CITY OF AUBURN WASHINGTON	**Planning Commission Meeting** **July 2, 2024 - 6:30 PM** **City Hall Council Chambers** **AGENDA**

I. PUBLIC PARTICIPATION

A. Public Participation Information

The City of Auburn Planning Commission Meeting scheduled for Tuesday, July 2, 2024 at 6:30 p.m., will be held in-person and virtually. To attend the meeting virtually, please click one of the links below, or call into the meeting at one of the phone numbers below:

Join Zoom Meeting
https://us06web.zoom.us/j/7999102307
Meeting ID: 799 910 2307
One tap mobile
+12532158782,,7999102307# US (Tacoma)
+12532050468,,7999102307# US
Dial by your location
• +1 253 215 8782 US (Tacoma)
• +1 253 205 0468 US
• +1 669 444 9171 US
• +1 719 359 4580 US
• 888 475 4499 US Toll-free
• 877 853 5257 US Toll-free

Meeting ID: 799 910 2307

Find your local number: https://us06web.zoom.us/u/kbLsn6aJ7H

II. CALL TO ORDER

A. **ROLL CALL/ESTABLISHMENT OF QUORUM**

B. **PLEDGE OF ALLEGIANCE**

III. PUBLIC COMMENT

Comment from the audience on any proposal for action by the Commission. If the comment is related to an action subsequently listed here as a public hearing, the comment should be provided at the time of the public hearing.

IV. APPROVAL OF MINUTES

A. June 4, 2024 Minutes from the Planning Commission Meeting

V. **INTRODUCTION**

A. Presentation Overview (Steiner)

Brief overview of upcoming Element Presentations and Public Hearing schedule.

VI. **PUBLIC HEARINGS**

A. Capital Facilities Element (Steiner)

Public Hearing for the public testimony and Planning Commission deliberation on the Capital Facilities Element

VII. **OTHER BUSINESS**

A. **Utilities Element Presentation (Steiner)**

Staff Presentation of the proposed changes to the Utilities Element

B. **Water System Plan Presentation (Vondrak)**

Staff Presentation of the proposed changes to the Water System Plan

VIII. **COMMUNITY DEVELOPMENT REPORT**

IX. **ADJOURNMENT**

The City of Auburn Planning Commission is a seven member advisory body that provides recommendations to the Auburn City Council on the preparation of and amendments to land use plans and related codes such as zoning. Planning Commissioners are appointed by the Mayor and confirmed by the City Council.

Actions taken by the Planning Commission, other than approvals or amendments to the Planning Commission Rules of Procedure, are not final decisions; they are in the form of recommendations to the city council which must ultimately make the final decision.

CITY OF AUBURN WASHINGTON

AGENDA BILL APPROVAL FORM

Agenda Subject:
June 4, 2024 Minutes from the Planning Commission Meeting

Date:
June 20, 2024

Department:
Community Development

Attachments:
June 4, 2024 Minutes

Budget Impact:
Current Budget: $0
Proposed Revision: $0
Revised Budget: $0

Administrative Recommendation:

Background for Motion:

Background Summary:

Reviewed by Council Committees:

Councilmember:

Staff: Teague

Meeting Date: July 2, 2024

Item Number:

Planning Commission Meeting
June 4, 2024 - 6:00 PM
Special Meeting - City Hall Council Chambers
MINUTES

I. VIRTUAL PARTICIPATION

A. Public Participation Information

The City of Auburn Planning Commission Meeting was held in person and virtually.

II. CALL TO ORDER

Chair Judi Roland called the meeting to order at 6:02 p.m. in the Council Chambers of Auburn City Hall, 25 West Main Street.

A. ROLL CALL/ESTABLISHMENT OF QUORUM

Commissioners present: Chair Judi Roland, Vice Chair Phillip Stephens, Julie Berry, Kent Sprague, William Stewart, Aaron Vanderpol, and Lynn Walters.

Staff members present: Acting City Attorney Doug Ruth, Senior Planner Josh Steiner, Sewer Utility Engineer Robert Elwell, Storm Drainage Utility Engineer Tim Carlaw, Planner Gabriel Clark, Development Engineer Manager Steve Sturza, Utilities Engineering Manager Ryan Vondrack, Parks Planning and Development Manager Thaniel Gouk, Records Clerk Gerri Blackwell, and Deputy City Clerk Rebecca Wood-Pollock

B. PLEDGE OF ALLEGIANCE

Chair Roland led those in attendance in the Pledge of Allegiance.

III. PUBLIC COMMENT

There was no public comment.

IV. APPROVAL OF MINUTES

A. May 7, 2024 Draft Minutes from the Special Planning Commission Meeting

Vice Chair Stephens moved and Commissioner Sprague seconded to approve the May 7, 2024 Planning Commission Meeting Minutes.

MOTION CARRIES UNANIMOUSLY. 7-0

V. **OTHER BUSINESS**

A. **Presentation Overview (Steiner)**

Staff will provide a brief overview of upcoming Element Presentations and Public Hearing schedule.

Senior Planner Steiner shared an update on the schedule for the future presentations on Comprehensive Plan Elements and Public Hearing schedule.

B. **Public Works Comprehensive Plan Schedule Update (Gaub)**

Update to Comprehensive Plan schedule for remaining Public Works items.

Assistant Director Sweeting shared a presentation with the Commission on the Public Works Comprehensive Plan Schedule Update, including changes to the Public Hearing schedule.

C. **Comprehensive Plan Adoption Process Changes (Teague)**

Discuss options for how Planning Commission will adopt Comprehensive Plan packages in 2024.

This item was addressed after the Sewer Element Public Hearing.

Senior Planner Steiner discussed the Comprehensive Plan Adoption Process Changes, including a proposal from staff to continue all Public Hearings through July 16, 2024 and hold on the acceptance of Water and Sewer Elements to a later date, the process for having the Community Development Comprehensive Plan Elements approved by City Council, other Departments' continuation of Element presentations, and changes to the Comprehensive Plan Adoption process.

D. **Rules and Procedures Updates for 2024 Meetings (Teague)**

Introduce and discuss options for continuing two meetings per month, with 6:00 p.m. start time, through the rest of 2024.

This item was addressed after the Sewer Element Public Hearing.

Manager Sturza discussed updates to the Rules and Procedures, including moving the public hearing and deliberation for each element to directly after the presentation, a new start time of 6:30 p.m., and scheduling two meetings per month.

Vice Chair Stephens moved and Commissioner Sprague seconded to suspend the Rules of Procedure to address changing the start time and frequency of regular meetings.

MOTION CARRIED UNANIMOUSLY. 7-0

Commission discussed verbiage of the proposed rule amendments

and the proposed new start time.

Vice Chair Stephens moved and Commissioner Vanderpol seconded to amend the Rules of Procedure to hold two regular meetings on the Tuesday following the first Monday of each month and the Tuesday following the third Monday of each month, and shall be open to the public. The meeting shall convene at 6:30 p.m., unless otherwise directed by the Secretary or the Chair. After December 31, 2024, Regular meetings shall be held on the Tuesday following the first Monday of each month and shall be open to the public. The meetings shall convene at 7:00 p.m., unless otherwise directed by the Secretary or the Chair.

MOTION CARRIED UNANIMOUSLY. 7-0

E. **PROS Plan Element (Gouk)**

Staff presentation of the proposed changes to the PROS Plan Element.

Director Faber, Manager Gouk, and SCJ Alliance Consultant Chris Overdorf shared a presentation with the Commission on the Parks, Recreation, and Open Space (PROS) Plan Element, including the work plan, physical context, the public's demands and needs, level of service and land development, the Capital Improvement Program, and Park Impact Fees.

The Commission discussed land development, the finalized PROS Plan Element, park development updates, park requirements for Homeowners Associations and housing developments, funding sources for the Capital Improvement Plan, and grant funding.

F. **Storm Element (Carlaw)**

Staff presentation of the proposed changes to the Storm Element.

Engineer Carlaw provided a presentation to the Commission on the Storm Element, including an overview of the Auburn Comprehensive Plan Elements, Plan development progress, a storm drainage utility introduction, an overview of the chapters of the 2024 Storm Drainage Comprehensive Plan, and the next steps in the process.

The Commission discussed population density, video monitoring, flood control, bioswales, unique challenges for the City to meet mandates, water mitigation, and financial aspects of the Comprehensive Plan.

G. **Transportation Element (Sweeting)**

Staff presentation of the proposed changes to the Transportation Element.

Assistant Director Sweeting shared a presentation with the Commission on the Transportation Element, including an overview

of the Plan, regulatory requirements, key goals and policies, an overview of the Multimodal Level of Service (MMLOS) Standards, a summary of the MMLOS Concurrency Approach, the potential implications of the proposed changes, capital projects to address growth and development and where they can be located on the City's website, and the next steps in the process.

The Commission discussed travel mode shifts, roundabouts, middle housing in the Lea Hill neighborhood, walkability of the Lakeland Hills neighborhood, parking, and transportation routes.

VI. PUBLIC HEARINGS

A. Sewer Element (Elwell)

Public Hearing for the public testimony and Planning Commission deliberation on the Sewer Element.

There was no public comment regarding the Public Hearing.

Sewer Utility Engineer Elwell provided a recap of the Sewer Element Presentation, including an update to the schedule.

Chair Roland closed the Public Hearing at 8:26 p.m.

VII. ADJOURNMENT

There being no further business to come before the Planning Commission, the meeting was adjourned at 8:49 p.m.

APPROVED this _____ day of _______, 2024.

________________________	**_________________________**
JUDI ROLAND, CHAIR	**Rebecca Wood-Pollock, Deputy City Clerk**

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CITY OF AUBURN WASHINGTON

AGENDA BILL APPROVAL FORM

Agenda Subject:
Presentation Overview (Steiner)

Date:
June 25, 2024

Department:
Community Development

Attachments:
2024 Comp Plan Memorandum

Budget Impact:
Current Budget: $0
Proposed Revision: $0
Revised Budget: $0

Administrative Recommendation:

Background for Motion:

Background Summary:

Reviewed by Council Committees:

Councilmember:

Staff: Steiner

Meeting Date: July 2, 2024

Item Number:

CITY OF AUBURN WASHINGTON

Memorandum

To: Judi Roland, Chair, Planning Commission
Planning Commission Members

From: Josh Steiner, Senior Long-Range Planner, Comm. Dev. Dept.
Ryan Vondrak, Utilities Engineering Manager, Public Works

Date: July 2, 2024

Re: **Special Meeting: 2024 Comprehensive Plan - Planning Commission**

Each city and county in Washington state is required to conduct a periodic update of its comprehensive plan and development regulations per RCW 36.70A.130 (The Growth Management Act or GMA). In general, the purpose is to ensure consistency with the Puget Sound Regional Council Vision 2050, the Countywide Planning Policies (for Auburn this means both Pierce and King County), any changes in state laws over the intervening time, and to respond to changing conditions within the local community.

Tonight, a public hearing on the Capital Facilities Element and a public meeting on the Water System Plan Element will be conducted. This meeting is open to the public and has been advertised appropriately as a regular meeting. The table below illustrates current, past, and upcoming Planning Commission meetings for the Comprehensive Plan update, as well as subject.

Subject	Public Meeting	Public Hearing	Deliberation and Action
Land Use	✓	✓	N/A
Housing	✓	✓	N/A
Historic Preservation	✓	✓	N/A
Economic Development	✓	✓	N/A
Climate	✓	✓	N/A
Parks and Open Space	✓	✓	N/A
Sewer Plan	✓	✓	September 17
Transportation	✓	July 16	July 16
PROS Plan	✓	TBD	TBD
Stormwater Plan	✓	✓	N/A
Capital Facilities	✓	July 2	October 23
Water System Plan	July 2	July 16	October 23
Utilities Element	July 2	July 16	October 23

Planning Commission Comp Plan Action (Community Development/Parks)	July 16		

For reference, the current adopted Comprehensive Plan Elements can be found here.

Feel free to contact Josh Steiner, Senior Planner, at jsteiner@auburnwa.gov or 253-804-5064 with any questions.

Included Attachments:
Attachment A – Capital Facilities Element Planning Commission Presentation
Attachment B – V3 Draft Capital Facilities Element
Attachment C – Utilities Element Planning Commission Presentation
Attachment D – V2 Draft Utilities Element
Attachment E – Water System Plan Planning Commission Presentation
Attachment F – Draft Water System Plan

Note: V1 = Currently adopted Plan showing staff edits
V2 = Clean version of V1 with staff edits incorporated
V3 = Clean version of V2 with edits incorporated, showing edits in response to public comments, Planning Commission comments, and/or agency comments. May include maps or other figures that have been amended by staff since V2 in response to comments.

If V1 is not available, please see currently adopted Element via link above.

AGENDA BILL APPROVAL FORM

Agenda Subject:
Capital Facilities Element (Steiner)

Date:
June 25, 2024

Department:
Community Development

Attachments:
Attachment A - Capital Facilities Element Presentation
Attachment B - V3 Draft Capital Facilities Element

Budget Impact:
Current Budget: $0
Proposed Revision: $0
Revised Budget: $0

Administrative Recommendation:

Background for Motion:

Background Summary:

Reviewed by Council Committees:

Councilmember:

Staff: Steiner

Meeting Date: July 2, 2024

Item Number: PH.1

CITY DEPARTMENTS

2024 COMPREHENSIVE PLAN – CAPITAL FACILITIES ELEMENT

JOSH STEINER, AICP, SENIOR PLANNER
PLANNING COMMISSION

JULY 2, 2024

Department of Community Development
Planning • Building • Development Engineering • Permit Center
Economic Development • Community Services • Code Enforcement

AUBURN VALUES

SERVICE
ENVIRONMENT
ECONOMY
CHARACTER
SUSTAINABILITY
WELLNESS
CELEBRATION

IMAGINE AUBURN
COMPREHENSIVE PLAN UPDATE 2024

Core Changes to Capital Facilities Element

- Regulatory Requirements (RCW 36.70A.070)

(3) A capital facilities plan element consisting of:

(a) An inventory of existing capital facilities owned by public entities, including green infrastructure, showing the locations and capacities of the capital facilities;

(b) Forecast of the future needs for such capital facilities;

(c) Proposed locations and capacities of expanded or new capital facilities;

(d) At least a six-year plan that will finance such capital facilities within projected funding capacities and clearly identifies sources of public money for such purposes; and

(e) Requirement to reassess the land use element if probable funding falls short of meeting existing needs and to ensure that the land use element, capital facilities plan element, and financing plan within the capital facilities plan element are coordinated and consistent. Park and recreation facilities shall be included in the capital facilities plan element.

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2024 PERIODIC COMPREHENSIVE PLAN – CAPITAL FACILITIES ELEMENT

Core Changes to Capital Facilities Element

Element Update Framework

- Pull in policy and non-financial text from Capital Facilities Plan
- Incorporate information from Utilities Element as appropriate
- Include inventories for capital facilities
  - Reference goals, policies, and technical information from other Elements as appropriate to avoid duplication
- Overall formatting and refinements for readability
- Note: Solid Waste polices have moved from CFE to Utilities Element

- Few comments from agencies
- Capital Facilities Plan is included as part of CFE package (6-year CIP)
- Multi-Department Effort

SERVICE • ENVIRONMENT • ECONOMY • CHARACTER • SUSTAINABILITY • WELLNESS • CELEBRATION

2024 PERIODIC COMPREHENSIVE PLAN – CAPITAL FACILITIES ELEMENT

Core Changes to Capital Facilities Element

- Element Update Framework

  - **Capital Facilities Inventory** – list of facilities and attributes (condition, age, size, etc.)
  - **Level of Service** – Adopted Level of Service standards that apply to facilities for identification of future needs. May be a reference to another document.
  - **Known Capacity Issues** – Deficiencies identified by Level of Service analysis and/or capacity issues identified in other documents (systems plans, etc.)
  - **Future Plans** – Summary of identified future projects or reference to other documents where information is found (systems plans, etc.)

Not all information is provided for each facility type

2024 PERIODIC COMPREHENSIVE PLAN – CAPITAL FACILITIES ELEMENT

IMAGINE AUBURN
COMPREHENSIVE PLAN UPDATE 2024

Next Steps

- **July 2nd** – Public Hearing

- **October 23rd** – Planning Commission Action (same night as Utilities Element and Water Comprehensive Plan action)

City of Auburn

Capital Facilities Element

Table of Contents

Introduction

This volume provides overall policy direction for the different capital facility plans and programs provided by the City. Capital facilities belonging to privately owned utilities (electricity, natural gas lines, etc.) and those that are city-operated (water, sewer, stormwater, etc.) are covered in the Utilities Element (Volume 4). Certain City plans and programs are further refined in other sections of this volume, such as Parks, Recreation, and Open Space, and Transportation. Overall, however, this volume acts as a reference for all of the City's various capital facility plans except for those found in other Elements, including the City of Auburn Six-Year Capital Facilities Plan (a key component of and adopted with this plan), comprehensive plans, capital improvement and investment programs, inventories, and studies that together represent the planning and financing mechanisms required to serve the capital facility needs of Auburn. For more details on a particular capital facility or the City's overall capital facility plan, see the most recently adopted version of the following:

- City of Auburn Airport Master Plan
- City of Auburn Capital Facilities Plan
- City of Auburn Comprehensive Water Plan
- City of Auburn Comprehensive Sewer Plan
- City of Auburn Comprehensive Stormwater Plan
- City of Auburn Parks and Recreation Master Plan
- City of Auburn Comprehensive Transportation Plan
- Auburn School District Capital Facilities Plan
- Kent School District Capital Facilities Plan
- Dieringer School District Capital Facilities Plan
- Federal Way School District Capital Facilities Plan
- Valley Regional Fire Authority (VRFA) Capital Facilities Plan

Vision

Capital facilities in Auburn are planned, designed, and constructed in a manner that adequately supports the future growth scenarios in the City's Land Use Element and that meets the needs of residents, visitors, and businesses. Sustainability is a principle that guides decisions about where facilities are placed, how they are constructed, how they are operated and maintained, and how all aspects of design, construction, and operation are funded.

Conditions and Trends

Growth: The provision and sizing of public facilities such as streets or waterlines and sewer lines can influence the rate or timing of development and is an important means of managing growth. Timed provision of facilities also ensures that new development can be assimilated into the existing community without serious disruptions or adverse impacts. This Plan establishes policies to allow development when and where all public facilities are adequate or can be made adequate, but only if such development can be adequately served by public facilities and services consistent with the adopted level-of-service standards.

A key provision of the Growth Management Act is concurrency. In general, concurrency seeks to ensure that development is permitted only if adequate public facilities are, or can be guaranteed to be, available to support new development. Concurrency requires that facilities needed to maintain a locally adopted level of service be provided “concurrently” with development. Concurrency places the finance function of local government in a much more prominent role in the land use development process. While the concept of concurrency is new to many jurisdictions, it has been used in Auburn since the adoption of its 1986 Comprehensive Plan.

The Act requires concurrency only for transportation facilities, though if a jurisdiction desires, concurrency can be applied to other public facilities as well. With respect to transportation facilities, concurrent is defined within the Act as being provided at the time of or within 6 years of development (this is done to coincide with the six-year time frame of most capital facilities plans). If the facility is not available at the time of development, the funding to construct the facility must be included in the six-year capital facilities plan.

Regardless of whether a local jurisdiction applies concurrency to public facilities beyond those for transportation, new development must be coordinated with the provision of capital facilities. This ensures that all relevant public facilities and services are planned and available to serve the demands of new growth.

Planning Approach

The Capital Facilities planning approach is to manage growth in a manner that enhances from community quality and values by actively coordinating land use type and intensity with City facility and service development and provision.

Values

<u>Character:</u> Public buildings and spaces incorporate high-quality building and landscape design so that they positively impact the surrounding built environment.

<u>Wellness:</u> Public spaces that are purchased and developed for capital facilities also incorporate features and infrastructure that provide more complete nonmotorized connections.

Service: City utilities and buildings are of high quality and complete, reliable, and available to residents and business owners.

Economy: City utilities are available or planned to be available to serve allowed commercial, recreational, and residential uses.

Celebration: Capital facility spaces will be available, designed, and programmed in a manner that promotes public gathering.

Environment: Development of capital facilities will place a premium on environmental preservation and protection.

Sustainability: Our philosophy of designing, constructing, and maintaining utilities and buildings embraces a long-term investment horizon rather than concepts that only provide short-term benefits and outcomes.

Concurrency and Levels of Service

Levels of Service

Level of Service (LOS) is a common measure used to determine the efficiency or effectiveness of services. For the City of Auburn, LOS targets serve as a means to assess the adequacy of public facilities in meeting the needs of the population for which it serves. The GMA requires that LOS be established for certain transportation facilities for the purposes of applying concurrency to development proposals. The State GMA guidelines recommend the adoption of LOS standards for other capital facilities to measure the provision of adequate public facilities.

Typically, measures of level of service are expressed as ratios of facility capacity to demand (i.e., actual or potential users). For example, in the case of park space, when there is an increase in population without a corresponding increase in park acreage, the LOS unit of measure (acres per 1,000 population) will decline, indicating a potential need to increase the total amount of park acreage to keep pace with population growth. On the other hand, a slight increase in population, coupled with a large increase in facilities, will result in an increased LOS. For example, facilities such as buildings or burial plots may be constructed or expanded to keep pace with anticipated population growth. While this will have the effect of increasing LOS in the short-term, in the longer-term, the LOS will gradually decline to the targeted level based on forecasted population. The impact of population growth to the LOS for facilities will vary depending on the type of facility and long-range planning by the City.

Concurrency

The GMA requires that jurisdictions have certain capital facilities in place or available within a specified time frame when development occurs. This concept is called concurrency. Under the GMA, concurrency is required for transportation facilities and is recommended by the State for certain other public facilities, namely potable water and sanitary sewer.

Concurrency has a direct relationship to level of service. The importance of concurrency to capital facilities planning is that development may be denied if it reduces the level of service for a capital facility below the locally adopted minimum. The level of service is unique for each type of facility and is presented in the subsequent sections. Concurrency has a direct relationship to level of service. The importance of concurrency to capital facilities planning is that development may be denied if it reduces the level of service for a capital facility below the locally adopted minimum. The level of service is unique for each type of facility and is presented in the subsequent sections.

The need for capital facilities is largely determined by a community's adopted LOS standards and whether or not the community has formally designated capital facilities, other than transportation, as necessary for development to meet the concurrency test. The CFP itself is therefore largely influenced by the selection of the level of service standards. Level of service standards are measures of the quality of life in the City. The standards should be based on the City's vision of its future and its values.

Level of Service Standards and Needs

The LOS for the following facilities will be increased as a result of population projections described in the Capital Facilities Plan (CFP), comparing the 2023 LOS to the projected 2028 LOS. For more information on the LOS thresholds and data sources please see the relevant related plan (Parks, Transportation, Airport, etc.).

Capital Facility	LOS Units	2023 LOS	2028 LOS (Projected)
Cemetery	Burial Plots per 1,000 population	29.00	56.00
Community Parks	Acres per 1,000 population	2.62	2.95
Linear Parks	Acres per 1,000 population	0.18	0.21
Neighborhood Parks	Acres per 1,000 population	0.72	0.78

The LOS for the following facilities will be maintained as a result of the CFP.

Capital Facility	LOS Units	2023 LOS	2028 LOS (Projected)
Transportation	See Comprehensive Transportation Plan		
Airport	% of Air Operations Support	100%	100%
Storm Drainage	N/A	N/A	N/A
Water	Residential GPCPD[1]	182.00	181.00

1 – GPCPD = Gallons per Customer per Day, or the equivalent of water used by a single-family residential unit per day.

The LOS for the following facilities will be decreased as a result of the CFP, comparing the 2023 LOS to the projected 2028 LOS.

Capital Facility	LOS Units	2023 LOS	2028 LOS (Projected)
General Municipal Buildings	Square Feet per 1,000 population	3,290.44	3,173.11
Open Space	Acres per 1,000 population	4.25	4.10
Senior Center	Square Feet per 1,000 population	135.70	129.12
Special Use Areas	Acres per 1,000 population	2.83	2.69

Other Level of Service metrics and thresholds related to specific capital facilities are located in the sections below.

Capital Facilities and Services

Municipal Facilities

The current inventory of City government administration and operations facilities include 207,629 square feet for general government operations, 66,469 square feet for police services, and 21,726 square feet for fire protection, for a total of 295,824 square feet. The table below lists the facilities along with their current capacity and location.

Community Facilities

Facilities Inventory

Facility Name	Location	Size
Community Center	910 9th St SE	19,804 sq ft
Senior Center	808 9th St SE	11,667 sq ft
Cemetery	2020 Mountain View Dr	4,011 sq ft (out buildings not included)
Golf Course	29630 Green River Rd	14,114 sq ft (out buildings not included)
Postmark Center for the Arts	20 Auburn Ave	8,744 sq ft
GSA	2905 C St SW	11,837 sq ft
4910 A Street	4910 A Street	5,920 sq ft
City Hall	25 W Main St	57, 316 sq ft
City Hall Annex	1 E Main St	47,000 sq ft
Justice Center	340 E Main St	36,000 sq ft
Maintenance & Operations	1305 C St SW	18,232 sq ft (out buildings not included)
Parks Maintenance	1403 C St SW	6,094 sq ft (out buildings not included)

Les Gove MPP Building	1040 Deal's Way	1,262 sq ft (out buildings not included)
R Street Building	2840 Riverwalk Drive SE	4,798 sq ft (out buildings not included)
Warren Building	411 E Street NE	1,813 sq ft (out buildings not included)
Herr Storage	1140 Auburn Way S	3,600 sq ft
Auburn Ave Theatre (scheduled for demolition)	10 Auburn Ave	7,590 sq ft
Auburn valley Humane Society	4910 A Street SE	5,920 sq ft

Level of Service

The current LOS of 3,290 square feet per 1,000 population is based on the existing inventory divided by the 2023 citywide population of 89,904. The proposed LOS of 3,173 square feet per 1,000 population is based on the projected inventory divided by the 2028-projected citywide population of 94,489.

Future Plans

As of 2024, the City is in the process of designing and constructing a replacement for the Auburn Ave Theatre, which was damaged when the adjacent historic mixed-use building on E Main Stret was damaged beyond repair due to fire. The new theatre is anticipated to be an activity anchor in downtown with its central location.

Public Library Facilities

The City of Auburn is served by the King County Library System in 15,000 square foot Auburn Library building at 1102 Auburn Way S. The library opened in 2000 after moving first from the Carnegie Library building in downtown (constructed in 1914), then from another facility in Les Gove Park (constructed in 1964). The current building has continued to be renovated and expanded over the past 25 years, with the last construction completed in 2012. Detailed information regarding the King County Library System is available at www.kcls.org.

Police

Facility Inventory

Name	Location	Size
Auburn Justice Center (Police)	340 E Main St	16,000 sq ft
Evidence Building	340 E Main St	4,400 sq ft

The Auburn Police Department has a staff of the Chief, Assistant Chief, 5 Commanders, 13 Sergeants, 57 Patrol Officers, 20 Detectives, 5 Traffic Officers, and multiple supervisors, specialists, technicians, and other staff as of 2023.

Police services are centered around the Auburn Justice Center that serves the entire City and supports the required staff, the majority of who are assigned to the patrol division. In 2004, the police department took occupancy of a portion of the Justice Center, primarily in the basement, with the Court located on the primary level. The police portion occupies just over 16,000 square feet. Currently the police facility houses 118 sworn police officers in addition to 22 civilian staff. Police headquarters provides both designated and temporary workspace, meeting rooms, common areas, locker rooms, storage space, utility space, electrical and utility space, and records storage space. A separate evidence building at the same site houses evidence storage, general equipment storage, and records archives. Additionally, the department maintains temporary evidence storage in the basement of city hall, utilizing approximately 200 square feet of space.

A facility needs assessment was completed in 2020 and was incorporated in the 2020 Facilities Master Plan.

Known Capacity Issues

Police facilities lack adequate space to support current staff and operations, and future growth.

- Suboptimal climate control, especially on ground floor as HVAC zone configuration does not align with current space configuration due to renovations.
- Facility too small to accommodate both Court and Police in long-term.
- Severely space-constrained, especially for Police, which grew 40% between 2004 and 2019.
- Undersized public lobby and soft interview space.
- Limited meeting/briefing space for all meeting types, including large groups, confidential discussions, and interviews.

Police office space is primarily in basement areas that have limited natural light.

- Defensive tactics and classroom training occur in a room with irregular column placement which impedes sightlines, creates barriers for physical training, and complicates furniture/mat reconfiguration.
- Evidence building is at capacity.
- Undersized parking; unsecured parking for marked vehicles.

Future Plans

A property located near the intersection of Auburn Way Sout & 12th Street Southeast has been acquired by the City. 2023-2024 budget allocated funding for facility planning at new location. Other than planning, there is no funding allocated for this project.

Fire Protection

The Valley Regional Fire Authority (VRFA) provides critical fire and life safety services to the approximately 97,000 citizens residing in the 37 square miles of Algona, Auburn, and Pacific. Oversight of the VRFA is provided by a nine-member Governance Board consisting of the Mayor and two council members from each participating city. Twenty personnel respond from five fire stations. These stations are staffed 24 hours a day, seven days a week, by four shifts. A battalion chief oversees each shift, and a deputy chief manages the entire division.

The Auburn Fire Department was formed over a century ago as a result of a devastating fire in August of 1890. The fire destroyed an entire city block of businesses in what was then known as the town of Slaughter. The original department, consisting of volunteer firefighters and a hand-drawn hose cart, was first named the Auburn Bucket Brigade. The name changed to the Auburn Volunteer Fire Department in 1908. On January 1, 2007, as a result of a voter-approved measure, the Auburn Fire Department combined with the Pacific Fire Department and the City of Algona to form the Valley Regional Fire Authority, which provides fire and EMS services to all three cities.

In an emergency, every second counts. The VRFA has established a Total Response Time (TRT) benchmark of seven minutes and 34 seconds (7:34) for EMS Calls and seven minutes and 49 seconds (7:49) for fire calls. TRT is the time it takes a unit to arrive at a scene once the call is received at the Fire Alarm Center. In 2022, we achieved those benchmarks 51% of the time for fire response and 57% for EMS response.

The VRFA's Capital Facilities Plan (CFP), which was adopted by the Board of Governance in 2021, made four recommendations:

- Priority 1: build an additional station in the northern part of VRFA's service area
- Priority 2: relocate and rebuild Station 38 in Pacific
- Priority 3: remodel or replace Station 31
- Priority 4: find a permanent location for Support Services

In 2022, the VRFA took several significant steps to implement the CFP, including:

- Purchasing property on 30th and I Street Northeast for a new north end fire station. Evaluating property on the Ellingson corridor in Pacific in order to relocate Station 38.
- Contracting with the leading architectural firm TCA to consult on land acquisition and complete preliminary design concepts on each element of the CFP.
- Initiating a discussion on the best way to fund these critical projects.

In 2022, 45% of revenue was from Property Taxes, 34% from Fire Benefit Charges, and 21% from other sources such as grants and permit fees. Expenditures in 2022 include 52% for wages, 15% for capital projects, 19% for benefits and 14% for other services and supplies.

Valley Regional Fire Authority Capital Facility Plans, Annual Reports, and other documents can be found at www.vrfa.org.

Level of Service

The current LOS of 0.20 fire apparatus per 1,000 population is based on the existing inventory (18 fire apparatus) divided by the 2023 citywide population estimate of 89,904. The proposed LOS of 0.20 fire apparatus per 1,000 is based on the 2028-planned inventory (19 fire apparatus) divided by the 2028-projected citywide population of 94,489.

Parking

Facilities Inventory

Facility Name	Location	Capacity	Condition
Kiss-n-Ride Parking Lot	Parcel #7815700172	21 Non-Handicap spaces; 1 accessible space	Fair
11 A Street NW Parking Lot	11 A Street NW	47 Non-Handicap spaces; 2 accessible spaces	Poor
B Street Parking Lot	137 E Main Street	60 Non-Handicap spaces; 13 accessible spaces	Fair
Safeway Parking Lot	Parcel #7331400135	122 Non-Handicap spaces; 4 accessible spaces	Poor
D Street Parking Lot	350 E Main St	20 Non-Handicap spaces; 0 accessible spaces	Very Poor
JC Employee Parking Lot	20 D Street SE	55 Non-Handicap spaces; 1 accessible spaces	Fair

Future Plans

On April 1, 2024, the City of Auburn relinquished possession and use of 113 off-site parking stalls to Sound Transit. The 113 parking stalls were code required parking stalls tied to two office-condominiums owned by the City and utilized as office space by City employees. The City will need to replace these 113 parking stalls within the code required 1,000/ft radius of the office condominiums with which they serve. Funding for the parking replacement will come in whole or in part from the monetary amount awarded to the City by the arbitrator who presided over the arbitration hearing.

Replacement of the 113 parking stalls relinquished to Sound Transit will likely need to be accomplished by constructing a multi-story parking garage.

Cemeteries

The City owns two cemeteries. The Mountain View Cemetery is a fully developed facility (60 acres and five buildings) that provides burial services and related merchandise for the community. The Pioneer Cemetery is a historic cemetery that is no longer used for burial purposes.

Level of Service

The current LOS of 29 burial plots/niches and cremation in ground plots per 1,000 population is based on the existing inventory divided by the estimated 2023 citywide population. The proposed LOS of 56 burial and plots/niches and cremation in ground plots per 1,000 population is based on the projected inventory divided by the 2028-projected citywide population.

Parks and Recreation

The Parks, Recreation, and Open Space (PROS) Plan is needed to meet legal requirements and secure funding for the City's parks and recreation areas for the next six to ten years. Developed with public involvement, city staff, and several city commissions, this plan provides a summary of the city's parks, recreation programs, and open spaces, and gathers information on the community's recreational needs through surveys, outreach, and online tools. This Plan establishes a vision, goals, and assesses the current level of service provided by city parks and open spaces. The Capital Improvement Plan (CIP) and its formal approval adoption completes the PROS Plan suggesting a series of recommended improvements to better serve the citizens of Auburn for the next six years and beyond, each tied to potential grant funding sources, serving to guide the City's response and priorities to the desired quality of life envisioned from its citizens.

Facilities Inventory

Currently, the City manages a diverse range of parks and recreation assets, including 23 neighborhood, or local, parks, 14 community parks, 7 parcels of dedicated open space including a golf course, trail systems, and 16 special use facilities. More information parks and recreation assets can be found in Appendix F – PROS Plan of the Comprehensive Plan.

Level of Service (LOS)

A 10-minute walk is considered an important park access metric for several reasons. A 10-minute walk (approximately 1/2 mile on level ground) as a park access metric is important because it promotes physical activity, equity, sustainability, social interaction, and overall community well-being. It aligns with various health, environmental, and social goals the City has and should encourage staff and policymakers to prioritize accessible green spaces as a fundamental part of Auburn's development and the community's desired quality of life.

Future Plans

A Needs Analysis and Capital Improvement Program (CIP) project list can be found in Appendix F – PROS Plan of the Comprehensive Plan.

Transportation

Roadways: The City's street system consists of a network of approximately 249 miles of arterials, collectors, local streets and alleys. Existing nonmotorized facilities include a mix of trails, sidewalks, and both dedicated and shared bicycle facilities.

Signals and ITS: The City's transportation system also includes 95 traffic signals, a Traffic Control Center employing Intelligent Transportation Systems (ITS), which centrally directs the signals, 89 traffic cameras, and various traffic beacons all communicating on a network of copper wire and fiber optic cable. The City also has three roundabouts.

Transit: King County Metro Transit, Sound Transit and Pierce Transit serve the Auburn area. Auburn is currently served by six Metro, two Sound Transit, and one Pierce Transit bus route. In addition, Sound Transit "Sounder" commuter trains provide peak hour and midday service at the Auburn Station. The Sounder also provides special event service to selected sporting events. Park and Ride facilities and the Auburn Station support bus and rail service.

Facilities Inventory

Quantity	Description
249	Miles of Streets
17	Bridges
11,000	Street Signs
13,389	Feet of Guardrail
96	Traffic Signals
31	Rapid Rectangular Flashing Beacons
3.684	Street Lights - City Owned
2,261	Street Lights - PSE Owned
53	School Zone Flashing Beacons
19	Speed Radar Feedback Signs
89	Traffic Cameras
12	Speed Photo Enforcement Locations (School Zones)
4	Dynamic Message Signs
43.86	Miles of Fiber Optic Systems
2	Community Banner Locations
22.62	Miles of Class I Bikeways
1.29	Miles of Class II Bikeway with Buffer (Both Sides of Roadway)

15.95	Miles of Class II Bikeway (Both Sides of Roadway)
4.21	Miles of Class II Bikeway (Intermittent or 1 Side of Roadway)
2.60	Miles of Class III Bikeway with Pavement Markings
298.21	Miles of City Sidewalk

Level of Service

The City's Comprehensive Transportation Plan (CTP) establishes multimodal level of service standards for City streets, active transportation facilities, and access to transit service, and freight movement to provide guidance to evaluate the multimodal facilities, identify deficiencies, and prioritize projects to eventually reach a complete multimodal network that can support and promote mode shift, reducing the vehicle capacity demand on the roadways. The following policies relate to vehicle level of service which the City primarily utilizes to evaluate transportation system capacity. Other level of service standards are utilized for concurrency and planning but generally focus on the existing or absence of facilities and services and the quality of those facilities and services rather than their capacity.

- Policy TR6-1-1: The City adopts the following Vehicle Level of Service (LOS) Standards for the AM and PM peak periods per the Highway Capacity Manual:
    - Signalized: The LOS standard for signalized intersections is "D", with the following exceptions: for signalized intersections of two principal arterial roads the LOS standard is "E".
    - Stop Controlled: The LOS standard stop controlled intersections is "D".
    - Roundabout: The LOS standard for roundabout controlled intersections is "D" with a V/C ratio for each lane group of less than 0.90.
    - Queuing: The LOS standard for intersection queuing is the 95th percentile queue shall not extend across an adjacent driveway, alley, or street intersection, except if the driveway, alley, or street intersection is within the functional intersection boundary of the queue in which case the queue may extend to the limit of the functional intersection boundary. Additionally, queuing for a designated turn lane shall not exceed turn lane storage area and cause a blockage of through lane(s).

Known Capacity Issues

The City utilizes the vehicle intersection delay level of service standard to evaluate general transportation system capacity for concurrency. Of the 157 intersections evaluated with the CTP, the following 11 (or 8%) were operating below the City's adopted level of service standard under existing conditions:

- Auburn Way North & 45th Street NE
- 116th Avenue SE & SE 304th Street
- 46th Place S/44th Avenue S & S 321st Street/51st Avenue S
- 51st Avenue S & 316th Avenue
- Henry Road NE/Pike Street NE & 8th Street NE
- C Street SW & 3rd Street NW
- M Street SE & Auburn Way South
- Auburn Way South & 17th Street SE
- A Street SE & 44th Street SE
- Lakeland Hills Way SE & Oravetz Road SE
- R Street SE & 33rd Street SE

Initial modeling of future conditions (2044) added another 10 intersections to the list of intersections that would be operating below the City's adopted level of service standard:

- Auburn Way N & 42nd Street NE
- I Street NE & 37th Street NE
- 30th Street NE & I Street NE
- 112th Avenue SE & SE 304th Street
- SE 304th Street & 118th Avenue SE
- 56th Avenue S & S 316th Avenue
- 15th Street NE & M Street NW
- A Street SE & 12th Street SE
- A Street SE & 21st Street SE
- A Street SE & Ellingson Road/41st Street SE

Transportation Project List

The Comprehensive Transportation Plan (CTP) includes projects and programs to address the vehicle level of service issues at intersections identified in the existing and future conditions. Those projects include new traffic signals, new roundabouts, modified lane configurations, new roadways, and other measures intended to reduce intersection vehicle delays. The CTP also includes projects, programs, and other actions intended to address to address level of service issues related to active transportation (bicycle and pedestrian), transit, and freight movement. Please refer to the CTP for lists and summaries of the projects, programs, and actions.

Public Utilities

The City of Auburn manages sanitary sewer, water, and storm drainage utilities as well as solid waste collection. The sanitary sewer and water utilities serve the City and several areas outside the City limits. The efficient provision of these services can play a significant role in managing the growth of the City as well as affecting the quality of life for residents of Auburn and the surrounding areas. Public utilities can serve the following goals:

- To protect the public health and safety by providing efficient and cost-effective water, sanitary sewer, storm drainage, and solid waste services to the community.
- Ensure that development will only occur if the urban services necessary to support such development will be available when it is developed.

Water

The City provided water service to over 15,000 service connections as of 2024. The City's water sources include the Coal Creek Springs and West Hill Springs watersheds and are supplemented by a system of ten wells (6 active) and two connections to the regional water system operated by Tacoma Public Utilities. Storage facilities are found on the Enumclaw plateau, at Lakeland Hills, and at Lea Hill. For more background information, see the Comprehensive Water Plan.

Facilities Inventory

- Approximately 306 miles of Water Main
- Over 15,000 Service Connections
- 8 Pump Stations
- 8 Reservoirs
- 1 Satellite Water System
- 6 Active Wells
- 2 Springs

Levels of Service Standards

The System Policies included in Appendix A of the Comprehensive Water Plan and provide direction for City Staff in the management of the utility. The City of Auburn (City) manages the water utility in accordance with established water system policies that govern various facets of utility operations. City policies are established by the City to provide a vision or mission of the water utility and to provide a framework for the design, operation, and ongoing wellbeing of the City's water utility.

The policies included in Appendix A of the Comprehensive Water Plan are developed specifically for the City's multi-source municipal water system and seek to provide consistent treatment to all utility customers and to provide documentation to current water-system customers as well as those considering service from the City.

The City's Comprehensive Water Plan is based upon the following mission statement for the water utility:

"The City will provide for the efficient, environmentally sound and safe management of the existing and future water system within Auburn's service area."

The City's Water utility policies are grouped within goal statements that are headlined under the following categories:

- Business Practices
- Service Area
- Operations and Maintenance
- Financial
- Planning
- Environmental Stewardship
- Design and Construction

A few examples of policies related to level of service standards provided by the water system include:

- Policy 5.3 - System-Wide Reliability
  The City shall invest the resources necessary to construct, maintain, and renew water-system infrastructure and equipment to ensure that customers are provided consistent, reliable service in accordance with WAC 246-290-420 Reliability and Emergency Response. Wherever possible, the City should anticipate system interruptions and design and operate the system to minimize the impact of such interruptions to customers.

- Policy 5.8 - Water Supply Planning
  The City's objective is to ensure a continuous, safe water supply to meet firm customer demands. Provision of water service must be consistent with the goals, objectives, and policies of the City of Auburn Comprehensive Water Plan. Effects of past water conservation will be considered when projecting future water needs. Future water demands will be estimated using existing water usage patterns and projected future populations developed by the City's comprehensive Plan and consistent with the Puget Sound Regional Council data.

- Policy 5.10 - Service Pressure
  The City should provide potable water to customers in sufficient quantity to meet maximum day demands at a pressure that meets or exceeds all minimum applicable regulations, except during emergency conditions. Property owners may install private booster pumps to achieve higher pressures under supervision of the City and in accordance with WAC 246-290-230 Distribution Systems.

Known Capacity Issues (based on Level of Service or other standards)

The preparation of the Comprehensive Water Plan included hydraulic modeling for existing and future conditions. Issues derived from the modeling with respect to pipeline improvements needed to meet fire flow conditions were ranked, with those locations ranked higher given more priority to be completed. The projects are anticipated to be completed under the Repair and Replacement program identified in Chapter 7 of the Comprehensive Water Plan. In addition, other known capacity issues with respect to water facilities and sources, include:

- Lea Hill Intertie Booster Pump Station - the Intertie Booster Pump Station (serves the Lea Hill 648 pressure zone) has a pumping capacity deficit, and the Pump Station lacks emergency power, impacting water supply during power outages.
- Lea Hill Service Area Storage - There is a reservoir/storage capacity shortage of 0.54 MG for the Lea Hill service area.
- Valley Service Area Storage - There is a reservoir/storage capacity shortage of 1.28 MG in the Valley service area.
- Wells 3A/3B - are offline due to high manganese levels.
- Wells 7 - is offline due to high manganese levels.
- Coal Creek Springs - is underutilizing its water right, leading to inefficiency.
- Well 5 - needs upgrades and property acquisition for expansion.
- Well 4 - requires facility and electrical improvements for efficient operation.
- Well 1 and Well 4 - Liquid chlorine degradation at the facilities affect water treatment during low winter demand periods.
- West Hill Springs - Aging chlorination building.
- Lea Hill Pump Station – pump station lacks redundancy.
- Game Farm Wilderness Park - pumps need replacement and building repairs.
- Reservoir 2 - Limited maintenance access to Reservoir 2 valves and lack of earthquake resiliency.
- Coal Creek Springs Transmission Main- 100+ year old pipe that needs to be replaced and is susceptible to leaks.
- West Hill Springs - Poor condition of existing cast iron transmission main.
- Howard Road Corrosion Control Treatment Facility (CCTF) - will exceed capacity after Coal Creek Springs Rehabilitation project completion.
- Howard Road Corrosion Control Treatment Facility (CCTF) - Existing liquid chlorine generating equipment reaching the end of its useful life at Fulmer CCTF.

Stormwater

The System consists of a combination of open ditches, closed conveyance pipes, water quality facilities, and pump stations. For more details, see the Comprehensive Storm Drainage Plan.

Facilities Inventory

- Over 240 miles of storm drainage pipe

- Over 40 miles of open channels and ditches
- Over 13,900 junction structures (catch basins, manholes)
- 167 detention ponds
- 7 pump stations.

Levels of Service Standards

The System Policies included in Chapter 3 of the Comprehensive Storm Drainage Plan provide direction for City Staff in the management of the utility. The following policies are specifically related to designed capacity level of service provided by the sewer conveyance system:

- Policy 1.1 -The City shall seek to manage stormwater runoff within the public Right of Way (ROW):
    - to provide access to and functionality of critical services.
    - to preserve mobility on major transportation routes (i.e., arterial roads) and residential roads.
    - to protect real property structures (e.g., residences and businesses.)
- Policy 1.2 - The City shall seek to provide pump redundancy and backup power generators or dual power feeds at City- owned and -operated drainage pump stations.
- Policy 1.3 - The City shall routinely assess the performance of pumped systems with a focus on capacity and vulnerability. This review aims to ensure that these systems operate efficiently, meet their intended capacity, and remain resilient against potential risks.

Known Capacity Issues

The preparation of the Comprehensive Storm Drainage Plan included hydraulic modeling focused on updating models within locations of proposed capital projects. In addition, existing drainage problems have been observed by the staff and are known to cause flooding of roadways at the following locations:

- Auburn Way South/ SR 18 Underpass - minor roadway flooding causes disruptions to traffic during periods of certain intense rainfall events.
- I St NE between 33rd St NE and 35th St NE – minor flooding has been observed when the Green River flows are high, and the gravity discharge is impacted.
- There are areas within the city not served by the public storm system, such as paved alleys or residential streets where minor flooding is observed.

Future Plans

The 6-year capital improvements are discussed in detail in Chapter 7 and the implementation schedule presented in Chapter 8 of the Comprehensive Storm Drainage Plan.

Sewer

The system is primarily a collection system with treatment provided by Metro. The system includes approximately 205 miles of sewers and force mains and 17 sewer pump stations. Significant portions of the City's service area are currently on septic systems, although plans for future expansion of sewer service into these areas is included in the Comprehensive Sewer Plan. For more details, see the Comprehensive Sewer Plan.

Facilities Inventory

Sewer facilities in the City currently consist of:

- 205 miles of gravity sanitary sewer main
- 17 sewer pump stations
- 5 miles of force main associated with pump stations
- 3 siphons (1 single pipe, and one double pipe under the Green River
- 2,700 sewer service connections

Level of Service Standards

The System Policies included in Chapter 2 of the Comprehensive Sewer Plan provide direction for City Staff in the management of the utility. The following policies are specifically related to designed capacity level of service provided by the sewer conveyance system:

Policy 3.3 - Require the transport of sewage by gravity whenever feasible in order to increase reliability, sustainability, and long-term cost effectiveness.

Policy 4.5 - Size the sewer collection system for peak wet weather flow rates that include I/I flows. Gravity sewers will be sized to convey the once-per-20-year peak hour flow without surcharging.

Policy 4.6 - Size pump stations and force mains for peak wet weather flow rates that include I/I flows. Pump stations will be sized to convey the once per 5-year flow with one pump out of service and convey the once per 20-year flow with all pumps in service.

Known Capacity Issues

The preparation of the Comprehensive Sewer Plan included hydraulic modeling for three scenarios. The first used existing system wastewater flows and applied the expected additional flow during a design storm (with a 20-year recurrence). The second was to escalate wastewater base flows based on population and employment projections for the year 2044, and the last was to increase the intensity and duration of the design storm based on anticipated rainfall changes associated with climate change.

- The existing system is shown to have few deficient pipes, none of which cause overflows.
- For future scenarios (2044-both including and not including climate change effects) show the following deficiencies:

- The Rainier Ridge Pump Station's capacity is anticipated to be under capacity; however, a project is currently underway to replace that station in 2025.
- The Dogwood Pump Station is anticipated to be under capacity in 2044.
- Approximately 4,000 feet of gravity sewer in Roegner Park is expected to be under capacity in 2044.
- Individual pipe segments upstream of each of the Green River crossings are expected to be under capacity at various times throughout the 20-year planning period. The precise timing is dependent on the rate and distribution of population and employment growth.

Future Plans

Conceptual plans for future sewer extensions and facilities are shown on Figure 5.5 of the Comprehensive Sewer Plan. Those extensions are to be funded by the property owners of the parcels served by them, so the timing of their construction is unknown. The Capital Improvement Plan is described in detail in Chapter 7 of the Comprehensive Sewer Plan. The Plan includes projects related to system capacity, repair and replacement, and system evaluation.

Solid Waste

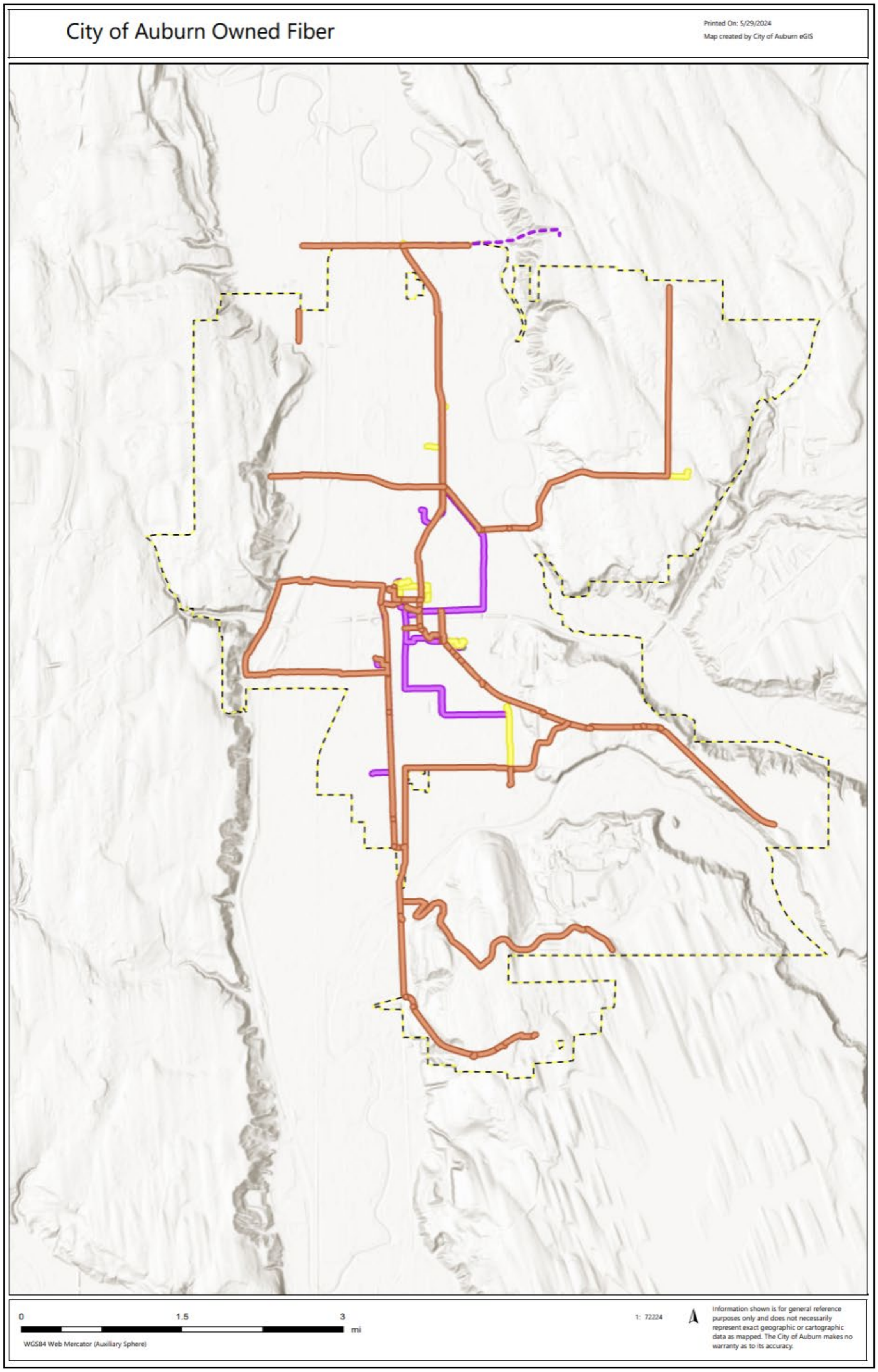
The City of Auburn contracts with Waste Management (WM) for collection of municipal garbage, recycling, and yard waste. Waste Management disposes of Auburn's garbage at a King County Solid Waste transfer station. Recycling is processed at WM's material recycling facility in Tacoma, WA. WM takes the yard and food waste to either DTG in Tacoma, WA or Cedar Grove in Maple Valley, WA to be converted into compost. There is a small area of Auburn that was recently annexed. This area is serviced by Republic Services. Republic Services takes the garbage to a King County Solid Waste transfer station, the recycling is processed at their material recycling center in Seattle, WA, and yard and food waste is taken to Cedar Grove in Maple Valley, WA.

Telecommunications

The City of Auburn owns and maintains a robust fiber optic Metropolitan Area Network (MAN) that connects most City owned building facilities and traffic signals throughout the Auburn area. This infrastructure delivers secure, high-speed broadband capabilities essential for supporting various government functions, including public safety, public works, planning, permitting, and tourism.

Additionally, our fiber optic network enhances city operations by facilitating interconnections with regional partners and service providers such as City of

Algona, City of Pacific, King County, The Community Connectivity Consortium, University of Washington, Valley Communications and Microsoft.


City of Auburn Owned Fiber
Printed On: 5/29/2024
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1: 72224
Information shown is for general reference purposes only and does not necessarily represent exact geographic or cartographic data as mapped. The City of Auburn makes no warranty as to its accuracy.

Public Education Facilities

Auburn's residential areas are served by a combination of Auburn School District, Dieringer School District, Federal Way Public Schools, and Kent School District. Detailed inventories of school district capital facilities and levels-of-service are contained in the Capital Facilities Plan (CFP) of each school district. The CFPs of the four school districts serving Auburn residential areas and the associated school impact fees are adopted annually as part of the Annual Comprehensive Plan amendment process. Locations of schools and school districts within the City of Auburn which are illustrated in the map below.

Future Plans

To accommodate projected growth, the school districts have noted the following projects in their 2023 Capital Facilities Plans:

<u>Auburn School District</u>

- Portable Relocation – Opens 2023-2024
- Middle School #5 – Opens 2027-2028

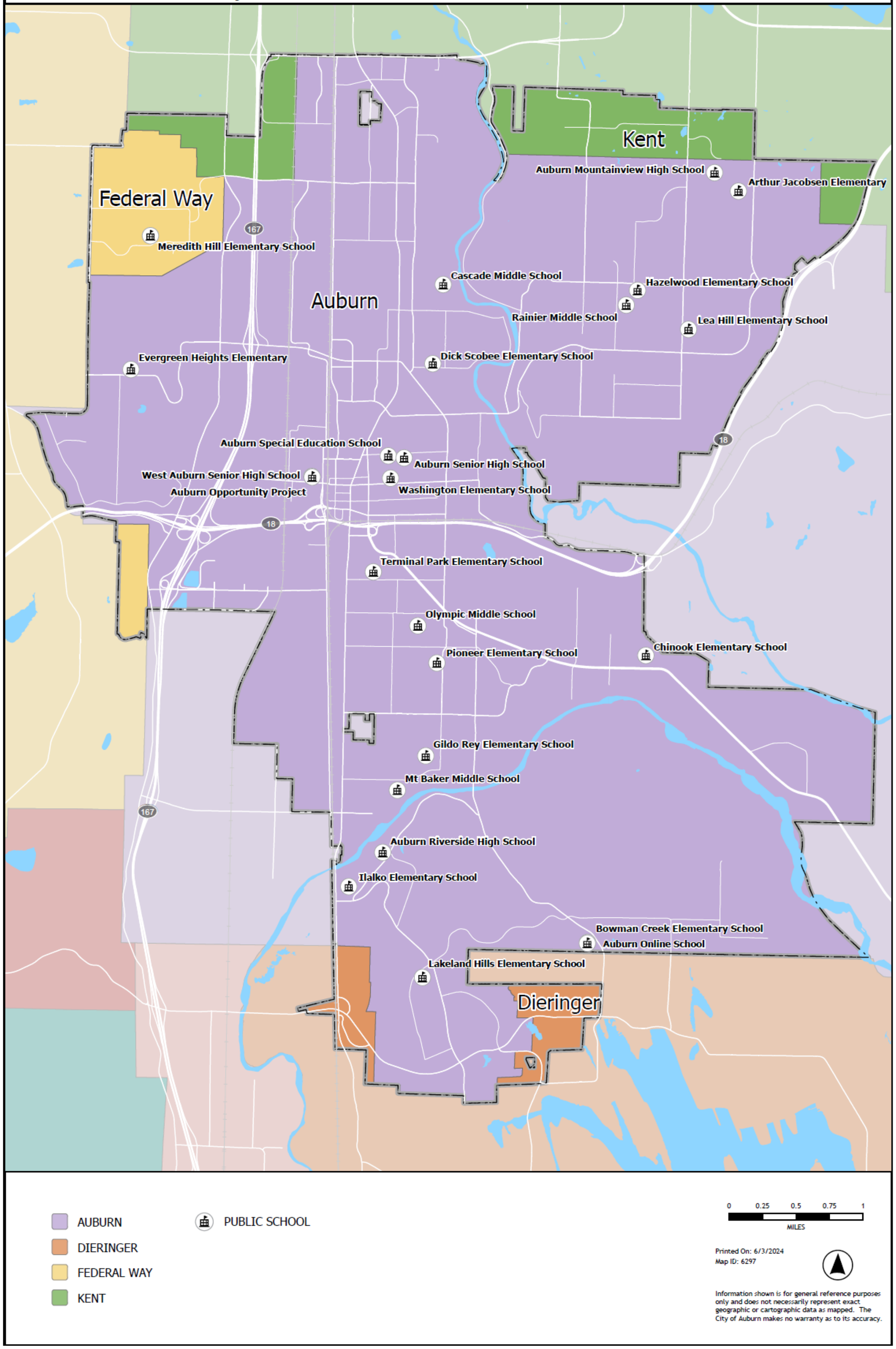
<u>Dieringer School District</u>

- Elementary School #3 – Opens 2027
- North Tapps Middle School Classroom Addition – Opens 2027

<u>Federal Way Public Schools</u>

- Illahee Middle School Modernization and Expansion – Opens 2024
- Former DeVry/ES 24 Site Acquisition – Opens 2028
- Portables Expansion – Through 2030

City of Auburn School Districts



Goals and Policies

Goal # 1 - Keeping Pace with Growth

Ensure that new development does not outpace the City's ability to provide and maintain adequate public facilities and services, by allowing new development to occur only when and where adequate facilities exist or will be provided, and by encouraging development types and locations that can support the public services they require.

Policies:

CF-1. Lands designated for urban growth by this Plan shall have public facilities (streets, sewer, water, storm drainage, and parks) that meet City standards prior to or concurrent with development.

CF-2. Encourage development where new public facilities can be provided in an efficient manner.

CF-3. If adequate facilities are currently unavailable and public funds are not committed to provide such facilities, developers must provide such facilities at their own expense to develop their proposed projects.

CF-4. The City shall encourage and approve development only where adequate public services including police protection, fire and emergency medical services, education, parks and other recreational facilities, solid waste collection, drinking water, storm drainage, roadway and nonmotorized and other governmental services are available or will be made available at acceptable levels of service prior to project occupancy or use.

CF-5. Provide additional public facility capacity when existing facilities are used to their maximum level of efficiency (consistent with adopted standards for level of service).

CF-6. Encourage development where new public facilities can be provided in an efficient manner.

CF-7. Public facilities shall be provided in accord with the guidance of the Capital Facilities Plan or, as may be appropriate a system plan for each type of facility designed to serve at an adequate level of service the locations and intensities of uses specified in this Comprehensive Plan.

CF-8. New development shall not be approved that is not supported by a minimum of facilities to support the development and that does not provide for its proportionate share of related system needs.

CF-9. The city will perform its activities and make capital budget decisions in conformity with the comprehensive plan. The Land Use Element of the comprehensive plan shall be reassessed if probable funding falls short of meeting existing needs.

CF-10. Establish land use patterns that optimize the use of public facilities.

CF-11. Exempt the following from the concurrency management program:

- Development vested by RCW 19.27.095, 58.17.033 or 58.17.170.
- Development that creates no added impact on public facilities.
- Expansions of existing development that were disclosed and tested for concurrency as part of the original application.

Goal # 2 – Public Facilities and Funding

Provide needed public facilities that are within the ability of the City to fund or within the City's authority to require others to provide.

Policies:

CF-12. Establish level of service standards that are achievable with the financing plan of this Capital Facilities Plan.

CF-13. Base the financing plan for public facilities on realistic estimates of current local revenues and external revenues that are reasonably anticipated to be received by the City.

CF-14. Match revenue sources to capital projects based on sound fiscal policies.

- The City shall continue to fund utility costs through utility enterprise funds, based on user fees and grants. Public facilities included in utilities are sewer, solid waste, storm drainage, and water.
- Where feasible pursue joint venture facility construction, construction timing, and other facility coordination measures for City provided facilities, as well as with school districts and other potential partners in developing public facilities.
- The City shall continue to assist through direct participation, LIDs and payback agreements, where appropriate and financially feasible. Where funding is available, the City may participate in developer-initiated facility extensions or improvements, but only to the extent that the improvements benefit the broader public interest and are consistent with the policies of this Capital Facilities Plan.

CF-15. If the projected funding is inadequate to finance needed public facilities and utilities based on adopted level of service standards and forecasted growth, the City will do one or more of the following to achieve a balance between available revenue and needed public facilities:

- Lower the level of service standards;
- Increase the amount of revenue from existing sources;
- Adopt new sources of revenue;

- Require developers to provide such facilities at their own expense; and/or
- Amend the Land Use Element to reduce the need for additional public facilities.

CF-16. Both existing and future development will pay for the costs of needed capital improvements.

- Ensure that existing development pays for capital improvements that reduce or eliminate existing deficiencies and pays for some or all of the cost to replace obsolete or worn-out facilities. Existing development may also pay a portion of the cost of capital improvements needed by future development. Existing development's payments may take the form of user fees, charges for services, special assessments, and taxes.
- Ensure that future development pays a proportionate share of the cost of new facilities that it requires. Future development may also pay a portion of the cost to replace obsolete or worn-out facilities. Future development's payments may take the form of voluntary contributions for the benefit of any public facility, impact fees, mitigation payments, capacity fees, dedications of land, provision of public facilities, and future payments of user's fees, charges for services, special assessments, and taxes.

CF-17. The City will determine the priority of public facility capital improvements using the following criteria as general guidelines. Any revenue source that cannot be used for the highest priority will be used beginning with the highest priority for which the revenue can legally be expended.

- Projects that eliminate hazardous conditions.
- Refurbishment of existing facilities that contribute to achieving or maintaining standards for adopted level of service.
- New or expanded facilities that reduce or eliminate deficiencies in level of service for existing demand.
- New or expanded facilities that provide the adopted level of service for new development and redevelopment during the next six fiscal years.
- Capital improvements that significantly reduce the operating cost of providing a service or facility, or otherwise mitigate impacts of public facilities on future operating budgets.
- Capital improvements that contribute to stabilizing and developing the economy of the City.
- Project priorities may also involve additional criteria that are unique to each type of public facility, as described in other elements of this Comprehensive Plan.

CF-18. Ensure that the ongoing operating and maintenance costs of a capital facility are financially feasible prior to constructing the facility.

Goal # 3 – Public and Environmental Health

Protect public health, environmental quality, and neighborhood stability and viability through the appropriate design and installation of public facilities.

Policies:

CF-19. Promote conservation of energy, water and other natural resources in the location and design of public facilities.

CF-20. Require the separation of sanitary and storm sewer facilities wherever combined sewers may be discovered.

CF-21. Practice efficient and environmentally responsible maintenance and operating procedures.

CF-22. The siting, design, construction and improvement of all public buildings shall be done in full compliance with the Americans with Disabilities Act (ADA).

CF-23. Promote economic and community stability and growth through strategic investments in public facilities and public/private partnerships.

Goal # 4 – Community Benefits of Public Facilities

Provide public facilities that provide a sense of community that is inclusive of diverse populations.

Policies:

CF-24. Contribute to community pride and foster a sense of community through provision of public facilities that create a community-gathering place for neighbors, family and friends.

CF-25. Through provision of public facilities, offer a broad range of activities promoting social interactions especially with new residents.

CF-26. Provide maximum flexibility and multiple uses through design of public facilities that are adaptable to changing interests.

CF-27. Provide a community center facility that is financially feasible, affordable for participants, and can generate revenue to offset a portion of the operating costs.

Goal # 5 – Consistency with Other Adopted Plans

Make the Capital Facilities Plan consistent with other elements of the comprehensive plan, and with other city, county, regional and state adopted plans.

Policies:

CF-28. Ensure that the growth and development assumptions used in the Capital Facilities Plan are consistent with similar assumptions in other elements of the comprehensive plan.

CF-29. Coordinate with non-city providers of public facilities on a joint program for maintaining applicable level of service standards, concurrency requirements, funding, and construction of public facilities.

Goal #6 - Public and Institutional Buildings

To site public and institutional buildings in accord with their service function and the needs of the members of the public served by the facility.

Policies:

CF-30. All "people-oriented" City facilities should be located near high-amenity sites. Les Grove Park and downtown are particularly appropriate sites for senior services, community centers, libraries, museums, etc.

CF-31. City park buildings should be developed in accordance with the Parks, Recreation, and Open Space Element.

CF-32. Public and institutional facilities should incorporate practices that reduce energy consumption, reduce the emission of greenhouse gases, conserve water, provide electric vehicle infrastructure, and preserve native vegetation.

CF-33. Public and institutional facilities that attract a large number of visitors (City Hall, museums, libraries, educational facilities, permit and license offices, health and similar facilities, etc.) should be sited in areas that are accessible (within 1/4 mile) by transit.

CF-34. The City shall encourage other agencies to follow these siting principles in considering new sites for public buildings.

CF-35. The location of religious institutions, private schools, community centers, parks and similar public or institutional facilities shall be related to the size of the facility and the area served. Citywide facilities should be sited in visible and accessible locations.

CF-36. Small public or institutional facilities intended to serve one or two residential neighborhoods may be located within a neighborhood. Larger public or institutional facilities intended to serve mainly Auburn residents or businesses shall be located along major arterial roads within the community-serving area of Auburn; however, elementary schools should be given flexibility to locate along smaller roads. Buffering from adjacent land uses may be required.

CF-37. The location of utility facilities is often dependent upon the physical requirements of the utility system. Sewage lift stations, pump stations, water reservoirs, and other similar facilities should be sited, designed, and buffered (through extensive screening and/or landscaping) to fit in harmoniously with their surroundings. When sited within or adjacent to residential areas, special attention should be given to minimizing noise, light, and glare impacts.

CF-38. Public facilities of an industrial or heavy commercial character should be confined to the region-serving area of Auburn, unless no other reasonable siting opportunity exists, in which case siting still must comply with applicable zoning standards. Examples of such facilities are the City maintenance and operations facility, state and regional solid waste facilities, and the Auburn School District bus barn.

CF-39. The siting and relocation of City maintenance and operation facilities shall be responsive to growing demands for utility, transportation, and fleet services, and shall also account for the City's role in emergency preparedness and response.

Goal # 7 - Essential Public Facilities

Essential public facilities include those facilities that are typically difficult to site such as airports, state education facilities, state or regional transportation facilities as defined in RCW 47.06.140, state and local correctional facilities, solid waste handling facilities, and in-patient facilities including substance abuse facilities, mental health facilities, group homes, and secure community transition facilities as defined in RCW 71.09.020."

More generally, essential public facilities are facilities, conveyances, or sites that meet the following definition: (1) the facility, conveyance or site is used to provide services to the public; (2) these services are delivered by government agencies, or private or nonprofit organizations that are under contract to or with substantial funding from government agencies, or by private firms or organizations subject to public service obligations; and (3) the facility or use of the site is necessary to adequately provide a public service.

The Growth Management Act requires that a local comprehensive plan include a process for siting essential public facilities. The Growth Management Act includes these provisions because siting certain public facilities has become difficult due to the impacts many of these facilities have on the adjacent community. Many factors contribute to this problem, including increased demand for facilities to serve a growing population, increased competition for land as the state becomes more urbanized, problems with siting processes, and judicial decisions that compel jurisdictions to provide certain facilities. By including a process for siting essential facilities in the Comprehensive Plan, deficiencies in the siting process can be minimized.

This section contains Auburn's process for siting essential public facilities. This is an interim process until development regulations are incorporated into city code.

When that process is developed, Auburn may modify these procedures to reflect the Council's recommendation.

Policies:

CF-40. Essential Public Facility Siting Process.

1. The City will review proposals through the process outlined in Policies 3 through 8 below, if the essential public facility largely serves a regional, countywide, statewide, or national need, and is included in a policy sense within an adopted state or regional plan that meets both of the following criteria:

    a. The state or regional plan was developed through an appropriate public process (including at least one local public hearing) and has undergone a NEPA and/or SEPA review.

    b. A clear policy statement supporting the type of facility proposed must be included. The plan should also include, in a policy sense, a set of siting guidelines to be used for such a facility. Such criteria may include but are not limited to the type and sufficiency of transportation access, colocation requirements, preferred adjacent land uses, on- or off-site security and/or mitigation, and required public facilities and services.

2. If the essential public facility largely serves a regional, countywide, statewide or national need and is not part of an adopted state or regional plan, the proponent will be required to request that the appropriate state or regional plan be amended to include the proposal meeting the criteria contained in Part 1 above. The proposal will also be reviewed following the process outlined in Parts 3 through 8.

Essential Public Facilities of a regional, countywide, statewide, or national nature:

3. Essential public facilities of a regional, countywide, statewide or national nature will be reviewed by the City through the special area plan process. The boundaries of the special area plan will be set at a scale directly related to the size and magnitude of the proposal. For facilities of regional, state, and national need, an alternative analysis will be performed, but will not be limited to, the guidelines described in Part 1 above. Auburn staff shall participate in the review process of Part 1 above, and use the data, analysis, and environmental documents prepared in that process to aid the City's special area plan review, if Auburn determines that those documents are adequate. If the facility requires other development permits, those approvals also shall be considered within the review process.

4. Impacts of the proposed essential public facility must be identified and an appropriate mitigation plan developed. Unless otherwise governed by state law, the financing strategy for the mitigation plan shall be structured so that the costs of the plan shall be allocated proportionally on a benefit basis using nonlocal sources of funding, although local sources of funding may also be used.

5. The special area plan process to be used for essential public facilities of a regional, countywide, statewide or national nature shall follow the City's Comprehensive Plan amendment process that includes multiple opportunities for public involvement.

6. An analysis of the facility's impact on City finances shall be undertaken. If the study shows that locating a facility in a community would result in a disproportionate financial burden on the City of Auburn, an agreement with the project's proponents must be executed to mitigate the adverse financial impact or the approval shall be denied.

Essential Public Facilities of primarily local nature:

7. If the essential public facility meets largely local needs (for example, in-patient facilities, including substance abuse facilities, mental health facilities and group homes), the facility shall be considered based upon Section 8 below.

All Essential Public Facilities:

8. The following criteria shall be used to evaluate all applications to site essential public facilities:

a. Whether there is a public need for the facility

b. The impact of the facility on the surrounding uses and environment, the City and the region

c. Whether the design of the facility or the operation of the facility can be conditioned, or the impacts mitigated, in a manner similar to those used in traditional private development, in order to make the facility compatible with the affected area and the environment

d. Whether a package of mitigating measures can be developed that would make siting the facility within the community more acceptable.

e. Whether the factors that make the facility difficult to site can be modified to increase the range of available sites or to minimize impacts on affected areas and the environment.

f. Whether the proposed essential public facility is consistent with the Auburn Comprehensive Plan.

g. Essential public facilities shall comply with any applicable state siting and permitting requirements (e.g., hazardous waste facilities).

h. Whether the State proves by clear, cogent, and convincing evidence that (1) a sufficient and reasonable number of alternative sites have been fully, fairly, and competently considered, and (2) such sites were found to be unsuitable for an SCTF for reasons other than the cost of property.

i. Whether careful analysis has been completed to show that siting of the facility will have no undue impact on any one racial, cultural, or socioeconomic group, and that there will not be a resulting concentration of similar facilities in a particular neighborhood, community, jurisdiction or region.

CF-41. The Planning Director or designee shall determine whether a development application will result in a significant change of use or a significant change in the intensity of use of an existing essential public facility. If the Planning Director or designee determines that the proposed changes are significant, the proposal will be subject to the essential public facility siting process as defined in Goal #4, Policy CF-10. If the Planning Director or designee determines that the proposed changes are insignificant, the application shall be reviewed through the City's standard development review procedures. The Planning Director or designee's determination shall be based upon:

a. The proposal's impacts on the surrounding area.

b. The likelihood that there will be future additions, expansions, or further activity related to or connected with the proposal.

CF-42. One of the difficulties of siting essential public facilities is that they are allowed in some but not all appropriate areas. To help address this problem, Auburn shall allow essential public facilities in all zones where they would be compatible. The types of facilities that are compatible will vary with the impacts likely from the facility and the zoning district. Essential public facilities are likely most compatible in the M-2 Heavy Industrial Zoning District. Uses within the zone may generate more externalities to the surrounding area.

CF-43. Essential public facilities shall be allowed in those zoning districts in which they would be compatible, and impacts can be mitigated. In situations where specific development standards cannot be met, but it is determined that the facility can be made compatible, the City Council can waive those specific standards with the requirement that appropriate mitigation is provided. The M-2 Zoning District should include broad use categories that allow all essential public facilities that are difficult to site as permitted or conditional uses as appropriate.

CF-44. Essential public facilities should be equitably located throughout the City, county and state. No jurisdiction should absorb a disproportionate share.

CF-45. Essential public facilities of a regional, countywide, statewide, or national nature should be restricted to the region-serving area of Auburn. Such facilities should be located in relationship to transportation facilities in a manner appropriate to their transportation needs. Extensive buffering from adjacent uses may be required. Facilities that generate a significant amount of truck traffic should be located such that they are served by existing truck routes or mitigation provided to address impacts on the street network.

AGENDA BILL APPROVAL FORM

Agenda Subject:
Utilities Element Presentation (Steiner)

Date:
June 25, 2024

Department:
Community Development

Attachments:
[Attachment C - Utilities Element Presentation]
[Attachment D - V2 Draft Utilities Element]

Budget Impact:
Current Budget: $0
Proposed Revision: $0
Revised Budget: $0

Administrative Recommendation:

Background for Motion:

Background Summary:

Reviewed by Council Committees:

Councilmember:

Staff: Steiner

Meeting Date: July 2, 2024

Item Number:

CITY DEPARTMENTS

2024 COMPREHENSIVE PLAN – UTILITIES ELEMENT

JOSH STEINER, AICP, SENIOR PLANNER
PLANNING COMMISSION

JULY 2, 2024

Department of Community Development
Planning • Building • Development Engineering • Permit Center
Economic Development • Community Services • Code Enforcement

AUBURN VALUES

SERVICE
ENVIRONMENT
ECONOMY
CHARACTER
SUSTAINABILITY
WELLNESS
CELEBRATION

2024 PERIODIC COMPREHENSIVE PLAN – UTILITIES FACILITIES ELEMENT

IMAGINE AUBURN
COMPREHENSIVE PLAN UPDATE 2024

Core Changes to Utilities Use Element

- **Regulatory Requirements (RCW 36.70A.070)**

(3) A Utilities Element consisting of:

(a) General location, proposed location, and capacity of all existing and proposed utilities including, but not limited to, electrical, telecommunications, and natural gas systems. Forecast of the future needs for such capital facilities;

(b) Identify all public entities that own utility systems and endeavor in good faith to work with other public entities, such as special purpose districts, to gather and include within its utilities element the information

2024 PERIODIC COMPREHENSIVE PLAN – UTILITIES FACILITIES ELEMENT

IMAGINE AUBURN
COMPREHENSIVE PLAN UPDATE 2024

Element and Plan Alignment

- How the Elements and Plans Fit Together

- Capital Facilities Element – Inventory, Level of Service, Future Plans, Growth, Essential Public Facility Policies, Municipal Buildings Policies
- Utilities Element – Overview of City-owned and Privately-Owned Utilities, and References to Other Plans, Privately-Owned and Solid Waste Policies
- Capital Facilities Plan – Project Finances and Financial Policies. Combined with CFE, satisfies GMA Comp Plan Requirements.
- Water, Sewer, and Stormwater Systems Plans – Technical Information and Policies
- Privately-owned Utility Plans– Technical Information and Policies. Not included as part of Comp Plan.

SERVICE • ENVIRONMENT • ECONOMY • CHARACTER • SUSTAINABILITY • WELLNESS • CELEBRATION

2024 PERIODIC COMPREHENSIVE PLAN – UTILITIES ELEMENT

Core Changes to Utilities Element

- Element Update Framework

  - Consolidate Private Utilities and City-owned utilities policies and information into one Element
  - City-owned utilities was located in Capital Facilities Element and Capital Facilities Plan
  - Incorporate information from Systems Plan and Reference
  - Overall formatting and refinements for readability

  - Few comments from agencies
  - Multi-Department Effort

IMAGINE AUBURN
COMPREHENSIVE PLAN UPDATE 2024

Core Changes to Utilities Element

Capital Facilities Types

- **City-Owned and Operated Utilities**
  - **Water**
  - **Stormwater**
  - **Sewer**
- **Private Utilities**
  - **Electricity and Natural Gas**
    - **Puget Sound Energy provides services to most of city**
    - **Enumclaw Natural Gas serves residential customers in Auburn Adventist Academy area**
  - **Telecommunications**
    - **Conventional Telephone service by CenturyLink**
    - **Cellular Telephone towers throughout city, regulated by FCC**
    - **Cable television provided by Comcast through aerial and underground cables**

Core Changes to Utilities Element

- Policy Updates

  - Water, Sewer, Stormwater policies in individual System Plans adopted by reference
  - Utility Element policies focus on private utility services, but do not include specific policies developed by service providers. Addressed at a high level.
  - No updates to private utility goals and policies.

2024 PERIODIC COMPREHENSIVE PLAN – UTILITIES ELEMENT

Next Steps

- **July 16th** – Public Hearing
  - Requested updates based on feedback

- **October 23rd** – Planning Commission Action (same night as Capital Facilities Element and Water Comprehensive Plan action)

Questions, Discussion, and Feedback

City of Auburn

Utilities Element

Table of Contents

Intent of the Utilities Element

The Utilities Element is required by the Department of Commerce to be included in the Comprehensive Plan per RCW 36.70A.070, and consists of the general location, proposed location, and capacity of all existing and proposed utilities including electrical, telecommunications, and natural gas systems. This Element generally describes these "privately-owned" services, as well as solid waste services, however Auburn does not own or operate these services and relies on outside service providers such as Puget Sound Energy and Waste Management.

This Element includes descriptions of "privately-owned" and summaries of city-owned and operated utilities such as water, sewer, and stormwater. Detailed information for both privately-owned and city-owned utilities can be found in the Water, Sewer, and Stormwater Systems Plans adopted by the City and referenced in the Comprehensive Plan, and by contacting privately-owned utility providers.

Values

<u>Character:</u> Utilities will provide a positive contribution to the quality, aesthetics, and functionality of the community.

<u>Wellness:</u> Utility infrastructure and systems support the delivery of safe and efficient electricity, gas, and telecommunications.

<u>Service:</u> Utility infrastructure and systems support the City's goals of providing accessible and transparent government services and processes.

<u>Economy:</u> Businesses are served by utility infrastructure meeting or exceeding the needs for market entry and future growth.

<u>Celebration:</u> Telecommunication systems are fully utilized to reach a broader cross-section of the community in a way that brings people together for civic activities, cultural events, and social awareness.

<u>Environment:</u> Siting, installation, and maintenance of utilities will ensure protection, preservation, and respect of the wildlife habitat, water quality, and environmentally sensitive features.

<u>Sustainability:</u> When designing, constructing, and maintaining utilities, a long-term investment horizon is favored over concepts that only provide short-term benefits and outcomes.

City-Owned and Operated Utilities

Introduction

This section provides overall policy direction for the different utility services provided by the city, including water, sewer, and stormwater facilities. A key provision of the Growth Management Act is concurrency. In general, concurrency seeks to ensure that development is permitted only if adequate public facilities are, or can be guaranteed to be, available to support new development. Concurrency requires that facilities needed to maintain a locally adopted level of service be provided "concurrently" with development. Concurrency places the finance function of local government in a much more prominent role in the land use development process. While the concept of concurrency is new to many jurisdictions, it has been used in Auburn since the adoption of its 1986 Comprehensive Plan.

Conditions and Trends

Accommodating Growth

The provision and sizing of public facilities such as streets or waterlines and sewer lines can influence the rate or timing of development and is an important means of managing growth. Timed provision of facilities also ensures that new development can be assimilated into the existing community without serious disruptions or adverse impacts. This Plan establishes policies to allow development when and where all public facilities are adequate or can be made adequate, but only if such development can be adequately served by public facilities and services consistent with the adopted level-of-service standards.

Utility Services

The following services are owned and operated by the City of Auburn.

Water System

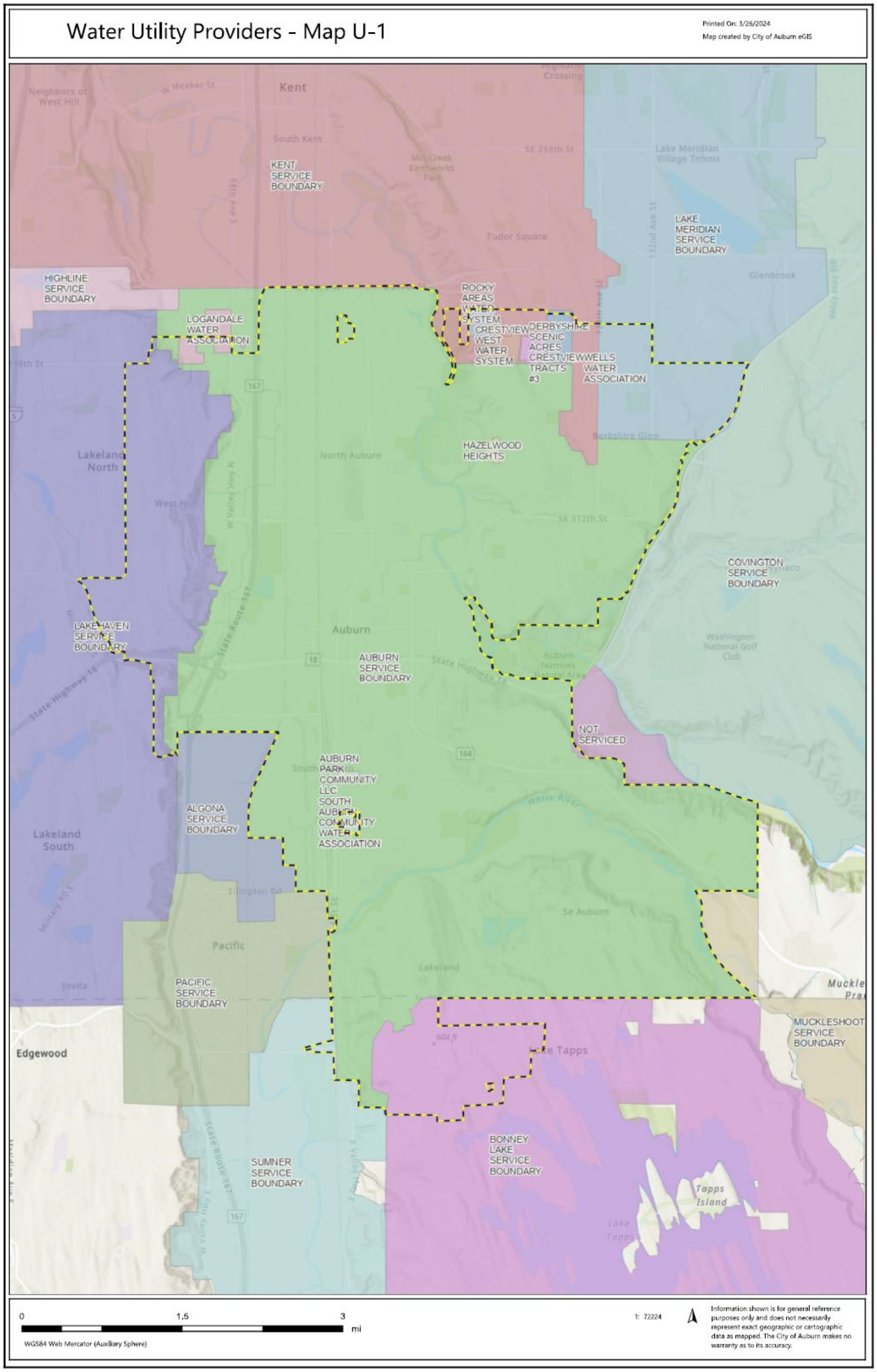
The City of Auburn (City) manages the water utility in accordance with established water- system policies that govern various facets of utility operations. City policies are established by the City in order to provide a vision or mission of the water utility and to provide a framework for the design, operation, and ongoing wellbeing of the City's water utility.

The policies included in this Water Comprehensive Plan are developed specifically for the City's multi-source municipal water system and seek to provide consistent treatment to all utility customers and to provide documentation to current water-system customers as well as those considering service from the City. It should be noted that what is included in these policies is limited to those things related to the water system and its design, maintenance, and operation. There are other policies and criteria that pertain to the water utility the City has in place regarding land use, development, and financial components, which are not directly addressed in this plan, that could still have an impact on the needs of the water system. These policies and criteria may include factors such as zoning regulations, building codes, infrastructure requirements, and financing options. These additional factors will be considered when planning for the water system, to meet the needs of the community in a sustainable and effective matter.

The City's Water Comprehensive Plan is based upon the following mission statement for the water utility: "The City will provide for the efficient, environmentally sound and safe management of the existing and future water system within Auburn's service area."

- The City's Water utility policies are grouped within goal statements that are headlined under the following categories:
- Business Practices
- Service Area
- Operations and Maintenance
- Financial
- Planning
- Environmental Stewardship
- Design and Construction

Map U-1 – Water Utility Providers



Stormwater Systems

This chapter describes a set of overarching goals for the City's Storm Drainage Utility and policies for complying with these goals.

UE-83 City Comprehensive Plan Consistency

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

UE-84 Storm Drainage Comprehensive Plan Policy Goals

The City's Storm Drainage Utility policies are grouped within goal statements that are headlined under the following categories:

- System Planning
- Operations and Maintenance
- Fiscal Responsibility
- Environment and Regional Coordination

Taken together with the City Comprehensive Plan and Auburn City Code (ACC) these goals define how the Storm Drainage Utility shall be operated and maintained. Several policies have been developed within each goal, many of which are also based on the Washington Department of Ecology Stormwater Management Manual (SWMMWW) and the City's Phase II National Pollutant Discharge Elimination Stormwater Permit (NPDES).

Sewer Systems

The City desires to employ recognized best business practices that result in an efficient and cost-effective operation of the Sanitary Sewer Utility. The City shall identify the key business functions within the Sanitary Sewer Utility (e.g., billing, permitting, asset management, and planning) and develop supporting best business practices for each.

The City understands that defining and implementing best business practices is a long-term effort and will require a stepwise approach. Given that the Sanitary Sewer Utility is made up largely of physical assets that have the greatest value and deserve the greatest commitment to operate and maintain, the City shall continue to prioritize the business practice of asset management.

Asset management is a systematic approach to maintaining assets in good working order to minimize future costs of maintaining and replacing them, especially to avoid costly deferred maintenance. The best practices for asset management involve systematically basing choices on an understanding of asset condition and performance, risks, and costs in the long term. Asset best practices include:

- Having extensive knowledge about assets and their costs for maintenance and replacement (i.e., detailed inventories);
- Maintaining Levels of Service;
- Taking a life-cycle approach to asset management planning; and
- Implementing the planned solutions to provide a reliable, cost-effective service.

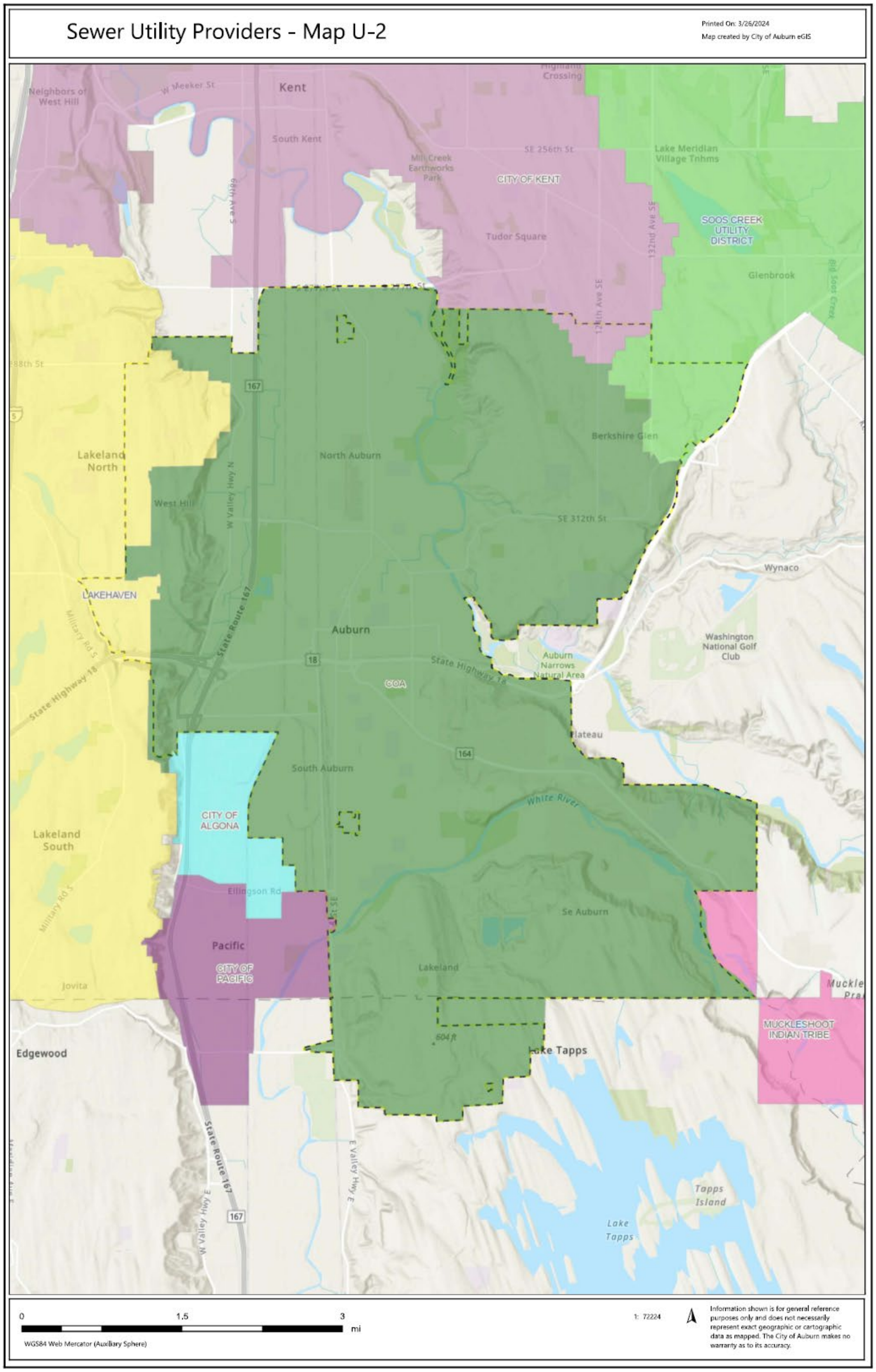
Since the adoption of the 2016 Comprehensive Sewer Plan, the Sanitary Sewer Utility has compiled an inventory of assets and their conditions for approximate 70% of its currents assets. The Sanitary Sewer Utility shall continue implementing the above best practices during the next planning period.

