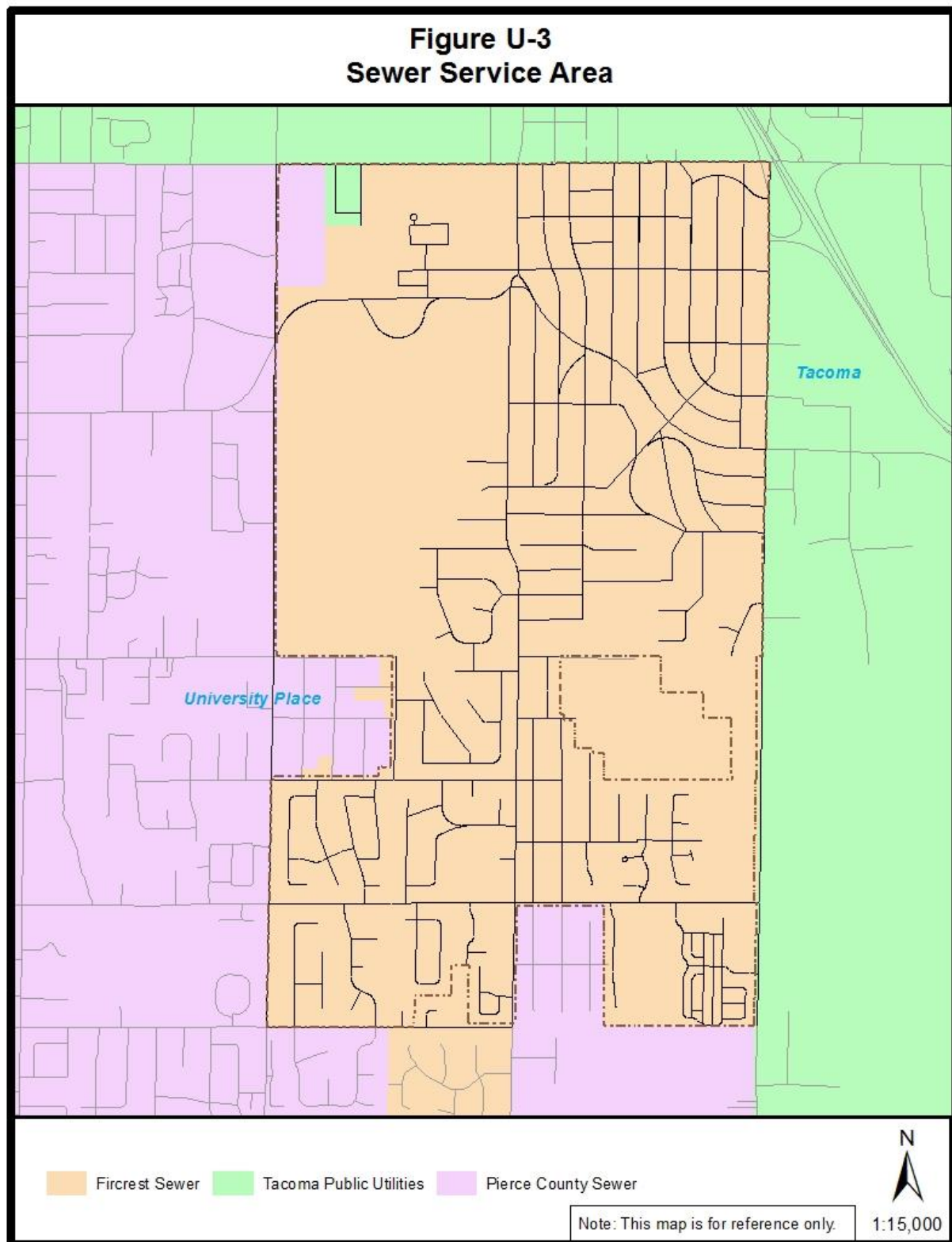
The primary components of Fircrest's sanitary sewer system are 32 miles of sewer main and six lift stations. The lift stations pump wastewater against gravity to overcome elevation gains on the route to a Tacoma Public Utilities treatment plant. Wastewater is conveyed to a Tacoma treatment plant outside of Fircrest and its PAA.

Part of the development of the Comprehensive Sewer System Plan included in-line video inspections of the pipes and manholes, which occurred in 2013. Updated and prioritized repair and replacement projects were identified and will be completed by 2016.

SERVICE AGREEMENTS

Fircrest has agreements with other service providers concerning service area boundaries and wastewater treatment. An ongoing agreement with the City of University Place delineates service area boundaries. Under this agreement, Fircrest provides service to specific areas outside of its corporate boundaries.

Wastewater treatment is provided through the *Tacoma-Fircrest Sewer Agreement*, which began in 1979 and was updated in 2014. This agreement provides for treatment of all wastewater from Fircrest at the Tacoma Central Wastewater Treatment Plant.



ALTERNATIVE SERVICE

The Pierce County Sewer Division Unified Sewer Plan was adopted in 2001 and updated in 2010 with final state Department of Ecology approval in 2012. The plan identifies future service needs for the County and makes provision for expansions to meet those needs, including expansion of the Chambers Creek Wastewater Plant (WWTP) to 43-45 MGD (million gallons per day) capacity in the first phase of a five phase major expansion to be completed in December 2016.