Sewer Comprehensive Plan Policies, Standards, and Guidelines

This Plan presents policies and standards related to system development, maintenance, funding, and generally how the Sanitary Sewer Utility should operate. These policies define limits and outline how the wastewater collection system should be operated and maintained and are grouped within goal statements that are headlined under the following categories:

- Service Area
- System Planning
- Operations and Maintenance
- Environmental Stewardship
- System Performance and Reliability
- Fiscal Responsibility

Map U-2 – Sewer Utility Providers



Private Utilities

Introduction

The Growth Management Act requires the City of Auburn to include a Private Utilities Element within its Comprehensive Plan. The element should pro- vide a framework for the efficient and predictable provision and siting of utility facilities and ser- vices within the City, consistent with each serving utility's public service obligations. This element covers private utilities (those not provided by the City of Auburn), and includes electricity, telecommunications, and natural gas. City-owned water, sewer, and stormwater utilities are described within the Capital Facilities Element (Chapter 3) of this Comprehensive Plan.

Investor-owned utilities in the state of Washington are regulated by the Washington Utilities and Transportation Commission. State law regulates the rates, charges, services facilities, and practices of utilities. Any changes in policies of these aspects of utility provision require WUTC approval.

The primary responsibility for the planning of private utilities rests with utility providers. Clearly, however, planning cannot take place without open lines of communication between the City and utility providers. The City acknowledges that some private utility providers are not willing to provide capacity or future construction plans, as some of this information may affect their competitiveness or be considered proprietary. Private utilities, however, must recognize that not providing relevant information may hinder the City's ability to assist them in their projects.

Vision

Private utilities in Auburn are planned, designed, and constructed in a manner that adequately supports the future growth scenarios predicted in the City's Land Use Element and that meets the needs of residents, visitors, and businesses. Sustainability is a principle that guides decisions for where utilities are placed, how they are constructed, how they are operated and maintained, and how all aspects of design, construction, and operation are funded.

Electricity and Natural Gas

Puget Sound Energy provides electrical and natural gas service to the City of Auburn and its potential annexation area. PSE is an investor-owned private utility that provides service to approximately 1.2 million customers in a service area that covers 6,000 square miles.

Electricity

PSE builds, operates, and maintains an electrical system consisting of generation, transmission, and distribution facilities. Facility technology for electricity transmission may change in the future in order to respond to the need for more efficient facilities, address various electromagnetic field and health concerns, and diversify resources. Utility policies should be updated in the future to consider changes in technology, facilities, and services.

Natural Gas

The Northwest Pipeline Corporation and Enumclaw Natural Gas also have gas lines in the southeastern portion of the City. Northwest

Pipeline Corporation's only customer in Auburn is Enumclaw Natural Gas. Enumclaw Natural Gas serves Auburn residential customers in the area of the Auburn Adventist Academy.

Telecommunications

Telecommunications includes a wide range of services including conventional telephone, cellular telephone, and cable television. Telecommunications technology continues to change rapidly. The City of Auburn owns and maintains a robust fiber optic Metropolitan Area Network (MAN) that connects most City owned building facilities and traffic signals throughout the Auburn area.

Conventional Telephone

Conventional local telephone service to the City is provided by CenturyLink. CenturyLink is a global provider of telecommunications services.

Calls are switched at facilities called central offices. Typically, four main lines leave each central office – one in each direction. Auburn's central office is located in downtown Auburn.

Several carriers provide long distance service to the area. These providers have underground fiber-optic cables passing through the City of Auburn.

Cellular Telephone

Cellular telecommunications provide mobile telephone communications via radios that send and receive signals from a network of receivers mounted on utility poles, towers, buildings, or other structures on private property or within a right-of-way. Cellular communication companies offer digital voice, messaging, and high-speed wireless data services to customers.

Cellular telephone service within the City, its potential annexation areas, and the Puget Sound region overall is provided by multiple private companies. Cellular providers are regulated by the Federal Communications Commission. Technology and business practices in the area of telecommunications continue to change rapidly.

Cable Television

Cable television service is provided by Comcast through a combination of aerial and underground cables. The locations of existing and planned cable lines are shown on Map 6.4.

Solid Waste

The City of Auburn contracts with WM for collection of municipal garbage, recycling, and yard waste. Waste Management disposes of Auburn's garbage at a King County Solid Waste transfer station. Recycling is processed at WM's material recycling facility in Tacoma, WA. WM takes the yard and food waste to either DTG in Tacoma, WA or Cedar Grove in Maple Valley, WA to be converted into compost. There is a small area of Auburn that was recently annexed. This area is serviced by Republic Services. Republic Services takes the garbage to a King County Solid Waste transfer station, the recycling is processed at their material recycling center in Seattle, WA, and yard and food waste is taken to Cedar Grove in Maple Valley, WA. There are approximately 20,200 Waste Management accounts as of 2024.

Goals and Policies

The following are Goals and Policies related to the private utility providers and ongoing coordination with those providers to help accommodate future growth planned in the Comprehensive Plan.

Goal # 1 – Service Area

Allow the development of private utilities to meet the needs of the existing community and provide for its planned growth consistent with serving utilities' public service obligations.

Policies:

U-1. Private utility providers will utilize the City's Comprehensive Plan Map for guidance regarding future land uses and intensities in order to determine and plan for future service. Private utility facilities and systems should be consistent with the uses and densities allowed by the Comprehensive Plan and Zoning Code. The City will make this information easily available to utility providers. The City will also coordinate with utility providers on pending development proposals (both public and private). In return, the City expects a cooperative posture toward coordinated and timely expansion of infrastructure.

U-2. Private utility companies should strive to provide utility services to all segments of the Auburn population and areas of the community in an equitable manner that prioritizes easy access and that offers pricing structures that strive to reduce barriers that otherwise exclude portions of the community.

U-3. Construction of facilities and provision of services by private utility providers within the City of Auburn shall be in compliance with all of the goals and policies of this Comprehensive Plan.

Goal # 2 – Compatibility in the Community

Prioritize visual quality of private utility facilities consistent with the serving utilities' public service obligations.

Policies:

U-4. The City shall require that new private utility distribution, service, and telecommunication lines be located underground within all new developments. The City will also work with utility companies to relocate existing distribution, service, and telecommunication lines underground as a part of new development whenever it is technologically feasible, and as part of City capital roadway projects whenever it is economically and technologically feasible. Expansions and upgrades completed by private utilities will be required to be underground unless they meet appropriate exemptions.

U-5. To reduce visual clutter, antennas, relay mechanisms, and similar structures should be located on existing poles, structures, or buildings whenever possible. When deemed feasible and necessary to minimize impacts on adjacent uses or views by the City, visual screening may be required.

U-6. The location of utility facilities is often dependent upon the physical requirements of the utility system. All utility facilities should be sited, designed, and buffered (through extensive screening and/or landscaping) to fit in with their surroundings harmoniously and safely. When sited within or adjacent to residential areas, special attention should be given to minimizing noise, light, and glare impacts.

U-7. Utility service boxes and cabinets should be designed, oriented and/or treated with in a manner intended to reduce the likelihood of graffiti tagging, contribute to Auburn's arts and culture programming, and to enhance the overall appearance of the community.

U-8. Generator and back up generators that are located within residential areas should be visually screened and incorporate techniques that mitigate noise impacts consistent with local and state requirements.

U-9. Substations and maintenance buildings within residential areas should be screened, landscaped and/or designed in a manner that provides visual compatibility.

Goal # 3 – Safety and Efficiency

Prioritize the safe and efficient installation, maintenance and operation of private utility facilities consistent with the serving utilities' public service obligations.

Policies:

U-10. Common utility trenches should be encouraged and coordinated by both private and public providers whenever possible.

U-11. Decisions regarding private utility facilities within Auburn should consider the safe, adequate, and efficient availability of these utilities to other jurisdictions.

Goal # 4 – Sustainability and Equity

Prioritize equitable access to the services offered by private utility facilities and ensure that the location, installation and maintenance of private utilities is carried our in an environmentally sensitive manner.

Policies:

U-12. The City shall consider the environmental impacts of proposed utility facilities as a part of its environmental review process. When requested by the City, the utility provider shall furnish documentation of current research results and/or provide additional information related to determination of the potential environmental impacts, if any, from the proposed facilities.

U-13. Private utility companies are recognized as providers of important services necessary for maintaining current and future lifestyles as well as contributing to equitable community outcomes.

U-14. Private utilities that are permitted to operate within Auburn offer various technological means for accessing information, education, services, and assistance. Because Auburn believes that all residents should be afforded equal access to education, information and services private utility providers should seek to recognize and reduce access barriers.

Table 1 - List of Utility Providers

Provider	Contact Info	Map #
City of Auburn Water	Customer Service Center 1 East Main Street 2nd Floor Auburn, WA 98002 253-931-3010	U-1
Lakehaven Water and Sewer	31627A 1st Ave S P.O. Box 4249 Federal Way, WA 98063 253-941-1516	U-1
Lake Meridian Water	27224 144th Ave SE Kent, WA 98042 253-631-3770 Office	U-1
City of Kent Water	Kent City Hall 220 4th Ave S, Kent, WA 98032 253-859-3373	U-1

Bonney Lake Water	Public Services Center 21719 96th ST E Buckley, WA 98321 253-447-4319	U-1
Logandale Water Assoc.	PO Box 1254 Auburn, WA 98071	U-1
Hazelwood Heights Water Assoc.	30224 108TH Ave SE Auburn, WA 98092	U-1
Rocky Acres Water System	28120 105TH Ave SE Auburn, WA, 98092-4075	U-1
Crestview West Water System	PO Box 194 Kent, WA 98035-0194	U-1
Crestview Tracts Water System	11237 SE 286th St Auburn, WA 98092	U-1
Derbyshire Scenic Acres Water System	11628 SE 282ND ST Auburn, WA 98092-4051	U-1
Wells Water Assoc.	28804 124th Ave SE Auburn, WA 98092	U-1
Auburn Park Community Assoc.		U-1
South Auburn Community Assoc.	3005 C ST SE Auburn, WA 98002-8829	U-1
City of Auburn Sewer	Customer Service Center 1 East Main Street 2nd Floor Auburn, WA 98002 253-931-3010	U-2
Lakehaven Water and Sewer	31627A 1st Ave S P.O. Box 4249 Federal Way, WA 98063 253-941-1516	U-2
City of Kent Sewer	Kent City Hall 220 4th Ave S, Kent, WA 98032 253-859-3373	U-2
Soos Creek Water and Sewer District	14616 SE 192nd St Renton, WA 98058 253-630-9900	U-2
City of Auburn Stormwater	Customer Service Center 1 East Main Street 2nd Floor Auburn, WA 98002 253-931-3010	N/A – Consistent with City boundary
Puget Sound Energy – Electricity and Gas	www.pse.com 1-888-321-7779	N/A – Consistent with City boundary
Comcast	www. business.comcast.com 1-855-237-7896	N/A – Consistent with City boundary

Goal # 5 - Solid Waste

To provide area residents and businesses with a universal and compulsory system for collection and disposal of all solid waste, including ample waste reduction and recycling opportunities intended to maximize diversion of the City's waste stream away from costly landfills, incineration, or other solid waste disposal facilities, and to conserve exhaustible resources.

Policies:

U-15. The King County Solid Waste Management Plan and Solid Waste Interlocal Forum, except as modified by City of Auburn Ordinance No. 4413 and this Plan shall form the basis for solid waste management activities within the City.

U-16. The City shall continue to fund solid waste collection, disposal and waste reduction and recycling programs and services through the existing solid waste utility, with supplemental funding provided through available grants.

U-17. The City shall implement solid waste management programs and services that provide ample opportunities and incentives to maximize the community's participation in local and regional waste reduction and recycling efforts.

U-18. The City's solid waste management programs shall be developed to make waste reduction and recycling efficient, reliable, cost-effective, and convenient for all residents and businesses.

U-19. The City encourages and should promote the use of products manufactured from recycled materials, and the use of materials that can be recycled. City Departments and contractors shall use recycled and recyclable products whenever and wherever feasible.

U-20. The City shall implement solid waste reduction and recycling programs that have the cumulative effect maintaining the 50 percent waste reduction and recycling goal (recycling tons/total solid waste stream).

U-21. The City shall periodically monitor and evaluate the effectiveness of Auburn's waste reduction and recycling programs to ensure that local and state goals and policies are being met.

U-22. The City shall promote the recycling of solid waste materials by providing opportunities for convenient recycling and by developing educational materials on recycling, composting and other waste reduction methods.

AGENDA BILL APPROVAL FORM

Agenda Subject:
Water System Plan Presentation (Vondrak)

Date:
June 25, 2024

Department:
Community Development

Attachments:
[Attachment E - Water System Plan Presentation]
[Attachment F - Draft Water System Plan]

Budget Impact:
Current Budget: $0
Proposed Revision: $0
Revised Budget: $0

Administrative Recommendation:

Background for Motion:

Background Summary:

Reviewed by Council Committees:

Councilmember:

Staff: Vondrak

Meeting Date: July 2, 2024

Item Number:

ENGINEERING SERVICES

2024 COMPREHENSIVE WATER PLAN OVERVIEW AND UPDATE

RYAN VONDRAK, UTILITIES ENGINEERING MANAGER

PLANNING COMMISSION MEETING

JULY 2, 2024

Public Works Department

Engineering Services • Airport Services • Maintenance & Operations Services

AUBURN VALUES

SERVICE

ENVIRONMENT

ECONOMY

CHARACTER

SUSTAINABILITY

WELLNESS

CELEBRATION

2024 COMPREHENSIVE WATER PLAN OVERVIEW AND UPDATE

- **Auburn Comprehensive Plan Elements**
  - Core Plan (Community Development)
  - Land Use Element (Community Development)
  - Housing Element (Community Development)
  - Historic Preservation (Community Development)
  - Climate Change – NEW (Community Development)
  - Economic Development (Community Development)
  - Capital Facilities Element (Public Works)
  - Transportation Element (Public Works)
  - **Utilities Element (Public Works)**
  - Parks and Recreation (Parks)

IMAGINE AUBURN
COMPREHENSIVE PLAN UPDATE 2024

Citywide effort involving all departments coordinating together to create a cohesive, consistent, and forward-thinking Plan covering range of subject areas

PLAN DEVELOPMENT PROGRESS/MILESTONES

Spring 2023 – Council Review of Goals and Policies

- Update Existing System Information
- Update and Calibrate Hydraulic Model

Fall 2023 – Complete Population/ Employment Projections

- Future Demand Projections
- Identify Future Capacity Issues
- Plan for Future Projects and Assessments

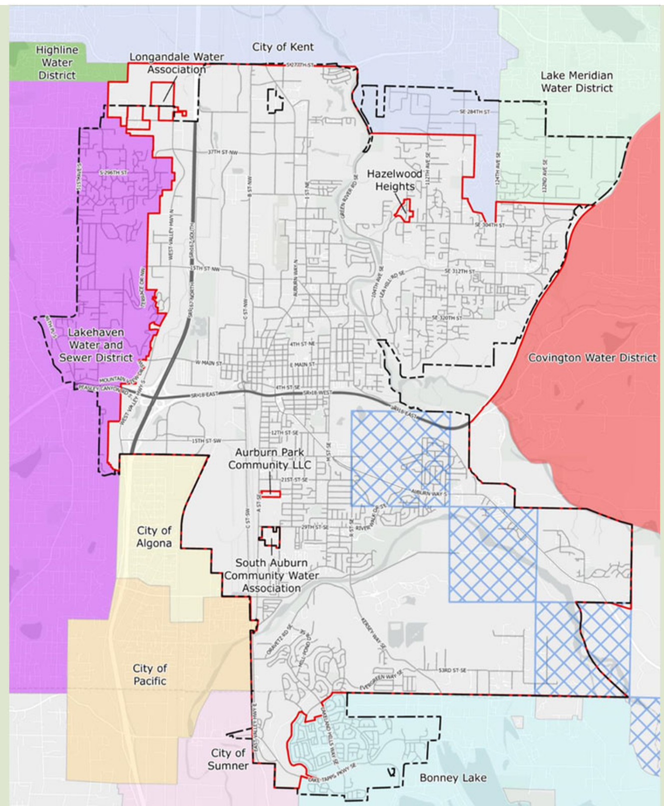
Spring/Summer 2024 - Planning Commission Review

- D.O.H. Review
- King County Review
- Pierce County Review
- Adjacent Purveyor Review
- SEPA Review

Fall 2024 – City Council Review and Adoption

2024 WATER UTILITY INTRODUCTION

- 4 Water Service Areas
  - Academy, Lakeland Hills, Lea Hill & Valley
- Sources of Water:
  - 6 active Wells, 2 Springs & 2 Interties (Tacoma)
- ≈ 306 miles Water Main
- Over 15,000 Service Connections



Service Area and Adjacent Purveyors

2024 WATER UTILITY INTRODUCTION

- 8 Pump Stations
  - 2 Treatment Facilities
- 8 Reservoirs
- Operate 1 Satellite System
- Provide Wholesale Water to Algona
- Produce ≈ 2.5 billion gallons of water per year

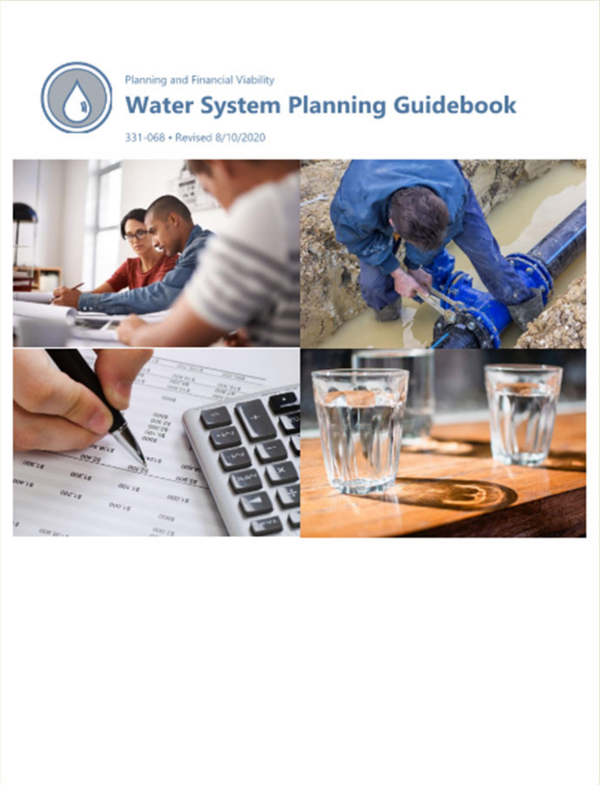
Fulmer Treatment Facility

Academy Pump Station

2024 WATER COMPREHENSIVE PLAN

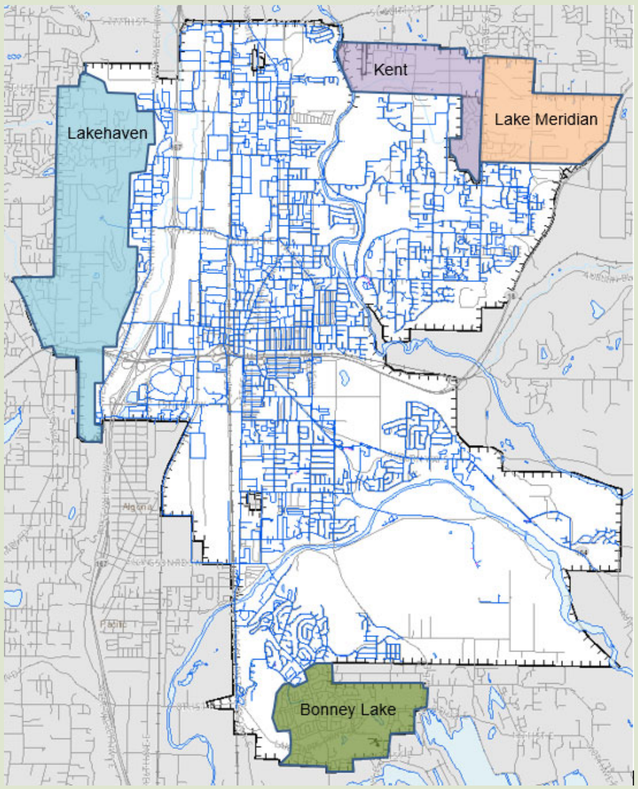
Key Elements

- Format updated to follow Department of Health (DOH) Guidebook and DOH Design Manual
- Creating 10-yr and 20-yr Planning Periods



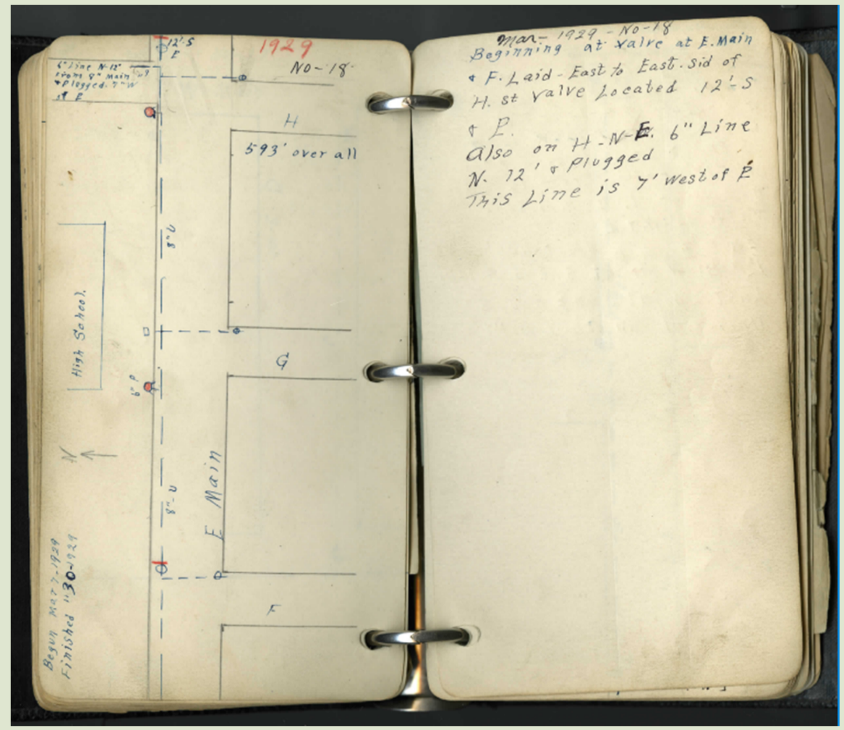
SERVICE • ENVIRONMENT • ECONOMY • CHARACTER • SUSTAINABILITY • WELLNESS • CELEBRATION

2024 WATER COMPREHENSIVE PLAN



Chapter 1 Description of the Water System

- Ownership and Management
- System History and Background
- Service Areas, Maps, and Land Uses
- System Policies
- Consistency



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2024 WATER COMPREHENSIVE PLAN

July 10, 2023

- Water Policies Review & Discussion

Goals

- Broad statements indicating a general aim or purpose to be achieved.

Policies

- Topic-specific statement providing guidelines for current and future decision-making.
- Indicates a clear commitment of the local legislative body.

Chapter 1 Description of the Water System

Policies:

- Business Practice
- Service Area
- Operations and Maintenance
- Financial
- Planning
- Environmental Stewardship
- Design and Construction

2024 WATER COMPREHENSIVE PLAN

Chapter 2 Basic Planning Data

- Water Service Area Population
- Water Service Connections and Usage
- Water Supply and Production
- Distribution System Leakage
- Water Supply Characteristics
- Water Supply Reliability Evaluation
- Future Population Projections and Land Use
- Future Water Demand

Number of Connections per Customer Classification

	2022
Single-Family Residential	11,980
Multi-Family Residential	1,052
Commercial	1,244
Manufacturing & Industrial	2
Schools	55
Municipal (City Accounts)	33
Irrigation	675
Wholesale	5
Number of Connections, Total	15,046

Historical Annual ADD, MDD, Peak Day, and Peaking Factor

	2015	2016	2017	2018	2019	2020	2021	2022
Annual Supply (MG)[1]	2,765	2,808	2,506	2,464	2,410	2,313	2,454	2,425
Average Day Demand (mgd)	7.57	7.67	6.87	6.75	6.60	6.32	6.72	6.64
Maximum Day Demand (mgd)	9.76	12.64	12.54	13.61	11.29	13.62	13.08	12.78
Max Day Date (month/day)	7/7	8/31	7/26	7/11	8/1	8/27	6/29	7/27
MDD/ADD Peaking Factor	1.29	1.65	1.83	2.02	1.71	2.15	1.95	1.92

2024 WATER COMPREHENSIVE PLAN

Chapter 3 System Analysis and Asset Management

- Asset Management – Inventory and Analysis
- Water Quality
- Design Standards
- Capacity Analysis
- Identify Deficiencies

RESIDENTIAL LEAD AND COPPER MONITORING

Residential lead and copper sampling was conducted in Summer 2021 to determine the concentrations of lead and copper that leach from residential water pipes and fixtures. Lead results ranged from <1 ppb to 6.6 ppb. Copper results ranged from <0.02 ppm to 0.294 ppm. The 90th percentile results for lead and copper were 1.3 ppb and 0.056 ppm respectively, which are below the Action Level for lead (15 ppb) and for copper (1.3 ppm).

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing.

The Auburn Water Utility is responsible for providing high quality drinking water, but cannot control the variety of materials used in its customers' plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for thirty seconds to two minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline at **800-426-4791** or at epa.gov/safewater/lead.

PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS)

PFAS are a group of manufactured chemicals that have been used worldwide since the 1940's. They are extensively utilized in industrial and consumer products, such as water and stain resistant and non-stick products, as well as certain firefighting foams. One of the primary concerns with PFAS is their persistence in the environment. Due to their chemical stability, PFAS can linger in soil, water, and air for extended periods without breaking down. This persistence means that even though some PFAS have been phased out of production, they continue to exist in the environment. There is still much to learn of these chemicals, however some PFAS possess the capacity to accumulate in human bodies over prolonged periods, potentially leading to adverse health effects. The City continues to track state and federal regulatory requirements pertaining to PFAS monitoring as they continue to evolve and is committed to delivering high quality water to our customers, meeting all regulatory requirements.

WATER USE EFFICIENCY

The main components of the City of Auburn Water Use Efficiency(WUE) program are managing the water distribution system to minimize water loss, and encouraging responsible use of water by our customers.

Water loss is the difference between the total water produced and the water used by our customers, presented here as a percentage of water produced. The City of Auburn Water Utility goal since 1999 has been to maintain water loss at or below 10 percent. In accordance with the Water Use Efficiency reporting requirements, the water loss for year 2023 is **6.7%**. The three year average for the years up to and including 2023 was **7.0%**. In an effort to limit water loss, the Utility performs annual system leak detection and repair; tests production and service meters, calibrating or replacing them as required; and issues permits for water withdrawal from hydrants.

Responsible water use by our customers is promoted by the Utility through educational programs for school children and homeowners. Quantifying the benefit of educational programs and corresponding behavioral changes is difficult, but reductions in water use and/or waste can have a significant impact on the amount of water used as a whole. The City of Auburn is committed to efficiently managing the water distribution system and encourages you to use water wisely.

The City's Water Use Efficiency Annual Performance Report and other information regarding Auburn's Water Use Efficiency program are available on the City of Auburn's website at visit auburnwa.gov/water.

FLUORIDE

The City of Auburn does not add fluoride to your drinking water. In 2023, Fluoride levels present in Auburn's water range from 0.0-0.2 ppm. If you have questions about fluoride for dental use, please consult with your doctor or dentist. For more information on fluoride in drinking water, visit the Environmental Protection Agency (EPA) website at epa.gov/ground-water-and-drinking-water.

CROSS CONNECTION PROGRAM

Protecting Our Water System From Contamination

A cross connection is a connection between a water pipe and a source of contamination. Examples of cross connections within the home include hose ends submerged in pools, hot tubs or buckets, irrigation systems and most hose-end spray applicators. Cross connections are extremely dangerous because they provide opportunities for contaminated fluids to be pulled back into the water system.

To protect our water supply, avoid using hose-end sprayers and maintain an air gap by keeping the hose end above the water surface when filling containers. Irrigation systems are required to have a backflow assembly. Backflow assemblies require a plumbing permit, must be inspected by a cross connection specialist, and must be tested by a certified tester when installed, and yearly thereafter. For more information or a list of certified testers, call the Water Division at **253-931-3048** or visit auburnwa.gov/water.

PARAMETER	STANDARDS		SAMPLE RESULTS		ADDITIONAL INFORMATION
	MCLG	MCL	Average	Range	Typical Source/Comments
INORGANIC SUBSTANCE					
Arsenic (ppb)	0	10		ND - 1.8	Erosions of natural deposits. Most recent sampling date and data are from the most recent testing done in accordance with the regulations.
Nitrate (ppm)	10	10		0.28 - 3.32	Natural deposits, fertilizer, septic tanks
SYNTHETIC ORGANIC SUBSTANCE					
PFOA (ppt)	NA	10			
PFOS (ppt)	NA	15			
PFHxS (ppt)	NA	65		ND	Run-off or leaching from firefighting foam. Industrial discharge, landfills and wastewater treatment plants
PFNA (ppt)	NA	9			
PFBS (ppt)	NA	345		2.8 - 3.1	
VOLATILE ORGANIC SUBSTANCE					
Haloacetic Acids (ppb)	NA	60		ND	By-product of drinking water disinfection
Total Trihalomethanes (ppb)	NA	80		8.42 - 10.02	By-product of drinking water disinfection
OTHER MONITORED SUBSTANCE					
Chlorine Residual (ppm)	4 (MRDL)	4 (MRDLG)	0.59	0.30 - 0.77	Measure of disinfectant added to water
Manganese (ppb)		50 (SMCL)		ND	Black to brown color, black staining; Bitter metallic taste

UNIT DESCRIPTION

NA: Not applicable
ND: Not detected
ppm: parts per million, or milligrams per liter (mg/l)
ppb: parts per billion, or micrograms per liter (µg/l)
ppt: parts per trillion, or nanograms per liter (ng/l)

DEFINITIONS

MCL | Maximum Contaminant Level
The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.

MCLG | Maximum Contaminant Level Goal
The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

MRDL | Maximum Residual Disinfectant Level
The highest level of a disinfectant allowed in drinking water.

MRDLG | Maximum Residual Disinfectant Level Goal
The level of a drinking water disinfectant below which there is no known or expected risk to health.

SMCL | Secondary Maximum Contaminant Level
The secondary standards are set to give public water systems some guidance on removing those chemicals to levels that are below what most people will find to be noticeable. They are non-mandatory and non-enforceable.

REQUIRED HEALTH INFORMATION FROM THE EPA

HEALTH ISSUES

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. Environmental Protection Agency (EPA)/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the EPA's Safe Water Drinking Hotline at **800-426-4791**.

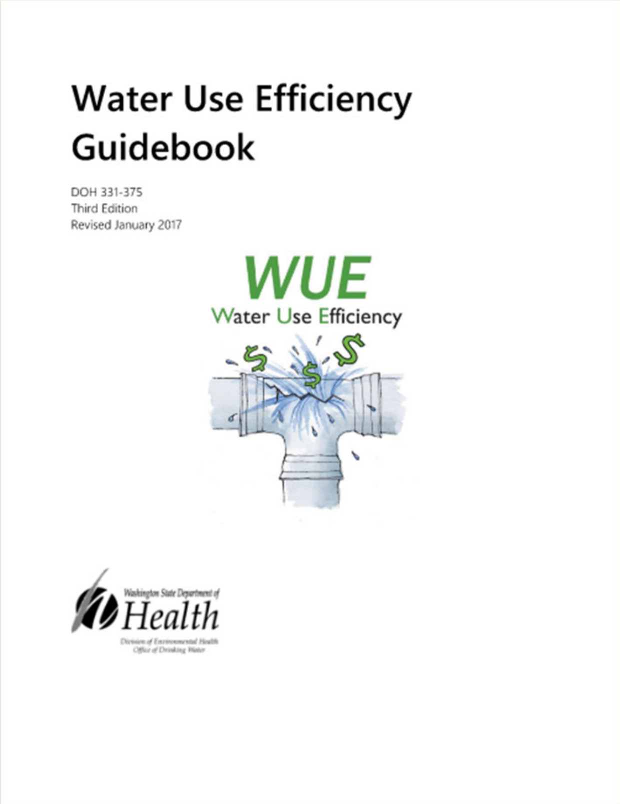
CONTAMINANTS AND REGULATIONS

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the EPA Safe Drinking Water Hotline at **800-426-4791**. The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity. Microbial contaminants, such as viruses and bacteria, may come from septic systems, livestock and wildlife. Inorganic contaminants, such as salts and metals, can be naturally occurring or result from urban stormwater run-off, septic systems or fertilizer use. Pesticides and herbicides may come from a variety of sources such as agriculture, urban stormwater run-off and residential uses. Organic chemical contaminants, including synthetic and volatile organic chemicals, are by-products of industrial processes and petroleum production, and can also come from gas stations, urban stormwater run-off, and septic systems. Radioactive contaminants can be naturally occurring or be the result of oil and gas production and mining activities. In order to ensure that tap water is safe to drink, EPA prescribes regulations that limit the amount of certain contaminants in water provided by public water systems. Food and Drug Administration regulations set limits for contaminants in bottled water that are intended to provide similar protection for public health.

2024 WATER COMPREHENSIVE PLAN

Chapter 4 Water use Efficiency

- Source and Service Metering
- Distribution System Leakage
- Water Use Efficiency Program
- Water Use Efficiency Savings
- Climate Change Resiliency



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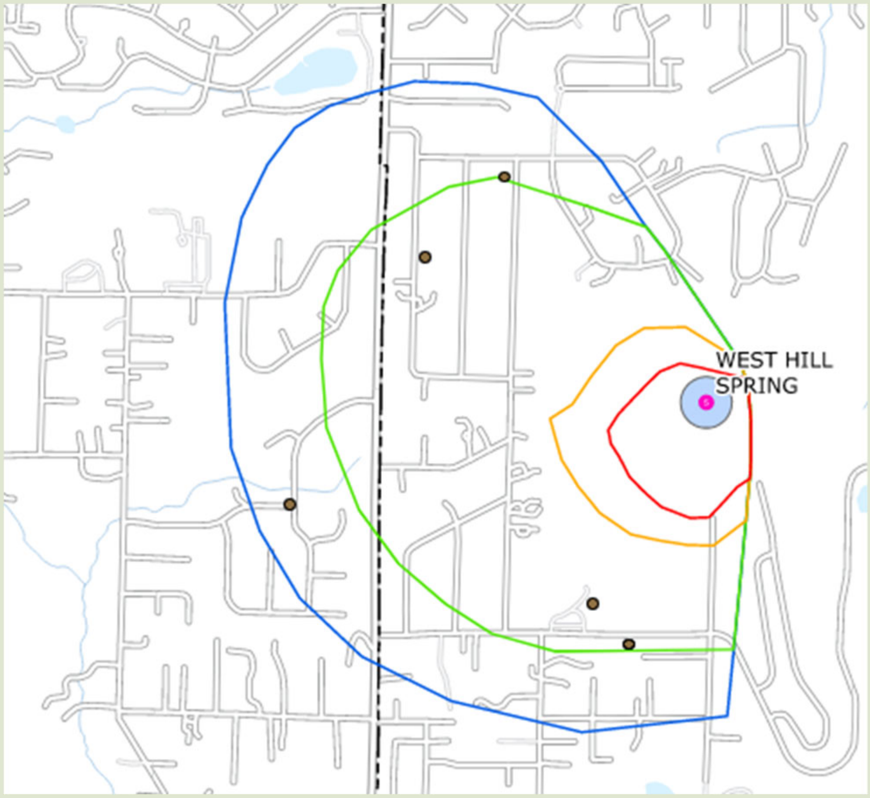
2024 WATER COMPREHENSIVE PLAN

Chapter 5 Source Water Protection

- Sanitary Control Area
- Wellhead Protection Program



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2024 WATER COMPREHENSIVE PLAN

Chapter 6 Operation and Maintenance Program

- Water System Management and Personnel
- Operations and Preventive Maintenance
- Comprehensive Water Quality Monitoring
- Emergency Preparedness and Response
- Safety Procedures

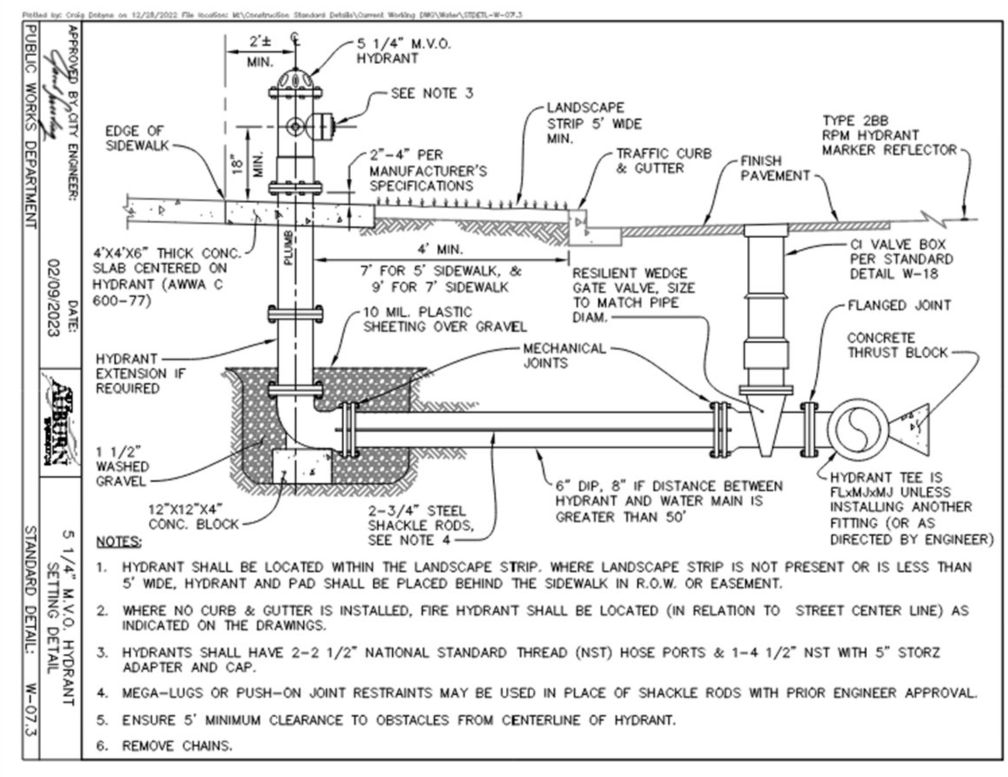
2024 WATER COMPREHENSIVE PLAN

Chapter 6 Operation and Maintenance Program

- Cross Connection Control Program
- Sanitary Survey Findings
- Customer Complaint Response Program
- Recordkeeping and Reporting
- Summary of O&M Deficiencies and Recommended Improvements

Chapter 7 Design and Construction Standards

- Project Review Procedures
- Policies and Requirements for Outside Parties
- Design and Construction Standards
- Construction Certification



2024 WATER COMPREHENSIVE PLAN

Chapter 8 Capital Improvements Plan

- Prioritization
- Capital Improvement Program
- Capital Improvement Summary and Schedule

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2024 WATER COMPREHENSIVE PLAN

Type	Name	CIP or CFP ID	Total Project Cost	2024	2025	2026	2027
Active Projects (In Design or Construction)							
Distribution	104th Park Development (104th to 102nd Water Main Loop)	CP1619	$ 350,000	$ 350,000			
Distribution	104th Avenue SE PRV Replacement	CP2301	$ 390,475	$ 390,475			
Distribution	C St SW Preservation	CP2123	$ 1,802,075	$ 901,038	$ 901,038		
Distribution	Coal Creek Springs Transmission Main Replacement	CP1603	$ 4,450,422	$ 4,450,422			
Distribution	D St SE and 23rd Street SE Storm Improvements	CP2125	$ 2,285,677	$ 2,285,677			
Supply	Well 4 Facility Improvements	CP2021	$ 884,822	$ 884,822			
Supply	Well 4 Electrical Improvements	CP2403	$ 1,050,000	$ 200,000	$ 850,000		
Distribution	112th Pl SE Water Main Replacement	CP2410	$ 2,100,000	$ 255,000	$ 1,845,000		
Distribution	Auburn Way South - Hemlock St SE to Poplar St SE	CP1622	$ 2,398,000	$	$ 2,398,000		
Distribution	Garden Avenue Realignment	CP2022	$ 699,797	$ 699,797			
Distribution	M Street NE Widening	CP2210	$ 357,000	$ 37,000	$ -	$ 320,000	
Distribution	R Street SE Widening	CP2116	$ 1,762,488	$	$ 100,000	$ 1,662,488	
Distribution	R St SE and 21st St SE Roundabout	CP2308	$ 544,897	$ 61,897	$ 483,000		
Distribution	R St SE Preservation - 33rd St SE to 37th St SE	CP2315	$ 301,850	$ 301,850			
Distribution	Lea Hill Road/104th Ave SE Roundabout	CP2319	$ 850,000	$ 100,000		$ 150,000	$ 600,000
Storage	Reservoirs 4 and 8 Seismic Rehabilitation	CP2219	$ 1,733,871	$ 1,433,871			
Distribution	12th St SE and Auburn Way South Water R&R	CP2404	$ 636,000	$ 318,000	$ 318,000		
Distribution	2025 Local Street Preservation	CP2412	$ 725,000	$ 65,000	$ 660,000		
Distribution	2026 Local Street Preservation	CPXXXX	$ 1,073,000	$ 50,000	$ 150,000	$ 873,000	
Supply	Coal Creek Springs Flowmeter Replacement	CP2329	$ 375,017	$ 375,017			
Storage	Reservoir 2 Valves	CP2413	$ 2,268,750	$ 68,750	$ 2,200,000		

2024 WATER COMPREHENSIVE PLAN

Type	Name	CIP or CFP ID	Total Project Cost	2024	2025	2026	2027	2028	2029	2030
Supply										
Supply	Coal Creek Springs Rehabilitation	S-08	$ 5,412,614	$ 75,614			$ 500,000	$ 1,000,000	$ 2,000,000	$ 1,837,000
Supply	On-Site Chlorine Generation Systems (OSEC) at Wells 1 and 4	S-05	$ 275,000			$ 100,000	$ 175,000			
Supply	Fulmer CCTF Replace On-Site Chlorine Generation System (OSEC)	S-06	$ 500,000			$ 150,000	$ 350,000			
Supply	Well 5/5A Upgrades	S-07	$ 2,715,000			$ 950,000	$ 265,000	$ 1,500,000		
Storage										
Storage	Reservoir Repair and Replacements	R-01	$ 1,392,000	$ 192,000	$ 60,000	$ 60,000	$ 60,000	$ 60,000	$ 60,000	$ 60,000
Storage	Reservoir Painting (10-year Cycle)	R-02	$ 3,500,000		$ 250,000	$ 1,500,000				
Storage	Academy PRV Project	R-03	$ 470,000				$ 470,000			
Storage	Reservoir Capital Improvements	R-04	$ 470,000				$ 470,000			
Pump										
Pump Station	Intertie Booster Pump Station Improvements	PS-01	$ 2,325,000	$ 75,000	$ 250,000	$ 2,000,000				
Pump Station	Lea Hill Pump Station Replacement	PS-02	$ 6,365,000				$ 765,000	$ 3,000,000	$ 2,600,000	
Distribution										
Distribution	Annual Distribution System Improvements Program	D-01	$ 59,699,000		$ 400,000	$ 2,500,000	$ 2,500,000	$ 2,500,000	$ 2,500,000	$ 2,500,000
Distribution	Street Utility Improvements	D-02	$ 24,618,000		$ 601,000	$ 617,000	$ 1,300,000	$ 1,300,000	$ 1,300,000	$ 1,300,000
Distribution	Water Repair & Replacements	D-03	$ 11,950,000		$ 150,000	$ 450,000	$ 600,000	$ 600,000	$ 600,000	$ 600,000
Distribution	Water Trench Patches Program	D-04	$ 3,360,000	$ 160,000	$ 160,000	$ 160,000	$ 160,000	$ 160,000	$ 160,000	$ 160,000
Distribution	West Hill Springs Transmission Main Replacement	D-05	$ 1,401,000	$ 50,000		$ 200,000	$ 1,151,000			
Distribution	Lea Hill 648 Zoning Adjustment	D-06	$ 104,000				$ 104,000			

2024 WATER COMPREHENSIVE PLAN

Chapter 9 Financial Analysis

- Costs of Service
- Capital Improvement Funding Plan
- Maintaining Reserves
- Rate Evaluation

NEXT STEPS

July 2024
- Planning Commission

July-September 2024
- SEPA and Agency Reviews

October 2024
- Draft Plan Discussion with Council

December 2024
- Resolution for Adoption

2024 WATER COMPREHENSIVE PLAN

Any Questions?

2024
Water System Plan

City of Auburn, Washington

June 2024

DRAFT - FOR AGENCY REVIEW

PREPARED BY:
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E: Rvondrak@auburnwa.gov

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City of Auburn, WA
Water System Plan
June 2024

This Plan was prepared under the direction of the following registered professional engineers:

Nichole Kruse, PE
Consor
Seattle, WA

Ryan Vondrak, PE
City of Auburn, Washington

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Table of Contents

Executive Summary

Chapter 1 Description of Water System

Chapter 2 Basic Planning Data

Chapter 7 Distribution Facilities Design and Construction Standards

Chapter 8 Capital Improvements Program

Chapter 9 Financial Program

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Appendices

Acronyms & Abbreviations

A	
AACE	American Association of Cost Estimators
AC	Asbestos-Cement
ACC	Auburn City Code
ac-ft/year	Acre-Foot Per Year
ADD	Average Day Demand
AFY	Acre Feet Per Year
Algona	City of Algona
AMC	Auburn Municipal Code
AMI	Advanced Metering Infrastructure
APWA	American Public Works Association
ASR	Aquifer Storage and Recovery
AWC	Association of Washington Cities
AWWA	American Water Works Association
B	
BCA	Bilaterial Compliance Agreement
Bonney Lake	City of Bonney Lake
BPS	Booster Pump Station
C	
Cascade	Cascade Water Alliance
ccf	Centum Cubic Feet
CCI	Construction Cost Index
CCPP	Calcium Carbonate Precipitation Potential
CCR	Consumer Confidence Report
CCT	Corrosion Control Treatment
CCTF	Corrosion Control Treatment Facility
CDBG	Community Development Block Grant
CDPW	Community Development & Public Works
CEMP	Comprehensive Emergency Management Plan
CERB	Community Economic Revitalization Board
CEU	Continuing Education Units
cfs	Cubic Feet Per Second
cfm	Cubic Feet Per Minute
CFP	Capital Facilities Plan
City	City of Auburn
CIP	Capital Improvement Plan
CMP	Coliform Monitoring Plan
CPR	Conservation Planning Requirements
CSCSL	Confirmed and Suspected Contaminate Sites
CWD	Covington Water District

CWSP	Coordinated Water System Plan
D	
D	Distribution Improvements
DBPR	Disinfectants and Disinfection Byproducts Rule
DBP	Disinfection Byproducts
DHS	Department of Homeland Security
DI	Ductile Iron
DNS	Determination of Non-Significance
DOE	Department of Ecology
DOH	Washington State Department of Health
DSL	Distribution System Leakage
DWSRF	Drinking Water State Revolving Fund
E	
EDCS	Engineering Design and Construction Standards
ENR	Engineering News Record
EOC	Emergency Operation Center
EPA	United States Environmental Protection Agency
EPS	Extended Period Simulation
ERU	Equivalent Residential Unit
EWE	Energy and Water Efficiency
F	
FEMA	Federal Emergency Management Agency
FF	Fire Flow
ft/s or fps	Feet Per Second
G	
G	General Improvements
gal/ERU	Gallons Per Equivalent Residential Unit
GIS	Geographic Information System
gpd	Gallons Per Day
gpm	Gallons Per Minute
GMA	Growth Management Act
G.O.	General Obligation
GWMP	Ground Water Management Plan
GWR	Groundwater Rule
GWUI	Groundwater Under the Influence of Surface Water
H	
HAA5	Haloacetic Acids
HGL	Hydraulic Grade Line
HPC	Heterotrophic Plate Count
HP	Horsepower
HWD	Highline Water District

I	
IA2	Interlocal Agreement 2
IA3	Interlocal Agreement 3
ICS	Incident Command System
IDSE	Initial Distribution System Evaluation
IGEA	Investment Grade Efficiency Audit
L	
LCRMR	Lead and Copper Rule Minor Revisions
LFC	Local Facilities Charge
LIDs	Local Improvement Projects
LMWD	Lake Meridian Water District
LRAAs	Locational Running Annual Averages
LR	Larson Ratio
LSI	Langelier
LWSD	Lakehaven Water and Sewer District
M	
MAG	Electromagnetic
Manual	Public Works Emergency Response Manual
MCL	Maximum Contaminant Level
MCLGs	Maximum Contaminant Level Goals
M/DBP	Microbial/Disinfection By-Product
MDD	Maximum Day Demand
MDRLs	Maximum Disinfectant Residual Level
MFR	Multifamily Residential
MG	Million Gallon
mgd	Million Gallons Per Day
MG/year	Million Gallons Per Year
MIT	Muckleshoot Indian Tribe
M&O	Maintenance and Operations
MRSC	Municipal Research and Services Center of Washington
MSDS	Material Safety Data Sheets
N	
NIMS	National Incident Management System
NOM	Natural Organic Matter
O	
O&M	Operations & Maintenance
OSHA	Occupational Safety and Health Administration
P	
PAA	Potential Annexation Areas
PGG	Pacific Groundwater Group
PHD	Peak Hour Demand
PHG	Public Health Goal

PIC	Forest Villa Manor
PI	Parcel Insight
Plan	Comprehensive Water Plan
PLC	Programmable Logic Controller
PNR	Public Notification Rule
PR	Pressure Reducing
Project ID	Identification Number
PRV	Pressure Reducing Valve
psi	Pounds Per Square Inch
PSRC	Puget Sound Regional Council
PS	Pump Stations
PUD	Planned Unit Development
PW	Public Works
PWB	Public Works Board
Q	
Qaw	White River Alluvium
Qd	Vashon Recessional Deltaic Deposits
Qom	Osceola Mudflow
Qua	Undifferentiated Alluvium
Qu	Undifferentiated Glacial and Interglacial Deposits
R	
R	Storage Improvement
R5	Residential 5 Du/Acre
RAA	Running Annual Average
RWSA	Retail Water Service Area
RWSS	Regional Water Supply System
S	
S	Supply Improvement
SCA	Sanitary Control Area
SCADA	Supervisory Control and Data Acquisition
SDC	Standard Development Charge
SDS	Safety Data Sheets
SDWA	Safe Drinking Water Act
SEATAC	Seattle-Tacoma International Airport
SEPA	State Environmental Policy Act
SFR	Single-Family Residential/Duplex
SMP	Standard Monitoring Program
SOC	Synthetic Organic Chemical
SOS	Save Our Streets
SSS	System-Specific Study
SWTR	Surface Water Treatment Rule

T	
Tacoma	City of Tacoma
TAZ	Transportation Analysis Zone
TCR	Total Coliform Rule
TPU	Tacoma Public Utility
TTHM	Total Trihalomethanes
U	
UCM	Unregulated Contaminant Monitoring
UDF	Unidirectional Flushing
ULID	Utility Local Improvement District
USGS	United States Geological Survey
USEPA	United States Environmental Protectional Agency
UTC	Utilities And Transportation Commission
V	
VA	Vulnerability Assessment
VFD	Variable Frequency Drive
VOC	Volatile Organic Compound
W	
WAC	Washington Administrative Code
WCIA	Washington Cities Insurance Authority
WD#111	King County Water District #111
WETRC	Washington Environmental Training Resource Center
WFI	Water Facilities Inventory
WHP	Wellhead Protection
WHPA	Wellhead Protection Areas
WHPP	Wellhead Protection Plan
WISHA	Washington Industrial Safety and Health Act
WSP	Water System Plan
WSSIP	Water System Security Improvement Plan
WUE	Water Use Efficiency

Executive Summary

Introduction

This Water System Plan (WSP) has been developed in accordance with Chapter 426-290 of the Washington Administrative Code (WAC), as presented in the Washington State Department of Health (DOH) regulations for Group A Public Water Systems. This WSP supersedes the City of Auburn's (City) 2015 WSP, approved by DOH on May 11, 2016, and the 2021 Limited WSP Update approved by DOH on December 16, 2021. The City's water system identification number is 03350V.

Th purpose of this WSP is to develop a long-term planning strategy for the City's Retail Water Service Area (RWSA). Updated every ten years per DOH, the WSP evaluates the existing system and its ability to meet the anticipated requirements for water source, treatment, transmission, storage, and distribution over a 20-year planning period. Historical data through the year 2022 were used for the analyses throughout the WSP. The ten-year planning period is 2024-2034. The long-term planning period is 2034-2044. Water system improvement projects have been developed to meet the changing demands of regulatory impacts, population growth, and necessary infrastructure repair and replacement. The WSP also identifies planning-level costs of the improvement projects and provides a financial plan for funding the projects.

ES.1 Description of Water System

The City is located in both King County and Pierce County in the Puget Sound Region of Washington. **Figure ES-1** shows the City's RWSA which encompasses approximately 30 square miles. Several water purveyors adjoin the City's RWSA, including the cities of Algona, Bonney Lake, Federal Way, Kent, Pacific, and Sumner. Also included are the Covington Water District (CWD), Lakehaven Water and Sewer District (LWSD), Lake Meridian Water District (LMWD) (formerly known as King County Water District #111), Highline Water District (HWD), and the Muckleshoot Indian Tribe (MIT). The City also provides internal staffing for the management, operations, and maintenance of the Braunwood Estates satellite system.

The City's water system consists of groundwater wells, springs, and interties with adjacent purveyors as water sources, chlorination and corrosion control treatment facilities, pump stations, pressure reducing valve stations, steel and concrete enclosed reservoirs for storage, and transmission and distribution pipelines to provide potable water to customers. The RWSA is further divided into four service areas (Valley, Lea Hill, Lakeland, and Academy) that include a total of 28 pressure zones. The City's four service areas and the location of key components of the water system are shown in **Figure ES-2.**

Interties provide a tool that water utilities use to move water between systems to meet supply needs, to increase reliability and respond to emergencies. The City maintains wholesale supply interties with three water systems: City of Tacoma (Tacoma), Algona, and LMWD. The City also has a supply contract with the MIT and the Indian Health Service, dating from 1972, for services along a pipeline at SE 368th PL extending from the City limits into the reservation. The City has emergency interties with seven water systems, Algona, Bonney Lake, Kent, Pacific, LWSD, LMWD and Tacoma.

A hydraulic profile of the City's water system is presented in **Figure ES-3**, showing all service areas, pressure zones, supplies, interties, reservoirs, and pump stations.

Figure ES-1 | RWSA Vicinity Map

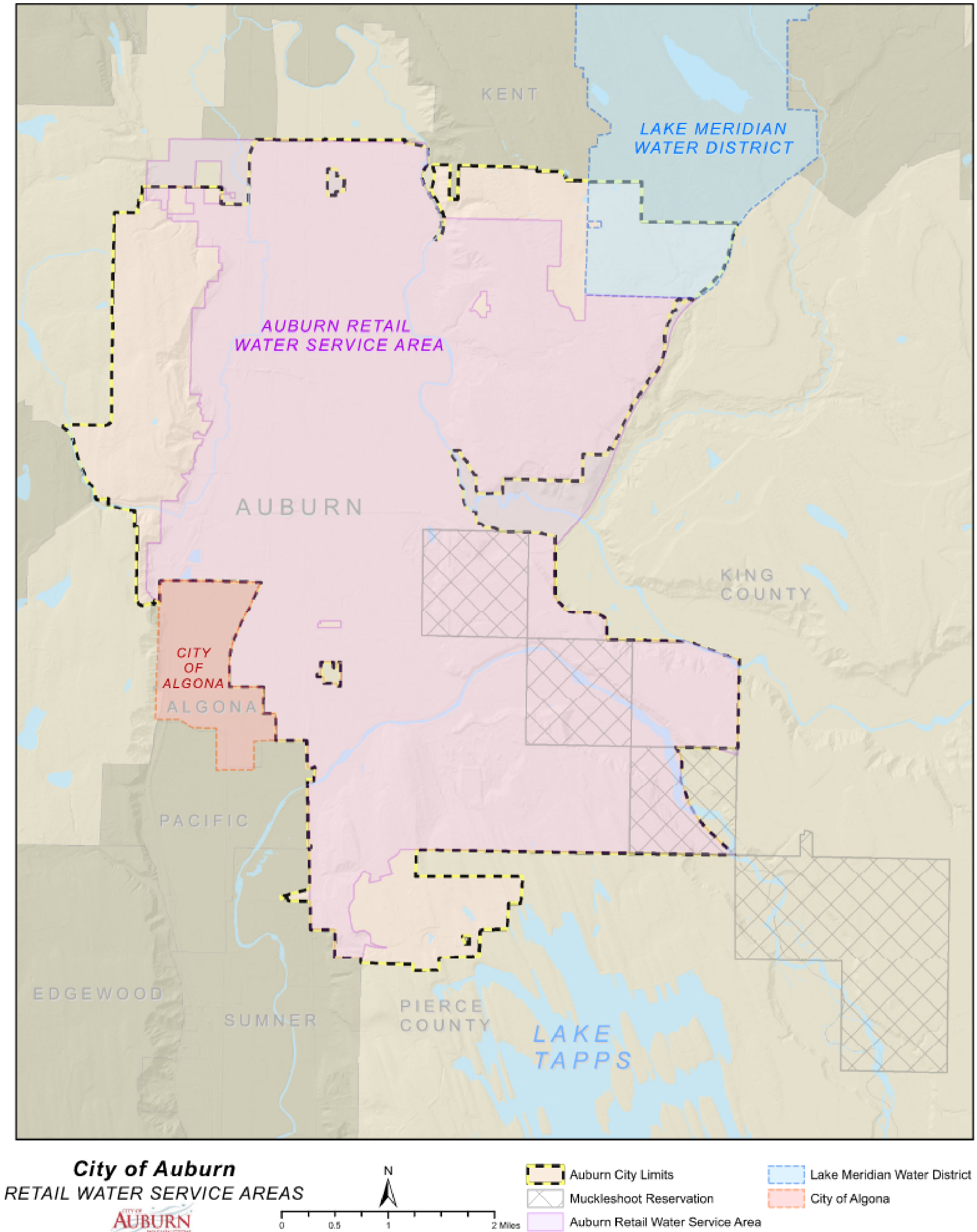
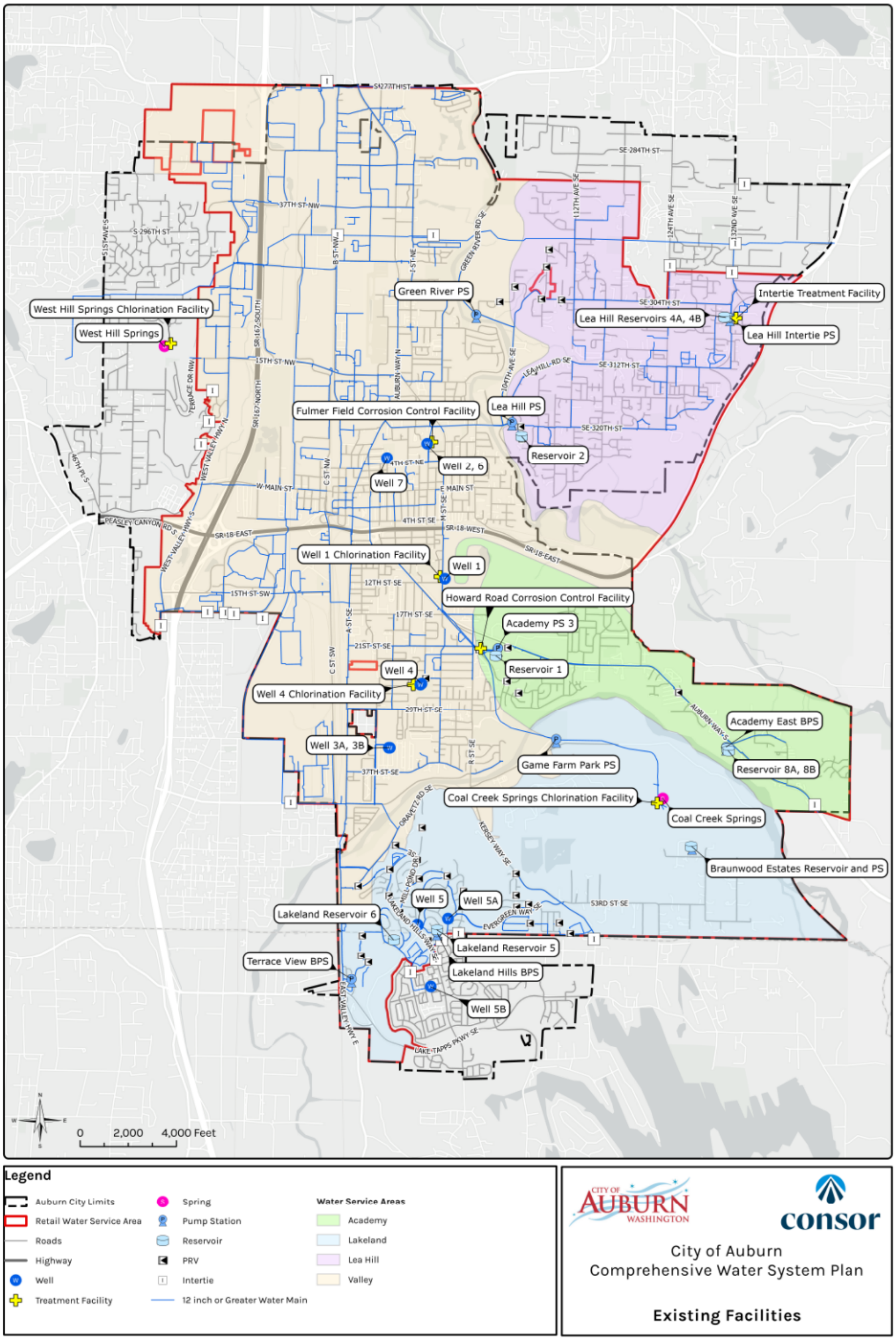
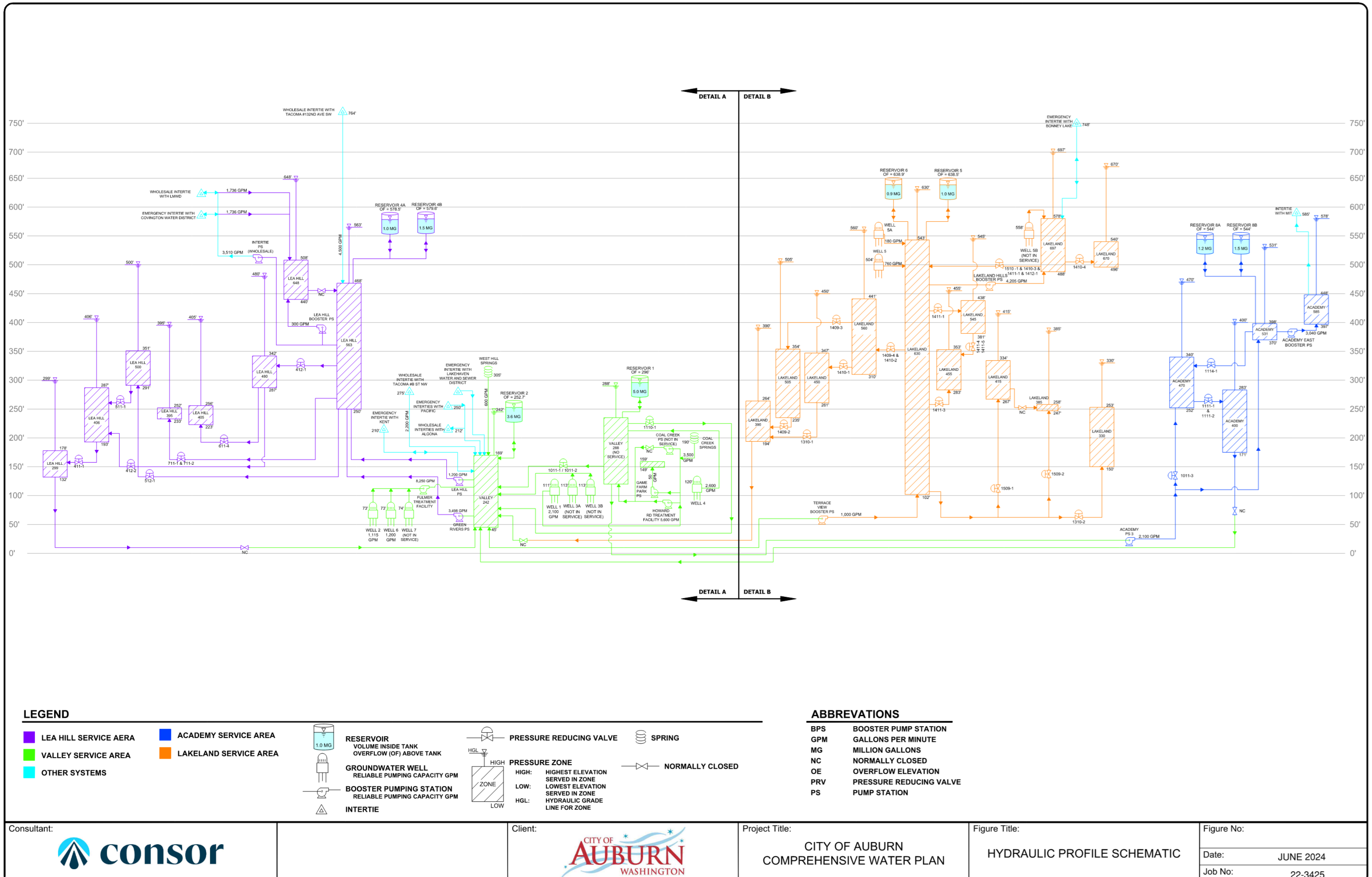


Figure ES-2 | Existing Facilities




DETAIL A
DETAIL B
LEGEND
LEA HILL SERVICE AERA
VALLEY SERVICE AREA
OTHER SYSTEMS
ACADEMY SERVICE AREA
LAKELAND SERVICE AREA
RESERVOIR
VOLUME INSIDE TANK
OVERFLOW (OF) ABOVE TANK
GROUNDWATER WELL
RELIABLE PUMPING CAPACITY GPM
BOOSTER PUMPING STATION
RELIABLE PUMPING CAPACITY GPM
INTERTIE
PRESSURE REDUCING VALVE
PRESSURE ZONE
HIGH: HIGHEST ELEVATION SERVED IN ZONE
LOW: LOWEST ELEVATION SERVED IN ZONE
HGL: HYDRAULIC GRADE LINE FOR ZONE
SPRING
NORMALLY CLOSED
ABBREVATIONS
BPS BOOSTER PUMP STATION
GPM GALLONS PER MINUTE
MG MILLION GALLONS
NC NORMALLY CLOSED
OE OVERFLOW ELEVATION
PRV PRESSURE REDUCING VALVE
PS PUMP STATION
Consultant:
consor
Client:
CITY OF AUBURN WASHINGTON
Project Title:
CITY OF AUBURN COMPREHENSIVE WATER PLAN
Figure Title:
HYDRAULIC PROFILE SCHEMATIC
Figure No:
Date: JUNE 2024
Job No: 22-3425

ES.2 Basic Planning Data

Water Service Connections and Usage

The City's current and future water demand requirements were projected for each customer class (single-family residential/duplex, multifamily residential, commercial, manufacturing/industrial, schools, city accounts, irrigation, and wholesale). The water consumption, or demand, of each customer classification can be expressed in terms of equivalent residential units (ERUs) for forecasting and planning purposes. One ERU is defined as the average quantity of water used by one average, full-time, single-family residence per day. The quantity of water used by other customer classes, or by the entire system, can be expressed in terms of equivalent ERUs. The historical average and maximum water demands are important parameters when performing system and supply analyses. The Average Day Demand (ADD) is typically used in operational evaluations. The Maximum Day Demand (MDD) represents the single largest day water demand during the year and is a key parameter for infrastructure sizing.

The City provided water to approximately 63,450 customers through 15,046 connections as of the end of 2022. Between 2015 and 2022 the ADD ranged from 6.32 million gallons per day (mgd) on the low end in 2020 to 7.67 mgd on the high end in 2016. The MDD has ranged from 9.76 mgd in 2015 to 13.62 mgd in 2020. The total number of connections increased by approximately three percent between 2015 and 2022. The City has two active wholesale water agreements, one with the City of Algona and the other with LMWD that is interruptible.

Water Supply and Production

The City has a diverse water supply consisting of two springs, ten wells and an intertie with the City of Tacoma. Wells 1, 2, 3A, 3B, 4, 6, and 7 are in the lower alluvial aquifer in the Auburn Valley, referred to as the Valley Wellfield. Wells 3A, 3B and 7 are currently offline due to high manganese concentrations. Wells 5, 5A, and 5B are in the Upland Wellfield within the Lakeland Service Area. Once Well 5B came online, the City discovered that the aquifer was not recovering and Well 5B has been offline since 2006. The safe yield of Wells 5 and 5A have been decreased from their design capacity due to a drop in the aquifer's capacity. The City has sufficient water rights to meet current demands and 10-year demand projections, as shown in the Water Rights Self-Assessment Form provided in **Appendix I**. Under 2044 high demand MDD conditions, the City does not have sufficient instantaneous water rights (Qi) to meet all demands for retail, firm wholesale and interruptible wholesale customers. Should this occur, the City could purchase water from Tacoma through wholesale interties to meet demands. Additionally, it is worth noting that this evaluation assumes 2.5 mgd of demand from LMWD who has an interruptible wholesale agreement with the City and would only be supplied as water is available to be provided, so this condition is expected to be unlikely. Additional information on the City meeting future demands is mentioned in the Capacity Analysis Section under ES.3 (System Analysis and Asset Management).

West Hill Springs draws from an unnamed confined aquifer. The spring source water flows by gravity into the Valley Service Area, although flows vary depending on aquifer conditions. Coal Creek Springs is the largest active water supply for the City and draws from a confined aquifer, however its flow varies depending on aquifer conditions. The City also owns two additional wells: the Algona Well 1, which is not operational and the Braunwood Well which serves the Braunwood satellite system.

Future Population and Demand Projections

Demographic projections are based on the Puget Sound Regional Council's (PSRC) 2044 forecasts for population and employment within the City's RWSA. Total population is projected to increase by 1.5 percent annually from 2021 to 2044 and total employment is projected to increase by 1.9 percent annually over the same period. Overall, the City is planning for an additional 24,987 residents and 20,525 employed people by 2044 within the RWSA. The Valley Service Area is projected to represent 64 percent of the system's population and 93 percent of the system's employment in 2044.

The projected ADD and MDD, along with wholesale demands, are summarized in **Table ES-1.** To be conservative, an ERU planning value higher than the average was used for demand forecasting. The 75th percentile of the historical ADD per ERU between 2015 and 2022 was used to select the planning ERU value of 182 gpd. The peak demands can be expressed as an MDD/ADD peaking factor, which is the relative magnitude of MDD compared to ADD. The City's MDD/ADD peaking factor was 1.96. Distribution system leakage and authorized unbilled consumption are accounted for in the projections.

Table ES-1 | ADD, MDD, and ERUs Summarized by Service Area with Wholesale Included

	2024	2034	2044
Lea Hill			
Average Day Demand (mgd)	1.00	1.04	1.09
Maximum Day Demand (mgd)	1.97	2.05	2.13
Equivalent Residential Units	5,511	5,734	5,970
Valley			
Average Day Demand (mgd)	5.11	5.84	6.73
Maximum Day Demand (mgd)	10.03	11.46	13.21
Equivalent Residential Units	28,055	32,061	36,948
Lakeland			
Average Day Demand (mgd)	0.51	0.59	0.67
Maximum Day Demand (mgd)	1.01	1.15	1.32
Equivalent Residential Units	2,817	3,220	3,687
Academy			
Average Day Demand (mgd)	0.43	0.48	0.54
Maximum Day Demand (mgd)	0.85	0.95	1.05
Equivalent Residential Units	2,377	2,644	2,948
Total Retail Customers			
Average Day Demand (mgd)	7.06	7.95	9.03
Maximum Day Demand (mgd)	13.86	15.61	17.72
Equivalent Residential Units	38,760	43,659	49,553
Retail with Firm Wholesale (Algona and MIT)			
Average Day Demand (mgd)	9.93	10.84	11.93
Maximum Day Demand (mgd)	16.05	17.84	19.99
Retail with Firm & Interruptible Wholesale (Algona, MIT, and LMWD)			
Average Day Demand (mgd)	12.43	13.34	14.43
Maximum Day Demand (mgd)	18.55	20.34	22.49

ES.3 System Analysis and Asset Management

Asset Management

The City actively assesses and plans for the maintenance, repair, and replacement of its assets while preventive maintenance practices keep assets in good condition, thereby extending their useful life. For asset management, the City utilizes CarteGraph in conjunction with the geographic information system (GIS). GIS is updated using as-builts as projects are completed and CarteGraph is auto-populated from this information. CarteGraph is used to track and schedule maintenance activities and track material and labor costs and project timelines.

An inventory of the City's existing water system assets including distribution system components, treatment, reservoirs, supply facilities, pump stations, backup power, and the telemetry system is presented in **Chapter 3**.

Water Quality

The DOH requires that source water be monitored for primary and secondary contaminants. Primary contaminant levels are not to be exceeded for health reasons and secondary contaminants should not be exceeded for aesthetic reasons. Distribution system water quality testing requirements include monitoring of many contaminants for which the DOH determines maximum contaminant levels.

Historically, the City has relied on groundwater supplies from wells and springs, which have been determined are not under the direct influence of surface waters. For these water sources, the City is required to meet the United States Environmental Protection Agency's (EPA's) Groundwater Rule. The treatment objectives of the City are to treat source water to contaminant concentrations below the maximum contaminant levels (MCLs) established by the EPA and WAC. All constituents are currently below their respective MCLs.

The required frequency of monitoring of inorganic chemical and physical parameters varies by source, however, the City typically monitors these constituents every 12 months. Within the study period, the maximum detected concentrations of these parameters did not exceed the MCLs published by the EPA.

All active sources are disinfected with chlorine prior to entering the distribution system except for Well 5. The City has a capital project discussed in **Chapter 8** that will include the addition of a chlorination facility to Well 5. Corrosion control treatment is required on the water produced by Coal Creek Springs, Well 1, Well 2, Well 6, and Well 7 to limit the corrosion of lead and copper in the system. Since the corrosion control treatment facilities were constructed, the lead and copper levels in the City's system have been well below the action level. There were no water quality violations in the distribution system between 2015 and 2022.

Design Standards

The City's most recent Engineering Design and Construction Standards are available on the City's website and are provided as **Appendix P**.

The City's water quality design standards follow the design standards set forth by the EPA and the Washington DOH.

Capacity Analysis

The City's water supply (production) capacity compared with demand projections and DOH and City criteria indicate that the City has the supply facilities necessary to meet demand projections under current and future projections for all required criteria.

The City's Water Rights Self-Assessment Form is provided in **Appendix I** and was used to assess the City's water rights and includes supply that is available to the City through firm wholesale interties with Tacoma. The form includes a comparison of the available water rights to the existing, 10-year and 20-year demand projections for the "High Demand Scenario" provided in **Chapter 2**. The calculations presented in the Water Rights Self-Assessment Form conclude that the City's existing water rights are anticipated to be adequate to meet the current and 10-year projections for Qi and Qa. Under 2044 high demand MDD conditions, the City does not have sufficient Qi water rights to meet all demands for retail, firm wholesale, and interruptible wholesale customers. Should this occur, the City could purchase water from Tacoma through wholesale interties to meet demands. It is worth noting that this evaluation assumes 2.5 mgd of demand from LMWD who has an interruptible wholesale agreement with the City and would only be supplied as water is available to be provided, so this condition is expected to be unlikely.

The City does not currently have the infrastructure necessary to withdraw from all water rights (i.e., Wells 3A, 3B, 5B, and 7 are not currently operational). Additionally, some sources have underlying aquifer or infrastructure restrictions that limit the capacity of the source (i.e., Well 2, Well 6, and Coal Creek Springs). Several facility improvement projects are necessary for the City to maximize water production capacity to meet future demands, and planned supply related capital projects to meet this need are discussed further in **Chapter 8**.

Table ES-2 provides an overview of pump station supply analysis results expressed as either having a capacity surplus or deficit for open and closed zones. Open zones are pressure zones that are fed by gravity from a reservoir. Pressure zones that do not include a storage facility are analyzed as a closed zone. A closed zone in the Lea Hill Service Area and the Game Farm Park closed zone have a BPS capacity deficit identified in all planning scenarios. The City has planned a capital project to resolve the deficiency at the Intertie Pump Station/Lea Hill BPS. The Game Farm Park Pump Station only provides service to a recreational area with no residential or commercial property connections supplied by this facility. The City has reviewed the deficit with the Fire Marshal and the deficiency is not critical to address, therefore no actions are currently planned to resolve the deficiency at the Game Farm Park Pump Station. As further development progresses in and around the Game Farm Park Pump Station, modifications will be considered to address the deficiency.

Table ES-2 | Summary of Pump Station Capacity Results

	2024	2034	2044
Valley Open Zone Pump Station Capacity	Surplus	Surplus	Surplus
Lea Hill Open Zone Pump Station Capacity	Surplus	Surplus	Surplus
Lakeland Open Zone Pump Station Capacity	Surplus	Surplus	Surplus
Academy Open Zone Pump Station Capacity	Surplus	Surplus	Surplus
Lakeland Closed Zone BPS Capacity	Surplus	Surplus	Surplus
Academy Closed Zone BPS Capacity	Surplus	Surplus	Surplus
Lea Hill Closed Zone BPS Capacity	**Deficit**	**Deficit**	**Deficit**
Game Farm Park Closed Zone BPS Capacity	**Deficit**	**Deficit**	**Deficit**

The City's water storage facilities were analyzed to determine if they have sufficient capacity to meet the existing and future storage requirements. A summary of the results is provided in **Table ES-3**. New sources and pump stations allow for reliable and redundant operation of the system as an interconnected whole, rather than separate Service Areas. As such, excess storage in one service area can be used to offset a deficit in another area of the system. The results of the storage analysis indicate that there is sufficient capacity to meet the projected 2024 and 2034 storage requirements, however additional storage is projected to be necessary in 2044. The City has a planned capital project to add a new reservoir in the Valley Service Area to address this deficiency.

Table ES-3 | Summary Storage Capacity Analysis

	Total Usable Storage	2024		2034		2044	
		Total Required Storage (MG)	Surplus/ (Deficit) (MG)	Total Required Storage (MG)	Surplus/ (Deficit) (MG)	Total Required Storage (MG)	Surplus/ (Deficit) (MG)
Academy	2.66	1.54	1.12	1.60	1.05	1.68	0.98
Lakeland	1.61	1.25	0.37	1.37	0.25	1.51	0.11
Lea Hill	2.12	2.29	(-0.18)	2.34	(-0.23)	2.40	(-0.29)
Valley	7.96	7.73	0.24	8.69	(-0.73)	10.00	(-2.04)
RWSA	**14.35**	**12.80**	**1.54**	**14.00**	**0.34**	**15.58**	**(-1.24)**

The City's existing distribution system was analyzed to determine if they have sufficient capacity to meet the existing and future demands and fire flow requirements using an updated and calibrated version of the City's hydraulic model. A low-pressure analysis was performed in the hydraulic model to confirm that pressures throughout the system were above 30 psi during under peak hour demand (PHD) conditions for 2024, 2034, and 2044. The results of this analysis indicated that all areas of existing and future system have pressures meeting this condition and were compliant with requirements.

An individual fire flow analysis was performed for each hydrant node in the hydraulic model to determine the available fire flow during MDD plus fire flow (FF) conditions, while maintaining a minimum residual pressure of 20 psi. The results of this analysis indicate that multiple pipeline improvement projects are necessary to address the distribution system deficiencies.

An analysis of the water system's overall physical capacity in terms of ERU using DOH Worksheet 4-1 is provided in **Appendix V**. The analysis indicates that the existing system has sufficient capacity to serve the current and projected water demands through 2034 (10-year planning horizon). Under 2024 and 2034 demand conditions, storage is the limiting system component for growth and development. In 2044 (20-year planning horizon) storage is deficient, which is consistent with the other analysis findings.

ES.4 Water Use Efficiency Program

Source and Service Metering

Each of the City's sources are metered to measure the amount of water produced. The meters are calibrated annually. If a meter cannot be calibrated properly, it is replaced with a new one. Propeller source meters are being replaced with electromagnetic (MAG) meters as part of on-going operation and maintenance (O&M) improvements.

Service meters are installed on every service line to measure the quantity of water used by a customer per WAC 246-290-496 and City Code Chapter 13.06.320. In 2015, the City began installing an Automated Metering Infrastructure (AMI) system, as a part of the Water Meter and Billing System Improvements project, which was completed in 2018. With the new AMI system, the City automatically receives meter reads via radio transmission and can integrate the data into the billing software.

Distribution System Leakage

Distribution System Leakage (DSL) represents the difference between production and documented water use (retail, wholesale, and authorized unmetered). The City's historical DSL performance complies with the DOH requirement that the three-year average DSL be under ten percent to minimize water waste. To further reduce DSL, the City has ongoing leak detection, meter calibration, and an active repair and replacement program for water system infrastructure.

Water Use Efficiency Program

The City's Water Use Efficiency (WUE) Program provides for efficient water use and supports stewardship of the City's resources. The selected program measures are interrelated and will help the City achieve its goals to both reduce average water use and peak water use per customer. Per the WUE requirements, the following measures implemented as part of the 2024-2034 WUE program:

- Install production (source) meters.
- Install consumption (service) meters.
- Perform meter calibration.
- Implement a water loss control action plan to control leakage if the three-year rolling average exceeds ten percent.
- Educate customers about water use efficiency practices.

Additionally, the following measures that must be evaluated are:

- Rates that encourage water demand efficiency (discussed in **Chapter 9**).
- Reclamation opportunities (discussed in detail in **Chapter 4**).

The DOH requires that the City estimate the amount of water saved through implementation of the system's WUE program over the last six years. Water use per-capita dropped from 112 gpd per capita in 2017 to 105 gpd per capita in 2022. The net water savings over this period equates to approximately 148 million gallons or 29.6 million gallons of savings per year.

The City has chosen to focus on implementing voluntary measures to decrease both the average and peak water usage. The City's goals are as follows:

- Decrease the planning ERU value (gpd/ERU) one percent annually from the current planning ERU value of 182 gpd/ERU,
- Decrease the planning peaking factor from the current 1.96 to 1.81, or less, and
- Maintain three-year average DSL under ten percent.

The City is committed to wastewater reuse and rainwater reclamation, as stated in its official water system policies summarized in **Appendix A**. Currently, there are no reclaimed water users in the City.

Climate Change Resiliency

To estimate the impact of climate change on the City's water demands, results from the Water Supply Forum's 2009 Regional Water Supply Outlook (WSF 2009 Outlook) were used. The impacts of climate change on sources that rely on groundwater are mostly unknown due to the variability between aquifers and site-specific effects. No changes to demand projections were made for the 20-year planning period to account for potential climate change due to the uncertain magnitude and timing of local effects. However, it is recognized that demand has the potential to increase in the future given these changes. In the event the City experiences such an increase, the City will use a model to compute firm yield from streamflow data, replacing historic inflows with projected inflows from three climate change scenarios as described by the WSF 2009 Outlook.

This WSP discusses short and long-term actions the City can take to improve the resiliency of the water system from the impacts of climate change. The short-term measures can improve resiliency within three to five years while the long-term measures may require decades to be fully implemented.

ES.5 Source Water Protection

Sanitary Control Areas (SCAs) have been established for each of the City's water sources per WAC 246-290-135(2). The standard SCA for wells has a minimum radius of 100 feet from the wellhead. The standard SCA for spring sources has a minimum radius of 200 feet from the spring head. All City water sources have SCAs that were established and approved by DOH, and are documented in the susceptibility forms provided in **Appendix T**.

The DOH has developed regulations that require Group A water systems using groundwater sources to develop and implement a Wellhead Protection Program (WHPP) in accordance with WAC 246-290-135. The City maintains its WHPP for 12 groundwater sources. A WHPP was prepared in 2014 for the City's 2015 WSP; this remains the current WHPP for the City.

Susceptibility Assessment Forms have been completed by the City and submitted to the DOH. The DOH's susceptibility assessment rating for each source is summarized in **Table ES-4**

Table ES-4 | Source Susceptibility Assessment Ratings

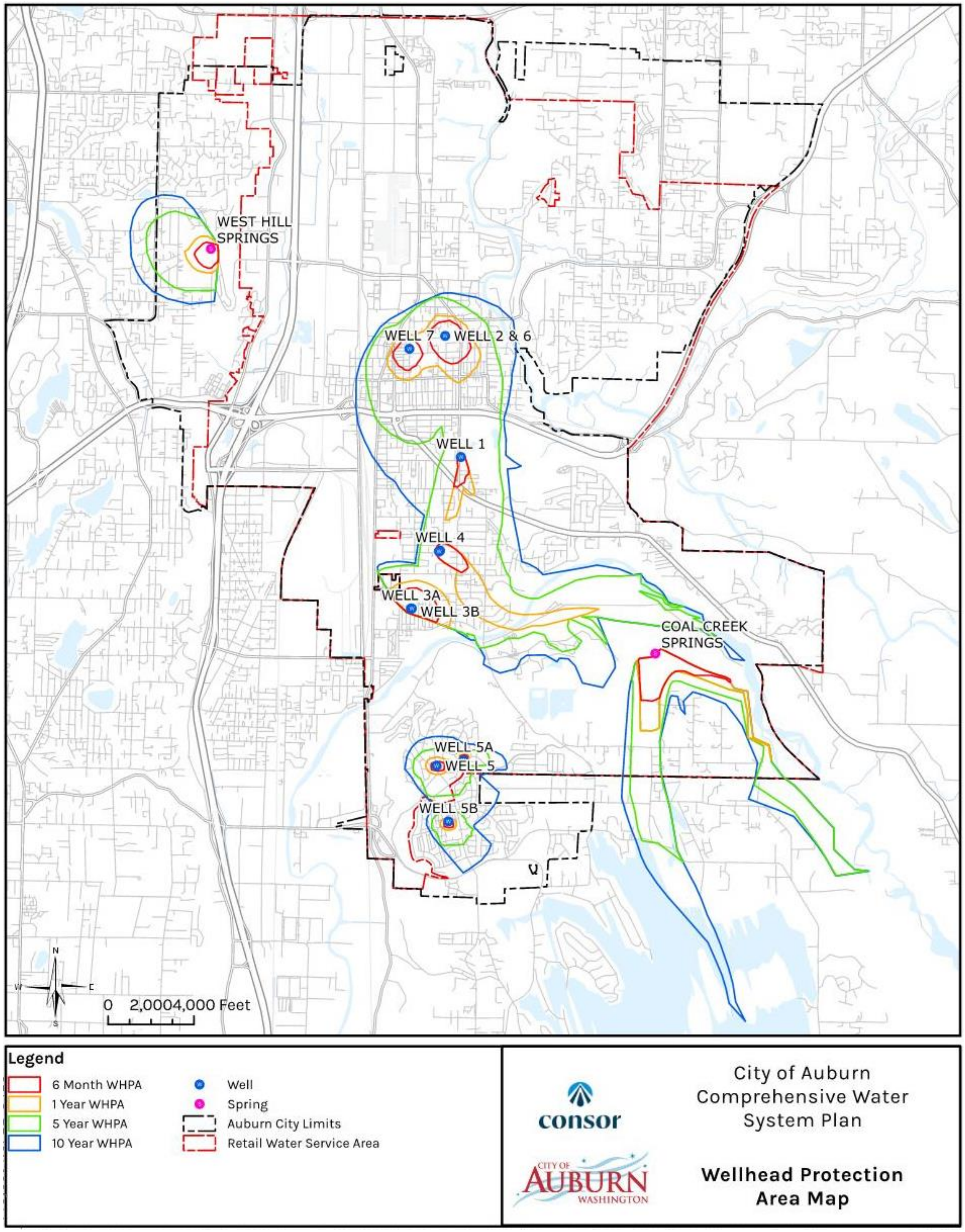
Source	DOH Issued Susceptibility Rating
Coal Creek Springs	High
West Hill Springs	High
Well 1	Moderate
Well 2	High
Well 3A	Low (Off-line)
Well 3B	Low (Off-line)
Well 4	Low
Well 5	Low
Well 5A	Low
Well 5B	Low (Off-line)

Well 6	High
Well 7	High (Off-line)

The Wellhead Protection Area (WHPA) defines the area around a groundwater source that has the potential to contaminate the source. This area is based on the source's capture zones, which are the zones of the source aquifer and ground surface that can contribute water to the source in six months, one year, five years, or ten years time of travel. The established WHPAs are shown in **Figure ES-4.**

A summary of potential contaminant sources for the City's water sources was updated in April 2024 and is included in **Appendix T**.

Figure ES-4 | Wellhead Protection Area Map



ES.6 Operations and Maintenance Program

The Auburn Water Utility is operated as a utility enterprise under the direction of the Public Works (PW) Director. Specific water utility management responsibilities within the PW Department fall under either the Utilities-Water Section of Engineering Services or the Water Division of Maintenance and Operations Services. The Utilities-Water Section of Engineering Services is responsible for comprehensive water system planning, development of a Capital Improvement Program (CIP), as well as programming the design, construction, and inspection of projects related to the water system. The Water Division of Maintenance and Operations Services is responsible for operating and maintaining the water system, performing daily operation and inspection, water quality monitoring as required by DOH, and line management of the Water Utility.

The mission statement of the City's Water Utility is to provide for the efficient, environmentally sound, and safe management of the existing and future water system within the City's service area. Operations staff provide daily O&M of wells, corrosion control treatment facilities, pump stations, and reservoirs. They also implement the cross connection control program and provide locating services for all City utilities. Distribution staff maintains the complete distribution system including water mains, valves, hydrants, pressure reducing stations, and meters.

Primary operation of the water system is maintained via the Supervisory Control And Data Acquisition (SCADA) computerized control system. Wonderware software works in association with SCADA to provide real time graphical display of system data for staff interpretation and control.

The Water Operations staff maintains an active and ongoing program of water quality monitoring and reporting to ensure a safe, high quality water supply. Two staff members are responsible for water quality monitoring, sampling, control, and record keeping as outlined in the City's Water Quality Monitoring Plan provided in Appendix O.