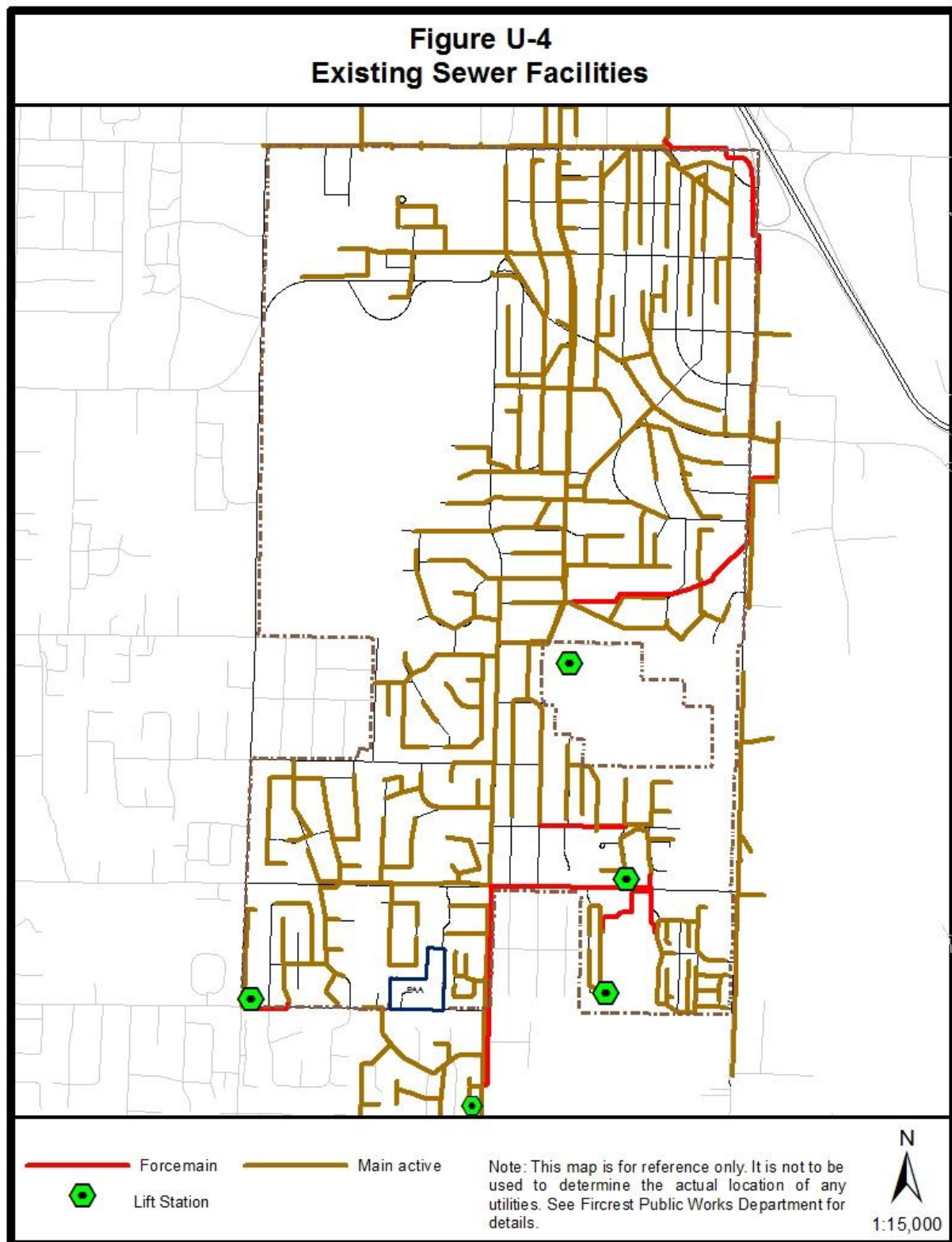
The Unified Sewer Plan identifies one project, the Upper Leach Creek Interceptor, which is on schedule to be completed by 2020. This improvement will enable new service to be provided to areas of eastern University Place not served and could also serve the City of Fircrest in the event its flows were to be transferred to Pierce County. This system component would be generally gravity fed, designed to direct flows downhill to the WWTP. Current treatment capacity is rated at 28.7 MGD and the WWTP operates at an average capacity of 18.0 - 20.0 MGD. Expansion is expected to continue to meet demand, accommodate anticipated growth (including possible flows from Fircrest), and meet increasingly stringent water quality standards over the next 25 years. Total build out is expected to be 60 MGD as outlined in the Unified Sewer Plan.

FACILITIES INVENTORY

Table U-2 summarizes Fircrest's major sewer facilities. **Figure U-4** shows locations of major facilities. Detailed maps showing all sewer lines are available in Fircrest Public Works.

Table U-2
Major Sewer Facilities

Facility Name and Location	Capacity and Condition
Sewer mains: located primarily in road and alley rights-of-way; some are located on private property.	Fircrest's service area has approximately 32 miles of sewer mains ranging in diameter from 4 to 24 inches. The majority of the pipe is 8-inch. Fircrest also uses a 14-inch force main that conveys large amounts of wastewater across extensive geographic areas on the route to a treatment plant. Some sewer mains are force mains through which lift stations pump wastewater to adjacent gravity systems. Lengths of force mains depend on the elevation rise. Sewer main conditions range from failure to excellent depending on the age of the pipe, the quality of the installation, and the quality of ongoing maintenance.
Lift stations (6): <ul style="list-style-type: none"> Contra Costa Av. & Elm Tree Lane Drake & Farallone Alameda & 46th St. 67th Av. & 44th St. Estate Place Princeton Place 	Pump 1: 1,850 gallons per minute (gpm) maximum Pump 2: 1,800 gpm max. Combined capacity: 2,550 100 gpm normal, 234 gpm max. 100 gpm normal, 200 gpm max. 100 gpm normal, 200 gpm max. 172 gpm constant output 150 gpm, two pumps alternating All lift stations are in fair to good condition.
Manholes	Manholes are typically located approximately every 300 feet along sewer mains. Fircrest has approximately 600 manholes, which vary from good to poor.



SERVICE LEVELS AND STANDARDS

Table U-3 summarizes the service levels and standards applicable in Fircrest and the PAA.

Table U-3
Service Levels and Standards

Service Parameter	Service Level
Capacity	220 gallons per day (gpd) per single family dwelling, which is referred to as a <i>residential equivalent</i> (one RE); service levels for multifamily dwellings, commercial and industrial businesses, public service organizations, etc. are expressed in numbers of REs; for example, multifamily units are expected to produce .83 RE or 183 gpd.
Average daily and peak flows	Average daily flow in 2014: 482,000 gpd Peak flow in 2014: 790,000 gpd
Wastewater quality	Sewage quality must conform to County Sanitary Sewer Utility Administrative Code and county Pretreatment Code requirements.
Design and construction of facilities	Construction of new facilities and rehabilitation of old facilities must conform to the standards of the wastewater treatment service provider.

DEMAND AND ADEQUACY

This section discusses current and future demand for sanitary sewer services and adequacy of facilities to meet demand.

Current demand from Fircrest's service area was studied by a consulting firm under the supervision of the Fircrest Public Works Department. The system is capable of handling current demand and future projected growth demand.

Future demand is based on assumptions of successful reduction of infiltration and inflow and of decreased residential water consumption. Therefore, a standard effluent rate of 220 gallons/RE has been used for computing future demand.

Table U-4 summarizes future residential demand in Fircrest and its PAA. The table includes all residences in the PAA, as all will eventually be required to connect to a sewer system when septic systems fail and extensions of sewer lines are made.

**Table U-4
Projected Residential Demand in 2035**

Area	Single Family (millions of gallons/day [mgd])	Duplex, Multifamily and ADUs (mgd)	Total (mgd)
Projected residential demand in Fircrest's current corporate boundaries	0.554 (2,520 units)	0.162 (884 units)	0.716 (3,404 units)
Projected residential demand in PAA	0.003 (15 units)	.	0.003 (15 units)
Total projected residential demand	0.558 (2,535 units)	0.162 (884 units)	0.720 (3,419 units)

Stormwater Management

Surface water and stormwater in Fircrest and its PAA originate with precipitation falling in and north, west, and east of Fircrest. Fircrest is located in the approximate center of this drainage area, which is known as the Leach Creek drainage subbasin. The Leach Creek subbasin has a total of 7.18 square miles and is a portion of the larger Chambers Bay drainage basin. This drainage basin is located in the Chambers - Clover Creek Watershed Resource Inventory Area 12 (WRIA 12). A small portion of Fircrest falls within the Tacoma West drainage basin. **Figure U-5** illustrates those portions of the Chambers Bay and Tacoma West drainage basins located in close proximity to Fircrest.

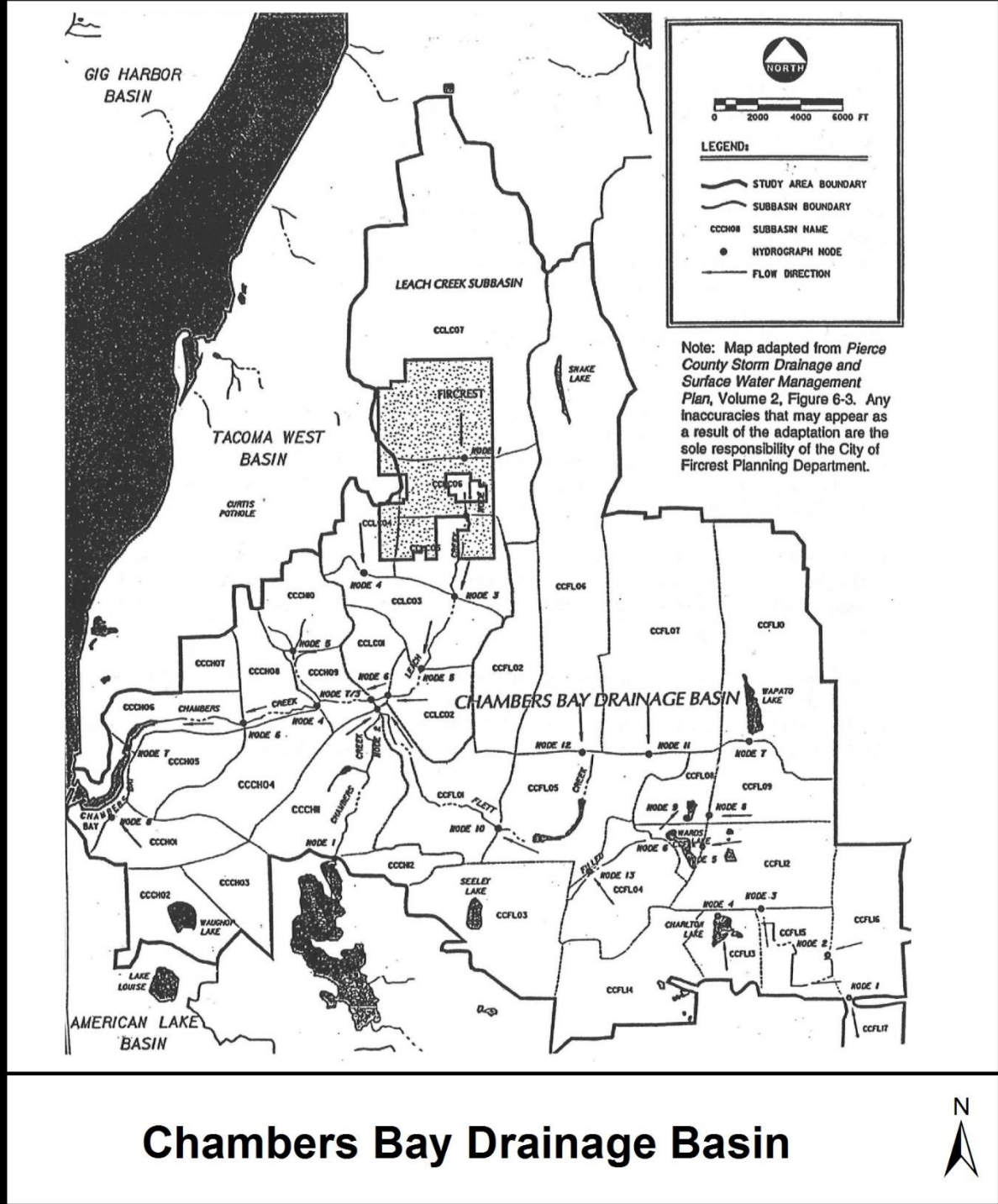
Stormwater within the Leach Creek subbasin, along with stormwater from the entire Chambers Bay basin, eventually reaches Puget Sound via Chambers Bay. The following section provides a general overview of flows in the Leach Creek subbasin.

SUMMARY OF SERVICES AND FACILITIES

Stormwater flows over the surface into dry wells, swales, ponds, and basins where some of it percolates through the soil into ground water. The remainder is conveyed to detention facilities via ditches and subsurface storm drainage pipes. Much of the stormwater originating in the northern portion of the Leach Creek subbasin is collected in the Leach Creek holding basin, which provides sediment removal, infiltration to ground water, peak discharge control, and outflow to Leach Creek. Subsurface water at Fircrest Park, the former site of Spring Lake, also is intercepted and piped to the holding basin.