The City has prepared an electronic Public Works Emergency Response Manual (Manual) as a guide for management of emergency situations, with the objective of protecting life and property and restoration of essential services, such as providing clean water, as quickly as possible. The Emergency Response Plan is updated annually at the first of the year. The master response program for the entire City is documented in the Comprehensive Emergency Management Plan (CEMP), which provides guidance to the Emergency Management Organization for mitigation, preparedness, responsibilities, recovery operations, training, and community education activities. The CEMP also describes the functions of local government and incorporation of essential non-governmental organizations into the Emergency Management Organization.

The City has a comprehensive safety program that meets Occupational Safety and Health Administration (OSHA) and Washington Industrial Safety and Health Act (WISHA) regulations. The safety policies and procedures for the water department are documented in this WSP and cover the full range of hazards staff may experience while operating the water system.

The City's Cross Connection Control Program (provided in Appendix Q) protects the public water system from contamination via cross connection hazards. It describes minimum operating policies, provides guidelines for installation, testing, and maintenance of approved backflow prevention assemblies, permitting process, inspection, and survey requirements for existing and new water service connections. The findings of the 2022 Sanitary Survey are also summarized in this WSP, along with the actions completed or in progress to address the deficiencies. The next DOH sanitary survey is scheduled for 2027.

ES.7 Distribution Facilities Design and Construction Standards

The Engineering Design and Construction Standards (EDCS) encompass policies and procedures governing project review and approval. To ensure the highest level of water system reliability, integration of the EDCS into the broader City infrastructure is essential. The integration of the EDCS in this WSP empowers the City to employ an alternative review process for distribution main projects, through the submittal exception process, which permits the City to approve project reports and construction documents without written approval from the DOH.

The City's Utilities-Water Section of Engineering Services reviews plans, including calculations, reports, and AutoCAD files, to verify conformity with development requirements, City standards, City policies, as well as other federal, state, and local requirements. Compliance with Washington State Department of Transportation (WSDOT) "Standard Specifications for Road, Bridge, and Municipal Construction," and relevant City, State, and Federal regulations is also evaluated during the review process.

ES.8 Capital Improvement Program

The CIP was developed to identify system improvements needed to meet customer demands throughout the 20-year planning horizon. The capital projects identified are categorized as water supply (S), storage (R), pump stations (PS), distribution (D), and general improvements (G). Planning-level cost estimates were developed for each of the recommended projects for budgeting purposes.

The capital projects for the facilities improvements were prioritized based on existing capacity deficiencies, safety concerns, maintenance or capacity requirements, and regulatory requirements. A summary of the total planned CIP cost is provided in **Table ES-5.** All costs are presented as total project costs in March 2024 dollars. For future budgeting purposes, the latest Engineering News Record (ENR) Construction Cost Index (CCI) can be used to project current estimates to the year of implementation. The cost estimates for the Auburn area used the ENR Seattle CCI. The March 2024 CCI is 15,477. Overall, the City anticipates total projects costs of $214M over the next 20 years, with more than 50 percent of the cost being for distribution system improvements.

Table ES-5 | Water System Capital Improvement Program Budget 2024-2044

Capital Improvement Category	Total for 20-Year Period From 2024-2044 (2024 USD)
Distribution	$121,858,681
Supply	$60,416,013
Storage	$21,579,621
Pump Station	$9,230,000
General	$1,750,000
TOTAL	**$214,834,315**

ES.9 Financial Program

Chapter 9 was prepared by FCS GROUP to provide a financial program that allows the City to remain financially viable during the 20-year planning horizon. This viability analysis considers the financial condition of the utility of the past six-year period (2017-2022), current and identified future financial and policy obligations, O&M needs, and the financial impacts of the capital projects identified in **Chapter 8**. A review of the water utility's current rate structure with respect to rate adequacy and customer affordability is also included.

The City's water charges for services increased from $14.8M in 2017 to $16.5M in 2022, averaging an annual increase of approximately 2.2 percent per year. Operating expenditures increased by $1.7M across the six years with an average annual increase of 2.8 percent. Despite total operating expenses outpacing growth in operating revenues, operating income has been positive in all years observed.

The financial forecast indicates that at existing rate levels the utility will become deficient in 2025 as growth in expenses outpaces growth in revenues and the utility takes on additional debt obligations to fund capital infrastructure investments. The City has adopted a 7.50 percent increase for 2025 to resolve the remaining projected deficiency. Rates will need to potentially increase by 9.50 percent annually from 2026 through 2030, before decreasing to 3.00 percent annually through 2033. A detailed rate study is planned for completion in 2025. It is recommended that the City regularly review and update the key underlying assumptions that compose the multi-year financial plan to confirm that adequate revenues are collected to meet the City's total financial obligations.

CHAPTER 1

Description of the Water System

1.1 Objective

This Water System Plan (Plan) for the City of Auburn (City) has been prepared to serve as a guide for planning and designing future water system infrastructure and to assist the City in the efficient use of its water resources. The Plan identifies system improvements intended to meet the anticipated growth and changing needs of the City while maintaining reliable and quality water service to customers.

The Plan is designed to meet state, county, and local requirements. It complies with the requirements of the Washington State Department of Health (DOH) as set forth in the Washington Administrative Code (WAC) 246-290-100, Water System Plan. This Plan supersedes the City's 2015 Water System Plan, approved by DOH on May 11, 2016, and the 2021 Limited Water System Plan Update approved by DOH on December 16, 2021.

A 10-year approval period is desired for this Plan, and therefore the Plan analyzes the 10-year and 20-year planning periods. This Plan contains a framework for future funding decisions and capital projects. However, the timeframes are estimates and do not represent actual commitments by the City, which may depend on funding, resources availability, and/or other unidentified factors.

1.2 Plan Content

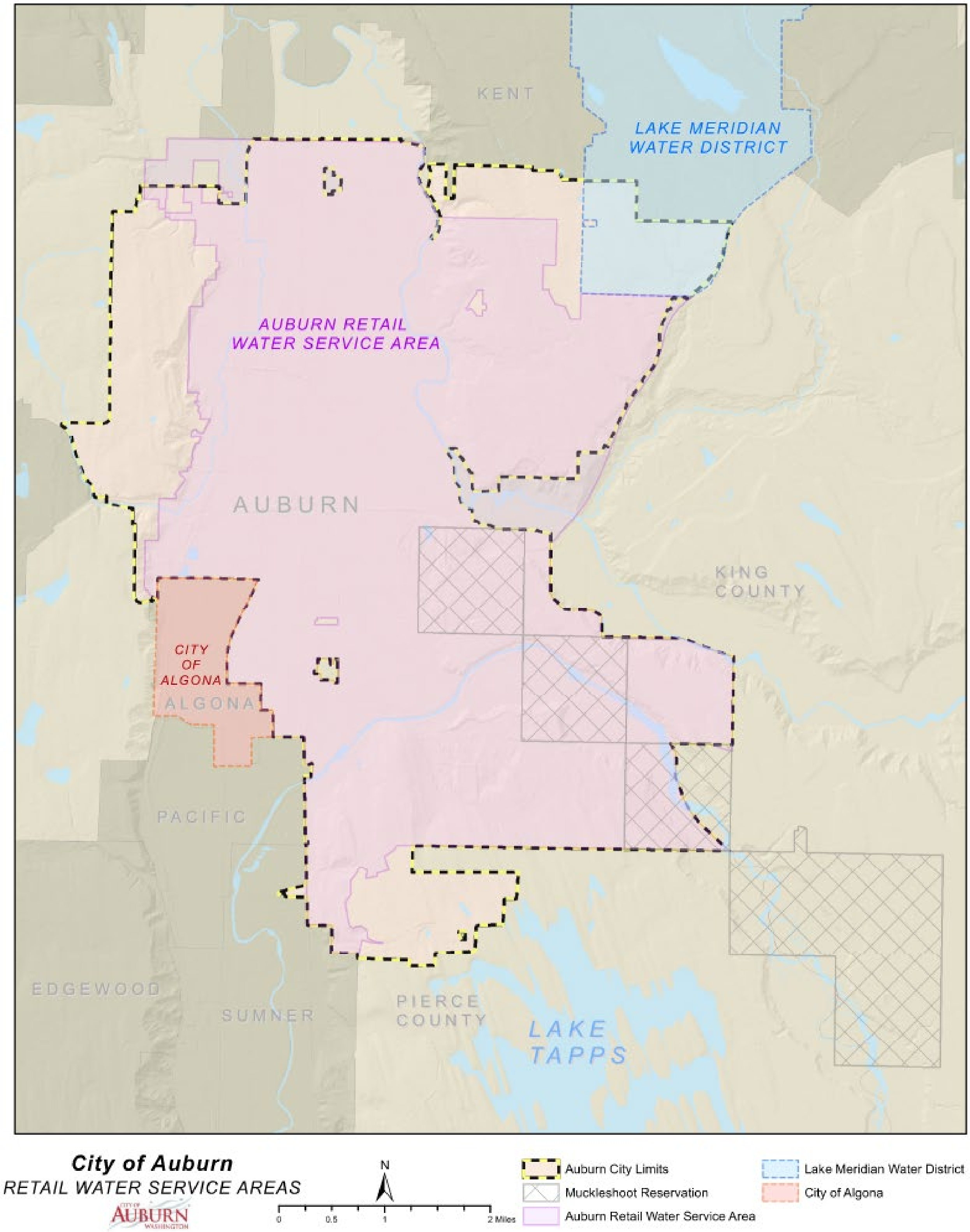
This chapter addresses the following topics:

- 1.3 Ownership and Management
- 1.4 System History and Background
- 1.5 Related Plans and Studies
- 1.6 Service Areas, Maps, and Land Uses
- 1.7 System Policies
- 1.8 Duty to Serve
- 1.9 Local Government Consistency
- 1.10 Watershed Consistency

1.3 Ownership and Management

The City owns and operates its water system and serves most of the City as delineated by the Retail Water Service Area (RWSA). The City also provides firm wholesale water supply to the City of Algona (Algona), and interruptible wholesale water supply to Lake Meridian Water District (LMWD) (formally known as King County Water District #111). The City RWSA boundary is further described in **Section 1.4** and **Figure 1-1** shows the City RWSA with wholesale customers.

Figure 1-1 | RWSA Vicinity Map



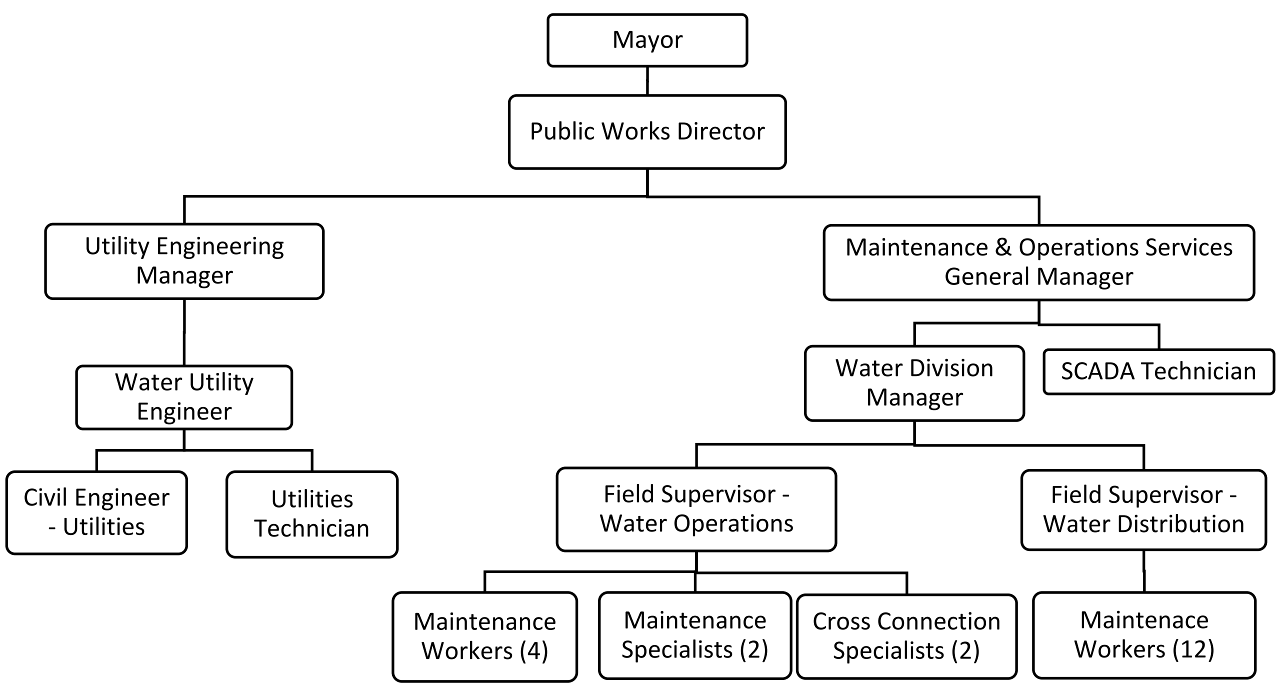
The City provides internal staffing for the management, operations, and maintenance of the water system and the Braunwood Estates satellite system. The DOH's data on these water systems, managed by the City, is presented in **Table 1-1**. The water management structure is presented in **Figure 1-2** and further elaborated in **Chapter 6**.

Chapter 3 provides details on the existing water facilities, while **Appendix H** includes a copy of the current Water Facility Inventory (WFI) form.

Table 1-1 | Water System Ownership Management

Information Type	Description
System Names	City of Auburn Braunwood Estates (Satellite System)
System Type	Group A - Community Public Water System
County	King County and Pierce County
City of Auburn System ID Number	03350V
Braunwood Estates System ID Number (Satellite System)	03336E
Address	25 W Main St Auburn, WA 98001
Primary Contact	Josh Flanders, Water Division Manager
Owner Contact	(253) 876-1998

Figure 1-2 | Water Utility – Organizational Chart



The City's water system is publicly owned, under the jurisdiction of the local government. As a result, it is exempt from regulation by the Washington Utilities and Transportation Commission (UTC), which is responsible for overseeing some private water companies. There are no plans to bring the City's water utility service under UTC's regulatory authority during this planning period.

1.4 System History and Background

1.4.1 Geography

The City is centrally located between Seattle and Tacoma in both King and Pierce Counties, Washington. It encompasses approximately 30 square miles. Adjacent cities include Pacific, Algona, Bonney Lake, Federal Way, Kent, Sumner, and Covington.

1.4.1.1 Topography

The City's RWSA is dominated by a broad valley surrounded by uplifted plateaus. The Green River enters from the eastern City limit and then runs north cutting through the center of the City. Mill Creek, a tributary of the Green River, parallels the western corporate limits. The White River flows through the southern part of the City before turning south to join the Puyallup River. The topography of the service area is a result, in part, of the glaciation of the region.

Most of the City lies on a two to three-mile wide plain bound by Mill Creek on the west and the Green River on the east. Ground elevations in the area range between 50 to 100 feet and slope upward generally to the north. The terrain rises sharply to elevations of 400 to 500 feet on either side of the valley as well as in the southern portion of the City, south of the White River and between the White and Green Rivers.

The topographic features of the RWSA provide for a necessary divide of the water system into four major service areas serving the valley and the surrounding plateaus. The following are the major service areas and associated elevations:

- Valley Service Area (service elevation from 39 to 235 feet)
- Lea Hill Service Area (service elevation from 129 to 513 feet)
- Academy Service Area (service elevation from 171 to 444 feet)
- Lakeland Service Area (service elevation from 122 to 578 feet)

Each service area is further subdivided into smaller hydraulic operating areas based on topographic elevations, called pressure zones. Additional details on the City's major service areas are provided in **Chapter 2**.

1.4.1.2 Climate

The RWSA has a West Coast, marine-type climate caused by the influence of air masses coming from the Pacific Ocean. In late fall and winter, orographic lifting, and cooling cause moist air masses to create clouds and precipitation throughout the area. The average annual rainfall is approximately 40 inches, generally occurring between October and March. The average annual snowfall is 8.6 inches. The temperatures typically range from mid-70 degrees Fahrenheit in the summer to 38 degrees Fahrenheit during the winter, with an overall average of 54 degrees Fahrenheit.

Water consumption is notably impacted by climate conditions, as customers adjust their usage based on weather patterns. In periods of hot and dry weather, consumption rises, driven by activities such as lawn watering and outdoor water use. Conversely, consumption tends to decrease during wet weather.

1.4.1.3 Geology

The geology of the City is the result of glacial and interglacial processes acting over millions of years. During the periods when large continental glaciers, not rivers nor lakes, occupied the Puget Sound area, landslides created deposits and erosion through glacial and interglacial deposits. Generally, the uplands surrounding the City are composed of glacial and interglacial deposits and the valleys are filled with more recent deposits overlying older ones.

Five major geologic units lie within the White and Green River Valleys: White River Alluvium (Qaw), Osceola Mudflow (Qom), Undifferentiated Alluvium (Qua), Vashon Recessional Deltaic Deposits (Qd) and Undifferentiated Glacial and Interglacial Deposits (Qu). Bedrock is known to lie approximately 1,280 feet beneath the valley floors.

The Pacific Groundwater Group (PGG) completed an extensive geological and hydrogeological study within the City's RWSA, known as the Auburn Water Resources Program Study, and the results are documented in several volumes:

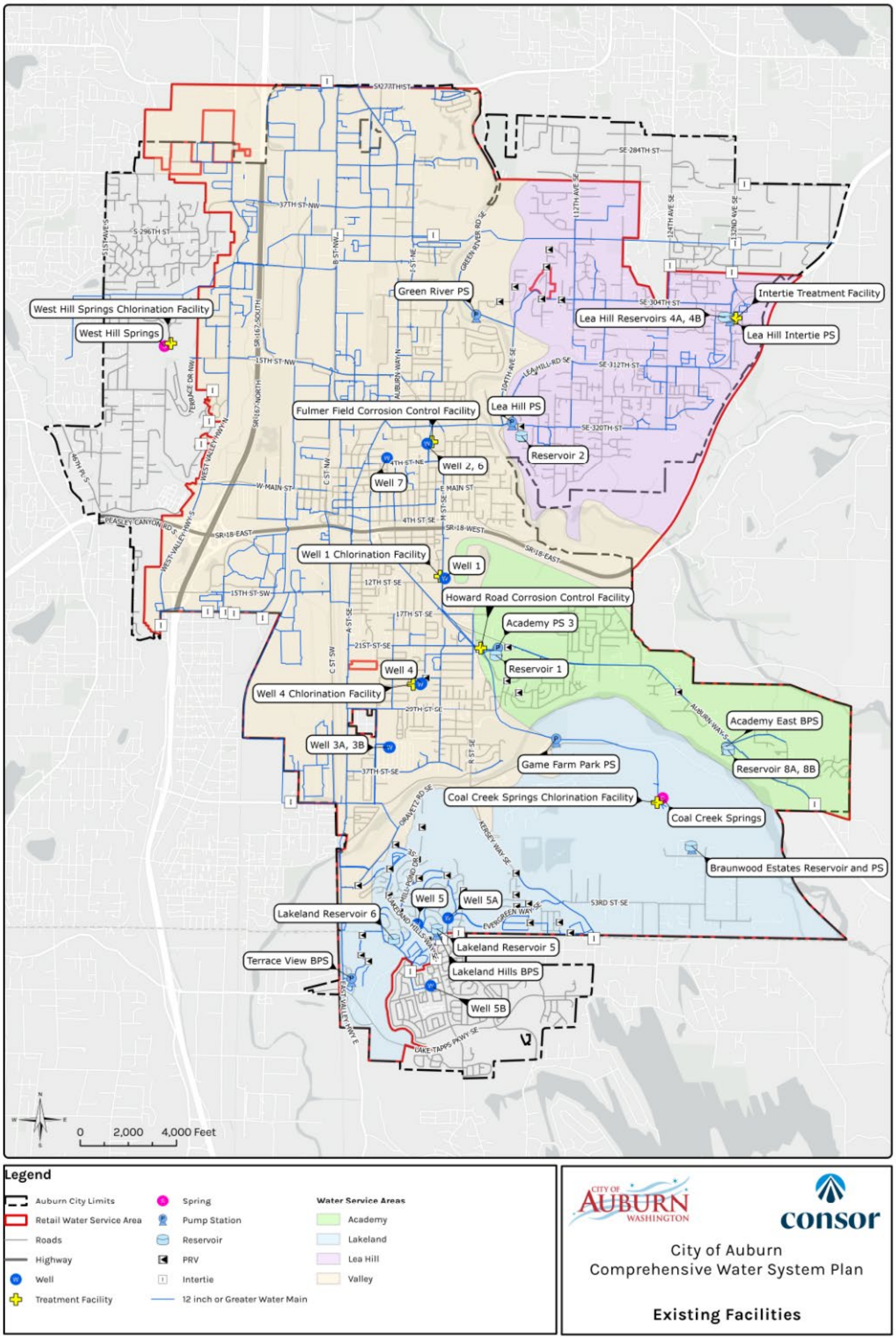
- 1996 Preliminary Hydrogeologic Characterization
- Summary of 1997 Hydrogeologic Investigations
- The 1997-1998 Test Well Drilling and Installation Program
- The 1999 Hydrogeologic Characterization Report and Appendices

The general groundwater flow system in the City's vicinity is characterized by recharge within uplands and discharge to the rivers in the lowland valleys. Precipitation and Lake Tapps are sources of groundwater recharge. Lake water flows from the lake bottom into the groundwater system. Contrary to recharge in other upland areas, recharge from Lake Tapps is not totally dependent upon precipitation because water is routed to the lake from outside the area. The main discharge zone for the City's area is the Green River Valley. Some groundwater discharges into the river in the City's vicinity and further downstream.

1.4.2 Existing System Overview

The City's water system consists of wells, springs and interties as water sources, chlorination stations and corrosion control facilities for water treatment, pump stations, pressure reducing stations, steel and concrete enclosed reservoirs for storage, and transmission and distribution pipelines to provide potable water to customers. Service is provided to four major service areas (Valley, Lea Hill, Lakeland, and Academy). Each major service area is further divided into pressure zones as required by local topography. The City's four major service areas and the location of key elements of the water system are shown in **Figure 1-3**. A more detailed inventory of assets and system hydraulic profile is presented in **Chapter 3**.

Figure 1-3| Existing Facilities



1.4.3 History

The earliest record of a potable water system for the City of Auburn traces back to 1884 with the establishment of the Peasley Canyon supply. Initially serving the City, then called Slaughter, a 4-inch wood-stave pipe connected Peasley Canyon Reservoir to deliver surface water. The year 1907 marked a pivotal moment as the City acquired West Hill Springs for $2,000, a source that continues to yield approximately 1 million gallons of water per day (600 gpm) and remains active.

As the City's population grew to a few thousand by 1922, the demand for water prompted the introduction of groundwater wells alongside the existing West Hill Springs. These wells, strategically drilled in the downtown area, were complemented by pump stations, with one situated at the present site of City Hall. Despite their longstanding service, these early wells and pump stations have since been decommissioned.

The evolution of Auburn's water distribution system saw a transition from wooden pipes to the installation of the first recorded steel water main in 1924 - a 10-inch pipeline connecting West Hill Springs to the valley floor. The Coal Creek Springs water collection system, which included a 24-inch steel main under the White River was constructed in 1925, along with the construction of Reservoir 1 (later replaced in 1975), to meet the escalating water needs of the growing City.

By 1946, the population had increased, prompting construction of the Coal Creek Pump Station, to pump water from Coal Creek Springs to the distribution system.

In 1960, the City embarked on further enhancements by supplementing its two springs with a well system, beginning with Well 1 and then Well 2 in 1969.

In 1961, water system facilities were constructed in the Academy Service Area.

Expansion into the Lea Hill Service Area occurred between 1964 and 1965, coinciding with extensive modifications to the Coal Creek supply system and the implementation of a Supervisory Control and Data Acquisition (SCADA) system.

The early 1980s saw the extension of the water system into Lakeland Service Area.

A key development occurred in 1991 with the acceptance of Braunwood Estates (now called Hidden Valley) as a satellite water system operating independently outside the City’s distribution network.

The late 1990s marked significant construction under the Interlocal Agreement 2 (IA2) project, a water supply project between LMWD, Covington Water District (CWD) and the City to provide LMWD and CWD with wholesale water supply, and as a result expanding the water system. Expansion into Pierce County and service agreement modifications characterized the late 1990s and early 2000s.

Table 1-2 summarizes key construction and enhancements related to the City's wells, springs, reservoirs, pump stations, treatment, water pipelines, and system upgrades. Notably, the water pipelines improvements focus on transmission mains, excluding distribution mains installation and replacements (due to the extensive list), with exceptions for distribution improvements mandated by environmental (water quality) regulations. The table provides a documented history of the water system, recognizing occasional gaps.

Table 1-2 | Water Facilities History

Springs	
West Hill Springs	• Before 1907: Established as a potable water supply for the City. • 1915: Construction of 210,000-gallon concrete reservoir to store water from West Hill Springs. • 1924: Installation of the first recorded steel water main (10" pipeline from West Hill Springs to the valley floor). • 1960: Ongoing use, with a replacement of collection boxes. • 1988: Removal of reservoir. West Hill Springs water flows continuously into the system. • 2000: Partial fencing of the watershed carried out according to the 2000 Water Comprehensive Plan. • 2017: Flow Control Improvements, including installation of an electromagnetic meter and flow control valve for automatic shutdown. • Current: The spring has a capacity of 600-gpm, with varying supply based on aquifer conditions. Equipped with chlorination station.
Coal Creek Springs	• 1925: Construction of Collection system. • 1925: Installation of 24" wood-stave supply pipeline connecting the Coal Creek Springs collection system to a booster pump station (present Howard Road site) and 14" transmission main to Reservoir 1, including installation of 24" steel pipe under the White River • 1964: Construction of south and middle collectors in the system. • 1964: Replacement of the 24" wood-stave supply pipeline connecting the Coal Creek Springs collection system to a booster pump station (present Howard Road site) with 24-inch concrete pipe. • 1998: Addition of the north collector for enhanced system performance. • 2023: Coal Creek Springs Transmission Main Replacement underway to install a new transmission main suspended from a utility/pedestrian bridge over the white river to replace a portion of the old main crossing the river. • Current: Flows by gravity to Howard Road Corrosion Control Treatment Facility (CCTF) and pumped into Reservoir 1, with typical production capacity of 3,000-gpm. Equipped with chlorination station.
Wells	
Well 1	• 1960: Construction of Well 1, within Valley Service Area. • 1998: Shutdown due to reduced well output and water levels. • 2010: The well was brought back into service temporarily to meet summer demands. • 2015: Phase 1 improvements to bring the facility back online. Construction of transmission main in M St SE, 17th St SE, R St SE & Howard Road SE to convey supplies from Well 1 to Howard Road CCTF. • 2016: Phase 2 improvements to bring the facility back online. Improvements included new well house, pumping system (2,200-gpm), disinfection with sodium hypochlorite, on-site emergency power, and upgraded electrical and SCADA controls. • Current: Operational and pumps to Howard Road CCTF, then boosted to Reservoir 1.
Well 2	• 1969: Construction of Well 2 (3,000-gpm capacity), within Valley Service Area. • 2000: Replacement with a new masonry building, pump (1,600-gpm) and associated equipment. • 2014: Installation of Variable-frequency Drive (VFD). • 2023: Rehabilitation and replacement of well pump and motor. • Current: Operational with the Fulmer Field CCTF, providing chlorination and emergency power.

Well 3A	• 1983: Construction of Well 3A (1,650-gpm) with automatic standby generator, pumps directly into Valley Service Area. • 1984: Installation of chlorination system. • Current: Inactive since mid-1990's (Est. 1995 – 1997) due to elevated manganese levels.
Well 3B	• 1984: Construction of Well 3B (1,650-gpm) adjacent to Well 3A, with chlorination system. • Current: Inactive since mid-1990's (Est. 1995 – 1997) due to elevated manganese levels.
Well 4	• 1985: Construction of Well 4 (2,600-gpm), to pump directly into Reservoir 1 and capable of feeding south end of Valley distribution system through pressure-reducing station. • 2016: Emergency Power Improvements project added a diesel-fueled generator and hypochlorite chlorination equipment. • 2018: Upgrade of Well soft starter. • 2023 (ongoing): Well 4 Facility Improvements project underway to replace aging mechanical equipment and electrical improvements. • Current: Pumps directly to Reservoir 1 and to south end of Valley Service Area through PRV's.
Well 5	• 1983: Construction of Well 5 (1,000-gpm) to serve the Lakeland Hills Development. • Current: Maximum production capacity of 650-gpm, not chlorinated and pumps directly into Lakeland Service Area and supplies Reservoirs 5 and 6.
Well 5A	• 1990: Construction of Well 5A (180-gpm) to supplement Well 5. • Current: Equipped with chlorination facilities and a manual transfer switch. Pumps directly into Lakeland Service Area and supplies Reservoirs 5 and 6.
Well 5B	• 2005: Construction of Well 5B (600-gpm) with hypochlorite generation and ATEC media filters, to remove iron and manganese prior to disinfection. • Current: Removed from service in 2006 due to irrecoverable aquifer.
Well 6	• 1998-2000: Construction of Well 6 (3,500-gpm) within Valley Service Area. • 2014: Replacement of pump bowl and installation of VFD. • 2000: Rehabilitation with a new masonry building, well pump (1,600-gpm), and associated equipment. • Current: Operational with the Fulmer Field CCTF, providing chlorination and emergency power.
Well 7	• 1997: Construction of Well 7 (3,500-gpm) within Valley Service Area. • Current: Inactive as of 2012, due to elevated manganese levels.
Reservoirs	
West Hill Springs Reservoir	• 1915: Construction of 210,000-gallon concrete reservoir to store water from West Hill Springs. • Current: Reservoir removal (1988). West Hill Springs water flows continuously into the system.
Academy Reservoir	• 1961: 500,000 gallons steel reservoir, supplied by Academy Pump Station. • Current: Reservoir removed (1978-1980) when Reservoir 8B was constructed.
Reservoir 1	• Est. 1925: Construction of 3.0 million gallons to store water from Coal Creek Springs. • 1975: Replacement of uncovered reservoir with covered 5-MG concrete reservoir. • 2019: Seismic isolation control valve installed on outlet piping. • Current: Primary storage for Coal Creek Springs and can also be filled with water from Well 4. Serves as water supply for the Academy Pump Station and Valley Service Area.

Reservoir 2	• 1975: Construction of a 3.6-MG pre-stressed concrete underground reservoir (dual-purpose facility with tennis court on top) in Lea Hill. • Current: Supplied with several City sources and Reservoir 1. Serves as water supply for Valley Service Area. Design for the addition of a seismic isolation control valve in 2024 with construction expected in 2025.
Reservoir 4A	• 1965: Construction of 1.0-MG steel reservoir in Lea Hill. • 1965: Installation of 12-inch ductile iron pipeline from Porter (8th St NE) Bridge to Reservoir 4A. • 1998: Replacement of exterior and interior protective coatings. • Current: Supplied by Valley Service Area through Lea Hill & Green River Pump Stations. Serves as water supply for Lea Hill Service Area. Addition of a seismic isolation control valve underway with construction anticipated in 2024.
Reservoir 4B	• 1983: Construction of 1.5-MG steel reservoir in Lea Hill. • 1998: Replacement of exterior protective coatings. • 2002-2003: Replacement of interior protective coatings • Current: Supplied by Valley Service Area through Lea Hill & Green River Pump Stations. Serves as water supply for Lea Hill Service Area. Addition of a seismic isolation control valve underway with construction anticipated in 2024.
Reservoir 5	• 1981: Construction of 1.0-MG steel reservoir for Lakeland Service Area. • 2015: Painting of the Interior and exterior, installation of seismic isolation control valve and addition of ladder. • Current: Supplied with wells 5, 5A and Terrace View Booster Pump Station. Serves as water supply for Lakeland Service Area.
Reservoir 6	• 2012: Construction of 1.0-MG reservoir in Lakeland Service Area (also provides storage for City of Algona). • Current: Supplied with wells 5, 5A and Terrace View Booster Pump Station. Serves as water supply for Lakeland Service Area and City of Algona.
Reservoir 8A	• 1973: Construction of 1.2-MG steel reservoir in Academy Service Area. • 2002-2003: Recoating of the reservoir’s exterior and interior. • Current: Supplied with Reservoir 1 through the Academy Pump Station. Serves as water supply for Academy Service Area. Addition of a seismic isolation control valve underway with construction anticipated in 2024.
Reservoir 8B	• 1980: Construction of 1.5-MG steel reservoir in Academy Service Area. • 2002-2003: Recoating of the reservoir’s exterior and interior. • Current: Supplied with Reservoir 1 through the Academy Pump Station. Serves as water supply for Academy Service Area. Addition of a seismic isolation control valve underway with construction anticipated in 2024.
Pump Stations	
Howard Road Site Pump Station	• 1925: Construction of Howard Road Site Pump Station with 5 hydraulic ram-type pumps to move water from coal creek springs to Reservoir 1 & distribution system. • Current: (1962) Operation of ram-type pumps ended.
Coal Creek Springs Pump Station	• 1946: Construction Coal Creek Springs Pump Station to pump water to Reservoir 1 and distribution system (consisted of pump house and an electric pump). • 1947-1952 (exact year unknown): Addition of second pump (2,000-gpm). • 1953: Addition of third pump (3,000-gpm) • 1964: Replacement of two pumps with new 1,500-gpm and 2,500-gpm pumps. • 1999: Replacement of Diesel fuel storage tanks for emergency generators with above-ground, double-walled fuel tanks (easier to inspect for fuel leakage). • Current: Pump station removed in 2003 to make way for Howard CCTF.

Academy Pump Station	• 1960: Construction of Academy Pump Station 1, housing Pumps 1 and 2 (300-gpm and 500-gpm capacity). • 1961: Installation of 2 miles 10” cast iron transmission main from Academy Pump station 1 to Academy reservoir. • 1980: Construction of Academy Pump Station 2, housing Pumps 3 and 4 (750-gpm capacity each), with emergency power generator. • 1980: Installation of 2 miles 14” ductile iron transmission main, connecting Academy Pump Station 2 to Reservoirs 8A & 8B. • 1999: Replacement of Diesel fuel storage tanks for emergency generators with above-ground, double-walled fuel tanks (easier to inspect for fuel leakage). • 2022: Academy Pump Stations 1 and 2 replaced with a single pump station, Academy Pump Station 3, that consists of 4 vertical turbines, variable speed drive pumps with firm pumping capacity of 2,100-gpm. • Current: Pumps water to the Academy Reservoirs (Reservoirs 8A & 8B)
Green River Pump Station	• 1999: Construction of the Green River Pump Station, equipped with 4 pumps (1,170-gpm capacity each), as part of the Interlocal Agreement 2 (IA2) to supply water to CWD & LMWD. • 2020: Facility improvements for emergency generator and associated electrical equipment. • Current: Pumps water to the Lea Hill Reservoirs (Reservoirs 4A & 4B).
Game Farm Park Pump Station	• 1988: Construction of the Game Farm Wilderness Park Pump station for water supply and fire protection of the park. • 1992: Installation of 60-gpm domestic pump. • 1993: Installation of 1,000-gpm fire pump. • Current: Pumps water to the Game Farm Wilderness Park from the Coal Creek gravity supply line.
(Lea Hill) Intertie/Booster Pump Station	• 1998-2000: Construction of Intertie Pump Station near Lea Hill Reservoirs, designed to operate in conjunction with Green River Pump Station to serve IA2 partners (using 4 pumps) and to also serve small area at the top of Lea Hill using a “package type” booster-pump station. • Current: Pumps water to small higher elevation service area in Lea Hill. Equipped with a hypochlorite chlorination system.
Lea Hill Pump Station	• 1965: Construction of Lea Hill Pump station with two 600-gpm and one 800-gpm pumps, to boost water from Valley Service Area to Lea Hill Service Area. • 1999: Replacement of Diesel fuel storage tanks for emergency generators with above-ground, double-walled fuel tanks (easier to inspect for fuel leakage). • Current: Pumps water to the Lea Hill Service Area.
Lakeland Hills Booster Pump Station	• 1990: Construction of Lakeland Hills Booster Pump Station, consisting of a three-pump pressure sustaining package system and two large-capacity fire pumps, to pump water from Lakeland Hills Reservoir to Lakeland Service Area. • 2013: Replaced for improved service to boosted Lakeland Service Area, using three low flow pumps (720-gpm capacity each) and two fire flow pumps (3,125-gpm capacity each). • Current: Pumps water to higher elevation service area in Lakeland.
Terrace View Booster Pump Station	• 2010: Construction of Terrace View Booster Pump Station with firm capacity of 1,100-gpm, to supply water from Valley 242 to Lakeland 630 pressure zone. • Current: Pumps Valley Service Area water to Lakeland Service Area. Equipped with hypochlorite feed pump.

Academy East Booster Pump Station	• 2014: Construction of the Academy East Booster Pump Station replaced the single pump Janssen's Addition Pump Station, equipped with three domestic pumps with firm capacity ranging from 750 to 1,250-gpm. • Current: Pumps water from Reservoirs 8A and 8B into Academy Service Area.
Treatment	
Howard Road Corrosion Control Treatment Facility (CCTF)	• 2004: Construction of the Howard Road CCTF (6,300-gpm capacity), to treat water from Coal Creek Springs and Well 1 and boost to Reservoir 1, using three 2,100-gpm booster pumps. • Current: Pumps water to Reservoir 1.
Fulmer Field CCTF	• 2004: Construction of the Fulmer Field CCTF (9,600-gpm capacity), to treat water from Well 2, 6 and 7 and boost to Reservoir 2 and distribution system, using four 3,200-gpm booster pumps. • 2013-2018: Evaluation of Fulmer Field CCTF (along with Wells 2, 6 and 7) to identify improvements to increase the supply and treatment capacity of the existing facilities and infrastructure. • Current: Pumps water to Reservoir 2 and the Valley Service Area.
Distribution Main Improvements (mandated by Environmental Regulations) & Interties	

Intertie with City of Algona	• After 1996: Construction of wholesale interties (combined 1.1-mgd capacity) at:
	  o 1149 Industry Drive SW
	  o Boundary Boulevard and Milwaukee Ave
	  o Iowa Drive and West Valley Highway
	  o 1st Avenue
	• Emergency Interties at
	  o Boundary Boulevard and Celery Ave
	  o Boundary Boulevard and O Street

Intertie with City of Bonney Lake	• 2002: Construction of 8" emergency intertie at Evergreen Way, southwest of Lakeland Hills Way
	• After 2010: Construction of emergency interties at
	  o Lakeland Hills Way & 59th Avenue
	  o Evergreen Way and Nathan Avenue
	  o Olive Avenue, south of Evergreen Loop

Intertie with City of Pacific	• After 2003: Construction of emergency interties at
	  o Ellingson Road near Pacific Ave
	  o A St SE, north of White River

Intertie with City of Kent	• After 2001: Construction of emergency intertie with 78th Avenue S and S 277th Street

Intertie with LMWD	• Est. 1996 – Construction of 12" wholesale intertie at 30502 132nd Avenue SE (5-mgd capacity)
	• 1996 – 2002: Construction of emergency interties in
	  o 127th Place SE, south of SE 299th Place
	  o 124th Avenue SE and SE 300th Way
	  o SE 300th & 132nd Ave SE
	  o 1998-2000 at SE 288th St & 132nd Ave SE

Intertie with Lakehaven Water & Sewer District (LWSD)	• Est. 1995: Construction of the Aaby Dr. wholesale intertie to LWSD at R St. NW. • 2004: Transfer of Aaby Dr. pump station and service from City to LWSD. • After 2010: Construction of 6" emergency intertie at Aaby Drive and Knickerbocker Dr.

Intertie with City of Tacoma	• Est. 2012: Construction of wholesale interties at:
	  o 3240 B St NW (2,200-gpm max. flow rate)
	  o 29598 132nd Ave SE (4,500-gpm max. flow rate)

Distribution Main Improvements (mandated by environmental (water quality) regulation)	• 2015: Replacement of 2,760 linear feet of Asbestos Cement (AC) water main with ductile iron main. • 2022: Removal and replacement of approximately 186 service lines with lead goosenecks and approximately 7,075 linear feet of distribution water main with ductile iron main.
System Upgrades	
Supervisory Control and Data Acquisition (SCADA) system	• 1975: Addition of SCADA/telemetry, to control all reservoirs, wells and pumps from the Maintenance and Operations building. • 2015: Extensive upgrade of the SCADA/telemetry system, to improve control of the water utility facilities and replace obsolete components.
Metering	• 2016: Installation of two master meters for Muckleshoot Indian Tribe (MIT) Casino, to facilitate City and MIT account administration. • 2017-2018: Installation of Advanced Metering Infrastructure (AMI) for all customers. The AMI allowed for more accurate meter reads, daily information for quicker detection of leaks, and improved efficiency of billing operations. • 2020 - 2022: Replacement of deduct meters used for irrigation purposes with separate water service tap on the city's main.

1.5 Related Plans and Studies

In preparing this Plan, related studies and plans were reviewed to ensure coordination with adopted documents that affect system planning and operations. The related plans are categorized into two groups for clarity: Internal Studies/Plans Specific to the City and External Plans Influencing City-Wide Water Management. A brief synopsis of these studies and plans are presented below.

Internal Studies/Plans Specific to the City:

Wellhead Protection Plan, City of Auburn, 2014: The City developed a Wellhead Protection Plan to identify and protect groundwater sources. The initial plan was created in 2000 by Pacific Groundwater Group (PGG) and subsequently updated by Robinson Noble in 2008 and 2014. The plan maintains existing wellhead protection areas (WHPAs) and contributes to hazard assessments within these zones. It aligns with county ordinances, impacting land use planning and reflecting in critical aquifer recharge areas as outlined in the King County Comprehensive Plan. Additionally, the plan developed a monitoring system for groundwater sampling, which enhanced operational readiness by providing early warnings of potential contaminations.

City of Auburn Water Resources Program, Pacific Groundwater Group, Inc., 1995-1999: Pacific Groundwater Group conducted a comprehensive groundwater study in response to recommendations of the 1995 Comprehensive Water Plan. The study was documented in a series of reports (listed below), collectively known as the Auburn Water Resources Program Study. The Auburn Water Resources Program assessed the long-term potential for the City's continued use of groundwater for its water supply. The study confirmed substantial quantities of groundwater underlying the valley area and provided the basis for the water supply conclusions for this Plan. This comprehensive program, spanning several years, strategically addresses water rights acquisition by delving into technical studies of the local groundwater system. Two key elements of the program were the installation of monitoring wells and river gauges, and the assessment of the existing City wells in the deep aquifer. The installation of monitoring wells and river gauges not only aids in system planning by understanding groundwater dynamics but also enhances operational efficiency through real-time data collection. The program also included the development of a regional ground-water model (MODFLOW), using the United States Geological Survey (USGS) model program. This provided a tool for analyzing potential withdrawal scenarios, offering valuable insights into optimizing water system operations.

- 1996 Existing Data Hydrogeologic Characterization
- 1996 Preliminary Hydrogeologic Characterization
- Summary of 1997 Hydrogeologic Investigations
- 1997-1998 Test Well Drilling and Installation Program
- 1999 Hydrogeologic Characterization Report and Appendices
- Regional Groundwater Model Report

Bilateral Compliance Agreement (BCA), 1996: This agreement, entered with the Department of Health (DOH) due to copper levels that exceeded the action levels in samples collected in 1993, outlined treatment options and schedules for corrosion control facilities. As a result, new corrosion facilities at the Howard Road/Coal Creek Springs Pump Station and Fulmer Field Park were completed in 2004. The completion of these facilities in 2002 directly impacts operational efficiency, ensuring compliance with health standards and safeguarding water quality in the long term.

City of Auburn – Public Works Emergency Response Manual, 2022: This electronic manual is only one element of the City's overall Emergency Response Plan, which serves as a guide for management of emergency situations. It was first developed in 1999 in response to the potential impact of Y2K and it is updated annually at the first of the year. The manual is not all-inclusive for every type of disaster that could occur, but it is a valuable tool for dealing with many of the emergency situations that most water utilities could face.

City of Auburn Comprehensive Plan, 2015 and Amendments: This current plan, originally adopted in 2015 in accordance with the State Growth Management Act (GMA) is the City's comprehensive land use plan and policy document. It consists of goals, land use policies, and the Comprehensive Plan maps. The plan may be amended annually as needed. The update of the comprehensive plan is taking place concurrently with the revision of this water system plan.

City of Auburn 2015 Comprehensive Water Plan, City of Auburn Public Works, 2015: The previous Comprehensive Water Plan provided evaluation of needs and recommended improvements to the City system for 2015-2022. In 2021, DOH extended the approval period for the 2015 WSP until May 11, 2026. The plan adopted in 2015 constitutes the basis for this Plan.

Capital Facilities Plan (2023-2028), City of Auburn Finance Department, 2022: Adopted in 2022, this plan is instrumental in both planning and operations. It outlines goals, policies, and implementation programs mandated by the State GMA, providing a roadmap for capital improvements. This directly influences the operational landscape by defining necessary infrastructure enhancements and improvements, aligning with the city's capital improvements program.

Engineering Design and Construction Standards, City of Auburn, 2024: The City updates its Design and Construction Standards as needed, typically on an annual or bi-annual basis. These standards not only guide the planning of new infrastructure but also enhance day-to-day operations by ensuring adherence to the latest industry practices and regulations. The City of Auburn Design and Construction Standards are attached in **Appendix P**.

Water Shortage Contingency Plan, City of Auburn, 2024: The plan establishes actions and procedures for implementing Auburn City Code (ACC) 13.14 during impending or actual water shortages, to maintain levels of service essential for public health and safety, minimize adverse impacts on economic activity, and protect customer's lifestyle; refer to **Appendix R.**

Water Cost of Service Rate Update Study, City of Auburn, 2022: This study informs strategic decisions related to water rates and influences the operational budget.

System Development Charge Study, City of Auburn, 2014: Completed in 2014, this study examines system development charges, offering insights for future infrastructure development. Its findings directly influence the planning of new systems and infrastructure projects and provide a financial basis for expansion.

External Plans Influencing City-Wide Water Management:

King County 2016 Comprehensive Plan, King County Department of Local Services, 2016: The King County Comprehensive Plan establishes land use zoning for areas outside the City limits, but within the RWSA. Additionally, King County provides critical area ordinances and critical aquifer recharge areas that support the City's wellhead protection efforts. The current King County Comprehensive Plan was first adopted on December 5, 2016, and was later amended in 2020.

Pierce County Comprehensive Plan, 2015 and Amendments: This is a comprehensive plan and policy document for Pierce County. The plan was developed in accordance with the GMA and is amended every two years. This plan influences planning by offering insights into regional policies.

Pierce County Coordinated Water System Plan, 2021: In 1983, all of Pierce County was declared a Critical Water Supply Service Area. In response to this declaration, Pierce County established the first Coordinated Water System Plan to coordinate planning and establish water service areas. The current Coordinated Water System Plan, adopted in 2021 through Ordinance 2018-39s2, influences both regional water planning and City's operational coordination with other systems in the county.

Pierce County White River Basin Plan, 2013: This plan provides a comprehensive guide to storm drainage and surface water management in portions of the White River Basin. Given that the City of Auburn utilizes this basin, the plan significantly influences operational considerations and emergency response strategies during storm events.

South King County Coordinated Water System Plan (CWSP), 1989: This plan, adopted in 1989, defined the initial service area boundaries for the water systems within the Critical Water Supply Area of South King County. The City of Auburn Comprehensive Water Plan, upon adoption, becomes an element of the CWSP.

South King County Ground Water Management Plan (GWMP), 2003: The GWMP was initiated by Ecology with the intent to develop methods to protect the quality and quantity of ground water, meet future resource needs while recognizing existing water rights and provide effective and coordinated management of ground-water resources. This plan is considered in planning for and operation of the City's water system.

Tribal Land Use Plan, Muckleshoot Indian Tribe, 1978: The adoption of the MIT's Zoning Ordinance in 1979, which influences land use within the Muckleshoot Indian Tribe, affects water-related considerations. This plan plays a crucial role in ensuring collaborative water management efforts that respect tribal land use.

USGS Hydrogeologic Framework, Groundwater Movement, and Water Budget in the Puyallup River Watershed and Vicinity, Pierce and King Counties, Washington: Scientific Investigations Report 2015-5068: A collaborative effort involving various entities (Cities of Auburn, Milton, Puyallup, Sumner, and Tacoma; Pierce Conservation District; DOH; Cascade Water Alliance; Lakehaven Utility District; Summit Water & Supply Company; Mt. View-Edgewood Water Company; and The Russell Family Foundation), this report contributes valuable insights into the hydrogeologic framework, groundwater movement, and water budget in the Puyallup River Watershed. It significantly influences both regional water planning and operational considerations, providing a scientific basis for understanding the water dynamics in the watershed.

Other Plans

In addition to the studies listed above, the current Water Comprehensive Plans from the following neighboring water systems (City of Algona, Bonney Lake, Kent, Pacific, CWD, LWSD, LMWD and Highline Water District (HWD)) were considered during the preparation of this Plan.

1.6 Service Area, Maps, and Land Use

The City's RWSA boundaries were initially defined and documented through the South King County CWSP in 1989. The boundaries of the RWSA have been adjusted since 1989. An area of Pierce County was incorporated into the RWSA through the Pierce County Coordinated Water System Planning process (1997) and interlocal agreements with Bonney Lake (1998 and 2016), LWSD (2004), Kent (2006), and LMWD (2006). Copies of the Water Service Area Agreements are provided in **Appendix G.**

Several water purveyors adjoin the City of Auburn RWSA, as shown in **Figure 1-4**. These include the cities of Algona, Bonney Lake, Kent, Pacific, and Sumner. Also included are the CWD, LWSD, LMWD, HWD, and MIT. Purveyors with wholesale water agreements and interties are discussed in **Section 1.6.1**.

Figure 1-4 | Adjacent Water Systems

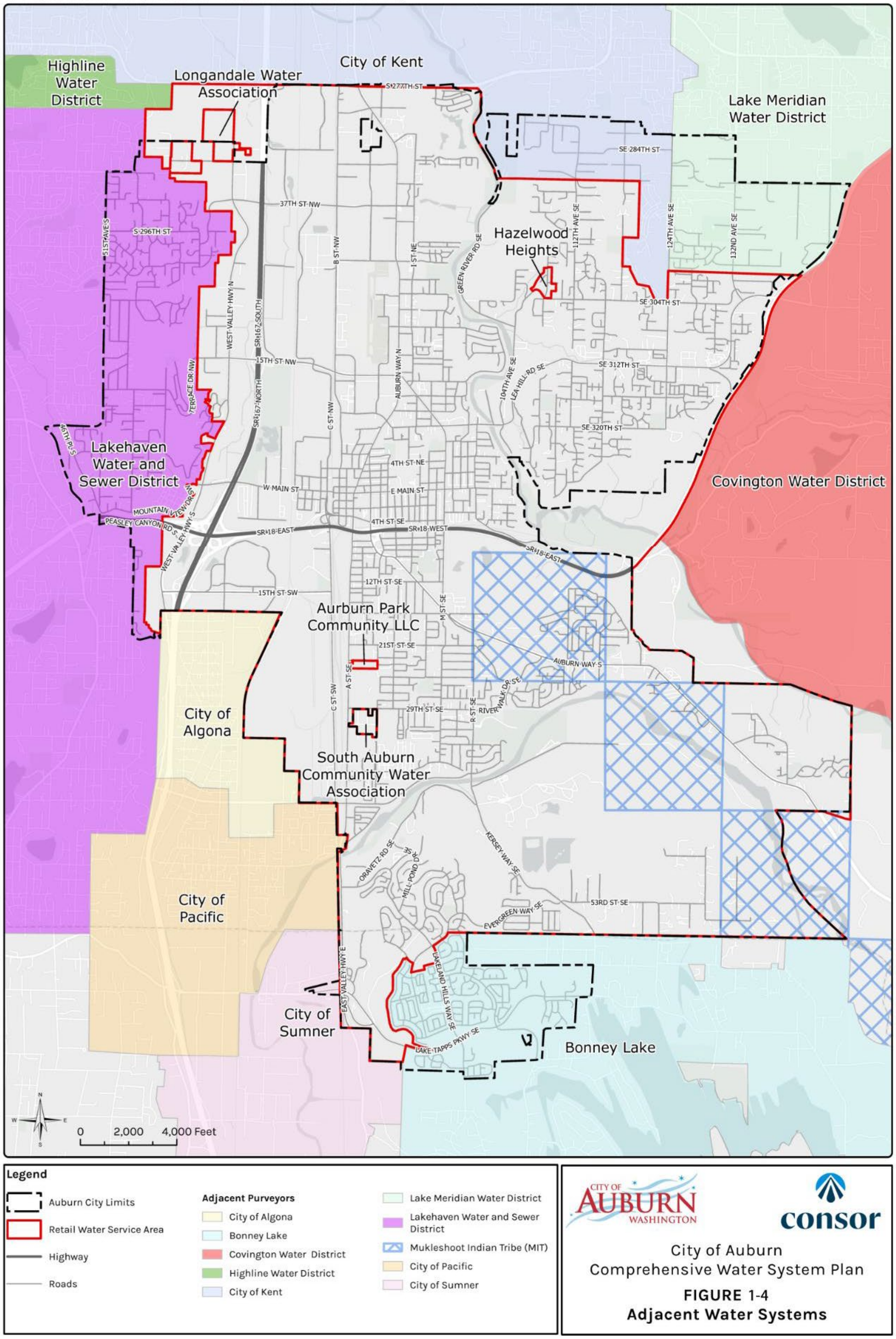
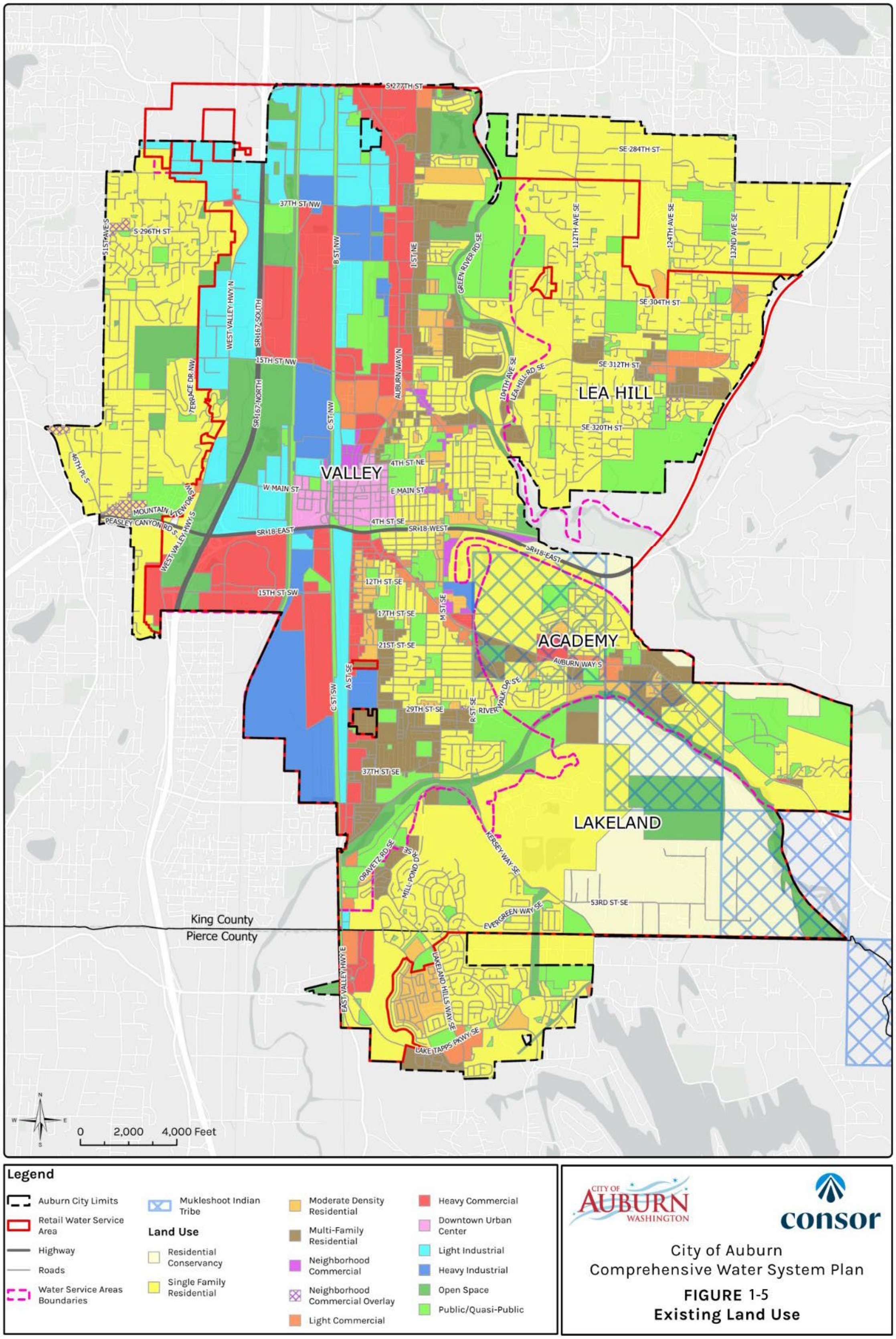


Figure 1-5 reflects the City's current land use designations. The City includes a wide range of residential, commercial, institutional, and industrial land uses. Public and quasi-public land uses include parks, open space, and public recreation as well as institutional uses such as schools. Commercial and industrial uses occur primarily in the valley; however, large areas of residential land use and the Downtown Urban Center (DUC) also exist in the valley area.

The Academy and Lakeland Service Areas are primarily residential, although some commercial development is located along Auburn Way South (SR 164) in the Academy Service Area. The Lea Hill Service Area is also primarily residential although other uses include small amounts of commercial and open spaces, and Green River College.

Areas within the RWSA, but outside the City limits, are governed by King County zoning. Land use is assumed to be consistent with zoning in these areas.

Figure 1-5 | Existing Land Use



1.6.1 Wholesale Interties

Interties provide a tool that water utilities use to move water between systems to meet supply needs, to increase reliability and respond to emergencies. The City maintains wholesale supply interties with three water systems: City of Tacoma, Algona, and LMWD. The City also has a supply contract with the MIT and the Indian Health Service, dating from 1972, for services along a pipeline at SE 368th PL extending from the City limits into the reservation.

1.6.1.1 City of Tacoma

In 2012, Tacoma agreed to provide water to the City in the quantity of up to 1.0 mgd average day use, 1.8 mgd peak day use, and 1.62 mgd four-day peak use. Two interties were constructed to supply the City: located at 3200 B Street NW and 29600 132nd Avenue SE in Auburn. This agreement will remain in force as long as Tacoma (or its successors in interest of its water system) remains in the business of providing water, and as long as the City meets the terms and conditions of the agreement.

In 2014, Tacoma **amended and restated the 2012 agreement** with the City to provide a total of 3.5 mgd (2,430 gpm) of average use and 5.12 mgd (3,555 gpm) of peak use from the interties. The B Street NW Intertie is limited to a maximum flowrate of 2,200 gpm and the 132nd Avenue SE Intertie is limited to a maximum flowrate of 4,500 gpm.

1.6.1.2 City of Algona (Algona)

In 1996, the City and Algona entered into a water supply interlocal agreement (IA3) for the City to provide wholesale water supply to Algona. In 2002, the agreement was superseded with Interlocal Agreement 3A (IA3A). IA3A called for the City to provide for a firm quantified (uninterruptible) wholesale water supply and Algona would provide the City its groundwater rights from the failed well located at the intersection of 3rd Avenue and Washington Boulevard. Per IA3A, Algona also agreed to maintain its 100,000 gallons of system storage and financially participate in an additional 180,000-gallon share of the City's Reservoir 6 storage capacity. Per request in 2016, Algona elected to increase its participation in Reservoir 6 by 100,000 gallons, which accounted for a total share of 280,000-gallon storage capacity. If the City experiences any failure or decreased capacity, the supply of water to Algona may be decreased by the same percentage that is experienced by the City.

Algona is served (per agreement IA3A) through 8-inch meter located at 1st Avenue and by two 8-inch intertie meter stations located at 1149 Industry Drive SW, and at Boundary Boulevard and Milwaukee Avenue. A fourth 8-inch master meter is located near Iowa Drive and West Valley Highway. All the interties are connected to the City's 242 zone.

1.6.1.3 Lake Meridian Water District (LMWD)

An intertie between the City and LMWD was constructed in 1996 as part of Interlocal Agreement 2 (IA2), to enable the District to purchase water from the City. The intertie also allows the City to provide an emergency supply to Kent's East Hill Service Area through LMWD. A provision of the IA2 agreement calls for the district to provide an emergency supply to the City when needed for the Lea Hill Service Area. As part of the IA2, the City agrees to provide up to 2.5 mgd of MDD to LMWD (total maximum day demand of 5.0 mgd).

Per the 2017 Amendment to the IA2, LMWD discontinued regular purchase of water from the City and instead switched their primary supply to CWD. The amendment maintained the intertie with LMWD but modified the conditions of service to interruptible.

1.6.2 Emergency Interties

The City has emergency interties with seven water systems as summarized in **Table 1-3.**

Table 1-3 | Emergency Interties

Water System	Receiver	Location	Auburn Pressure Zone	Mode of Operation	Meter Size	Operated by
City of Algona	City of Algona	Boundary Boulevard and Celery Ave	Valley 242	Manual	N/A	City of Auburn
City of Algona	City of Algona	Boundary Boulevard and O Street	Valley 242	Manual	8"	City of Auburn
City of Bonney Lake	City of Bonney Lake	Evergreen Way SE (southwest of Lakeland Hills Way)	Lakeland 697	Manual	8"	City of Bonney Lake
City of Bonney Lake	Two-way	Lakeland Hills Way & 59th Avenue	Lakeland 697	Manual	N/A	City of Auburn / Bonney Lake
City of Bonney Lake	Two-way	Evergreen Way and Nathan Avenue	Lakeland 697	Manual	N/A	City of Auburn / Bonney Lake
City of Bonney Lake	Two-way	Olive Avenue, south of Evergreen Loop	Lakeland 697	Manual	N/A	City of Auburn / Bonney Lake
City of Kent	Two-way	78th Avenue S and S 277th Street	Valley 242	Manual	6"	City of Auburn / Kent
City of Pacific	City of Pacific	Ellingson Road near Pacific Ave	Valley 242	Manual	4"	City of Pacific
City of Pacific	City of Pacific	A St SE (north of White River)	Valley 242	Manual	N/A	City of Pacific
Lakehaven Water & Sewer District (LWSD)	City of Auburn	Aaby Drive and Knickerbocker Drive	Valley 242	Manual	6”	LWSD
LMWD	Two-way	127th Place SE, south of SE 299th Place	Lea Hill 648	Manual	N/A	City of Auburn
LMWD	Two-way	124th Avenue SE and SE 300th Way	Lea Hill 648	Manual	N/A	City of Auburn
LMWD	LMWD	SE 300th & 132nd Ave SE	Lea Hill 648	Manual	8”	City of Auburn
LMWD	LMWD	SE 288th St & 132nd Ave SE	Lea Hill 648	Manual	8”	City of Auburn
City of Tacoma	City of Auburn	B St NW	Valley 242 / Lea Hill 648	Remote	8”	City of Tacoma

1.7 System Policies

The City manages the water utility in accordance with established water system policies that govern various facets of utility operations. The water system policies are established to support a vision or mission and to provide a framework for the design, operation, and ongoing wellbeing of the City's water utility. The policies establish consistency and ensure that adequate levels of service are provided throughout the system. The policies also provide documentation to current water-system customers, as well as those considering service from the City.

The City's Water Comprehensive Plan is based upon the following mission statement for the water utility:

"The City will provide for the efficient, environmentally sound and safe management of the existing and future water system within Auburn's service area."

For areas outside its municipal boundaries, the City maintains water franchises that allow for construction, operation, and maintenance of its facilities. Water system design and construction in the franchise areas are consistent with franchise requirements and the design and construction standards included in this Plan.

The City's water system policies and criteria, provided in **Appendix A**, are grouped within goal statements that are headlined under seven categories: Business Practices, Service Area, Operations and Maintenance, Financial, Planning, Environmental Stewardship, and Design and Construction.

1.8 Duty to Serve

The City recognizes its duty to serve all new service connections within its RWSA when the following thresholds are met per WAC 246-290-106.

- The water system has sufficient capacity to serve water in a safe and reliable manner.
  - To ensure the water system's capacity for safe water delivery, hydraulic analysis is conducted. This involves assessment of peak demand patterns, pressure requirements, and potential system expansions. The goal is to establish and maintain a water supply infrastructure that can reliably and securely accommodate the needs of new connections.
- The service request is consistent with adopted local plans and development regulations.
  - Service requests undergo a comprehensive review to ascertain their alignment with local plans, including the City's Design and Construction Standards.
- The water system has sufficient water rights to provide service.
  - Assessment of water production data is performed for all sources to confirm the water system's capacity and compliance with available water rights.
- The water system can provide service in a timely and reasonable manner.
  - The assessment of the water system's capability to provide service promptly and reasonably encompasses evaluating infrastructure readiness, adherence to construction timelines, and minimizing disruption to existing customers.

The City will plan to provide water service to all customers within its RWSA, in accordance with the WAC requirements and City Code. Revisions to the City's RWSA will be made only by written agreement and in accordance with local, county and state regulations.

1.9 Local Government Consistency

The City has submitted this plan to DOH, King and Pierce Counties, adjacent utilities, and local governments as part of the Agency Review process. Local government consistency review is completed in accordance with WAC 246-290-100(7) and WAC 246-290-108 to confirm consistency between the water system plan and local comprehensive plans, development regulations, and other local codes.

The consistency review also supports planning and development, minimizing conflicts and legal entanglements. The completed and signed Local Government Consistency Determination forms (DOH 331-568) are provided in Appendix F.

1.10 Watershed Plan Consistency

The City is in the Duwamish-Green (WRIA 9) and Puyallup-White Watershed (WRIA 10). The City currently has no plans to expand water rights place of use to include any portion of the service area that was not previously within the place of use for the water right when documented in an approved planning or engineering document and as identified in this Plan.

If the City expands water rights place of use, the new area within the water rights place of use service area will be formed in compliance with the terms of WAC 246-290-107 and consistent with the Watershed Plan approved for WRIA 9 or WRIA 10, under RCW 90.54.040(1).

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CHAPTER 2

Basic Planning Data

This chapter's objective is to meet the requirements of WAC 246-290-100 (4)(b), incorporating basic planning data into this 22024 Water System Plan (WSP). It provides current population and water demand information; estimates future population and water demand; validates data; and compares future population and water demand estimates with locally adopted plans.

Projecting realistic future water requirements, or demand, is necessary for planning infrastructure projects and securing adequate water supply to meet future growth. Future water demands are a key component of the water system analyses presented in this WSP and in the City's Capital Improvement Program (CIP). Accurate demand projections require a thorough review of historical water use, predicting where and how much growth will occur, and estimating the future water use for existing and new customers.

The following topics are addressed in this chapter:

- 2.1 Water Service Area Population
- 2.2 Water Service Connections and Usage
- 2.3 Water Supply and Production
- 2.4 Distribution System Leakage
- 2.5 Water Supply Characteristics
- 2.6 Water Supply Reliability Evaluation
- 2.7 Future Population Projections and Land Use
- 2.8 Future Water Demand

2.1 Water Service Area Population

The City's current area within the RWSA boundary is smaller than its City limits, with adjacent purveyors serving the portion of the City's population that is outside its RWSA boundary, as shown in **Figure 1-1** presented in **Chapter 1**. As a result, historical City population data does not accurately represent the population served by the City's water system. To calculate the RWSA population, the Housing Unit Method was used, which is presented as an acceptable option for population determination in the Washington State Department of Health's (DOH) Water System Planning Guidebook 2020 Revision. The Housing Unit Method calculates the population based on the number of residential units and the area's average person's per household ratio.

The historical population data for the water system, as calculated using the Housing Unit Method, is presented in **Table 2-1**. These calculated populations are consistent with the numbers the City has reported on its Water Facilities Inventory (WFI), included in **Appendix H.**

Table 2-1 | Historical Population

	2015	2016	2017	2018	2019	2020	2021	2022
Persons per household[1]	2.73	2.75	2.76	2.77	2.79	2.80	2.81	2.82
Single-Family Residential Connections[2,3]	11,600	12,128	11,852	11,857	11,883	11,894	11,985	11,980
Multi-Family Residential Connections[2]	1,045	1,070	1,035	1,044	1,054	1,054	1,064	1,052
Calculated Multi-Family Units[4]	10,450	10,700	10,350	10,440	10,540	10,540	10,640	10,520
Calculated Population Served[5]	60,259	62,704	61,294	61,872	62,535	62,876	63,576	63,450
City Population[6]	78,210	80,362	82,058	84,352	86,353	87,256	88,080	88,750
City Employment (Non-Residential Population)[7]	37,298	39,466	29,487	40,855	41,985	39,092	37,871	N/A

Notes:

1. Persons per household per Washington State Office of Financial Management (OFM). 2021 and 2022 values are projected since OFM data is only available for the census period of 2010-2020.
2. Single and Multi-Family connections per City's water system billing records.
3. Single-Family Residential connections include duplexes per the City's design standards.
4. Assumed units per multi-family connection is 10 per the City's WFI, updated on 3/15/2022.
5. Calculated Population Served is calculated as the number of single-family connections plus the number of multi-family units multiplied by the persons per household.
6. City population per the Washington State OFM records.
7. Employment data is from the United States Census OnTheMap data source using a City-defined selection area.

Based on the calculated historical water system population presented in **Table 2-1**, the City's water system has seen growth in population between 2015 and 2022 averaging a one percent increase annually. The number of connections peaked in 2016 (along with the calculated population), however this was during the time when the City was transferring services to AMI metering, resulting in some apparent fluctuations of reported connections during the switchover that could not be easily rectified. The last row in **Table 2-1** provides the City population as reported by the Office of Financial Management (OFM). The City population has had a similar, steady growth to the calculated water system population, with an average annual growth rate of 1.8 percent annually. The City population as reported by the OFM is larger than the calculated water system population because the RWSA is smaller than the City limits as shown in the Water System Map (**Figure 1-3**). Additionally, growth in parts of the City beyond the RWSA has been greater than the rate of growth experienced within the RWSA. The OFM City population information is provided for reference; the calculated population served will be used for the purposes of this WSP.

2.2 Water Service Connections and Usage

Historical water use, or consumption, data was obtained from City records to characterize the demands of the City's customers. Annual water use data for the years 2015 to 2022 was used to develop historical demand patterns and parameters, which represent current and likely future water use. Two key demand parameters were generated from the data: typical water use per customer classification, and typical water use per equivalent residential unit. These parameters were used as the basis of future demand projections.

2.2.1 Historical Accounts

The City's water customers are divided into eight customer classifications, which are:

- Single-family Residential (SFR).
- Multi-family Residential (MFR).
- Commercial.
- Manufacturing and Industrial.
- Schools.
- Municipal (City Accounts).
- Irrigation.
- Wholesale.

The number of connections for each customer classification is summarized in **Table 2-2**. Unmetered, also referred to as non-revenue water, also accounts for a portion of the City's water use, however, this classification is not included in **Table 2-2**. Please note that per the City's standards, SRF connections include duplexes.

Table 2-2 | Historical Number of Connections per Customer Classification

	2015	2016	2017	2018	2019	2020	2021	2022
Single-Family Residential	11,600	12,128	11,852	11,857	11,883	11,894	11,985	11,980
Multi-Family Residential	1,045	1,070	1,035	1,044	1,054	1,054	1,064	1,052
Commercial	1,317	1,386	1,340	1,339	1,333	1,328	1,284	1,244
Manufacturing & Industrial	50	4	4	3	2	2	2	2
Schools	70	64	60	60	60	60	58	55
Municipal (City Accounts)	32	34	33	33	33	33	33	33
Irrigation	459	499	484	499	514	514	620	675
Wholesale	8	8	8	7	5	5	5	5
Number of Connections, Total	**14,581**	**15,193**	**14,816**	**14,842**	**14,884**	**14,890**	**15,051**	**15,046**

As summarized in **Table 2-2**, SFR connections make up approximately 80 percent of all accounts. The total number of connections has increased by approximately three percent between 2015 and 2022. Variation in the total number of water service connections in 2016 is linked to the rollout of AMI technology from 2016 to 2017. Throughout this transitional phase, there may have been instances of double counting meters in 2016, leading to an inflated number of connections. Subsequently, there was a notable decrease in 2017 as the number of connections were normalized.

A significant change in manufacturing and industrial accounts occurred between 2015 and 2016 due to some meters being reclassified as commercial connections. Manufacturing and industrial services are classified as businesses engaging in the manufacture of products, materials, equipment, machinery, and supplies with a meter size of two inches or larger and a monthly annual average water consumption equal to or greater than 30,000 cubic feet. There were several accounts that did not meet the criteria for this classification and were changed to Commercial classification rate following 2015. The total number of connections from 2016 to 2017 decreased due to low and high flow meters (two meters) being replaced with one meter; this impacted Commercial, Manufacturing and Industrial, and School connections.

The number of SFR, MFR, and commercial connections peaked in 2016, however, as mentioned in the opening paragraph, this is likely due to the fluctuations in the City's transition to AMI metering. Municipal connections remained constant over this period.

Wholesale connections were reduced in 2019 when Covington Water District (CWD) and Lake Meridian Water District (LMWD), formerly known as King County Water District # 111, discontinued regular purchase of water from the City.

2.2.2 Historical Consumption

The City's historical annual water consumption based on City billing data for each customer classification is presented in **Table 2-3** in million gallons (MG); the table does not include non-revenue (unmetered) water.

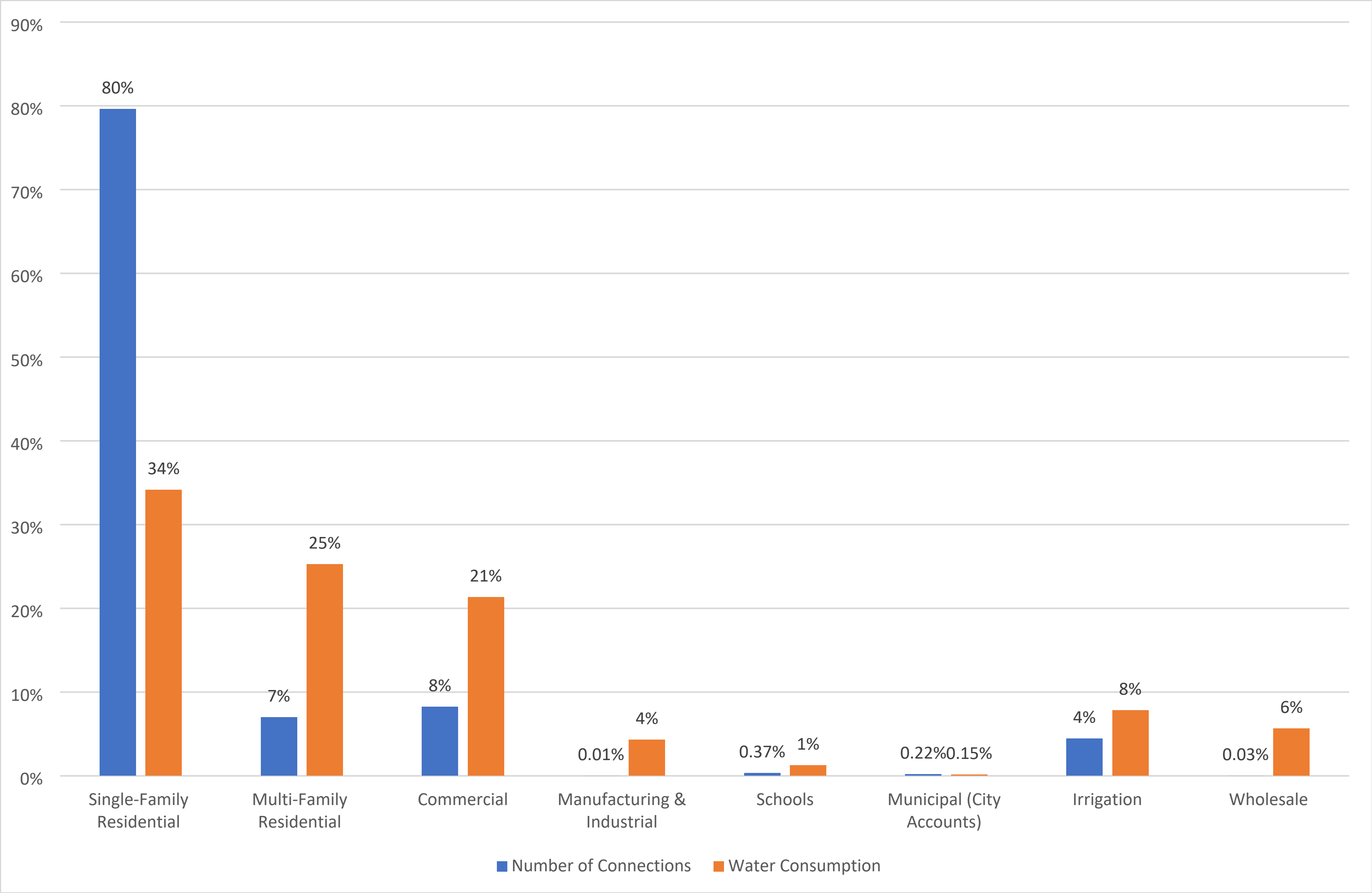
Table 2-3 | Historical Consumption in Million Gallons (MG) by Customer Classification

	2015	2016	2017	2018	2019	2020	2021	2022
Single-Family Residential	774	753	759	836	729	777	796	755
Multi-Family Residential	537	546	523	587	536	553	559	559
Commercial	501	581	595	594	585	461	470	472
Manufacturing & Industrial	170	153	123	124	121	101	94	96
Schools	41	49	56	49	42	30	33	28
Municipal (City Accounts)	5	4	5	5	5	4	4	3
Irrigation	163	162	160	102	102	118	173	173
Wholesale	425	428	153	137	130	131	128	125
Total Consumption, MG	**2,616**	**2,676**	**2,374**	**2,433**	**2,251**	**2,175**	**2,257**	**2,211**

Consumption has slightly declined over the period of record. While SFR and MFR consumption varied from year to year, it generally saw a slight increase during the study period which is correlated to the steady increase in the number of connections presented in **Table 2-2**. SFR and MFR consumption peaked in 2018, which is likely due to AMI meters implementation. Manufacturing and industrial demands decreased between 2015 and 2022 which is attributed to the reduced number of connections (reclassification) presented in **Table 2-2** as well as reduced consumption from Boeing which is the City's only current manufacturing and industrial customer. Commercial and school consumption decreased in 2020 through 2022 which is likely correlated with remote working and schooling that resulted during the COVID-19 pandemic. Wholesale demands also decreased over the planning period since LMWD and CWD discontinued purchase of water from the City. Additionally, no wholesale water was supplied to MIT for the future fish hatchery; refer to **Section 2.8** for additional information.

Figure 2-1 presents the percentage of customer connections and annual billed water consumption by customer classification in 2022. Comparing the number of connections and water consumption illustrates the differences in water consumption between the different customer classifications. For example, SFR customers represent 80 percent of the connections, yet only 34 percent of the total consumption in 2022. Conversely, MFR customers represent seven percent of the connections, but 25 percent of the total consumption in 2022. Wholesale customers have six accounts in 2022 (0.04 percent of the total connections), but account for six percent of the total consumption in 2022. Similarly, manufacturing and industrial have two connections in 2022 (0.01 percent of the total connections), but account for four percent of the total consumption in 2022.

Figure 2-1 | Comparison of Number of Connections to Annual Water Consumption per Customer Classification in 2022



2.2.2.1 Historical Wholesale Consumption

Wholesale consumption decreased between 2015 and 2022. From 2015 to 2016 wholesale consumption represented 16 percent of the City's annual water consumption. In 2017 wholesale consumption decreased to six percent and remained relatively constant through 2022.

The City has two wholesale water agreements, one with the City of Algona and the other with LMWD. These agreements are described below, and copies of the agreements are included in **Appendix G**.

The City of Algona relies on the City of Auburn for water supply under the Water System Intertie Agreement, Algona/Auburn Intertie Agreement No. 3A (Agreement 3A). Agreement 3A was amended in 2002 to continue the agreement for the City of Auburn to provide a portion of the City of Algona's long-term water supply needs. Additionally, in 2016 the City of Algona purchased 100,000 gallons of additional storage in Lakeland Reservoir 6, bringing their total storage capacity to 280,000 gallons. Algona's consumption increased in 2018. Water consumption averaged 0.33 mgd between 2015 and 2017, and 0.36 mgd between 2018 and 2022. See **Table 2-6** for annual usage totals.

The City's Interlocal Agreement 2 (IA2) outlines the agreement with LMWD. The City's agreement with LMWD is on an interruptible basis and allows sales up to 2.5 mgd. This agreement was executed in October of 1996 and amended as Resolution 5332 in 2017. The agreement will remain in full force unless terminated by mutual agreement of the participants. LMWD did not purchase wholesale water during the planning period since they discontinued regular purchase of water from the City of Auburn in 2017 per the amendment to IA2. Instead, LMWD switched their primary supply to CWD, however, LMWD still maintains intertie with the City to use as a wholesale water supply on an as-needed basis.

The first amendment to IA2 also included the termination of CWD's wholesale agreement with the City; CWD did not purchase wholesale water during the planning period.

2.2.3 Water Use Per Connection and Equivalent Residential Units

The water use, or demand, of each customer classification can be expressed in terms of equivalent residential units (ERUs) for forecasting and planning purposes. One ERU is defined as the average quantity of water beneficially used by one average, full-time, SFR per day. The ERU calculation does not include non-revenue water or distribution leakage. **Table 2-4** summarizes the annual demand per ERU from 2015 to 2022 in gpd.

Table 2-4 | Historical Annual Demand per ERU (gpd per ERU)

	2015	2016	2017	2018	2019	2020	2021	2022
SFR Consumption (MG)[1]	774	753	759	836	729	777	796	755
Number of SFR Connections[2]	11,600	12,128	11,852	11,857	11,883	11,894	11,985	11,980
ERU_{ADD} (gpd)[3]	**183**	**170**	**176**	**193**	**168**	**179**	**182**	**173**

Notes:

1. Per annual residential consumption from **Table 2-3.**
2. Per residential connections from **Table 2-2.**
3. Calculated as annual consumption divided by number of connections.

To be conservative, an ERU planning value higher than the average was used by the City for demand forecasting. The 75th percentile of all the eight-year values was used to select the planning ERU value of

182 gpd. This methodology is consistent with the City's 2015 Plan. The ERU value of 182 gpd is seven percent lower than the 2015 Plan's ERU planning value of 195 gpd per ERU.

The conversion of total water consumption to ERUs provides a means to express water consumption by non-residential customers as an equivalent number of SFR accounts. The number of ERUs per account is obtained by dividing the water consumption per account by the water use per ERU (182 gpd for this planning period). **Table 2-5** presents the number of ERUs per account for each customer classification based on the planning value of 182 gallons per ERU.

Table 2-5 | Historical Demand as Equivalent ERUs per Customer Classification

	2015	2016	2017	2018	2019	2020	2021	2022
Single-Family Residential(ERUs)[1]	11,600	12,128	11,852	11,857	11,883	11,894	11,985	11,980
Multi-Family Residential (ERUs)	8,078	8,194	7,864	8,832	8,067	8,295	8,403	8,411
Commercial (ERUs)	7,542	8,709	8,947	8,933	8,806	6,920	7,066	7,096
Manufacturing & Industrial (ERUs)	2,561	2,298	1,857	1,864	1,817	1,510	1,412	1,437
Schools (ERUs)	614	730	842	742	624	448	497	420
Municipal (City Accounts) (ERUs)	69	62	69	72	82	56	67	49
Irrigation (ERUs)	2,454	2,431	2,412	1,528	1,534	1,775	2,608	2,603
Wholesale (ERUs)	6,395	6,414	2,299	2,057	1,949	1,966	1,925	1,884
Annual Demand Equivalent (ERUs)	**39,314**	**40,967**	**36,141**	**35,884**	**34,762**	**32,863**	**33,963**	**33,881**

Note:
1. The number of Single-Family Residential ERUs is equivalent to the actual number of connections. For all other customer classifications, the planning value of one ERU is equivalent to 182 gpd.

2.2.4 Largest Water Users

The top 20 largest water users for the City's water system are summarized in **Table 2-6** and **Figure 2-2** with rank assignments based on 2022 consumption. Total consumption values are presented in MG. This list, in conjunction with the information above, provides information on where water is consumed in the system. It is important to note the type of customer classification, because the top 20 water users consume a significant percentage of the total consumption. As mentioned above, SFR connections make up most of the total connections and water consumption for the system, but no individual SFR connections are listed within the top 20 largest water users. Though the City of Algona is comprised of individual SFR's, the City of Algona is one of the top 20 largest water users because it is a wholesale customer supplied via a limited number of connections.

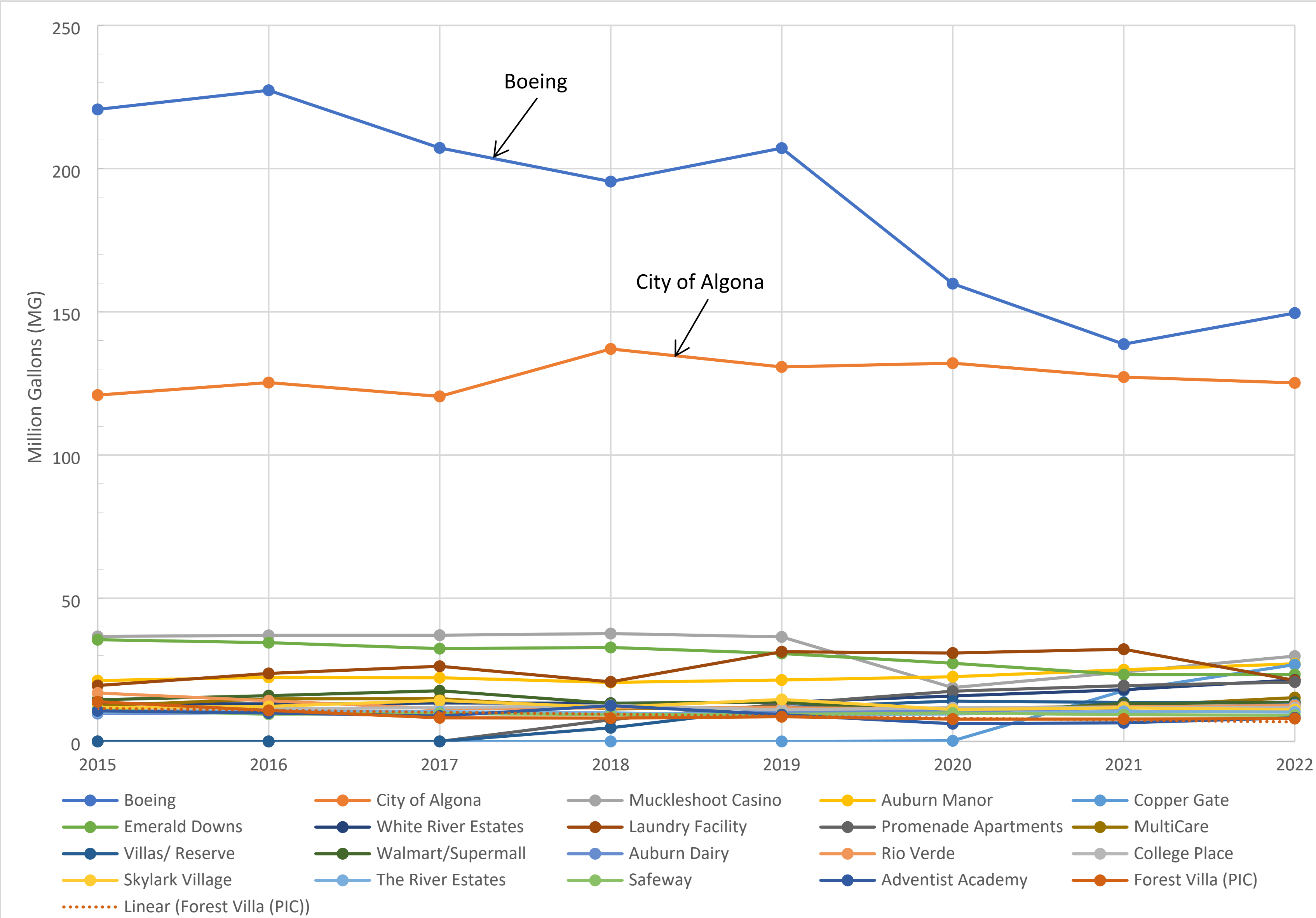
The top 20 water users in the City's water system accounted for approximately 24 percent of the total water system consumption in 2022. LMWD was the largest water user in 2015 and 2016, purchasing over 300 MG per year, but discontinued regular purchase of consumed water from the City in 2017. Copper Gate, Promenade Apartments, and Villas/Reserve are developments that were constructed after 2015, which pushed Tall Cedars and Leisure Manor multi-family users out of the top 20. Boeing and the City of Algona make up almost 50 percent of the top 20 water users' consumption.

Table 2-6 | Historical Annual Consumption of the Top 20 Largest Water Users in Million Gallons (MG)

Rank[1]	Customer Name	Classification	Service Area	2015	2016	2017	2018	2019	2020	2021	2022
1	Boeing	Manufacturing/Commercial	Valley	220.67	227.34	207.23	195.48	207.15	159.83	138.70	149.57
2	City of Algona	Wholesale	Valley	120.93	125.29	120.46	137.04	130.75	132.07	127.22	125.18
3	Muckleshoot Casino	Commercial	Academy	36.65	37.04	37.08	37.66	36.49	18.79	24.24	29.79
4	Auburn Manor	Multi-Family	Valley	21.25	22.367	22.24	20.61	21.45	22.59	25.03	27.10
5	Copper Gate[2]	Irrigation/Multi-Family	Valley	-	-	-	-	-	0.22	17.70	26.80
6	Emerald Downs	Commercial/Irrigation	Valley	35.51	34.48	32.40	32.81	30.69	27.28	23.33	23.36
7	White River Estates	Multi-Family	Valley	13.24	13.09	13.42	13.36	13.66	15.87	18.06	21.47
8	Laundry Facility	Commercial	Valley	19.52	23.73	26.25	20.81	31.31	30.87	32.19	21.32
9	Promenade Apartments[2]	Commercial/Irrigation/Multi-Family	Lea Hill	-	-	-	7.58	13.00	17.53	19.48	20.74
10	MultiCare	Commercial/Irrigation	Valley	12.45	14.86	14.95	11.35	12.04	11.48	12.32	15.30
11	Villas/Reserve[2]	Commercial/Irrigation/Multi-Family	Valley	-	-	-	4.75	11.84	14.09	13.62	13.66
12	Wal-mart/Supermall	Commercial/Irrigation	Valley	14.54	15.98	17.70	13.31	13.78	9.79	13.26	13.58
13	Auburn Dairy	Commercial	Valley	9.73	10.03	9.73	9.49	10.38	10.63	11.58	12.82
14	Rio Verde	Multi-Family	Valley	16.91	14.21	11.41	11.72	11.72	11.46	12.12	12.48
15	College Place	Multi-Family	Lea Hill	10.81	11.46	11.75	12.59	10.99	11.77	11.89	11.74
16	Skylark Village	Multi-Family	Valley	11.80	12.23	14.30	11.93	14.65	11.13	11.73	11.11
17	The River Estates	Multi-Family	Valley	10.23	10.59	10.38	9.97	9.17	9.59	10.49	10.27
18	Safeway	Commercial	Valley	11.01	9.48	9.81	9.27	9.44	9.95	9.32	9.14
19	Adventist Academy	School/Multi-Family	Academy	10.66	9.92	8.89	12.49	9.33	6.17	6.50	8.26
20	Forest Villa (PIC)	Multi-Family	Academy	13.86	10.83	8.24	8.13	8.63	7.80	7.82	8.00
-	LMWD[3]	Wholesale	Lea Hill	302.89	303.02	29.40	-	-	-	-	-
		TOTAL CONSUMPTION (MG)[3]		**905.86**	**918.45**	**618.85**	**588.28**	**613.31**	**545.32**	**546.66**	**571.67**

Notes:
1. Rank assignments are based on 2022 consumption data.
2. Service location was constructed after 2015 WSP was published.
3. LMWD was the largest water user in 2015 and 2016 but discontinued purchase of water from the City in 2017. Included to contribute to the total consumption.
4. The annual total is the sum of the top 20 largest users from each year; Tall Cedars and Leisure Manor consumption data is not shown but is included in the total.