In the southern portion of Fircrest, a pond within the Thelma Gilmur Park is a collection point for some stormwater. Like the holding basin, this pond provides sediment removal and infiltration. Overflow from Thelma Gilmur Park is conveyed ultimately to Leach Creek. Leach Creek flows into Chambers Creek, which flows into Puget Sound via Chambers Bay.

**Figure U-5
Drainage Basin**



A small amount of stormwater within the western boundary of Fircrest sheds west toward Puget Sound rather than east; this area is part of the Tacoma West drainage basin. The small number of facilities in that area conveys stormwater away from Fircrest and Leach Creek. Stormwater in the Tacoma West drainage basin does not have a significant impact on Fircrest stormwater facilities.

Because stormwater originating in the City of Tacoma, City of University Place and unincorporated Pierce County flows through Fircrest, how stormwater is managed in those jurisdictions directly impacts the stormwater present in Fircrest. Likewise, Fircrest's stormwater management practices affect the water present in Leach and Chambers Creeks.

Fircrest has adopted the *latest version of Department of Ecology (DOE) Stormwater Management Manual for Western Washington* which addresses the standards, procedures, and development practices needed to implement good stormwater management.

FACILITIES INVENTORY

Stormwater facilities in Fircrest and its PAA are owned by the City of Fircrest and the City of Tacoma and are planned, installed, maintained, and operated under the supervision of the respective Public Works Departments. Each jurisdiction assesses properties for stormwater management within its own boundaries. The *DOE Stormwater Management Manual for Western Washington* includes the procedures necessary to facilitate consistency in interlocal planning and implementation of stormwater facilities projects.

Note: In addition to publicly-owned stormwater facilities, there are some privately-owned stormwater facilities. Privately-owned stormwater facilities are not discussed in this document.

Table U-6 lists major stormwater facilities and their owners and capacities. Locations are shown in **Figure U-6**. Jurisdiction-specific maps showing the locations of all facilities listed below are available in the City of Fircrest Public Works Department.

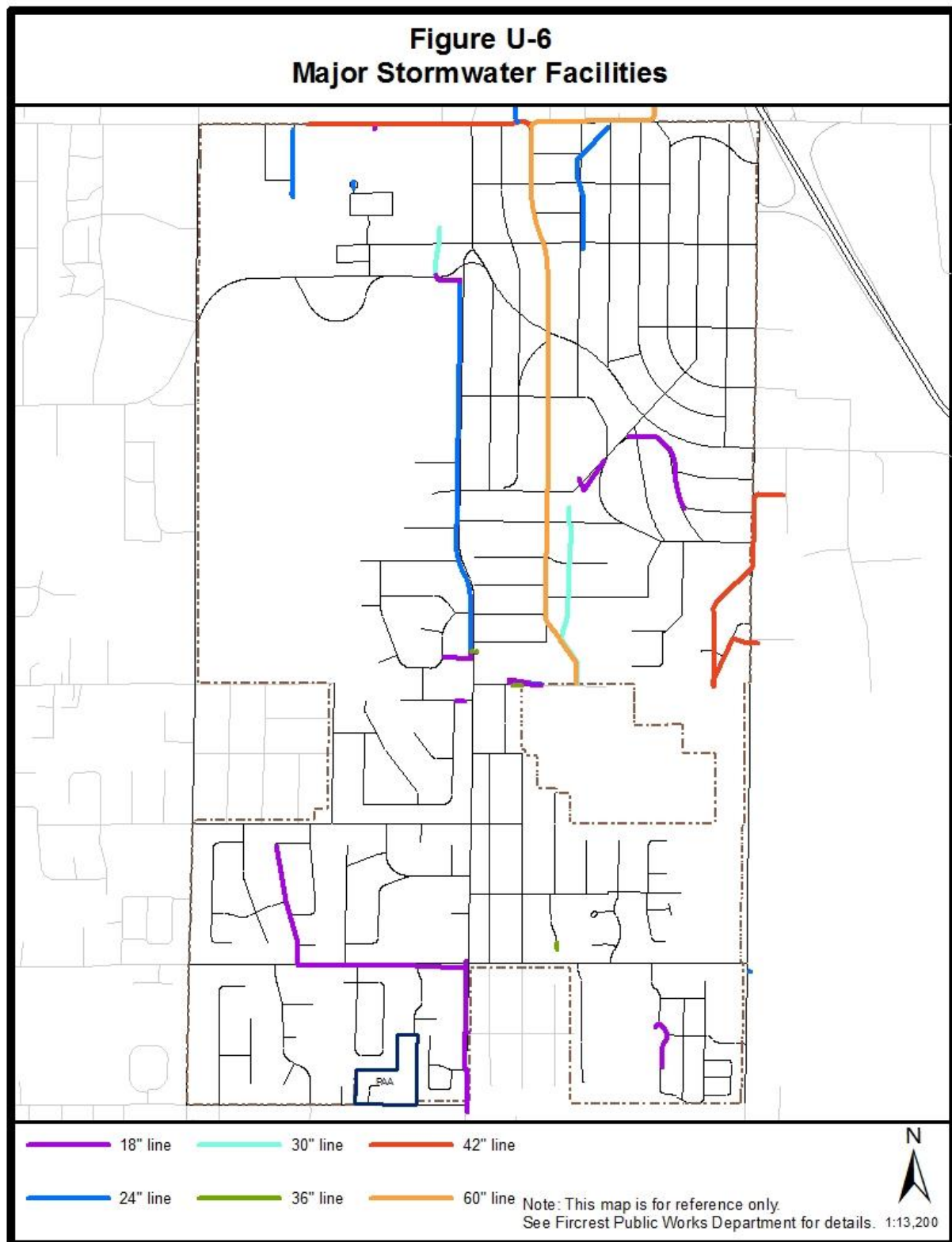
Table U-6

Facility Name(Owner)	Location, Capacity, and Condition
Leach Creek holding basin and pump (Tacoma Public Works)	Located near Fircrest's eastern boundary between 35th Street West and 37th Street West Drainage area: 2,450 acres Storage capacity: 82 acre-feet Pumping capacity: 96 cubic feet per second When stormwater flows discharged from the holding basin exceed a preset level, the pump redirects some of the stormwater to the Thea Foss Waterway in Commencement Bay.
Conveyance system facilities (Tacoma Public Works)	Design event: 10-year, 24-hour storm
Trunk lines (Tacoma Public Works)	Design event: 25-year, 24-hour storm
Detention pond (Fircrest Public Works)	Thelma Gilmur Park contains a natural detention pond south of Emerson St. between Woodside and Evergreen Drives. Capacity data is not available.
Conveyance system facilities and trunk lines (Fircrest Public Works)	Design events: Existing stormwater facilities in Fircrest have been designed in accord with the <i>Standard Plans for Road, Bridge, and Municipal Construction</i> by the Washington State Department of Transportation and the American Public Works Association.