Figure 2-2 | Historical Annual Consumption of the Top 20 Largest Water Users in Million Gallons (MG)



2.3 Water Supply and Production

The historical average and maximum water demands are important parameters when performing system and supply analyses. The term "water demand" refers to all the water requirements of a system including metered customers, unmetered water use, and unaccounted for water loss such as leakage and theft. For this reason, the City's supply data, which accounts for all water demand, was used to calculate the Average Day Demand (ADD) and Maximum Day Demand (MDD) for each year.

2.3.1 Historical Water Supply

The City produces water through its springs, wells, and, when needed, wholesale water purchases. **Table 2-7** summarizes the amount of water produced and purchased by the City between 2015 and 2022 as MG. The City has not purchased water from the City of Tacoma since 2016.

Table 2-7 | Historical Annual Water Supply by Source in Million Gallons (MG)

	2015	2016	2017	2018	2019	2020	2021	2022
Lakeland Well 5	4.9	0.1	0.2	0.5	1.0	0.9	1.2	3.3
Lakeland Well 5A	54	45	64	76	68	65	72	59
Lakeland Well 5B	-	-	-	-	-	-	-	-
Valley Well 1	-	200	336	93	143	143	57	73
Valley Well 2	-	-	-	270	296	235	305	314
Valley Well 3A	-	-	-	-	-	-	-	-
Valley Well 3B	-	-	-	-	-	-	-	-
Valley Well 4	302	430	421	121	96	84	88	66
Valley Well 6	-	-	-	402	445	349	438	468
Valley Well 7	-	-	-	-	-	-	-	-
Coal Creek Springs	1,456	1,613	1,510	1,315	1,208	1,268	1,338	1,225
West Hill Springs	173	198	114	176	136	133	140	157
Algona Well 1	-	-	-	-	-	-	-	-
Total Production (MG)[1]	2,033	2,487	2,506	2,464	2,410	2,313	2,454	2,425
Total Purchased (MG)	732	321	-	-	-	-	-	-
Total Supply (MG)	**2,765**	**2,808**	**2,506**	**2,464**	**2,410**	**2,313**	**2,454**	**2,425**

Note:

1. Small differences exist between the total production value and the sum of individual production values by source. This is due to the use of raw unprocessed data for individual sources and adjusting for corrections made to the reporting of production from Lakeland Well 5. The Total Production values presented depict the most accurate information available.

Table 2-8| 2022 Monthly Water Production by Source (MG)

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Lakeland Well 5	0.4	0.2	0.2	0.2	0.2	0.2	0.9	0.6	0.1	0.1	0.1	0.1
Lakeland Well 5A	6	5	6	6	6	6	5	6	6	6	-	1
Lakeland Well 5B	-	-	-	-	-	-	-	-	-	-	-	-
Valley Well 1	3	1	-	1	-	3	19	41	5	-	-	-
Valley Well 2	27	25	29	28	29	25	30	29	24	23	21	24

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Valley Well 3A	-	-	-	-	-	-	-	-	-	-	-	-
Valley Well 3B	-	-	-	-	-	-	-	-	-	-	-	-
Valley Well 4	3	2	2	3	-	2	18	27	8	1	-	-
Valley Well 6	41	37	44	41	43	36	44	44	37	35	31	35
Valley Well 7	-	-	-	-	-	-	-	-	-	-	-	-
Coal Creek Springs	90	71	77	62	83	110	129	159	153	112	89	90
West Hill Springs	13	11	13	12	13	13	13	15	14	14	13	13
Algona Well 1	-	-	-	-	-	-	-	-	-	-	-	-

2.3.2 Average Day Demands and Maximum Day Demands

Table 2-9 summarizes the historical ADD and MDD based on production from 2015 through 2022.

To calculate the ADD, the total annual supply was divided by the number of days in the year.

Historical values of MDD are equivalent to the highest production and purchase in one day in a given year, usually during the summer when irrigation use is highest. The MDD is a key parameter used for supply capacity, pump station discharge rates, reservoir capacity, and pump sizes. The peaking factor is also a key parameter in developing the future MDD projections.

Table 2-9 | Historical Annual ADD, MDD, Peak Day, and Peaking Factor

	2015	2016	2017	2018	2019	2020	2021	2022
Annual Supply (MG)[1]	2,765	2,808	2,506	2,464	2,410	2,313	2,454	2,425
Average Day Demand (mgd)	7.57	7.67	6.87	6.75	6.60	6.32	6.72	6.64
Maximum Day Demand (mgd)	9.76	12.64	12.54	13.61	11.29	13.62	13.08	12.78
Max Day Date (month/day)	7/7	8/31	7/26	7/11	8/1	8/27	6/29	7/27
MDD/ADD Peaking Factor	1.29	1.65	1.83	2.02	1.71	2.15	1.95	1.92

Note:

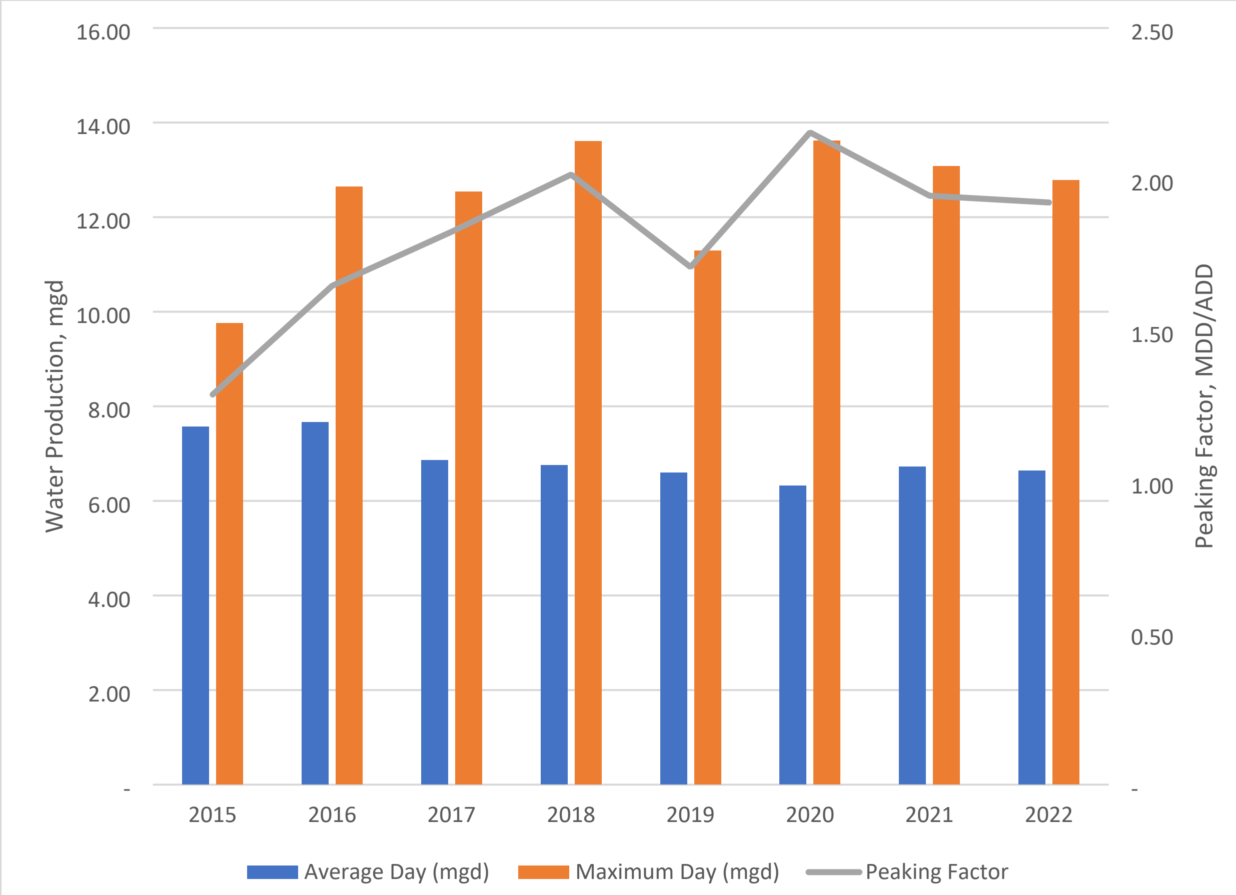
1. Value is from **Table 2-7**.

The last row of **Table 2-9** presents the historical MDD to ADD peaking factor, which normalizes the historical data to compare between years. The minimum MDD factor was 1.29 in 2015, and the maximum MDD was 2.15 in 2020.

Due to variability of the peaking factor, the City has chosen to use the 75th percentile of the historical peaking factors in demand projections, which is 1.96. This factor provides a better representation of the peaking factors observed historically for water supply predictions.

Figure 2-3 shows that from 2015 to 2022 the ADD has decreased which is correlated with improved water use efficiency, but the MDD and MDD/ADD peaking factor have increased, likely due to warmer and drier summer months.

Figure 2-3 | Historical Water Production with Peaking Factor



2.3.3 Peak Hour Demand

Peak Hour Demand (PHD) is the amount of water used, excluding fire flow, during the largest use hour of the year. Because the City does not track hourly production data, PHD was estimated based on Equation 3-1 from the DOH Water Design Manual, which is as follows:

$PHD = (ERU_{MDD}/1440) [(C \times N) + F] + 18$
Where **PHD =** Peak Hourly Demand, total system (gpm)
C = Coefficient Associated with Ranges of ERUs (1.6 for systems with more than 500 ERUs)
N = Number of ERUs based on MDD
F = Factor Associated with Ranges of ERUs (225 for systems with more than 500 ERUs)
ERU_{MDD} = Maximum Day Demand per ERU (gpd)

The calculated annual PHD for the system is summarized in **Table 2-10**.

Table 2-10 | Historical Peak Hour Demand

	2015	2016	2017	2018	2019	2020	2021	2022
ERU_{MDD} (gpd)	235	300	333	367	311	393	354	350
Number of ERUs based on MDD	41,586	42,115	37,692	37,068	36,253	34,690	36,907	36,479

	2015	2016	2017	2018	2019	2020	2021	2022
PHD (gpm)	10,902	14,113	14,005	15,196	12,613	15,208	14,607	14,273
PHD to MDD Factor	1.61	1.61	1.61	1.61	1.61	1.61	1.61	1.61

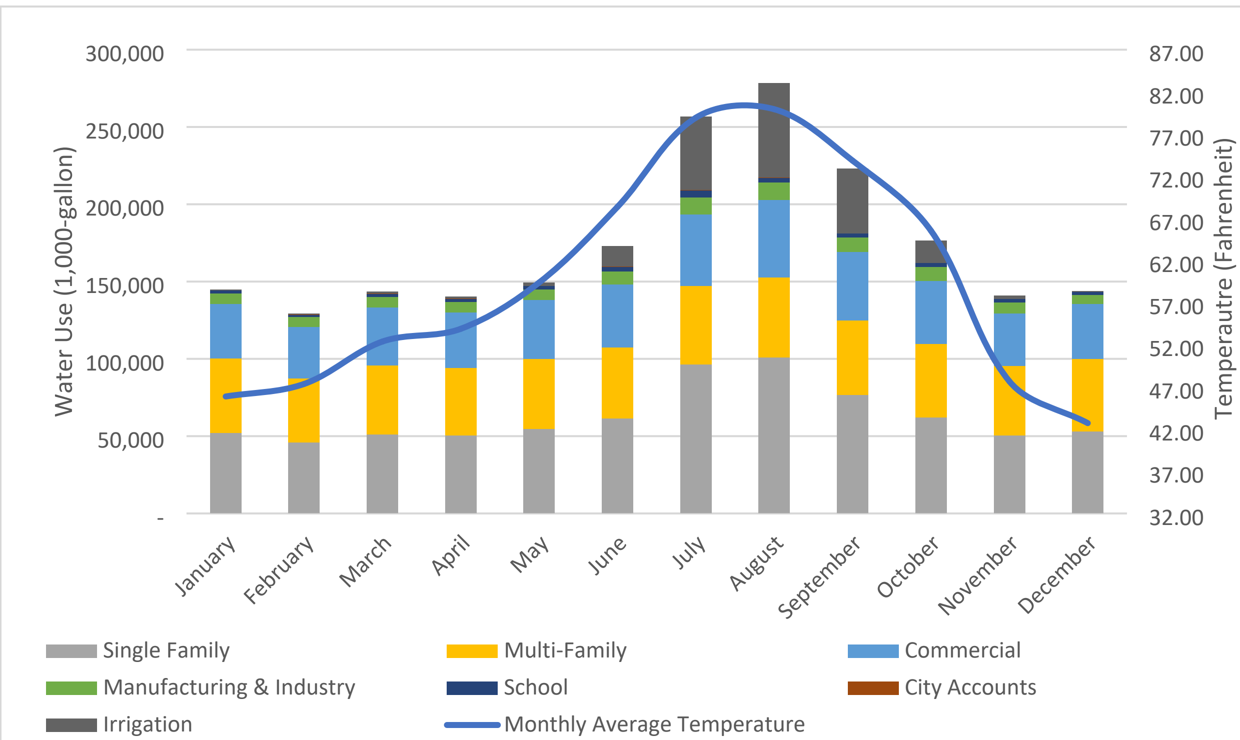
The last row of **Table 2-10** provides the calculated PHD to MDD factor, which normalizes the historical data to compare between years. The calculated PHD factor remained consistent at 1.61 between 2015-2022. Due to this consistency, the City has elected to use the PHD factor of 1.61 in future demand projections.

2.3.4 Seasonal Variations

The pattern of water consumption differs between the customer classifications. Water use increases significantly during the summer when daylight hours are longer, and lawn and landscape watering is prominent. Other outdoor uses, including car washing, pools, and recreation, are also at their highest during summer months.

Figure 2-4 presents the effect that temperature has on water usage by comparing 2022 monthly consumption data per customer classification to the average monthly temperature.

Figure 2-4 | Temperature Effects on Water Usage in 2022



As seen in **Figure 2-4**, SFR and irrigation customers show a significant peak in total consumption during the summer months. Other customer classifications show a smaller similar peak during these months. MFR customers do not show a significant peak during summer monthly because City's policy dictates the use of separate irrigation accounts for all non-SFR accounts. These monthly variations can be used to target water use efficiency efforts and/or to project future water-use patterns for planning purposes.

2.4 Distribution System Leakage

Distribution System Leakage (DSL) represents the difference between production and documented water use (retail, wholesale, and authorized unmetered). It may include inaccurate master and service connection meters, unaccounted-for non-revenue water use, pipeline leakage, and unauthorized use. DSL does not include authorized water usage such as water used for fire protection, flushing, construction, and other maintenance and operations practices. However, to be credited, this must be accounted for by metering or estimating using credible means.

DSL is calculated as the difference between the total amount of water produced and the sum of water sold and authorized unbilled water usage. DOH requires the three-year average DSL to be under 10 percent to minimize water waste.

The City's estimated DSL for 2015 through 2022 is presented in **Table 2-11**. Revised DSL values have been provided to DOH for 2020, 2021 and 2022 that are lower than the values presented in **Table 2-11**. However, the revised values are not utilized for projections, as the revisions were made after the demand projections and system analysis were completed. Since the values used for demand projections and system analysis are slightly higher than the revised values, the projections are slightly more conservative than would have been necessary otherwise.

Table 2-11 | Historical Distribution System Leakage

	2015	2016	2017	2018	2019	2020	2021	2022
Total Water Supply[1] (MG)	2,765	2,808	2,506	2,464	2,410	2,313	2,454	2,425
Billed Consumption[2] (MG)	2,616	2,676	2,374	2,433	2,251	2,175	2,266	2,214
Authorized Non-Billed Consumption (MG)	7	4	6	13	7	4	5	5
Total Authorized Consumption (MG)	2,623	2,679	2,380	2,446	2,257	2,179	2,271	2,219
DSL (MG)	142	128	126	18	153	133	183	207
Annual Percent DSL	5.1%	4.6%	5.0%	0.7%	6.3%	5.8%	7.5%	8.5%
3-Year Rolling Average (Percent)	6.8%	5.1%	4.9%	3.4%	4.0%	4.3%	6.5%	7.2%
3-Year Rolling Average (MG)	183	139	132	91	99	101	156	174

Notes:
1. From **Table 2-7.**
2. From **Table 2-3.**

For the City's water system, the total three-year rolling average DSL ranged from 3.4 percent and 7.2 percent of the total production meeting DOH requirements and the City's goal. The City's annual average DSL over the period was 5.3 percent. During this period the City maintained a DSL below 10 percent on an annual basis, which is an improvement from the last planning period. Abnormally high authorized non-billed consumption was recorded in 2018 due to unidirectional flushing for the Valley Service Area. Starting in 2021, the billed consumption was updated to track hydrant water used during construction.

The City is committed to maintaining a 3-year rolling average DSL below 10 percent and actively works to identify and eliminate DSL throughout the system through its ongoing leak detection, meter calibration, and repair and replacement programs for water system infrastructure, as detailed in **Chapter 6 – Operations and Maintenance**. Additionally, the City has maintained efforts to reduce non-payment bills and water theft.

2.5 Water Supply Characteristics

The City has a diverse water supply consisting of two springs, ten wells and an emergency intertie with the City of Tacoma; refer to the Existing Facilities Figure provided in **Chapter 1** (**Figure 1-3**). The City's aquifer characteristics are described in several sources; this section draws mainly from the Conceptual Mitigation Plan (CMP) for Water Right Application G1-28404, provided in **Appendix S**.

Wells 1, 2, 3A, 3B, 4, 6, and 7 are in the lower alluvial aquifer in the Auburn Valley, referred to as the Valley Wellfield. This wellfield is mostly confined by the Osceola Mudflow, an important aquitard in the Auburn Valley depicted in Figure 4 of the CMP. Groundwater discharge from the upland aquifers is the primary source of recharge to the lower alluvial aquifer, which hosts all the City's wells. Groundwater generally moves upward in the valley aquifers and moves horizontally at approximately one to four feet per day. Alluvial groundwater from the White River also recharges the Green River alluvial aquifer. Groundwater in the vicinity of Wells 2, 6, and 7 discharges into the Puget Sound via the Green River and the Duwamish River valley. Wells 2, 6, and 7 are located northeast of downtown Auburn and collectively referred to as the Fulmer Wellfield. Wells 1, 3A, 3B, and 4 are in the White River Drainage Basin and Wells 2, 6, 7 and West Hill Springs are in the Green River Drainage Basin.

Well 7 is currently not in use due to high manganese concentrations, however the City plans to install a manganese treatment system for Well 7 to bring it back online. The City has a pending water right application for 13,443 acre-feet per year from the existing Wells 6 and 7 and a future Well 8. The City has sufficient water rights to meet current demands and 10-year demand projections, as shown in the Water Rights Self-Assessment Form provided in **Appendix I.** Under 2044 high demand MDD conditions, the City does not have sufficient instantaneous water rights (Qi) to meet all demands for retail, firm wholesale and interruptible wholesale customers. Should this occur, the City could purchase water from Tacoma through wholesale interties to meet demands. It is worth noting that this evaluation assumes 2.5 mgd of demand from LMWD who has an interruptible wholesale agreement with the City and would only be supplied as water is available to be provided, so this condition is expected to be unlikely. Mitigation obligations due to the proposed water right for Wells 6, 7, and 8 are listed below and are described in detail in the CMP:

- Mitigation of impacts to Green River,
- Mitigation of impacts to White River, and
- Mitigation of impacts to Mill Creek.

Wells 5, 5A, and 5B are in the Upland Wellfield and constructed within the Lakeland Service Area. The upland aquifers are recharged through precipitation and leakage from Lake Tapps and discharge into the White River system. Once Well 5B came online, the City discovered that the aquifer was not recovering. Well 5B has been offline since 2006. The safe yield of Wells 5 and 5A have been decreased from their design capacity due to a drop in the aquifer's capacity. Specific information on the individual wells and their associated water rights are provided in **Section 3.4.1**.

West Hill Springs draws from an unnamed confined aquifer. The spring source water flows by gravity into the Valley Service Area, although flows vary depending on aquifer conditions, and discharges into Mill Creek, which flows into the Green River.

Coal Creek Springs is the largest active water supply for the City and draws from a confined aquifer, however its flow varies depending on aquifer conditions. Coal Creek Springs collection system is located at the base of Lake Tapps Upland and is in the White River Drainage Basin. Further aquifer details are provided within the Wellhead Protection Program (WHPP) provided as **Appendix T**.

The City also owns two additional wells: the Algona Well 1 and the Braunwood Well. Algona Well 1 was acquired by the City in 1996 but has since been taken offline due to operational issues.

The City plans to use a groundwater flow model being developed by the USGS to predict potential impacts to surface water.

2.6 Water Supply Reliability Evaluation

The City's active water sources have maintained current production capacities and are deemed reliable, as they have back-up power sources available. The production of some water sources is limited by pump or intake capacity, as mentioned in **Section 2.5**, however all production is managed to be within available water rights and is managed by the physical capacity of each facility as summarized in **Table 2-12**.

Table 2-12 | Summary of Source Water Pumping or Production Capacity Compared to 2022 Maximum Daily Production

Source	Service Area	Pumping/Production Capacity (gpm)	Maximum Daily Production[1] (gpm)
Well 5	Lakeland	760	397
Well 5A	Lakeland	180	161
Well 5B	Lakeland	--[2]	--
Well 1	Valley	2,100	2,094
Well 2	Valley	1,115	1,110
Well 3A	Valley	--[2]	--
Well 3B	Valley	--[2]	--
Well 4	Valley	2,600	1,496
Well 6	Valley	1,200	1,189
Well 7	Valley	--[2]	--
Coal Creek Springs	Valley	3,500[3]	4,401
West Hill Springs	Valley	600	469
Algona Well 1	--	--[2]	--
TOTAL		**12,055**	**11,317**

Notes:

1. Maximum daily production per source is the maximum production rate recorded in 2022.
2. The facility is currently offline. No production capacity is available without facility improvements.
3. Water rights for Coal Creek Springs allow for a Qi of 6,732 gpm. 3,500 gpm is the typical historical production capacity limitation experienced. The City is currently investigating the possible factors influencing the feasible withdrawal from this source.

Calculations presented in the Water Rights Self-Assessment Form (**Appendix I**) conclude that the City's existing water rights are anticipated to be adequate to meet the current and 10-year projections for maximum instantaneous flows (Qi) and total annual withdrawal (Qa). The City does not have sufficient Qi water rights to meet the 20-year high demand scenario projections and has a deficit of 1,253 gpm. Should this occur, the City could purchase water from Tacoma through the wholesale interties to meet demands. It is worth noting that this evaluation assumes 2.5 mgd of demand from LMWD who has an interruptible wholesale agreement with the City and would only be supplied as water is available to be provided, so this condition is expected to be unlikely.

However, the City does not have the infrastructure required to withdraw from all water sources, and some sources have underlying production restrictions that require further evaluation. Several facility improvement projects are required to maximize production and obtain the full water rights. Furthermore, potential demand from LMWD was not included in the assessment, as they have an interruptible wholesale agreement with the City which is a secondary priority to the City's demand. Currently, the City's interties with the City of Tacoma provide additional wholesale water for purchase if necessary to meet demands, however the City has not purchased water from Tacoma since 2016.

The City has established a policy of maintaining the capability to supply the MDD while the largest water source is out of service. The system analysis documented in **Chapter 3** confirms that with projected demands over the 20-year planning period, the City will maintain the capability to meet MDD if the largest pumping source is out of service. This evaluation includes the Tacoma interties as available sources to meet this need and excludes the capacity of facilities that are offline or not operational.

Of the twelve sources, only Wells 5 and 7 are currently without a standby power source. Standby power will be added to Wells 5 and 7 as part of CIP projects discussed in **Chapter 8.** The Fulmer Field Corrosion Control Treatment Facility has backup power.

The Game Farm Park Pump Station, Lea Hill BPS, and Intertie Pump Station are the only pump stations without a standby power source or connection. Backup power will be added to the Lea Hill BPS as part of a capital project discussed further in **Chapter 8**. The City is currently installing temporary back-up power at the Intertie Pump Station by utilizing the generator previously utilities at Academy Pump Station 1 and Academy Pump Station 2, as these facilities were recently replaced by Academy Pump Station 3. The Intertie Pump Station back-up generator is anticipated to be operational by the end of 2024. The Game Farm Park Pump Station is a small facility that serves a recreational area and does not serve residential or commercial properties, therefore back-up power is not a critical element.

2.6.1 Use Impacts on Instream Flows

New water right appropriations in the Green-Duwamish Basin are subject to instream flow (ISF) regulations as described in the CMP and WAC 173-509. These ISF are senior to the City's recent water rights application G1-28404. This requires mitigation for potential impacts to the Green River when instream flows are not met, such as predicting when streamflow will drop below ISFs as well as determining the lag time associated with impacts to instream flows from groundwater withdrawals. The CMP includes the following detailed description of the streamflow characteristics:

> "A review of historical streamflow data indicates that on average streamflow's are below the ISFs at the Auburn gauge approximately 20 percent of the time (Table 3). Streamflow's are generally more often below the minimum ISFs during the summer months, falling below the minimum ISFs 35 percent to 61 percent of the time between June and September. The flows are frequently above the minimum ISFs during the spring and winter months but can drop to below ISFs at any time of the year. For example, in April, streamflow falls below the minimum ISFs approximately 3 percent of the time (4.1.2)."

The City's current rights are senior to the instream rights and therefore not effected by the instream flow limitations, however as stewards of the watershed, the City has an aggressive water use efficiency program described in **Chapter 4** meant to limit the volume of withdrawals, especially during the dry season. The City has a minor surplus of both annual volume withdrawn (Qa) and maximum instantaneous flow rate withdrawn (Qi) to meet MDD through the 20-year planning period. However, several facility improvements are required to make the withdrawals feasible.

2.6.2 Wholesale Interties

The City has three wholesale interties, described below and in further detail in **Section 1.6.2.**

City of Algona

The City has supplied water to Algona on a regular basis since 1996, when interlocal agreement IA3 was negotiated. A superseded agreement, IA3A, was negotiated in October 2002 which reflects the current status. The agreement will remain unless terminated by mutual agreement of the City and Algona. Currently, Algona is served through the metered Boeing Welded Duct Intertie and by two eight-inch, manually operated meter stations located at Boundary Boulevard and Industry Drive North, and at Boundary Boulevard and Milwaukee Avenue.

LMWD

An intertie between the City and LMWD was constructed in 1996 as part of IA2 to enable LMWD to purchase water from the City. The manually operated intertie also allows the City to provide an emergency supply to Kent's East Hill Service Area. The City agreed to provide up to 2.5 MGD average day and 5.0 MGD maximum day use. A provision of the agreement calls for LMWD to send an emergency supply of water to the City when needed for the Lea Hill Service Area. The IA2 agreement also included several improvements to allow delivery of water:

- The Green River Pump Station and pipelines to deliver additional water into the Lea Hill Service Area
- The Intertie Pump Station and pipelines to deliver water from the Lea Hill Service Area to LMWD
- Construction of two additional wells (Wells 6 and 7).

LMWD discontinued regular purchase of water from the City in 2017 per the amendment to IA2, however LMWD still maintains the intertie with the City to use as a wholesale water supply on an as-needed basis. This interlocal agreement has a term of sixty years, commencing in 2017.

City of Tacoma

In 2012, Tacoma agreed to provide water to the City in the quantity of up to 1.0 MGD average day use, 1.8 MGD peak day use, and 1.62 MGD four-day peak use. Two interties were constructed to supply the City's Valley pressure zone: located at 3200 B Street NW and 29600 132nd Avenue SE in Auburn. In 2014, Tacoma amended and restated the 2012 agreement with the City to provide a total of 3.5 mgd (2,430 gpm) of average use and 5.12 mgd (3,555 gpm) of peak use from the interties. The B Street NW remotely operated intertie is limited to a maximum flowrate of 2,200 gpm and the 132nd Avenue SE Intertie is limited to a maximum flowrate of 4,500 gpm. This agreement will remain in force as long as the City of Tacoma remains in the business of providing water, however the City has not purchased water for consumption from the City of Tacoma since 2016.

2.6.3 Emergency Interties

Emergency interties are an important tool that helps water utilities increase reliability and respond to emergencies. The City has emergency interties with seven water systems, as described in **Section 1.6.2** and summarized in **Table 1-3.**

2.6.4 Potential Interties

The City has an interest in acquiring additional interties that would enhance the reliability of water service in the City and among adjacent purveyors. Tacoma Public Utilities constructed the Second Supply Pipeline Project, which runs through the north end of the City's RWSA between 30th and 37th Streets NE. In addition to the B Street NW and 132nd Avenue SE interties, a third turnout was constructed as part of the pipeline project in the Valley Service Area. The City does not currently plan to develop this turnout but may do so in the future.

2.7 Future Population Projections and Land Use

2.7.1 Demographic Forecast

Demographic forecasts provide an estimate of future population and employment. The City is a member of the Puget Sound Regional Council (PSRC), which develops demographic analyses for the central Puget Sound region (King County, Kitsap County, Pierce County, and Snohomish County). The demographic projections are developed based on local planned development capacities and regional policies adopted by the PSRC Vision 2050. Vision 2050 established the region's strategy for accommodating population and employment growth to maintain the high quality of living, economic prosperity, and a healthy environment through the year 2050. Through this planning process, the City is required to plan for a specific number of additional housing units and jobs.

Consistent with the Washington State Growth Management Act (GMA), the City uses the Vision 2050 growth values as the basis of the demographic projections.

Demographic projections are based on the PSRC's 2044 forecasts for housing, population, and employment for each Transportation Analysis Zone (TAZ) within the City's RWSA, as the City's policy is to serve all customers within its RWSA. Additional information on the City's existing land use, future zoning, demographic projections, and corresponding rates of growth are detailed in this Section.

2.7.2 Future Land Use and Zoning

Land use and zoning regulations provide important information in determining future water requirements. Land use and zoning determines the area available for various types of development including both SFR and MFR development, as well as commercial and other types of land use that provide the economic base necessary to support residential development. The housing, population and employment projections developed for the 2024 Periodic Comprehensive Plan are based on the employment and housing targets provided by King and Pierce counties that the City must accommodate over the 20-year planning horizon. This consistent approach is encouraged by the Washington State GMA and should result in predictable and stable land uses over longer planning periods.

Future land use and zoning designations for the City's RWSA are shown on the Comprehensive Zoning Map provided as **Figure 2-5**. Zoning designations implement the land use identified in the City's Comprehensive Plan; therefore, the current land use reflects the City's historical zoning. House Bill 1337 and House Bill 1110, both effective as of July 2023, are geared at expanding housing options. As such, the City has adopted future zoning to allow for accessory dwelling units within areas previously dedicated to single-family detached housing. **Table 2-13** summarizes the updating zoning designations and fire flow requirements. Note that the required fire flow in some zoning designations will be determined on a case-by-case basis pending development or re-development type.

The City includes a wide range of residential, commercial, institutional, and industrial land uses. Public and quasi-public land uses include parks, open space, and public recreation as well as institutional uses such as schools. Commercial and industrial uses occur primarily in the Valley Service Area; however, large areas of residential land use and the Downtown Urban Center (DUC) also exist in the Valley Service Area.

The Academy and Lakeland Service Areas are primarily residential, although some commercial zoning is located along Auburn Way South (SR 164) in the Academy Service Area. The Lea Hill Service Area is also primarily residential although other uses include small amounts of commercial and open space, and Green River College.

Areas within the RWSA, but outside the City limits, are governed by King County zoning. Land use was assumed to be consistent with zoning in these areas. The area in the northwest corner of the RWSA, west of SR167 and north of S 287th Street is zoned for Agriculture. A second area is located near Auburn Narrows State Park, which is north and west of SR18. This area includes Rural Residential, as well as Park and Greenbelt zoning. The City does not currently provide service in this area; however, it is willing to provide service to customers meeting the Service Area Policies. There are two additional unincorporated “pockets” of urban residential zoning within the RWSA that the City currently serves, where the southern area also contains a single parcel of Industrial zoning. The King County zoning was used in the demographic analyses.

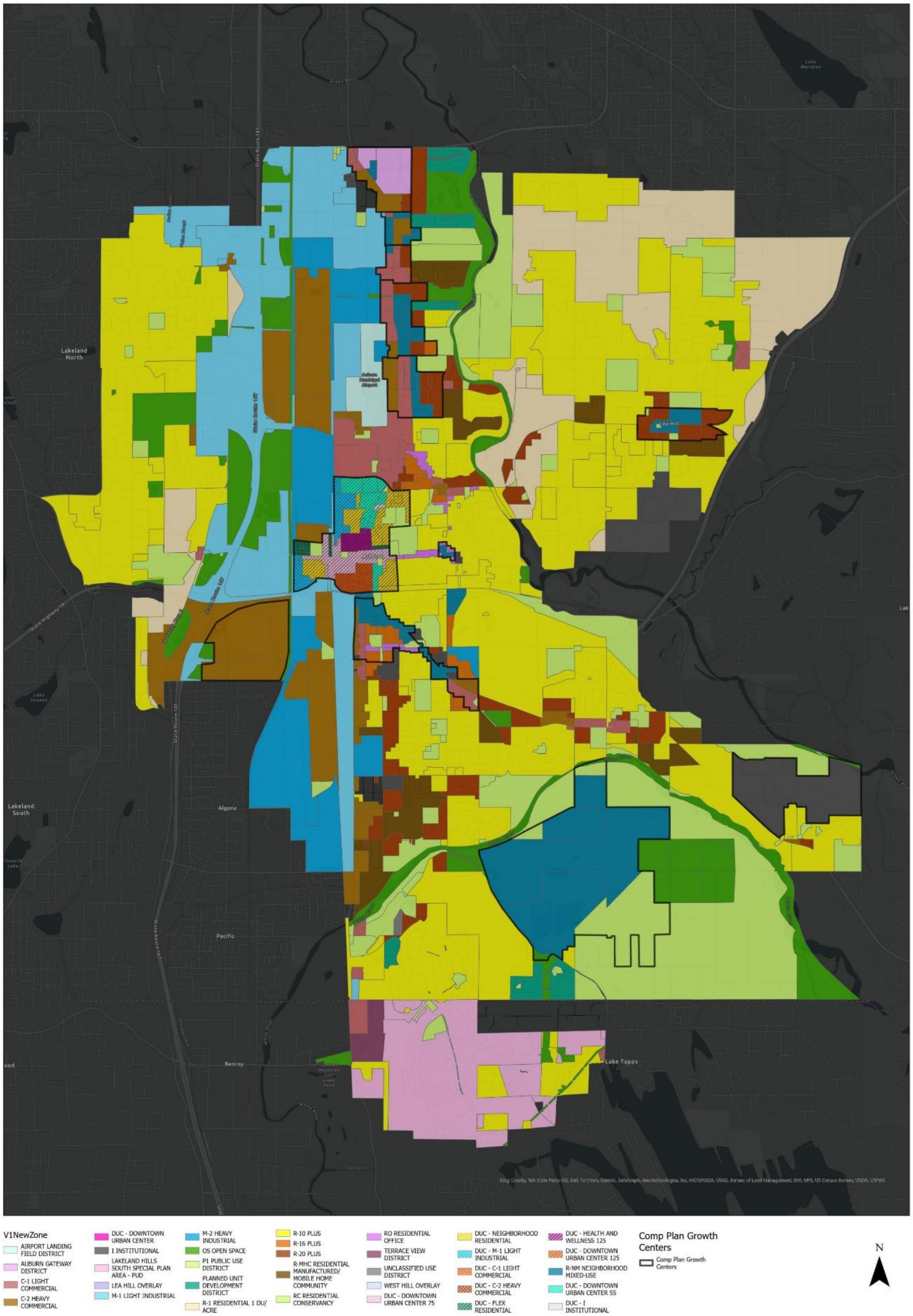


Figure 2-5 | Comprehensive Future Land Use and Zoning Map

Table 2-13 | Updated Zoning Districts and Fire Flow Requirements

Zoning District	Land Use	Definition	Fire Flow Requirement (gpm)
RC RESIDENTIAL CONSERVANCY	Residential Conservancy	No change	1,500
R-1 RESIDENTIAL 1 DU/ACRE	Neighborhood Residential One	No change	1,500
R-10 PLUS[1]	Neighborhood Residential Two	Single family, townhouse, duplex, triplex, fourplex, two-story stacked flats, cottage housing-4-6 units/lot ADUs	1,500 - 2,500
R-16 PLUS	Neighborhood Residential Two	R-10, plus five-plex, six-plex, 3 story stacked flats, courtyard apartments, apartment buildings and mixed use up to 20 units ADUs	2,500
R-20 PLUS	Neighborhood Residential Three	R-16 plus apartment buildings, and mixed use over 20 units ADUs	2,500
R-NM NEIGHBORHOOD MIXED-USE	Mixed Use	R-16 and C-1 Uses + Mixed-use (horizontal or vertical) encouraged	2,500
R-MHC RESIDENTIAL MANUFACTURED/MOBILE HOME COMMUNITY	Neighborhood Residential Three	No change	2,500
RO RESIDENTIAL OFFICE	Mixed Use	Smaller scale R-NM with emphasis on conversion of existing structure	2,500
C-1 LIGHT COMMERCIAL DISTRICT	Commercial	Generally the same as existing	2,500
C-2 HEAVY COMMERCIAL DISTRICT	Commercial	Generally the same as existing	2,500
AUBURN GATEWAY DISTRICT	Mixed Use	North Auburn Subarea Use	2,500
M-1 LIGHT INDUSTRIAL DISTRICT	Industrial	Generally the same as existing	2,500
M-2 HEAVY INDUSTRIAL DISTRICT	Industrial	Generally the same as existing	2,500
AIRPORT ZONE	Industrial	No change	2,500
P1 PUBLIC USE DISTRICT	Public/Quasi-Public	Public schools, recreational spaces, police stations, fire stations, cemeteries	2,500
I INSTITUTIONAL USE DISTRICT	Public/Quasi-Public	Private schools, Green River College, large campus development	2,500
OS OPEN SPACE	Open Space	No change	-
DUC - DOWNTOWN URBAN CENTER 125	Downtown Urban Center	DUC with up to 125-ft tall buildings where permitted	2,500
DUC - DOWNTOWN URBAN CENTER 75	Downtown Urban Center	DUC with up to 75-ft tall buildings where permitted	2,500
DUC - DOWNTOWN URBAN CENTER 55	Downtown Urban Center	DUC with up to 55-ft tall buildings where permitted	2,500

Zoning District	Land Use	Definition	Fire Flow Requirement (gpm)
DUC - NEIGHBORHOOD RESIDENTIAL	Downtown Urban Center	Mixed-use and R-15	2,500
DUC - HEALTH AND WELLNESS 125	Downtown Urban Center	R-OH-MultiCare Zone	2,500
DUC - FLEX RESIDENTIAL	Downtown Urban Center	RO with permitted specific industrial uses (craft workshops, breweries, coffee, etc.)	2,500
LAKELAND HILLS SOUTH SPECIAL PLAN AREA – PUD[1]	Neighborhood Residential Two		1,500-2,500
AIRPORT LANDING FIELD DISTRICT	Industrial		2,500
AUBURN GATEWAY DISTRICT	Mixed Use		2,500
DUC - I INSTITUTIONAL	Downtown Urban Center		2,500
DUC - M-1 LIGHT INDUSTRIAL	Downtown Urban Center		2,500
I INSTITUTIONAL	Public/Quasi-Public		2,500
PLANNED UNIT DEVELOPMENT DISTRICT[1]		Varies by location	1,500-2,500
TERRACE VIEW DISTRICT	Commercial		2,500
UNCLASSIFIED USE DISTRICT[1]		Varies by location	1,500-2,500

Note:
1. Required fire flow will be determined on a case-by-case basis pending development or re-development type.

2.7.3 Projected Demographic Growth

Many factors influence population growth including the state of the economy, interest rates, annexation of adjacent areas, and up-zoning for new development. Growth management policies, along with coordination between local governments, should make development more predictable and growth projections more accurate than they have been historically. The City's Comprehensive Plan, as well as this Plan, are key documents to aid the City in preparing for the predicted growth. However, it is common for actual growth rates to vary from those predicted. In addition, growth rates will vary between various parts of the City based on the availability of services and the costs to develop for the zoned use.

Housing, population, and employment projections were used to calculate rates of growth. PSRC's Vision 2050 requires the City to plan for a given number of additional housing units and jobs. The demographic projections for population and employment were allocated based on water meter locations within the four Water Service Areas that comprise the RWSA. Population projections extending beyond the RWSA boundary were modified or eliminated and are not included in the projections.

2.7.3.1 Demographic Projections

Existing and future demographic projections consistent with the City's GMA goals were provided by the City for 2021 and 2044. City planning provided projections of housing, population, and employment growth based on TAZ data. The intermediate 10-year planning horizon (2034) was interpolated assuming consistent compounding growth across the planning period.

The projections were further delineated by Service Area, as growth is expected to vary due to zoning, availability of vacant or re-developable land, existing and proposed infrastructure, etc. Demographic growth rates, rather than total number of people or employed people, were used to develop demand projections. The resulting demographic growth rates as a compounding annual percentage are presented in **Table 2-14.** Total population is projected to annually increase by 1.5 percent from 2021 to 2044 and total employment is projected to increase by 1.9 percent annually over the same period. Overall, the City is planning for an additional 24,987 people and 20,525 employed people by 2044 within the RWSA.

Table 2-14 | Growth Rates by Customer Class and Service Area

	Total Growth from 2021 to 2044 (Housing Units/Population)	Total Growth from 2021 to 2044 (%)	Annual Average Compounding Growth (%)
Single-Family Unit Projections			
Lea Hill	201	5.9%	0.248%
Valley	275	5.3%	0.223%
Lakeland	534	27.0%	1.043%
Academy	436	36.3%	1.355%
Multi-Family Unit Projections			
Lea Hill	254	12.6%	0.518%
Valley	7,862	77.1%	2.515%
Lakeland	1,003	55.7%	1.943%
Academy	124	10.4%	0.433%
Population Projections			
Lea Hill	1,245	8.2%	0.343%
Valley	18,009	44.1%	1.602%
Lakeland	4,113	39.4%	1.456%
Academy	1,621	24.6%	0.962%
Employment Projections			
Lea Hill	484	30.6%	1.168%
Valley	18,692	43.8%	1.586%
Lakeland	171	31.1%	1.172%
Academy	1,178	77.8%	0.316%

Table 2-15 summarizes the calculated demographic projections for population or employment projections by Service Area for each category when applying the growth rates from **Table 2-14.**

Table 2-15| Population and Employment Projections Calculated by Service Area

	2024	2034	2044
Single-Family Population			
Lea Hill	10,498	10,864	11,243
Valley	19,889	23,315	27,330
Lakeland	4,394	5,077	5,866
Academy	5,009	5,512	6,066
Subtotal	**39,789**	**44,767**	**50,505**
Multi-Family Population			
Lea Hill	5,341	5,527	5,719

	2024	2034	2044
Valley	25,203	29,544	34,633
Lakeland	3,454	3,991	4,612
Academy	1,535	1,689	1,859
Subtotal	**35,533**	**40,752**	**46,824**
Total Population			
Lea Hill	15,839	16,391	16,962
Valley	45,092	52,859	61,964
Lakeland	7,848	9,068	10,478
Academy	6,544	7,201	7,925
Subtotal	**75,323**	**85,519**	**97,328**
Employment			
Lea Hill	1,720	1,932	2,170
Valley	46,946	54,948	64,313
Lakeland	596	669	752
Academy	1,605	1,656	1,709
Subtotal	**50,867**	**59,205**	**68,944**

The demographic growth for each Service Area is shown in **Figure 2-6, Figure 2-7**, and **Figure 2-8**, where single family population, multi-family population, and employment population growth are each presented in a different graph. The figures show the anticipated variability in growth between the Service Areas. For example, employment growth rate (percentage) is projected to be greater in the Valley Service Area than the other Services Areas between 2024 and 2044. Since the Valley Service Area has a much greater magnitude of population and employment than the other Service Areas, minor differences in growth projection percentages results in larger increases in total population and employment numbers. The Valley Service Area is projected to represent 64 percent of the system's population and 93 percent of the system's employment in 2044.

Figure 2-6 | Single Family Population Projections by Service Area

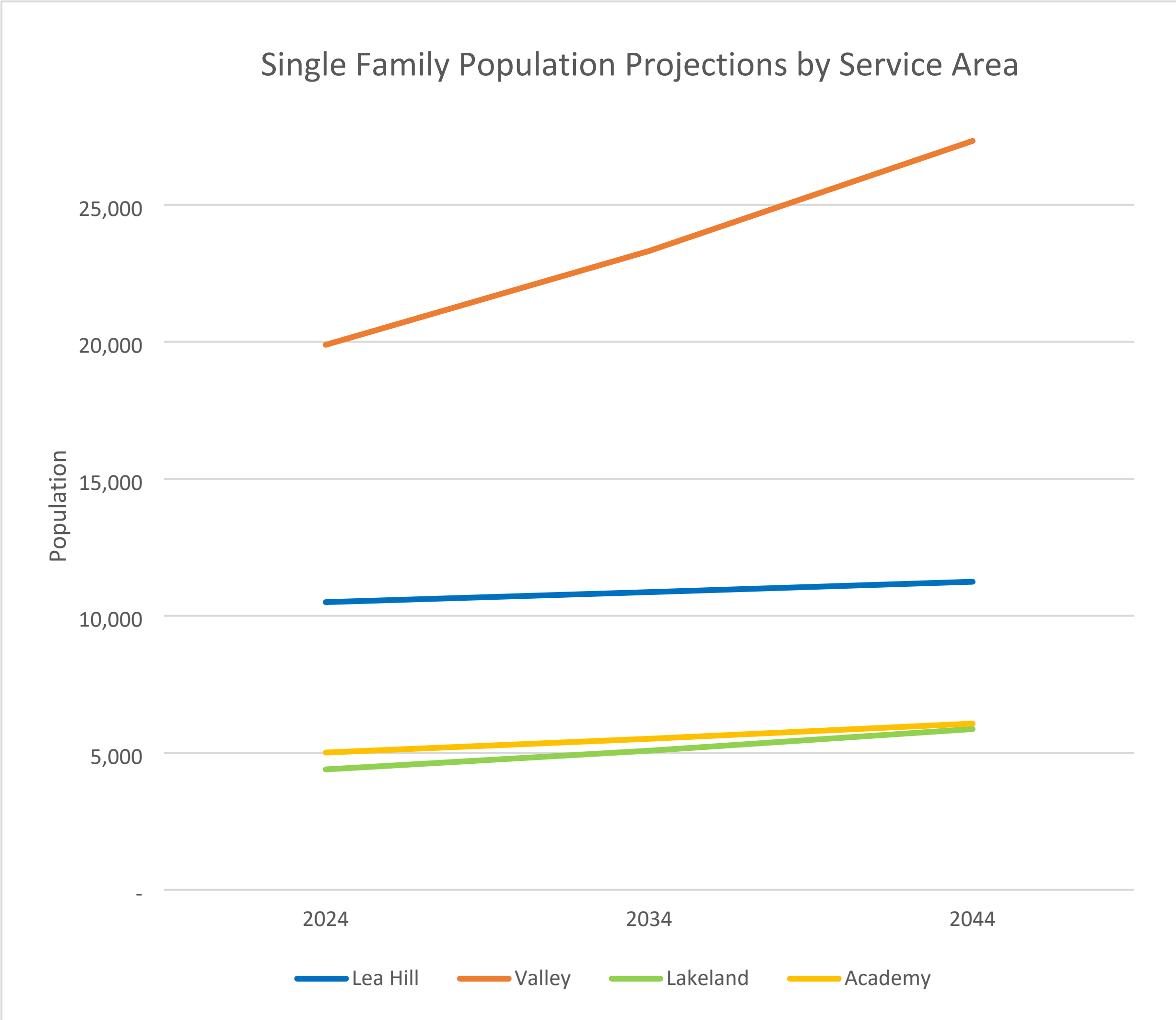


Figure 2-7 | Multi-Family Population Projections by Service Area

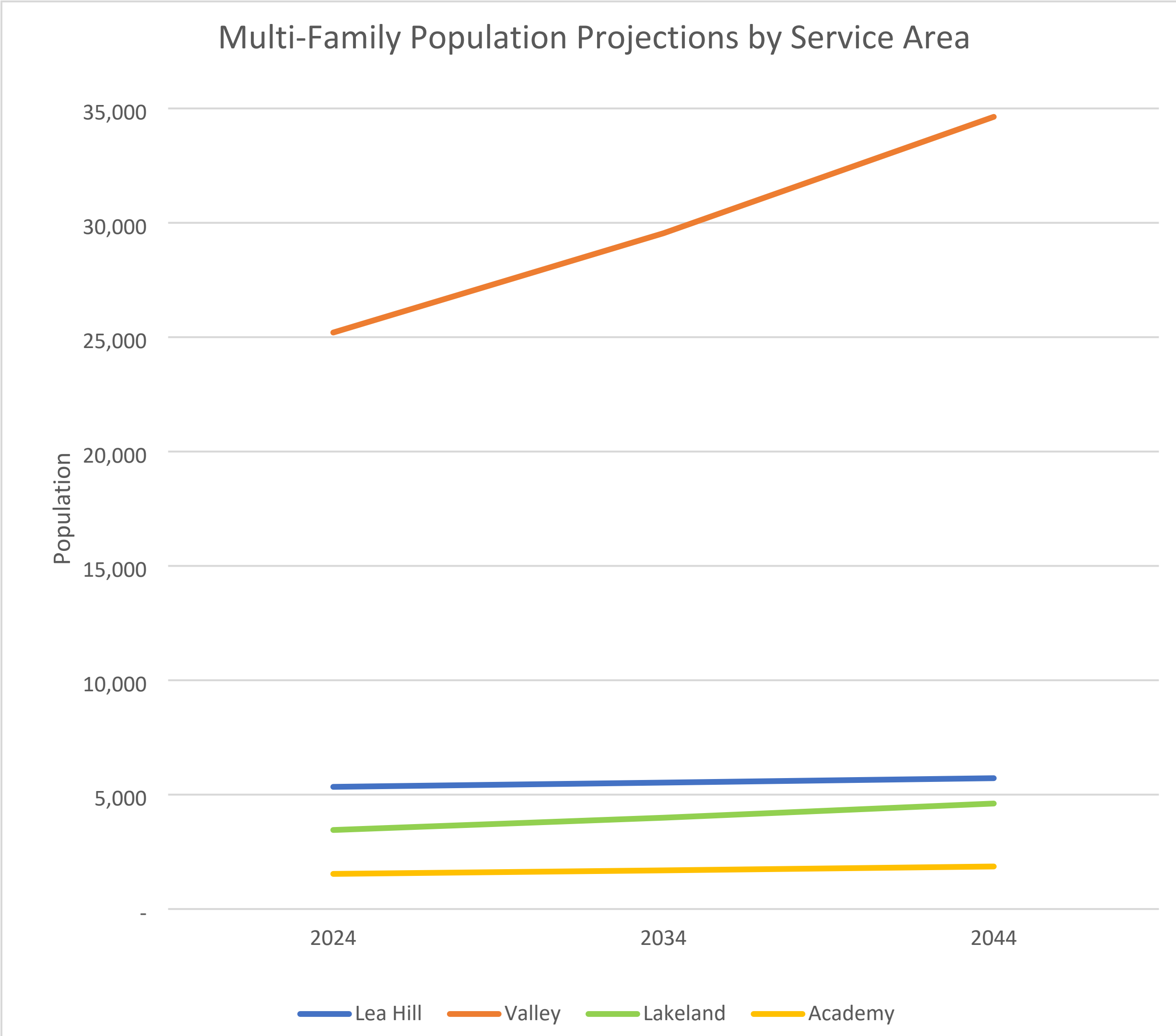
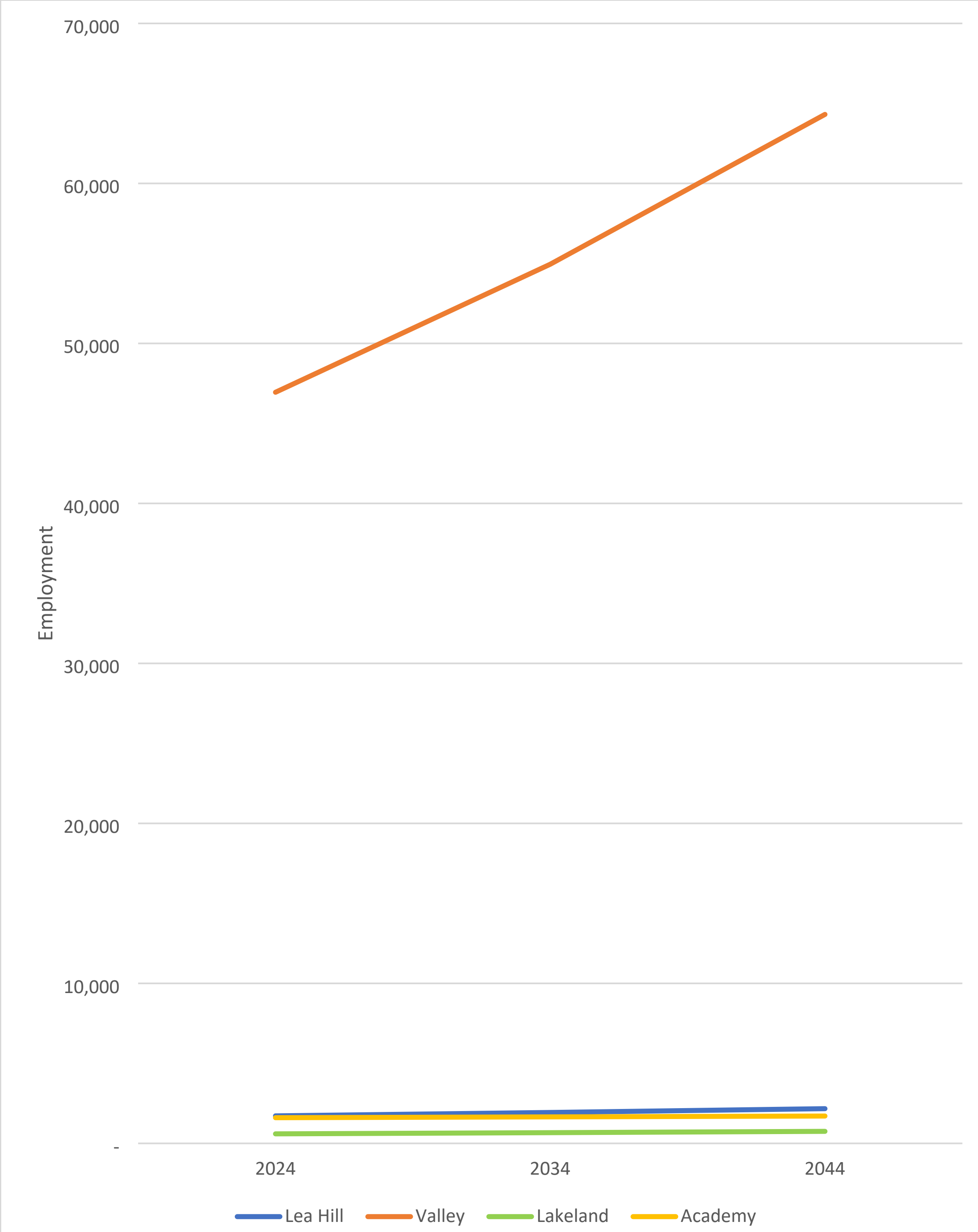
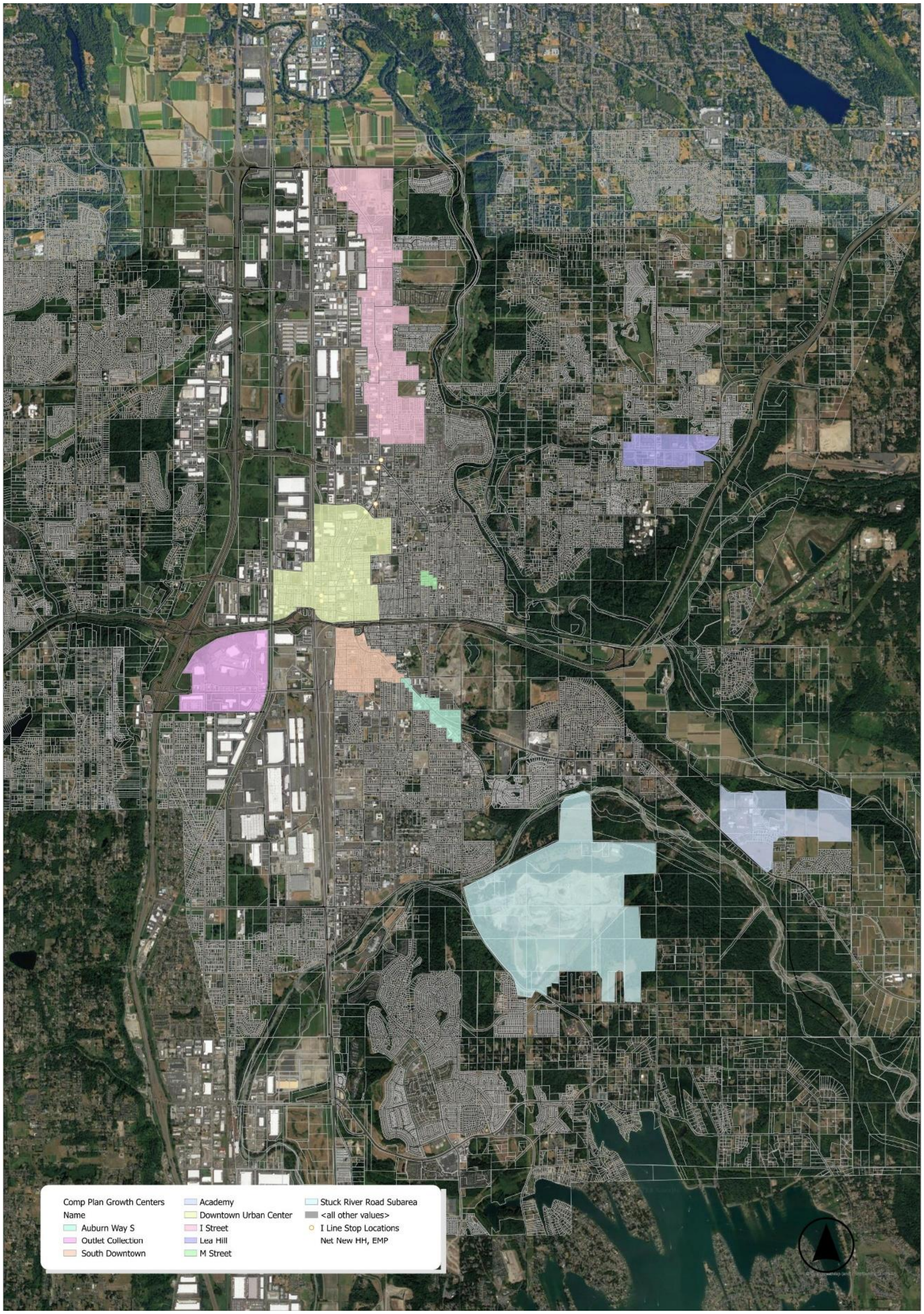


Figure 2-8 | Employment Projections by Service Area



Areas anticipated to have higher than average population and employment growth through 2044, termed "Growth Centers" identified in the City's Comprehensive Plan, are presented in **Figure 2-9.** Demand in each Service Area was modified during the system analysis to reflect focus growth in the areas identified in **Figure 2-9**, matching the population and employment growth projection data.

Figure 2-9 | Map of Projected Areas with Greatest Population Growth



2.8 Future Water Demand

2.8.1 Projected Number of Connections

The number of water connections was used in determining the ERU, ADD, and MDD projections. The number of water connections in the future was projected using the demographic growth rates presented in **Table 2-14** and the number of existing water accounts presented in **Table 2-2**. The projected future connections by both Service Area and customer classification are presented in **Table 2-16.**

- The respective housing unit growth rates for each Service Area were used to calculate projected SFR and MFR connections.
- The School connections were projected by multiplying the percentage of the City population aged 5-19 (22%) by population growth rates for each Service Area.
- The projected employment growth rates were used to calculate future Commercial, Municipal (City Accounts), and Irrigation connections.
- The City's largest user (Boeing) is not included in **Table 2-16**, their projections are based on individual demand and are presented separately. Boeing also accounts for the only Manufacturing and Industrial connections within the City.
- Wholesale customers are not included in **Table 2-16**, their projections are based on individual demand and are presented separately.

Table 2-16| Connection Projections by Customer Classification and Service Area

	2024	2034	2044
Lea Hill			
Single-Family Residential	3,265	3,347	3,431
Multi-Family Residential	167	176	186
Commercial	22	24	27
Manufacturing/Industrial	-	-	-
Schools	11	11	11
Municipal (City Accounts)	1	1	1
Irrigation	61	69	78
Valley			
Single-Family Residential	5,954	6,088	6,226
Multi-Family Residential	807	1,035	1,327
Commercial	1,272	1,489	1,743
Manufacturing/Industrial	-	-	-
Schools	37	38	40
Municipal (City Accounts)	32	38	45
Irrigation	532	622	729
Lakeland			
Single-Family Residential	1,354	1,502	1,666
Multi-Family Residential	109	132	161
Commercial	34	39	43
Manufacturing/Industrial	-	-	-
Schools	9	9	9

	2024	2034	2044
Municipal (City Accounts)	-	-	-
Irrigation	21	23	26
Academy			
Single-Family Residential	1,581	1,808	2,069
Multi-Family Residential	47	49	51
Commercial	14	14	15
Manufacturing/Industrial	-	-	-
Schools	2	2	2
Municipal (City Accounts)	1	1	1
Irrigation	34	35	36
Total			
Single-Family Residential	12,153	12,745	13,391
Multi-Family Residential	1,131	1,393	1,725
Commercial	1,342	1,566	1,828
Manufacturing/Industrial	-	-	-
Schools	59	60	62
Municipal (City Accounts)	35	40	47
Irrigation	648	750	868

2.8.1.1 Lea Hill Service Area

The Lea Hill Service Area is located east of the Auburn-Kent Valley and the Green River. The area is mostly residential with supportive neighborhood businesses. Green River College is in the Lea Hill Service Area and has a concentration of multi-family residential units in the vicinity of the college.

The Lea Hill service area is projected to have the lowest growth rate in population with a 0.3 percent per year average increase from 2021 to 2044. This Service Area is projected to have a moderate growth in employment with a 1.2 percent growth per year from 2021 to 2044.

2.8.1.2 Valley Service Area

The Valley Service Area contains a significant amount of developable land designated as multi-family and commercial, including the Downtown Urban Center. The Service Area is projected to have the highest growth rate in population at 1.6 percent per year from 2021 to 2044. The multi-family connections in this area are projected to grow 2.5 percent per year from 2021 to 2044 and employment is projected to grow 1.6 percent per year. These growth projections are based on the City's anticipation of growth trends and the redevelopment of Auburn's Downtown Urban Center, as well as commercial developments in locations with available space throughout the Service Area.

2.8.1.3 Lakeland Service Area

The Lakeland Service Area includes the entire City south of the White River. A sizable portion of this Service Area is designated residential conservancy land use, which is anticipated to be developed within the planning horizon related to the anticipated closure of the Segale Gravel Pit. The area includes proposed special planning areas for Stuck River Road and Mount Rainier Vista anticipated to be developed with a moderate population growth rate of 1.5 percent per year. This Service Area is projected to have a moderate growth in employment with a 1.2 percent growth per year from 2021 to 2044.

2.8.1.4 Academy Service Area

The Academy Service Area is a well-developed portion of the City. It is expected to have a population growth of 1.0 percent per year from 2021 to 2044. This Service Area is projected to have minimal growth in employment with a 0.3 percent per year increase from 2021 to 2044.

2.8.2 Projected Water Demand

Projecting future water demand is one of the key elements of the water system planning process. Identification of system improvements such as supply, pumping, storage, and piping requirements are all related to demand projections. This section summarizes the ERU, ADD, and MDD projections, as well as the potential range in future demands associated with various factors, such as water use per ERU, DSL, and demographic growth rate.

2.8.2.1 Potential Range in Future Water Demand

Several factors and assumptions affect the accuracy of projected future water demands. Recognizing that certain assumptions built into the demand projections will vary in the future, the projections were developed for medium and high demand scenarios to provide a range in demands that may be experienced in the future. The medium projection will be used for the system analysis in **Chapter 3**, while the high projection will be used for the water right evaluation in **Chapter 5**. The system analysis determines future pumping, storage, and distribution system deficiencies and identifies potential improvements to achieve the City's established capacity criteria. The water right evaluation looks at both water rights and overall supply capacity. Only the medium projections are presented within this Chapter. The variables considered in developing the range of demand projections are summarized in **Table 2-17** and are discussed below.

- Future Water Connections: The future water connections are presented in **Table 2-16** and were used for both demand scenarios.

- Water Use Per ERU_{ADD}: Water use per ERU for the average demand day projections are based on the 75th percentile of the historical data, which is the medium demand scenario, presented in **Table 2-4**. This value equals 182 gpd per ERU. The high demand scenario used the highest annual value from the data set presented in **Table 2-4**, which equals 193 gpd per ERU.

- ERUs per Account: The historical ERU per account by customer classification presented in **Table 2-4** was used to develop demand projections. The ERU per Account values are based on the 75th percentile of the historical data and a water use per ERU value of 182 gpd per ERU. These values are used in both projections.

- Distribution System Leakage: Historical annual DSL varied between 0.7 and 8.5 percent of the City's total City production between 2015 and 2022. The average three-year rolling average of historical DSL values of 5.3 percent is utilized in the medium demand scenario and the maximum three-year rolling average of 7.2 percent was used for the high demand scenario.

- Authorized Unbilled Consumption: Historical annual authorized unbilled consumption varied between 0.14 and 0.54 percent of the City's total billed consumption between 2015 and 2022. The 75^{th} percentile value of 0.27 percent is utilized in the medium demand scenario and the maximum values of 0.54 percent is used for the high demand scenario.

- Water Use Per ERU_{MDD}: Water use per ERU for the maximum demand day projections are based on 75th percentile of the historical data, which is the medium demand scenario, presented in **Table 2-10**

0. This value equals 358 gpd per ERU. The high demand scenario used the highest annual value from the data set presented in **Table 2-10**, which is 393 gpd per ERU.

- MDD/ADD Peaking Factor: The MDD/ADD peaking factor varied by 66 percent between 2015 and 2022. The 75th percentile of historical annual peaking factors of 1.96 is utilized in the medium demand scenario. The highest value in the historical annual peaking factor data set was used for the high demand scenario, which is 2.15.

The City's largest user (Boeing) and wholesale customers are not included in **Table 2-17**, their projections are based on individual demand and are presented separately.

Table 2-17 | Proposed Planning Values for Demand Projections

Assumptions	Medium Demand Scenario	High Demand Scenario
Water Demand per ERU_{ADD} (gpd)	182	193
DSL	5.3%	7.2%
Authorized Unbilled	0.27%	0.54%
Water Demand per ERU_{MDD} (gpd)	358	393
MDD/ADD Peaking Factor	1.96	2.15

2.8.3 Large User Demand Forecast

The large user term is used to identify customers consuming the greatest volume of water on an annual basis as presented in **Table 2-6**. Projections for the City's single largest user (Boeing) is separated from the demand forecasts to aid in accurate forecasting and in the system analyses. The forecasts were based on historical water use data from 2015 through 2022 and is presented in **Table 2-18**. The projected demand will use the 75^{th} percentile of water use from the historical period of record. Boeing's consumption has trended down over the historical period of record, therefore, the projected demand is conservative and actual consumption is anticipated to be less than the value presented in **Table 2-18**.

Wholesale connections are also projected separately in **Table 2-22.** The remaining largest users are not presented separately in demand forecasts; their projected consumption is built into the overall Service Area projections by customer classification.

Table 2-18 | Large User Demand Projections

Large User	Customer Class	Service Area	Representative Historical Water Use Statistic[1]	Representative Annual Water Use (MG)[2]	Projected ERUs in 2044
Boeing	Manufacturing Commercial	Valley	75^{th} percentile	210.6	3,168

Notes:
1. Historical water use data from 2015 through 2022
2. Based on representative historical water use statistic.

2.8.4 Projected Retail ERUs

Future water system demands are based on projected ERUs, which in turn are based on the projected water consumption by customer classification and the projected number of accounts discussed earlier in this chapter. **Table 2-19** shows the projected ERUs for the City's individual service areas over the planning period. The projected number of ERUs for each Service Area was calculated by multiplying the projected numb er of accounts, provided in **Table 2-16**, by the number of ERUs per account, as summarized in **Table 2-3**, for each customer class. Wholesale customer demand in terms of ERUs is not included in the demand projections below and must be added separately as show in **Table 2-23**.

Table 2-19 | ERU Projections by Customer Class and Service Area

	2024 ERU	2034 ERU	2044 ERU
Lea Hill			
Single-Family Residential	3,265	3,347	3,431
Multi-Family Residential	1,379	1,452	1,529
Commercial	128	143	161
Manufacturing/Industrial	-	-	-
Schools	127	128	129
Municipal (City Accounts)	2	3	3
Irrigation	319	358	402
Authorized Unbilled	14	15	15
DSL	276	288	299
Valley			
Single-Family Residential	5,954	6,088	6,226
Multi-Family Residential	6,652	8,528	10,933
Commercial	7,554	8,841	10,348
Manufacturing/Industrial	-	-	-
Schools	435	451	467
Municipal (City Accounts)	70	82	96
Irrigation	2,758	3,228	3,778
Boeing (Largest User)	3,170	3,170	3,170
Authorized Unbilled	56	66	78
DSL	1,407	1,608	1,853
Lakeland			
Single-Family Residential	1,354	1,502	1,666
Multi-Family Residential	900	1,091	1,323
Commercial	204	230	258
Manufacturing/Industrial	-	-	-
Schools	102	106	109
Municipal (City Accounts)	-	-	-
Irrigation	108	121	136
Authorized Unbilled	7	8	9
DSL	141	161	185
Academy			
Single-Family Residential	1,581	1,808	2,069
Multi-Family Residential	388	405	423
Commercial	81	84	86
Manufacturing/Industrial	-	-	-
Schools	25	26	27
Municipal (City Accounts)	2	2	2
Irrigation	174	179	185
Authorized Unbilled	6	7	8
DSL	119	133	148
Total			
Single-Family Residential	12,153	12,745	13,391

Multi-Family Residential	9,320	11,477	14,209
Commercial	7,967	9,298	10,853
Manufacturing/Industrial	-	-	-
Schools	690	711	732
Municipal (City Accounts)	74	87	101
Irrigation	3,359	3,887	4,502
Boeing (Largest User)	3,170	3,170	3,170
Authorized Unbilled	83	96	110
DSL	1,944	2,189	2,485
City of Algona Firm Wholesale	Refer to **Table 2-23.**		

2.8.5 Projected Retail Average Day and Maximum Day Demands

The ADD projections include the projected customer demands by customer classification, authorized unbilled consumption, and DSL by service area. The resulting ADD projections are summarized in **Table 2-20**.

- Customer demands by classification were calculated by multiplying the projected ERUs summarized in **Table 2-19** by the average ERU water use (182 gpd/ERU).
- Authorized unbilled consumption projections were calculated by multiplying the sum of all customer classification use by the medium demand scenario percentage presented in **Table 2-17**.
- DSL consumption projections were calculated by multiplying the sum of all customer classification use and authorized unbilled use by the medium demand scenario percentage presented in **Table 2-17** for DSL.

Table 2-20 | ADD Projections

	2024 (mgd)	2034 (mgd)	2044 (mgd)
Lea Hill			
Single-Family Residential	0.595	0.610	0.625
Multi-Family Residential	0.251	0.265	0.279
Commercial	0.023	0.026	0.029
Manufacturing/Industrial	-	-	-
Schools	0.023	0.023	0.023
Municipal (City Accounts)	-	-	0.001
Irrigation	0.058	0.065	0.073
Authorized Unbilled	0.003	0.003	0.003
DSL	0.050	0.052	0.055
Valley			
Single-Family Residential	1.084	1.109	1.134
Multi-Family Residential	1.212	1.553	1.991
Commercial	1.376	1.610	1.885
Manufacturing/Industrial	-	-	-
Schools	0.079	0.082	0.085
Municipal (City Accounts)	0.013	0.015	0.017
Irrigation	0.502	0.588	0.688
Boeing (Largest User)	0.577	0.577	0.577

	2024 (mgd)	2034 (mgd)	2044 (mgd)
Authorized Unbilled	0.010	0.012	0.014
DSL	0.256	0.293	0.337
Lakeland			
Single-Family Residential	0.247	0.274	0.303
Multi-Family Residential	0.164	0.199	0.241
Commercial	0.037	0.042	0.047
Manufacturing/Industrial	-	-	-
Schools	0.019	0.019	0.020
Municipal (City Accounts)	-	-	-
Irrigation	0.020	0.022	0.025
Authorized Unbilled	0.001	0.002	0.002
DSL	0.026	0.029	0.034
Academy			
Single-Family Residential	0.288	0.329	0.377
Multi-Family Residential	0.071	0.074	0.077
Commercial	0.015	0.015	0.016
Manufacturing/Industrial	-	-	-
Schools	0.005	0.005	0.005
Municipal (City Accounts)	-	-	-
Irrigation	0.032	0.033	0.034
Authorized Unbilled	0.001	0.001	0.001
DSL	0.022	0.024	0.027
Total			
Single-Family Residential	2.214	2.321	2.439
Multi-Family Residential	1.698	2.091	2.588
Commercial	1.451	1.694	1.977
Manufacturing/Industrial	-	-	-
Schools	0.126	0.129	0.133
Municipal (City Accounts)	0.014	0.016	0.018
Irrigation	0.612	0.708	0.820
Boeing (Largest User)	0.577	0.577	0.577
Authorized Unbilled	0.015	0.017	0.020
DSL	0.354	0.399	0.453

The MDD projections include the projected customer demands by customer classification, authorized unbilled consumption, and DSL by service area and are summarized in **Table 2-21**.

- Customer demands by classification, authorized unbilled consumption projections, and DSL projections were calculated by multiplying the ADD projections as summarized in **Table 2-20** by the MDD/ADD Peaking Factor presented in **Table 2-17.**

Table 2-21 | MDD Projections

	2024 (mgd)	2034 (mgd)	2044 (mgd)
Lea Hill			
Single-Family Residential	1.167	1.197	1.227
Multi-Family Residential	0.493	0.519	0.547
Commercial	0.046	0.051	0.058
Manufacturing/Industrial	-	-	-

	2024 (mgd)	2034 (mgd)	2044 (mgd)
Schools	0.045	0.046	0.046
Municipal (City Accounts)	0.001	0.001	0.001
Irrigation	0.114	0.128	0.144
Authorized Unbilled	0.005	0.005	0.005
DSL	0.099	0.103	0.107
Valley			
Single-Family Residential	2.129	2.177	2.226
Multi-Family Residential	2.379	3.049	3.909
Commercial	2.701	3.161	3.700
Manufacturing/Industrial	-	-	-
Schools	0.156	0.161	0.167
Municipal (City Accounts)	0.025	0.029	0.034
Irrigation	0.986	1.154	1.351
Boeing (Largest User)	1.134	1.134	1.134
Authorized Unbilled	0.020	0.024	0.028
DSL	0.503	0.575	0.663
Lakeland			
Single-Family Residential	0.484	0.537	0.596
Multi-Family Residential	0.322	0.390	0.473
Commercial	0.073	0.082	0.092
Manufacturing/Industrial	-	-	-
Schools	0.037	0.038	0.039
Municipal (City Accounts)	-	-	-
Irrigation	0.039	0.043	0.049
Authorized Unbilled	0.003	0.003	0.003
DSL	0.051	0.058	0.066
Academy			
Single-Family Residential	0.565	0.647	0.740
Multi-Family Residential	0.139	0.145	0.151
Commercial	0.029	0.030	0.031
Manufacturing/Industrial	-	-	-
Schools	0.009	0.009	0.010
Municipal (City Accounts)	0.001	0.001	0.001
Irrigation	0.062	0.064	0.066
Authorized Unbilled	0.002	0.002	0.003
DSL	0.043	0.047	0.053
Total			
Single-Family Residential	4.346	4.557	4.788
Multi-Family Residential	3.333	4.104	5.081
Commercial	2.849	3.325	3.881
Manufacturing/Industrial	-	-	-
Schools	0.247	0.254	0.262
Municipal (City Accounts)	0.027	0.031	0.036
Irrigation	1.201	1.390	1.610
Boeing (Largest User)	1.134	1.134	1.134
Authorized Unbilled	0.030	0.034	0.039
DSL	0.695	0.783	0.889

2.8.6 Wholesale Demands

The City currently has a wholesale water contract with the City of Algona. The City is also planning to supply wholesale water for the Muckleshoot Indian Tribe's future fish hatchery. As stated in the Retail Water Service Policy, "the City will plan for and provide water service to all retail customers and wholesale customers with firm contracts. As supply permits, the City may provide water to wholesale customers without firm contracts unilaterally or as part of a capital improvement partnership agreement." The wholesale demands for the City are shown in Table 2-22.

Algona's current agreement allows for the sale of up to 525,000 gallons per day on a firm basis for the ADD and up to 1,114,00 gallons per day on a firm basis for the MDD. In 2022, Algona purchased an average of 342,953 gallons per day of water from the City. Algona's 2022 Water System Plan (WSP) projects 2042 ADD to be 404,278 gallons per day and 2042 MDD to be 766,137 gallons per day. Algona's WSP demand projections were used for projecting the wholesale water purchases by Algona, rather than the contractual amount, as shown in Table 2-22.

Muckleshoot Indian Tribe plans to develop a fish hatchery on the White River. An agreement dated from 1986 (included in Appendix G) requires that the City provide the tribe with an average annual demand of 3.9 cubic feet per second (cfs) (2.52 mgd) from Coal Creek Springs for MIT's future fishery enhancement purposes. The agreement does not specify an MDD but rather states:

"The Tribe and the City agree to work in harmony toward a mutually satisfactory allocation of the Coal Creek waters. In furtherance of this goal, the City understands that the water requirements for fishery enhancement purposes are greatest in the winter and spring months. Accordingly, the City agrees to increase the amount of water above 3.9 cfs as needed for fishery purposes. The Tribe understands that the City's requirement for water for domestic use is greatest in the summer and fall months. Accordingly, the Tribe agrees to decrease its use of water below 3.9 cfs, as needed for domestic water purposes…It is further understood that the tribe requires a minimum of 3 cfs at all times for fishery enhancement purposes".

The intent of this agreement indicates that the MIT demand will be at a minimum when the City's demands are at their maximum. Based on this understanding, the planned MDD for the MIT is 1.5 mgd and the ADD was 2.5 mgd. For planning purposes, the MIT demand was added to the Algona demand and included in the "Retail + firm wholesale" group of demands.

LMWD has an interruptible (non-firm) wholesale contract that can be terminated at any time and is therefore represented separately. As discussed in the Historical Wholesale Consumption section, LMWD discontinued regular purchase of water from the City in 2017 per the amendment to IA2 but maintains an intertie with the City to use wholesale water supply on an as-needed basis. LMWD may purchase up to 2.5 mgd of wholesale water per IA2. The contract does not have an expiration date and therefore 2.5 mgd of interruptible wholesale demand is projected through 2044.

Table 2-22 | Wholesale Demand Projections

Wholesale Customer	Service Area	Contractual Delivery[1]	2024 (mgd)	2034 (mgd)	2044 (mgd)[2]
ADD					
Algona	Valley	Firm	0.37	0.39	0.41
MIT	Valley	Firm	2.5	2.5	2.5
LMWD	Lea Hill	Non-Firm	2.5	2.5	2.5
MDD					
Algona	Valley	Firm	0.69	0.73	0.78
MIT	Valley	Firm	1.5	1.5	1.5
LMWD	Lea Hill	Non-firm	2.5	2.5	2.5

Notes:

1. The City will plan for and provide water services to all retail customers and wholesale customers with firm contracts. As supply permits, the City may provide water to wholesale customers without firm contracts unilaterally or as part of a CIP agreement.
2. Algona's projections are provided through 2042; their projected rate increase was used to project consumption to 2044.

2.8.7 Total Demands

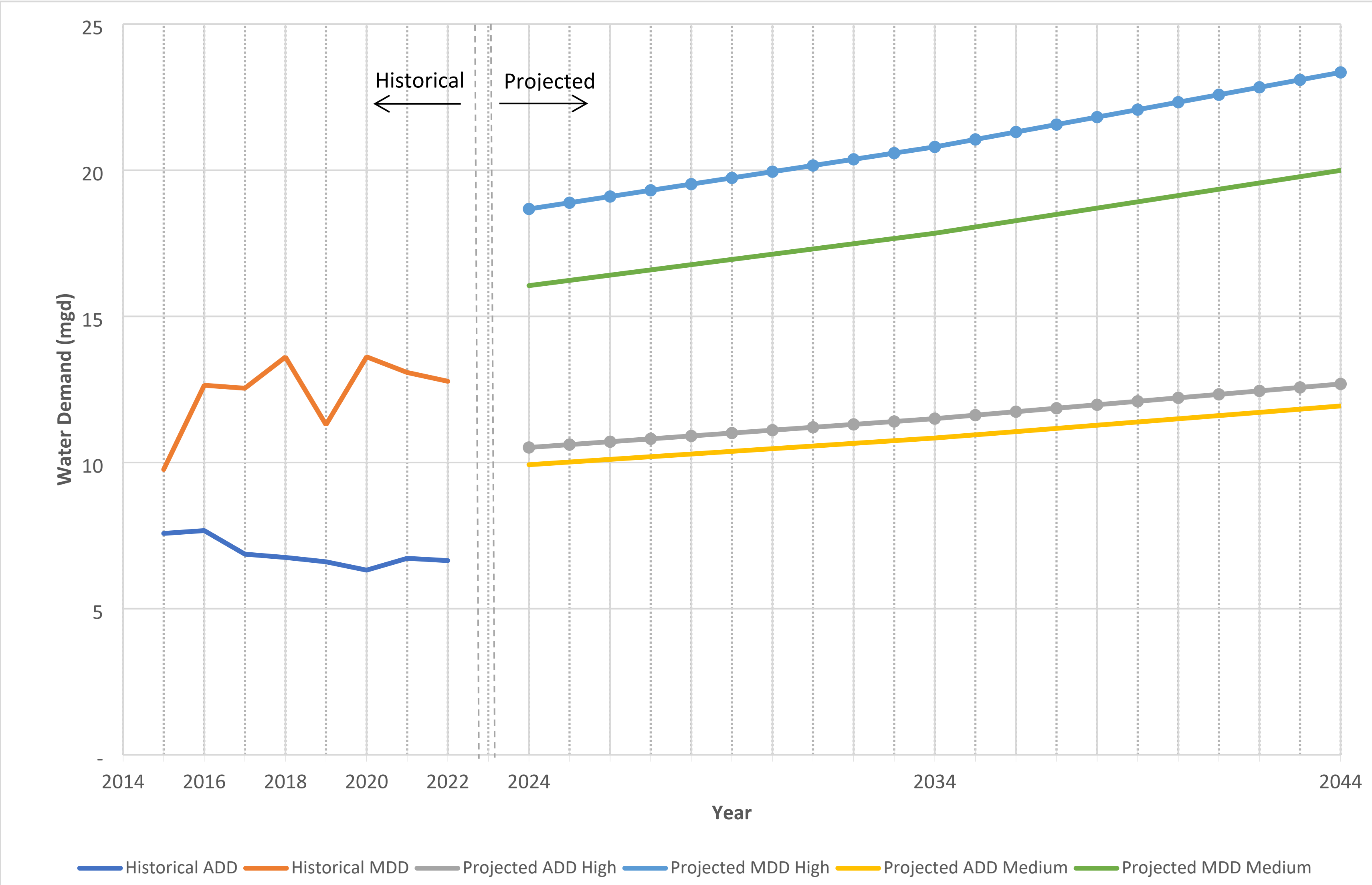
The total projected demands are tabulated for retail customers, firm wholesale, and interruptible wholesale in **Table 2-23**. The demands are presented separately to show the level of obligation to the City's customers. Projected retail ADD, MDD, and ERUs are presented by Service Area for the medium demand scenario. Additionally, the ADD and MDD are presented as the total of the projected retail demand and firm wholesale. The retail with firm wholesale represents the projected demand that is used as the basis for the system analysis and are shown in **Figure 2-10**. The difference between the historical and projected wholesale demands is due to the projected allocation of the supply to the proposed MIT Fish Hatchery, per the 1986 Stipulation Settlement Agreement. Additionally, both CWD and LMWD discontinued regular purchase of water from the City in 2017.

The 2044 retail ADD demand is projected to 9.24 mgd, which represents a 28 percent increase from 2024. Throughout the planning period, approximately 40 percent of the City's demand may be from wholesale purchases when both firm and interruptible supply are considered. The MDD is projected to increase by 25 percent from 2024 to 2044 for the sum of firm wholesale customers and retail customers.

Table 2-23 | ADD, MDD, and ERUs Summarized by Service Area with Wholesale Included

	2024	2034	2044
Lea Hill			
Average Day Demand (mgd)	1.00	1.04	1.09
Maximum Day Demand (mgd)	1.97	2.05	2.13
Equivalent Residential Units	5,511	5,734	5,970
Valley			
Average Day Demand (mgd)	5.11	5.84	6.73
Maximum Day Demand (mgd)	10.03	11.46	13.21
Equivalent Residential Units	28,055	32,061	36,948
Lakeland			
Average Day Demand (mgd)	0.51	0.59	0.67
Maximum Day Demand (mgd)	1.01	1.15	1.32
Equivalent Residential Units	2,817	3,220	3,687
Academy			
Average Day Demand (mgd)	0.43	0.48	0.54
Maximum Day Demand (mgd)	0.85	0.95	1.05
Equivalent Residential Units	2,377	2,644	2,948
Total Retail Customers			
Total Average Day Demand (mgd)	7.06	7.95	9.03
Total Maximum Day Demand (mgd)	13.86	15.61	17.72
Total Equivalent Residential Units	38,760	43,659	49,553
Retail with Firm Wholesale (Algona and MIT)			
Total Average Day Demand (mgd)	9.93	10.84	11.93
Total Maximum Day Demand (mgd)	16.05	17.84	19.99
Retail with Firm & Interruptible Wholesale (Algona, MIT Fish Hatchery, and LMWD)			
Average Day Demand (mgd)	12.43	13.34	14.43
Maximum Day Demand (mgd)	18.55	20.34	22.49

Figure 2-10 | Projected Retail Plus Firm Wholesale ADD and MDD



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CHAPTER 3

System Analysis and Asset Management

This chapter's objective is to identify existing facilities and determine their capacity to reliably satisfy current and projected water demands with safe drinking water. The cost of addressing identified infrastructure deficiencies and operational and maintenance improvements is addressed in priority order in Chapter 8.

This chapter addresses the following topics:

- 3.1 Asset Management – Asset Inventory and Analysis
- 3.2 Water Quality
- 3.3 Design Standards
- 3.4 Capacity Analysis
- 3.5 Summary of System Deficiencies

3.1 Asset Management – Asset Inventory and Analysis

This section establishes a date-based inventory of all system-owned water assets and satisfies the requirements of WAC 246-290-100(4)e(iii). The City actively assesses and plans for the maintenance, repair, and replacement of its major assets while preventive maintenance practices keep assets in good condition, thereby extending their useful life.

The City utilizes Cartegraph, an asset management software program, in conjunction with ESRI ArcGIS, a geographic information system (GIS) software program to manage its water assets. GIS is updated using record drawings as projects are completed and Cartegraph is linked to automatically update with new GIS information. Cartegraph is used to track and schedule maintenance activities, as well as materials, labor hours, costs and project timelines. Capital costs for the replacement of assets are assessed on a case-by-case basis.

The City's water system is comprised of groundwater wells, springs, interties with other water systems, treatment facilities, pump stations, storage facilities, pressure reducing stations, and water transmission and distribution pipelines. The City's water system includes 28 pressure zones in four different service areas: Lea Hill, Valley, Academy, and Lakeland. The location of major assets and pressure zones are shown in Figure 3-1. The hydraulic profile of the City's water system is presented in Figure 3-2, with enlargements provided as Figure 3-3 and Figure 3-4.

Water system vulnerabilities relating to risks from natural hazards, such as power outage, flooding, and earthquake are detailed in the Natural Hazard Vulnerability Summary, which is provided in Appendix U.

Figure 3-1 | Map of Water System Assets and Pressure Zones

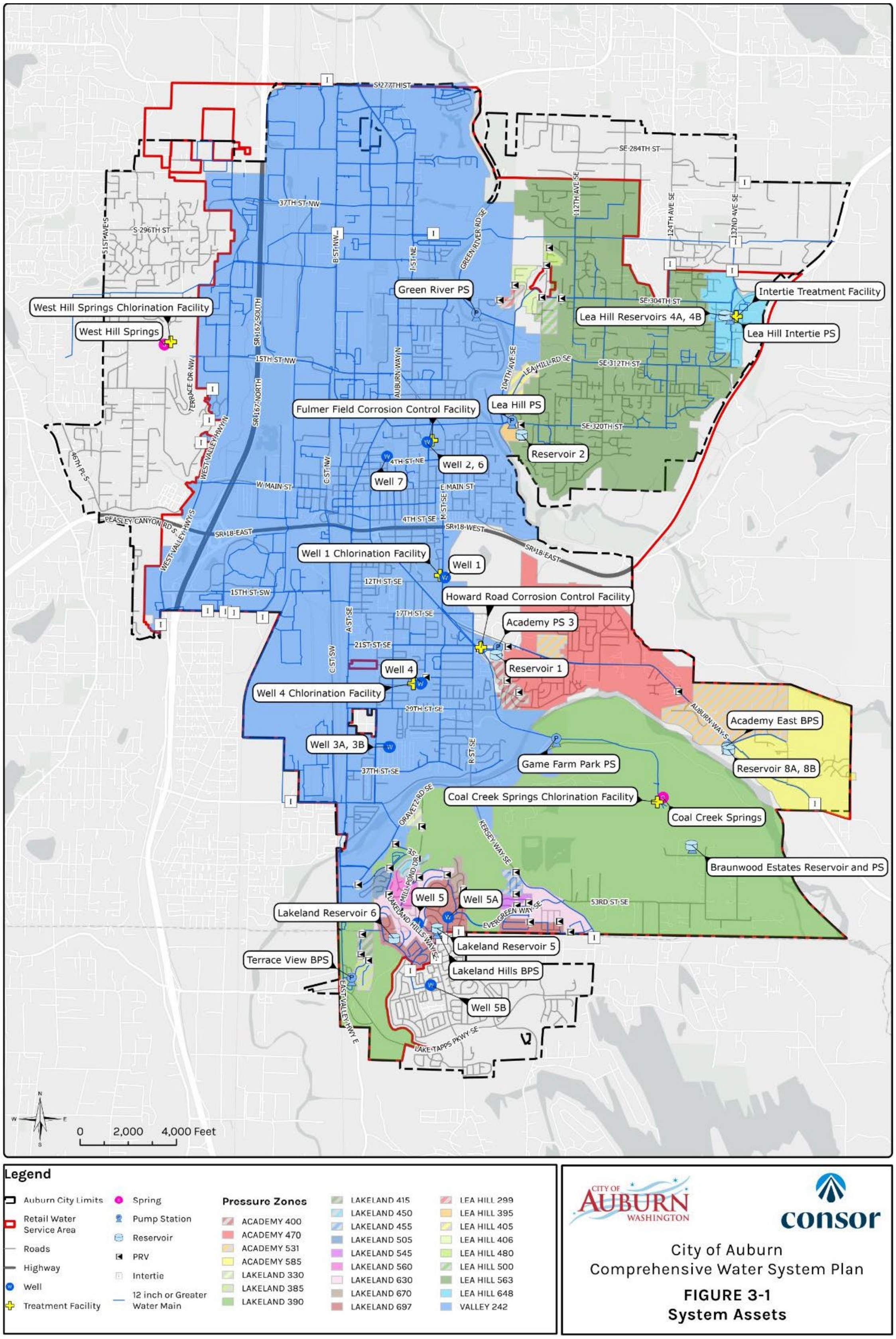


Figure 3-2 | Hydraulic Profile

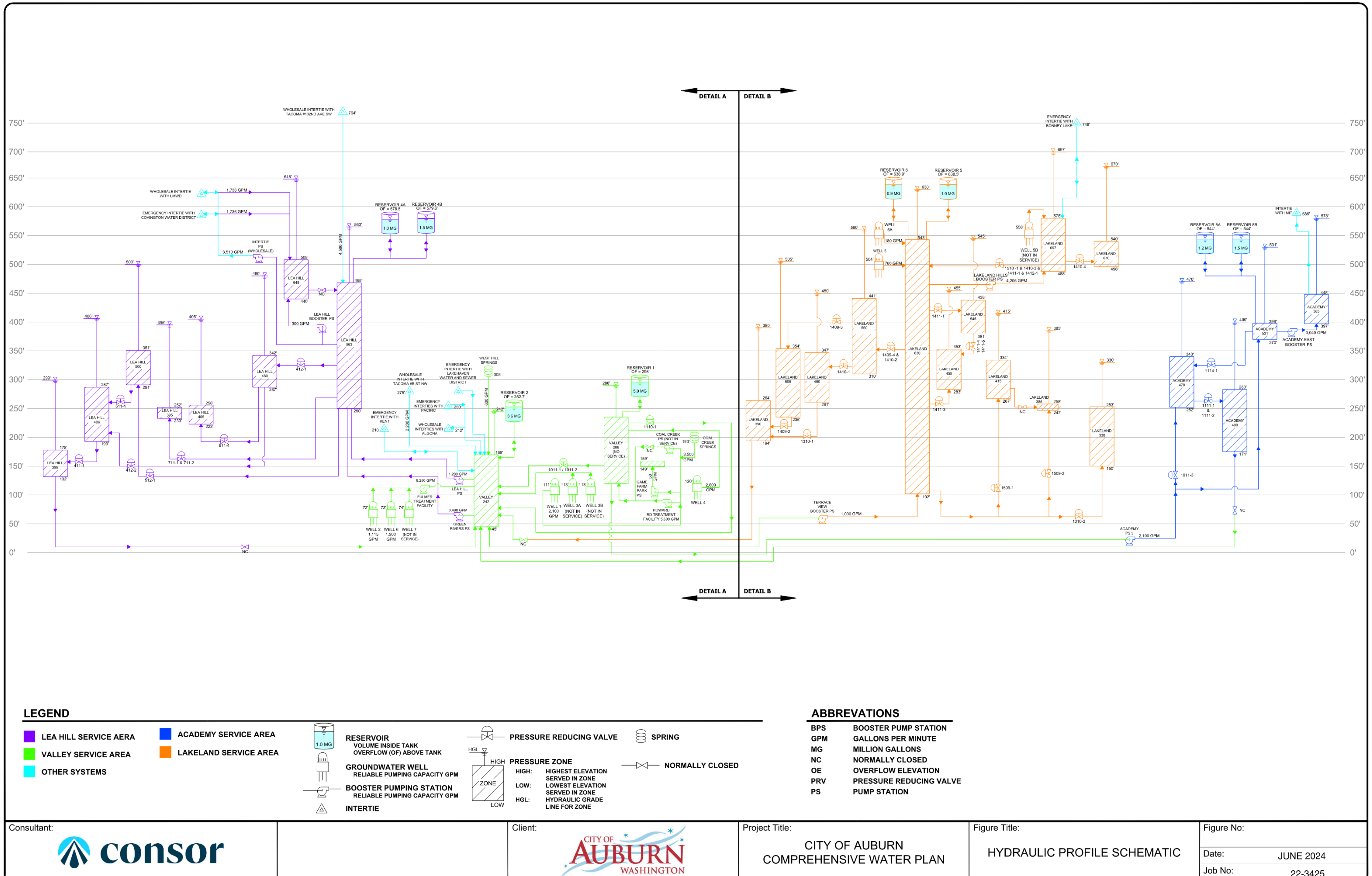
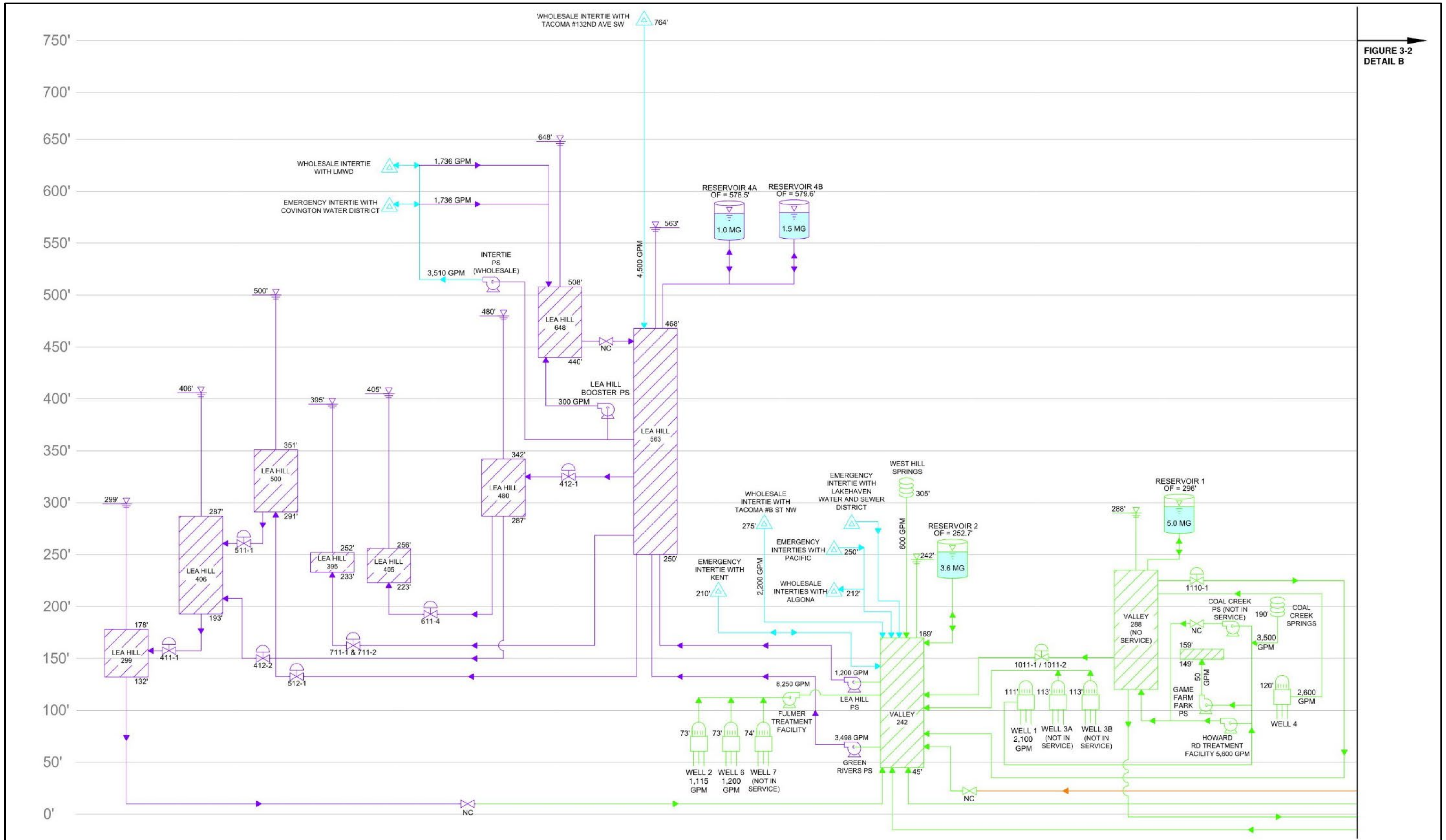


Figure 3-3 | Hydraulic Profile - Detail A



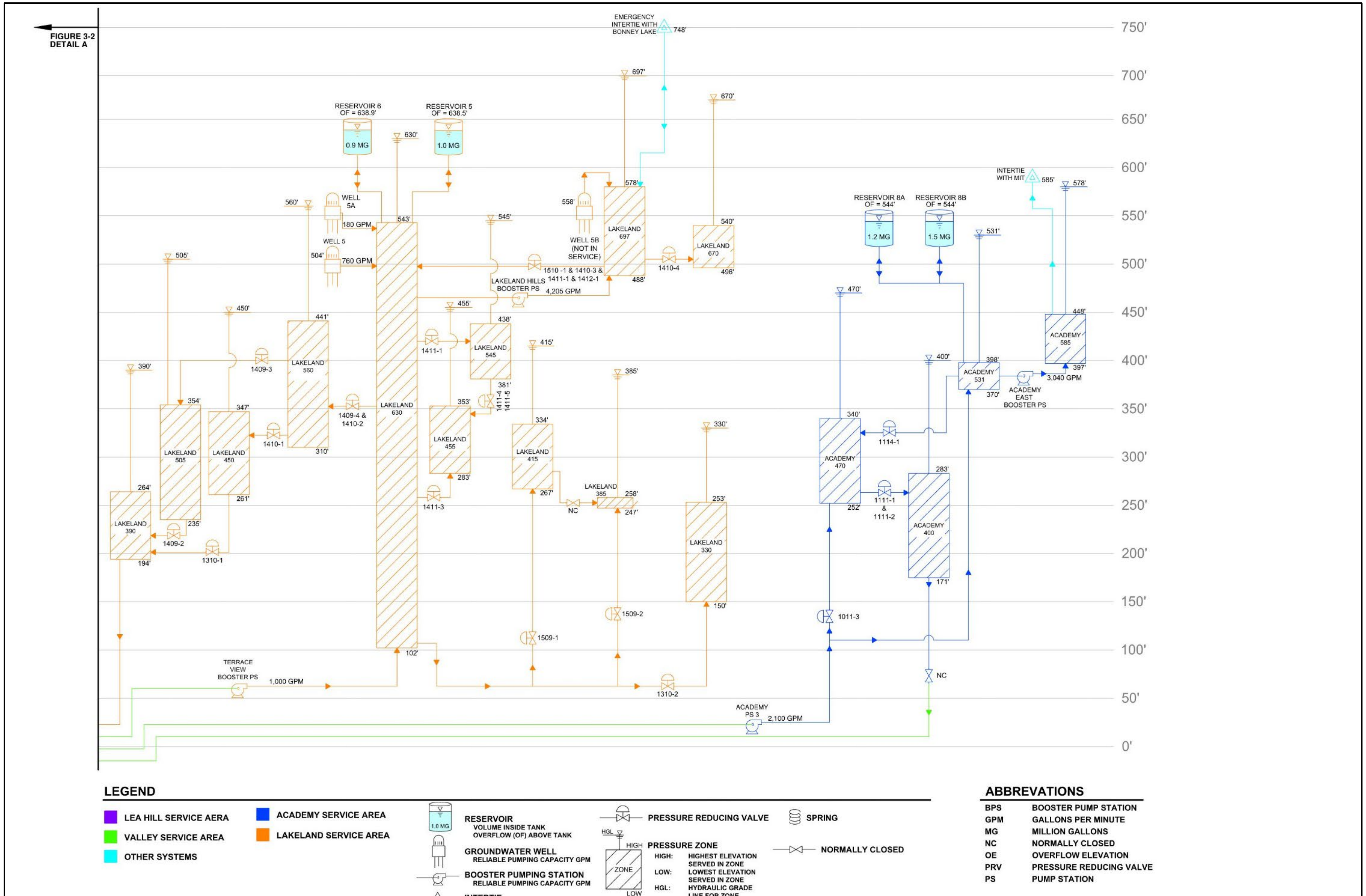
LEGEND

- LEA HILL SERVICE AERA
- VALLEY SERVICE AREA
- OTHER SYSTEMS
- ACADEMY SERVICE AREA
- LAKELAND SERVICE AREA
- RESERVOIR — VOLUME INSIDE TANK; OVERFLOW (OF) ABOVE TANK
- GROUNDWATER WELL — RELIABLE PUMPING CAPACITY GPM
- BOOSTER PUMPING STATION — RELIABLE PUMPING CAPACITY GPM
- INTERTIE
- PRESSURE REDUCING VALVE
- SPRING
- PRESSURE ZONE — HIGH: HIGHEST ELEVATION SERVED IN ZONE; LOW: LOWEST ELEVATION SERVED IN ZONE; HGL: HYDRAULIC GRADE LINE FOR ZONE
- NORMALLY CLOSED

ABBREVATIONS

BPS	BOOSTER PUMP STATION
GPM	GALLONS PER MINUTE
MG	MILLION GALLONS
NC	NORMALLY CLOSED
OE	OVERFLOW ELEVATION
PRV	PRESSURE REDUCING VALVE
PS	PUMP STATION

Figure 3-4 | Hydraulic Profile - Detail B



3.1.1 Distribution Facilities

The City' water distribution system includes approximately 300 miles of piping. **Table 3-1** summarizes the water piping inventory by size (diameter). The criticality ratings for the system's pipes are presented in **Table 3-1**, as criticality of the pipelines is assessed based on size. Water main and transmission pipelines vary in diameter from 4 to 36 inches, with a predominance of 8 and 12 inches, and range in age with the oldest piping dating back to 1925. Approximately 78 percent of the distribution system is ductile iron pipe.

Table 3-1 | Transmission and Distribution System Piping Inventory by Pipe Diameter

Distribution System Piping Diameter (inches)	Length (linear feet)	Design Life (years)	Criticality Rating (Bigger # = Less Critical)[1]
≤ 6	189,574	100	4
8-10	681,601		4
12-15	532,953		3
16-20	119,997		3
24-30	15,582		2
36-42	35		2
Unknown	1,380		--

Note:

1. Criticality was assessed based on pipe diameter. Larger diameter pipes were identified as being more critical than smaller diameter pipes.

Table 3-2 organizes water system piping by material and age and identifies the anticipated pipe condition. Pipe condition was assessed based on pipe age and remining useful life. Cast iron pipe that was installed after the 1930's, which constitutes over 48 miles of water mains or 16 percent of the total length of water mains in the City's system, was designated to have a significantly reduced design life of 50 years due to known pipe integrity issues. As such, the City is prioritizing replacement of cast iron pipe and regularly partners with other City projects to replace this piping efficiently and has capital programs to fund replacements as discussed further in **Chapter 8**. Piping that has an unknown material and unknown installation date will be updated in the City's GIS system and Cartegraph as more records research is completed.

In 2014, the City conducted leak detection testing and condition assessment of approximately 2.8 miles of 14 to 24-inch ductile iron and concrete composite pipe. The results indicated that the 20-inch and 16-inch ductile iron mains in the Lea Hill Service Area range from moderate to good condition. The Coal Creek Springs concrete composite main was identified as being in good condition. The 14-inch ductile iron main located in the Academy Service Area was suspected of being in poor condition, however this was later thought to be in decent condition as more information regarding the pipe material was obtained. A portion of the 14-inch piping was replaced as part of a roundabout project within Auburn Way S.

In 2020 the City conducted additional leak detection testing and condition assessment of approximately 13,500 feet of 10 to 16-inch cast iron main. With a focus on four specific sites: Auburn Way South, C Street Southwest, West Hill Springs, and Lea Hill Road. All the pipe on Auburn Way South and Lea Hill Road are in moderate condition. The pipe on C Street Southwest and at West Hill Springs are in poor to moderate condition. The C Street Southwest piping is currently being replaced by the City's "C St SW Preservation" capital project that will begin construction in in 2024.The West Hill Springs piping will be replaced in a forthcoming capital project titled "West Hill Springs Transmission Main Replacement" that is identified in **Chapter 8**.

Table 3-2 | Transmission and Distribution System Piping Inventory by Material and Installation Decade

Piping Material	Total Length (linear feet)	Install Decade (10-Year Period)	Length (linear feet)	Design Life (years)	Remaining Useful Life (years)	Condition Rating (Bigger # = Worse Condition)[1]
Cast Iron	253,919	1920	11,877	100	-4	7
		1930	10,602		6	6
		1940	3,079	50	-34	10
		1950	5,937		-24	10
		1960	147,764		-14	9
		Unknown	74,660		--	--
Concrete[2]	11,284	1960	11,284	100	36	3
Ductile Iron	1,198,958	1960	48,235	100	36	4
		1970	115,184		46	4
		1980	283,977		56	4
		1990	299,293		66	4
		2000	230,295		76	3
		2010	156,307		86	2
		2020	50,594		96	1
		Unknown	15,072		--	--
HDPE	409	2010	409	100	86	1
PVC[2]	19,498	1960	1,630	100	36	4
		1970	2,598		46	4
		1980	1,251		56	4
		1990	1,784		66	4
		2000	2,647		76	3
		2010	2,588		86	2
		2020	1,117		96	1
		Unknown	5,884		--	--
RCP	1,014	1970	884	100	46	3
		2020	130		96	1
Steel	1,030	1920	870	100	-4	6

Piping Material	Total Length (linear feet)	Install Decade (10-Year Period)	Length (linear feet)	Design Life (years)	Remaining Useful Life (years)	Condition Rating (Bigger # = Worse Condition)[1]
		1970	160		46	4
Unknown - Anticipated to be Cast Iron based on install date	4,022	1960	4,022	50	-14	4
Unknown – Anticipated to be Ductile Iron based on install date	28,564	1970	4,001	100	46	4
		1980	3,822		56	4
		1990	12,465		66	4
		2000	4,165		76	3
		2010	4,112		86	2
Unknown	23,089	Unknown	23,089	50	--	--

Note:
1. Condition was assessed based on remaining useful life of the pipe.
2. The City is investigating pipe materials in 2024 to verify pipe materials in the City's database that may be mislabeled.

The distribution system piping is delineated into pressure zones using Pressure Reducing Valves (PRVs). An inventory of the City's PRVs, as well as their size, remaining useful life, condition, and criticality are summarized in **Table 3-3**. As PRVs approach their anticipated design life, the City's Maintenance and Operations (M&O) staff remove and rebuild the valve to extend the useful life of the asset, when feasible.

Table 3-3 | Pressure Reducing Valve (PRV) Inventory

Valve ID #	PRV Location Description	Valve Size (inches)	Install Date (year)	Design Life (years)	Remaining Useful Life (years)	Condition Rating (Bigger # = Worse Condition)	Criticality Rating (Bigger # = Less Critical)
Lea Hill Service Area							
411-10 - Primary Valve	Cobble Creek Upper at 30216 104th Ave SE	8	2024	40	40	1	3
411-11 - Secondary Valve		2					4
411-12 - Relief Valve		1.5					4
411-20 - Primary Valve	104th Ave SE/SE 302nd St. Cobble Creek Lower	6	1994		10	4	3
411-21 - Secondary Valve		2					4
411-22 - Relief Valve		1.5					4
412-10 - Primary Valve	298th Pl SE & 109th Ave SE	6	2011		27	2	3

Valve ID #	PRV Location Description	Valve Size (inches)	Install Date (year)	Design Life (years)	Remaining Useful Life (years)	Condition Rating (Bigger # = Worse Condition)	Criticality Rating (Bigger # = Less Critical)
412-11 - Secondary Valve		2					4
412-12 - Secondary Valve		2					4
412-20 - Primary Valve	300 Block SE & 108th Ave SE	6	2005	40	21	1	3
412-21 - Secondary Valve		2					4
412-22 - Secondary Valve		2					4
511-10 - Primary Valve	SE 304th St. & 108th Ave. SE	6	2016		32	1	3
511-11 - Secondary Valve		2					4
511-20 – Primary Valve	Cobble Creek Lower at 10230 304th Pl SE	6	1994		10	1	3
511-21 – Secondary Valve		2					4
511-22 – Relief Valve		1.5					4
512-10 – Primary Valve	SE 304th St & 110th Pl SE	6	2018		34	1	3
512-11 – Secondary Valve		2					4
512-12 – Secondary Valve		2					4
611-30 - Primary Valve	Carriage Square	8	2018		34	1	3
611-31 - Secondary Valve		3					4
611-32 - Secondary Valve		3					4
711-10 - Primary Valve	Amberview North	8	1986		2	5	3
711-11 – Secondary Valve		2					4
711-20 - Primary Valve	Amberview South	8	1986		2	5	3
Valley Service Area							
1110-10 - Primary Valve	25th St SE & K St SE	10	1987	40	3	6	3
1110-20 - Secondary Valve		4					4
Lakeland Service Area							
1309-10 - Primary Valve	Mill Pond Dr SE & Oravetz Rd SE	10	1980	40	-4	6	3
1309-11 - Secondary Valve		3					4
1309-12 - Secondary Valve		3					4
1309-13- Secondary Valve		1					4
1310-10 - Primary Valve	Mill Pond Dr SE & Mill Pond Loop SE	10	1980		-4	6	3
1310-11 - Secondary Valve		3					4

Valve ID #	PRV Location Description	Valve Size (inches)	Install Date (year)	Design Life (years)	Remaining Useful Life (years)	Condition Rating (Bigger # = Worse Condition)	Criticality Rating (Bigger # = Less Critical)
1310-12 - Secondary Valve		2		40			4
1310-13 - Secondary Valve		1					4
1409-10 - Primary Valve	Oravetz Rd SE & Lakeland Hills Way SE	8	1990		6	5	3
1409-11 - Secondary Valve		4					4
1409-12 - Secondary Valve		2					4
1409-13 - Secondary Valve		2					4
1409-20 - Primary Valve	47th St SE & Lakeland Hills Way SE	8	1992		8	5	3
1409-21 - Secondary Valve		4					4
1409-22 - Secondary Valve		2					4
1409-23 - Secondary Valve		2					4
1409-30 - Primary Valve	Lakeland Hills Way SE & 51st St SE	10	2004		20	3	3
1409-31 - Secondary Valve		3					4
1409-32 - Secondary Valve		2					4
1409-40 - Primary Valve	Mill Pond Dr SE & Lakeland Hills Way SE	10	1988		4	5	3
1409-41 - Secondary Valve		3					4
1409-42 - Secondary Valve		3					4
1409-43 - Secondary Valve		1					4
1410-10 - Primary Valve	5018 Mill Pond Dr SE	10	1980		-4	6	3
1410-11 - Secondary Valve		3					4
1410-12 - Secondary Valve		2					4
1410-20 - Primary Valve	52nd St SE & East of Mill Pond Dr SE	8	1992		8	5	3
1410-21- Secondary Valve		4					4
1410-22- Secondary Valve		2					4
1410-23- Secondary Valve		2					4
1410-30 - Primary Valve	Nathan Ave SE & Highland Dr SE	8	1992		8	5	3
1410-31- Secondary Valve		4					4
1410-32- Secondary Valve		2					4

Valve ID #	PRV Location Description	Valve Size (inches)	Install Date (year)	Design Life (years)	Remaining Useful Life (years)	Condition Rating (Bigger # = Worse Condition)	Criticality Rating (Bigger # = Less Critical)
1410-33- Secondary Valve		2		40			4
1410-40 - Primary Valve	5203 Quincy Ave SE	8	1995		11	4	3
1410-41- Secondary Valve		4					4
1410-42- Secondary Valve		2					4
1410-43- Secondary Valve		2					4
1509-10 - Primary Valve	Terrace View Lower	10	2007		23	3	3
1509-11- Secondary Valve		3					4
1509-12- Secondary Valve		3					4
1509-20 - Primary Valve	Terrace View Middle	10	2007		23	3	3
1509-21- Secondary Valve		3					4
1509-22- Secondary Valve		3					4
1509-30 - Primary Valve	Terrace View Upper	10	2007		23	3	3
1509-31- Secondary Valve		3					4
1509-32- Secondary Valve		3					4
1509-40 - Primary Valve	Terrace View Dr SE & Alexander Pl SE	10	2007		23	3	3
1509-41- Secondary Valve		3					4
1509-42- Secondary Valve		3					4
1510-10 - Primary Valve	Lakeland Hills Way SE & Evergreen Way SE	8	1994		10	4	3
1510-11- Secondary Valve		4					4
1510-12- Secondary Valve		2					4
1510-13- Secondary Valve		2					4
1411-10 - Primary Valve	56th St SE at Bennett Ave SE	6	2011		27	2	3
1411-11- Secondary Valve		2					4
1411-12- Secondary Valve		2					4
1411-20 - Primary Valve	5310 Bennett Ave SE	6	2010		26	2	3
1411-21- Secondary Valve		2					4
1411-22- Secondary Valve		2					4
1411-30 - Primary Valve	Kersey Way SE & 50th St SE	8	2015		31	2	3

Valve ID #	PRV Location Description	Valve Size (inches)	Install Date (year)	Design Life (years)	Remaining Useful Life (years)	Condition Rating (Bigger # = Worse Condition)	Criticality Rating (Bigger # = Less Critical)
1411-31- Secondary Valve		2					4
1411-32- Secondary Valve		2					4
1411-40 - Primary Valve		10					3
1411-41- Secondary Valve	2305 54th St SE	3	2015		31	2	4
1411-42- Secondary Valve		3					4
1411-50 - Primary Valve		6		40			3
1411-51- Secondary Valve	5253 Wesley Ave SE	2	2015		31	2	4
1411-52- Secondary Valve		2					4
1412-10 - Primary Valve		6					3
1412-11- Secondary Valve	5539 Franklin Ave SE	2	2012		28	2	4
1412-12- Secondary Valve		2					4
Academy Service Area							
1011-30 - Primary Valve		8					3
1011-31 - Secondary Valve	2003 Auburn Way S	3	2006		22	3	4
1011-32 - Secondary Valve		3					4
1111-10 - Primary Valve		6					3
1111-11 - Secondary Valve	Riverwalk Dr SE & Howard Rd SE	2	2006		22	3	4
1111-12 - Secondary Valve		2					4
1111-20 - Primary Valve		6		40			3
1111-21 - Secondary Valve	2204 27th St SE	2	1997		13	3	4
1111-22 - Secondary Valve		2					4
1114-10 - Primary Valve		8					3
1114-11 - Secondary Valve	4500 Auburn Way South	3	2006		22	3	4
1114-12 - Secondary Valve		3					4

Figure 3-5 shows the locations of water main breaks and leaks that have required repair since 2014. A total of 93 repairs have been completed during this timeframe and include water main break and leak repairs, water main appurtenance repairs, service lines repairs, and repairs due to damage caused by construction contractors.

Figure 3-5 | Water Main Leak and Break Repair Locations from 2014-2024

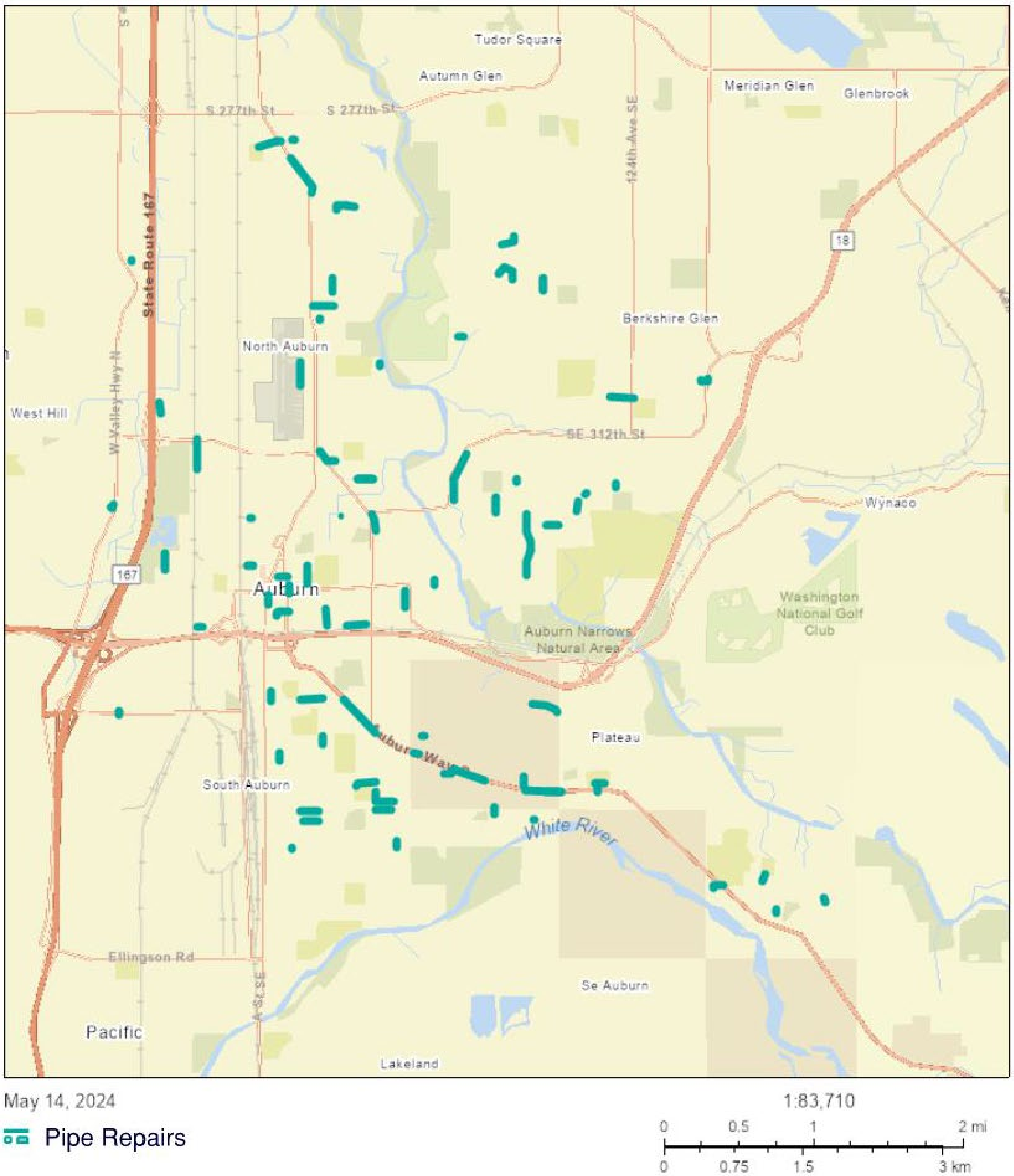
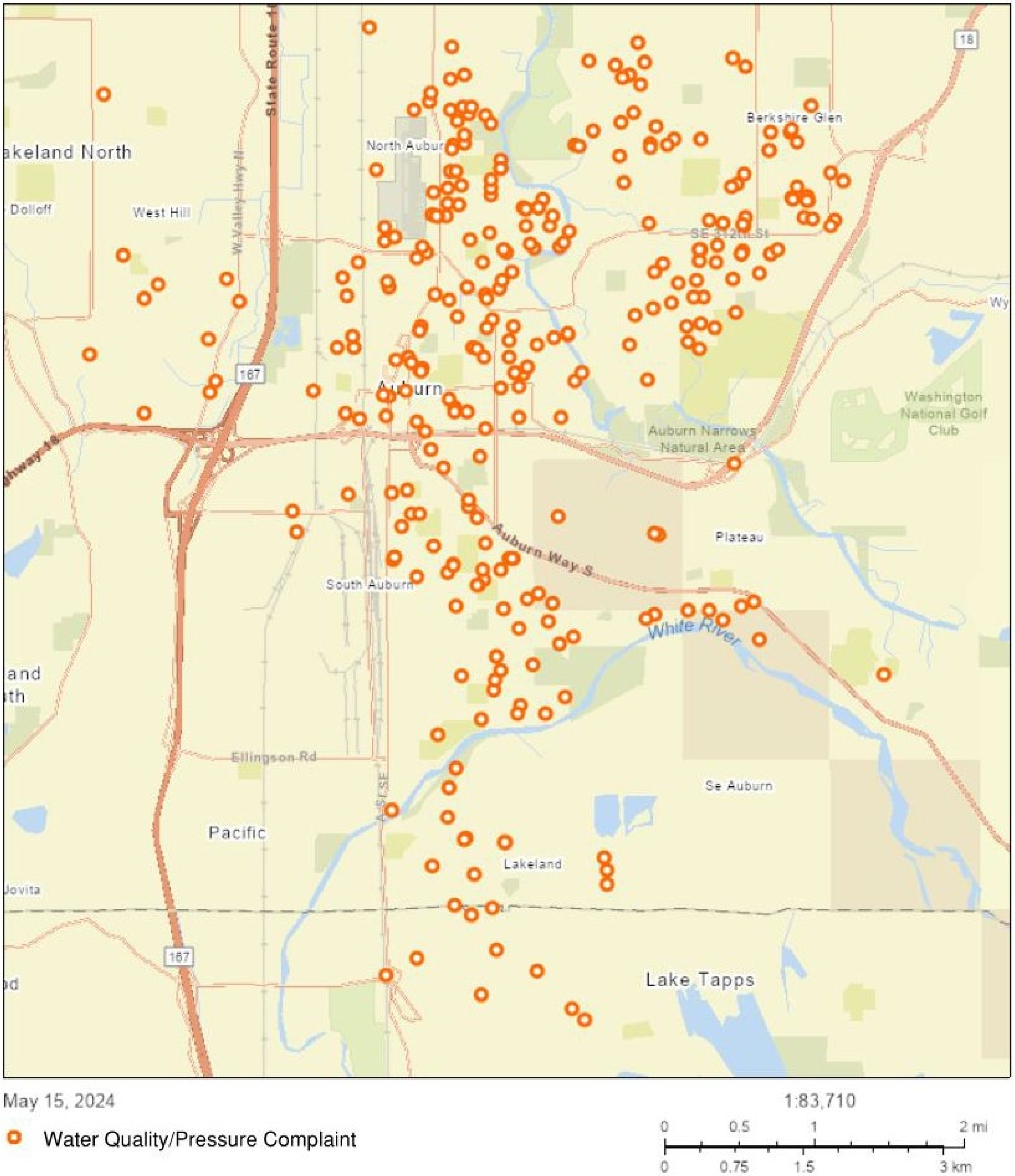


Figure 3-6 shows the locations of low pressure and water quality (odor and discolored water) complaints received since 2014.

Figure 3-6 | Low Pressure, Odor, and Discolored Water Complaints from 2014-2024



A summary of the customer complaints by category is presented in **Table 3-4**. Overall, there has been only one odor complaint within the last ten years. Pressure complaints and water quality complaints have remained fairly consistent, with the fewest number of complaints being made in 2023.

Table 3-4 | Summary Customer Complaints

Category	2014[1]	2015	2016	2017	2018	2019	2020	2021	2022	2023
Water Quality (Appearance)	0	40	47	23	14	55	48	47	27	9
Odor	3	1	0	0	0	0	0	0	0	0
Pressure	6	9	16	19	12	8	4	11	8	10
Total	**9**	**50**	**63**	**42**	**26**	**63**	**52**	**58**	**35**	**19**

Note:
1. Data in 2014 is incomplete due to the City transitioning to Cartegraph Asset Management.

3.1.2 Water Source Facilities

The City uses a combination of groundwater wells and springs as supply sources for the water system. The pumping capacity, remaining useful life, condition and criticality of the City's groundwater wells are summarized in **Table 3-5**. The City's two spring sources, Coal Creek Springs and West Hill Springs, are not included in **Table 3-5** since both these sources operate by gravity and have no on-site pumping equipment. Condition ratings are assigned based on the 2013 Water Facilities Evaluation Study.

A detailed description of each water source facility, including both springs and groundwater wells, and planned improvements is provided following **Table 3-5**. A summary of the pumping or production capacity of each source, including the springs, is included in **Section 2.6** of **Chapter 2**. Discussion of the City's current water rights for each water source is provided in **Section 3.4.1**.

Table 3-5 | Source of Supply Well Pump Inventory

<table>
<tr><th>Facility Name</th><th>Capacity (MGD)</th><th>No. of Pumps</th><th>Pump Type</th><th>Install Year</th><th>Design Life (years)</th><th>Remaining Useful Life (years)</th><th>Condition Rating (Bigger # = Worse Condition)</th><th>Criticality Rating (Bigger # = Less Critical)</th></tr>
<tr><td colspan="9">Valley Service Area</td></tr>
<tr><td>Well 1</td><td>3.02</td><td>1</td><td>Vertical Turbine</td><td>2016</td><td rowspan="2">40</td><td>32</td><td>2</td><td>2</td></tr>
<tr><td>Well 2</td><td>1.61</td><td>1</td><td>Centrifugal</td><td>2023</td><td>39</td><td>3</td><td>1</td></tr>
<tr><td>Well 3A</td><td colspan="8">Not in Service</td></tr>
<tr><td>Well 3B</td><td colspan="8">Not in Service</td></tr>
<tr><td>Well 4</td><td>3.74</td><td>1</td><td>Centrifugal</td><td>1985</td><td rowspan="2">40</td><td>30</td><td>1</td><td>3</td></tr>
<tr><td>Well 6</td><td>1.73</td><td>1</td><td>Vertical Turbine</td><td>1999</td><td>15</td><td>4</td><td>1</td></tr>
<tr><td>Well 7</td><td colspan="8">Not in Service</td></tr>
<tr><td colspan="9">Lakeland Service Area</td></tr>
<tr><td>Well 5</td><td>0.94</td><td>1</td><td>Submersible</td><td>1983</td><td rowspan="2">40</td><td>-1</td><td>7</td><td>3</td></tr>
<tr><td>Well 5A</td><td>0.26</td><td>1</td><td>Submersible</td><td>1990</td><td>6</td><td>7</td><td>2</td></tr>
<tr><td>Well 5B</td><td colspan="8">Not in Service</td></tr>
</table>

3.1.2.1 Coal Creek Springs

Coal Creek Springs is a primary water supply for the City due to its production capacity. This source is more economical to operate than other sources as it can provide a large volume of water and does not require pumping for extraction. Much of the spring's collector system, including the south and middle collectors, was constructed in 1964. A third collector (the north collector) was added in 1998 to enhance system performance and to provide increased reliability. Currently, the flow from this collector is by gravity, however a buried manhole structure was installed in the line to provide space for a future pump station that could increase production.

Each collector is connected to an overflow structure before connection to a 24-inch transmission line that conveys flow to the Howard Road Corrosion Control Treatment (CCT) Facility where the water is treated for corrosion and is then pumped to Reservoir 1. Between the Coal Creek Springs headworks and the Howard Road CCT Facility is a single connection that supplies potable water to Game Farm Wilderness Park. This transmission main is in good condition, however a suspected leak on the 24-inch steel transmission main crossing the White River was identified in a facility evaluation study completed in 2014. It was later identified that there was not a leak, but the evaluation results were caused by river turbulence due to portions of the pipe being exposed along the riverbed. The City is currently constructing a project that replaces the river crossing with new transmission piping suspended from a utility and pedestrian bridge; the project will be completed in 2024 and is identified in **Chapter 8**.

In recent years, the production capacity of Coal Creek Springs has been reduced. A maximum instantaneous production rate up to 4,500 gpm is currently feasible, however a more consistent functional production capacity of 3,500 gpm is currently achieved (approximately 52 percent of the water right capacity). The City is currently investigating the cause of reduced production and potential solutions. A capital project is planned to rehabilitate Coal Creek Springs once a solution is identified; the project is discussed further in **Chapter 8**.

3.1.2.2 West Hill Springs

Although the use of West Hill Springs as a potable water supply dates to before 1907, most of the current facilities and equipment were constructed after 1960. More recent improvements include replacement of the collection boxes, as recommended in the 1995 Comprehensive Water Plan, and partial fencing of the watershed, as recommended by the 2000 Water Comprehensive Plan. The spring's existing transmission main is constructed of 10-inch diameter cast iron piping and has experienced two breaks. The City plans to replace approximately 1,250 linear feet of the transmission main with 12-inch diameter ductile iron pipe in an upcoming capital project identified in **Chapter 8**.

3.1.2.3 Well 1

Well 1 was constructed in 1960 and underwent substantial renovation in 2016, significantly improving the overall facility condition. Renovations included transmission piping to Howard Road CCT Facility, site improvements, a new well house, new pumping system, disinfection with sodium hypochlorite, on-site emergency power, and upgraded electrical and supervisory control and data acquisition (SCADA) controls. The new well pumping system is a two-stage, vertical turbine pump with a capacity of 2,100 gpm, driven by a 100-HP motor and controlled by a variable frequency drive (VFD). Supply from Well 1 will be routed along the recently constructed 16-inch transmission main and conveyed to the Howard Road CCT Facility.

3.1.2.4 Wells 2 & 6

Well 2 was constructed in 1970 and the well and well house were replaced in 2000 with a new masonry building and pumping equipment as part of the City's corrosion control strategy. The facility built in 2000 also houses Well 6, which was built in 1999. Within the facility is a two-stage 1,115 gpm centrifugal pump powered by a 125-HP motor, installed in 2023 (Well 2), and a 1,200 gpm, two-stage, vertical-turbine pump driven by a 200-HP motor (Well 6). The wells discharge to a 14-inch transmission main to Fulmer Field CCT Facility for treatment prior to distribution.

Since the Fulmer Field CCT Facility is required to re-pump the water from Wells 2 and 6 into the Valley Service Area and to Reservoir 2, Wells 2 and 6 are functional only with operation of the Fulmer Field CCT Facility. Chlorination and emergency power for both Wells 2 and 6 are housed in the Fulmer Field CCT Facility.

In 2023 the City completed an interim replacement of the pump at Well 2. Full replacement of Well 2 is planned as a capital project discussed further in **Chapter 8.** Additionally, rehabilitation work completed in 2013 and 2014 indicated that it would be beneficial to clean and rehab both wells on a regular basis. As such, the City initiated a program for regular cleaning of the wells established on a 3-year cycle which is discussed further in **Chapter 8**.

3.1.2.5 Wells 3A & 3B

Wells 3A and 3B are located at the same site, off 37th Street SE on the extension of E Street SE. The wells are approximately 50 feet apart and were constructed in 1983 and 1984 respectively. Each well is equipped with a four-stage, centrifugal pump driven by a 125-HP motor, each with a maximum pumping capacity of 1,650 gpm when operated individually. A standby generator capable of running one pump at a time is available on site. The system is equipped with an automatic transfer switch.

Currently, Wells 3A and Well 3B are not operated because they produce water that contains high concentrations of manganese. Since the wells were taken offline, the chlorination facilities have been removed. If operated, the wells pump directly into the Valley Service area distribution system. The City plans to construct treatment for these wells as part of the "Wells 3A/3B Treatment" project discussed further in **Chapter 8**.

3.1.2.6 Well 4

Well 4 was originally constructed in 1985 and was rebuilt in 2012. This source is currently in excellent condition. The well is equipped with a 2,600-gpm, four-stage, centrifugal, turbine pump driven by a 300-HP motor. Well 4 pumps directly to a 16-inch transmission main that can either convey water to Reservoir 1 or to distribution through a PRV. Well 4 is an important supply for the southern end of the City's Retail Water Service Area (RWSA). Operation of the well is normally controlled by the water level in Reservoir 1.

3.1.2.7 Well 5

Well 5 is one of three City wells that were constructed to serve the Lakeland Hills Development within the City's Lakeland Service Area. Well 5 pumps directly into the Lakeland Service Area distribution system. The well was constructed in 1983 and is equipped with a seven-stage submersible turbine pump, driven by a 125-HP motor. The well facility was assessed to be in poor condition in the 2013 Water Facilities Evaluation Study. The City plans to upgrade the facility as part of the Well 5/5A Upgrades project discussed in **Chapter 8**.

3.1.2.8 Well 5A

Well 5A is the second well serving the Lakeland Service Area and was constructed in 1990 to supplement Well 5. The well pumps directly into the Lakeland Service Area distribution system. The well is equipped with a ten-stage submersible turbine pump, driven by a 60-HP motor and has on-site chlorination facilities. A manual transfer switch is provided to allow operation of Well 5A using a portable emergency generator. The well facility was assessed to be in poor condition in the 2013 Water Facilities Evaluation Study. The City plans to upgrade the facility as part of the Well 5/5A Upgrades project discussed in **Chapter 8**.

3.1.2.9 Well 5B

Well 5B was constructed in 2005 with a 600 gpm pump. Once this source came on-line, the City discovered the aquifer was not recovering, so the well was taken out of service in 2006 and has not been operated since. The City has no plans to operate this well within the planning horizon.

3.1.2.10 Well 7

Well 7 was constructed in 1997 and was originally equipped with a 3,500-gpm variable-stage, vertical-turbine pump driven by a 500-HP motor. Well 7 is configured to pump directly to the Fulmer Field CCT Facility through a 16-inch transmission main. The treated water is then re-pumped into the Valley Service Area. If necessary, Well 7 can pump untreated water directly to the Valley Service Area through a PRV. The well was taken out-of-service in 2012 due to high manganese concentrations. The City has planned capital projects to expand the treatment capacity and treat manganese at Fulmer Field CCT Facility to accommodate flows from Well 7 so operation of this facility can be reinstated. The projects to provide treatment and back-up power for Well 7 are discussed in **Chapter 8**.

3.1.2.11 Algona Well 1

In 1996, the City acquired the water rights for Algona Well 1 as a condition of the wholesale agreement with the City of Algona (Algona). Due to pump operational problems, Algona Well 1 was removed from service. The 500-gpm pump and associated piping have been removed from the well house and the building has been demolished, but the well casing is still intact, and the well is plugged. The City has a capital project identified in **Chapter 8** to study the well and options for potential use or relocation.

3.1.3 Water Treatment Facilities

The City's water treatment facilities provide chlorination and corrosion control. An inventory of the water system's treatment facilities, including the treatment type, capacity, remaining useful life, condition, and criticality is provided in **Table 3-6**. Condition ratings are assigned based on the 2013 Water Facilities Evaluation Study. A detailed description of each water treatment facility and planned improvements is provided following **Table 3-6**.

Table 3-6 | Water Treatment Facility Inventory

Facility Name	Treatment Type	Treatment/ Dosing Capacity	Install Date	Design Life (years)	Remaining Useful Life (years)	Condition Rating (Bigger # = Worse Condition)	Criticality Rating (Bigger # = Less Critical)
Coal Creek Springs	Gas Chlorination	0.75-0.80 mg/L	1976	35	-13	3	2

<table>
<tr><th>Facility Name</th><th>Treatment Type</th><th>Treatment/ Dosing Capacity</th><th>Install Date</th><th>Design Life (years)</th><th>Remaining Useful Life (years)</th><th>Condition Rating (Bigger # = Worse Condition)</th><th>Criticality Rating (Bigger # = Less Critical)</th></tr>
<tr><td>West Hill Springs</td><td>Gas Chlorination</td><td>0.75-0.80 mg/L</td><td>1992</td><td></td><td>15</td><td>5</td><td>3</td></tr>
<tr><td rowspan="2">Fulmer Field CCT Facility</td><td>Hypochlorite</td><td>0.95 mg/L</td><td rowspan="2">2002</td><td rowspan="7">35</td><td rowspan="2">13</td><td rowspan="2">5</td><td>2</td></tr>
<tr><td>Corrosion/Air-Stripping</td><td>11.88 MGD</td><td>1</td></tr>
<tr><td>Howard Road CCT Facility</td><td>Corrosion/Air-Stripping</td><td>8.06 MGD</td><td>2004</td><td>15</td><td>5</td><td>1</td></tr>
<tr><td>Terrace View Booster Pump Station</td><td>Re-chlorination</td><td>0.75 mg/L</td><td>2010</td><td>21</td><td>3</td><td>2</td></tr>
<tr><td>Well 1</td><td>Hypochlorite</td><td>0.75-0.80 mg/L</td><td>2016</td><td>27</td><td>2</td><td>2</td></tr>
<tr><td>Well 4</td><td>Hypochlorite</td><td>0.75-0.80 mg/L</td><td>2016</td><td>27</td><td>2</td><td>3</td></tr>
<tr><td>Well 5A</td><td>Hypochlorite</td><td>0.75-0.80 mg/L</td><td>1990</td><td>1</td><td>3</td><td>2</td></tr>
</table>

3.1.3.1 Chlorination Facilities

3.1.3.1.1 Coal Creek Springs Chlorination

The Coal Creek Springs chlorination station was built in 1976 and achieves 4-log treatment of the supply. The chlorination station is housed in a masonry building approximately 300 feet north of the collectors and is in fair condition. As a major source of water for the system, Coal Creek Springs is used to maintain chlorine residuals in the Academy Service Area and south end of the Valley Service Area.

This chlorination station is equipped with two chlorinators. Gaseous chlorine is stored on site in a separate room. Alarms from the chlorination equipment are transmitted back to the Water Control Center at the M&O Facility. A chlorine residual analyzer provides high and low alarms to the M&O Facility. Chlorine is dosed into the water at a range of 0.75-0.80 milligrams per liter (mg/L) and is adjusted based on the chlorine residual measured in the Academy and the south end of the Valley Service Area.

The City has a capital project planned to replace the chlorination building and upgrade the chlorination equipment from chlorine gas to hypochlorite disinfection. This project is discussed further in **Chapter 8**.

3.1.3.1.2 West Hill Springs Chlorination

The West Hill Springs Chlorination Facility was constructed in 1992. Water produced at West Hill Springs continuously flows from the collection boxes to the on-site chlorination station, housed in a wood building, where gas chlorine is metered continuously to treat the water. Chlorine dosage typically ranges from 0.75 – 0.80 mg/L and is adjusted based on the measured chlorine residual in the north end of the Valley Service Area. From the chlorination station, the water flows by gravity into the Valley Service Area.

3.1.3.1.3 Well 1

Liquid sodium hypochlorite treatment was installed at Well 1 in 2016. The chlorine dosage typically ranges from 0.75 - 0.80 mg/L. A residual monitoring system is tied into the City's existing SCADA system. The City plans to replace the liquid hypochlorite system with an on-site chlorine generation system (OSEC) to better accommodate seasonal changes to chemical demands and reduce chemical waste. This project is discussed further in **Chapter 8**.

3.1.3.1.4 Wells 2 and 6

Water produced at Wells 2 and 6 is treated and chlorinated at the Fulmer Field CCT Facility prior to distribution.

3.1.3.1.5 Well 4

Well 4 was equipped with a liquid sodium hypochlorite chlorination system in 2016. The chlorine dosage typically ranges from 0.75 – 0.80 mg/L. The City plans to replace the liquid hypochlorite system with an on-site chlorine generation system (OSEC) to better accommodate seasonal changes to chemical demands and reduce chemical waste. This project is discussed further in **Chapter 8**.

3.1.3.1.6 Well 5

There is currently no chlorination provided for water produced at Well 5. This City has a capital project discussed in **Chapter 8** that will include the addition of a chlorination facility to Well 5.

3.1.3.1.7 Well 5A

Well 5A was equipped with a liquid sodium hypochlorite chlorination station in 1990. The chlorine dosage typically ranges from 0.75 – 0.80 mg/L and is adjusted based on the chlorine residual measured in the Lakeland Service Area.

3.1.3.1.8 Fulmer Field CCT Facility

The Fulmer Field CCT Facility was constructed in 2004. Chlorination at Fulmer Field CCT, along with B Street Intertie, is a major source of chlorine residual in the north end of the Valley Service Area and in the Lea Hill Service Area and is achieved using an on-site chlorine generation system. The existing on-site chlorine generation cell was replaced in 2012, but the system was identified as being in poor condition and sourcing replacement parts for repairs has become increasingly more difficult. A capital project to replace the entire on-site generation system is planned and discussed further in **Chapter 8**.

The Fulmer Field CCT Facility treats the water from Wells 2, 6, and 7 (when operational). Chlorine is introduced into the system prior to the air-stripping towers at a dose of approximately 0.95 mg/L. The chlorine is adjusted based on measured chlorine residual at the station analyzer. The treated water is then stored in the clearwell and boosted into the distribution system and Reservoir 2. If needed, the chlorine can be manually introduced into the clearwell rather than prior to the towers.

3.1.3.1.9 Terrace View Booster Pump Station (BPS)

The Terrace View BPS was equipped with a liquid sodium hypochlorite chlorination system in 2010, adding 6 percent solution to the discharge piping of the station at an approximate dose of 0.75 mg/L.

3.1.3.1.10 Intertie Pump Station

Through the First Amendment to Interlocal Agreement No. 2 for the Lea Hill Intertie project executed in 2017, Covington Water District (CWD) terminated its rights or obligations to Interlocal Agreement No. 2 or the First Amendment and Lake Meridian Water District (LMWD) continues to receive wholesale water from the City, as needed, on an interruptible basis. The chlorination equipment was removed from the Intertie Pump Station since the intertie is not used on regular basis.

3.1.3.2 CCT Facilities

To limit the corrosion of lead and copper in the system, the City treats major supplies. The treatment process increases the pH of the water, which reduces the solubility of lead and copper, allowing the water to comply with the Lead and Copper Rule. The goal of the CCT facilities is to adjust the water leaving the facility to a pH of approximately 7.5.

3.1.3.2.1 Fulmer Field CCT Facility

The Fulmer Field CCT Facility also adjusts the pH of the water from its sources to approximately 8.0 by air-stripping in three 33,000 gallon air-stripping towers to provide corrosion control treatment. Three 10,000 cubic feet per minute (CFM) blowers provide air. As the carbon dioxide is stripped from the water, the treated water is stored in the clearwell and boosted through four booster pumps back into the distribution system and Reservoir 2. The firm capacity of the facility is 11.88 MGD.

3.1.3.2.2 Howard Road CCT Facility

The Howard Road CCT Facility was constructed in 2004 and is located near the existing Coal Creek Springs Pump Station. It has a life expectancy of an additional 15 years and is generally in fair condition. This facility is housed in a masonry building and treats the water from Coal Creek Springs and Well 1. The pH of the water from the wells is then adjusted to approximately 7.8 by air-stripping in two 33,000 gallon air-stripping towers. Two 9,300 CFM blowers provide air. The treated water is then stored in the clearwell and re-boosted through three booster pumps to Reservoir 1. The firm capacity of the facility is 8.06 MGD.

3.1.4 Storage Facilities

The City currently maintains a total of 15.7 million gallons (MG) of water storage in eight water reservoirs located throughout the system. Storage reservoirs are present in each of the City's Service Areas. The location of each storage reservoir is shown in **Figure 3-1**. A summary of the City's storage reservoirs, as well as the type of storage tank, installation date, remaining useful life, condition and criticality is provided in **Table 3-7**. Condition ratings are assigned based on the 2013 Water Facilities Evaluation Study. The storage volumes provided in **Table 3-7** represent the maximum tank volume; however, the City commonly operates the reservoirs at below the maximum levels. A detailed description of reservoir and planned improvements is provided following **Table 3-7**.

Table 3-7 | Inventory of Storage Reservoirs

Reservoir Name	Storage Volume (MG)	Type	Install Date	Design Life (years)	Remaining Useful Life (years)	Condition Rating (Bigger # = Worse Condition)	Criticality Rating (Bigger # = Less Critical)
Valley Service Area							
Reservoir 1	5.0	Prestressed Concrete	1975	100	45	5	2
Reservoir 2	3.6	Prestressed Concrete	1975		45	3	2
Lea Hill Service Area							
Reservoir 4A	1.0	Steel Standpipe	1965	70	11	3	2
Reservoir 4B	1.5	Steel Standpipe	1983		29	4	2

Reservoir Name	Storage Volume (MG)	Type	Install Date	Design Life (years)	Remaining Useful Life (years)	Condition Rating (Bigger # = Worse Condition)	Criticality Rating (Bigger # = Less Critical)
Lakeland Service Area							
Reservoir 5	1.0	Steel Standpipe	1981	70	27	2	3
Reservoir 6	0.9	Steel Standpipe	2012		58	2	3
Academy Service Area							
Reservoir 8A	1.2	Steel Standpipe	1973	70	19	3	3
Reservoir 8B	1.5	Steel Standpipe	1980		26	3	3

3.1.4.1 Reservoir 1

Reservoir 1 is located at the southeast end of the Valley Service Area and is the primary storage location for water produced at Coal Creek Spring and pumped from the Howard Road CCT Facility. Reservoir 1 can also be filled by water produced at Well 4. The reservoir was constructed in 1975 and is a covered, pre-stressed concrete tank with a capacity of 5 MG. Reservoir 1 is 184.5 feet in diameter and has an overflow elevation of 269 feet. Academy Pump Station 3 draws water from Reservoir 1 to feed the Academy Service Area. Reservoir 1 also serves the Valley Service Area through Control Valve 1. Control Valve 1 is essential to limit flow and maintain adequate supply to the Valley Service Area.

Reservoir 1 was last inspected and cleaned on March 15, 2023. Recommended improvements identified in 2013 Water Facilities Evaluation Study are planned to be completed as part of the "Reservoir Capital Improvements" project discussed further in **Chapter 8**.

3.1.4.2 Reservoir 2

Reservoir 2 is located on the northeast side of the City's Water Service Area and serves the Valley Service Area. The reservoir was constructed in 1975 and is a buried, pre-stressed concrete tank with public tennis courts on the concrete roof. The reservoir has a maximum storage capacity of 3.6 MG, has a diameter of 143 feet and an overflow elevation of 252.7 feet. Reservoir 2 is filled by the water sources located in the Valley Service Area and is also filled from Reservoir 1 through Control Valve 1.

Reservoir 2 was last inspected and cleaned on March 13, 2023. A capital project is planned to replace the fill and drain valves associated with the reservoir; the project is discussed further in **Chapter 8**. This project will also resolve improvements identified in the 2022 sanitary survey.

3.1.4.3 Reservoirs 4A and 4B

Storage in the Lea Hill Service Area is provided in two steel standpipe reservoirs located in the northeast corner of the City's RWSA, Reservoir 4A and Reservoir 4B. The reservoirs have capacities of 1.0 MG and 1.5 MG respectively. Reservoir 4A was constructed in 1965 with a diameter of 46 feet and an overflow elevation of 578.5 feet. Reservoir 4B was constructed in 1983 with a diameter of 58 feet and an overflow elevation of 579.6 feet. Water is supplied to the Lea Hill reservoirs from the City's Valley Service Area through the Green River Pump Station and Lea Hill Pump Station.

The reservoirs were last inspected and cleaned in June and April of 2018. A capital project is planned to install seismic control valves on the outlet piping from both reservoirs to prevent catastrophic flow during a seismic pipe failure; the project is discussed further in **Chapter 8**. Additionally, required improvements identified in the 2022 Sanitary Survey will be completed as part of the Reservoir Repair and Replacements Program also discussed in **Chapter 8**.

3.1.4.4 Reservoir 5

Reservoir 5 is one of two reservoirs providing storage for the Lakeland Service Area. The reservoir was constructed in 1981 and has a total capacity of 1.0 MG. The reservoir is filled by Well 5, Well 5A, and the Terrace View BPS. Reservoir 5 is steel standpipe with a 53.25-foot diameter and an overflow elevation of 638.5 feet. The reservoir was last cleaned and inspected in 2019 and the interior and exterior were last painted in 2016 as part of routine maintenance.

3.1.4.5 Reservoir 6

Reservoir 6 is in the Lakeland Service Area within the boundary of the Lakeland 697 pressure zone but is connected to distribution piping for the Lakeland 630 pressure zone. Reservoir 6 is a steel standpipe constructed in 2012 and has a total capacity of 0.9 MG. This reservoir has a diameter of 63.4 feet and an overflow elevation of 638.9 feet. The reservoir is filled by Well 5, Well 5A, and the Terrace View BPS. The reservoir was last cleaned and inspected in 2019.

3.1.4.6 Reservoir 8A and 8B

Reservoirs 8A and 8B are steel standpipes that provide storage for the Academy Service Area. The reservoirs are normally operated in parallel, functioning as one large reservoir. Reservoir 8A has a diameter of 52.75 feet and a total storage volume of 1.2 MG and was constructed in 1973. Academy Reservoir 8B has a diameter of 60 feet and a total storage volume of 1.5 MG and was constructed in 1980. Both reservoirs have an overflow elevation of 544 feet. Academy Pump Station 3 fills the reservoirs.

The reservoirs were last cleaned and inspected in October 2019. A capital project is planned to install seismic control valves on the outlet piping from both reservoirs to prevent catastrophic flow during a seismic pipe failure; the project is discussed further in **Chapter 8**. Additionally, required improvements identified in the 2022 Sanitary Survey will be completed as part of the Reservoir Repair and Replacements Program also discussed in **Chapter 8**.

3.1.5 Pump Station Facilities

The City operates and maintains several pump stations to move water throughout the distribution system and to provide water at the required service pressures. An inventory of the City's pump stations is provided in **Table 3-8** and locations are shown in **Figure 3-1**. Condition ratings provided in **Table 3-8** are assigned based on findings from the 2013 Water Facilities Evaluation Study.

Table 3-8 | Pump Station and Booster Pump Station Inventory

Facility Name	Firm Capacity (gpm)	Firm Capacity (MGD)	Install Date	Design Life (years)	Remaining Useful Life (years)	Condition Rating (Bigger # = Worse Condition)	Criticality Rating (Bigger # = Less Critical)
Lea Hill Service Area							
Intertie Pump Station (Wholesale)	3,510	5.05	1999	40	15	3	4
Lea Hill BPS	300	0.432	1999		15	3	3
Lea Hill Pump Station	1,200	1.73	1965		-19	6	3
Green River Pump Station	3,498	5.04	1999		15	3	2
Valley Service Area							
Game Farm Park Pump Station	50	0.07	1988	40	4	7	4
Lakeland Service Area							
Lakeland Hills BPS	4,205	6.06	2012	40	28	2	2
Terrace View BPS	1,000	1.44	2010		26	2	2
Fulmer Field CCT Facility	8,250	11.88	2004		20	3	1
Howard Road CCT Facility	5,600	8.06	2004		20	4	1
Academy Service Area							
Academy Pump Station 3	2,100	3.02	2023	40	39	1	1
Academy East BPS	3,040	4.38	2014		30	2	2

3.1.6 Facility Back-Up Power

An inventory of the City's existing facilities with backup power accommodation is provided in **Table 3-9**. Of the City's twelve water sources, only Wells 5 and 7 are currently without a standby power source. Standby power will be added to both wells as part of capital projects discussed in **Chapter 8**. Back-up power for Wells 2 and 6 is housed at the Fulmer Field CCT Facility.

The Game Farm Park Pump Station, Lea Hill BPS, and Intertie Pump Station are the only pump stations without a standby power source or connection. Backup power will be added to the Lea Hill BPS as part of a capital project discussed further in **Chapter 8**. The City is currently installing temporary back-up power at the Intertie Pump Station by utilizing the generator previously utilities at Academy Pump Station 1 and Academy Pump Station 2, as these facilities were recently replaced by Academy Pump Station 3. The Intertie Pump Station back-up generator is anticipated to be operational by the end of 2024. The Game Farm Park Pump Station is a small facility that serves a recreational area and does not serve residential or commercial properties, therefore back-up power is not a critical element.

Table 3-9 | Back Up Power Inventory

Generator Location	Generator Type and Size	Install or Purchase Date	Design Life (years)	Remaining Useful Life (years)	Condition Rating (Bigger # = Worse Condition)	Criticality Rating (Bigger # = Less Critical)
Fulmer Field CCT Facility	On-site, 1000 kW	2001	25	2	4	3
Howard Road CCT Facility	On-site, 600 kW	2004		5	3	3
Academy East BPS	On-site, 600 kW	2010		11	2	3
Academy Pump Station 3	On-site, 450 kW	2023		24	1	3
Green River Pump Station	On-site, 515 kW	2004		5	2	3
Lakeland Hills BPS	On-site, 300 kW	2012		13	2	3
Lea Hill Pump Station	On-site, 250 kW	1964		-35	6	3
Terrace View BPS	On-site, 250 kW	2010		11	2	3
Well 1	Portable, 230 kW	2014		15	2	3
Well 3A/3B	On-site, 210 kW	1983		-16	5	3
Well 4	On-site, 450 kW	2016		17	2	3
Well 5A	Portable, 230 kW	1992		-7	4	3
Well 5B	On-site, 400 kW	2005		6	3	4
Coal Creek Springs	On-site, 20 kW	1964		-35	6	3

3.1.7 Facility Monitoring and Control

Primary monitoring and operation of the City's water system and facilities is conducted via a SCADA computerized control system. A software program called "Wonderware" works in association with SCADA to provide real time graphical display of system data, set points, and alarms for staff monitoring and control. The City's SCADA system controls are centralized at the Public Works M&O Facility. Major upgrades of the City's SCADA system were complete in 2015 and again in 2024, and the system regularly undergoes updates as facility upgrades or improvements are completed.

3.1.8 2022 Sanitary Survey Findings

The City has already taken corrective actions and will continue to resolve all deficiencies identified in the 2022 Sanitary Survey, as summarized in **Table 3-10**.

Table 3-10 | Summary of 2022 Sanitary Survey Findings

Issues/Recommended Improvements		Required Action
Sources and Treatment		
Well 3A	Offline due to manganese issues	--
Well 3B	Offline due to manganese issues	--
Well 5	Water supply lines to chlorine solution tanks must be provided with either air gaps or reduced pressure backflow assemblies to eliminate potential cross connections.	This deficiency was mislabeled by DOH, This should have been for Well 4. A letter from the DOH acknowledging the error was received on October 17, 2022.
Well 5	Pump to waste line should terminate above grade.	Will be addressed in Well 5/5A Upgrades project included in CIP; refer to **Chapter 8**.

	Issues/Recommended Improvements	Required Action
Well 5A	Water supply lines to chlorine solution tanks must be provided with either air gaps or reduced pressure backflow assemblies to eliminate potential cross connections.	Completed. On September 21, 2022, a reduced pressure backflow assembly was installed at Well 5A, on the water supply line to the chlorine tank.
	Raise casing to terminate above grade or provision of sump pump or alarms that activate when water accumulates in vault. In the meantime, the vault should be inspected weekly and immediately following significant storm events.	City implemented an inspection program in October 2022. Will be addressed further in Well 5/5A Upgrades project included in CIP; refer to **Chapter 8**.
Well 7	Offline due to manganese issues	--
Storage		
Reservoir 2	Reservoir overflow should not be connected directly to any drain, sanitary sewer, or storm sewer.	Will be addressed in Reservoir 2 improvements project included in CIP; refer to **Chapter 8**.
Reservoir 4A	Reservoir vents should open downward to prevent windblown debris from entering tank.	Will be completed as part of City's annual Reservoir Repair and Replacement program or Reservoirs 4 and 8 Seismic Rehabilitation project; refer to **Chapter 8**.
	Reservoir overflow should not be connected directly to any drain, sanitary sewer, or storm sewer.	Will be completed as part of City's annual Reservoir Repair and Replacement program or Reservoirs 4 and 8 Seismic Rehabilitation project; refer to **Chapter 8**.
Reservoir 4B	Reservoir overflow should not be connected directly to any drain, sanitary sewer, or storm sewer.	Will be completed as part of City's annual Reservoir Repair and Replacement program or Reservoirs 4 and 8 Seismic Rehabilitation project; refer to **Chapter 8**.
Reservoir 8A	Reservoir overflow screen must be repaired	Completed. On September 13, 2022, the overflow screen at Reservoir 8A was repaired.
	Reservoir vents should open downward to prevent windblown debris from entering tank.	Will be completed as part of City's annual Reservoir Repair and Replacement program or Reservoirs 4 and 8 Seismic Rehabilitation project; refer to **Chapter 8**.
Reservoir 8B	Reservoir overflow screen must be repaired	Completed. On September 13, 2022, the overflow screen at Reservoir 8B was repaired.
	Reservoir vents should open downward to prevent windblown debris from entering tank.	Will be completed as part of City's annual Reservoir Repair and Replacement program or Reservoirs 4 and 8 Seismic Rehabilitation project; refer to **Chapter 8**.

3.2 Water Quality

The quality of drinking water in the United States is regulated by the EPA. Under provisions of the Safe Drinking Water Act (SDWA) established in 1974, the EPA is allowed to delegate primary enforcement responsibility for water quality control to each state. In the State of Washington, DOH is the agency responsible for implementing and enforcing the drinking water regulations. For the State to maintain the authority to implement requirements under the SDWA, it must adopt drinking water regulations that are at least as stringent as federal regulations. In meeting these requirements, the State has published drinking water regulations that are contained in Chapter 246-290 of the WAC.

As a Group A system, the City is responsible for monitoring and complying with all applicable SDWA and WAC regulations pertaining to source water and distribution system water quality. The purpose of this section is to document the water system's water quality compared to the above drinking water standards, satisfying the requirements of WAC 246-290-100(4)(e)(ii).

The City also owns and operates the Braunwood satellite system located in southeast Auburn in the Braunwood development, also known as the Hidden Valley Acres development. This system is classified as a Group A - Community Water System by DOH. This system is not discussed further in this chapter since it is a small satellite system that is regularly monitored by the City as required and has not had water quality issues as documented in the City's annual water quality reports for the system.

This section includes the following:

- Water quality and treatment objectives
- Analysis of source water quality
- Analysis of distribution system water quality
- Recent regulatory changes

3.2.1 Water Quality Treatment and Objectives

The treatment objectives of the City are to treat source water to contaminant concentrations below the MCLs established by the EPA and WAC.

Historically, the City has relied on groundwater supplied from wells and springs, which have been determined to be not under the direct influence of surface waters (DOH 2004 for Coal Creek Springs). For these water sources, the City is required to meet the EPA's Groundwater Rule (GWR). The City treats water from all groundwater and spring sources, except for Well 5. The City's water treatment facilities provide chlorination and corrosion control. A summary of the required operator certifications for each type of facility is provided in **Table 3-11**.

Table 3-11 | Summary of Operator Certifications

Treatment Facility	Required Operator Certifications
Corrosion Control Treatment (CCT) Facilities	Water Distribution Manager 4 (WDM-4) and Water Treatment Plant Operator (WTPO)
Chlorination Facilities	WDM-4

The City began using surface water in 2012 through the B-St Wholesale Intertie with the City of Tacoma (Tacoma). This supply, referred to as the Regional Water Supply, originates from the Green River and the Howard Hansen Dam. Since the City receives treated water as a wholesale purchaser, it is not required to meet the Surface Water Treatment Rule. Tacoma maintains compliance with the Interim Enhanced Surface Water Rule, Long Term 1 and Long Term 2 Enhanced Surface Water Treatment Rules; and the Filter Backwash Recycling Rule. The City has not purchased water for consumption from Tacoma since 2016.

3.2.2 Analysis of Source Water Quality

3.2.2.1 Raw Water Quality

The City only samples post-treatment water except for Well 5, which does not currently have treatment or chlorination. Water quality data for Well 5 is provided in **Table 3-12**.

3.2.2.2 Finished Water Quality

Monitoring of inorganic chemical and physical parameters varies by source but is typically required once per 36-month compliance period, however, the City typically monitors these constituents every 12 months (annually) in July. Samples are collected from each source following treatment. A summary of the maximum detected concentrations for monitoring data from 2015 through 2022 is provided in **Table 3-12**. During this time, none of the MCLs published by the EPA were exceeded; all samples were below required limits.

Asbestos sampling is usually required once per 36-month compliance period. However, the City has a waiver that requires sampling once every nine years at three distribution system sample sites. No data was collected during the study period. The City is expected to sample again in 2028. Annual VOC sampling is required for Wells 2 and 6, which are both currently represented by the Fulmer Field CCT Facility. All active sources are disinfected with chlorine prior to entering the distribution system except for Well 5, which serves the Lakeland Service Area.

Monitoring data for 2015 through 2022 for inorganic constituents, physical parameters, SOCs, and VOCs were reviewed and is summarized in **Table 3-12**. All values are post-treatment, except for Well 5 since water from this source is not treated. Wells 3A, 3B, 5B, and 7 were not used during this period and were therefore not sampled.

Table 3-12 | EPA Primary Drinking Water Standards Results from 2015 through 2022

Constituent	MCL	Units	Maximum Detected Concentration From 2015 Through 2022[1] (mg/L)						
			Coal Creek Springs	West Hill Springs	Well 1	Well 4	Well 5	Well 5A	Fulmer Field CCT Facility[2]
EPA Primary Drinking Water Standards									
Arsenic	0.01	mg/L	0.001	0.001	0.001	0.001	0.001	0.002	0.002
Barium	2	mg/L	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Cadmium	0.005	mg/L	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Chromium	0.1	mg/L	0.007	0.007	0.007	0.007	0.007	0.007	0.007
Mercury	0.002	mg/L	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
Selenium	0.05	mg/L	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Beryllium	0.004	mg/L	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003
Nickel[3]	-	mg/L	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Antimony	0.006	mg/L	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Thallium	0.002	mg/L	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Cyanide	0.2	mg/L	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Fluoride	4.0	mg/L	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Nitrite-N	1	mg/L	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Nitrate-N	10	mg/L	1.7	3.6	2.4	1.4	1.9	0.4	1.7

Constituent	MCL	Units	Maximum Detected Concentration From 2015 Through 2022[1] (mg/L)						
			Coal Creek Springs	West Hill Springs	Well 1	Well 4	Well 5	Well 5A	Fulmer Field CCT Facility[2]
Total Nitrate/Nitrite[4]	10	mg/L	1.7	3.6	2.4	1.4	1.9	0.5	1.7
EPA Secondary Drinking Water Standards[5]									
Iron	0.3	mg/L	0.1	0.1	0.1	0.62[6]	0.16	0.1	0.1
Manganese	0.05	mg/L	0.01	0.01	0.01	0.01	0.01	0.01	0.032
Silver	0.1	mg/L	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Chloride	250	mg/L	5	8	5	4	6	3	9
Sulfate	250	mg/L	9	15	12	12	11	6	14
Zinc	5	mg/L	0.2	0.2	0.2	0.2	0.2	0.2	0.2
State Regulated Characteristics									
Sodium	20	mg/L	6	8	7	7	10	6	12
Conductivity	700	μmhos/cm	150	254	184	152	275	133	224
Turbidity	1	NTU	0.4	1.5	9.6	5.8	1.2	0.4	3.1
Color	15	Color Units	5	5	10	5	5	5	5
Total Dissolved Solids (TDS)[7]	600	mg/L	N/A	N/A	N/A	N/A	N/A	N/A	N/A
State Unregulated									
Lead[8]	0.015	mg/L	0.001	0.001	0.001	0.018	0.001	0.001	0.001
Copper	1.3	mg/L	0.02	0.3	0.02	0.2	0.02	0.02	0.02
Hardness[9]	-	mg/L	66	122	83	100	130	62	100

Notes:

1. Based on monitoring conducted between 2015 and 2022. Wells 3A, 3B, and 5B were not in use during this time period and no monitoring was conducted.
2. The Fulmer Field CCT Facility was monitored in 2015, 2018,2020, 2021, and 2022, it replaces monitoring of Wells 2, 6, and 7.
3. There is no state or federal MCL, but Washington state has a detection reporting limit of 0.005 mg/L.
4. EPA has set a treatment goal of Total Nitrate at 10 mg/L.
5. EPA does not enforce these "secondary maximum contaminant levels" (SMCLs). They are established as guidelines to assist public water systems in managing their drinking water for aesthetic considerations, such as taste, color, and odor. These contaminants are not considered to present a risk to human health at the SMCL.
6. Iron levels in Well 4 exceeded the Secondary Drinking Water Standards in 2015 but have since all been below the MCL.
7. N/A - not applicable, no testing conducted; testing for total dissolved solids is only required if the specific conductivity is greater than 700 micomhos per centimeter (umhos/cm).
8. On November 30, 2023, the EPA announced the proposed Lead and Copper Rule Improvements, which would lower the Lead Action Level from 0.015 mg/L to 0.010 mg/L if finalized in October 2024.
9. No MCL, as hardness is not a regulated characteristic.

3.2.2.3 Water Quality and Treatment Technique Violations

There were no water quality treatment violations from 2015 through 2022.

3.2.3 Analysis of Distribution System Water Quality

3.2.3.1 Seasonal Water Quality Changes

Water quality within the distribution system is relatively consistent throughout the year. The Valley Service Area distribution water experiences low pH during the winter, however no changes are implemented to offset seasonal variations.

3.2.3.2 Distribution Water Quality Objectives

The City collects 100 samples at 70 dedicated sampling sites for total and fecal coliform monitoring. Sampling is conducted at one quarter of the routine sample locations each week during the first four weeks of a month. The City also monitors weekly for total and fecal coliform at Coal Creek Springs and West Hill Springs at their respective collector vaults, as well as after treatment, and at several additional sites to support operations on a weekly basis. The City uses two types of disinfectant for treatment, chlorine gas and liquid sodium hypochlorite, which both produce free chlorine residuals in the distribution system. Average chlorine residuals throughout the distribution system ranged from 0.57 to 0.71 mg/L from 2015 through 2022, as summarized in **Table 3-13**. Although the range of chlorine residual varies throughout the year, the range of chlorine residual is relatively consistent from year to year. Planned improvements to chlorination facilities at Well 1 and Well 4 are expected to help maintain a more consistent chlorine residual level within the water system.

Table 3-13 | Total Chlorine Residuals Results from 2015 through 2022

Year	Sample Results (mg/L)	
	Average	Range
2015	0.71	0.40 - 1.09
2016	0.64	0.37 – 0.89
2017	0.58	0.32 – 0.79
2018	0.57	0.30 – 0.78
2019	0.59	0.33 – 0.77
2020	0.57	0.33 – 0.80
2021	0.58	0.36 – 0.78
2022	0.59	0.40 – 0.77

The Stage 1 Disinfection By-Product Rule (DBPR) monitoring was superseded in 2012 with Stage 2 DBPR monitoring because the City's population exceeded 50,000 people. The City conducts monthly sampling within the distribution system to determine the concentration of fluoride. This sampling is in addition to the inorganic source monitoring required by DOH. The City does not add fluoride to their water. The City of Tacoma does fluoridate their water and is wholesale supplier to the City, but the City has not purchased water for consumption from Tacoma since 2016. Sampling is conducted for informational purposes only and to answer customer questions regarding natural fluoride in the City's water. Should the City purchase water from Tacoma, this information would also be used to monitor the blending of different water sources within the distribution system.

The City conducted both Stage 1 and Stage 2 DBPR monitoring since the last water system plan (WSP). **Table 3-14** provides a summary of the sample results from 2015 through 2022. The City's Total Trihalomethanes (TTHMs) and Haloacetic Acid 5 (HAA5) monitoring has been conducted once per year during the month with the warmest water temperature (i.e., July or August). All samples were well below the concentrations that DOH uses to determine whether a water system qualifies for reduced monitoring (0.080 mg/L for TTHMs and 0.060 mg/L for HAA5).

Table 3-14 | Summary of Disinfection By-Product Rule Monitoring Results from 2015 through 2022

Year	TTHM Concentration (µg/L)[2]		HAA5 Concentration (µg/L)[2]	
	Range for LRAA[1]	Compliance	Range for LRAA[1]	Compliance
2015	2.6 – 19.0	< 80	Not Detected – 4.8	< 60
2016	2.2 – 23.1	< 80	Not Detected – 6.0	< 60
2017	1.7 – 15.0	< 80	1.1 – 6.9	< 60
2018	6.7 – 15.1	< 80	Not Detected – 6.9	< 60

Year	TTHM Concentration (μg/L)[2]		HAA5 Concentration (μg/L)[2]	
	Range for LRAA[1]	Compliance	Range for LRAA[1]	Compliance
2019	ND	< 80	0.2 – 0.3	< 60
2020	7.5 – 11.95	< 80	Not Detected – 3.66	< 60
2021	6.45 – 17.62	< 80	1.25 – 12.41	< 60
2022	9.03 – 10.41	< 80	Not Detected	< 60

Notes:
1. Local running annual average.
2. Microgram per liter (μg/L).

Corrosion control treatment (CCT) is required for the water produced at Coal Creek Springs, Well 1, Well 2, Well 6, and Well 7. Per the Lead and Copper Rule (LCR), the City is required to collect at least 30 water samples per 36-month compliance period in alignment with reduced lead and copper monitoring requirements of WAC 246-290. Sample results from 2015 through 2022 are presented in **Table 3-15**. Since the CCT facilities were constructed, the lead and copper levels have been well below the action level.

Table 3-15 | Summary of Lead and Copper Sampling Results from 2015 through 2022

Constituent	Range of Results from 2015 through 2022
Copper Concentrations (mg/L)	
Copper Concentration Range	<0.02 – 0.3
Copper 90th Percentile	0.091
Lead Concentrations (mg/L)	
Lead Concentration Range	<0.001-0.018
Lead 90th Percentile	<0.001

3.2.3.3 Water Quality and Treatment Technique Violations

There were no water quality violations in the distribution system from 2015 through 2022.

3.2.4 Recent Regulatory Changes

The EPA established a health advisory for drinking water of 70 parts per trillion (ppt) for perfluorooctane sulfonic acid (PFOS) and perfluorooctanoic acid (PFOA), two commonly found Perfluorinated compounds (PFAS). When both compounds are found in the water, the combined health advisory is also 70 ppt. The Washington State Board of Health (Board) adopted rule changes to chapter 246-290 WAC, Group A Public Water Supplies and WAC 246-390, Drinking Water Laboratory Certification and Data Reporting. The newly adopted rules became effective on January 1, 2022.

The rule establishes the administrative processes for setting drinking water quality standards as State Action Levels (SAL) and state MCLs. The rule establishes SALs for five PFAS contaminants: PFOA, PFOS, perfluorohexane sulfonic acid (PFHxS), perfluorononanoic acid (PFNA), and perfluorobutane sulfonic acid (PFBS). The rule requires Group A community and non-transient noncommunity public water systems to test for PFAS. For those Group A water systems that have detections of PFAS, but do not exceed the SAL, the rule requires additional ongoing monitoring, with the frequency of monitoring based upon the detected level in comparison to the SAL. It also establishes reporting, recordkeeping, and consumer confidence report requirements. For those Group A water systems that exceed the SAL, the rule requires follow-up actions such as monitoring, public notification, additional recordkeeping, and reporting requirements. SALs for regulated PFAS compounds are shown in **Table 3-16** with results from the City's latest samples. Most results indicated that the PFAS compounds were not detected (ND), being they were below detectable limits. PFBS was detected at Well 1, Coal Creek Springs, and West Hill Springs, however the levels are far below regulated levels. In more recent results received in May 2024, all samples were below detection limits for all facilities and the City was approved for a 3-year testing schedule.

Table 3-16 | PFAS State Action Levels and Monitoring Data

PFAS Compound	SAL (ng/L)[1]	Maximum Detected Concentration (ng/L)[1]									
		Well 1	Fulmer Field CCT Facility	Well 3A	Well 3B	Well 4	Well 5	Well 5A	Well 5B	Coal Creek Springs	West Hill Springs
PFOA	10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PFOS	15	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PFHxS	65	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PFNA	9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PFBS	345	2.8	ND	ND	ND	ND	ND	ND	ND	3.1	3.0

Notes:

1. Nanograms per liter (ng/L).
2. Not detected (ND).

3.3 Design Standards

The City's most recent Engineering Design Standards are available on the City's website and are provided as **Appendix P**. **Table 3-17** highlights keys standards that are used to evaluate the capacity of the City's water system, summarizing both DOH criteria and City criteria. The City's water quality design standards follow the design standards set forth by the EPA and DOH, as discussed in **Section 3.2**.

Table 3-17 | System Capacity Analysis Criteria

Evaluation Type		Evaluation Criteria	Agency's Standard
Water Reliability Recommendations	Multiple Source	2 or more supply sources are available	DOH
	Backup Power	Source of supply pump stations have power connections to two independent primary public power sources, have in-place auxiliary power available, and/or maintain adequate gravity standby storage	DOH
	Surface Water Reliability	Firm watershed yield for surface water provides 98% reliability to meet normal, anticipated system demands.	DOH
	Groundwater Reliability	Factor of safety is applied to well pumping test safe yield determination.	DOH
Water Source	Source Capacity	MDD while replenishing Fire Suppression Storage (FSS) within 72-hrs (24-hr source pumping may be assumed).	DOH
		ADD with largest source out of service.	DOH
		MDD in a pumping period of 20 hours or less of pumping.	DOH
		MDD with the largest active water source out of service.	City
Pump Stations	Capacity - Open System (sufficient storage in zone)	ADD with largest pump out of service.	DOH
		MDD with all pumps in service.	
		MDD with largest pump out of service.	City

Evaluation Type		Evaluation Criteria	Agency's Standard
		Fire Flow is met from storage reservoir.	
	Capacity - Closed System (no/insufficient storage in zone)	PHD with largest pump out of service.	DOH
		MDD + Fire Flow at a pressure of at least 20 psi at all points throughout the distribution system.	
		PHD + Fire Flow with largest pump out of service.	City
		Standby power with capacity to run with any single pump out of service.	
Storage Facilities	Total Storage Capacity	Sum of operational, equalization, standby, fire suppression, and dead storage.	DOH
	Operating Storage (OS)	The volume of water before sources turn on.	DOH
		(pump off elev. – pump on elev.) x gal/ft	
	Equalizing Storage (ES)	(PHD – maximum supply capacity) x 150 min	DOH
		Min. pressure of 30 psi.	
		Must be provided when source pumping capacity cannot meet the peak hourly demand.	
	Standby Storage (SB)	Min. standby storage of 200 gallons per ERU.	DOH
		Min. pressure of 20 psi.	
		Standby storage volume equal to one day of MDD for the pressure zone(s) served.	
	Fire Suppression Storage (FSS)	(required fire flow rate) x (duration in minutes)	DOH
		Min. pressure of 20 psi.	
		Nested storage (same storage for Standby and Fire Suppression Storge) requires written consent of fire protection authority.	
	Dead Storage (DS)	Volume that cannot provide minimum design pressure (20 psi) to all customers.	DOH
		Volume below the outlet pipe and cannot be used because of hydraulic limitations.	City
Distribution System	Minimum Pressures	PHD at no less than 30 psi.	DOH
		MDD + Fire Flow at no less than 20 psi.	
	Maximum Pressures	Add individual PRVs for ADD pressures more than 80 psi.	DOH
		Max. target pressure of 80 psi in water distribution system.	City
	Maximum Velocity	No more than 8 feet per second (fps) under PHD conditions.	DOH
		No more than 8 fps in distribution mains and 5 fps in transmission mains under PHD conditions. No more than 18 fps under MDD+FF conditions.	City
	Minimum Pipe Size	6-inch diameter in residential areas and 8-inch diameter in commercial areas, unless a hydraulic analysis justifies another size.	DOH
		Single-Family Residential minimum 8-inch diameter and Industrial/Commercial/Multi-Family minimum 12-inch diameter.	City
	Telemetry	Each parcel receiving water service shall have its own meter	City
		Meters shall be located as close to the water main from which the service is taken as possible, distance not to exceed 50 feet.	

Evaluation Type		Evaluation Criteria	Agency's Standard
		Meters shall be placed in landscape strips, behind the sidewalk, or at the right-of-way limits in that order of availability.	
		Meters in landscaped or unimproved areas shall be set 2 inches above the finished grade.	
	Maximum Valve Spacing	Maximum 400-foot spacing and at the intersection of lateral lines in all zones.	City
	Hydrant Spacing	Single-Family Residential maximum 600-foot spacing.	City
		Industrial/Commercial/Multi-Family maximum 300-foot spacing.	
Fire Flow & Duration	Residential	Minimum 1,500 gpm at 2 hours.	City
	Multi-Family Residential	Minimum 2,500 gpm at 3 hours.	
	Commercial		
	Industrial		

3.4 Capacity Analysis

This section provides an analysis of legal and physical capacity of the water system based on the system's available water rights, sources, treatment, storage, and distribution components.

3.4.1 Water Rights

A summary of the City's current water rights is presented in **Table 3-18**. The maximum instantaneous allowable flow for each source (Qi) is in units of gpm. The total annual withdrawal for each source (Qa) is in units of acre-feet per year. The City does not have any interruptible water rights.

Table 3-18 | Summary of Existing Water Rights

Water Right	Primary Qi (gpm)	Primary Qa (acre-feet/year)
Coal Creek Springs	6,732	9,410
Well 1, 6, & 7	2,200	1,120
Well 2, 6, & 7	2,400	1,360
Well 3A & 3B, 6, & 7	2,800	3,600
Well 4, 6, and 7	2,800	3,600
Wells 5, 5A, 5B, &5C	1,000	720
Well 5A	167	0
Algona Well	500	175
Braunwood Well	20	6.5
West Hill Springs	625	1,010
TOTAL	**19,244**	**21,002**

In addition to the water rights presented above, the City also has a wholesale agreement with the City of Tacoma and can purchase water through two interties as discussed in **Chapter 1, Section 1.6.1**. These two interties are also considered to be supply facilities. The City also has several emergency interties with adjacent purveyors.

3.4.1.1 Analysis Criteria

Supply facilities must be reliable and provide sufficient water at pressures that meet the requirements of WAC 246-290-230. The capacity of supply facilities in a pressure zone with adequate storage must be sufficient to provide water at a rate that is equal to or greater than the MDD of the zone being served. This approach assumes that demands greater than the MDD will be supplied using equalizing storage.

According to Section 3.10.5 and Section 5.4 of the 2020 DOH Water System Design Manual, water system sources must be capable of supplying MDD and replenishing depleted within 72-hours (assuming continuous pumping), provide MDD in a pumping period of 20 hours or less, and provide ADD with the largest source out of order. The City's standards have a more stringent requirement to provide MDD with the largest active source out of service.

3.4.1.2 Analysis Results

The City's water supply (production) capacity compared with demand projections and DOH and City criteria are summarized in **Table 3-19**. It is worth noting that the water supply (production) capacity is not synonymous with the supply water rights. The MDD and ADD values are based on the demand projections included in **Chapter 2** and include wholesale supply projections for the City of Algona. Demand allocation for wholesale customers, the Muckleshoot Indian Tribe (MIT) and LMWD are not included since they do not rely on the City as their main source of water. The FSS flow rate is calculated as the sum of the FSS for each service area presented in **Section 3.4.2.3.2**, which totals 797 gpm, divided over a 72-hour period.

The results presented in **Table 3-19** demonstrate that the City has the supply facilities necessary to meet demand projections under current and future projections for all required criteria.

Table 3-19 | Supply Analysis with Largest Source Out of Service

Description	2024 Scenario	2034 Scenario	2044 Scenario
Required Supply (gpm)			
FSS Replenished in 72-hours	797	797	797
Maximum Day Demand[1], gpm	10,105	11,349	12,843
Average Day Demand[1], gpm	5,156	5,790	6,552
Available Supply (gpm)			
Largest Source (Q_L) – Tacoma 132nd Ave Intertie	4,500	4,500	4,500
Largest Active Source – Coal Creek Springs[2]	3,500	3,500	3,500
Total Sources (Q_t)[3,4]	18,755	18,755	18,755
DOH Criteria: MDD while replenishing FSS within 72-hrs (24-hr source pumping may be assumed)			
Surplus / (Deficit) of Supply, gpm	7,853	6,609	5,116
DOH Criteria: ADD with largest source out of service			
Surplus / (Deficit) of Supply, gpm	9,099	8,465	7,703
DOH Criteria: MDD in a pumping period of 20 hours or less of pumping			
Surplus / (Deficit) of Supply, gpm	5,524	4,280	2,787
City Criteria: MDD with largest active water supply source out of service			
Surplus / (Deficit) of Supply, gpm[2]	5,150	3,906	2,412

Notes:

1. Current analysis does NOT include a separate allocation for wholesale customers who have not purchased water from the City since 2019 or earlier (i.e., MIT or LMWD).
2. The City's largest active source is Coal Creek Springs since the City has not purchased water from Tacoma since 2016.
3. Total sources are: Well 1, 2, 4, 5, 5a, and 6 (7,955 gpm), Coal Creek Springs (3,500 gpm), West Hill Springs (600 gpm), and two Tacoma Interties (6,700 gpm).
4. Supplies do NOT include emergency interties with CWD (1,736gpm) or LMWD (1,736 gpm).