SERVICE LEVELS AND STANDARDS

The primary controls for stormwater quality in Fircrest have been administrative. Administrative techniques are still in use. For example, development projects are controlled through site plan review, conditioned permits, and on-site inspection. Controls also include Public Works maintenance techniques such as street sweeping and cleaning of sedimentation out of catch basins. Operational solutions such as installation of oil/water separators are also employed. Fircrest publishes educational articles in the City's newsletter that encourage the reduction of non-point pollution sources from households and businesses.

Standards, specifications, and best management practices to prevent, control, and treat pollution in stormwater in new development and redevelopment in Fircrest must conform to those defined in the latest version of the *DOE Stormwater Management Manual for Western Washington*.



Fircrest will need to comply with Phase II Western Washington Municipal Stormwater Permit requirements in accordance with the EPA's National Pollutant Discharge Elimination System (NPDES). The City will need to incorporate best management practices during periodic refinement of storm water regulations to address stormwater quality and quantity, erosion prevention, and minimizing downstream impacts of runoff in a manner consistent with NPDES Phase II requirements.

STORMWATER MANAGEMENT ISSUES AND PROJECTS

The City of Fircrest has been developing a Stormwater Management Program since 2007. The first Stormwater Management Program was adopted in 2009 and an update of the program was completed in April, 2015. The purpose of the program is to reduce the discharge of pollutants to the "maximum extent practicable", protect water quality and satisfy the appropriate requirements of the Clean Water Act. This program is operated by the City and regulates its surface and storm water facilities. The program includes five permit specific elements:

- Public Education and Outreach;
- Public Involvement and Participation;
- Illicit Discharge Detection and Elimination;
- Controlling Runoff from New Development, Redevelopment and Construction Sites; and
- Pollution Prevention, and Operations and Maintenance for Municipal Operations.

Planned improvements that are consistent with this program are identified in the Capital Facilities Element. These improvements are intended primarily to provide for treatment of existing stormwater facilities.

Electric

Tacoma Power, a division of Tacoma Public Utilities, is the electrical provider to Fircrest and its PAA. The utility is governed by a five member utility board appointed by the Tacoma City Council. Tacoma Power has a 180 square mile service area that includes the cities of Tacoma, Ruston, University Place, Fife, and Fircrest, part of Lakewood, as well as portions of unincorporated Pierce County including Graham, Spanaway, Parkland, Joint Base Lewis McChord, Midland, Summit, Frederickson, Waller, South Hill Puyallup, and Elk Plan

SUMMARY OF SERVICES AND FACILITIES

Tacoma Power operates both transmission and distribution facilities. Tacoma Power has one transmission line that runs through Fircrest. Six distribution substations, each located outside of Fircrest, supply customer load for the city, and the total nameplate capacity is 150 Megavolt Amperes (MVA). Several feeders from these substations ring the area along major arterials. Through these feeders, the substations back one another up in case of substation outage. Of the 3082 customers served by Tacoma Power in Fircrest and its PAA, approximately 92.7 percent are residential and 7.3 percent are commercial and other non-residential.

Tacoma Power utilizes forecasts produced by the Puget Sound Regional Council (PSRC) and local municipalities to project future load growth. Tacoma Power uses this information in conjunction with its system planning criteria to prepare a six-year facilities plan. The six-year plan helps Tacoma Power identify those strategic projects that will ensure a safe, reliable, and operable system. Tacoma Power's current level of service is to maintain the standard voltage level within + or - 5% of nominal voltage. All distribution service shall be provided within the acceptable range established by current industry standards.

Pursuant to its six-year plan, Tacoma Power does not anticipate development of new substations or major line replacements within Fircrest. The addition of a large commercial or industrial load in the area may require development of additional new facilities.

Figure U-7 depicts the general location of electrical system facilities in Fircrest and adjoining areas.