The City's Water Rights Self-Assessment Form is provided in **Appendix I** and was used to assess the City's water rights water rights and includes supply that is available to the City through firm wholesale interties with Tacoma. The form includes a comparison of the available water rights to the existing, 10-year and 20-year demand projections for the "High Demand Scenario" presented in **Chapter 2**. The calculations presented in the Water Rights Self-Assessment Form conclude that the City's existing water rights are anticipated to be adequate to meet the current and 10-year projections for Qi and has sufficient Qa capacity through the 20-year projections. Under 2044 high demand MDD conditions, the City does not have sufficient Qi water rights to meet all demands for retail, firm wholesale and interruptible wholesale customers. Should this occur, the City could purchase water from Tacoma through wholesale interties to meet demands. It is worth noting that this evaluation assumes 2.5 mgd of demand from LMWD who has an interruptible wholesale agreement with the City and would only be supplied as water is available to be provided, so this condition is expected to be unlikely.

The City does not have all the infrastructure required to withdraw from all water rights (i.e., Wells 3A, 3B, 5B, and 7 are not currently operational). Additionally, some sources have underlying aquifer or infrastructure restrictions that limit the capacity of the source (i.e., Well 2, Well 6, and Coal Creek Springs). Several facility improvement projects are necessary for the City to maximize water production capacity to meet future demands, and planned supply related capital projects to meet this need are discussed further in **Chapter 8**.

3.4.2 Physical Capacity Analysis

This section includes an analysis of the physical capacity of the City's distribution system. The specific components analyzed include:

- Pump Station Capacity Analysis
  - Open Pressure Zones: Zones with storage reservoirs
  - Closed Pressure Zones: Zones without storage
- Storage Capacity Analysis
- Hydraulic Analysis of the Distribution System
- System Analysis based on ERUs

To complete the physical capacity analysis, the projected demands calculated in **Chapter 2** were utilized for the 2024 scenario (existing conditions), 2034 scenario (10-year projections) and 2044 scenario (20-year projections). When evaluating facilities under fire flow conditions, the largest fire flow demand was utilized in each Service Area. The fire flow required for single family residential customers is 1,500 gpm for two hours and all other customer types have a requirement of 2,500 gpm for two hours. There are select buildings throughout the system that require fire flow capacity in the water system that exceeds 2,500 gpm for two hours as determined by the Fire Marshal; these individual locations and their fire flow requirements are summarized in **Table 3-20**.

Table 3-20 | Buildings in Auburn with High Fire Flow Requirements

ID #	Location Description	Address	Service Area	Flow Required (gpm)
1	RPS Distribution Center	3702 C St. NE	Valley	4,000
2	Emerald Downs	2300 Emerald Downs Drive	Valley	3,000

ID #	Location Description	Address	Service Area	Flow Required (gpm)
3	Panattoni Warehouse	816 44th ST NW	Valley	4,000
4	Span Alaska Transportation Inc.	3815 W Valley Highway N	Valley	3,125
5	AMB Valley Distribution Center	2202 Perimeter Road SW	Valley	4,000
6	Grace Community Church	1106 12th Street SE	Valley	3,750
7	Riverside High School	501 Oravetz Road SE	Valley	3,000
8	Wesley Homes Senior Housing	10805 SE 320th Street	Lea Hill	4,000
9	Auburn Elementary School at Lakeland	1020 Evergreen Way SE	Lakeland	3,125
10	Academy Campus	5000 Auburn Way South	Academy	4,000
11	MIT Casino Expansion	2402 Auburn Way South	Academy	2,625

3.4.2.1 Pump Station Analysis: Open Pressure Zones

This section evaluates the pumping capacity of the water system on a zone-by-zone basis with consideration for pump stations between zones and supply wells pumping directly into the pressure zones that contain a storage reservoir. All reduced pressure zones are included in the open zone analysis, as they are ultimately fed by gravity from a reservoir. Pressure zones that do not include a storage facility are analyzed as a closed zone.

3.4.2.1.1 Valley Service Area

The Valley Service Area is the largest service area in the water system and consists of two pressure zones: Valley 288 and Valley 242. The Valley 288 pressure zone is a transmission zone that does not directly serve any customers. Valley 242 is the largest pressure zone in the RWSA and is draws supply from the following facilities:

- Wells 2 and 6 via the Fulmer Field CCT Facility
- Coal Creek Springs and Well 1 via the Howard Road CCT Facility with transmission through Valley 288
- Well 4 with transmission through Valley 288
- West Hill Springs

Table 3-21 provides an overview of the total pump station capacity into the Valley Service Area compared with demand projections and DOH and City criteria. The results presented in **Table 3-21** demonstrate that the City has adequate pumping capacity within the open pressure zones of the Valley Service Area to meet current and future demand projections for all required criteria.

Table 3-21 | Pumps Station Capacity for Valley Service Area Open Pressure Zones

Description	Valley 2024 Scenario	Valley 2034 Scenario	Valley 2044 Scenario
Required Capacity (gpm)			
FSS Replenished in 72-hours	222	222	222
Maximum Day Demand, gpm	7,447	8,469	9,713
Average Day Demand, gpm	3,802	4,323	4,957
Available Capacity (gpm)			
Largest Pump (Q_L), gpm	2,800	2,800	2,800

Description	Valley 2024 Scenario	Valley 2034 Scenario	Valley 2044 Scenario
Total Pumping Capacity (Q_t), gpm	19,400	19,400	19,400
DOH Criteria: Reliable Capacity (ADD + largest pump out of service)			
Surplus / (Deficit), gpm	15,598	15,077	14,443
DOH Criteria: Total Capacity (MDD + replenish FSS in 72-hours)			
Surplus / (Deficit), gpm	11,953	10,931	9,687
City Criteria: MDD + largest pump out of service			
Surplus / (Deficit), gpm	9,153	8,131	6,887

3.4.2.1.2 Lea Hill Service Area

Water supply for the Lea Hill Service Area is provided by the Lea Hill Pump Station and the Green River Pump Station. In 2014, the City added wholesale water supply from Tacoma through the 132nd Ave SW intertie, however the City has not purchased water for consumption from Tacoma since 2016. The intertie and pump stations feed the Lea Hill 563 pressure zone, which includes Reservoirs 4A and 4B. Therefore, the Lea Hill and Green River Pump Stations were evaluated based on the open zone criteria. **Table 3-22** provides a summary of the pump station capacity into the Lea Hill Service Area compared with demand projections and DOH and City criteria. The results presented in **Table 3-22** demonstrate that the City has adequate pumping capacity within the open pressure zones of the Lea Hill Service Area to meet current and future demand projections for all required criteria.

Table 3-22 | Pump Station Capacity for Lea Hill Service Area Open Pressure Zones

Description	Lea Hill 2024 Scenario	Lea Hill 2034 Scenario	Lea Hill 2044 Scenario
Required Capacity (gpm)			
FSS Replenished in 72-hours	222	222	222
Maximum Day Demand, gpm	1,368	1,424	1,482
Average Day Demand, gpm	697	725	755
Available Capacity (gpm)			
Largest Pump (Q_L), gpm	1,166	1,166	1,166
Total Pumping Capacity (Q_t), gpm	6,664	6,664	6,664
DOH Criteria: Reliable Capacity (ADD + largest pump out of service)			
Surplus / (Deficit), gpm	5,967	5,939	5,909
DOH Criteria: Total Capacity (MDD + replenish FSS in 72-hours)			
Surplus / (Deficit), gpm	5,296	5,240	5,182
City Criteria: MDD + largest pump out of service			
Surplus / (Deficit), gpm	4,130	4,074	4,016

3.4.2.1.3 Lakeland Service Area

The Lakeland Service Area is supplied from the Upland Well Field (Wells 5 and 5A) and by sources in the Valley Service Area using the Terrace View BPS. The Terrace View BPS supplies the Lakeland 630 pressure zone from the Valley Service Area, which is then distributed through the Service Area. Since the Lakeland 630 pressure zone contains two reservoirs (Reservoirs 5 and 6), the Terrace View BPS was evaluated based on the open zone criteria. **Table 3-23** provides a summary of the pump station capacity into the Lakeland

Service Area compared with demand projections and DOH and City criteria. The results presented in **Table 3-23** demonstrate that the City has adequate pumping capacity within the open pressure zones of the Lakeland Service Area to meet current and future demand projections for all required criteria.

Table 3-23 | Pump Station Capacity for Lakeland Service Area Open Pressure Zones

Description	Lakeland 2024 Scenario	Lakeland 2034 Scenario	Lakeland 2044 Scenario
Required Capacity (gpm)			
FSS Replenished in 72-hours	130	130	130
Maximum Day Demand, gpm	700	799	915
Average Day Demand, gpm	356	407	466
Available Capacity (gpm)			
Largest Pump (Q_L), gpm	500	500	500
Total Pumping Capacity (Q_t), gpm	1,500	1,500	1,500
DOH Criteria: Reliable Capacity (ADD + largest pump out of service)			
Surplus / (Deficit), gpm	1,144	1,093	1,034
DOH Criteria: Total Capacity (MDD + replenish FSS in 72-hours)			
Surplus / (Deficit), gpm	800	701	585
City Criteria: MDD + largest pump out of service			
Surplus / (Deficit), gpm	300	201	85

3.4.2.1.4 Academy Service Area

The Academy Service Area is supplied from the Valley Service Area using Academy Pump Station 3. The pump station operates based on levels in Reservoirs 8A and 8B located in the Academy 531 pressure zone. **Table 3-24** provides a summary of the pump station capacity into the Academy Service Area compared with demand projections and DOH and City criteria. The results presented in **Table 3-24** demonstrate that the City has adequate pumping capacity within the open pressure zones of the Academy Service Area to meet current and future demand projections for all required criteria.

Table 3-24 | Pump Station Capacity for Academy Service Area Open Pressure Zones

Description	Academy 2024 Scenario	Academy 2034 Scenario	Academy 2044 Scenario
Required Capacity (gpm)			
FSS Replenished in 72-hours	222	222	222
Maximum Day Demand, gpm	590	657	732
Average Day Demand, gpm	301	334	373
Available Capacity (gpm)			
Largest Pump (Q_L), gpm	700	700	700
Total Pumping Capacity (Q_t), gpm	2,800	2,800	2,800
DOH Criteria: Reliable Capacity (ADD + largest pump out of service)			
Surplus / (Deficit), gpm	2,499	2,466	2,427
DOH Criteria: Total Capacity (MDD + replenish FSS in 72-hours)			
Surplus / (Deficit), gpm	2,210	2,143	2,068

Description	Academy 2024 Scenario	Academy 2034 Scenario	Academy 2044 Scenario
City Criteria: MDD + largest pump out of service			
Surplus / (Deficit), gpm	1,510	1,443	1,368

3.4.2.2 Booster Pump Station Analysis: Closed Pressure Zones

The City operates a closed zone in each of its Service Areas. Closed zones do not have a storage reservoir directly serving the zone and are required to supply the peak hour demand (PHD) and fire flow via a BPS. The BPS serving each closed pressure zone was evaluated using the closed zone criteria as defined by DOH.

3.4.2.2.1 Lakeland Hills BPS

The Lakeland Service Area has two closed pressure zones served by the Lakeland Hills BPS: Lakeland 697 and Lakeland 670. **Table 3-25** provides a summary of the BPS capacity into the Lakeland closed pressure zones compared with demand projections and DOH and City criteria. The results presented in **Table 3-25** demonstrate that the City has adequate pumping capacity within the closed pressure zones of the Lakeland Service Area to meet current and future demand projections for all required criteria.

Table 3-25 | BPS Capacity for Lakeland Service Area Closed Pressure Zones

Description	Lakeland 670 & 697 2024 Scenario	Lakeland 670 & 697 2034 Scenario	Lakeland 670 & 697 2044 Scenario
Required Capacity (gpm)			
Fire Flow Required, gpm	3,125	3,125	3,125
Maximum Day Demand, gpm	270	303	343
Peak Hour Demand, gpm	435	488	552
Available Capacity (gpm)			
Largest Pump (Q_L), gpm	3,125	3,125	3,125
Total Pumping Capacity (Q_t), gpm	7,330	7,330	7,330
DOH Criteria: Firm Capacity (no storage; PHD + largest pump out of service)			
Surplus / (Deficit), gpm	3,770	3,717	3,653
DOH Criteria: Reliable Capacity (no storage; MDD + FSS + largest pump out of service)			
Surplus / (Deficit), gpm	3,935	3,902	3,862
City Criteria: PHD+ FSS + largest pump out of service			
Surplus / (Deficit), gpm	645	592	528

3.4.2.2.2 Academy East BPS

The Academy Service Area has one closed zone served by the Academy East BPS: Academy 585. **Table 3-26** provides a summary of the BPS capacity into the Academy closed pressure zone compared with demand projections and DOH and City criteria. The results presented in **Table 3-26** demonstrate that the City has adequate pumping capacity within the closed pressure zones of the Academy Service Area to meet current and future demand projections for all required criteria.

Table 3-26 | BPS Capacity for Academy Service Area Closed Pressure Zone

Description	Academy 585 2024 Scenario	2 Academy 585 2034 Scenario	Academy 585 2044 Scenario
Required Capacity (gpm)			
Fire Flow Required, gpm	2,500	2,500	2,500
Maximum Day Demand, gpm	102	114	129
Peak Hour Demand, gpm	164	184	208
Available Capacity (gpm)			
Largest Pump (Q_L), gpm	1,250	1,250	1,250
Total Pumping Capacity (Q_t), gpm	4,290	4,290	4,290
DOH Criteria: Firm Capacity (no storage; PHD + largest pump out of service)			
Surplus / (Deficit) of Supply, gpm	2,876	2,856	2,832
DOH Criteria: Reliable Capacity (no storage; MDD + FSS + largest pump out of service)			
Surplus / (Deficit), gpm	1,688	1,676	1,661
City Criteria: PHD+ FSS + largest pump out of service			
Surplus / (Deficit), gpm	376	356	332

3.4.2.2.3 Lea Hill BPS

The Lea Hill Service Area has one closed zone served by the Lea Hill BPS: Lea Hill 648. **Table 3-27** provides a summary of the BPS capacity into the Lea Hill closed pressure zone compared with demand projections and DOH and City criteria. The results presented in **Table 3-27** indicate that the Lea Hill BPS is currently deficient and cannot meet the required criteria for existing or future demands.

Table 3-27 | BPS Capacity for Lea Hill Service Area Closed Pressure Zone

Description	Lea Hill 648 2024 Scenario	Lea Hill 648 2034 Scenario	Lea Hill 648 2044 Scenario
Required Capacity (gpm)			
Fire Flow Required, gpm	2,500	2,500	2,500
Maximum Day Demand, gpm	129	145	164
Peak Hour Demand, gpm	207	233	264
Available Capacity (gpm)			
Largest Pump (Q_L), gpm	1,500	1,500	1,500
Total Pumping Capacity (Q_t), gpm	1,800	1,800	1,800
DOH Criteria: Firm Capacity (no storage; PHD + largest pump out of service)			
Surplus / (Deficit), gpm	93	67	36
DOH Criteria: Reliable Capacity (no storage; MDD + FSS + largest pump out of service)			
Surplus / (Deficit), gpm	(829)	(845)	(864)
City Criteria: PHD+ FSS + largest pump out of service			
Surplus / (Deficit), gpm	(2,407)	(2,433)	(2,464)

The Intertie Pump Station shares a building with the Lea Hill BPS and contains pumps which were originally purposed to serve the intertie for wholesale supply to CWD and LMWD. Since CWD and LMWD no longer rely on the City as their primary water source, the City plans to complete facility modifications so the pumps at the Intertie Pump Station can serve the Lea Hill 648 pressure zone. This project is discussed further in **Chapter 8** and will resolve the deficiencies identified in **Table 3-27**.

3.4.2.2.4 Game Farm Park Pump Station

The Valley Service Area has one closed zone served by the Game Farm Park Pump Station: Game Farm Park (no assigned pressure zone name). **Table 3-28** provides a summary of the BPS capacity into the Valley closed pressure zone compared with demand projections and DOH and City criteria. The results presented in **Table 3-28** indicate that the Game Farm Park Pump Station is currently deficient and cannot meet the required criteria for existing or future demands.

The Game Farm Park Pump Station provides service to a park restroom facility, two fire hydrants, and individual RV campsites. As this is a small BPS with the single purpose of providing service to a recreational area, and there are no residential or commercial property connections supplied by this facility, no actions are planned to resolve this deficiency. The DOH and City criteria are geared towards providing reliable service for residents and businesses and are not applicable for this minor facility. The City has reviewed this condition with the Fire Marshal, and no exceptions were taken. As further development progresses in and around the Game Farm Park Pump Station, modifications will be considered to address the deficiency.

Table 3-28 | BPS Capacity for Game Farm Park Closed Pressure Zone

Description	2024 Game Farm	2034 Game Farm	2044 Game Farm
Required Capacity (gpm)			
Fire Flow Required, gpm	1,500	1,500	1,500
Maximum Day Demand, gpm	0	0	1
Peak Hour Demand, gpm	1	1	1
Available Capacity (gpm)			
Largest Pump (Q_L), gpm	1,000	1,000	1,000
Total Pumping Capacity (Q_t), gpm	1,050	1,050	1,050
DOH Criteria: Firm Capacity (no storage; PHD + largest pump out of service)			
Surplus / (Deficit), gpm	49	49	49
DOH Criteria: Reliable Capacity (no storage; MDD + FSS + largest pump out of service)			
Surplus / (Deficit), gpm	(450)	(450)	(451)
City Criteria: PHD+ FSS + largest pump out of service			
Surplus / (Deficit), gpm	(1,451)	(1,451)	(1,451)

3.4.2.3 Storage Analysis

This section evaluates the City's existing water storage facilities to determine if there is sufficient capacity to meet existing and future storage requirements of the system.

3.4.2.3.1 Components of Storage

The City currently maintains a total of 15.7 MG of water storage in eight reservoirs located throughout the service area. Each Service Area has two reservoirs, providing redundancy for cleaning and maintenance. Historically, the City has evaluated each Service Area independently. However, new sources, pump stations, and PRV facilities now allow for reliable and redundant operation of the system as an interconnected whole, rather than as separate Service Areas. The storage analysis reflects the new operational ability by allowing sharing of emergency storage between the Service Areas. The existing infrastructure and customer expectations still require that other storage components, such as FSS, be stored in individual Service Areas.

Water storage requirements are typically defined by the following components: operational storage, equalizing storage, standby storage, fire suppression storage, and dead storage. A description of each storage component and the criteria used to evaluate the capacity of the City's reservoirs is as follows:

- Operational Storage: Operational storage is used to supply the water system under normal demand conditions and provides pump protection to avoid frequent starting and stopping of pumps for pump stations that are used to fill reservoirs. The operational storage is calculated per the DOH Design Manual as the pump supply firm capacity (in gpm) times 2.5-minutes.

- Equalizing Storage: When the source pumping capacity cannot meet the periodic daily (or longer) peak demands placed on the water system, equalizing storage must be provided as a part of the total storage for the system and must be available at 30 psi to all service connections. The criteria for determining the equalizing storage requirements for the City's system is based on the equalizing calculation in the DOH Design Manual (refer to equation 7-1).

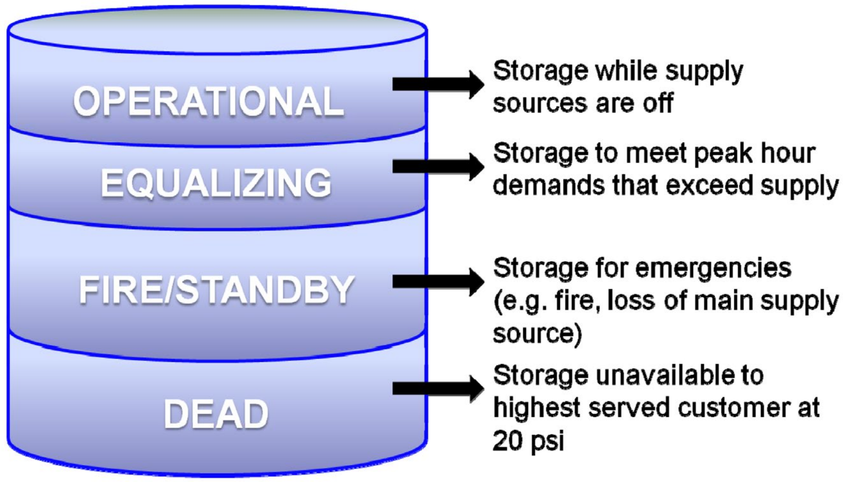
- Standby Storage: Standby storage is the portion of the reservoir used to supply the water system when supply facilities are out of service. DOH allows water systems with multiple sources to require that standby volume be supplied with the largest supply source out of service but recommends a minimum standby storage of 200 gallons per ERU in the system. The City calculates standby storage as the maximum volume required to supply all ERUs at least 240 gallons (based on the DOH minimum times a 20 percent factor of safety).

- Fire Suppression Storage (FSS): FSS is the portion of the reservoir with sufficient volume to supply water to the system at the maximum rate and duration required to extinguish a fire at the building with the highest fire flow requirement. The required volume of the FSS is the product of the fire flow rate and duration of the system's maximum fire flow requirement.

- Dead Storage: Dead storage is the bottom portion of the reservoir that cannot be used because water is stored at an elevation that is too low to provide sufficient system pressure (below 20 psi at the highest elevation served by the reservoir). This unusable storage occupies the lower portion of many ground-level standpipe-type reservoirs. When the highest service elevation is not the limiting factor, the City defines dead storage as being 1-foot above the reservoir inlet elevation for operational reasons.

The City's reservoir storage requirements depend on the water system's configuration, seasonal and daily variation in water-use patterns, and the reliability of various water system components. This section describes the five components of storage, summarizes the existing system's capacity to meet the storage needs of each Service Area, and makes recommendations to address identified storage deficits.

Figure 3-7 | Illustration of Reservoir Storage Components



3.4.2.3.2 Storage Analysis Results

The storage available in the four Service Areas was evaluated to confirm each is provided with the required usable Operational, Equalizing, Fire Suppression, and Emergency Storage volumes. Reflecting the interconnectedness of the system, excess storage in higher Service Areas (i.e., Lea Hill, Lakeland and Academy) can be used in the Valley Service Area and vice versa through use of the system pump stations. The storage analysis compares the required storage, based on the criteria in **Table 3-17**, and the available storage. The FSS for each region was calculated using 4,000 gpm for four hours except for Lakeland, which used 3,125 gpm for three hours based on buildings with the highest fire flow requirement in each Service Area (see **Table 3-20**).

Table 3-29 summarizes the existing 2024 storage analysis and results. The results indicate a deficit in the Lea Hill Service Area, however, this deficit is offset by surplus storage available in other Service Areas.

Table 3-29 | System-Wide Storage Analysis for the 2024 Scenario

Description	RWSA 2024	Academy 2024	Lakeland 2024	Lea Hill 2024	Valley 2024
Usable Storage (MG)					
Maximum Storage Capacity	15.68	2.72	1.88	2.48	8.60
Dead Storage	1.34	0.06	0.27	0.36	0.64
Total Usable Storage	14.35	2.66	1.61	2.12	7.96
Required Storage (MG)					
Operational Storage	0.05	0.01	0.00	0.01	0.03
Equalizing Storage	0.00	0.00	0.00	0.00	0.00
Standby Storage (Emergency)	9.30	0.57	0.68	1.32	6.73
FSS (Emergency)	3.44	0.96	0.56	0.96	0.96
Total Required Storage	12.80	1.54	1.25	2.29	7. 73
Surplus/ (Deficit) Storage	**1.54**	**1.12**	**0.37**	**(0.18)**	**0.24**

Table 3-30 summarizes the 2034 storage analysis and results (10-year projections). The results indicate a deficit in the Lea Hill and Valley Service Areas, however, this deficit is offset by surplus storage available in other Service Areas.

Table 3-30 | System-Wide Storage Analysis for the 2034 Scenario

Description	RWSA 2034	Academy 2034	Lakeland 2034	Lea Hill 2034	Valley 2034
Usable Storage (MG)					
Maximum Storage Capacity	15.68	2.72	1.88	2.48	8.60
Dead Storage	1.34	0.06	0.27	0.36	0.64
Total Usable Storage	14.35	2.66	1.61	2.12	7.96
Required Storage (MG)					
Operational Storage	0.05	0.01	0.00	0.01	0.03
Equalizing Storage	0.03	0.00	0.03	0.00	0.00
Standby Storage (Emergency)	10.48	0.63	0.77	1.38	7.69
FSS (Emergency)	3.44	0.96	0.56	0.96	0.96
Total Required Storage	14.00	1.60	1.37	2.34	8.69
Surplus/ (Deficit) Storage	**0.34**	**1.05**	**0.25**	**(0.23)**	**(0.73)**

The 2044 storage analysis was performed to determine the ability of the proposed storage facilities to meet the future storage requirements in 2044, based on projected demands. The analysis results indicate that the existing storage facilities do not have sufficient capacity to meet the future demands of the system based on the demand projections presented in **Chapter 2**. The City is currently planning a new reservoir in the Valley Service area to address these future deficiencies in the 20-year time frame. **Table 3-31** summarizes the buildout 2044 storage analysis.

Table 3-31 summarizes the 2044 storage analysis and results (20-year projections). The results indicate an overall deficit in the RWSA, spurred largely by the projected growth within the Valley Service Area in the 20-year horizon.

Table 3-31 | System-Wide Storage Analysis for the 2044 Scenario

Description	RWSA 2044	Academy 2044	Lakeland 2044	Lea Hill 2044	Valley 2044
Usable Storage (MG)					
Maximum Storage Capacity	15.69	2.72	1.89	2.48	8.60
Dead Storage	1.34	0.06	0.27	0.36	0.64
Total Usable Storage	14.35	2.66	1.61	2.12	7.96
Required Storage (MG)					
Operational Storage	0.05	0.01	0.00	0.01	0.03
Equalizing Storage	0.19	0.00	0.06	0.00	0.14
Standby Storage (Emergency)	11.89	0.71	0.88	1.43	8.87
FSS Storage (Emergency)	3.44	0.96	0.56	0.96	0.96
Total Required Storage	15.58	0.98	1.51	2.40	10.00
Surplus/ (Deficit) Storage	**(1.24)**	**0.98**	**0.11**	**(0.29)**	**(2.04)**

Since most of the future storage deficiency is in the Valley Service Area, a new storage reservoir is planned in the northeastern portion of the Service Area (Valley 242 pressure zone). The reservoir is a planned capital project to be completed in the 20-year horizon and is discussed further in **Chapter 8**.

The Lea Hill PS has sufficient capacity to transfer standby storage from Valley to Lea Hill. In addition, there are multiple PRVs which can be used to transfer water from the Academy and Lakeland Service Areas back to Valley to utilize excess standby storage in those areas. No other projects are necessary to resolve this deficiency.

3.4.2.4 Distribution and Transmission Capacity Analysis

This section evaluates the City's existing distribution and transmission mains to determine if the water pipelines are sized and looped adequately to provide the required flow and pressures to meet existing and future system conditions. The evaluation used an updated version of the City's computerized hydraulic water system model and InfoWater Pro, a GIS-based modeling software developed by Autodesk (formerly Innovyze). The model was updated to accurately reflect the City's existing water system and verified against field hydrant test data. Results from the model were used to evaluate the existing system and identify deficiencies.

3.4.2.4.1 Model Update

The following updates were made to the City's hydraulic model prior to conducting the capacity analyses:

- Facility updates
- Pipeline network updates
- Elevation updates
- Demand updates

Each update is described in further detail below.

Facility Updates

Existing facilities within the hydraulic model were reviewed and updated based on information provided by the City. The facilities reviewed included groundwater wells, springs, interties with adjacent water systems, potable water reservoirs, pump stations, treatment facilities, flow control valves, and PRVs. The following documents were used to confirm the accuracy of the facility information within the hydraulic model:

- Interlocal agreements
- Record drawings
- PRV calibration records
- Pump curves
- SCADA data
- Operations and maintenance data

Pipeline Network Updates

The existing pipeline network within the hydraulic model was compared to the City's existing GIS data to locate areas where pipelines may have been missing in the model. In addition, the pipeline material type was added to the model to match data available from GIS to more accurately reflect the existing distribution system.

Elevation Updates

Node elevations within the model were updated using United States Geological Survey (USGS) Digital Elevation Model (DEM). The DEM is a tile of the 3-Dimenional Elevation Program (3DEP) with data that is updated regularly and distributed in geographic coordinates in units conforming with the North American

Datum of 1983 (NAD 83). All elevation values are in meters and, over the contiguous United States, are referenced to the North American Vertical Datum of 1988 (NAVD 88). The assigned elevations were converted to feet when applied to the model.

In addition to the general elevation update of the model nodes, the record drawings of the water reservoirs were used to verify the bottom and overflow elevations of the reservoirs within the model. Where necessary based on date, the as-built elevations were corrected to NAVD88 values, as some of the reservoirs were constructed using National Geodetic Vertical Datum of 1929 (NGVD 29). A conversion of 3.51 feet was used to update elevations from NGVD 29 to NAVD 88.

Demand Updates

Demands in the model were updated using the City's customer billing database. The meters were geolocated based on the customer's address and assigned to the closest model junction. No demands were allocated to transmission pipelines or facility nodes (i.e., pump station, reservoirs, etc.). Approximately 10 percent of the demand was unable to be allocated using this method. The remaining demand and non-billed usage, like DSL and construction meters, was distributed uniformly throughout the model by applying a scaling factor to match the 2022 production data. The demand sets in the model sought to distribute the demand projections provided in **Chapter 2**. A scaling factor was then applied to all demand nodes to equal the demand projection in years 2024.

As discussed in **Chapter 2**, TAZ data was used to determine growth projections and the future water demand. Based on the TAZ data, each Service Area was split between focused growth areas and non-growth areas. Future demands were allocated equally across all current demand nodes within the focused growth and non-growth areas of each Service Area. Demand peaking factors from **Chapter 2** were used to adjust demands to MDD for the fire flow analyses and PHD for the pressure analysis.

3.4.2.4.2 Model Calibration

To verify and calibrate the hydraulic model, the City collected field hydrant testing data. A map of the hydrant testing locations and testing plan is included in **Appendix K**. The City also collected static pressure at the test locations to verify the hydraulic grade line (HGL) of specific areas of the water system.

In addition to the hydrant tests results, the boundary conditions of the water system facilities at the time of each test were provided. The boundary conditions were used to calculate the demand observed during each test. The boundary conditions were also entered into the model for each hydrant test to accurately simulate the system conditions during the hydrant test. At most locations, hydrants were operated to stress the system to identify required changes to the boundary conditions and pipe roughness factors (C-factors) within the hydraulic model.

A fire flow calibration scenario was set up within the hydraulic model and each of the hydrant test locations was simulated. **Appendix K** provides the field flow data compared to the flow data input into the model and a comparison of the static pressures and pressure drops observed at each hydrant test. **Table 3-32** summarizes the final Hazen Williams C-factors used during the calibration based on piping material.

Table 3-32 | Final C-Factors for Piping Materials

Material	C-Factor
Cast Iron	90-120
Concrete	120
Ductile Iron	120
HDPE	130
PVC	130
RCP	120
Steel	120
Unknown	115

Valley Service Area

A total of 16 hydrant tests were conducted in the Valley Service Area, however the results from one test were excluded as the static pressure was not recorded. The static pressure and pressure drop in the calibrated model is now within 5 psi, or less, of the observed data for each of the hydrant tests.

Lea Hill Service Area

A total of nine hydrant tests were conducted in the Lea Hill Service Area. The static pressure and pressure drop in the calibrated model is now within 5 psi, or less, of the observed data for each of the hydrant tests.

The HGL from the hydrant testing was higher than the reported HGL in the hydraulic model for the Lea Hill 462 pressure zone. The PRV setpoints were referenced to confirm the higher HGL observed during the hydrant testing. As such, the naming for the pressure zone was updated to Lea Hill 480. The update and supporting calculations are included in **Appendix K**.

Academy Service Area

A total of five hydrant tests were conducted in the Academy Service Area. The static pressure and pressure drop in the calibrated model is now within 5 psi, or less, of the observed data for each of the hydrant tests.

The HGL from the hydrant testing was higher than the reported HGL in the hydraulic model for the Academy 350 and Academy 445 pressure zones. The PRV setpoints were referenced to confirm the higher HGL observed during the hydrant testing. As such, the naming for each pressure zone was updated to Academy 400 and Academy 470 respectively. The updates and supporting calculations are included in **Appendix K**.

Lakeland Service Area

A total of ten hydrant tests were conducted in the Lakeland Service Area, however the results from one test were excluded as the recorded static pressure was determined to be incorrect. The static pressure and pressure drop in the calibrated model is now within 5 psi, or less, of the observed data for each of the hydrant tests.

The HGL from the hydrant testing varied from the reported HGL in the hydraulic model for the Lakeland 440, Lakeland 441, Lakeland 446, and Lakeland 485 pressure zones. The PRV setpoints were referenced to confirm the HGLs observed during the hydrant tests. As such, the naming for each pressure zone was updated as follows:

- Lakeland 440 pressure zone was split into two pressure zones: Lakeland 450 and Lakeland 405.

- Lakeland 441 pressure zone was updated to Lakeland 385
- Lakeland 446 pressure zone was updated to Lakeland 415
- Lakeland 485 pressure zone was updated to Lakeland 455.

The hydrant test for Lakeland 575 was not simulated in the model as observed in the field since a static pressure of 101 psi was recorded during the hydrant test. According to the PRV setpoints, the HGL on the test date was anticipated to be an error. The City re-checked the hydrant on February 8, 2024, and a static pressure of 69 psi was recorded. It was concluded that the original hydrant test data was inaccurate, and the test was voided. The Lakeland 575 pressure zone was updated to Lakeland 560 instead based on the PRV setpoints and static pressure reading completed in February 2024. The updates and supporting calculations are included in **Appendix K**.

3.4.2.4.3 Hydraulic Analysis

PHD Analysis

During PHD conditions, the water system must maintain a minimum pressure of 30 psi at all service nodes, a maximum velocity of 8 fps in wall water mains, and a maximum velocity of 5 fps in all transmission mains in accordance with DOH and City standards. The hydraulic model was set up to evaluate pressures and velocities throughout the system under PHD conditions for the 2024 (existing conditions), 2034 (10-year), and 2044 (20-year) scenarios. The results of this analysis are shown in **Figure 3-8**, **Figure 3-9**, and **Figure 3-10** respectively. The results of this analysis indicate that all areas of the water system meet these requirements under existing and future conditions.

Figure 3-8 | 2024 PHD Scenario – Pressure and Velocity

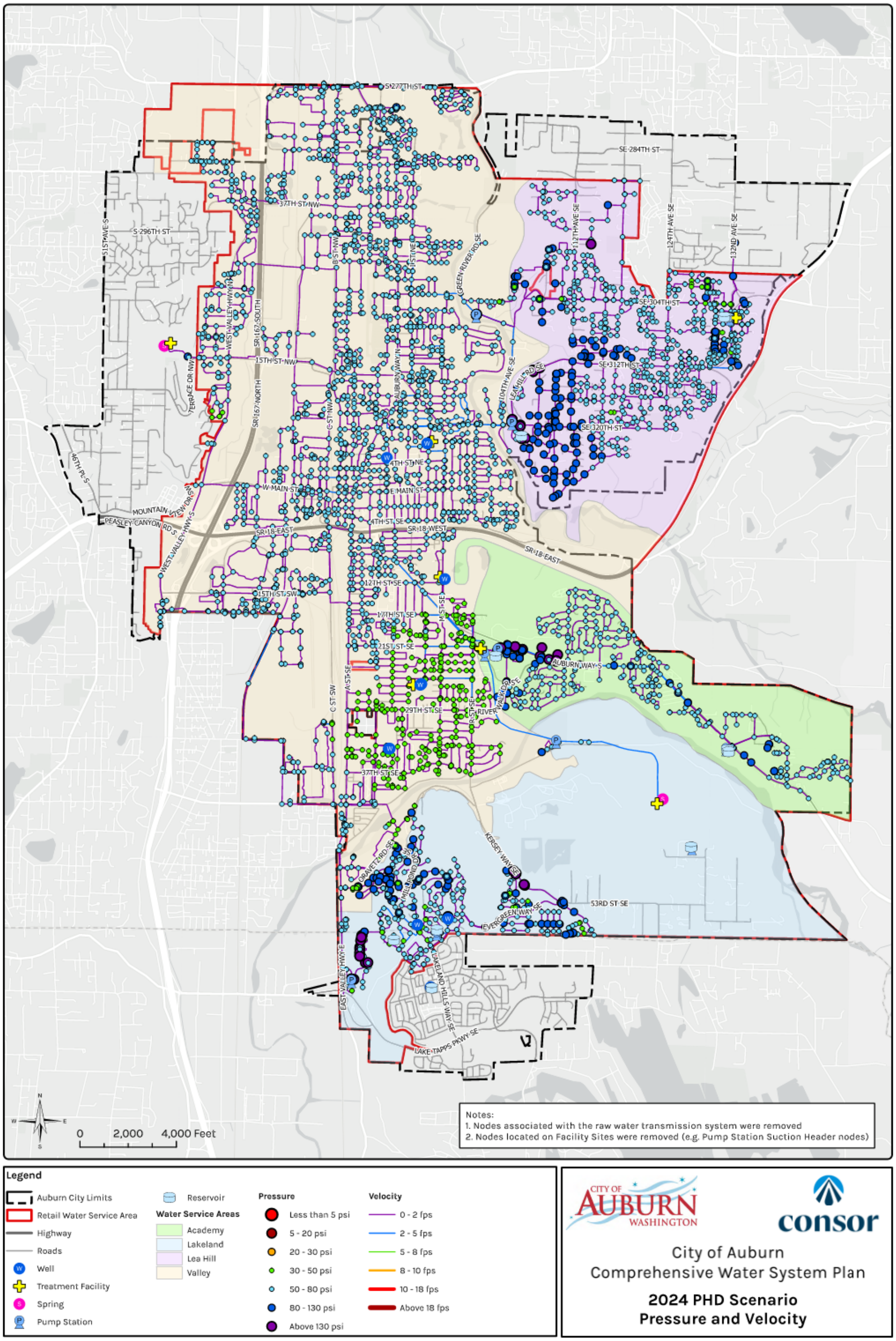


Figure 3-9 | 2034 PHD Scenario – Pressure and Velocity

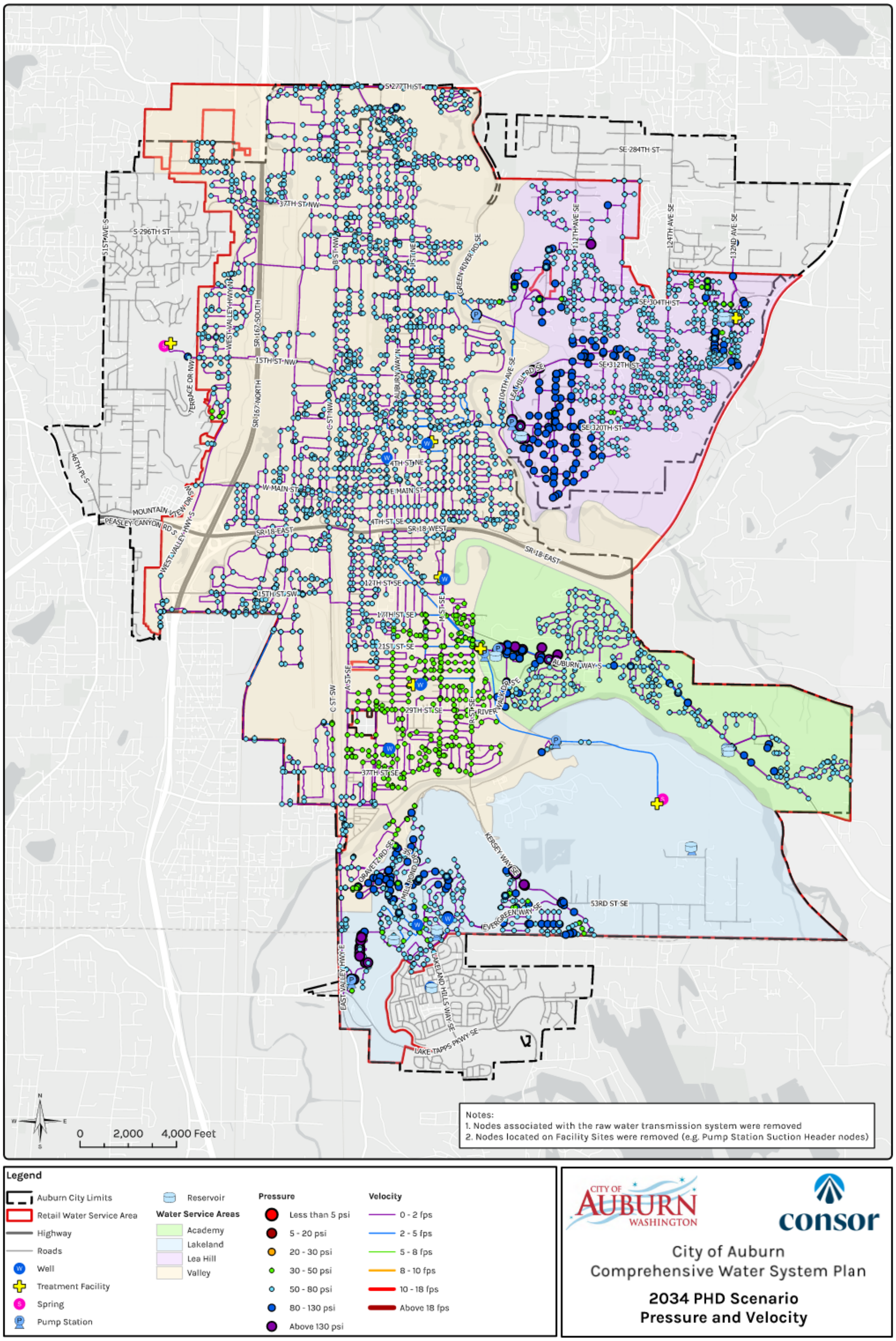
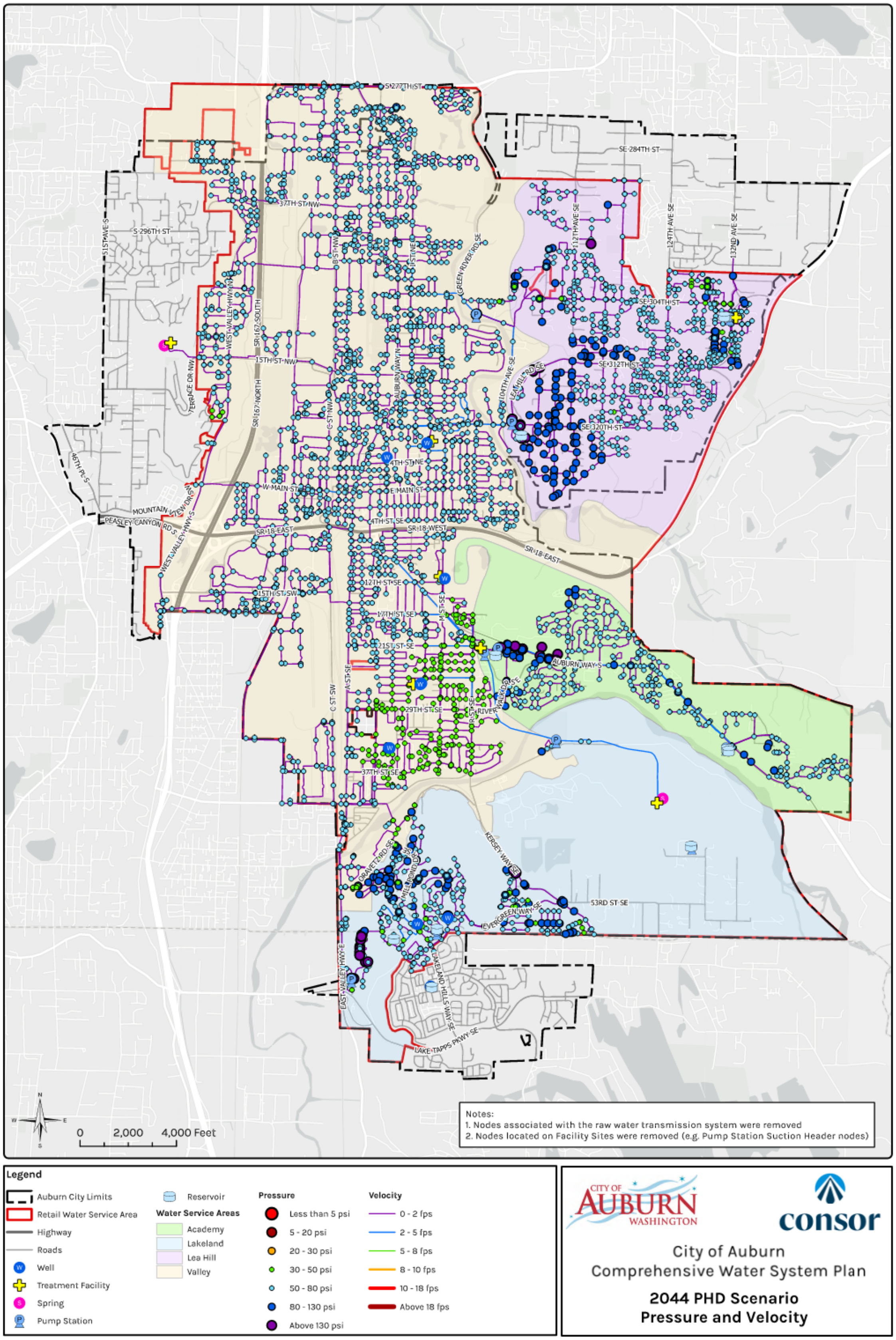


Figure 3-10 | 2044 PHD Scenario – Pressure and Velocity



Fire Flow Analysis

The fire flow analysis assesses each hydrant node in the hydraulic model to determine the available fire flow while maintaining a minimum residual pressure of 20 psi throughout the respective pressure zone. To complete the analysis, the water elevation in each reservoir was set to top of dead storage (below operational, equalizing and standby storage) per DOH recommendations. In addition, the system demands were set to MDD for each scenario (2024, 2034 and 2044). For each node, the modeled available fire flow was compared to its target fire flow requirement as follows:

- Single Family Residential Meters: 1,500 gpm of fire flow required.
- All Other Meters (i.e., multi-family, commercial, etc.): 2,500 gpm of fire flow required.
- Specific Buildings with Higher Fire Flow Requirements: Assessed individually per **Table 3-20**.

Fire flow requirements were assigned to the model nodes based on account classifications of the assigned water meters. Where multiple meters with different account classifications were assigned to the same node, the highest fire flow requirement was assigned to the node. The hydrant locations provided in the City's GIS system do not correspond to the exact location of the hydrant node in the model. Therefore, the nodes that were predicted to have fire flow below what is required were checked based on their proximity to the nearest hydrant to verify whether the appropriate hydrant could provide the required fire. As shown in **Figure 3-11** the results of this analysis indicated that multiple areas of the system under current and future demand conditions have fire flow deficiencies. A summary of the proposed pipeline improvements to resolve the deficiencies is shown in **Figure 3-12** and summarized in **Table 3-33**. **Figure 3-12** also includes on-going projects currently being completed by the City or developers.

Valley Service Area

Multiple deficiencies are identified in the Valley Service Area. The highest priority project assists with raising the HGL of the highest critical node on the west side of the RWSA. This project will increase the available fire flow at most of the western failure locations. The remaining improvements assist with specific failure locations by upsizing water mains experiencing significant headloss.

Additionally, a new PRV facility is proposed to rezone a portion of the Valley 242 pressure zone to the Academy 350 pressure zone to resolve deficiencies in the area. This PRV facility will also allow storage transfer from the Academy Service Area where this is surplus storage to the Valley Service Area to resolve a 2034 storage deficit projections. This project is discussed further in **Chapter 8**.

Lakeland Service Area

There were no failure locations identified within the Lakeland Service Area for the existing and future demand conditions.

Lea Hill Service Area

Multiple deficiencies are identified in the Lea Hill Service Area. The highest priority project in this area is to rezone a portion of Lea Hill 563 pressure zone to the Lea Hill 648 pressure zone. In addition, deficiencies were noted in the northern part of Lea Hill 563, in the vicinity of 112th Avenue, 290th Street, 295th Street, and 293rd Street. These pipelines were replaced recently and provide an available fire flow of approximately 1,350 gpm after the rezoning of the Lea Hill 563 pressure zone is completed. Therefore, a project was not proposed in this area and was confirmed with the Fire Marshal. The remaining improvements assist with specific failure locations by upsizing water mains experiencing significant headloss.

Academy Service Area

Multiple deficiencies are identified in the Academy Service Area. The planned Oak Vista Development provides a significant increase in available fire flow in Academy 585 pressure zone. The remaining improvements assist with specific failure locations by upsizing pipelines with high predicted headloss.

Figure 3-11 | MDD+FF Deficiency Locations for 2024, 2034 and 2044 Scenarios

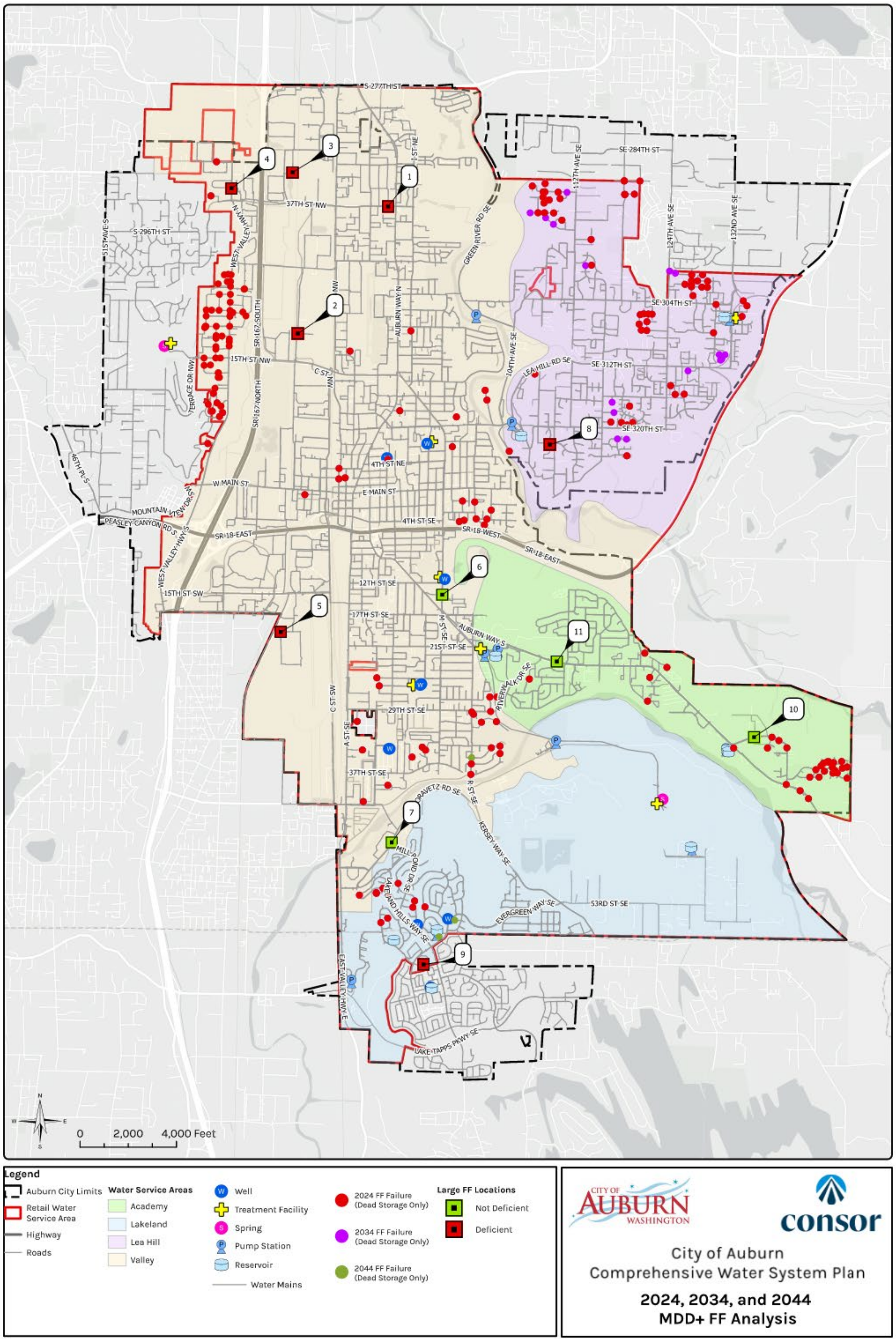


Figure 3-12 | Capital Improvement Projects Addressing Fire Flow Deficiencies

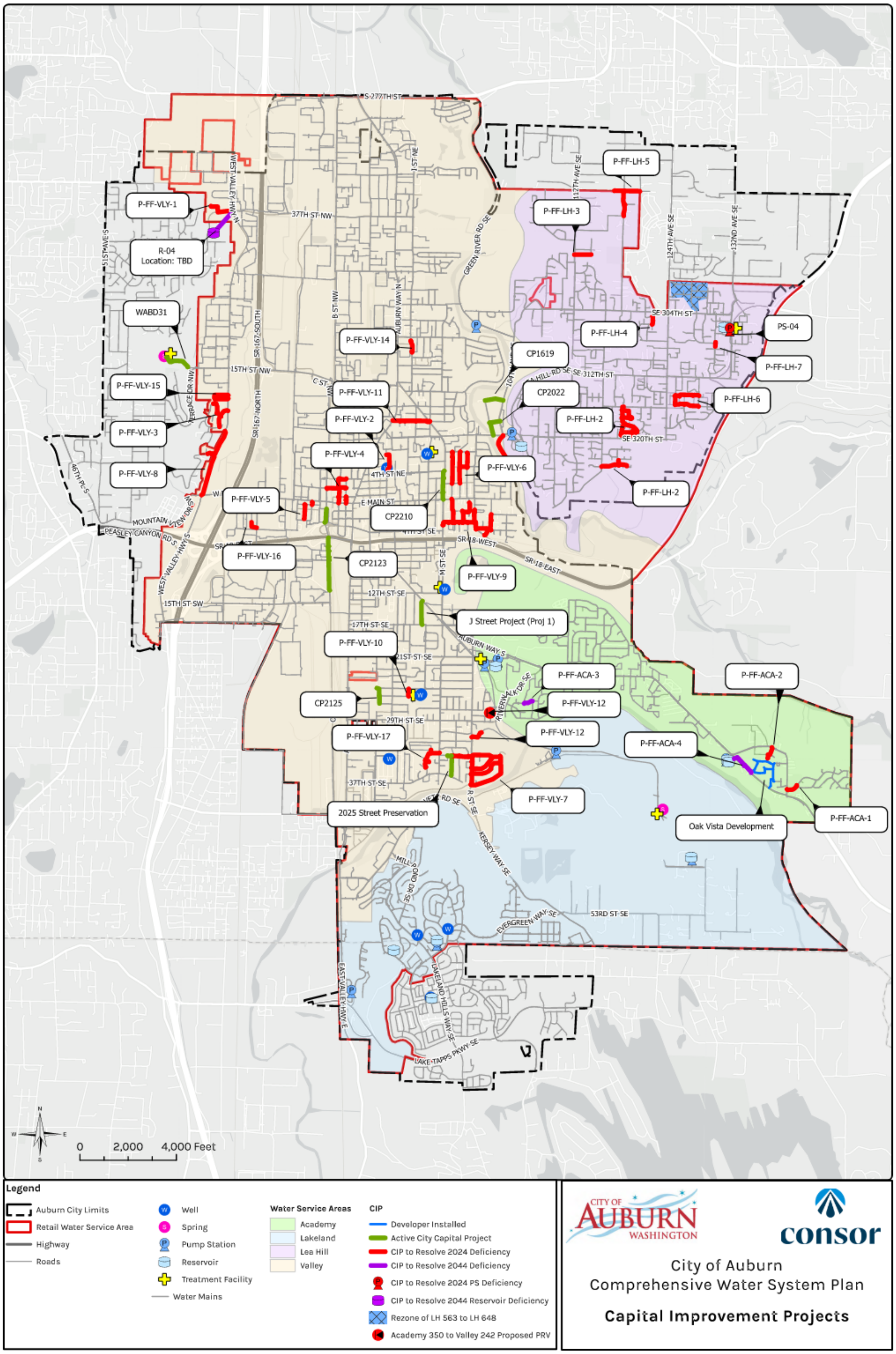


Table 3-33 | Prioritized Pipeline Improvements to Address Fire Flow Deficiencies

Project Priority	Service Area	Project ID	Summary of Deficiency	Summary of Improvements
1	Valley	P-FF-VLY-8	2024 Scenario: Hydrants less than 500 gpm	Replace existing with 3,200 LF of 16-inch diameter piping.
2	Lea Hill	P-FF-LH-3	2024 Scenario: Hydrants less than 1,000 gpm	Replace existing with 690 LF of 12-inch diameter piping.
3	Lea Hill	P-FF-LH-7	2024 Scenario: Hydrants less than 1,000 gpm.	Replace existing with 180 LF of 8-inch diameter piping. Move hydrant connection to higher zone.
4	Lea Hill	P-FF-LH-5	2024 Scenario: Hydrants less than 1,000 gpm	Replace existing with 1,080 LF of 12-inch diameter piping and 1,170 LF of 16-inch diameter piping.
5	Valley	P-FF-VLY-15	2024 Scenario: Hydrants less than 1,000 gpm	Replace existing with 1,320 LF of 12-inch diameter piping.
6	Valley	P-FF-VLY-6	2024 Scenario: Hydrants less than 1,000 gpm	Replace existing with 3,590 LF of 8-inch diameter piping.
7	Valley	P-FF-VLY-7	2024 Scenario: Hydrants less than 1,500 gpm	Replace existing with 7,9840 LF of 8-inch diameter piping and 4,380 LF of 12-inch piping.
8	Valley	P-FF-VLY-13	2024 Scenario: Hydrants less than 1,000 gpm	Replace existing with 1,290 LF of 12-inch diameter piping.
9	Valley	P-FF-VLY-12	2024 Scenario: Hydrants less than 1,000 gpm	Replace existing with 1,440 LF of 8-inch diameter piping and 550 LF of 12-inch piping.
10	Lea Hill	P-FF-LH-1	2024 Scenario: Hydrants less than 1,500 gpm	Replace existing with 4,540 LF of 8-inch diameter piping.
11	Lea Hill	P-FF-LH-2	2024 Scenario: Hydrants less than 1,500 gpm	Replace existing with 1,300 LF of 8-inch diameter piping.
12	Lea Hill	P-FF-LH-6	2024 Scenario: Hydrants less than 1,500 gpm	Replace existing with 2,470 LF of 12-inch diameter piping.
13	Academy	P-FF-ACA-2	2024 Scenario: Hydrants less than 1,500 gpm.	Replace existing with 590 LF of 8-inch diameter piping.
14	Academy	P-FF-ACA-1	2024 Scenario: Hydrants less than 1,500 gpm.	Replace existing with 500 LF of 12-inch diameter piping.
15	Lea Hill	P-FF-LH-4	2024 Scenario: Hydrants less than 1,500 gpm	Replace existing with 340 LF of 8-inch diameter piping.
16	Valley	P-FF-VLY-9	2024 Scenario: Multiple hydrants less than 1,500 gpm	Replace existing with 190 LF of 8-inch diameter piping and 5,765 LF of 12-inch piping.
17	Valley	P-FF-VLY-14	2024 Scenario: Hydrants less than 2,500 gpm	Replace existing with 510 LF of 12-inch diameter piping.
18	Valley	P-FF-VLY-2	2024 Scenario: Hydrants less than 2,500 gpm	Replace existing with 910 LF of 12-inch diameter piping.
19	Valley	P-FF-VLY-17	2024 Scenario: Hydrants less than 2,500 gpm	Replace existing with 170 LF of 8-inch diameter piping and 1,270 LF of 12-inch piping.
20	Valley	P-FF-VLY-4	2024 Scenario: Hydrants less than 2,500 gpm	Replace existing with 2,610 LF of 12-inch diameter piping.

Project Priority	Service Area	Project ID	Summary of Deficiency	Summary of Improvements
21	Valley	P-FF-VLY-10	2024 Scenario: 4-inch Cast Iron near 1,500 gpm dead end	Replace existing with 320 LF of 12-inch diameter piping.
22	Valley	P-FF-VLY-3	2024 Scenario: Hydrant less than 1,500 gpm available.	Replace existing with 1,010 LF of 8-inch diameter piping and 660 LF of 12-inch piping. Complete P-FF-VLY-8 has higher priority for initial improvement in this area.
23	Valley	P-FF-VLY-1	2024 Scenario: Hydrants less than 2,500 gpm	Replace existing with 960 LF of 12-inch diameter piping.
24	Valley	P-FF-VLY-11	2024 Scenario: Hydrants less than 2,500 gpm	Replace existing with 1,630 LF of 12-inch diameter piping.
25	Valley	P-FF-VLY-16	2024 Scenario: Hydrants less than 2,500 gpm	Replace existing with 390 LF of 12-inch diameter piping.
26	Valley	P-FF-VLY-5	2024 Scenario: Hydrants less than 2,500 gpm	Replace existing with 750 LF of 12-inch diameter piping.
27	Academy	P-FF-ACA-3	2044 Scenario: Hydrants less than 2,500 gpm	Replace existing with 380 LF of 12-inch diameter piping.
28	Academy	P-FF-ACA-4	2044 Scenario: Hydrants less than 2,500 gpm	Replace existing with 1,040 LF of 16-inch diameter piping.

3.4.2.5 System Capacity Analysis Results

Chapter 2 of this WSP calculated the ADD ERU planning value to be at 182 gallons per day per Equivalent Residential Units (gpd/ERU) and an MDD ERU planning value of 358 gpd/ERU. An analysis of the water system's overall physical capacity in terms of ERU using DOH Worksheet 4-1 is provided in **Appendix V**. Demand projection values include retail customer demands, distribution system losses, authorized unbilled consumption, and wholesale demand from Algona. Projections for MIT and LMWD are not included since they do not rely on the City as their main source of water.

The results of the ERU analysis included in **Appendix V** are summarized in **Table 3-34**. The analysis indicates that the existing system has sufficient capacity to serve the current and projected water demands through 2034 (10-year planning horizon). Under 2024 and 2034 demand conditions, storage is the limiting system component for growth and development. In 2044 (20-year planning horizon) storage is deficient, which is consistent with the analysis findings summarized in **Section 3.4.2.3** and is planned to be resolved with a new reservoir project included in **Chapter 8**.

Table 3-34 | System Capacity Analysis in ERU Basis

Description of Capacity Parameter	2024	2034	2044
Demands per ERU Basis			
Average Day Demand, gpd/ERU	182	182	182
Maximum Day Demand, gpd/ERU	358	358	358
Peak Hour Demand, gpd/ERU	576	576	576
Projected Retail Customer Demand, ERUs	**38,760**	**43,659**	**49,553**
Algona (Wholesale) Projected ADD, ERUs	2,005	2,120	2,246
Algona (Wholesale) Projected MDD, ERUs	1,202	1,271	1,347

Description of Capacity Parameter	2024	2034	2044
Total ERUs Required for Qa Analysis (ADD), ERUs	**40,765**	**45,779**	**51,799**
Total ERUs Required for Qi and Qs Analysis (MDD), ERUs	**39,962**	**44,930**	**50,899**
Source Capacity (Qi)			
Total Supply Capacity, Qi (20 hours of pumping), gpd	23,092,800	23,092,800	23,092,800
Maximum Day Demand, gpd/ERU	358	358	358
Maximum Supply Capacity, ERUs	**64,580**	**64,580**	**64,580**
Projected MDD Demand, ERUs	39,962	44,930	50,899
Remaining Qi Capacity Surplus/(Deficit), ERUs	**24,618**	**19,650**	**13,681**
Water Rights (Qa)			
Supply Capacity, Qa (Total), gpd	18,749,377	18,749,377	18,749,377
Average Day Demand, gpd/ERU	182	182	182
Maximum Supply Capacity, ERUs	**102,938**	**102,938**	**102,938**
Projected ADD Demand, ERUs	40,765	45,779	51,799
Remaining Qa Capacity Surplus/(Deficit), ERUs	**62,173**	**57,159**	**51,139**
Pumping Capacity (Qs)			
Total Pumping Capacity, Qs (20 hours of pumping), gpd	22,506,000	22,506,000	22,506,000
Maximum Day Demand, gpd/ERU	358	358	358
Maximum Supply Capacity, ERUs	**62,939**	**62,939**	**62,939**
Projected MDD Demand, ERUs	39,962	44,930	50,899
Remaining Pumping Capacity Surplus/(Deficit), ERUs	**23,977**	**18,009**	**12,040**
Storage Capacity			
Maximum Usable Storage Capacity, MG	14.35	14.35	14.35
Available Standby and Equalization Storage Capacity, MG	10.85	10.85	10.85
Standby Storage Requirement, gal/ERU	240	240	240
Equalizing Storage Requirement, gal/ERU	-	-	-
Maximum Storage Capacity, ERUs	**45,209**	**45,209**	**45,209**
Projected Retail System ERUs	38,760	43,659	49,553
Remaining Storage Capacity Surplus/(Deficit), ERUs	**6,449**	**1,550**	**(4,344)**
System Capacity Analysis Summary			
Limiting Component of System Capacity Surplus/ (Deficit), ERUs	**6,449**	**1,550**	**(4,344)**

3.4.3 New Source of Supply Analysis

The City has a pending water right application for 13,443 acre-feet from the existing Wells 6 and 7 and a future Well 8. The location of the future Well 8 has not yet been determined but is expected to be located near Wells 6 and 7. Flows from future Well 8 would be treated at the Fulmer Field CCT Facility. It is anticipated that water quality from Well 8 would be similar to Wells 6 and 7 and may require manganese treatment.

Calculations presented in the Water Rights Self-Assessment Form (**Appendix I**) conclude that the City's existing water rights are anticipated to be adequate to meet the current and 10-year projections for maximum instantaneous flows (Qi) and total annual withdrawal (Qa). Under 2044 high demand MDD conditions, the City does not have sufficient Qi water rights to meet all demands for retail, firm wholesale and interruptible wholesale customers. Should this occur, the City could purchase water from Tacoma through wholesale interties to meet demands. It is worth noting that this evaluation assumes 2.5 mgd of demand from LMWD who has an interruptible wholesale agreement with the City and would only be supplied as water is available to be provided, so this condition is expected to be unlikely.

The City has established a policy of maintaining the capability to supply the MDD while the largest water source is out of service. The system analysis documented in this chapter confirms that, with projected demands over the 20-year planning period, the City will maintain the capability to meet MDD with the largest pumping source is out of service with the use of the Tacoma interties as an available source.

Mitigation obligations due to the proposed water right for Wells 6, 7, and 8 are listed below and are described in detail in the Conceptual Mitigation Plan (**Appendix S**):

- Mitigation of impacts to Green River,
- Mitigation of impacts to White River, and
- Mitigation of impacts to Mill Creek.

Water Use Efficiency measures described in **Chapter 4** will be applied to the expanded supplies from Wells 6 and 7 and the new supply from Well 8 if the pending water right is approved.

Aside from the pending water right application, the City has several projects planned over the 20-year horizon to improve supply production or fully utilize their existing water rights, as discussed in **Section 3.1.2**.

3.5 Summary of System Deficiencies

Table 3-35 provides a summary of the system deficiencies described in this chapter. Proposed improvements include pump station improvements, storage improvements, and distribution system improvements. Total project costs and the anticipated source of funding for each project are provided in **Chapter 8**.

Table 3-35 | Summary of System Deficiencies

CIP Improvement	Classification of Deficiency	Description of Project Solution	Location in WSP Where Deficiency is Identified	Location in WSP Where Analysis Demonstrates Deficiency will be Addressed by Project
Supply Improvements	Reliability, Resiliency	• Coal Creek Springs Rehabilitation • Well 2 Replacement • Well 2 and Well 6 Cleaning Program • Wells 5/5A Upgrades • Well 7 Back-up Power • Algona Well 1 Study	Section 3.1.2	Section 3.1.2 and Chapter 8

CIP Improvement	Classification of Deficiency	Description of Project Solution	Location in WSP Where Deficiency is Identified	Location in WSP Where Analysis Demonstrates Deficiency will be Addressed by Project
Treatment Improvements	Reliability	• Wells 3A/3B Treatment • Well 5 Chlorination • Well 7 Treatment • Coal Creek Springs Chlorination Building Replacement • Wells 1 and 4 On-site Chlorination Improvements • Fulmer Field CCT Facility Chlorination Improvements	Section 3.1.3	Section 3.1.3and Chapter 8
Storage Improvements	Growth, Fire Flow, Reliability, Resiliency	• Reservoir 2 Valve Improvements • Reservoirs 4 and 8 Seismic Rehabilitation • Additional storage in the Valley Service Area	Section 3.1.4 and Section 3.4.6	Section 3.1.4, Section 3.4.6, and Chapter 8
Pump Station Improvements	Reliability, Fire Flow	• Modifications to Lea Hill BPS/Intertie PS	Section 3.4.5	Section 3.4.5 and Chapter 8
Distribution Improvements	Growth, Fire Flow	• Coal Creek Springs Transmission Improvements • West Hill Springs Transmission Improvements • Replacing and upsizing pipelines where needed	Section 3.1.2 and Section 3.4.7	Section 3.1.2, Section 3.4.7, and Chapter 8

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CHAPTER 4

Water Use Efficiency Program

The purpose of this chapter is to describe the water system's program to improve water use efficiency (WUE). WUE contributes to the long-term water supply reliability and promotes good stewardship of the state's water resources.

This chapter addresses the following topics.

4.1 Source and Service Metering
4.2 Distribution System Leakage
4.3 Water Use Efficiency Program
4.4 Water Use Efficiency Savings
4.5 Climate Change Resiliency

Table 4-1 lists the requirements of the WUE Rules from the DOH 2020 Water Use Efficiency Guidebook and reflects the City's level of compliance with these requirements.

Table 4-1 | WUE Rule Requirements

Category	Requirement	City of Auburn Compliance Status
Meters		
	Meter all sources.	Yes, all sources are metered.
	Meter all service connections.	Yes, all services are metered.
Data Collection		
	Provide annual consumption by customer class.	Yes, provided in Section 2.2.2.
	Provide "seasonal variations" consumption by customer class.	Yes, provided in Section 2.5.
	Evaluate reclaimed water opportunities.	Yes, provided in Section 4.3.5.
	Consider water use efficiency rate structure.	Yes, the City has an inverted block rate structure to promote conservation.
	Provide monthly and annual production for each source.	Yes, provided in Section 2.3.1.
Distribution System Leakage		
	Calculate annual volume and percent using formula defined in WUE Rules.	Yes, distribution leakage is calculated and reported in Section 4.2.
	Report annually: annual leakage volume, annual leakage percent, and for systems not fully metered, meter installation progress and leak minimization activities.	Yes, distribution leakage is reported to DOH on an annual basis.
	Develop water loss control action plan (if leakage is over 10% for 3-year average).	N/A, system has a 3-year average water loss of less than 10%.
Goals		
	Establish measurable (in terms of water production or usage) conservation goals and re-	Yes, measurable goals were established via a public process. See Section 4.3.3.

Category	Requirement	City of Auburn Compliance Status
	establish every 6 years. Provide schedule for achieving goals.	
	Use a public process to establish goals.	
	Report annually on progress.	Yes, report submitted annually to DOH.
WUE Program		
	Describe existing conservation plan.	Yes, see Section 4.3.
	Estimate water saved over last 6 years due to conservation program.	Yes, see Section 4.3.1.
	Describe conservation goals.	Yes, see Section 4.3.3.
	Implement or evaluate 1-12 measures, depending on size. Nine measures for City of Auburn.	Yes, see Section 4.3.4.
	Describe conservation programs for next 6 years including schedule, budget, and funding mechanism.	Yes, see Section 4.3.6.
	Describe how customers will be educated on efficiency practices.	Yes, see Section 4.3.4.
	Estimate projected water savings from selected measures.	Yes, see Section 4.4.
	Describe how efficiency program will be evaluated for effectiveness.	Yes, see Section 4.3.1.
	Estimate leakage from transmission lines (if not included in distribution system leakage).	N/A, transmission line leakage included in distribution system leakage as system does not have true transmission lines.
Demand Forecast		
	Provide demand forecast reflecting no additional conservation.	Yes, provided in Section 4.4.
	Provide demand forecast reflecting all "cost effective" evaluated measures.	
Performance Reports		
	Develop annual report including goals and progress towards meeting them, total annual production, annual leakage volume and percent and, for systems not fully metered, status of meter installation and actions taken to minimize leakage.	Yes, reports will be submitted annually to DOH.
	Submit annually by July 1 to DOH and customers and make available to the public.	

4.1 Source and Service Metering

4.1.1 Source Meters

Source meters, also known as production meters, measure the amount of water emitted from the City's springs and wells. Each of the City's sources are metered to measure the amount of water produced. The meters are calibrated annually by an outside contractor under the direction of the Water Operations Supervisor to ensure an accurate accounting of water produced. If a meter cannot be calibrated properly, it is replaced with a new one. Propeller source meters are being replaced with electromagnetic (MAG) meters in conjunction with planned capital improvements projects, or as the budget allows.

Table 4-2 | Source Meter Details

Source Meter ID	Manufacturer	Meter Type	Meter Size	Years in Service	Date of Last Calibration
Coal Creek Springs	Siemens	Magnetic	24-inch	26	August 2023
West Hill Springs	Siemens	Magnetic	10-inch	10	Unknown
Algona Well 1	N/A	N/A	Not in use	Not in use	Not in use
Valley Well 1	Siemens	Magnetic	12-inch	14	August 2023
Valley Well 2	Siemens	Magnetic	10-inch	24	August 2022
Valley Well 3A	Sparling	Turbine	Not in use	Not in use	Not in use
Valley Well 3B	Sparling	Turbine	Not in use	Not in use	Not in use
Valley Well 4	Siemens	Magnetic	12-inch	39[1]	August 2023
Lakeland Well 5	Sparling	Turbine	8-inch	41[1]	August 2023
Lakeland Well 5A	Siemens	Magnetic	4-inch	34	August 2023
Lakeland Well 5B	Siemens	Magnetic	Not in use	Not in use	Not in use
Valley Well 6	Siemens	Magnetic	12-inch	24[1]	August 2023
Valley Well 7	Sparling	Turbine	Not in use	Not in use	Not in use

Note:

1. Years in service assumed to be from source's original construction date.

4.1.2 Service Meters

Water meters are installed on every service line to measure the quantity of water used by a customer per WAC 246-290-496 and City Code Chapter 13.06.320. All new direct service connections must be metered at the time-of-service activation per WAC 246-290-496(2)(d). All meters shall remain the property of the City and shall not be removed except by the City. In all cases where meters are lost, damaged or broken by carelessness, negligence, or willful actions of owners/operators of premises, they shall be replaced or repaired by or under the direction of the City. The actual cost of repairs or replacement of meters will be charged against the owners/operators. In case of nonpayment of fees, fines, charges, or penalties, the water shall be shut off and will not be turned on until all charges are paid.

In 2015, the City began installing an Automated Metering Infrastructure (AMI) system, as a part of the Water Meter and Billing System Improvements project, which was completed in 2018. With the new AMI system, the City automatically receives meter reads via radio transmission and can integrate the data into the billing software. The benefits of an AMI system include increased accuracy and efficiency, early leak detection, and improved customer service. The AMI system is anticipated to have a 20-year life, including the system components and batteries in the radios.

In conjunction with the AMI system installation, the City also completed a meter changeout in 2018. Since 2015, the City has installed 15,156 meters, ranging in size from ¾ inch to ten inches. Meter replacement will be on a 20-year program to coincide with the AMI system. Large source meters and three-inch and larger commercial meters will be tested and calibrated annually. Small meters (less than three inches) are not calibrated.

All new service connections under three inches, in addition to repairs, retrofits or replacements of existing services, are typically conducted by Water Distribution Staff unless unusual circumstances arise. Meter services consist of meters, meter vaults, meter boxes, service lines, valves, setters, re-setters, and other associated equipment.

- Small Meters (3/4 to two inch)
    - Replacement Cost: $700 - $1,620
    - New Installation Cost: $550 - $1,500
- Large Meters (three to eight inch)
    - Replacement Cost: $3,300 - $12,000
    - New Installation Cost: $2,800 - $11,500

The City uses master meters when beneficial to the City and its customers. Master meters are used at certain locations such as mobile home parks, the Auburn Business Park (formerly the Federal General Services Administration Property), and Muckleshoot Indian Tribe (MIT) commercial properties.

4.1.2.1 Large Meters

Large meters are used to measure water consumption by customers with significant demand requirements. They are usually employed by the following customer classes.

- Commercial
- Farms or Parks – Irrigation
- Schools
- Multifamily Complexes
- Industrial / Manufacturing Businesses
- Wholesale Customers
- Municipal Buildings

Large meters are defined as water meters three inches or larger and new meters are installed by contractors rather than City maintenance staff. There are a total of 127 large meters in the City's system. All large meters are calibrated for accuracy each year, usually between the months of April and June, as part of the City's System Loss Program. Calibration of large meters is conducted by an outside contractor, but two maintenance staff members under the direction of the Water Distribution Supervisor assist in the process. If a meter cannot be calibrated, it is replaced with a new one by City maintenance staff.

4.2 Distribution System Leakage

Distribution System Leakage (DSL) represents the difference between production and documented water use (retail, wholesale, and authorized unmetered). It may include inaccurate master and service connection meters, unaccounted-for non-revenue water use, pipeline leakage, and unauthorized use. DSL does not include authorized water usage such as water used for fire protection, flushing, construction, and other maintenance and operations practices. However, to be credited, this must be accounted for by metering or estimating using credible means.

The DSL is calculated as the difference between the total amount of water produced and the sum of water sold plus any authorized unmetered water usage. The City's estimated DSL for 2015 through 2022 is presented in **Chapter 2**, **Error! Reference source not found.1**. For the City's water system, the 2022 three-year rolling average DSL was 6.8 percent of total production (corrected value submitted by the City to DOH in 2024). This falls below the DOH requirement that the three-year average DSL be under ten percent to minimize water waste.

The City is committed to maintaining DSL below the required ten percent and is actively working to identify and minimize DSL. To minimize DSL, the City has ongoing leak detection, meter calibration, and an active repair and replacement program for water system infrastructure, as detailed in **Chapter 6 – Operations and Maintenance**. The City completes a leak detection study of 25 percent of the water distribution system every year to detect and fix leaks. Additionally, the City has recently increased its efforts to reduce non-payment of bills and water theft. The City recently completed a major SCADA system upgrade in 2024. These investments should significantly increase the City's ability to measure DSL both temporally and geographically. The resulting information may allow the City to better target its WUE activities to reduce DSL.

4.2.1 Water Audits

The City has implemented AMI throughout the system, completing installations between 2015 and 2018. AMI is a tool that improves the effectiveness of the WUE Program measures, providing detailed water use data for each customer that allows the City to better understand water use patterns and target WUE Program measures to specific customers. Data can be sent in real-time or stored for several weeks or months. Potential AMI capabilities vary depending on the chosen hardware and software however, most systems can aid in the WUE Program. Below is a summary of how the City can use the AMI data.

- Advanced algorithms and metering data will allow the City to identify customer leaks.
- Advanced metering will provide cost savings in the Leak Detection and Repair and Service Meter Replacements programs.
- Advanced metering will aid in the City's efforts to reduce non-payment of bills and water theft.
- By comparing production and customer water use, DSL can be evaluated in greater temporal and geographic detail. For example, DSL may be calculated by month or for a given service area.
- Advanced metering data will help the City identify groups of customers to target for WUE measures and can be used to track the effectiveness of the measures for the same customers.
- Advanced metering data will allow additional reporting options to educate customers, such as their peak water use.

The City reports DSL annually; refer to **Appendix M** for the previous three annual WUE reports. The newly installed AMI system will provide substantial benefits for the WUE Program and improve savings, further outlined in **Section 4.4** of this chapter.

4.3 Water Use Efficiency Program

In 2003, the Washington State Legislature passed the 2003 Municipal Water Law (MWL) which added a requirement that water purveyors use water efficiently. This law was expanded in January 2007 with the WUE Rule and has since been updated. WUE requirements are listed under WAC 246-290 and include:

- Publicly establishing a water savings goal.
- Evaluating water use efficiency opportunities specific to each community.
- Developing a WUE planning program.
- Meter installation on all customer connections by January 22, 2017.
- Achieve a standard of no more than ten percent water loss, on a three-year rolling annual average.
- Annual reporting on WUE progress.

The City's WUE Program provides for efficient water use and supports continued growth. This program fulfills all the necessary requirements of DOH. The selected program measures will allow the City to meet its WUE goals, resulting in decreased water demand. Measures are interrelated and will help the City achieve its goals to both reduce average water use and peak water use per customer. Public education measures (showing water use in bills, workshops, school outreach, fairs/trade shows, etc.) will continue to be a focus of the WUE Program to increase customer awareness and knowledge of WUE opportunities. Public education is needed to support the City's other WUE measures and to support reductions in both average and peak water use. Continued appliance rebates and shower head giveaways help customers implement what is learned in the public education campaign. With the implementation of AMI, it is expected that the City and customers will be able to identify more water loss reduction opportunities than previously possible. Therefore, customer and City leak detection, water audits, and meter repair and replacement may have a prominent role in the 2024-2034 WUE Program. The program will also continue to provide financial disincentives for excessive water use through metering and WUE pricing. This aspect of the program is likely to help reduce peak water usage further. These measures will result in the City being able to achieve its WUE goals, which includes reduced demand.

The 2024-2034 WUE Program will be a continuation of the City's successful existing WUE Program. The program has also been updated to leverage the City's investments in improved SCADA, leak detection, and AMI. The 2024 Plan complies with regulations as set forth in WAC 246-290-830 and DOH's 2020 Water Use Efficiency Guidebook. This section summarizes the program's goals, demand and supply side measures, reclaimed water, and DSL. The projected demand with the conservation goals, program budget, and cost savings are also presented.

4.3.1 Program Requirements

The WUE requirements emphasize the importance of measuring water usage and evaluating the effectiveness of the City's program. There are three fundamental requirements of a WUE Program that the City follows.

- **Planning Requirements** – Municipal water suppliers are required to:
  - Collect data.
  - Forecast demand.
  - Evaluate WUE measures.
  - Calculate DSL.
  - Implement a WUE Program to meet their goals.

- **Distribution Leakage Standard** – Municipal water suppliers are required to meet a distribution system leakage standard to minimize water loss from their distribution system.

- **Goal setting and performance reporting** – Municipal water suppliers are required to set WUE goals through a public process and report annually to their customers and DOH.

The DOH requires that the City estimate the amount of water saved through implementation of the system's WUE program over the last six years. **Table 4-3** shows the average day demand per-capita from 2017 to 2022. Water use per-capita dropped from 112 gpd per capita in 2017 to 105 gpd per capita in 2022. The net water savings over this period equates to approximately 148.0 million gallons or 29.6 million gallons per year. This was calculated by multiplying the population for each individual year (over the six-year period) by the difference in calculated savings in gpd per capita year after year. The result was then multiplied by the total days in each year. Annual totals were summed for the entire six-year period.

Table 4-3 | Annual Average Day Demand (gpd) per Capita[1]

2017	2018	2019	2020	2021	2022
112	109	106	100	106	105

Note:
1. Average day demand per capita was calculated by dividing the Average Day Demand from **Table 2-9** by the population served from **Table 2-1** and converting to gpd.

4.3.2 Mandatory Measures

The WUE Program includes supply side measures that the City implements to understand and control leakage including new meters, leak detection surveys, and water audits. Per the WUE requirements, the following measures shall be continued for the 2024-2034 WUE program.

- Install production (source) meters.
- Install consumption (service) meters.
- Perform meter calibration.
- Implement a water loss control action plan to control leakage if the three-year rolling average exceeds ten percent.
- Educate customers about water use efficiency practices.

Additionally, the following measures that must be evaluated are:

- Rates that encourage water demand efficiency (discussed in **Chapter 9**)
- Reclamation opportunities (discussed below)

The City has complied with these requirements in the past and will continue to comply with these regulations.

4.3.3 Program Goals

Per the WAC 246-290-830(4)(a), all water purveyors with 1,000 or more connections were required to set efficiency goals through a public process. The City has chosen to focus on implementing voluntary measures to decrease both the average and peak water usage. The 2024 program has established the following goals.

- <u>Water Use per ERU Goal:</u> Decrease the planning ERU value (gpd/ERU) one percent annually from the current planning ERU value of 182 gpd/ERU, which is the 75th percentile of eight years of historical data (2015 – 2022). Revaluate goal when the planning ERU value reaches less than 172 gpd/ERU.
  - To be conservative, an ERU planning value higher than the average was used by the City for demand forecasting. The 75th percentile of the eight-years of data was used to select the planning ERU value of 182 gpd. This methodology is consistent with the City's 2015 Plan. The ERU value of 182 gpd is seven percent lower than the 2015 Plan's ERU planning value of 195 gpd per ERU.

- MDD/ADD Peaking Factor: Decrease the planning peaking factor from the current 1.96, which is equal to the 75th percentile of eight years of historical data (2015-2022), to a planning peaking factor of less than 1.81, the average peaking factor from 2015-2022.

- Distribution System Leakage: Maintain three-year average DSL under ten percent to minimize water waste.

- Customer Support: Provide the service and support necessary to those water customers expressing a desire to conserve water as a part of their environmental ethic and as a means of minimizing water bills.

The WUE Program measures, as summarized below, are designed to help meet these established goals.

4.3.4 2024-2034 Demand-Side Program Measures

To encourage WUE and support customers, the City has incorporated program measures that target demand reductions. Under the WUE requirements, a program measure may include water efficient devices, actions, business practices, or policies that promote efficient water use. With 14 measures as part of the 2024 Program, the City exceeds the minimum DOH requirement of nine measures. WUE measures can target specific customer classes or a combination of customer classes. The City's demand-side program measures are summarized below.

1. School Outreach: The City will continue to participate in programs arranged to educate students on efficient water usage as requested by schools.

2. Speakers' Bureau: The City will seek speaking opportunities to discuss efficient water use with a wide audience spectrum. Topics could include water efficient fixtures and appliances, curbing seasonal peak demands, lawn watering practices, etc.

3. Program Promotion: The City will seek opportunities for social media, television, and/or radio public service announcements for WUE and submit news articles to local papers and Auburn Magazine on efficient water usage especially during the spring and summer months.

4. Theme Shows/Fairs: The City hosts an annual Kids Day fair. The fair includes a wide range of activities for all ages of kids. As part of the fair, the City has fun, water-related activities and provides water efficiency brochures and other materials. The City will conduct outreach at other Theme Shows/Fairs if requested. Water saving device kits are distributed to interested single-family and multiple-family residential customers.

5. Water Audits: The City will conduct a water audit upon the request of a customer, including industrial, commercial, and institutional customers. The audits will review items such as: recirculation of cooling water, reuse of cooling and process water, reuse of treated wastewater, efficient landscape irrigation, low water using fixtures, fixing leaks, and process modifications.

6. Customer Leak Detection: The City identifies potential leaks through investigation of the water meter upon request of customers. The City runs multiple reports in the AMI system to analyze data and investigate water meters to identify leaks.

7. Bills Showing Consumption History: The City will continue to provide customer bills showing the previous year's water usage. The City provides water usage information from AMI on the customers e-portal.

8. Water Saving Device Kits: The City will participate in distribution of water use efficiency kits through education events such as speakers' bureaus, theme shows, fairs, and through bill insert request forms.

9. WUE Pricing: The City has an inverted block rate structure for single-family residential customers to encourage WUE. The City will consider WUE in future cost of service/rate studies. Studies should determine the most appropriate water structures and rate levels to achieve the City's WUE goals, while generating sufficient revenues for utility operations. It is recommended that the studies consider uniform rates by class, inverted block rates, seasonal rates, and excess use rates.

10. Water Efficient Toilet Rebate Program: The City will continue to provide rebates to customers that replace old toilets with new high-efficiency toilets through their Environmental Protection Agency (EPA) WaterSense Toilet Rebate program.

11. Low-Flow Shower Heads Giveaways: The City gives away free low-flow shower heads at the Utility Billing Counter.

12. School Outdoor Water Use Reduction: The City will target schools to reduce their outdoor water consumption. Water audits and education on the benefits of replacing inefficient irrigation systems or landscaping (including turf) will be conducted.

13. City Water Use Reduction: The City will audit the water use of City accounts to identify both indoor and outdoor water saving opportunities. The Water Utility staff will help educate City account holders on WUE; however, no water budget has been allocated to implement water saving devices at City facilities.

14. Rainwater Harvesting: The City will evaluate implementation of a rainwater harvesting (rainwater reclamation) promotion program as a means to reduce irrigation water usage by commercial, public, and residential customers. The City's Stormwater Utility's requirements to use Low Impact Development (LID) measures, where feasible, strives to keep rainwater on the property, further reducing irrigation demands.

It is important to note that in addition to the water cost savings for the WUE measures, other benefits result, both to the utility and to its customers, from WUE activities. Such additional benefits could include:

- Significant customer energy savings because water heaters are the second largest energy users in the home. Hot water use can be reduced by almost one-third by cost-effective WUE measures, such as water efficient fixtures and appliances. Significant energy savings can also occur for industrial processes requiring water heating and other power uses.
- Efficient landscaping and irrigation techniques save on maintenance costs.
- Reductions in water production decrease energy required by utilities to treat and distribute water and to collect and treat wastewater. Chemical costs are also reduced in water and wastewater operations.
- System measures could provide substantial benefits in addition to water production cost savings including:
    - Identification of non-revenue water could result in recovery of unbilled revenue (inaccurate meters) and reduced unauthorized water usage (theft).

- Leak detection helps prevent major main breaks, which could result in significant repair costs to the utility.
- Leak detection reduces a utility's liability due to prevention of potential property damage.
- Repair and/or replacement of service and source meters allows a utility to recover unbilled water revenues.

4.3.5 Reclaimed Water

According to WAC 246-290-100 and the WUE requirements, water systems with over 1,000 connections must collect and evaluate information on reclaimed water opportunities. The City is committed to wastewater reuse and rainwater reclamation, as stated in its official water system policies summarized in **Appendix A**. The City participates in the King County reclaimed water program, which completed a Reclaimed Water Comprehensive Plan in 2012. Additionally, the City has completed the King County Water Reclamation Evaluation Checklist, included as **Appendix L**. Currently, there are no reclaimed water users in the City. The City considers the most likely candidates for use of reclaimed water to be the irrigation customer class. Since the City conveys all sewage to King County's regional sewerage system, there is not an opportunity for the City to sell reclaimed water and there is not currently an alternative reclaimed water source in the area.

The City will implement reclaimed water as a conservation measure and include these savings in the demand projections when specific opportunities arise. The City, in conjunction with King County, may develop projects or consider participation in water reuse projects and programs developed by adjacent purveyors and others as appropriate. The efforts may include demonstration or pilot projects developed in accordance with applicable federal, state, and local laws and regulations.

4.3.6 WUE Budget

The City has established a budget for each program measure from 2023 to 2029, as required per WAC 246-290-810 4.e, shown in **Table 4-4**. WUE measures are funded through rates.