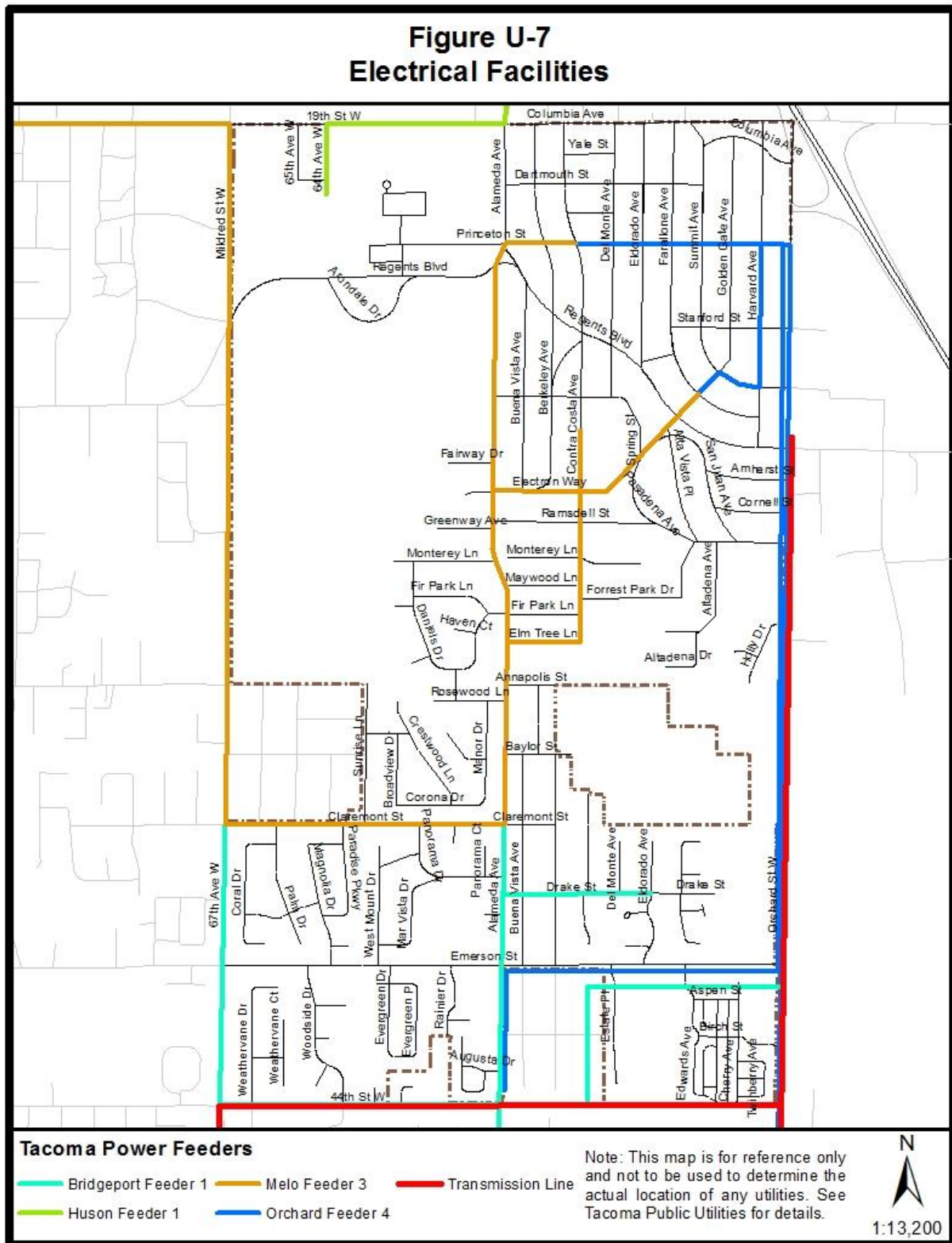
Natural Gas

COMPANY OVERVIEW

Natural gas is provided in Fircrest by Puget Sound Energy (PSE), an investor-owned utility. PSE is a private utility providing natural gas and electric service to homes and businesses in Puget Sound region of Western Washington and portions of Eastern Washington, covering 10 counties and approximately 6,000 square miles. PSE's regional and local natural gas and electric planning efforts are integrated and centered on providing safe, dependable, and efficient energy service. PSE provides natural gas to more than 770,000 customers, throughout six counties, covering approximately 2,900 square-mile area. As of March 2015, PSE provides natural gas service to approximately 1,893 customers within the City of Fircrest.

REGULATORY ENVIRONMENT

PSE's operations and rates are governed by the Washington Utilities and Transportation Commission (WUTC). PSE natural gas utility operations and standards are further regulated by the U.S. Department of Transportation (DOT), including the Pipeline and Hazardous Materials Administration (PHMSA). PHMSA's Pipeline Safety Enforcement Program is designed to monitor and enforce compliance with pipeline safety regulations. This includes confirmation that operators are meeting expectations for safe, reliable, and environmentally sound operation of PSE's pipeline infrastructure. PHMSA and the WUTC update pipeline standards and regulations on an ongoing basis to assure the utmost compliance with standards to ensure public safety. The businesses and residents within the City of Fircrest rely on the coordinated effort between PSE and the City for the adoption and enforcement of ordinances and/or codes to support on the safe, reliable, and environmentally sound construction, operation and maintenance of PSE's natural gas facilities.



INTEGRATED RESOURCE PLAN

In order for PSE to meet its regulatory requirements, it updates and files an Integrated Resource Plan (IRP) with the WUTC every two years. The IRP identifies methods to provide dependable and cost effective natural gas service that address the needs of retail natural gas customers. Natural gas sales resource need is driven by design peak day demand. The current design standard ensures that supply is planned to meet firm loads on a 13-degree design peak day, which corresponds to a 52 Heating Degree Day (HDD). Currently, PSE's supply/capacity is approximately 970 MDth/Day at peak. This figure will be updated in the fall of 2015. The IRP suggests the use of liquefied natural gas (LNG) for peak day supply and to support the needs of emerging local maritime traffic and truck transport transportation markets.

NATURAL GAS SUPPLY

PSE controls its gas-supply costs by acquiring gas, under contract, from a variety of gas producers and suppliers across the western United States and Canada. PSE purchases 100 percent of its natural-gas supplies needed to serve its customers. About half the natural gas is obtained from producers and marketers in British Columbia and Alberta, and the rest comes from Rocky Mountain States. All the gas PSE acquires is transported into PSE's service area through large interstate pipelines owned and operated by Williams Northwest Pipeline. PSE buys and stores significant amounts of natural gas during the summer months, when wholesale gas prices and customer demand are low, and stores it in large underground facilities and withdraws it in winter when customer usage is highest; ensuring a reliable supply of gas is available.

SYSTEM OVERVIEW

To provide the City of Fircrest and adjacent communities with natural gas, PSE builds, operates, and maintains an extensive system consisting of transmission and distribution natural gas mains, odorizing stations, pressure regulation stations, heaters, corrosion protection systems, above ground appurtenances, and metering systems. When PSE takes possession of the gas from its supplier, it is distributed to customers through more than 21,000 miles of PSE-owned natural gas mains and service lines.

PSE receives natural gas transported by Williams Northwest Pipeline's 36" and 30" high pressure transmission mains at pressures ranging from 500 PSIG to 960 PSIG. The custody change and measurement of the natural gas occurs at locations known as Gate Stations. PSE currently has 39 such locations throughout its service territory. This is also typically where the gas is injected with the odorant mercaptan. Since natural gas is naturally odorless, this odorant is used so that leaks can be detected. The Gate Station is not only a place of custody transfer and measurement but is also a common location of pressure reduction through the use of "pressure regulators". Due to state requirements, the pressure is most commonly reduced to levels at or below 250 PSIG. This reduced pressure gas continues throughout PSE's high pressure supply system in steel mains ranging in diameter of 2" to 20" until it reaches various other pressure reducing locations. PSE currently has 755 pressure regulating stations throughout its service territory. These locations consist of Limiting Stations, Heaters, District Regulators, and/or high pressure Meter Set Assemblies.