Table 4-4 | Annual WUE Budget

Measure	2023	2024	2025	2026	2027	2028	2029
School Education (NPDES & Water)	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000
Conservation Public Education/ WQ Report	$6,350	$6,350	$6,350	$6,350	$6,350	$6,350	$6,350
Toilet Rebates & Low-flow Shower Heads	$11,000	$11,000	$11,000	$11,000	$11,000	$11,000	$11,000
Large Meter Test/Repair/Replace	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000
WSP Update (WUE)	$22,000	-	-	-	-	-	-
Total	**$89,350**	**$67,350**	**$67,350**	**$67,350**	**$67,350**	**$67,350**	**$67,350**

4.4 Water Use Efficiency Savings

The WUE Program primarily provides cost savings in two ways, reducing demand and reducing DSL. Reducing demand may reduce or delay capital projects for additional supply and expanded distribution infrastructure. Reducing DSL can provide additional revenue, as well as increase the efficiency of supplying existing water uses. Additionally, advanced metering will provide cost savings in the Leak Detection and Repair and Service Meter Replacements programs.

The City has completed a cost analysis of their proposed WUE Program using historical data and projected annual water savings. **Table 4-5** shows projected demands with and without annual water savings. This analysis maintains the target water use efficiency goal of one percent reduction per year in the planning ERU value. This goal will be reached through implementation of the proposed program measures. These reductions in demand can be translated into tangible benefits once realized, such as more time before new sources must be developed, increased ERUs that can be served by the existing water infrastructure, and cost savings in power and water treatment.

Table 4-5 | Demand Forecast With and Without Projected WUE Savings

Year	ADD (mgd)				MDD (mgd)			
	Without WUE	With WUE	Savings	% Savings	Without WUE	With WUE	Savings	% Savings
2024	7.07	7.00	0.07	1%	13.88	13.74	0.14	1%
2025	7.16	7.02	0.14	2%	14.06	13.78	0.28	2%
2026	7.26	7.04	0.22	3%	14.25	13.82	0.43	3%
2027	7.35	7.06	0.29	4%	14.43	13.86	0.58	4%
2028	7.45	7.08	0.37	5%	14.63	13.90	0.73	5%
2029	7.55	7.10	0.45	6%	14.82	13.93	0.89	6%
2030	7.65	7.12	0.54	7%	15.02	13.97	1.05	7%
2031	7.76	7.14	0.62	8%	15.23	14.01	1.22	8%
2032	7.85	7.15	0.71	9%	15.43	14.04	1.39	9%
2033	7.97	7.17	0.80	10%	15.64	14.08	1.56	10%
2034	8.08	7.19	0.89	11%	15.86	14.11	1.74	11%

4.5 Climate Change Resiliency

In 2023, the Washington State Legislature passed House Bill 1181, which requires all group A community public water systems serving 1,000 or more connections to include a climate resilience element in water system plans initiated after June 30, 2025. Though this requirement is not yet in effect, the following section is included to initiate discussion and planning for climate resilience and to supplement the Climate Element being incorporated into the City's 2024 Comprehensive Plan update.

4.5.1 Expected Climate Changes for the City of Auburn

Climate is a key factor driving water use as temperature, precipitation, and other climate-driven weather patterns affect irrigation, and commercial and industrial cooling. Auburn's maritime climate is characterized by wet cool winters and dry warm summers. The City's temperate climate is largely protected from continental weather by the Cascade Mountains to the east.

According to the publication Climate Change Impacts and Adaptation in Washington State, Washington State is projected to experience decreases in snowpack, increases in stream temperatures, and widespread changes in streamflow timing, flooding, and summer minimum flows. Climate change is expected to cause more frequent summer water shortages, especially in fully allocated watersheds with little management flexibility. The average spring snowpack in Washington is projected to decline by 38 percent to 46 percent by the 2040s[1].

To estimate the impact of this change in climate on the City's water demands, results from the Water Supply Forum's 2009 Regional Water Supply Outlook (WSF 2009 Outlook) were used. The impacts of climate change on sources that rely on groundwater are mostly unknown due to the variability between aquifers and site-specific effects, such as recharge rates.

Continued increases in average annual and seasonal air temperatures in the Puget Sound are projected due to climate change, as well as increases in extreme heat. Projected changes in annual precipitation are generally minor, although summer precipitation is projected to decrease and heavy rainfall events are projected to become more severe[2].

No changes to demand projections were made for the 20-year planning period to account for potential climate change due to the uncertain magnitude and timing of local effects. However, it is recognized that demands have the potential to increase in the future given these changes. In the event the City experiences an increase in demand, to understand the scale of the impact, the City will run a model of the City water system that would compute firm yield from inputted streamflow data, replacing historic inflows with projected inflows from three climate change scenarios as described by the WSF 2009 Outlook. Those climate change scenarios for King County are provided in **Table 4-6**.

Table 4-6 | Predicted Increase in Demand from Baseline Due to Climate Change[1]

Climate Change Scenario	2005	2020	2030	2040
Baseline	0.0%	0.0%	0.0%	0.0%
Warm	3.5%	4.4%	4.9%	5.4%
Warmer	4.6%	4.9%	5.8%	7.4%
Warmest	4.8%	6.2%	7.6%	9.5%

4.5.2 Extreme Weather Events and Significant Challenges

To meet the requirements for risk and resilience assessments in America's Water Infrastructure Act (AWIA) of 2018, the City completed a Risk and Resilience Analysis (RRA) in December 2020 using the EPA's Vulnerability Self-Assessment Tool (VSAT). VSAT was developed to serve as an all-hazards assessment tool for water and wastewater utilities of all sizes and addresses malevolent acts, dependency/proximity threats, and natural hazards. Through this effort, the City has identified the following assets as the most vulnerable to flood hazards.

- Coal Creek Springs aquifer
- Coal Creek Springs and West Hill Springs piping
- Valley Aquifer (Wells 1, 2, 3A, 3B, 4, 6, 7)
- Green River and Lea Hill pump stations

[1] Climate Change Impacts and Adaptation in Washington State: Technical Summaries for Decision Makers (uw.edu)
[2] *2009RegionalWaterSupplyOutlook.pdf (amazonaws.com)

- Distribution System

Climate change exacerbates existing challenges with flooding, landslides, droughts, wildfire, and other natural hazards by potentially changing the frequency, intensity, and duration of these events. Heavier rainfall increases the threat of flooding. In addition to immediate flood threats, flood waters can damage and contaminate wells and water treatment plants resulting in short-term outages and increased risk of waterborne diseases in drinking water. Higher levels of pathogens in runoff from areas around drinking water wells and surface water intakes from flooding of the wells themselves.

In October 2018, the Intergovernmental Panel on Climate Change (IPCC) released the Special Report on Global Warming of 1.5 degrees Celsius (^{O}C). Warming of 1.5^{O}C is projected to decrease summer streamflow in the Puget Sound by 23 percent. Average temperatures in 2015 were 2.7^{O}C warmer than pre-industrial era temperatures which resulted in low summer streamflow and warmer waters[3]. According to the King County Climate Change GIS map "Summer Runoff: Change, 2040s", summer (July-September) runoff in the City of Auburn is expected to decrease by 2.4 percent by the 2040s from historical conditions (1970-1999)[4]. The WSF 2009 Outlook believes the region is reasonably well prepared for drought, however further actions could improve drought preparation. During droughts, water supplies may fall short of meeting demands, especially in summer months. In the past, water utilities in the Puget Sound have adapted to fluctuations in water supplies from droughts through reservoir management and system adaptations such as long-term conservation programs and short-term demand curtailments[1].

Warming of 1.5^{O}C is also expected to bring larger and more frequent wildfires, which could disrupt regional water supplies. Significant water quality impairments from a wildfire include increased turbidity and introduction of radionuclides, metals, and fire-retardant chemicals[5], although impacts to the City's water quality is not likely as there are not surface water sources. The City can maintain existing emergency interties to mitigate wildfires that affect adjacent systems more severely than the City's. While the City contains land that is considered Wildland-Urban Interface, the United States Forest Service has classified the City as either Very Low or Non-burnable in its Potential Wildfire Hazard GIS map (2020)[6].

4.5.3 Assessment of Actions to Protect System

In the face of continued warming, there are actions the City can take to improve the resiliency of the water system from the impacts of climate change. Below are possible short-term and long-term actions for the City to consider. The short-term measures can improve resiliency within three to five years while the long-term measures may require decades to be fully implemented[5].

4.5.3.1 Short-Term Actions

Source Inventory: Identify sources that will remain online in the event of a 100-year or 500-year flood. Utilize GIS or other mapping tools to create a map to visualize which sources are at risk of inundation in such events. Develop protocols for isolating these sources. Determine how sources could be used for critical health and safety following an extreme weather event and how these sources relate to emergency shelters and critical facilities, such as hospitals.

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[3] NoTimeToWaste_CIG_Feb2019.pdf (uw.edu)
[4] https://climate-kingcounty.opendata.arcgis.com/maps/bab86832a962416cbdbb35644dacb11b
[5] Phase2SummaryReport20180731FINAL.pdf (amazonaws.com)
[6] https://hub.arcgis.com/datasets/usfs::wildfire-hazard-potential-version-2020-classified-image-service/explore?location=47.307822%2C-121.937736%2C10.98

Groundwater Supplies: Develop new groundwater supplies or augment existing groundwater supplies to improve drought resiliency and offset challenges posed by the wetter winters and drier summers expected with warming temperatures. Establish models to understand the effects of drier summers and increased risk of drought on groundwater supplies. Evaluate impacts of lower snowpack levels in the Cascade Mountains on aquifer recharge.

Wildfire Mitigation: Evaluate fire-fighting capacity for open space areas such as Game Farm Park and Wilderness Area.

Interaction with Research Community: Build and sustain routine interactions with the research community on the subject of climate change and water supply. Consider opportunities to fund water-industry research with direct application to water supplies in western Washington. Explore opportunities to have imbedded persons, such as employing a scientist with climate change expertise.

Rate Factors: Implement less frequently used rate factors, such as a rate for drought periods, to encourage lower demands.

Floodproofing: Build flood barriers such as levees and dikes to protect critical infrastructure. Elevate critical equipment or place it within waterproof containers or foundation systems.

Power Supplies: Extreme weather events can cause power outages. Consider alternative or on-site power supplies to provide resiliency during such events.

4.5.3.2 Long-Term Actions

Monitor Aquifer Conditions: Establish a program of long-range monitoring of aquifer recharge and water levels as affected by climate change. Assess risk of saltwater intrusion. Establish models to assess source redundancy in extreme drought events.

Green Infrastructure: Apply green infrastructure strategies to collect and manage stormwater. Regional or water-shed scale plans for stormwater management can be more cost effective than individual plans.

Water Use Efficiency: Continue to invest in and evaluate WUE programs to reduce water consumption and improve efficiency. Consider partnering with King County to assess reclamation and reuse programs to augment non-potable water demands.

Water Rights: Invest in permanent or mobile infrastructure to ensure access to all available water rights to maximize available sources.

CHAPTER 5

Source Water Protection

The City relies on groundwater sources to meet current water supply demands. This chapter's objective is to update the City of Auburn's (City's) program to protect and improve source water used by the City. As the City's sources only include groundwater wells and springs which are not under the influence of surface water, a Watershed Control Program is not required.

This chapter addresses the following topics:

5.1 Sanitary Control Area

Sanitary Control Areas (SCAs) have been established for each of the City's water sources per WAC 246-290-135(2). An SCA is the front-line protection against contamination of the water source. The standard SCA for wells has a minimum radius of 100 feet from the wellhead. The standard SCA for spring sources has a minimum radius of 200 feet from the spring head. All City water sources have SCAs that were established and approved by DOH, and are documented in the susceptibility forms provided in **Appendix T**. All properties within the SCA for each water source are under the City's ownership and control.

5.2 Wellhead Protection Program

DOH has developed regulations that require Group A water systems using groundwater sources to develop and implement a Wellhead Protection Program (WHPP) in accordance with WAC 246-290-135. The basic elements required of a WHPP are:

- Assessment of initial groundwater susceptibility (physical susceptibility to contamination) for each water supply source,
- Delineation of the wellhead protection area (WHPA) that directly contributes groundwater to each water supply well,
- Identification of potential sources of contamination within each WHPA,
- Documentation of notification to owner/operators of known or potential hazards, and
- Development of spill prevention plans and water contingency plans that minimize or eliminate the possibility of contamination to the groundwater supply and development of options for maintaining water supply in the event the aquifer contributing to a source is contaminated.

The City maintains its WHPP for 12 groundwater sources. A WHPP was prepared in 2014 for the City's 2015 WSP; this remains the current WHPP for the City. The purpose of the WHPP is to help prevent the City's water supply from becoming contaminated and to develop contingency and emergency response procedures in case one or more sources are lost due to contamination. This is accomplished by providing

WHPAs around public groundwater sources, identifying existing groundwater contamination sources, and managing potential groundwater contamination sources prior to their entry into the drinking water system.

The WHPP provides tasks for the City to implement wellhead protection and the City prioritizes those tasks by criteria such as available staff, time to complete, cost, and urgency due to limited available resources. The City maintains an annual operating budget for implementing tasks related to the wellhead protection program, as well as identifying and monitoring potential new hazards. The City allocates budget annually for the Water Resources Protection Program, as discussed in **Chapter 8.**

5.2.1 Susceptibility Assessment

Susceptibility Assessment Forms have been completed by the City and submitted to the DOH. The forms are provided in **Appendix T**. The DOH's susceptibility assessment rating for each source is summarized in **Table 5-1.**

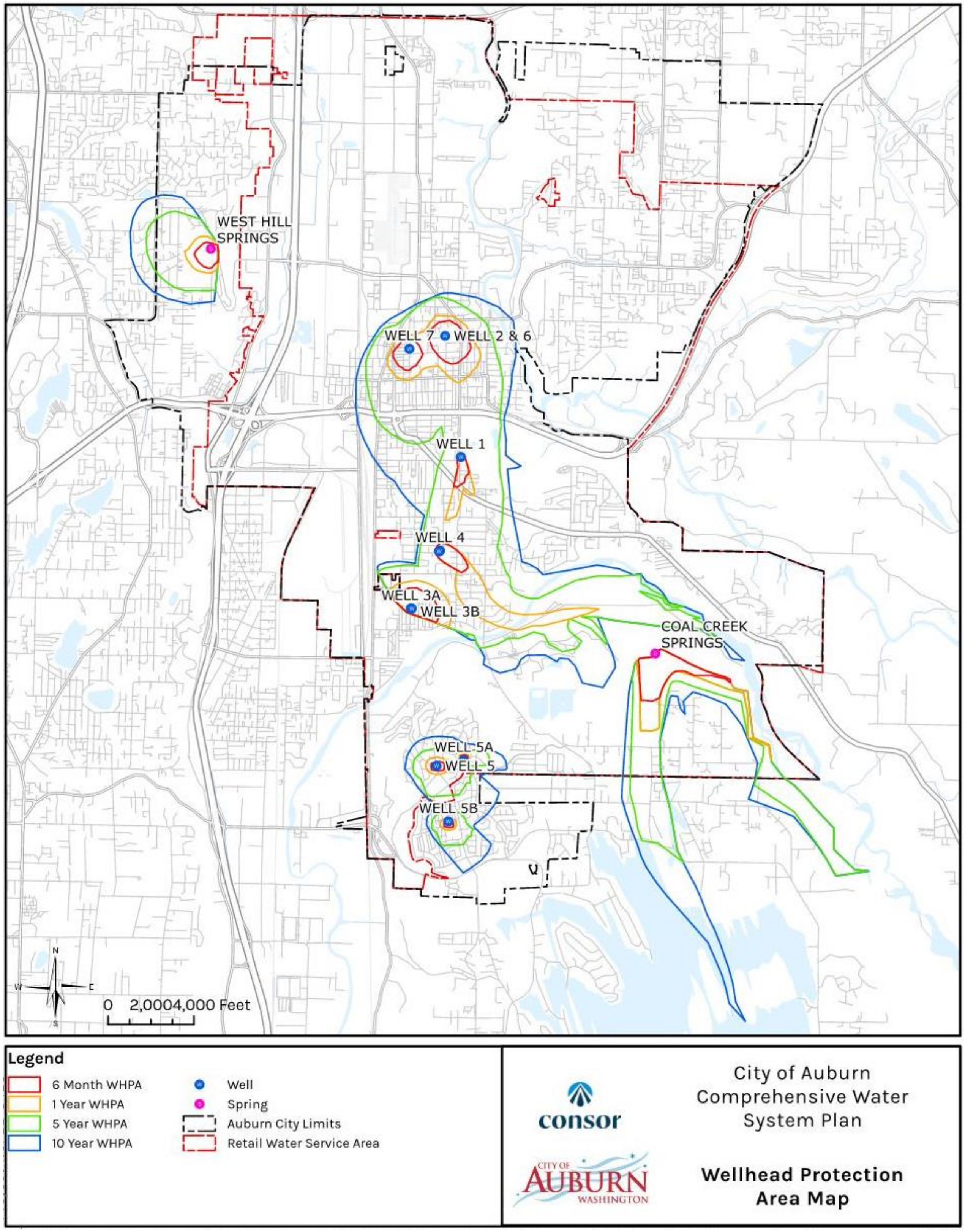
Table 5-1 | Source Susceptibility Assessment Ratings Issued by DOH

Source	Susceptibility Rating
Coal Creek Springs	High
West Hill Springs	High
Well 1	Moderate
Well 2	High
Well 3A	Low (Off-line)
Well 3B	Low (Off-line)
Well 4	Low
Well 5	Low
Well 5A	Low
Well 5B	Low (Off-line)
Well 6	High
Well 7	High (Off-line)

5.2.2 Wellhead Protection Area Delineation

The WHPA defines the area around a groundwater source that has the potential to contaminate the source. This area is based on the source's capture zones, which are the zones of the source aquifer and ground surface that can contribute water to the source in six months, one year, five years, or ten years. The City's 2014 WHPP largely replaced the initial plan created in 2000. The study area, physiographic settings, and WHPAs were defined in the 2000 WHPP and remain valid. Capture zones were delineated using a three-dimensional particle-tracking program with a steady-state head distribution created by a numerical model. The established WHPAs are shown in **Figure 5-1.**

Figure 5-1 | Wellhead Protection Area Map



5.2.3 Contaminant Source Inventory and Notification of Findings

A summary of potential contaminant sources for the City's water sources was updated in April 2024. The Contaminant Source Inventory (CSI) was updated utilizing Ecology's Facility/Site ID database. The contaminant sources are organized by water source and time travel zones, and are included in **Appendix T**.

DOH requires notifications be sent to landowners with potential contaminant sources, as well as state and local agencies, of the CSI findings. Letters and WHPA maps were mailed to landowners in June 2024; copies of the notification letter template and maps that were sent to landowners are included in **Appendix T.**

State and local agencies use the CSI findings and WHPAs to help prioritize local and state pollution control outreach, to provide incentives to landowners for risk reduction, and to support local land-use planning decisions. DOH requires that state and local emergency responders be notified of the WHPAs, results of the susceptibility assessment, CSI findings, and the contingency plan. Copies of the notifications sent to emergency responders and regulatory agencies, as well as the WHPA maps, are included in **Appendix T**. A list of state and local agencies that were sent notifications letters, along with the date of the notification is summarized in **Table 5-2**.

Table 5-2 | State and Local Agencies Notified of CSI Findings

Agency	Notification Date
Washington Department of Ecology	June 2024
Washington State Department of Health Southwest Regional Office	June 2024
King County Public Health	June 2024
Auburn Police Department	June 2024
East Pierce Fire and Rescue	June 2024
King County Fire Protection District 31	June 2024
Mountain View Fire and Rescue	June 2024
South King Fire and Rescue	June 2024
Valley Regional Fire Authority	June 2024

5.2.4 Contingency Plan

The City developed a Water Source Loss Mitigation Plan (City of Auburn Standard Operating Procedure 5.2.1) to address how the water system will provide consumers with adequate supply of potable water in the event one or more sources become temporarily or permanently unavailable; this plan is included in **Appendix T**. Should one water source be unavailable, the City has sufficient capacity across the remaining sources and interties to supply potable drinking water to its customers; water supply availability is evaluated in greater detail in **Chapter 3**.

CHAPTER 6

Operations and Maintenance Program

This chapter provides an overview of the City of Auburn's (City) Water Utility organization, operations and maintenance (O&M). The purpose of the chapter is to document existing procedures and to identify areas where improvements or changes could enhance system operation.

The following topics are addressed in this chapter:

- 6.1 Water System Management and Personnel
- 6.2 Operations and Preventive Maintenance
- 6.3 Comprehensive Water Quality Monitoring
- 6.4 Emergency Preparedness and Response
- 6.5 Safety Procedures
- 6.6 Cross Connection Control Program
- 6.7 Sanitary Survey Findings
- 6.8 Customer Complaint Response Program
- 6.9 Recordkeeping and Reporting
- 6.10 Summary of O&M Deficiencies and Recommended Improvements

6.1 Water System Management and Personnel

6.1.1 Mission Statement

The mission statement of the City's Water Utility is to provide for the efficient, environmentally sound, and safe management of the existing and future water system within the City's service area.

6.1.2 Department Overview

The Water Utility is responsible for providing potable water to the City's customers that meets or exceeds the recognized standards of today and the future by efficiently administering, operating, and maintaining the water supply. The Water Utility will also continue to enhance its customer service through public education and information. A primary responsibility of the Water Utility is implementing the Comprehensive Water Plan (Plan).

6.1.3 Internal and External Factors

The objective of the Water Utility is based on compliance with internal and external factors. An internal Work Plan Overview is generated at the beginning of each work year with a review process at the end of the year. The Work Plan Overview describes budget goals, performance measures, engineering tasks, capital projects, and maintenance and operations tasks. External factors include adoption of goals, recommendations, and standards established by the following regulatory or professional practice agencies:

- Washington State Department of Health (DOH)
- Washington State Department of Ecology (Ecology)
- American Public Works Association (APWA)
- Association of Washington Cities (AWC)
- Department of Homeland Security (DHS)
- American Water Works Association (AWWA)
- Washington Cities Insurance Authority (WCIA)
- Municipal Research and Services Center of Washington (MRSC)
- United States Environmental Protection Agency (USEPA)

6.1.4 Water Utility Division Organization

The Auburn Water Utility is operated as a utility enterprise under the direction of the Public Works (PW) Director. Specific Water Utility Management Responsibilities within the PW Department fall under either the Utilities-Water Section of Engineering Services or the Water Division of Maintenance and Operations Services.

The Utilities-Water Section of Engineering Services is responsible for comprehensive water system planning, development of a Capital Improvement Program (CIP), as well as programming the design, construction, and inspection of projects related to the water system.

The Water Division of Maintenance and Operations Services is responsible for operating and maintaining the water system, performing daily operation and inspection, water quality monitoring as required by DOH, and line management of the Water Utility.

The organization of the Water Utility is shown within the Public Works Organizational chart in **Figure 6-1**. The responsibilities of each staff within the Utilities-Water Section of Engineering Services, including professional and technical support staff from within Engineering Services that are not specifically within the Water Utility are summarized below.

- <u>Utilities Engineering Manager and Water Utility Engineer:</u> Primarily responsible for development of the comprehensive water plans, water capital facility plan, annual project budgeting, technical design, and construction standards, "as-built" drawings, and designs, utilized in the construction of the water systems facilities. They also provide technical computations, water modeling and other analysis required to support system operation. Additional responsibilities include engineering, consultant contracts, capital projects planning, and customer assistance with City code, drawings, and permits.

- <u>Water Quality Programs Coordinator:</u> Assist with the Water Quality and Water Conservation Programs and is responsible for compiling DOH sampling data and verifying DOH sampling was conducted per the sampling schedule.

- <u>City Engineer</u>: Responsible for issuance of the City's Design and Construction Standards. Responsible for the management and the design and construction of capital projects managed by Project Engineers, including consultant-designed projects and construction contractors. Under the direction of the City Engineer, GIS Specialists are responsible for the transfer of data from "as-built" drawings to the GIS database. GIS is a mapping software that records and locates infrastructure related to the water system. GIS Specialists are also responsible for provision of maps and statistics to staff within the PW Department.

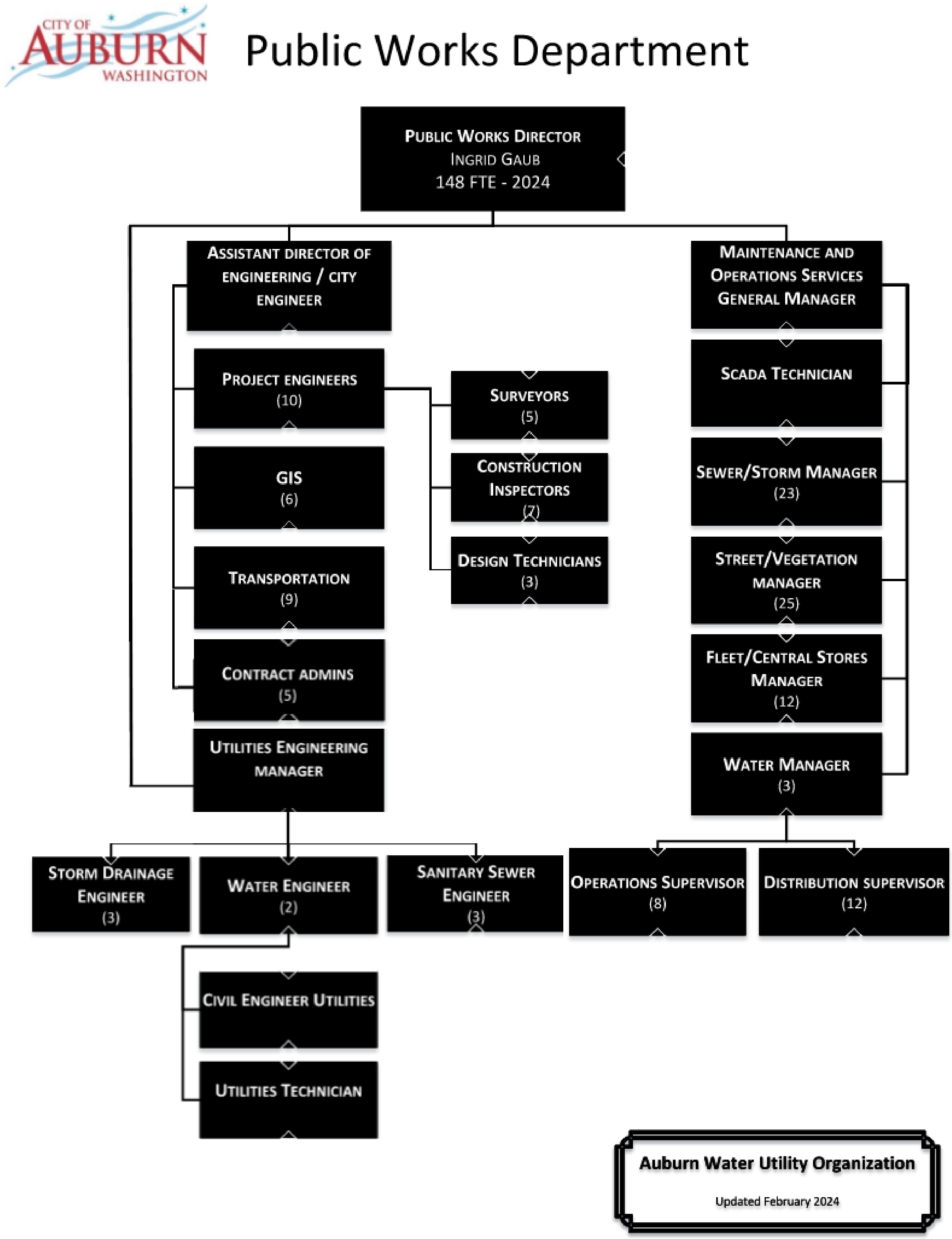
- Utilities Technician: Assist with certain permit-related activities involving the water system. The Technician is also responsible for customer inquiries, assistance with applications, tracking water system usage for reporting, and updating and updating water system records.

- Utilities Civil Engineer: Review City capital improvements and development projects pertaining to water system improvements and provides customer assistance regarding projects and permit activities.

Personnel lists for Engineering and Maintenance and Operation (M&O) staff that are responsible for daily operations are summarized in **Table 6-1** and **Table 6-2**. Operations staff provide daily O&M of wells, corrosion control treatment facilities, pump stations, and reservoirs. They also implement the cross connection control program and provide locating services for all City utilities. Distribution staff maintains the complete distribution system including water mains, valves, hydrants, pressure reducing stations, and meters.

The City has a mayor-council form of government; therefore, the PW Director reports to the Mayor. The City Council provides oversight of the Water Utility regarding policy, planning, and management of the water system.

Figure 6-1 | Auburn Water Utility Organizational Chart



6.1.5 Communication System

The City maintains a robust communication system to contact Water Utility personnel during normal work hours and after hours. This system is necessary to respond to customer requests, routine maintenance, or emergency situations. Maintenance staff vehicles and other rolling stock are all equipped with radios and personnel carry cellular phones. The Water Utility also has access to an inventory of portable emergency use radio units, should they be required.

A Standby Call-Out Program was initiated in 2006 to ensure that coverage for after-hours response was guaranteed. One staff member in Operations and one staff member in Distribution always carry a dedicated cell phone during their off hours. Standby duration runs for one week before responsibility is rotated to the next staff member on the roster.

Water problems involving service leaks, quality issues, main breaks, broken hydrants, etc., that occur outside normal working hours, are reported through the City's 911 emergency response system. An "Emergency Call-Out List" is provided to the emergency operators who will attempt to contact the designated standby Water Distribution or Water Operations employee, based on the type of service required. If contact cannot be made, the operator will contact the designated Standby Public Works Maintenance and Operation Manager.

Table 6-1 | Water Operations and Distribution Staff and Certifications

Position	Primary Function(s)	Certification(s)[1]
Water Manager	Management	Water Distribution Manager 4
Water Operations Field Supervisor	Management (Operations)	Water Distribution Manager 4, Water Treatment Plant Operator 1, Cross Connection Specialist
Water Distribution Field Supervisor	Management (Distribution)	Water Distribution Manager 3
Maintenance Lead (Distribution)	Management (Distribution)	Water Distribution Manager 2
Cross Connection Control Specialist	Cross Connection Control & Backflow Assembly Tester	Water Distribution Manager 1, Cross Connection Specialist, Backflow Assembly Tester
Distribution Specialist	Distribution Operations Maintenance	Water Distribution Manager 1
Maintenance Worker II / Locator	Operations & Distribution Maintenance	N/A
Maintenance Worker I	Operations & Distribution Maintenance	N/A

There are 12 staff members on the On-Call Manager Standby List and one of them has call-out responsibility for an entire week until it rotates to the next staff member. The 12 staff positions on the Standby List are:

- Water Manager
- Water Distribution Supervisor
- Water Operation Supervisors
- Sanitary Sewer and Storm Drainage Manager
- Sanitary Sewer Supervisor
- Storm Drainage Supervisor
- Streets and Vegetation Manager
- Street Supervisor
- Vegetation Supervisor

- Fleet/General Service Manager
- Maintenance & Operations (M&O) Support Supervisor
- M&O Services General Manager

There are also three other maintenance staff members on standby that can be called out as needed. The staff members are employed by Sanitary Sewer Division, Storm Drainage Division, and Street Division. The 911 operator also has phone access to the other Public Works staff, if the situation warrants it.

Telemetry alarms that occur after hours are handled by an automated Supervisory Control and Data Acquisition (SCADA) alarm and an automated dialer for notification called WIN911. The SCADA alarm calls standby staff from the WIN911 list. If no one responds within 15 minutes, then WIN911 calls the Water Operations standby staff on the call out list. The system will continue to cycle through the roster of seven employees until contact is made.

6.1.6 Operator Certification Program

The Washington Administrative Code (WAC) 246-292, requires minimum standards for the certification status of water operators. Also, the City has recognized the value of having a knowledgeable and well-trained staff operating the Water Utility and encourages employees to obtain the highest level of certification available. The City currently serves a population of greater than 50,000, which classifies their distribution system into a group 4 according to WAC 246-292-040. Certifications required per staff role are summarized in **Table 6-1**.

The City pays for annual certification fees, provides time and tuition for certification training courses, and allows time for certification examinations. In addition, the City provides opportunities for staff to obtain continuing education units (CEUs) to maintain certification. Professional growth requirements for certification CEUs are monitored and maintained by the Washington Certification Services.

6.1.7 Education and Training Program

Continuing educational opportunities are fundamental for staff in the Water Utility. The Water Utility training budget is funded to support staff in maintaining their technical awareness and skill sets. Seminars, conferences, and college coursework: 1) broaden their knowledge and 2) allow them to network with other professionals involved in Water Utility work. Subjects include cross connection control, pumps, motors, pressure reducing valves, hydrants, chlorination, generators, forklift training, confined space, first aid, CPR, electrics, and other essential topics.

Most staff are tasked with specific job functions during their normal work shift and the consistent nature of the work allows them to complete their jobs in a very professional and efficient manner. However, all staff are rotated through an active cross training program to cope with employee absences such as vacation, sickness, retirement, and termination.

6.2 Operations and Preventive Maintenance

The City's water system is comprised of pump stations, chlorination stations, corrosion control facilities, reservoirs, springs, and wells. **Figure 1-3** presented in **Chapter 1** provides an overview map of the major existing system facilities. These components all work together to ensure that water is available to meet customer demands. Primary operation of the water system is maintained via the SCADA computerized control system. Wonderware software works in association with SCADA to provide real time graphical display of system data for staff interpretation and control. The SCADA system is often referred to as the

Telemetry system based on one of the definitions of Telemetry (the science and technology of the transmission and measurement of data from a distant source). The City's SCADA system is monitored in the Public Works M&O Building, 1305 C Street SW, and responsibility for the system related to the Water Utility falls under the Water Manager and associated staff.

Some of the functions that SCADA monitors, records, and controls include:

- Reservoir levels
- Source meter production
- Pumps
- Motors
- Valves
- Chlorination
- Pressures: Low, High, Discharge, Suction
- Alarms: Intrusion, Fire, Generator Run, Low Fuel, Overflows, Failures, Turbidity

Status reports are continuously received via radio and information regarding system demand is used to determine system activation. The SCADA system includes logic programming which automates the process; however, Operations staff can manually override most computer decisions, if necessary. The alarm infrastructure is linked to WIN911 for after-hour call-out and response.

All data monitored by the SCADA system is electronically recorded by a computer server maintained by the Innovation & Technology (IT) Department. A back-up copy is made each evening to ensure that records are retrievable should hardware or software failures occur. SCADA records are available to all PW staff via the City's computer server. Access and control of the system is relegated to two dedicated computer terminals at the M&O Building. The computer terminal that houses SCADA is password protected and entry into the building is keycard access controlled.

The SCADA software and historical data is maintained on the City's Wide Area Network (WAN). Staff have access to the system via workstations connected to the WAN or remote network applications. A telephone connection provides the auto-dialer for the WIN911 notification to phones or pagers. An Ethernet radio connected to the computer system at the M&O Building sends and receives radio signals to/from the Programmable Logic Controllers (PLCs) at the water facilities. PLCs at the facilities are also able to communicate directly with each other via radio signal.

The City recently completed a SCADA Upgrade Project, completed in 2024, which updated the system platform to the most current version, modernizing the City's SCADA system from its last major upgrade in 2015. Major components were also replaced throughout the system to provide more reliable communication. The new hardware, in conjunction with software upgrades, provides additional control of the city's facilities.

6.2.1 Inspections, Preventive Maintenance, Repairs, and Replacement

Systematic inspection of Water Utility facilities is conducted on a daily or weekly basis by Distribution Specialists under direction of the Water Operations Supervisor as summarized in **Table 6-2**. The inspection process serves the following purposes:

- System Confirmation - proper operation of automated control and monitoring equipment
- Sound Check - listen for unusual noises
- Well Levels - static and dynamic

- Equipment Check - pumps, motors, valves, chlorination, heaters, vents, generators, etc.
- Security Verification - intrusion, vents, hatches, locks, gates, graffiti, etc.

A portion of the maintenance tasks handled by the Operations staff are associated with a Preventive Maintenance Program and some of those activities are arranged to coincide with the Facility Inspection Schedule shown in **Table 6-22**. The maintenance activities are based on equipment manufacturer recommendations and maintenance staff observations for infrastructure located within and outside the facility. Preventive maintenance tasks are essential for reliable operations and preservation of investment so adherence to the program is stressed. Additional maintenance activities handled by Water Operations staff include repairs, replacement, small improvement projects, and response to customer requests.

The Distribution staff is involved in the same activities as Water Operations staff regarding inspection, preventive maintenance, repairs, replacement, and response to customer requests. Water Distribution staff activities are usually in response to damage or leaks involving mainlines, service laterals, meters, meter boxes, and hydrants. Other Distribution tasks include fire flow testing, system flushing, meter installation, and miscellaneous small improvement projects.

Most customer requests are associated with water quality concerns and water pressure issues. Those requests are handled by the Distribution staff and/or Cross Connection Specialists, on a case-by-case basis.

Table 6-2 | Water Operations - Facility Inspection Schedule

Type of Facility	Facility Name	Daily Inspection 5 Day Workweek	Weekly Inspection
Booster Pump Station	Academy Pump Station 3	X	
	Academy East Booster Pump Station	X	
	Green River Pump Station	X	
	Lea Hill Pump Station	X	
	Lea Hill Booster Pump Station		X
	Lea Hill Intertie Booster Pump Station	X	
	Terrace View Booster Pump Station	X	
	Lakeland Hills Booster Pump Station	X	
	Game Farm Park Pump Station		X
	Braunwood Booster Pump Station	X	
Chlorination Facility	Lea Hill Intertie Pump Station (Re-chlorination)	X	
	Terrace View Booster Pump Station (Re-chlorination)	X	
	Coal Creek Springs – Chlorine Gas	X	
	West Hill Springs - Chlorine Gas	X	
	Well 1 – Hypochlorite	X	
	Well 3A – Chlorine Gas (when well is in operation)		Off-line
	Well 3B – Chlorine Gas (when well is in operation)		Off-line
	Well 4 - Hypochlorite	X	
	Fulmer Field Corrosion Control Facility – Onsite Generated Hypochlorite (Treats Well 2, 6, and 7 sources)	X	
	Well 5A - Hypochlorite	X	

Type of Facility	Facility Name	Daily Inspection 5 Day Workweek	Weekly Inspection
	Braunwood Well - Hypochlorite	X	
Corrosion Control Facility	Howard Road Corrosion Control Treatment Facility (Treats Coal Creek Springs source)	X	
	Fulmer Field Corrosion Control Treatment Facility (Treats Well 2, 6 and 7 sources)	X	
Metals Removal Facility	Well 5B (Treats iron and manganese)		Off-line
Reservoir	Reservoir 1 – Valley Service Area	X	
	Reservoir 2 – Valley Service Area	X	
	Reservoir 4A – Lea Hill Service Area	X	
	Reservoir 4B – Lea Hill Service Area	X	
	Reservoir 5 – Lakeland Service Area	X	
	Reservoir 6 – Lakeland Service Area	X	
	Reservoir 8A - Academy Service Area	X	
	Reservoir 8B - Academy Service Area	X	
	Braunwood Reservoir	X	
Spring Source	Coal Creek Springs	X	
	West Hill Springs	X	
Well Source	Well 1	X	
	Well 2	X	
	Well 3A (Off-line)		Off-line
	Well 3B (Off-line)		Off-line
	Well 4	X	
	Well 5	X	
	Well 5A	X	
	Well 5B (Off-line)		Off-line
	Well 6	X (when on)	X (when off)
	Well 7 (Off-line)		Off-line
	Braunwood Satellite Well	X	
Intertie Supply	Tacoma B Street Intertie		X
	Tacoma 132nd Avenue Intertie		X

6.2.2 Reservoir Maintenance

Reservoirs are a fundamental part of the water distribution system. They act as storage and regulating devices for water flow and maintaining them in prime physical condition is an essential activity. The Water Utility began a rigorous reservoir maintenance program in 1997 and it has evolved into an annual routine function. Each year, two of the reservoirs have their interiors thoroughly inspected by a contractor experienced in reservoir maintenance. The annual inspection process is based on a rotational schedule to ensure inspection of each reservoir on a 5-year timetable.

Since the reservoirs are usually filled with water, a diver must conduct the inspection. The diver is equipped with lights and an audio/video device to record the process. Issues of concern include corrosion, cracks, and condition of coating on the walls, valve, fasteners, etc. The diver is also equipped with a vacuum unit to remove sedimentation. The contractor also performs a visual inspection of the exterior of the reservoir for the same elements noted for the interior. The recording is reviewed by the contractor, a report is generated based on the interior and exterior inspection and a copy of the report and recording are given to the Water Manager and Water Utility Engineer for review.

If the report and recording indicate that a reservoir needs major repair, relining, or repainting, another contractor is acquired for a recommended course of action. If interior work is required, the reservoir must be drained of water. In those situations, a carefully orchestrated timetable and shifting of water resources is necessary to balance maintenance with the needs of the City's customers.

6.2.3 Pump Station Maintenance

Pump Stations are inspected daily or weekly depending on the station by Water Operations staff. The inspection checklist includes confirming that proper operation of the automated controls and monitoring equipment align with the standard operating procedures for the equipment, sound checks for unusual noises, static and dynamic well level checks, equipment checks (pumps, motors, valves, chlorination, heaters, vents, generators, etc.), security checks through visual inspection of the facility grounds for intrusion, graffiti, or issues with vents, hatches, locks, gates, and anything else that may seem unusual or misaligned.

6.2.4 Treatment Facility Maintenance

Treatment Facilities are inspected daily by Water Operations staff. The inspection checklist includes confirming that proper operation of the automated controls and monitoring equipment align with the standard operating procedures for the equipment, sound checks for unusual noises, equipment checks (pumps, motors, valves, chlorination, heaters, vents, generators, aeration towers, etc.), security checks through visual inspection of the facility grounds for intrusion, graffiti, or issues with vents, hatches, locks, gates, and anything else that may seem unusual or misaligned.

6.2.5 Pressure Reducing Valve Stations

Pressure Reducing Valve (PRV) Stations are inspected every month by Water Operations staff. The inspection checklist includes condition of the vault, valves, inlet pressure, outlet pressure, and pilot controls. Staff inspections are supplemented by a more thorough inspection and calibration process conducted annually by a contractor that specializes in PRVs. Repair or replacement maintenance, unless minor, is usually performed by the contractor. The City plans to implement an in-house repair maintenance program.

Rebuilds of PRVs are typically done every three to five years based on the rebuild schedule.

6.2.6 Utility Locating Service

Two Water Utility staff are designated as the Utility Locators for all City utilities and roadway infrastructure (Water, Storm Drainage, Sanitary Sewer, and Street lights and traffic signals) and additional staff may also be present to provide flagging when safety issues arise. The number of location requests varies daily but averages out to a full-time commitment. The Utility Locators report to the Water Operation Supervisor, but location requests may be made indirectly by the Water Distribution, Sanitary Sewer, or Storm Drainage Supervisors.

6.2.7 Fire Hydrant Inspection

In 1999, a fire hydrant inspection goal was initiated. The intent was to inspect, repair, and test at least one third of the utility owned fire hydrants in the system each year. The importance of this program cannot be understated since fire hydrants are the first defense against loss of life or property due to fire. The inspections also improve water quality due to the stagnant water that is purged from the hydrant stubs. A water de-chlorination program, in response to Ecology guidelines, was initiated in 2001 to treat water purged from hydrant stubs. The Water Distribution Supervisor has made public hydrant inspection a year-round routine task of Water Utility operations. Secondary maintenance of public hydrants such as rust removal, painting, street reflector replacement, clearing obstructions, etc., is handled by seasonal part time staff when time permits. Property owners with private hydrants are solely responsible for obtaining annual, satisfactory inspections of their private hydrants from a qualified inspector.

6.2.8 Dead-end Flushing

A key component of water quality control is dead-end line flushing. The City has approximately 548 dead-end mains throughout the distribution system. The water in dead-end mains tends to stagnate due to lack of turnover which can have an impact on water quality for customers in the immediate vicinity. Flushing dead-ends is the only effective way to purge the lines of stagnant water and associated particulate matter. In 2000, an engineering consulting firm was hired to assist the City with the development of a Dead-end Flushing Program. They examined the City's distribution system via GIS data and supplemented the study with field inspections. A comprehensive operating procedure detailing separate flushing instructions for each dead-end was developed and continues to be used today.

Maintenance staff, under the direction of the Water Distribution Supervisor, follow the program instructions and record their activities. This program has been incorporated into the Unidirectional Flushing program, see Section 6.2.10.

6.2.9 Valve Exercising

The AWWA technical manual *M44 Distribution Valves: Selection, Installation, Field Testing, and Maintenance*, suggests that valve exercising should be conducted each year and more frequently for valves 16 inches and larger.

The Water Utility has a Valve Exercising Program, which is in concert with the Unidirectional and Dead-end Flushing programs. Historically, distribution valves have only been exercised on a limited and sporadic basis. Through the Valve Exercising Program, the City's goal is to exercise 25 percent of the distribution valves each year. Hydrant foot valves are not included in the valve exercising program and instead, are exercised as part of the hydrant inspection process.

Opening and closing valves by hand is a repetitive, ergonomically unsafe, and time-consuming task. The City has purchased a portable valve exercising machine and vacuum device to speed up removal of debris that collects in the bottom of valve boxes. Valves requiring repair or replacement are documented and corrected by City Staff or contractors.

Additionally, Distribution staff work with GIS staff to correct inaccurate valve information in the City's GIS data.

6.2.10 Unidirectional Flushing

In 2013, the City implemented a comprehensive Unidirectional Flushing (UDF) program to flush its water system. The program's goals include:

- Improving cleaning of accumulated deposits on pipes,
- Reducing water use, as compared with conventional flushing, and
- Reducing the impact on customers.

The Water Distribution Supervisor is responsible for the UDF program to maintain Water Quality.

The UDF process concentrates flow within a pipe by closing valves and using specific hydrants to isolate each pipeline and create flow in a single direction. The concentrated flows increase velocities within the pipe that results in scouring of accumulated deposits on pipes. UDF may remove sand, gravel, plastic, biofilms, and other accumulated materials that are not removed by conventional flushing. The cleaned mains may have improved water clarity or color, reduced turbidity, and improved chlorine residual.

Flushing times of a half hour or less are typical, which can equate to substantial water savings. Therefore, UDF is a key component of the City's Water Use Efficiency (WUE) program. The reduced flushing time also limits the impact on the Water Utility's customers.

As previously mentioned, the City has incorporated the valve exercising and dead-end flushing programs into the UDF program. Valves not used as part of a flushing sequence along each pipe length are exercised by distribution system staff to complete the Valve Exercising Program. While the UDF program flushes dead-end mains, more frequent dead-end main flushing may be required for water quality reasons. The UDF program also provides static pressure measurements.

The City's goal is to conduct UDF of approximately 20 percent of the system each year.

6.2.11 System Loss Program

The City has committed to an active System Loss Program to maintain water loss under 10 percent. The achievement is documented each year in the Distribution System Leakage Report. Elements of the Program include Leak Detection, Source Meter Calibration, Large Meter Testing, and Meter Replacement. Each of these is discussed in detail below.

6.2.11.1 Leak Detection

The City is committed to a tight, non-leaking water distribution system. As of 2016, the city implemented an in-house Leak Detection program, with a goal to inspect 90 miles of water main every year.

6.2.11.2 Source Meters

Source meters, also known as production meters, measure the amount of water emitted from the City's springs and wells. They are calibrated by an outside contractor under the direction of the Water Operations Supervisor and if a meter cannot be calibrated properly, it is replaced with a new one.

6.2.11.3 Meter Replacement Program

Between 2017 and 2018, the City replaced all service meters with an Automated Metering Infrastructure (AMI) system, under the Water Meter and Billing System Improvements project. The system automatically receives meter reads via radio transmission and integrates the data into the City's billing software. The benefits of an AMI system include increased accuracy and efficiency; early leak detection; high usage, zero usage, and backflow detection; and improved customer service. This has saved staff time associated with regular meter reading, missed or incorrect reads, final reads for customer account close-out, and confirmation of high reads for potential leaks. An optional interactive customer portal allows customers to view their monthly, daily, and hourly usage to see exactly when they are using water and how much. This allows customers to better understand their water usage, encourages conservation, and potentially saves them money.

The AMI system is anticipated to have a 20-year life. That includes the system components and batteries in the radios. Meter replacement will be on a 20-year program to coincide with the AMI system.

6.2.11.4 Meter Services

Water Distribution staff are responsible for all new service connections under three inches and contractors are usually secured for installation of sizes three inches and larger. Repairs, retrofits, or replacements of existing services are typically conducted by Water Distribution Staff unless unusual circumstances arise. Meter services consist of meters, meter vaults, meter boxes, service lines, valves, setters, and other associated equipment. The City uses master meters when beneficial to the City and its customers. Master meters are currently used at several mobile home parks, the Auburn Business Park, and Muckleshoot Indian Tribe (MIT) commercial properties.

6.2.11.5 Large Meter Testing

Large meters are devices that measure water consumed by customers with significant demand requirements. They are usually employed by the following customer classes:

- Commercial
- Farms or Parks – Irrigation
- Schools
- Multifamily Complexes
- Industrial / Manufacturing Businesses
- Wholesale Customers
- Municipal Buildings

Large meters are defined as water meters three inches or larger. The system contains a total of 151 large meters, all of which are calibrated annually, as part of the City's System Loss Program.

Calibration of large meters is conducted by an outside contractor, but one maintenance staff member under the direction of the Water Distribution Supervisor assists in the process. If a meter cannot be calibrated, it is replaced with a new one.

6.2.12 Distribution System Corrosion Inspection

One program that the Water Distribution Division would like to activate, if additional funds and labor resources are available, is a Distribution System Corrosion Inspection program. A significant percentage of the City's piping system is constructed of metal which is subject to corrosive deterioration. Corrosion is an electrochemical reaction whereby metal is eroded and reduced. It is not possible to stop corrosion of metal pipe, but it can be substantially reduced if proper anti-corrosive measures are taken.

The Distribution System Corrosion inspection will identify which pipes can benefit from corrosion resistance measures, resulting in a longer serviceable life. Popular measures taken to resist corrosion include coatings, poly-bagging, and anode packs, and they are described further below:

- Coatings are electrical insulator types of finishes applied to a surface and is the most common method of corrosion protection. Though coatings are common, they are subject to damage and decay. Damage from soil stress such as contraction and expansion can rip coatings from pipes. Pinholes in the insulation, also known as holidays, can allow seepage between the coating and pipe and accelerate corrosion. Penetration of the pipe occurs even more rapidly when pinholes are present than it would on a bare line.
- Anode packs are metal cylinders that are connected to a metal structure via electrically conductive wires and inserted into the ground adjacent to the structure. The ground is subject to stray electric currents and these currents are the electrical component of the electrochemical nature of corrosion. Anode packs become the sacrificial metal to corrode in lieu of the structure. This type of treatment, when initiated, provides benefits in two ways: 1) it could save substantial amounts of money by reducing unnecessary, early replacement of pipe and 2) it would reduce possible disruptive service to the City's customers that could occur if pipe replacement were necessary. Though anodes packs are effective and economical, their current capacity is limited and they typically have a short lifespan.
- Poly-bagging is the process of wrapping the exterior of buried water mains and appurtenances, typically under the influence of corrosive soils, with polyethylene, creating a protective layer around the mains and appurtenances. Poly-bagging is an effective method for corrosion protection of water mains and they are resistant to tearing or puncturing. Though economical, they are not as environmentally friendly and add another layer to maintenance activities.

6.3 Comprehensive Water Quality Monitoring

The Water Operations staff maintains an active and ongoing program of water quality monitoring and reporting to ensure a safe, high quality water supply. Two staff members are responsible for water quality monitoring, sampling, control, and record keeping. The Water Operations staff also receives assistance from the Engineering Services - Water Quality Program Coordinator. A detailed description of the City's water quality monitoring and results is presented in **Appendix Q**, which includes the following:

- Summary of the City's water quality monitoring programs.
- Summary of recent water quality testing results.
- Summary of the Wholesale Interties Blending Evaluation.

The City's Water Quality Monitoring Program is detailed in a manual entitled "City of Auburn Public Water System Water Quality Monitoring Plan" provided in **Appendix O**. The document includes plans associated with coliform, lead and copper, disinfection by-products and treatment specific monitoring, and the Water Quality Monitoring Schedule. These plans comply with DOH regulations for Group A public water systems. All sampling is conducted in accordance with the annual Water Quality Monitoring Schedule received from DOH. The City samples for inorganic and physical parameters, synthetic and volatile organic compounds, asbestos, nitrate and nitrite, radionuclides, coliforms, residual chlorine, disinfection byproducts, lead and copper, fluoride, and per and poly-fluoroalkyl substances (PFAS). A map of the sampling locations is included with the documents provided in **Appendix O**.

Additional sampling also occurs based on special requests by DOH or by customers concerned about water quality issues involving unusual taste, odor, or color.

The Water Manager maintains hard copies of the water quality analysis laboratory reports. These reports are kept at the M&O Building in files organized by years and analysis type. As specified by DOH regulations, chemical analysis reports are kept indefinitely, and bacteriological reports are maintained for a minimum of five years.

The City will comply with the Follow-Up Action Requirements of WAC 246-290-320 whenever water quality results exceed a prescribed level. The Water Utility also complies with the requirements of WAC 246-290 for public notification, as established by the Safe Drinking Water Act (SDWA) and DOH.

Forms for "Water Boil Notification" and "Drinking Water Problem Corrected Notification" have been developed and are available for immediate distribution, if necessary. A list of the appropriate print, TV, and radio media to contact for public notice is included in the electronic Emergency Response Manual. An additional procedure described in the Emergency Response Manual to address water quality issues involves an "Action Plan for Water System Contamination Via Threat Warning."

The City maintains equipment to perform some basic water quality monitoring functions. However, all testing required for water quality regulatory compliance is contracted to independent testing laboratories. The current primary laboratory used by the City is:

Water Management Laboratory
1515 80th Street East
Tacoma, Washington 98404
206-531-3121

If testing cannot be done on a timely basis, the City also uses the following laboratory:

Analytical Resources, Inc.
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200

6.4 Emergency Preparedness and Response

The City has prepared an electronic Public Works Emergency Response Manual (Manual) as a guide for management of emergency situations, with the objective of protecting life and property and restoration of essential services, such as providing clean water, as quickly as possible. The Manual is only one element of the City's overall Emergency Response Plan, which serves as a guide and was first developed in 1999 in response to the potential impact of Y2K. The Emergency Response Plan is updated annually at the first of the year. It is not all-inclusive for every type of disaster that could occur but is a valuable tool for dealing with many of the emergency situations that most utilities could face.

The Manual contains a detailed table of contents and is tabbed to allow quick access to information. Three copies of the Manual have been published. Copies are located at the M&O Building, in Engineering Services with the Public Works Director, and at the Valley Regional Fire Authority, Station 31. The Manual is also available in digital format on the City's computer server.

The master response program for the entire City is documented in the Comprehensive Emergency Management Plan (CEMP), which provides guidance to the Emergency Management Organization for mitigation, preparedness, responsibilities, recovery operations, training, and community education activities. The CEMP also describes the functions of local government and incorporation of essential non-governmental organizations into the Emergency Management Organization. Copies are in each City Department, the Public Works M&O Building, and the Valley Regional Fire Authority, Station 31. The CEMP is also available in digital format on the City's Emergency Operation Center (EOC) computer server.

An additional emergency response manual that is available for use is the Water Division Intertie Locations and Policy Manual. This manual contains contact names, addresses, and phone numbers for cities and water districts that have intertie connections with the City. Included are photos of the intertie vaults, valves, and meters, along with information for activating or deactivating an intertie. Three copies have been published and are located at the M&O Building, in Engineering Services with the Water Utility Engineer, and at the Valley Regional Fire Authority, Station 31.

The City has been involved with several tabletop exercises to prepare for emergencies and they are an ongoing feature of the City's Emergency Response Program. Staff, depending on their position, have also been trained for emergencies in accordance with the Federal Emergency Management Authority (FEMA) under the auspices of Homeland Security. The training program, known as the National Incident Management System (NIMS), offers educational classes tailored for the Incident Command System (ICS).

The NIMS and ICS program is a solid blueprint for federal and local emergency command activities, but it does not provide the type of response details needed by PW maintenance staff and managers. Consequently, the PW Emergency Response Manual is the reference tool referred to on a more intimate scale.

6.4.1 Vulnerability Assessment

The City's Vulnerability Assessment (VA) was prepared in 2004 under the guidance of an engineering consultant firm and it was submitted to the USEPA on November 15, 2004. A Water System Security Improvement Plan (WSSIP) was also prepared in conjunction with the VA to prevent or significantly lessen the impact of intrusive activities.

Recommendations noted in the WSSIP have been adequately addressed by completing the SCADA system upgrades and physical security project. As further upgrades are completed at City facilities, the recommendations noted in the WSSIP are considered, as well as other considerations as technology continues to advance.

6.4.2 Wellhead Protection Program

The City's wellhead protection program is key to managing potential sources of groundwater contamination prior to their entry into the drinking water system. The wellhead protection plan (WHP) was updated as part of the Plan and summarized in **Chapter 5**.

Engineering Services staff are charged with implementation of the program. Staff track and follow up on construction projects, spills, and monitor possible contamination sources, as possible.

6.4.3 Water Shortage Contingency Plan

In Auburn City Code (ACC) 13.14 the Mayor may order water use restrictions and conservation measures, when necessary, to protect public health, safety, and welfare during a water shortage or emergency caused by drought conditions, city water utility damage or destruction, or any other cause which threatens to disrupt or diminish the City's water supply below its ability to meet normal demands.

The City has also updated its Water Shortage Contingency Plan, attached as **Appendix R**, which establishes actions and procedures during impending or actual water shortages. These actions and activities maintain levels of service essential for public health and safety, minimize adverse impacts on economic activity, and protect customers' lifestyles. The plan addresses both progressive situations, such as those that are weather-related, and more drastic and immediate situations such as facility emergencies (e.g., a pipeline break). Initial stages of the Water Shortage Contingency Plan may coincide with efforts in the WUE program; however, it is distinct as it is a response to a specific situation, and it may lead to mandatory restrictions and curtailment.

6.5 Safety Procedures

The City has a comprehensive safety program that meets Occupational Safety and Health Administration (OSHA) and Washington Industrial Safety and Health Act (WISHA) regulations. The safety policies and procedures for the water department are documented in 25 policies that are summarized in **Table 6-3**. The policies cover the full range of hazards staff may experience while operating the water system. These include, but are not limited to, operation of motor vehicles and equipment, chemicals, confined spaces, falls, traffic, and fires. Each policy includes a purpose, organization affected, references, the policy, definitions, procedures to implement the policy, and responsibilities for the implementation. Responsibilities are assigned to individual roles, such as employee, supervisor, or safety manager. The policies and procedures clearly identify contact information of the applicable regulating agencies in case of a serious incident. All policies are available on the City's intranet.

Table 6-3 | Safety Policies and Procedures

Number	Policy Name	Description
300-01	Workplace Health & Safety	Document workplace health and safety policy
300-03	Hearing Conservation	Implement program to protect employee hearing
300-04	Personal Protective Equipment	Establish policy that requires employees to always use personal protective equipment when performing certain tasks or when in an unsafe environment
300-05	Flagger Certification	Flagger certification requirements
300-06	First Aid	Employee first aid training, first aid supplies and emergency stations
300-07	Hazard Reporting	Procedure to report an obvious or potential safety or health hazard
300-08	Incident Reporting	Procedures for reporting non-vehicular incidents
300-09	On The Job Injury	Establish policy to monitor on-the-job injuries
300-10	Safety Inspection of City Owned Facilities	Procedure for inspection of all City-owned and operated facilities
300-11	Central Safety Committee	Establish function and structure of Central Safety Committee
300-13	Emergency Evacuations of City Buildings	Procedure for evacuation of City buildings in the event of an emergency
300-14	Safety Restraints & Seat Belts	Requires mandatory use of safety restraints/seat belts while driving or riding in the City vehicles
300-15	Excavation Trenching & Shoring	Establish policy for shoring and sloping all excavations or trenches over four (4) feet in depth

Number	Policy Name	Description
300-16	Safety Line Procedure All Cranes, Backhoes, & Hoists	Procedures for controlling moving loads being hoisted or swinging ground or truck using hoists, backhoes, cranes, or any mechanical device use in moving loads
300-17	Chemical Hazard Communication (Worker Right To Know)	Establish chemical and global hazard communication program to assure the health and safety of City employees
300-18	Welding, Brazing, & Cutting	Procedure for welding, cutting or brazing work or practices which may result in an injury or death
300-19	Lockout & Tagout	Requirements for the lockout or tagout of energy isolating devices
300-20	Bloodborne Pathogens	Procedure to prevent exposure to blood or other substances and materials that may carry bloodborne pathogens. Procedures for decontamination of equipment and evaluation and treatment of employees who experience exposure.
300-21	Reporting Vehicle Accidents	Procedure for reporting vehicle accidents
300-22	Heat Related Illness	Training for potential heat related illness
300-23	Confined Spaces	Procedures for entering a confined space
300-24	Green Housekeeping Guidelines	Procedures that sustain a "Green Cleaning" environment
300-25	Respiratory Protection Program	Procedures that will prevent employees from inhaling hazardous airborne chemicals
300-26	Fall Protection & Rooftop Safety	Procedures for rooftop safety and use of fall protection
300-27	Powered Industrial Trucks	Training, operation, and safety of powered industrial vehicles

In addition to the policies, all M&O staff receive safety training. The contents of the training are periodically reviewed and updated, if necessary, through departmental and city-wide safety committees. The Human Resources and Risk Management Department maintains information and schedules on safety training.

The City maintains appropriate safety equipment and information. Each vehicle and facility have a fire extinguisher and first aid kit. All staff use personal protective equipment, such as hard hats, safety glasses, safety vests, etc., appropriate to the task. Climbing equipment and lockout/tagout equipment is available and stored at the M&O Building and the Well 7 storage facility. Additionally, each site with chemicals has a Safety Data Sheets (SDS) book that contains the Material Safety Data Sheets (MSDS) for all chemicals on site. A master sheet of all chemicals used by the Water Utility is maintained at the M&O Building.

6.6 Cross Connection Control Program

The City's Cross Connection Control Program (provided in **Appendix Q**) protects the public water system as defined by WAC 246.290.010, WAC 246.290.490, and Auburn City Code (ACC) 13.12 from contamination via cross connection hazards. It describes minimum operating policies, provides guidelines for installation, testing, and maintenance of approved backflow prevention assemblies, permitting process, inspection, and survey requirements for existing and new water service connections. The program is maintained by two Cross Connection Specialists under the direction of the Water Operations Supervisor. The specialists are responsible for identification and elimination of potential and actual cross connections and contamination hazards within the public water system.

6.7 Sanitary Survey Findings

DOH completes periodic inspections of the City's water facilities, their operations, and facility records to identify potential health risks to the public. The sanitary survey, conducted by DOH on August 22, 2022, identified significant deficiencies such as air gaps or backflow assemblies that must be added to the water supply lines at Wells 5 and 5A. Additionally, repair needs were identified for the reservoir overflow screens at Reservoirs 8A and 8B.

DOH identified the need to terminate the pump to waste line at Well 5 above grade and either raise the casing at Well 5A or provide a sump pump or alarms to address potential water accumulation in the vault. Weekly vault inspections, especially after significant storms, were recommended until a permanent solution is implemented.

The survey noted that the reservoir vents at Reservoirs 4A, 4B, and 8A should open downward to prevent debris entry. It also identified a need for evaluation of the overflow piping at Reservoirs 2, 4A, and 4B, to ensure compliance with regulations.

The next DOH sanitary survey is scheduled for 2027.

The City has taken the following actions to address some of the deficiencies identified in the sanitary survey.

- A backflow assembly was installed at Well 5A.
- The reservoir overflow screen at Reservoirs 8A and 8B was repaired on September 13, 2022.
- The City implemented an inspection and maintenance program to conduct weekly inspections at Well 5A and immediately after a significant storm even.
- The direct connections of reservoir overflows (Reservoirs 4A and B to drains, sanitary sewer, and/or storm sewer) have been addressed.

The following deficiencies identified in the sanitary survey will be addressed with ongoing or planned Capital Improvement Projects identified in **Chapter 8** and are captured in **Section 6.13** as recommended improvements:

- Reservoir vents will be retrofitted or replaced as part of the ongoing Reservoirs 4A, 4B, 8A, and 8B Seismic Valves Retrofit capital project.
- The request for the pump to waste line at Well 5 to terminate above grade will be addressed with a capital improvement project.
- The direct connections of reservoir overflows (Reservoirs 2) to drains, sanitary sewer, and/or storm sewer, will be addressed with a capital improvement project.

6.8 Customer Complaint Response Program

One member of the Water Distribution staff is a Customer Service Representative. This individual is responsible for meter turn-on and turn-off, delinquency notices, meter rereads, new service reads, final service reads, leak adjustments, high consumption investigations, account documentation, and other duties, as assigned. The employee maintains a modified work schedule, which provides more flexibility in dealing with emergency service requests by customers.

Beginning in 2006, the Water Utility, along with the rest of PW transitioned to an asset management software system called CarteGraph. Some of the benefits include:

- Ability to assign and track citizen complaints and requests
- Produce work orders
- Monitor work and maintenance projects
- Track costs for labor, equipment, and material
- Enhanced inventory control
- Integration with GIS
- Benchmark analysis
- Generate reports
- Track infrastructure conditions – GASB 34

The City has a customer service program accessible by the public and City staff via the City's website. Customers fill out the online Citizen Report form and describe the services they are seeking. The submitted form downloads into the CarteGraph system for review and action by staff. In addition, customers can stay connected with the City on mobile devices with a SeeClickFix application. The SeeClickFix app allows customers to report graffiti, abandoned vehicles or potholes, water issues, etc.

6.8.1 Customer Request Response Program

As described above, the CarteGraph system can assign and track customer requests (or complaints) and produce work orders. The City maintains a list of requests and identifies the work done to respond to any requests from the public. The City categorizes the citizen reported issues into the following five categories:

- Water Appearance: contains all requests related to the color of the water (brown, discoloration, cloudy, etc.)

- Odor: contains all requests related to water smell (chemical, sulfur, chlorine smell, etc.)

- Pressure: contains all requests related to change in water pressure (pressure drop, high water pressure, fluctuation in pressure, etc.)

- Taste: contains all requests related to water taste (poor, bitter, strong chlorine taste, etc.)

- Water Quality: contains all requests related to a combination of odor, taste, and discoloration issues.

Customer requests are entered into the CarteGraph or SeeClickFix and a work order is generated. Typically, a Distribution staff member or team will investigate the issue and respond directly to the customer.

A table summarizing the number and type of requests or complaints is provided in **Chapter 3**.

6.9 Recordkeeping and Reporting

All recordkeeping and reporting practices follow DOH regulations as specified in WAC 246-290-480. The Water Manager maintains hard copies of the water quality analysis laboratory reports. These reports are kept at the M&O Building in files organized by year and analysis type.

Analytical laboratories submit reports directly to DOH. As specified by the regulations, chemical analysis reports are kept indefinitely, and bacteriological reports are maintained for a minimum of five years.

Additionally, Construction Completion Reports are submitted to DOH, as required. Construction Completion Reports for distribution main projects are maintained on file at the City and are available upon request by DOH, in accordance with WAC 246-290-125.

Water production and purchase source meters are read daily (during the work week). Paper copies are scanned at the end of the month and digital copies in pdf format are maintained on the City computer server by month and year. Annual summary spreadsheets are also maintained on the computer server. This data is added to the monthly DOH reports. Records are maintained for a minimum of 10 years.

Chlorine residual samples are collected in the distribution system and analyzed on a weekly basis. Summary spreadsheets are maintained on the City computer server by year. Records are maintained for a minimum of three years.

Monthly reports containing water production and treatment data are submitted to DOH by the 10th day of the following month, using forms provided by DOH. Signed paper copies are scanned to produce a digital copy and are maintained on the City computer server, organized by year. Digital copies are maintained for a minimum of 10 years.

Most records that Water Utility collected in the past are based on hard copy paper forms. This includes forms that track maintenance and inspection records used for pumps, valves, meters, reservoirs, hydrants, operating equipment, etc. A portion of the integration process with CarteGraph involved the collection and collation of historical data into a form that can be downloaded into the software system. The City's goal is a near-paperless documentation system that can be accessed by staff in the office, field, or home on a 7-day, 24-hour basis. Existing electronic records include those described below.

6.9.1 Cross Connection Control Program

Cross Connection Control records are managed with Tokay software and Laserfiche. Test reports conducted are stored in Laserfiche and are kept for 5 years. Tokay is used for creating reports, identifying and updating when tests are required, and general data entry and management of cross connection devices per parcel.

6.9.2 Water Meter Consumption

Water meter consumption records are maintained by the Finance Department using the Springbrook Utility Billing System. These records include customer account data for classes of customers, billing, service, comments, and questions. The system also includes a tracking feature for water sold each month as well as annual total water sales. The tracking feature is useful because data on water consumption by customer type and season supports the City's WUE Program, per Chapter 4. The Finance Department also provides staff with monthly financial reports regarding Water Utility operations.

The City also uses AMI throughout the system as a tool for the WUE Program. Using AMI data, the City may be able to identify customer leaks and, as a result, provide cost savings in the Leak Detection, Repair, and Service Meter Replacements programs. Advanced metering also aids the City's efforts to reduce non-payment of bills and water theft.

6.9.3 Supervisory Control and Data Acquisition (SCADA)

The SCADA system monitors, records, and controls water system operations at various facilities. The electronic records are maintained by the IT Department and a back-up copy is made each evening to ensure that records are retrievable should hardware or software failure occur.

Please note that the SCADA system is discussed more thoroughly in **Section Error! Reference source not found.** of this chapter.

6.9.4 Water Meter Reading

Effective January 1, 2019, the City transitioned to monthly consumption billing. The Utility Billing staff imports the water meter reads monthly into the City Utility Billing System. With the implementation of the AMI system, the City obtained a Cloud-Based Data Analytics Solution with meter data management capabilities called Sensus Analytics. Within Sensus Analytics, is a billing access application, which enables Utility Billing staff to generate and export a billing request file defined by a billing cycle and billing window. Subsequently, the file that contains meter numbers, account numbers, and current water meter reads are imported into the City Utility Billing System. The Utility Billing staff reviews abnormally high or low consumption levels compared to previous readings from the previous year, same period.

Water service meters are read monthly to document customers' water usage for billing purposes. The AMI system automatically stores and transmits the water use data for utility billing, without the need for personnel to collect the data on site.

6.10 Summary of O&M Deficiencies and Recommended Improvements

6.10.1 Water Facilities Evaluation Study

The City completed an extensive Water Facilities Evaluation Study in 2014. The study conducted a physical inspection and evaluation of 40 out of the City's 97 water supply facilities. Inspections included pump stations, treatment facilities, reservoirs, wells, transmission mains, and PRVs. Inspections considered general conditions, corrosion and rust, structural deficiencies, ability to meet current code, and operational constraints. In addition to the inspections, the remaining useful life of the facilities were developed in a desktop analysis for pump, motor, pipe, valve, general electrical equipment, and major electrical equipment.

Where notable deficiencies were identified in the inspections or assets exceeded their usable life, improvements were recommended. Many of the recommended improvements have been completed or are currently scheduled to be completed and identified in the Capital Improvement Plan. Remaining improvements less than or equal to $10,000 are considered capital maintenance projects, which the City staff or a small works contractor will address as part of the normal M&O budget and are not identified in the Capital Improvement Plan.

Based on the observed facilities, general maintenance improvements are recommended for each facility to create a schedule of improvements based on the facility's remaining useful life. Regular facility inspections are also recommended, as summarized in Error! Reference source not found.. Additionally, maintenance plans were developed for each inspected water system facility. These plans included the improvement type, estimated project cost, and frequency the improvement is required.

Table 6-4 | Recommended Inspections

Asset Type	Recommended Inspection	Frequency (years)
Pump	Perform pump test	5
Motor	Check motor amp draw	5

Asset Type	Recommended Inspection	Frequency (years)
Reservoir	Inspect coating thickness	5
Reservoir	Inspect reservoir interior	5
PRV Station	Inspect for corrosion and signs of flooding	1
Structure	Inspect for cracks in grout (where applicable)	1
Piping	Inspect for general coating conditions	3

6.10.2 Recommended Improvements

The City operates and maintains an efficient, environmentally sound, and safe water system. Recommended improvements include the outstanding projects identified from the 2014 Facility Evaluation Study, outstanding items to be corrected from the 2022 Sanitary Survey, and general continued repairs and maintenance activities that are conducted by M&O staff or contracted out. **Table 6-5** provides a summary of the identified O&M projects and their costs.

Table 6-5 | O&M Improvement Projects

O&M Deficiency	Planned Year	Notes
The pump to waste line at Well 5 to terminate above grade will be addressed with a capital improvement project. (Identified in 2022 Sanitary Survey)	2026-2028	Included with the Well 5/Well 5A Upgrades Project
Raising the casing at Well 5A to terminate above grade or the provision of a sump pump or alarms to activate when water accumulates in the vault. (Identified in 2022 Sanitary Survey)	2026-2028	Included with the Well 5/Well 5A Upgrades Project
Reservoir vents will be retrofitted or replaced as part of the ongoing Reservoirs 4A, 4B, 8A, and 8B Seismic Valves Retrofit capital project. (Identified in 2022 Sanitary Survey)	2024-2025	Included in CP2219 – Reservoirs 4 and 8 Seismic Rehabilitation
The direct connections of reservoir overflows at Reservoirs 2 to drains, sanitary sewer, and/or storm sewer, will be addressed with a capital improvement project. (Identified in 2022 Sanitary Survey)	2024-2025	Included in Reservoir 2 Valves Project
Conduct inspections of facilities at frequency recommended in the Facilities Evaluation Study.	--	Refer to **Table 6-4**. To be completed via annual M&O operating budget.
Continue distribution system corrosion inspection.	TBD	To be completed via annual M&O operating budget as funds are available.
Develop a UDF Program for the Lakeland Service Areas.	TBD	To be completed via annual M&O operating budget as funds are available.
Replace source water supply meters with flow transmitters for improved electronic data transmission and record keeping.	TBD	To be completed via annual M&O operating budget as funds are available.
Continue PRV Vault Repairs	2024-2026	To be completed via annual M&O operating budget as funds are available.
Continue Pump and Equipment Repairs and Maintenance	2024-2026	To be completed via annual M&O operating budget as funds are available.

O&M Deficiency	Planned Year	Notes
Continue Annual HVAC Maintenance and Repairs	2024-2026	To be completed via annual M&O operating budget as funds are available.
Continue Fencing Repairs at Water Facilities	2024-2026	To be completed via annual M&O operating budget as funds are available.
Continue Generator Maintenance and Repair	2024-2026	To be completed via annual M&O operating budget as funds are available.
Continue Large Meter Repair and Testing	2024-2026	To be completed via annual M&O operating budget as funds are available.
Continue Chlorine Feed and Analyzer Maintenance	2024-2026	To be completed via annual M&O operating budget as funds are available.
Continue Vegetation Control and Maintenance at Water Facilities	2024-2026	To be completed via annual M&O operating budget as funds are available.

CHAPTER 7

Distribution Facilities Design and Construction Standards

This chapter outlines the Engineering Design and Construction Standards (EDCS) of the City of Auburn (City), concerning its water system. It encompasses policies and procedures governing project review and approval. To ensure the highest level of water system reliability, integration of the EDCS into the broader city infrastructure is essential. The City recognizes the interdependence of its water system with other municipal services. As such, there is an ongoing collaborative effort between the Water Division and other relevant City departments, such as Community Development and Finance, as well as non-City stakeholders, such as the Valley Regional Fire Authority (VRFA).

The integration of the EDCS in this Water System Plan empowers the City to employ an alternative review process for distribution main projects, through the submittal exception process, which permits the City to approve project reports and construction documents without written approval from the Department of Health (DOH). This submittal exception is granted provided the conditions specified in WAC 246-290-125(2) are met.

The submittal exception does not apply for source of supply, reservoir, pump station, and water treatment projects. For those projects, the City will seek approval from DOH through the submittal process outlined in WAC 246-290-110 and 246-290-120.

The following topics are addressed in this chapter:

- 7.1 Project Review Procedures
- 7.2 Policies and Requirements for Outside Parties
- 7.3 Design and Construction Standards
- 7.4 Construction Certification

7.1 Project Review Procedures

For all construction activities related to the City's water system, coordination must be done directly through the City's Water Department. The City's Water Department reviews plans, including calculations, reports, and AutoCAD files, to verify conformity with development requirements, City standards, City policies, as well as other federal, state, and local requirements. The plan sets are required to feature an overall utility plan illustrating public water facilities and private connections within the water service boundary, regardless of whether the project is inside or outside the City limits. City staff also review projects proposed by developers or other water purveyors to determine impacts to the City's water system facilities.

Development review processes are detailed in the Engineering Design Standards (EDS), available on the City's website. Compliance with Washington State Department of Transportation (WSDOT) "Standard Specifications for Road, Bridge, and Municipal Construction," and relevant City, State, and Federal regulations is also evaluated during the review process.

All water-related improvements projects, whether for capital improvement or development, undergo a thorough review process by the Water Division, including evaluation by the VRFA and City's Fire Authority for fire protection standards. Additionally, all plans involving main extensions, modifications, and fire service installations must be stamped by a Professional Engineer licensed in Washington State.

7.2 Policies and Requirements for Outside Parties

The City manages the water utility in accordance with established water- system policies that govern various facets of utility operations. City policies are established by the City to provide a vision or mission of the water utility and to provide a framework for the design, operation, and ongoing wellbeing of the City's water utility.

Policies are developed specifically for the City's multi-source municipal water system and seek to provide consistent treatment to all utility customers and to provide documentation to current water-system customers as well as those considering service from the City. What is included in these policies is limited to those things related to the water system and its design, maintenance, and operation. There are other policies and criteria that pertain to the water utility the City has in place regarding land use, development, and financial components that could still have an impact on the needs of the water system. These policies and criteria may include factors such as zoning regulations, building codes, infrastructure requirements, and financing options. These additional factors will be considered when planning for the water system, to meet the needs of the community in a sustainable and effective matter.

Policies set forth for development are described in the Water System Policies provided as Appendix A of this Plan.

7.3 Design and Construction Standards

Within the Retail Water Service Area (RWAS), the City has established specific standards governing the design and construction of water mains, detailed in the City's EDCS. The EDCS collectively contains the following:

- City of Auburn Engineering Design Standards (EDS).
- City of Auburn Engineering Construction Standards (ECS):
    - City of Auburn Engineering Construction Standards – Standard Details (STD DTL)
    - City of Auburn Engineering Construction Standards – General Special Provisions (GSP)
    - City of Auburn Engineering Construction Standards – Technical Special Provisions (TSP)

These standards undergo periodic updates, with the most recent revision in 2024. The City's 2024 design standards and construction specifications related to the water system are outlined in Appendix P. Additionally, this plan incorporates relevant sections of the City's current construction standards, including materials, methods, and standard details applicable to the construction of water system appurtenances.

For detailed information, the latest versions of the collective EDCS are accessible for view on the City's Public Works web page.

Table 7-1 lists sections of the EDCS sections for the specifications, drawing standards, and special conditions of water main installations, extensions, and replacements. Standards for supply sources, reservoirs, pump stations, and water treatment facilities are not presented due to the complex nature of these facilities. For those projects, the City will seek approval from DOH through the submittal process outlined in WAC 246-290-110 and 246-290-120.

Table 7-1 | Water Main Design and Construction Standards

Specifications for:	
Pipe material and pipe class. ANSI/NSF Standard 61 certified materials required for all pipes.	EDS Section 7.01.02
Disinfection procedures (include de-chlorination or chlorinated water disposal specifications).	TSP – 7.09.3(24)
Pipe bedding and installed depth of bury.	EDS Section 9.05
Bacteriological testing.	TSP – 7.09.3(24)N
Pressure and leakage testing.	TSP – 7.09.3(23)
Separation from sewer mains, non-potable conveyance systems, and other buried utilities.	EDS Section 6.02
Valve spacing.	EDS Section 7.03
Construction Drawings Standards	
Plan and profile views drawn to a particular scale	EDS Sections 3.03, 3.04 & 3.04.07
Easement locations and dimensions	EDS Sections 2.02, 3.04 & 3.04.07.B, 6.01, 7.01.04, 7.01.05, 7.02.01, 7.03 and STD DTL W-06.3, W-22.2, W-23.3,
Appurtenant Design Standard Drawings	
Pipeline trench cross-section, including pipe bedding, backfill, compaction, and road restoration standard details	STD DTL T-01
Hydrants (for fire, flushing)	STD DTL W-07, W-08
Valves	STD DTL W-17, W-18, W-19
Service Meters	STD DTL W-15, W-16, W-16a
Service lines and service connection to main	STD DTL W-9, W-13, W-14
Air relief, vacuum relief, and combination air-vacuum relief valve and valve vault	STD DTL W-02
Pressure reducing valve stations	Submittal review (project specific)
Thrust blocking	STD DTL W-01
Backflow prevention assemblies	STD DTL W-21, W-22, W-23, W-24, W-25
Blow-offs	STD DTL W-03, W-04
Special Conditions	
Pipeline corrosion mitigation measures	TSP 7.09.03(25)
Potable/non-potable pipeline crossing construction details	EDS Section 6.02
Stream-crossing construction details	N/A
Individual service booster pumps	N/A
Temporary water service (i.e., employed during water main replacement or emergency repair)	N/A

7.4 Construction Certification

Construction work aimed at improving City roads and utilities, whether initiated by private developers or the City itself, must adhere to approved contract documents. City approval is mandatory for any modifications to approved plans before implementation, especially for work within the public right-of-way (ROW) or designated easements. Compliance with general WSDOT/APWA Standard Specifications, approved plans, and the City's EDCS is strictly enforced.

Prior to the start of construction, a pre-construction meeting must be held by the City and the developer, contractor, and/or designated representative. Pre-construction meetings establish the first touch point between the City and developer/contractor to discuss the schedule, certain unique aspects of the work, any special restrictions, and general coordination and communication protocols. Consistent presence of the approved set of plans with redline markups identified and requisite permits at the job site during construction is a shared responsibility of the City, the developer, and the construction contractor. The City exercises its authority to enforce standards through appointed project engineers, assistants, and inspectors, ensuring collective adherence to specified standards. Inspections, test measurements, and actions outlined in the City's Development Guidelines and Public Works Standards are pivotal. Post-construction, the submission of as-built drawings is mandated.

Non-compliance with approved project documents can lead to stop-work orders and potential removal of completed elements, subject to penalties established by ordinance. The project's conclusive status is granted only when the City issues a formal letter of acceptance to the responsible party.

Upon completion of construction activities related to the water system, including disinfection, flushing, and pressure testing for water mains, a construction completion report must be submitted. This document becomes part of the project records, and the release of water meters for any lot or building linked to a project is contingent upon final acceptance.

CHAPTER 8

Capital Improvements Program

This chapter's objective is to develop a cohesive Capital Improvement Program (CIP) for the City of Auburn (City) by summarizing and prioritizing all capital projects identified in the previous chapters. The CIP provides a comprehensive accounting of capital projects needed to continue consistent, efficient water supply to the City's Retail Water Service Area (RWSA) through the 20-year planning horizon. The recommended projects were developed in coordination with City staff.

Projects identified as part of the City's asset management program that are anticipated to cost greater than $50,000 were included as capital projects. The capital projects discussed in Section 8.2 include water supply and storage improvements, improvements to the distribution system, and upgrades or replacement of aging facilities and distribution piping as discussed in Chapter 3.

Projects were allocated to the 10-year (2025 to 2034) and 20-year (2035-2044) planning horizons. Planned projects coincide with the City's current Capital Facilities Plan (CFP) and have been placed into specific years for planned completion. These timeframes are intended to be a framework for future funding decisions that directs when future actions and decisions are intended to occur. However, these timeframes are estimates, and depending on factors involved in the processing of applications and project work, and availability of funding, the timing may change from the included timeframes. The framework does not represent actual commitments from the City, which may depend on funding and staffing resources available.

8.1 Prioritization

8.1.1 Project Identification

Capital projects are organized into two categories to help provide a better understanding of the primary project driver as follows:

- Capacity Projects (CAP): These projects are needed to expand infrastructure capacity to meet increased demands associated with current deficiencies or projected growth.

- Non-Capacity (Non-CAP): These projects are needed to address aged and/or obsolete equipment to maintain and/or improve the reliability of the infrastructures system. These projects are needed to improve existing infrastructure for reasons other than capacity.

The capital projects are also identified and grouped into categories based on the infrastructure they are focused on. Each project is assigned an identification number (Project ID) with the following ID prefixes:

- Supply (S): These projects are associated with the City's water supply sources and treatment facilities.

- Storage (R): These projects are associated with the City's storage reservoirs or allow modifications in the system impacting reservoir storage transfer throughout the RWSA.
- Pump Stations (PS): These projects are associated with the City's pump stations or booster pump stations (BPS).
- Distribution (D): These projects are associated with the City's transmission and distribution piping systems.
- General Improvements (G): General improvement projects do not fit into the other categories and may be broader, impacting multiple components of the City's water system.

8.1.2 Prioritization Factors

The capital projects for the facilities improvements were prioritized based on system deficiencies, safety concerns, maintenance or capacity requirements, and regulatory requirements.

The capital projects for the capacity driven distribution system improvements were prioritized based on the fire flow availability; projects resolving the largest deficits were prioritized higher, and as such are planned to be completed sooner than projects resolving smaller deficits. The capital projects for the condition driven distribution improvements were prioritized based on the existing pipe age, size, and material. More details are discussed in **Chapter 3**.

The priority order of these improvements is reflected in the schedule of improvements, which is presented in **Section 8.3** and **Appendix W**.

8.1.3 Estimated Costs

"Active projects" are projects that are currently underway for completion. The project costs presented include total project costs for the current and future years and are presented in 2024 dollars.

For projects already included in the City's 2023 CFP, it was assumed that the project cost in 2024 dollars remains the same, unless the costs were identified as needing to be reassessed.

For planned capital projects identified in the 2015 WSP that have not been completed and are not included in the City's 2023 CFP, the project costs were escalated from 2014 dollars as presented in the 2015 WSP to 2024 dollars using the Engineering News Record (ENR) Construction Cost Index (CCI).

For all other projects that were newly identified, modified, or reassessed, planning-level project cost estimates were developed for the improvements using average costs from RSMeans, HeavyBid Construction Cost Data, recent City of Auburn project bid tabs, City input, industry experience, and local contractor and supplier costs. These project costs are planning-level estimates and are categorized as Class 5 estimates, as defined by the Association for the Advancement of Cost Engineering (AACE) International:

> *Class 5 estimates are generally prepared based on very limited information, and subsequently have wide accuracy ranges. As such, some companies and organizations have elected to determine that due to the inherent inaccuracies, such estimates cannot be classified in a conventional and systemic manner.*
>
> *Class 5 estimates are prepared for any number of strategic business planning purposes, such as but not limited to market studies, assessment of initial viability, evaluation of alternate schemes, project*

screening, project location studies, evaluation of resource needs and budgeting, long-range capital planning, etc.

Typical accuracy ranges for Class 5 estimates are -50 % to -20% on the low side and +30% to +100% on the high side, depending on the construction complexity of the project, appropriate reference information and other risks (after inclusion of an appropriate contingency determination). Ranges could exceed those shown if there are unusual risks.

All project descriptions and cost estimates in this WSP represent planning-level accuracy and opinions of costs (-50 percent to +100 percent).

During the pre-design phase of each project, the project definition, scope, and specific information (e.g., pipe length and diameter, roadway restoration requirements, permitting requirements) should be verified. The final cost of individual projects will vary depending on actual labor and material costs, site conditions, market conditions, regulatory requirements, project schedule and other factors. Because of these factors, project feasibility and risks must be carefully reviewed prior to making specific financial decisions or establishing project budgets to support proper project evaluation and adequate funding.

Total estimated project costs were developed through a progression of steps and multiple methodologies. The steps included development of component unit costs, construction costs and, finally, total project costs. The component unit cost includes the sum of materials, labor and equipment of a project's basic features. The construction cost is the sum of component costs and construction markups, which includes a 30 percent allowance for contingency and 10.2 percent for sales tax. The total project costs presented is the sum of construction costs with the following additional allowances:

- 15 percent for City management, survey, legal, and project administration.
- 15 percent engineering design.
- 15 percent construction management and inspection.

The following costs are not included, unless specifically noted:

- Land or right-of-way acquisition.
- Maintenance expenses.
- Operation expenses.

All cost estimates were developed as total project costs in March 2024 dollars. In **Table 8-10**, costs have been inflated and escalated using an annual increase rate from 2024 dollars to their planned implementation year. For projects that will be designed or constructed in 2024, an annual increase of eight percent was used. For projects that will be designed or constructed after 2024, an annual increase of five percent was used. For future budgeting purposes, the latest engineering news record (ENR) Construction Cost Index (CCI) can be used to project current estimates to the year of implementation. The cost estimates for the Auburn area used the ENR CCI in Seattle of 15,477 (March 2024).

8.1.3.1 Pipeline Component Unit Costs

The pipelines unit costs were developed using recent City construction bid tabs assuming the use of ductile iron pipe and a typical cover depth of four feet. The estimated unit cost is provided by pipe diameter per linear foot of pipe in **Table 8-1**, which includes the cost for the pipe, trench, roadway restoration, appurtenances, installation, and direct construction markups. As the diameter of pipe and the trench width increase, the costs also increase.

Table 8-1 | Water Pipeline Construction Costs per Linear Foot

Pipe Diameter (inch)	Unit Construction Cost ($/linear foot)
8	$490
10	$510
12	$520
14	$570
16	$630
18	$730
20	$780
24	$880

8.1.3.2 Reservoir Component Unit Costs

Reservoir (storage tank) unit costs were determined based on the tank volume in gallons. Conceptual costs for tanks vary based on the material of storage: prestressed concrete and welded steel being the most common options. Unit costs for the different reservoir options are presented in **Table 8-2** in terms of cost per gallon of storage. The unit costs do not include site piping, site improvements, land acquisition, repair, or recoating. Storage reservoir costs are sensitive to site-specific geotechnical and seismic considerations. A tank siting study is necessary whenever a new tank project is initiated to obtain the information required to inform the design.