The most common of these is the intermediate pressure District Regulator. It is at these locations that pressures are reduced to the most common levels ranging from 25 PSIG to 60 PSIG. This reduced pressure gas continues throughout PSE's intermediate pressure distribution system in mains of various materials consisting of polyethylene and wrapped steel that range in diameters from 1-1/4" to 8" (and in a few cases, larger pipe). The gas flows through the intermediate pressure system until it reaches either a low pressure District Regulator or a customer's Meter Set Assembly.

To safeguard against excessive pressures throughout the supply and distribution systems due to regulator failure, over-pressure protection is installed. This over-pressure protection will release gas to the atmosphere, enact secondary regulation, or completely shut off the supply of gas. To safeguard steel main against corrosion, PSE builds, operates, and maintains corrosion control mitigation systems to prevent damaged pipe as a result of corrosion.

FUTURE PROJECTS

To meet the regional and City of Fircrest's natural gas demand, PSE's delivery system is modified every year to address new or existing customer growth, load changes that require system reinforcement, rights-of-way improvements, and pipeline integrity issues. The system responds differently year to year and PSE is constantly adding or modifying infrastructure to meet gas volume and pressures demands. Ongoing system integrity work includes:

- The replacement of DuPont manufactured polyethylene main and service piping and certain/qualified steel wrapped intermediate pressure main and service piping. There will be ongoing pipe investigations throughout the city to determine the exact location of any DuPont pipe and qualified steel wrapped pipe to be replaced.
- Investigations throughout the City to determine the location of where gas lines have been cross bored through sewer lines and make subsequent repairs.

Telecommunications

Telecommunications services in Fircrest consist of land-based telephone service, cellular telephone service, and cable television service furnished by private providers. The following subsections summarize the information provided to Fircrest by each of the private service providers.

LAND-BASED TELEPHONE SERVICE

CenturyLink, a private for-profit corporation, is certified by the Washington Utilities and Transportation Commission (WUTC) to provide local telephone and other related special services (alarm circuits and data transmittal) throughout Fircrest. The WUTC regulates the provision of telecommunication services, including those provided by local exchange carriers such as CenturyLink. Telephone utilities are considered an essential utility by the WUTC; therefore, CenturyLink has an obligation to serve the public

requirements for communication utilities. CenturyLink is also subject to various federal laws and regulations administered by the Federal Communications Commission (FCC).

Local jurisdictions in Washington fall within a particular Local Access and Transportation Area (LATA). A LATA is a telephone exchange area that services to define the area within which Century Link is permitted to transport telecommunications traffic. Century Link is permitted to carry telephone calls only within LATA boundaries. Calls outside of the LATA require long distance carriers, which Fircrest residents may select for this service.

Hundreds of Central Offices (COs) serve Century Link customers in Washington. A CO is a telecommunications common carrier facility where calls are switched. For local exchange or intra-LATA calls the central office switches calls within and between line exchange groupings.

The transmission facilities that serve Fircrest originate with the Logan Central Office located at 2823 Bridgeport Way, from which main cable routes extend generally north, south, east, and west to serve Fircrest and the surrounding area. From each main cable route are branch feeder routes. Branch feeder routes may be aerial or buried, copper or fiber. Extending from the branch feeder routes are the local loops that provide dial tone to every telephone subscriber. Century Link construction planning is driven by the needs of its customers. As communities grow, facilities are upgraded to ensure adequate service levels. RCW 80.36.090 requires Century Link to provide adequate telecommunications services on demand. To comply with RCW 80.36.090, Century Link regularly evaluates the capacity of its facilities. Century Link's goal is to maintain its routes at 85 percent capacity. When usage exceeds 85 percent, additional facilities are planned, budgeted and installed. Moreover, facilities are upgraded as technology makes additional services available. Capacity is available to serve the area.

CELLULAR SERVICE

There are seven cellular providers licensed by the FCC to serve in the Puget Sound area. With the passage of the Federal Telecommunications Act of 1996, service area competition has increased. Prior to the Act's passage, only two cellular providers would be licensed by the FCC to service a particular area. With the Act's passage, the number of carriers competing in a particular market may conceivably include all seven. In the future, the FCC may also expand the frequency range available to wireless providers, potentially resulting in new providers entering the market.

Where feasible, cellular companies site facilities on existing structures, poles, and buildings. This is where antennas can be mounted on rooftops and electronic equipment located within the building itself. Topography and other engineering constraints influence specific site selection because of the need to "hand off" the signal so that it can be picked up by another facility. The City has adopted telecommunications regulations to address the siting of cellular and other telecommunications facilities inside of the City limits.

There are two cellular transmission facilities in Fircrest. The facilities are located on the City's water tank within the Fircrest Golf Club and the Fircrest water tower located east of the City's Orchard Street boundary across from Stanford Street.

CABLE TELEVISION SERVICE

Click!, a division of Tacoma Public Utilities, and Comcast provide cable service to the City of Fircrest under separate franchise agreements. Fircrest is a member of Rainier Communications Commission, which was created through an inter-local agreement with Pierce County and other cities and towns in the County, in order to establish inter-jurisdictional cooperation on regulation and oversight activities and to build expertise in negotiating with cable companies.

Cable service is delivered to customers through a complex series of electrical components and many miles of cable. Located at the origin of a cable system is the *receive site* where towers with antennae and earth station receivers are located to pick up off-air and satellite signals. From the receive site, signals are sent to the *headend* to be processed for entry onto the *trunk line*, which is the main artery of the cable system. From the trunk, the signals are branched off onto *feeder lines*, which carry the signals through neighborhoods past individual residences. The signals are branched off again from the feeder onto *drop cable* that allows the signal to flow to the subscriber's television set or computer cable modem.