Table 8-2 | Reservoir Tank Construction Costs per Gallon

Tank Material	Unit Construction Cost ($/gallon)
Prestressed Concrete	$1.50
Welded Steel	$1.25

8.2 Capital Improvement Program Summary and Schedule

8.2.1 Completed Projects

The following projects have been completed since 2015 WSP was completed:

- S-01: Onsite Improvements Projects, completed in 2016.
- S-02: Emergency Power Improvements Project, completed in 2016.
- S-17: West Hill Springs Flow Control Improvements, completed in 2017.
- S-19: Fulmer Field Improvements Project, completed in 2018.
- R-01: Lakeland Hills Reservoir 5 Improvements, completed in 2016.
- D-03: SCADA Upgrades, completed in 2015.
- D-10: Pipeline Asset Management Study, completed in 2020.
- D-13: Lea Hill PRV Station Improvements, completed in 2018.
- D-14: Valley AC Main Replacement, completed in 2015.
- PS-03: Green River Pump Station Emergency Power, completed in 2020.
- PS-07: Academy Pump Station No.1 Improvements, completed in 2023.
- G-06: Muckleshoot Indian Tribe (MIT) Casino Master Meters, completed in 2016.
- G-09: Water Meter & Billing System Improvements, completed in 2018

The following projects have been eliminated since 2015 WSP was prepared:

- G-05 - Utilities Field Operations Center: This project was replaced with a more comprehensive upgrade to the City's Operations and Maintenance Facilities as reported in the 2021 Limited Comprehensive Plan Update.
- D-12 - Academy Transmission Replacement: This project was eliminated, after further investigation found no issues with the existing pipeline.
- D-15: Braunwood Transmission: This project was split from Reservoir Seismic Rehabilitation (R-06) identified in the 2015 WSP. This project was originally planned to incorporate the Braunwood Satellite System, however after further evaluation, there is not a business case to support this project. Instead, it is replaced in this WSP with a mechanical upgrades project for the Braunwood Pump Station to maintain operation. The potential for incorporation of the Braunwood Satellite System may be more viable in the future pending potential development in the southern portion of the City's RWSA.
- D-16 - Game Farm Park Transmission: This project was originally planned to allow for the decommissioning and removal of the Game Farm Park Pump Station, however after further evaluation, there is not a business case to support this project. Instead, it is replaced in this WSP with a mechanical upgrades project to maintain operation of the Game Farm Park Pump Station. Elimination of the Game Farm Park Pump Station may be more viable in the future pending potential development in the southern portion of the City's RWSA.
- S-12 - West Hill Springs Water Quality Improvements: The City had planned to replace the aging West Hill Springs chlorination building and equipment with a new liquid chlorination system. However, since this project is not required to meet regulatory requirements and after further review of the City's Financial Program, this project was eliminated to prioritize projects required to resolve deficiencies. This project will be completed later, likely beyond the planning horizon for this WSP.
- S-14 - Algona Well 1 Redevelopment: This project was eliminated until the Algona Well 1 Study is completed. A new capital project may be developed in the 10 to 20-year planning horizon pending the outcome of the study.

8.2.2 Active Projects

The following projects are currently underway for completion by the City and are referred to as "Active Projects" that have remaining costs to be spent in the near term:

- CP2021 - Well 4 Facility Improvements: This project was split from the Well 4 Pump Improvements project (S-22) identified in the 2015 WSP. This project includes upgrades to much of the mechanical systems at the facility.
- CP2043 - Well 4 Electrical Improvements: This project was split from the Well 4 Pump Improvements project (S-22) identified in the 2015 WSP to accommodate beneficial electrical improvements outside the original scope of the project. The well facility is over 40 years old and much of the electrical equipment is original. Upgrades to the electrical system will improve the overall efficiency of the facility.

- CP2219 - Reservoir 4 and 8 Seismic Rehabilitation: This project was split from Reservoir Seismic Rehabilitation (R-06) identified in the 2015 WSP. The City plans to install seismic control valves on outlet piping of the Lea Hill Reservoirs (4A & 4B) and Academy Reservoirs (8A & 8B). A seismic control valve isolates the reservoir to prevent catastrophic flows from the reservoir during a seismic pipe failure. This project will also address outstanding deficiencies identified in the 2022 Sanitary Survey, including vent modifications, overflow connection modifications and overflow screen repairs.

- CP2134 - Comprehensive Water System Plan Update: This project was split from identified in the 2015 WSP (G-08), which originally included updates for both 2024 and 2034. This project will be carried forward in the CIP with further WSP updates being required in 2034 and 2044.

- CP1603 - Coal Creek Springs Transmission Main Replacement: This project was identified in the 2015 WSP as project (D-11) will be completed in 2024. The project will replace the existing 24-inch diameter steel transmission main crossing the White River with a new transmission main suspended from a utility and pedestrian bridge to cross the White River.

- CP2204 - Coal Creek Springs Rehabilitation (Phase 1): The Coal Creek Springs Rehabilitation project aims to investigate the cause of low yield and identify potential upgrades to improve water production. The updates will be completed in Phase 2 of the project.

- CP2413 - Reservoir 2 Valves: This project was split from Reservoir Seismic Rehabilitation (R-06) identified in the 2015 WSP. This project will replace the existing 20-inch supply valve with a seismic control valve and replace the 12-inch drain valve at Reservoir 2. Both valves will be installed in a vault. This project was identified as a maintenance issue due to limited access to the valves. The addition of a seismic control valve will improve the resiliency of the distribution system. This project will address the outstanding deficiency identified in the 2022 Sanitary Survey by modifying the overflow connection.

- CP1914 - Cascade Water Alliance Water Purchase: This project was identified in the 2015 WSP as project (S-04) and finances System Development Charges for the right to purchase water from Tacoma Public Utilities (TPU) through the Second Supply Pipeline to meet future projected demand, based on agreements with Cascade Water Alliance. Council approved the agreements for permanent and reserve wholesale supply in September 2013, and a new agreement was executed in 2014. Budget reflects purchase of permanent supply; payments will continue through 2029.

- S-08 - Water Resources Protection Program (Wellhead Protection): This program provides annual funding for implementing strategies identified in the Wellhead Protection Plan. Although some tasks will be performed as part of the water operations budget, other tasks will require consultants with expertise in review and investigation of contaminant sites and other environmental databases, development of spill response plans, and leaking underground storage tanks. This program will continue through the 20-year planning horizon.

- R-03 - Reservoir Repair and Replacements: This is an annual program that provides budget for general reservoir maintenance and minor repairs. This program will continue through the 20-year planning horizon.

- R-05 - Reservoir Painting: This is a program that operates on a 10-year cycle to complete reservoir coatings. This program will continue through the 20-year planning horizon with the next anticipated painting project planned in 2025.

The following projects include distribution improvements identified in the 2015 WSP to be completed as part of either the Annual Distribution System Improvements Program (D-02), Water Repair and Replacement Program (D-09) or are in partnership with other City utilities and are funded by budget available in the Street Utility Improvements annual program (D-06). All three programs have been updated and will continue through the 20-year planning horizon. In total the following active projects will replace approximately 9,000 linear feet of water main in the City's system. The locations of all active distribution system improvement projects are identified in **Figure 3-12** in **Chapter 3**.

- CP1619 - 104th Park Development (104th to 102nd Water Main Loop)
- CP2301 - 104th Avenue SE PRV Replacement
- CP2123 - C St SW Preservation
- CP2125 - D St SE and 23rd Street SE Storm Improvements
- CP2410 - 112th Pl SE Water Main Replacement
- CP1622 - Auburn Way South - Hemlock St SE to Poplar St SE
- CP2022 - Garden Avenue Realignment
- CP2210 - M Street NE Widening
- CP2116 - R Street SE Widening
- CP2308 - R St SE and 21st St SE Roundabout
- CP2315 - R St SE Preservation - 33rd St SE to 37th St SE
- CP2319 - Lea Hill Road/104th Ave SE Roundabout
- CP2404 - 12th St SE and Auburn Way South Water R&R
- CP2412 - 2025 Local Street Preservation
- 2026 Local Street Preservation

The following active projects were not identified in the 2015 WSP:

- CP2405 - Fulmer Treatment Facility VFD Replacements: The variable frequency drive (VFD) for pumps 1 and 2 at Fulmer Corrosion Control Treatment Facility (CCTF) were installed in 2002. They are at the end of their useful life and require replacement as repair parts are no longer available.

- CP2329 - Coal Creek Springs Flowmeter Replacement: The project will replace existing source meters on the Coal Creek Springs collectors to improve the accuracy and frequency of production readings.

- Algona Well 1 Study – Phase 1: The project will conduct a preliminary assessment of options to utilize the existing water right.

- Valley Service Area Reservoir No. 3 Siting Analysis: The project will conduct a siting analysis to identify and evaluate possible locations for the new reservoir.

- Braunwood Pump Station Assessment: The project will identify process mechanical upgrades necessary to continued operation. The project will also evaluate roofing replacement material options and costs.

- Coal Creek Springs Rehabilitation – Phase 1: The project will investigate the cause of reduced production from Coal Creek Springs and recommend improvements to increase production capacity.

8.2.3 Capital Improvement Projects

The following projects identified in the 2015 WSP have not been completed since the WSP was prepared, but have been revisited and are discussed in detail in the following sections for completion during this planning period. The timing of most projects has been adjusted based on the City's financial analysis and project prioritization updates.

- S-03 - Well 7 Back-Up Power: Delayed to 2032 since Well 7 has been offline due to high levels of Manganese. The timing of this project will be aligned with the completion of the Well 7 Treatment Phase 1 project (S-15) that will allow the Well to resume operation.
- S-06 - Well 5/5A Upgrades: Delayed from 2022 to 2026.
- S-07 - Well Inspection and Redevelopment Program: Delayed from 2015-2033 to 2026.
- S-09 - Coal Creek Springs Rehabilitation: Delayed from 2018 to 2027 based on awaiting results of ongoing investigations to identify the cause and possible solutions to improve production from Coal Creek Springs. The timing of this project may be adjusted pending results of the on-going investigation.
- S-11 - Wells 3A/3B Treatment: Delayed from 2035 to 2036.
- S-13 - Algona Well 1 Study: Delayed from 2015 to 2039.
- S-15 - Well 7 Treatment Phase 1: Delayed from 2022 to 2030 based on City financial analysis and updated project prioritization.
- S-16 - Well 7 Treatment Phase 2: Moved forward from 2035 to 2033.
- S-18 - Howard Road CCTF Expansion: Delayed from 2025 to 2032. The timing of this project must be aligned with the completion of the Coal Creek Springs Rehabilitation project, as its purpose is to provide increased treatment capacity to accommodate increased flows from Coal Creek Springs.
- S-20 - Well 2 Replacement: Moved forward from 2035 to 2030.
- S-21 - Coal Creek Springs Chlorination Building Replacement: Moved forward from 2035 to 2030.
- R-04 - Valley Service Area Reservoir No. 3: Delayed from 2025 to 2041.
- R-07 - Reservoir Capital Improvements: Delayed from 2025 to 2027 to avoid timing conflicts with other current projects at Reservoirs 4A, 4B, and 8A.
- R-07 - Braunwood Reservoir Improvements: Separated from "Reservoir Capital Improvements" project and delayed from 2025 to 2039.
- PS-04 - Intertie Booster Pump Station Improvements: Delayed from 2021 to 2024.
- PS-09 - Game Farm Park Pump Station Mechanical Upgrades: Replaces original project 'Game Farm Park Pump Station/Distribution System Improvements. Delayed from 2025 to 2034.
- PS-10 - Lea Hill Pump Station Replacement: Delayed from 2025 to 2027 to avoid conflicts with concurrent work in area being completed as part of a separate project.

- G-08 - Comprehensive Water System Plan Update: This project was split into two separate completion years for future updates (2034 and 2044).

Based on the information provided by the City, information included in the 2023 CFP, asset management program input, and results of the system capacity analysis provided in **Chapter 3**, the following new projects were identified that are included in the CIP and are discussed in further detail below:

- Rehabilitate & Clean Wells 2 and 6 (3-year Cycle).
- On-Site Chlorine Generation Systems (OSEC) at Wells 1 and 4.
- Academy PRV Project.
- Braunwood Pump Station Mechanical Upgrades.
- Water Trench Patches Program.
- West Hill Springs Transmission Main Replacement.
- Lea Hill 648 Zoning Adjustment.

8.2.3.1 Water Supply

The City's water supply strategy details both project sizing and timing. A summary of the 0 to 10-year and 10 to 20-year capital projects recommended for securing adequate supply to meet the system's future demands are presented in **Table 8-3**. Project IDs have been revised to reflect the updated prioritization and planned timing of projects presented in this WSP. Previous project IDs from the 2015 WSP as presented above will be discontinued for clarity purposes. Active projects identified above are not discussed in detail as they are already well defined and in progress.

8.2.3.1.1 Cascade Water Alliance Water Purchase (S-01)

Financing to purchase water from Tacoma Public Utilities (Tacoma) to meet water demands is based on an agreement with Cascade Water Alliance (Cascade), which had purchased water supply from Tacoma. The Council approved the agreement for permanent wholesale supply in September 2013. The agreement provides an additional 3.32 mgd of supply during the peak day and 1.5 mgd of average day supply. The City's permanent and reserve agreement requires System Development Charges (SDC) payments of $21,073,743 between 2017 and 2029. A total of $934,810 of payments will continue from 2023 through 2029. The SDC costs will decrease if less than the full reserve amount is purchased. The project ID was previously S-04 in the 2015 WSP.

8.2.3.1.2 Water Resources Protection Program (Wellhead Protection) (S-02)

Annual funding for implementing strategies identified in the Wellhead Protection Plan. Although some tasks will be performed as part of the water operations budget, other tasks will require consultants with expertise in review and investigation of contaminant sites and other environmental databases, development of spill response plans, and leaking underground storage tanks. The project ID was previously S-08 in the 2015 WSP.

8.2.3.1.3 Rehabilitate & Clean Wells 2 and 6 (3-year Cycle) (S-3)

Rehabilitation work completed in 2013-2014 indicated it would be beneficial to clean and rehabilitate both wells on a regular basis to improve production capacity and pumping efficiencies. Cleaning was completed in 2020 and again in late 2023/early 2024. This program was originally established as a 5-year cycle, however based on more recent evidence, more frequent cleaning is required. Cleaning and rehabilitation for Wells 2 and 6 will be performed over a 3-year cycle. This program was not identified in the 2015 WSP.

8.2.3.1.4 Well Inspection and Redevelopment Program (S-04)

The City allocates annual funding for investigations and redevelopment of supply wells and springs necessary to support production at maximum capacity for efficient utilization. This program is to be used for production wells and spring collectors, and is not intended to finance the replacement of pumps, motors, buildings, etc. The project ID was previously S-07 in the 2015 WSP.

8.2.3.1.5 On-Site Chlorine Generation Systems (OSEC) at Wells 1 and 4 (S-05)

The existing liquid chlorine (sodium hypochlorite) used at Wells 1 and 4 degrades during low winter demand periods when the volume used is much lower and product turnover is decreased. This results in more chemical consumption to achieve the same chlorine dose which is not cost effective. The hypochlorite systems will be replaced with on-site chlorine generation systems sized to meet peak summer demands while providing flexibility during winter months. This project was not identified in the 2015 WSP.

8.2.3.1.6 Fulmer CCTF Replace On-Site Chlorine Generation System (OSEC) (S-06)

The existing on-site chlorine generating equipment was installed in 2002. The generation cell was replaced in 2012. Sourcing parts for equipment repairs has become increasingly difficult due to the equipment age. An analysis performed in 2018 comparing chlorine alternatives indicated that on-site generation has the lowest overall cost. This project will replace the entire generation system. The chlorination system will be sized to accommodate future production from Well 7.

8.2.3.1.7 Well 5/5A Upgrades (S-07)

Well 5 needs significant improvements including a new building, a backup generator, chlorination, and a hydrologic investigation to evaluate observed decreased production. Due to the small size of the existing site, the acquisition of an adjacent parcel may be required. Additionally, the project will address the recommended Capital Improvements identified in the 2014 Facility Evaluation Study (CIP Project G-01), including a new pump at Well 5 and new pump and motor at Well 5A. Additional upgrades may be identified in the hydrologic investigation; therefore, the cost of this CIP item should be revisited upon completion of the study. This project will also include improvements to address outstanding deficiencies identified in the 2022 Sanitary Survey, including modifications to the pump waste line for Well 5 and addressing water accumulation in the vault at Well 5A. The project ID was previously S-06 in the 2015 WSP.

8.2.3.1.8 Coal Creek Springs Rehabilitation – Phase 2 (S-08)

Complete rehabilitation of the Coal Creek Springs collectors to improve production capacity resulting in greater utilization of the water right. Improvements are to be defined by the outcomes of the 2023/2024 hydrogeologic study currently being completed as Phase 1 (S-04). Additional upgrades may be identified in the hydrologic investigation; therefore, the cost of this CIP item should be revisited upon completion of the study.

8.2.3.1.9 Coal Creek Springs Chlorination Building Replacement (S-09)

Coal Creek Springs chlorination building was identified as requiring replacement in the 2013 Facility Evaluation Study. Additionally, the project will upgrade the source treatment from chlorine gas to a liquid sodium hypochlorite disinfection system. Sizing of the new equipment will be dependent upon capacity improvements completed as part of the Coal Creek Springs Rehabilitation Project. A new building will be constructed to house the equipment. The project ID was previously S-21 in the 2015 WSP.

8.2.3.1.10 Well 7 Treatment Phase 1 (S-10)

Well 7 is not operational due to high manganese levels. Manganese treatment is required to allow operation of this facility to be restored and to utilize the full water right for this well. Due to space limitations at the Well 7 site, the treatment facilities will be added at the Fulmer Field CCT Facility. The treatment facility will be installed in two phases. The first phase will provide 2.5 mgd of capacity. Additionally, phase 1 of the project will address the recommended improvements to the Fulmer Field CCT Facility identified in the 2013 Facility Evaluation Study, including a new pump and motor. The project ID was previously S-15 in the 2015 WSP.

8.2.3.1.11 Well 2 Replacement (S-11)

The Fulmer Well Field Improvement project found that Well 2 can continue to serve the City but would need to be replaced to resolve ongoing operational challenges. This project includes installation of a new large diameter well. It is assumed that the well will remain on its existing site, or other City-owned property. The project ID was previously S-20 in the 2015 WSP.

8.2.3.1.12 Howard Road CCTF Expansion (S-12)

The inflow to the Howard Road CCTF will increase with the completion of the Well 1 Improvements project in 2016 and planning production improvements for Coal Creek Springs Collector Improvements. The existing facility will be expanded to its full capacity to provide additional treatment capacity and redundant pump capacity to match increased flows. Additionally, the project will address the recommended improvements to Howard Road CCTF identified in the 2013 Facility Evaluation Study, including a new pump and motor. The expansion will include an additional aeration tower and a pump to match existing. The project ID was previously S-18 in the 2015 WSP.

8.2.3.1.13 Well 7 Back-up Power (S-13)

Well 7 is currently out of service, but the City has plans to bring the facility back online once manganese treatment is provided as part of the Well 7 Treatment Phase 1 Project. Without back-up power to its pumps, Well 7 is not considered a reliable source of supply for the Valley Service Area. The City has limited land available at the Well 7 site, therefore, backup power will be installed at the Fulmer Field CCT Facility. The project also includes installing underground electrical transmission capability between Well 7 and the Fulmer Field CCT Facility. The project ID was previously S-03 in the 2015 WSP.

8.2.3.1.14 Well 7 Treatment Phase 2 (S-14)

Well 7 Treatment Phase 2 will complete the manganese treatment facilities at the Fulmer Field CCT Facility to allow year-round use of Well 7. Phase 2 will add 2.5 mgd of treatment for a total capacity of 5.0 mgd. The project ID was previously S-16 in the 2015 WSP.

8.2.3.1.15 Wells 3A/3B Treatment (S-15)

Wells 3A and 3B are not operated due to high manganese levels. Manganese treatment is required to allow these wells to be used, which would add 4.03 mgd of instantaneous flow capacity to the City's supply capabilities. The project includes manganese treatment, a new well and treatment building, well pumps, and onsite backup-power. Additionally, a new sodium hypochlorite system for chlorination will be installed. The project ID was previously S-11 in the 2015 WSP.

8.2.3.1.16 Algona Well 1 Study – Phase 2 (S-16)

Algona Well 1 has been abandoned and all related facilities removed. This project will study possible options to utilize the existing water right. One option may be to redevelop the well on-site at its previous location. Another alternative may be to pursue an alternative well location or how to use the water right at another existing facility. The project does not include the development of design, permitting or construction of well infrastructure. The project ID was previously S-13 in the 2015 WSP.

Table 8-3 | Prioritized Water Supply Improvement Projects

Project Name	Project ID	Project Timing	Added Qi Capacity (mgd)	Estimated Cost 2024 USD	Brief Project Description
0 to 10-Year Planning Horizon					
Cascade Water Alliance Water Purchase	S-01	2024-2029	3.32	$5,608,860	The agreement provides an additional 3.32 mgd of supply during the peak day and 1.5 mgd of average day supply.
Water Resources Protection Program (Wellhead Protection)	S-02	2024-2044 (Annual)		$1,287,700	Annual funding for Wellhead Protection activities.
Rehabilitate & Clean Wells 2 and 6 (3-year Cycle)	S-03	2025-2044		$1,750,000	3-year cycle program to clean and rehab Wells 2 and 6.
Well Inspection and Redevelopment Program	S-04	2026-2027		$420,000	Annual funding allocation for investigations and redevelopment of wells and springs to maximize production capacity.
On-Site Chlorine Generation Systems (OSEC) at Wells 1 and 4	S-05	2026-2027		$275,000	Replace liquid hypochlorite systems with on-site generation systems.
Fulmer CCTF Replace On-Site Chlorine Generation System (OSEC)	S-06	2026-2027		$500,000	Replace aged on-site chlorine generation equipment.
Well 5/5A Upgrades	S-07	2026-2028		$2,715,000	New building, back-up generator, chlorination, and a hydrologic investigation to evaluate the reasons for decreased production.
Coal Creek Springs Rehabilitation – Phase 2	S-08	2027-2030	4.32	$5,337,000	Rehabilitation of the Coal Creek Springs collectors to improve production.
Coal Creek Springs Chlorination Building Replacement	S-09	2030-2031		$2,081,000	Replace chlorination system and building at Coal Creek Springs Facility with hypochlorite disinfection system.
Well 7 Treatment Phase 1	S-10	2030-2032	2.5	$10,097,000	Requires manganese treatment facilities
Well 2 Replacement	S-11	2030-2031	3.46	$1,960,000	Replace Well 2 to resolve ongoing operational challenges.
Howard Road CCTF Expansion	S-12	2032-2033		$1,450,000	Expand the facility to its full capacity (including an additional aeration tower and pumps).
Well 7 Back-Up Power	S-13	2032-2033		$2,075,000	Provide back-up power for this source.
Well 7 Treatment Phase 2	S-14	2033-2035	2.5	$8,054,000	Requires completion of manganese treatment facilities.
10 to 20-Year Planning Horizon					
Wells 3A/3B Treatment	S-15	2036-2038	4.03	$13,945,000	Provide manganese treatment for well operation
Algona Well 1 Study – Phase 2	S-16	2039		$250,000	Evaluate possible uses of water right.
Subtotal				**$57,805,560**	

8.2.3.2 Storage

Table 8-4 provides a summary of the planned reservoir projects. Project IDs have been revised to reflect the updated prioritization and planned timing of projects presented in this WSP. Previous project IDs from the 2015 WSP as presented above will be discontinued for clarity purposes. Active projects identified above are not discussed in detail as they are already well defined and in progress.

8.2.3.2.1 Reservoir Repair & Replacements (R-01)

The City has allocated an annual capital expenditure for general reservoir maintenance and minor improvements. Projects are identified by the City on an as-needed basis. The project ID was previously R-03 in the 2015 WSP.

8.2.3.2.2 Reservoir Painting (10-year Cycle) (R-02)

The City plans to paint the welded steel reservoirs to extend their useful life. This program finances the painting of two reservoirs every 10 years. The project ID was previously R-05 in the 2015 WSP.

8.2.3.2.3 Academy PRV Project (R-03)

A new PRV facility will be located to rezone a portion of the Valley 242 pressure zone to the Academy 350 pressure zone to resolve fire flow deficiencies in the area. This PRV facility will also allow storage transfer from the Academy Service Area where this is surplus storage to the Valley Service Area to resolve 2034 storage deficit projections, allowing for more system flexibility. The PRV facility location is assumed to be in a cul-de-sac where U St SE meets 28th St SE but will be confirmed during design. The PRV vault is assumed to house a 2-inch PRV for low flows (normal operation) and a 6-inch PRV for fire flows. This project was not identified in the 2015 WSP.

8.2.3.2.4 Reservoir Capital Improvements (R-04)

The 2013 Facility Evaluation Study identified improvements to reservoir facilities based on the condition and remaining useful life of the assets within the facilities. Improvements were identified at Reservoir 1, Reservoir 4A & 4B, and Reservoir 8A & 8B. The project ID was previously R-07 in the 2015 WSP.

8.2.3.2.5 Braunwood Reservoir Improvements (R-05)

The 2013 Facility Evaluation Study identified improvements to reservoir facilities based on the condition and remaining useful life of the assets within the facilities. Improvements were identified at the Braunwood Reservoir and were previously included in Reservoir Capital Improvements project (R-07) in the 2015 WSP.

8.2.3.2.6 Valley Service Area Reservoir No. 3 (R-06)

To meet future storage requirements in the Valley Service Area, it is recommended that a new, 2-MG storage reservoir. A siting study should be conducted to identify the preferred reservoir location and other details; it is assumed that the reservoir will be in the northeast portion of the Valley 242 pressure zone. Property acquisition is expected to be required and an allowance of $1M is included in the project budget. The project ID was previously R-04 in the 2015 WSP. It was assumed that the new reservoir will be a prestressed concrete tank, however this should be confirmed during the siting study.

Table 8-4 | Storage Improvements Projects

Project Name	Project ID	Project Timing	Added Storage (MG)	Estimated Cost 2024 USD	Brief Project Description
0 to 10-Year Planning Horizon					
Reservoir Repair & Replacements	R-01	2024-2044 (Annual)		$1,392,000	Annual program for reservoir maintenance and minor improvements.
Reservoir Painting (10-year Cycle)	R-02	2025-2044		$3,500,000	Required for maintenance and reservoir longevity in both Academy and Lea Hill service areas.
Academy PRV Project	R-03	2027		$470,000	PRV for storage transfer and rezoning to meet fire flow demands.
Reservoir Capital Improvements	R-04	2027		$470,000	Improvements to Reservoir 1, Reservoir 4A&4B, Reservoir 8A&8B based on the condition and remaining useful life.
10 to 20-Year Planning Horizon					
Braunwood Reservoir Improvements	R-05	2039-2040		$250,000	Improvements based on condition and remaining useful life.
Valley Service Area Reservoir No. 3	R-06	2041-2044	2.0	$11,745,000	Required to meet future storage requirements in the Valley service area.
Subtotal				$17,827,000	

8.2.3.3 Pump Stations

Table 8-5 provides a summary of the planned pump station projects. Project IDs have been revised to reflect the updated prioritization and planned timing of projects presented in this WSP. Previous project IDs from the 2015 WSP as presented above will be discontinued for clarity purposes. Active projects identified above are not discussed in detail as they are already well defined and in progress.

8.2.3.3.1 Intertie Pump Station/Lea Hill BPS Improvements (PS-01)

The Lea Hill BPS serves the closed 648 Pressure Zone and does not have sufficient capacity to meet fire flow requirements under current or future demand projections. To meet fire flow requirements, an additional 2,500 gpm of firm capacity is required. The Lea Hill BPS and that Intertie Pump Station share a building. To increase capacity of the Lea Hill PS, the project will provide additional piping and modify the existing Intertie Pump Station/Lea Hill BPS building to utilize the existing Intertie Pump Station pumps to serve the Lea Hill 648 pressure zone. The project will also add pressure reducing valves and control valves at Lea Hill reservoirs, and system valves to provide efficient operation of the 132nd Ave Tacoma Intertie. On-site back-up power improvements for the Lea Hill BPS are also included to improve facility reliability.

In the 2015 WSP, this project also included distribution system improvements to rezone a portion of the Lea Hill Service Area; this work has been shifted to a separate project titled the Lea Hill 648 Zoning Adjustment project. This project ID was previously PS-04 in the 2015 WSP.

8.2.3.3.2 Lea Hill Pump Station Replacement (PS-02)

The Lea Hill Pump Station will be reconstructed to provide redundant pumped supply to the Lea Hill area. If the Green River Pump Station is out of service for maintenance, a redundant pump station would avoid the need to purchase more expensive regional surface water through the 132nd Intertie. The pump station needs to be relocated from its current location on the shoulder of Lea Hill Road at the base of a steep hill for safety and reliability considerations. Two separate active projects (Garden Avenue Realignment and Lea Hill Roundabout) will construct approximately 900 feet and 835 feet of 12-inch diameter transmission main respectively, that is required for the future pump station. The project ID was previously PS-10 in the 2015 WSP.

8.2.3.3.3 Braunwood Pump Station Mechanical Upgrades (PS-03)

The Braunwood Pump Station is an aging facility that serves the Braunwood Satellite System. The project will include minor mechanical or electrical improvements to rehabilitate the facility for continued use. This project ID was previously PS-09 in the 2015 WSP. This project was not identified in the 2015 WSP.

8.2.3.3.4 Game Farm Park Pump Station Mechanical Upgrades Project (PS-04)

The Game Farm Wilderness Park Pump Station is an aging facility that serves the Game Farm Wilderness and recreational area. The 2013 Facility Evaluation Study identified improvements to allow continued use of the station including pump replacement and building repairs. Additional minor mechanical or electrical improvements may be warranted to rehabilitate the facility for continued use. This project ID was previously PS-09 in the 2015 WSP.

Table 8-5 | Pump Station Improvement Projects

Project Name	Project ID	Project Timing	Added Firm/Reliable Capacity (gpm)	Estimated Cost 2024 USD	Brief Project Description
0 to 10-Year Planning Horizon					
Intertie Pump Station/Lea Hill BPS Improvements	PS-01	2024-2026	2,500 gpm	$2,325,000	Expand the fire flow capacity of the Lea Hill BPS by connecting to the Intertie PS pumps.
Lea Hill Pump Station Replacement	PS-02	2027-2029		$6,365,000	Decommission and replace the pump station at the end of its usable life.
10 to 20-Year Planning Horizon					
Braunwood Pump Station Mechanical Upgrades	PS-03	2034-2035		$250,000	Rehabilitate Pump Station to allow continued use.
Game Farm Park Pump Station Mechanical Upgrades	PS-04	2034-2035		$250,000	Rehabilitate Pump Station to allow continued use.
Subtotal				**$9,190,000**	

8.2.3.4 Distribution System

The City's water distribution system will require many improvements to address fire flow deficiencies identified by the system analysis presented in **Chapter 3**. Additionally, the City has undersized, and aging piping within the water system that needs to be replaced to reduce the risk of breaks and leaks. The identified distribution system improvements programs are described below and summarized in **Table 8-7**. Project IDs have been revised to reflect the updated prioritization and planned timing of projects presented in this WSP. Previous project IDs from the 2015 WSP as presented above will be discontinued for clarity purposes. Active projects identified above are not discussed in detail as they are already well defined and in progress.

8.2.3.4.1 Annual Distribution System Improvements Program (D-01)

The Annual Distribution System Improvements Program is focused on capacity related improvements to the City's water distribution system as identified in **Figure 3-12** and **Table 3-33** of **Chapter 3**. These improvements address deficiencies during fire flow demand scenarios. A comprehensive list of the projects and their individual estimated costs are provided in **Appendix W**. The total of all project costs is distributed across the 20-year planning horizon and will be prioritized to address the areas with the greatest deficiency first. This project ID was previously D-02 in the 2015 WSP.

8.2.3.4.2 Street Utility Improvements (D-02)

The City Street Utility program provides an annual budget to perform water main improvements in coordination with the Street Preservation programs and general arterial street improvements. By replacing water infrastructure concurrent with other utility or street improvement projects, the City can reduce overall project costs. Identified projects are anticipated to occur annually throughout the planning period. This project ID was previously D-06 in the 2015 WSP.

8.2.3.4.3 Water Repair & Replacements (D-03)

Previous WSPs identified pipelines for the City's Water Repair & Replacement program focus on replacement of old cast iron pipes, pipes under 6-inches that serve fire hydrants, dead-end mains in non-residential areas, and decommissioned duplicate pipes. The budget for this project has been re-evaluated and is revised to focus on the replacement of undersized cast iron pipe. The budget was developed focusing specifically on 4-inch diameter cast iron pipe, however the City may also allocate this budget to replace other undersized cast iron pipe within the system. **Table 8-6** summarizes the basis of the program budget using the same unit cost assumptions and allowances established in **Section 8.1.3**. The City's pipeline water repair and replacement program will be accomplished through the combination of the Street Utility Improvements (D-02) and this program. Ideally, Water Repair and Replacement and Street Utility projects will be constructed on alternating years to maintain consistent levels of capital expenditures. This project ID was previously D-09 in the 2015 WSP.

Table 8-6 | Water Repair & Replacements Cost Estimate

Length (LF)	Existing Size (inch)	New Size (inch)	Unit Cost	Component Cost	Construction Cost	Project Cost
11,740	4	8	$490/LF	$5,752,500	$8,241,000	$11,950,000

8.2.3.4.4 Water Trench Patches Program (D-04)

This program provides annual funding for roadway restoration of trench patches from water main leak repairs and water service installation that are beyond the scope of work done by City maintenance staff. This project was not identified in the 2015 WSP.

8.2.3.4.5 West Hill Springs Transmission Main Replacement (D-05)

The 2020 pipeline assessment indicated the existing cast iron transmission main is in poor condition. The main has experienced two breaks in the past. The project will replace approximately 1,250 LF of 10-inch diameter cast iron pipe with 12-inch diameter ductile iron pipe. The project includes preliminary geotechnical investigations prior to design and construction. This project was not identified in the 2015 WSP.

8.2.3.4.6 Lea Hill 648 Zoning Adjustment (D-06)

The system capacity analysis identified deficiencies in the upper portion of the Lea Hill 563 pressure zone where the highest service elevations of the zone are located. This project includes system piping and valving modifications to rezone a portion of the Lea Hill 563 pressure zone to the Lea Hill 648 pressure zone. GIS and site verification, as well as minimal system modeling are required to verify necessary modifications.

Table 8-7 | Distribution System Improvements Projects

Project Name	Project ID	Project Timing	Estimated Cost 2024 USD	Brief Project Description
0 to 20-Year Planning Horizon				
Annual Distribution System Improvements Program	D-01	2025-2044 (Annual)	$59,699,000	Pipe improvement projects required to address system capacity deficits.
Street Utility Improvements	D-02	2025-2044 (Annual)	$24,618,000	Water main improvements concurrent with street improvements.
Water Repair & Replacements	D-03	2025-2044 (Annual)	$11,950,000	Pipe improvements to replace aging and undersized pipes.
Water Trench Patches Program	D-04	2024-2044 (Annual)	$3,360,000	Annual program for restoration following water and service leaks.
West Hill Springs Transmission Main Replacement	D-05	2024, 2026-2027	$1,401,000	Transmission piping replacement.
Lea Hill 648 Zoning Adjustment	D-06	2027	$104,000	Pressure zone modifications to address fire flow capacity deficit.
Subtotal			**$101,132,000**	

8.2.3.5 General Utility Projects

The general water system projects and their estimated costs are provided in **Table 8-8**. Project IDs have been revised to reflect the updated prioritization and planned timing of projects presented in this WSP. Previous project IDs from the 2015 WSP as presented above will be discontinued for clarity purposes.

8.2.3.5.1 Water System Plan Updates (G-01, G-02)

DOH requires Water System Plans to be updated every ten years. The City has allocated budget to complete Water System Plan Updates in 2034 and 2044. The project ID for both updates was previously G-08 in the 2015 WSP.

Table 8-8 | General Water System Projects

Project Name	Project ID	Project Timing	Estimated Cost 2024 USD	Brief Project Description
0 to 10-Year Planning Horizon				
Water System Plan Update - 2034	G-01	2033-2034	$750,000	Mandated by Washington Department of Health.
10 to 20-Year Planning Horizon				
Water System Plan Update - 2044	G-02	2043-2044	$750,000	Mandated by Washington Department of Health.
Subtotal			**$1,500,000**	

8.3 CIP Summary and Schedule

Table 8-9 summarizes the total CIP cost by project categories for the 20-year planning horizon. All costs shown are in 2024 dollars. Distribution system improvements comprise more than 50 percent of the allocated costs for the CIP.

Table 8-9 | Total CIP Cost by Project Category from 2024 through 2044

Category	Total CIP Cost Summary 2024 – 2044 (2024 USD)
Supply	$60,416,013
Storage	$21,579,621
Pump Stations	$9,230,000
Distribution	$121,858,681
General	$1,750,000
TOTAL	**$214,834,315**

The results of prioritizing the improvements were used to establish an implementation schedule that can be used by the City for preparing its 20-year CIP and 6-year CFP. The implementation schedule for the active projects and planned CIP projects is summarized in **Table 8-10**. More details are included in **Appendix W**. The City uses this information to develop rates and SDC charges.

The City will schedule the water main projects in the Annual Distribution Improvements Program and Water Repair and Replacements during the annual budget process. This provides the City with the flexibility to coordinate these projects with roadway or other projects within the same area.

Table 8-10 | Capital Improvements Program Costs and Phasing

CIP ID	Name	CAP/Non-CAP	Total Estimated Cost 2024 USD	2024	10-Year										20-Year		
					2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035-38	2039-42	2043-44
Active Projects																	
CP1619	104th Park Development (104th to 102nd Water Main Loop)	Non-CAP	$350,000	$350,000													
CP2301	104th Avenue SE PRV Replacement	Non-CAP	$390,475	$390,475													
CP2123	C St SW Preservation	Non-CAP	$1,802,075	$901,038	$901,038												
CP1603	Coal Creek Springs Transmission Main Replacement	Non-CAP	$4,450,422	$4,450,422													
CP2125	D St SE and 23rd Street SE Storm Improvements	Non-CAP	$2,285,677	$2,285,677													
CP2021	Well 4 Facility Improvements	Non-CAP	$884,822	$884,822													
CP2403	Well 4 Electrical Improvements	Non-CAP	$1,050,000	$200,000	$850,000												
CP2410	112th Pl SE Water Main Replacement	Non-CAP	$2,100,000	$255,000	$1,845,000												
CP1622	Auburn Way South - Hemlock St SE to Poplar St SE	Non-CAP	$2,398,000		$2,398,000												
CP2022	Garden Avenue Realignment	Non-CAP	$699,797	$699,797													
CP2210	M Street NE Widening	Non-CAP	$357,000	$37,000		$320,000											
CP2116	R Street SE Widening	Non-CAP	$1,762,488		$100,000	$1,662,488											
CP2308	R St SE and 21st St SE Roundabout	Non-CAP	$544,897	$61,897	$483,000												
CP2315	R St SE Preservation - 33rd St SE to 37th St SE	Non-CAP	$301,850	$301,850													
CP2319	Lea Hill Road/104th Ave SE Roundabout	Non-CAP	$850,000	$100,000		$150,000	$600,000										
CP2405	Fulmer Treatment Facility VFD Replacements	Non-CAP	$175,000	$175,000													
CP2219	Reservoirs 4 and 8 Seismic Rehabilitation	Non-CAP	$1,433,871	$1,433,871													
CP2404	12th St SE and Auburn Way South Water R&R	Non-CAP	$636,000	$318,000	$318,000												
CP2412	2025 Local Street Preservation	Non-CAP	$725,000	$65,000	$660,000												
	2026 Local Street Preservation	Non-CAP	$1,073,000	$50,000	$150,000	$873,000											
CP2329	Coal Creek Springs Flowmeter Replacement	Non-CAP	$375,017	$375,017													

CIP ID	Name	CAP/Non-CAP	Total Estimated Cost	2024	10-Year										20-Year		
CP2134	Comprehensive Water System Plan Update - 2024	Non-CAP	$250,000	$250,000													
CP2209	Coal Creek Springs Rehabilitation - Phase 1	Non-CAP	$75,614	$75,614													
CP2413	Reservoir 2 Valves	Non-CAP	$2,268,750	$68,750	$2,200,000												
	Algona Well 1 Study – Phase 1	Non-CAP	$50,000	$50,000													
	Valley Service Area Reservoir No. 3 Siting Analysis	Non-CAP	$50,000	$50,000													
	Braunwood Pump Station Assessment	Non-CAP	$40,000	$40,000													
Supply																	
S-01	Cascade Water Alliance Water Purchase	CAP	$5,608,860	$934,810	$934,810	$934,810	$934,810	$934,810	$934,810								
S-02	Water Resources Protection Program (Wellhead Protection)	Non-CAP	$1,287,700	$87,700	$60,000	$60,000	$60,000	$60,000	$60,000	$60,000	$60,000	$60,000	$60,000	$60,000	$240,000	$240,000	$120,000
S-03	Rehabilitate & Clean Wells 2 and 6 (3-year Cycle)	Non-CAP	$1,750,000		$250,000			$250,000			$250,000			$250,000	$250,000	$250,000	$250,000
S-04	Well Inspection and Redevelopment Program	Non-CAP	$420,000			$210,000	$210,000										
S-05	On-Site Chlorine Generation Systems (OSEC) at Wells 1 and 4	Non-CAP	$275,000			$100,000	$175,000										
S-06	Fulmer CCTF Replace On-Site Chlorine Generation System (OSEC)	Non-CAP	$500,000			$150,000	$350,000										
S-07	Well 5/5A Upgrades	CAP	$2,715,000			$950,000	$265,000	$1,500,000									
S-08	Coal Creek Springs Rehabilitation – Phase 2	CAP	$5,337,000				$500,000	$1,000,000	$2,000,000	$1,837,000							
S-09	Coal Creek Springs Chlorination Building Replacement	Non-CAP	$2,081,000							$520,250	$1,560,750						
S-10	Well 7 Treatment Phase 1	CAP	$10,097,000							$1,500,000	$2,597,000	$6,000,000					
S-11	Well 2 Replacement	CAP	$1,960,000							$400,000	$1,560,000						
S-12	Howard Road CCTF Expansion	CAP	$1,450,000									$450,000	$1,000,000				
S-13	Well 7 Back-Up Power	Non-CAP	$2,075,000									$414,961	$1,660,039				
S-14	Well 7 Treatment Phase 2	CAP	$8,054,000										$1,654,000	$3,800,000	$2,600,000		
S-15	Wells 3A/3B Treatment	CAP	$13,945,000												$13,945,000		

CIP ID	Name	CAP/Non-	Total Estimated	10-Year											20-Year		
			Cost	2024													
S-16	Algona Well 1 Study – Phase 2	Non-CAP	$250,000													$250,000	
Storage																	
R-01	Reservoir Repair & Replacements	Non-CAP	$1,392,000	$192,000	$60,000	$60,000	$60,000	$60,000	$60,000	$60,000	$60,000	$60,000	$60,000	$60,000	$240,000	$240,000	$120,000
R-02	Reservoir Painting (10-year Cycle)	Non-CAP	$3,500,000		$250,000	$1,500,000									$1,750,000		
R-03	Academy PRV Project	CAP	$470,000				$470,000										
R-04	Reservoir Capital Improvements	Non-CAP	$470,000				$470,000										
R-05	Braunwood Reservoir Improvements	Non-CAP	$250,000													$250,000	
R-06	Valley Service Area Reservoir No. 3	CAP	$11,745,000													$1,500,000	$10,245,000
Pump Station																	
PS-01	Intertie Pump Station/Lea Hill BPS Improvements	Non-CAP	$2,325,000	$75,000	$250,000	$2,000,000											
PS-02	Lea Hill Pump Station Replacement	Non-CAP	$6,365,000				$765,000	$3,000,000	$2,600,000								
PS-03	Braunwood Pump Station Mechanical Upgrades	Non-CAP	$250,000											$70,000	$180,000		
PS-04	Game Farm Park Pump Station Mechanical Upgrades	Non-CAP	$250,000											$70,000	$180,000		
Distribution																	
D-01	Annual Distribution System Improvements Program	CAP	$59,699,000		$400,000	$2,500,000	$2,500,000	$2,500,000	$2,500,000	$2,500,000	$2,500,000	$2,500,000	$2,500,000	$3,572,636	$14,290,546	$14,290,546	$7,145,273
D-02	Street Utility Improvements	Non-CAP	$24,618,000		$601,000	$617,000	$1,300,000	$1,300,000	$1,300,000	$1,300,000	$1,300,000	$1,300,000	$1,300,000	$1,300,000	$5,200,000	$5,200,000	$2,600,000
D-03	Water Repair & Replacements	Non-CAP	$11,950,000		$150,000	$450,000	$600,000	$600,000	$600,000	$600,000	$600,000	$600,000	$600,000	$650,000	$2,600,000	$2,600,000	$1,300,000
D-04	Water Trench Patches Program	Non-CAP	$3,360,000	$160,000	$160,000	$160,000	$160,000	$160,000	$160,000	$160,000	$160,000	$160,000	$160,000	$160,000	$640,000	$640,000	$320,000
D-05	West Hill Springs Transmission Main Replacement	Non-CAP	$1,401,000	$50,000		$200,000	$1,151,000										
D-06	Lea Hill 648 Zoning Adjustment	CAP	$104,000				$104,000										
General																	
G-01	Comprehensive Water System Plan Update - 2034	Non-CAP	$750,000										$375,000	$375,000			
G-01	Comprehensive Water System Plan Update - 2044	Non-CAP	$750,000														$750,000
Total Project Cost (March 2024 USD)			$214,834,315	$15,368,740	$13,020,848	$12,897,298	$10,674,810	$11,364,810	$10,214,810	$8,937,250	$10,647,750	$11,544,961	$9,369,039	$10,367,636	$9,012,636	$10,091,636	$11,030,636
Cost in Future USD with Inflation/Escalation				$15,505,949	$13,438,366	$15,356,813	$13,346,021	$14,919,117	$14,079,931	$12,934,911	$16,181,050	$18,421,739	$15,697,211	$18,238,810	$16,647,840	$19,572,979	$22,463,903

CHAPTER 9

Financial Program

9.1 Introduction

This chapter was prepared by FCS GROUP to provide a financial program that allows the City of Auburn (City) water utility to remain financially viable during the planning period. This financial viability analysis considers the historical financial condition, current and identified future financial and policy obligations, operation and maintenance (O&M) needs, and the financial impacts of the capital projects identified in this Water System Plan (WSP). Furthermore, this chapter provides a review of the water utility's current rate structure with respect to rate adequacy and customer affordability.

9.2 Past Financial Performance

This section includes a historical summary of financial performance as reported by the City, including fund resources and uses arising from cash transactions.

9.2.1 Comparative Financial Statements

The City legally owns and operates a water utility. Table 9-1 shows a summary of water fund resources and uses arising from cash transactions for the previous 6 years (2017 through 2022). 2023 financial statements were not available at the time the chapter was developed. Table 9-2 shows a summary of assets and liabilities, with the difference between the two reported as "net position." Increases and decreases in net position are useful indicators of the financial position of the City's utility. Noteworthy findings and trends for the historical performance and condition of the City's water utility are then discussed.

Table 9-1 | Summary of Historical Fund Resources and Uses Arising From Cash Transactions

	2017	2018	2019	2020	2021	2022
OPERATING REVENUES						
Charges for Service	$ 14,781,310	$ 15,293,485	$ 15,057,517	$ 14,846,679	$ 15,879,799	$ 16,459,868
Other Operating Revenue	-	600	835	835	-	-
Total Operating Revenues	$ 14,781,310	$ 15,294,085	$ 15,058,352	$ 14,847,514	$ 15,879,799	$ 16,459,868
OPERATING EXPENSES						
Operations and Maintenance	$ 3,753,573	$ 3,692,419	$ 3,789,093	$ 3,727,553	$ 3,912,937	$ 3,840,391
Administration	4,672,569	4,702,259	4,727,971	4,615,503	5,221,782	6,028,393
Depreciation and Amortization	3,269,581	3,407,933	3,848,016	3,774,956	3,826,387	3,533,926
Other Operating Expenses	8,964	-	-	-	-	-
Total Operating Expenses	$ 11,704,687	$ 11,802,611	$ 12,365,080	$ 12,118,012	$ 12,961,106	$ 13,402,710
Operating Income (Loss)	$ 3,076,623	$ 3,491,474	$ 2,693,272	$ 2,729,502	$ 2,918,693	$ 3,057,158
NONOPERATING REVENUES (EXPENSES)						
Interest Revenue	$ 104,564	$ 178,271	$ 261,654	$ 49,808	$ 22,790	$ 278,430
Other Non-Operating Revenue	269,264	324,228	589,809	148,433	26,542	86,333
Gain (Loss) on Sale of Capital Assets	-	-	-	-	-	-
Interest Expense	(703,321)	(697,363)	(658,808)	(910,452)	(663,857)	(601,400)
Other Non-Operating Expense	-	-	-	(225,230)	-	(90,443)
Total Non-Operating Revenues (Expenses)	$ (329,493)	$ (194,864)	$ 192,655	$ (937,441)	$ (614,525)	$ (327,080)
Income (Loss) Before Contributions and Transfers	$ 2,747,130	$ 3,296,610	$ 2,885,927	$ 1,792,061	$ 2,304,168	$ 2,730,078
Capital Contributions	$ 1,176,756	$ 1,271,234	$ 3,246,853	$ 2,170,407	$ 5,382,110	$ 1,772,439
Transfers In	2,500,000	2,686,332	39,258	6,536,029	-	-
Transfers Out	(2,693,946)	(2,800,400)	(147,002)	(6,643,340)	(119,472)	(96,339)
Change in Net Position	$ 3,729,940	$ 4,453,776	$ 6,025,036	$ 3,855,157	$ 7,566,806	$ 4,406,178
Net Position, January 1	75,751,705	79,481,645	83,935,421	89,960,457	93,815,614	101,382,420
Net Position, December 31	$ 79,481,645	$ 83,935,421	$ 89,960,457	$ 93,815,614	$ 101,382,420	$ 105,788,598
O&M Coverage Ratio	126.3%	129.6%	121.8%	122.5%	122.5%	122.8%
Net Operating Income as a % of Operating Revenue	20.8%	22.8%	17.9%	18.4%	18.4%	18.6%
Debt Service Coverage Ratio	3.83	4.16	3.93	3.63	3.17	2.85

9.2.1.1 Findings and Trends

- The City's water charges for services increased from $14.8M in 2017 to $16.5M in 2022. The average annual increase was approximately 2.2 percent per year, with a total increase of 11.4 percent from 2017 to 2022. Charges for services increase each year, except for 2019 and 2020 where revenues fell by 1.5 percent and 1.4 percent respectively. Operating Expenditures increased by $1.7M across the six years with an average annual increase of 2.8 percent. Similar to observations made in revenues, expenditures dropped in 2020 but to a greater extent, decreasing by 2.0 percent. Despite total operating expenses slightly outpacing growth in operating revenues, operating income has been positive in all years observed. 2019 and 2020 had slightly less operating income than other years, observed at $2.7M, with the remainder of the years averaging $3.1M.

- The O&M coverage ratio (total operating revenues divided by total operating expenses) was 126.3 percent in 2017. With expenses slightly outpacing revenues this metric decreased and ended 2022 at 122.8 percent. A ratio of 100.0 percent or greater shows that operating revenue will successfully cover operating expenses, and the utility has remained above this ratio for all years observed.

- Net operating income as a percentage of operating revenue was 20.8 percent in 2017, decreasing to a low of 17.9 percent in 2019, before ending 2022 at 18.6 percent. Similar to the O&M coverage ratio, these trends show how successfully operating revenue actually covered operating expenses, with higher positive numbers being the best and negative numbers showing a need for improvement. In addition, these trends demonstrate the ability of the utility to invest in capital, whether through direct cash transfers or the issuance and servicing of debt.

- The debt service coverage ratio measures the amount of cash flow available to meet principal and interest payments. Typically, revenue bond debt service coverage requires a minimum factor of 1.25 during the life of the loans. This ratio is calculated by dividing cash or net operating income (operating revenues less operating expenses) by annual revenue bond debt service. The debt service coverage ratio for all outstanding revenue bond debt ended 2017 at 3.83, decreasing to 2.85 by 2022, as the City took on more debt liabilities. The fact that this ratio has sustained levels higher than the minimum target of 1.25 indicates a stable capacity for new debt and will likely result in favorable terms when entering the bond market.

Table 9-2 | Summary of Historical Comparative Statements of Net Position

	2017	2018	2019	2020	2021	2022
CURRENT ASSETS						
Cash and Cash Equivalents	$ 5,765,412	$ 7,294,288	$ 9,568,609	$ 11,417,193	$ 14,719,905	$ 13,826,776
Investments	-	-	-	-	-	-
Restricted Cash:						
Bond Payments	1,690,316	1,687,994	1,672,123	2,334,270	2,246,000	2,183,144
Customer Deposits	43,892	31,541	40,062	64,792	91,672	104,070
Other (Reserve for Bonds and Rate Stabilization)	1,630,313	1,630,314	1,627,520	11,586,722	5,987,879	2,448,053
Customer Accounts	1,363,945	1,837,533	1,912,797	2,090,429	2,007,050	2,203,858
Other Receivables	-	-	-	-	-	-
Due From Other Governmental Units	17,968	14,338	-	-	10,000	-
Inventories	135,450	183,252	189,071	233,015	242,192	313,273
Total Current Assets	$ 10,647,296	$ 12,679,260	$ 15,010,182	$ 27,726,421	$ 25,304,698	$ 21,079,174
NONCURRENT ASSETS						
Net Pension Asset	$ -	$ -	$ -	$ -	$ 2,266,854	$ 920,143
Capital Assets Not Being Depreciated:						
Land	897,971	897,971	897,971	1,283,524	1,283,524	1,283,524
Intangible - Water Rights	5,449,186	5,701,772	5,954,358	6,889,163	7,823,968	8,758,773
Construction In Progress	8,374,328	620,533	3,488,784	4,443,772	6,918,228	6,283,865
Capital Assets:						
Buildings and Equipment	2,509,599	2,509,599	2,509,599	2,509,599	2,509,599	2,509,599
Improvements Other Than Buildings	131,463,582	142,480,531	145,175,810	151,038,789	159,207,726	167,888,532
Less Accumulated Depreciation	(54,538,817)	(57,946,751)	(61,794,767)	(65,569,723)	(69,396,109)	(72,930,035)
Total Noncurrent Assets Net of Accumulated Depreciation	$ 94,155,849	$ 94,263,655	$ 96,231,755	$ 100,595,124	$ 110,613,790	$ 114,714,401
TOTAL ASSETS	$ 104,803,145	$ 106,942,915	$ 111,241,937	$ 128,321,545	$ 135,918,488	$ 135,793,575
DEFFERED OUTFLOWS OF RESOURCES						
Deferred Outflow from Bond Refunding	$ -	$ -	$ -	$ 78,146	$ 78,146	$ 78,146
Deferred Outflow related to Pensions	312,206	274,590	296,941	334,033	309,166	866,866
Total Deferred Outflows of Resources	312,206	274,590	296,941	412,179	387,312	$ 945,012
CURRENT LIABILITIES						
Current Payables	$ 1,354,856	$ 831,153	$ 971,724	$ 1,015,566	$ 1,627,369	$ 700,718
Claims Payable	-	-	-	-	-	-
Loans Payable - Current	634,328	652,107	467,646	478,000	250,914	224,800
Employee Leave Benefits - Current	125,285	122,115	128,188	122,116	172,872	172,114
Leases Payable - Current	-	-	-	-	-	-
Revenue Bonds Payable - Current	871,737	902,092	935,347	1,215,345	1,268,753	1,327,964
Payable From Restricted Assets:						
Accrued Interest	828,486	794,779	754,158	1,126,592	1,065,376	998,923
Deposits	43,892	31,541	40,062	64,792	91,672	104,070
Other Liabilities Payable	600	-	-	-	-	-
Total Current Liabilities	$ 3,859,184	$ 3,333,787	$ 3,297,125	$ 4,022,411	$ 4,476,956	$ 3,528,589
NONCURRENT LIABILITIES						
Employee Leave Benefits	$ 37,836	$ 44,177	$ 34,069	$ 44,176	$ 74,823	$ 66,026
Loans Payable	3,689,390	3,123,514	2,697,219	2,359,332	2,108,418	1,883,620
Leases Payable	-	-	-	-	-	-
Revenue Bonds Payable	14,899,559	13,952,693	12,972,571	26,189,156	24,596,375	22,944,382
Net Pension Liability	2,775,633	2,245,967	1,937,559	1,917,936	1,216,710	1,478,887
Total Non Current Liabilities	$ 21,402,418	$ 19,366,351	$ 17,641,418	$ 30,510,600	$ 27,996,326	$ 26,372,915
TOTAL LIABILITIES	$ 25,261,602	$ 22,700,138	$ 20,938,543	$ 34,533,011	$ 32,473,282	$ 29,901,504
DEFERRED INFLOWS OF RESOURCES						
Deferred Inflow Related to Leases	$ -	$ -	$ -	$ -	$ -	$ -
Deferred Inflow Related to Pensions	372,104	581,946	639,878	385,099	2,450,098	1,048,485
Total Deferred Inflows of Resources	$ 372,104	$ 581,946	$ 639,878	$ 385,099	$ 2,450,098	$ 1,048,485
NET POSITION						
Net Investment in Capital Assets	$ 75,751,151	$ 77,321,243	$ 80,831,095	$ 72,687,561	$ 86,632,404	$ 87,779,897
Restricted For:						
Debt Service	801,827	835,535	873,362	10,460,130	658,575	3,265,869
Rate Stabilization	-	-	-	-	-	-
Pension Asset	-	-	-	-	-	920,143
Unrestricted	2,928,667	5,778,643	8,256,000	10,667,923	14,091,441	13,822,689
TOTAL NET POSITION	$ 79,481,645	$ 83,935,421	$ 89,960,457	$ 93,815,614	$ 101,382,420	$ 105,788,598
Current Ratio	2.8	3.8	4.6	6.9	5.7	6.0
Debt to Net Position Ratio	0.26	0.23	0.20	0.33	0.29	0.26
Debt to Noncurrent Capital Assets Ratio	0.22	0.21	0.19	0.31	0.26	0.24

9.2.1.2 Findings and Trends

- The current ratio is calculated by dividing unrestricted current assets by current liabilities and measures an entity's ability to pay short-term obligations. This ratio ranges from a low of 2.8 in 2017 to a high of 6.9 in 2020, ending at 6.0 in 2022. Anything above 2.0 for this liquidity ratio is good.

- The Debt to Net Position Ratio compares total debt to total net position, which is the difference between total assets and liabilities. This ratio ranged from a high of 0.33 or 33 percent in 2020 to a low of 0.20 or 20 percent in 2019. For utilities, a ratio of 40 to 60 percent helps to moderate rate impacts by spreading costs over a longer period of time. Based on these results, the City may consider utilizing debt service for future capital investments, especially if it benefits system expansion.

- The Debt to Noncurrent Capital Asset Ratio compares total debt to noncurrent capital assets, which are also known as property, plant and equipment. This ratio begins at 0.22 or 22 percent debt to 78 percent noncurrent assets in 2017. Noncurrent capital assets increase by $20.6 million throughout the six-year history while debt increased by $6.2 million, and the ratio increases to 24 percent by 2022. Similar to the debt to net position ratio, these results indicate the utility has ample borrowing capacity and may consider utilizing debt service for future capital investments, especially if it benefits system expansion. A ratio of 40 percent debt to 60 percent equity or below is a general industry target.

9.3 Financial Plan

The water utility is responsible for generating sufficient revenue to meet all of its costs. The primary source of funding is derived from ongoing monthly service charges, with additional revenue coming from late penalties and interest earnings. The City controls the level of user charges and, with City Council approval, can adjust user charges as needed to meet financial objectives.

The financial plan can only confirm financial feasibility if it considers the total system costs of providing water services, both operating and capital. To meet these objectives, the following elements have been completed.

1. **Capital Funding Plan.** Identifies the total capital improvement plan (CIP) obligations of the planning period. The plan defines a strategy for funding the CIP, including an analysis of available resources from rate revenues, existing reserves, connection charge revenues, debt financing, and any special resources that may be readily available (e.g., grants, developer contributions, etc.). The capital funding plan impacts the financial plan through the use of debt financing (resulting in annual debt service) and the assumed rate revenue made available for capital funding.

2. **Financial Forecast.** Identifies future annual non-capital costs associated with the operation, maintenance, and administration of the water system. Included in the financial plan is a reserve analysis that forecasts cash flow and fund balance activity, along with testing for satisfaction of actual or recommended minimum fund balance policies. The financial plan ultimately evaluates the sufficiency of utility revenues in meeting all obligations, including cash uses such as operating expenses, debt service, capital outlays, and reserve contributions, as well as any coverage requirements associated with long-term debt. The plan also identifies the future adjustments required to fully fund all utility obligations in the planning period.

9.3.1 Capital Funding Plan

To properly evaluate future capital funding needs, capital costs were escalated by 3.00 percent annually to the year of planned spending. The CIP developed for this WSP identifies $129.4M in escalated project costs over the 10-year planning horizon from 2024-2033. The 20-year period, through 2043, includes $262.6M in total escalated project costs.

A summary of the 10-year and 20-year CIPs are shown in **Table 9-3**. As shown, each year has varied capital cost obligations depending on construction schedules and infrastructure planning needs.

Table 9-3 | 10-Year and 20-Year CIPs

Year	Unescalated $	Escalated $
2024	$ 15,368,740	$ 15,368,740
2025	13,020,848	13,411,473
2026	12,897,298	13,682,743
2027	10,674,810	11,664,653
2028	11,364,810	12,791,194
2029	10,214,810	11,841,764
2030	8,937,250	10,671,544
2031	10,647,750	13,095,389
2032	11,544,961	14,624,811
2033	9,369,039	12,224,471
10-Year Total	**$ 114,040,315**	**$ 129,376,782**
2034 - 2043	87,371,364	133,200,307
20-Year Total	**$ 201,411,679**	**$ 262,577,089**

Table 9-4 provides more detail for the 10-year CIP.

Table 9-4 | 10-Year CIP (Escalated $)

Project	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Active Projects (In Design or Construction)										
104th Park Development (104th to 102nd Water Main Loop)	$ 350,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
104th Avenue SE PRV Replacement	390,475									
C St SW Preservation	901,038	928,069								
Coal Creek Springs Transmission Main Replacement	4,450,422									
D St SE and 23rd Street SE Storm Improvements	2,285,677									
Well 4 Facility Improvements	884,822									
Well 4 Electrical Improvements	200,000	875,500								
112th Pl SE Water Main Replacement	255,000	1,900,350								
Auburn Way South - Hemlock St SE to Poplar St SE		2,469,940								
Garden Avenue Realignment	699,797									
M Street NE Widening	37,000		339,488							
R Street SE Widening		103,000	1,763,734							
R St SE and 21st St SE Roundabout	61,897	497,490								
R St SE Preservation - 33rd St SE to 37th St SE	301,850									
Lea Hill Road/104th Ave SE Roundabout	100,000		159,135	655,636						
Fulmer Treatment Facility VFD Replacements	175,000									
Reservoirs 4 and 8 Seismic Rehabilitation	1,433,871									
12th St SE and Auburn Way South Water R&R	318,000	327,540								
2025 Local Street Preservation	65,000	679,800								
2026 Local Street Preservation	50,000	154,500	926,166							
Coal Creek Springs Flowmeter Replacement	375,017									
Comprehensive Water System Plan Update - 2024	250,000									
Reservoir 2 Valves	68,750	2,266,000								
Supply										
Cascade Water Alliance Water Purchase	934,810	962,854	991,740	1,021,492	1,052,137	1,083,701				
Water Resources Protection Program	87,700	61,800	63,654	65,564	67,531	69,556	71,643	73,792	76,006	78,286
Rehabilitate & Clean Wells 2 and 6 (3-year Cycle)		257,500			281,377			307,468		
Well Inspection and Redevelopment Program			222,789	229,473						
Coal Creek Springs Rehabilitation	75,614			546,364	1,125,509	2,318,548	2,193,474			
Coal Creek Springs Chlorination Building Replacement							621,206	1,919,526		
Howard Road CCTF Expansion									570,047	1,304,773
On-Site Chlorine Generation Systems (OSEC) at Wells 1 and 4			106,090	191,227						
Fulmer CCTF Replace On-Site Chlorine Generation System (OSEC)			159,135	382,454						
Well 5/5A Upgrades			1,007,855	289,573	1,688,263					
Well 7 Treatment Phase 1							1,791,078	3,193,982	7,600,620	
Well 7 Back-Up Power									525,660	2,165,974
Well 7 Treatment Phase 2										2,158,095
Well 2 Replacement							477,621	1,918,603		
Algona Well 1 Study	50,000									
Storage										
Reservoir Repair and Replacements	192,000	61,800	63,654	65,564	67,531	69,556	71,643	73,792	76,006	78,286
Reservoir Painting (10-year Cycle)		257,500	1,591,350							
Academy PRV Project				513,582						
Reservoir Capital Improvements				513,582						
Valley Service Area Reservoir No. 3	50,000									
Pump Stations										
Intertie Booster Pump Station Improvements	75,000	257,500	2,121,800							
Lea Hill Pump Station Replacement				835,936	3,376,526	3,014,112				
Braunwood Pump Station Mechanical Upgrades	40,000									
Distribution System										
Annual Distribution System Improvements Program		412,000	2,652,250	2,731,818	2,813,772	2,898,185	2,985,131	3,074,685	3,166,925	3,261,933
Street Utility Improvements		619,030	654,575	1,420,545	1,463,161	1,507,056	1,552,268	1,598,836	1,646,801	1,696,205
Water Repair & Replacements		154,500	477,405	655,636	675,305	695,564	716,431	737,924	760,062	782,864
Water Trench Patches Program	160,000	164,800	169,744	174,836	180,081	185,484	191,048	196,780	202,683	208,764
West Hill Springs Transmission Main Replacement	50,000		212,180	1,257,729						
Lea Hill 648 Zoning Adjustment				113,644						
General										
Comprehensive Water System Plan Update - 2034										489,290
	$15,368,740	$13,411,473	$13,682,743	$11,664,653	$12,791,194	$11,841,764	$10,671,544	$13,095,389	$14,624,811	$12,224,471

9.4 Available Funding Assistance and Financing Resources

9.4.1 City Resources

Resources appropriate for funding capital needs include accumulated cash in the capital fund, rate revenues designated for capital spending purposes, developer contributions, and capital-related charges such as system development charges. The first two resources will be discussed in the **Fiscal Policies** section of the **Financial Forecast**. Capital-related charges are discussed below.

9.4.1.1 System Development Charges

A connection charge such as the City's system development charge (SDC) refers to a one-time charge imposed on new customers as a condition of connecting to the water system. The purpose of the SDC is two-fold: 1) to promote equity between new and existing customers; and 2) to provide a source of revenue to fund capital projects necessary for meeting growth. This revenue can only be used to fund utility capital projects or to pay debt service incurred to finance those projects. In the absence of a connection charge, growth-related capital costs would be borne in large part by existing customers. In 2024, the City charged all new customers an SDC of $9,553 per meter capacity equivalent (MCE). MCEs are defined by the American Water Works Association and represent the maximum safe operating flow capacity in gallons per minute, relative to the base meter size.

9.4.1.2 Local Facilities Charges

While a connection charge is the manner in which new customers pay their share of system investment costs, local facilities charge funding is used to pay the costs of local facilities that connect each property to the system's infrastructure. Local facilities funding is often overlooked in rate forecasting because it is funded upfront by either connecting customers and developers, or through an assessment to properties, but never from rates.

A number of mechanisms can be considered toward funding local facilities. One of the following scenarios typically occurs: (a) the utility charges a connection fee based on the cost of the local facilities (under the same authority as the facilities assessment fee); (b) a developer funds an extension of the system to its development and turns those facilities over to the utility (contributed capital); or (c) a local assessment is set up called a Utility Local Improvement District (ULID/LID) or a Local Utility District (LUD), which collects tax revenue from benefited properties.

A local facilities charge (LFC) is a variation of the connection charge. It is a city-imposed charge to recover the cost related to service extension to local properties. Often called a front-footage charge and imposed on the basis of footage of the main "fronting" a particular property, it is usually implemented as a reimbursement mechanism to a city for the cost of a local facility that directly serves a property. It is a form of a connection charge and thus can accumulate up to 10 years of interest. It typically applies in instances when no developer-installed facilities are needed through developer extension due to the prior existence of available mains already serving the developing property.

The developer extension is a requirement that a developer install on-site and sometimes off-site improvements as a condition of extending service. These are in addition to the connection charge required and must be built to City standards. Part of the agreement between the City and the developer planning to extend service might include a latecomer agreement (also called payback agreements), resulting in a latecomer charge to new connections for the developer extension.

Latecomer charges are a variation of developer extensions, whereby new customers connecting to a developer-installed improvement make a payment to the City based on their share of the developer's cost. The City passes this charge on to the developer who installed the facilities. As part of the developer extension process, this defines the allocation of costs and records latecomer obligations on the title of affected properties. No interest is allowed, and the reimbursement agreement cannot exceed 20 years in duration.

ULID/LID is another mechanism for funding infrastructure that assesses benefited properties based on the special benefit received by the construction of specific facilities. Most often used for local facilities, some

ULIDs also recover related general facilities costs. Substantial legal and procedural requirements can make this a relatively expensive process, and there are mechanisms by which a ULID can be rejected.

9.4.2 Outside Resources

This section outlines various grant, loan, and bond opportunities available to the City through federal and state agencies to fund the CIP identified in the WSP.

9.4.2.1 Grants and Low-Cost Loans

Historically, federal and state grant programs were available to local utilities for capital funding assistance. However, these assistance programs have been mostly eliminated, substantially reduced in scope and amount, or replaced by loan programs. Remaining grant programs are generally lightly funded and heavily subscribed. Nonetheless, the benefit of low-interest loans makes the effort of applying worthwhile.

The State of Washington's Department of Commerce maintains a document currently entitled "*Funding Programs for Drinking Water and Wastewater Projects; Updated 3-5-2024*", which contains details on government programs, eligibility requirements, and contact information, should the City wish to inquire about program offerings and eligibility requirements.

9.4.2.2 Bond Financing

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

Revised Code of Washington (RCW) 39.36.020 states:

> (2)(a)(ii) Counties, cities, and towns are limited to an indebtedness amount not exceeding one and one half percent of the value of the taxable property in such counties, cities, or towns without the assent of three-fifths of the voters therein voting at an election held for that purpose.
>
> (b) In cases requiring such assent counties, cities, towns, and public hospital districts are limited to a total indebtedness of two and one-half percent of the value of the taxable property therein.

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

Revenue Bonds – Revenue bonds are commonly used to fund utility capital improvements. The debt is secured by the revenues of the issuing utility. With this limited commitment, revenue bonds typically bear higher interest rates than G.O. bonds and require security conditions related to the maintenance of dedicated reserves (a bond reserve) and financial performance (added bond debt service coverage). The City agrees to satisfy these requirements by resolution as a condition of bond sale.

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

9.4.3 Capital Financing Strategy

An ideal capital financing strategy would include the use of grants and low-cost loans when debt issuance is required. However, these resources are very limited and competitive in nature and do not provide a reliable source of funding for planning purposes. It is recommended that the City pursue these funding avenues but assume revenue bond financing to meet the needs which can't be met by available cash resources. The capital financing strategy developed to fund the CIP identified in this WSP assumes the following funding resources:

- Accumulated cash reserves,
- Transfers of excess cash (over minimum balance targets) from the Operating Fund,
- System development charge revenue,
- Interest earned on Capital Fund balances,
- Grant proceeds, and
- Revenue bond financing.

The cash resources described above are anticipated to fund 47.1 percent of the 10-year CIP and 56.4 percent of the 20-year CIP. The remaining funding is assumed to be from new debt obligations of $69.1M in the next 10-year planning period and an additional $45.3M between 2034-2043. **Table 9-5** presents the 10-year and 20-year capital financing strategy.

Table 9-5 | 10-Year and 20-Year Capital Financing Strategy

Year	Capital Expenditures Escalated	System Development Charge Revenue	Grant Funding	Revenue Bond Proceeds	Cash / Reserve Funding	Total Financial Resources
2024	**$ 15,368,740**	$ 325,000	$ 2,717,531		$ 12,326,209	**$ 15,368,740**
2025	**13,411,473**	452,813		12,958,660	-	**13,411,473**
2026	**13,682,743**	468,497		3,541,340	9,672,907	**13,682,743**
2027	**11,664,653**	484,723		11,179,930	-	**11,664,653**
2028	**12,791,194**	501,511		6,320,070	5,969,613	**12,791,194**
2029	**11,841,764**	518,881		10,400,000	922,883	**11,841,764**
2030	**10,671,544**	536,853		-	10,134,691	**10,671,544**
2031	**13,095,389**	555,446		12,539,943	-	**13,095,389**
2032	**14,624,811**	574,684		2,260,057	11,790,070	**14,624,811**
2033	**12,224,471**	594,589		9,305,411	2,324,471	**12,224,471**
Subtotal	**$ 129,376,782**	**$ 5,012,997**	**$ 2,717,531**	**$ 68,505,411**	**$ 53,140,843**	**$ 129,376,782**
2034 - 2043	**133,200,307**	7,204,781		45,894,589	80,100,937	**133,200,307**
Total	**$ 262,577,089**	**$ 12,217,778**	**$ 2,717,531**	**$ 114,400,000**	**$ 133,241,780**	**$ 262,577,089**

9.5 Financial Forecast

The financial forecast, or revenue requirement analysis, forecasts the amount of annual revenue that needs to be generated by user rates. The analysis incorporates operating revenues, O&M expenses, debt service payments, rate-funded capital needs, and any other identified revenues or expenses related to operations. The objective of the financial forecast is to evaluate the sufficiency of the current level of rates. In addition to annual operating costs, the revenue needs also include debt covenant requirements and specific fiscal policies and financial goals of the City.

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

Cash Test – The cash flow test identifies all known cash requirements for the City in each year of the planning period. Typically, these include O&M expenses, debt service payments, rate-funded system reinvestment funding or directly funded capital outlays, and any additions to specified reserve balances. The total annual cash needs of the City are then compared to projected cash revenues using the current rate structure. Any projected revenue shortfalls are identified, and the rate increases necessary to make up the shortfalls are established.

Coverage Test – The coverage test is based on a commitment made by the City when issuing revenue bonds and some other forms of long-term debt. For the purposes of this analysis, revenue bond debt is assumed for any needed debt issuance. As a security condition of issuance, the City would be required per covenant to agree that the revenue bond debt would have a higher priority for payment (a senior lien) compared to most other expenditures; the only outlays with a higher lien are O&M expenses. Debt service coverage is expressed as a multiplier of the annual revenue bond debt service payment. For example, a 1.00 coverage factor would imply that no additional cushion is required. A 1.25 coverage factor means revenue must be sufficient to pay O&M expenses, annual revenue bond debt service payments, and an additional 25.0 percent of annual revenue bond debt service payments. The excess cash flow derived from the added coverage, if any, can be used for any purpose, including funding capital projects. Targeting a higher coverage factor can help the City achieve a better credit rating and provide lower interest rates for future debt issues.

9.5.1 Current Financial Structure

The City maintains a fund structure and implements financial policies that target management of a financially viable and fiscally responsible water system.

9.5.1.1 Fiscal Policies

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

Operating Reserve – Operating reserves are designed to provide a liquidity cushion to ensure that adequate cash working capital will be maintained to deal with significant cash balance fluctuations, such as seasonal fluctuations in billings and receipts, unanticipated cash expenses, or lower than expected revenue collections. Like other types of reserves, operating reserves also serve another purpose: they help smooth rate increases over time. Target funding levels for an operating reserve are generally expressed as a certain number of days of O&M expenses, with the minimum requirement varying with the expected revenue volatility. Industry practice for utility operating reserves ranges from 30 days (8.0 percent) to 120 days (33.0 percent) of O&M expenses, with the lower end more appropriate for utilities with stable revenue streams and the higher end more appropriate for utilities with significant seasonal or consumption-based fluctuations. The City's current goal is to maintain a minimum balance in the Operating Fund equal to 90 days of O&M expenses for working capital.

Capital Reserve – A capital contingency reserve is an amount of cash set aside in case of an emergency should a piece of equipment or a portion of the utility's infrastructure fail unexpectedly. The reserve also could be used for other unanticipated capital needs, including capital project cost overruns. Industry practices range from maintaining a balance equal to 1.0 to 2.0 percent of fixed assets, an amount equal to a 5-year rolling average of CIP costs, or an amount determined sufficient to fund equipment failure (other than catastrophic failure). The final target level should balance industry practices with the risk level of the City.

This financial plan targets a minimum balance in the water utility capital fund equal to 1.0 percent of fixed assets.

System Reinvestment – System reinvestment funding promotes system integrity through ongoing repair and replacement of system infrastructure. Ideally, a detailed asset management plan would guide the level of rate funded system reinvestment, however, in absence of this level of effort, annual depreciation expense is commonly used as a measure of the decline in asset value associated with routine use of the system. Particularly for utilities that do not already have an explicit system reinvestment policy in place, implementing a funding level based on full depreciation expense could significantly impact rates. An alternative benchmark is annual depreciation expense net of debt principal payments on outstanding debt. This approach recognizes that customers are still paying for certain assets through the debt component of their rate and intends to avoid simultaneously charging customers for an asset and its future replacement. The specific benchmark used to set system reinvestment funding targets is a matter of policy that must balance various objectives, including managing rate impacts, keeping long-term costs down, and promoting "generational equity" (i.e., not excessively burdening current customers with paying for facilities that will serve a larger group of customers in the future).

The City is currently phasing in system reinvestment funding, aiming to reach 100 percent of annual depreciation levels by 2030. With this phase-in strategy in place, the City is forecast to fund an average of $3.8 million in capital costs annually through dedicated rate revenues within the 10-year forecast period.

Debt Management – It is prudent to consider policies related to debt management as part of a broader utility financial policy structure. Debt management policies should be evaluated and formalized, including the level of acceptable outstanding debt, debt repayment, bond coverage, and total debt coverage targets. The City has three outstanding water revenue bonds, a Public Works Trust fund loan, and two other low interest loans. This forecast meets or exceeds the required revenue bond debt service coverage of 1.25.

9.5.1.2 Financial Forecast

The financial forecast is primarily based upon the City's budget through 2024 and takes into consideration other key factors and assumptions needed to develop a complete portrait of the City's annual water utility financial obligations. The following is a list of the key revenue and expense factors and assumptions used to develop the financial forecast.

- **Growth** – Rate revenue is escalated utilizing a 0.45 percent growth rate developed based on actual historical trends at the City.

- **Revenue** – The City has two general revenue sources: 1) water service charges (rate revenue); and 2) miscellaneous (non-rate) revenue. In the event of a forecasted annual shortfall, rate revenue can be increased to meet the annual revenue requirement. For the purpose of this financial forecast, rate revenues are forecasted to increase with customer growth. Non-rate revenues are held constant throughout the forecast period, with the exception of interest earnings which are calculated based on projected balances and assumed investment rates.

- **System Development Charge Revenue** – the existing system development charges are applied to the projected new connections to forecast revenue. Connection charges are forecast to generate an average of $501,000 annually from 2024-2033. This equates to an average of 46 new MCEs per year. Connection charge revenue is directed towards annual capital needs.

- **Expenses –** O&M expense projections are based on the City's budget through 2024 with general cost inflation increases of 3.0 percent, labor cost inflation of 5.0 percent for 2025 and 2026, decreasing to 3.0 percent thereafter and benefit cost inflation increases of 12.50 percent for 2025 and 2026, decreasing to 5.5 percent per year thereafter. Budget figures were used for taxes in 2024. Future taxes are calculated based on forecasted revenues and prevailing tax rates.

    - **Facilities GO Bond** - In order to construct a new facility for Maintenance and Operations for the City, the water utility will fund part of a General Obligation Bond totaling approximately $39.1 million. Beginning in 2025, the water utility's proportionate share of the bond is forecasted at $333,000 annually for the remainder of the twenty-year forecast.

- **Existing Debt –** The water utility has six (6) outstanding debt issues: three (3) revenue bonds, one (1) Public Works Trust Fund (PWTF) loan and two (2) Drinking Water State Revolving Fund (DWSRF) loans. Total annual existing debt service obligations begin 2024 at $2.7 million, decreasing to $1.1 million by 2033 as four (4) of the six (6) loans are fully repaid.

- **Future Debt –** The capital financial strategy developed for this WSP forecasts the need for $69.1M in new debt proceeds in five (5) separate instances throughout the ten-year forecast. The analysis performed assumes all new debt is through revenue bond financing. Annual new debt service obligations are forecasted to begin in 2025 at $1.5 million increasing to $6.1 million by 2033.

- **Transfers to Capital -** Operating fund balance above the minimum requirement is assumed to be available to fund capital projects and projected to be transferred to the Capital Fund each year, if needed. In total, the utility is forecast to fund $16.7 million in capital projects from excess operating fund cash within the 10-year forecast period.

Although the financial plan is completed through 2043, the rate strategy focuses on the shorter-term planning period of 2024 through 2033. It is recommended that the City revisit the proposed rates every 3 to 4 years to ensure that the rate projections developed remain adequate. Any significant changes should be incorporated into the financial plan and future rates should be adjusted as needed.

Table 9-6, following, summarizes the annual revenue requirements based on the forecast of revenues, expenditures, fund balances, and fiscal policies.

Table 9-6 | 10-Year Financial Forecast

Revenue Requirement	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Revenues										
Rate Revenues Under Existing Rates	$ 18,398,987	$ 18,480,409	$ 18,562,210	$ 18,644,392	$ 18,726,956	$ 18,809,906	$ 18,893,241	$ 18,976,964	$ 19,061,078	$ 19,145,583
Non-Rate Revenues	711,618	995,023	921,087	742,167	760,542	763,594	775,863	779,012	795,263	798,519
Total Revenues	**$ 19,110,605**	**$ 19,475,432**	**$ 19,483,297**	**$ 19,386,559**	**$ 19,487,499**	**$ 19,573,500**	**$ 19,669,104**	**$ 19,755,976**	**$ 19,856,341**	**$ 19,944,102**
Expenses										
Cash Operating Expenses	$ 14,490,240	$ 15,195,624	$ 15,775,495	$ 16,147,464	$ 16,560,290	$ 16,986,418	$ 17,429,740	$ 17,888,499	$ 18,366,342	$ 18,860,547
Existing Debt Service	2,674,248	2,671,361	2,665,106	2,615,447	2,611,734	2,601,528	2,598,336	1,759,410	1,759,292	1,090,490
New Debt Service	-	1,455,336	1,455,336	2,998,874	2,998,874	3,916,177	3,916,177	5,221,569	5,221,569	6,094,771
Rate Funded System Reinvestment	1,738,857	1,037,921	2,016,114	1,877,607	3,393,539	4,213,598	5,626,454	5,888,362	6,180,858	6,425,348
Total Expenses	**$ 18,903,345**	**$ 20,360,242**	**$ 21,912,050**	**$ 23,639,392**	**$ 25,564,438**	**$ 27,717,721**	**$ 29,570,707**	**$ 30,757,840**	**$ 31,528,062**	**$ 32,471,155**
Total Surplus (Deficiency)	**$ 207,259**	**$ (884,810)**	**$ (2,428,754)**	**$ (4,252,833)**	**$ (6,076,939)**	**$ (8,144,221)**	**$ (9,901,603)**	**$ (11,001,863)**	**$ (11,671,720)**	**$ (12,527,053)**
Annual Rate Adjustment	**0.00%**	**7.50%**	**9.50%**	**9.50%**	**9.50%**	**9.50%**	**9.50%**	**3.00%**	**3.00%**	**3.00%**
Cumulative Annual Rate Adjustment	**0.00%**	**7.50%**	**17.71%**	**28.90%**	**41.14%**	**54.55%**	**69.23%**	**74.31%**	**79.54%**	**84.92%**
Rate Revenues After Rate Increase	$ 18,398,987	$ 19,866,440	$ 21,850,041	$ 24,031,724	$ 26,431,269	$ 29,070,437	$ 31,973,157	$ 33,078,288	$ 34,221,651	$ 35,404,570
Additional Taxes from Rate Increase	-	229,097	543,446	890,472	1,273,446	1,695,963	2,161,979	2,330,808	2,505,891	2,687,448
Net Cash Flow After Rate Increase	**$ 207,259**	**$ 272,124**	**$ 315,632**	**$ 244,027**	**$ 353,928**	**$ 420,347**	**$ 1,016,334**	**$ 768,653**	**$ 982,962**	**$ 1,044,486**
Coverage After Rate Increases	3.00	2.10	2.40	1.91	2.24	2.19	2.52	2.41	2.50	2.43

The financial forecast indicates that at existing rate levels the utility will become deficient in 2025 as growth in expenses outpaces growth in revenues and the utility takes on additional debt obligations to fund capital infrastructure investment. The City has adopted a 7.50 percent increase for 2025, to resolve the remaining projected deficiency, rates will need to increase by 9.50 percent annually from 2026 through 2030, before decreasing to 3.00 percent annually through 2033.

9.5.1.3 City Funds and Reserves

Table 9-7 shows a summary of the projected Operating Fund and Capital Fund ending balances through 2033 based on the rate forecasts presented above. The Operating Fund is maintained above 90 days of O&M expenses. The Capital Fund balance meets or exceeds the minimum target of 1 percent of fixed assets in most years of the study timeframe with the exception of 2026, 2028 and 2030 where balances fall below target. Fund balances are rebuilt and meet or exceed target balances by the end of the ten-year timeframe.

Table 9-7 | Ending Cash Balance Summary

Ending Fund Balance	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Operating Fund	$ 8,988,743	$ 9,260,867	$ 3,943,874	$ 4,036,866	$ 4,140,073	$ 4,246,604	$ 4,357,435	$ 4,472,125	$ 4,591,586	$ 4,715,137
Capital Fund	2,019,201	6,659,039	1,226,711	9,587,690	1,038,144	4,653,056	1,096,853	9,910,203	3,003,538	8,649,973
Total	**$11,007,944**	**$15,919,905**	**$ 5,170,585**	**$13,624,556**	**$ 5,178,217**	**$ 8,899,660**	**$ 5,454,288**	**$14,382,328**	**$ 7,595,123**	**$13,365,110**

9.6 Current and Projected Rates

9.6.1 Current Rates

The existing water rates are composed of a fixed monthly charge that varies by meter size and a variable consumption charge per hundred cubic feet (CCF) for all water usage. While fixed charges are consistent across customer classes for all meter sizes except one inch, usage charges are different for each customer class. Consumption for the single family class is divided into three escalating pricing tiers that are applied year-round. This type of inclining tier structure is designed to discourage discretionary usage of water and encourage conservation. All other customers are charged a uniform rate for all consumption used. **Table 9-8** shows the existing City of Auburn water system rate schedule.

Table 9-8 | Existing Schedule of Rates

Description	2024 Existing
Monthly Fixed Charges (All Classes)	
3/4"	$ 21.08
1" - Single Family	21.08
1" - All Other Classes	23.66
1 1/2"	25.76
2"	29.69
3"	57.11
4"	71.66
6"	91.57
8"	118.30
10"	167.97
Volume Charges per CCF	
Single Family	
0-7 CCF	$ 4.18
7-15 CCF	5.11
Greater Than 15 CCF	5.81
Multi-Family	$ 5.00
Commercial	5.27
Manufacturing / Industrial	5.15
Schools	5.61
Municipal	5.19
Irrigation	6.94

9.6.2 Projected Rates

The financial forecast discussed above indicates the need for annual rate adjustments in order to satisfy all forecasted financial obligations. The city has adopted a 7.50 percent increase for 2025, with annual 9.50 percent increases forecasted from 2026 through 2030, and 3.00 percent increases from 2031 to 2033. **Table 9-9** shows the projected rates with increases applied uniformly to the water fixed and volume components for all classes. A more detailed rate study that will analyze the projected increases beyond the current adopted rates will be conducted in 2025.

Table 9-9 | Proposed Schedule of Rates

Description	Existing	Proposed								
	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Monthly Fixed Charges (All Classes)										
3/4"	$ 21.08	$ 22.66	$ 24.81	$ 27.17	$ 29.75	$ 32.58	$ 35.68	$ 36.75	$ 37.85	$ 38.99
1" - Single Family	21.08	22.66	24.81	27.17	29.75	32.58	35.68	36.75	37.85	38.99
1" - All Other Classes	23.66	25.43	27.85	30.50	33.40	36.57	40.04	41.24	42.48	43.75
1 1/2"	25.76	27.69	30.32	33.20	36.35	39.80	43.58	44.89	46.24	47.63
2"	29.69	31.92	34.95	38.27	41.91	45.89	50.25	51.76	53.31	54.91
3"	57.11	61.39	67.22	73.61	80.60	88.26	96.64	99.54	102.53	105.61
4"	71.66	77.03	84.35	92.36	101.13	110.74	121.26	124.90	128.65	132.51
6"	91.57	98.44	107.79	118.03	129.24	141.52	154.96	159.61	164.40	169.33
8"	118.30	127.17	139.25	152.48	166.97	182.83	200.20	206.21	212.40	218.77
10"	167.97	180.57	197.72	216.50	237.07	259.59	284.25	292.78	301.56	310.61
Volume Charges per CCF										
Single Family										
0-7 CCF	$ 4.18	$ 4.49	$ 4.92	$ 5.39	$ 5.90	$ 6.46	$ 7.07	$ 7.28	$ 7.50	$ 7.73
7-15 CCF	5.11	5.49	6.01	6.58	7.21	7.89	8.64	8.90	9.17	9.45
Greater Than 15 CCF	5.81	6.25	6.84	7.49	8.20	8.98	9.83	10.12	10.42	10.73
Multi-Family	$ 5.00	$ 5.38	$ 5.89	$ 6.45	$ 7.06	$ 7.73	$ 8.46	$ 8.71	$ 8.97	$ 9.24
Commercial	5.27	5.67	6.21	6.80	7.45	8.16	8.94	9.21	9.49	9.77
Manufacturing / Industrial	5.15	5.54	6.07	6.65	7.28	7.97	8.73	8.99	9.26	9.54
Schools	5.61	6.03	6.60	7.23	7.92	8.67	9.49	9.77	10.06	10.36
Municipal	5.19	5.58	6.11	6.69	7.33	8.03	8.79	9.05	9.32	9.60
Irrigation	6.94	7.46	8.17	8.95	9.80	10.73	11.75	12.10	12.46	12.83

9.6.3 Conservation Based Rates

In 2003 the Washington State Legislature passed the Municipal Water Supply Efficiency Requirements Act. The Water Use Efficiency rules went into effect on January 22, 2007 and typically apply to Water System Plans that each jurisdiction is required to develop every six to ten years. The Revised Code of Washington (RCW) outlines the rules of this act, under RCW 70.119.180. In section 4(B), the RCW states that jurisdictions must perform an "evaluation of the feasibility of adopting and implementing water delivery rate structures that encourage water conservation." The City of Auburn currently charges their single family residential customers based on an inclining block rate structure to incentivize water use conservation, therefore no additional evaluation was performed.

9.7 Affordability

The Washington State Department of Health and the Department of Commerce Public Works Board use an affordability index to prioritize low-cost loan awards depending on whether rates exceed 2.5 percent of the median household income for the service area. The average median household income for the City was $87,406 between 2018 and 2022, expressed in 2022 dollars, according to the U.S. Census Bureau. The 2022 value is escalated based on the actual rate of inflation in 2023 of 4.31 percent and the 3.00 percent inflation rate used in the financial forecast to project the median household income in future years. **Table 9-10** presents the City's monthly water bill, projected to 2033 and tested against the 2.5 precent monthly affordability threshold.

Table 9-10 | Community Affordability Test

Year	Inflation	Median HH Income	2.5% Monthly Threshold	Projected Monthly Bill	% of Median HH Income
2022		$ 87,406			
2023	4.31%	91,173			
2024	3.00%	93,908	$ 195.64	$ 50.34	0.64%
2025	3.00%	96,726	201.51	54.09	0.67%
2026	3.00%	99,627	207.56	59.25	0.71%
2027	3.00%	102,616	213.78	64.90	0.76%
2028	3.00%	105,695	220.20	71.05	0.81%
2029	3.00%	108,866	226.80	77.80	0.86%
2030	3.00%	112,132	233.61	85.17	0.91%
2031	3.00%	115,495	240.62	87.71	0.91%
2032	3.00%	118,960	247.83	90.35	0.91%
2033	3.00%	122,529	255.27	93.10	0.91%

Applying the 2.5 percent monthly affordability test, the City’s rates are forecasted to remain within the indicated affordability range through 2033.

9.8 Conclusion

The results of this analysis indicate that at existing rate levels the utility will be deficient beginning in 2025. To keep pace with expenses and prepare for new debt obligations needed to fund system infrastructure needs, the City has adopted a 7.50 percent rate increase in 2025. Forecasting into the future a 9.5 percent annual rate increase will be required from 2026 through 2030, followed by 3.00 percent increases through 2033. It is recommended that the City regularly review and update the key underlying assumptions that compose the multi-year financial plan to ensure that adequate revenues are collected to meet the City’s total financial obligations.