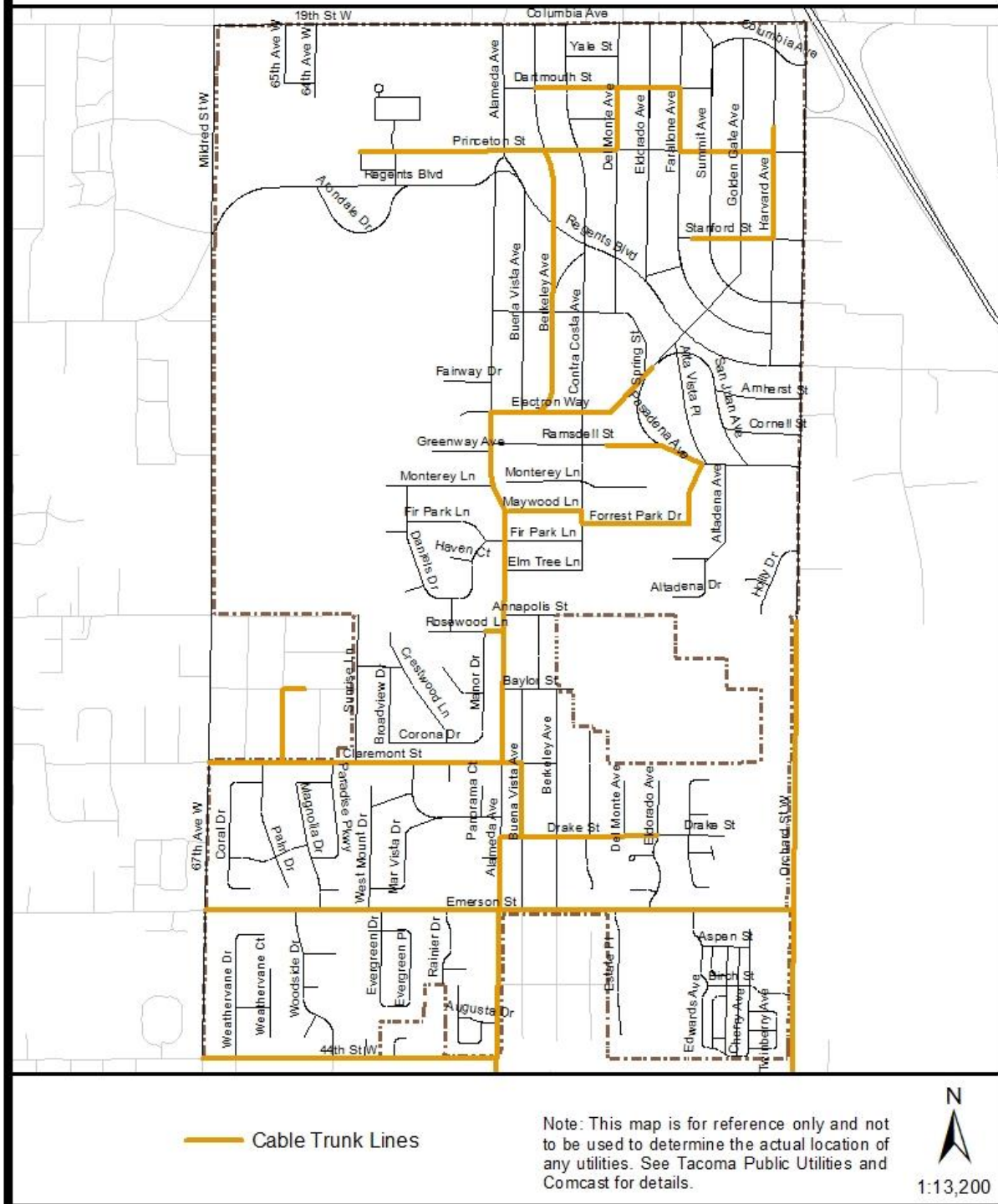
The Comcast headend serving Fircrest is located at S. 56th St. and Orchard St. The trunk line runs north along Orchard St. from the headend. At Emerson Street St. it branches west and follows Emerson west through Fircrest. Figure U-8 shows Comcast trunk line routes in Fircrest. Feeder lines branch off from this trunk line to reach every street in Fircrest. Feeder lines are generally co-located with electric lines. Detailed maps indicating the locations of all facilities in Fircrest are available in the Fircrest Public Works Department.

Click! offers cable television packages for residential and commercial locations in Fircrest. Two internet service providers (ISPs) operate on its network: Advanced Stream and Rainier Connect. These ISPs offer a variety of high speed internet and phone packages to residential and commercial locations.

Commercial customers in Fircrest have access to custom network solutions through Click's Authorized Service Partners: Integra, Rainier Connect, Optic Fusion and Spectrum Networks. These Authorized Service Partners offer voice and data services, internet, co-location, and local and long distance phone services. Services can be delivered over SONET Based Line Services or Metro Ethernet Services.

Comcast and Click! make every attempt to provide service to all residents within their franchise areas. Factors considered in extending service include the overall technical integrity, economic feasibility, and franchise agreements. Both Comcast and Click! can serve future growth in Fircrest.

**Figure U-8
Cable Facilities**



Solid Waste

State law requires counties, in coordination with their cities, to adopt comprehensive solid waste plans for the management, handling, and disposal of solid waste for twenty years and to update them every five years. Cities may choose to be joint participants in the plan, delegate planning to the county, or do their own plan. In Pierce County, waste management and recycling activities for all jurisdictions are coordinated under the umbrella of the Tacoma-Pierce County Solid Waste Plan.

There are three separate collection and disposal systems in the County: 1) The County's system includes the unincorporated areas of the county and 19 cities and towns using the County's disposal system; 2) Tacoma, as a joint participant in the plan, has its own collection utility and disposal system and the Town of Ruston operates its own collection utility, but has an inter-local agreement with Tacoma for disposal and an inter-local agreement with the County adopting the Solid Waste Plan; and, 3) Joint Base Lewis McChord use the Fort's disposal system but coordinate with the County on public outreach and educational programs about waste reduction and recycling.

An update of the Solid Waste Plan was adopted in 2008 and the City signed an interlocal agreement with Pierce County pursuant to the plan. Under this agreement, the County has responsibility for overall planning, disposal and waste reduction and recycling education. Cities are responsible for collection and the development of any recycling program specific to their jurisdiction.

Waste is collected in Fircrest by Westside Disposal, a subsidiary of University Place Refuse. Collected waste is handled through the Pierce County disposal system. Westside Disposal has a franchise with the City that runs through 2022. The company offers residents solid waste, recycling, and yard waste collection programs coordinated with the unincorporated areas and 18 other cities and towns. Further, the company coordinates with the City to provide citywide clean-up programs in the spring and fall of each year plus special yard waste pick-up programs each spring and fall. The County provides public outreach and school education programs about waste management, waste reduction, and recycling for all residents of 19 cities and unincorporated areas.

Cities are responsible for collection and the development of any recycling program specific to their jurisdiction.