7 | DISTRIBUTION FACILITIES DESIGN AND CONSTRUCTION STANDARDS

INTRODUCTION

The City of Richland (City) operates and plans water service for the residents of the City according to the design criteria, laws, and policies that originate from the seven sources listed in **Table 7-1**, shown in descending order of authority from the broadest to the narrowest.

Table 7-1
Regulatory Agencies

Agency	Design Criteria/Laws/Policies
U.S. Department of Health and Human Services	Federal Regulations
U.S. Environmental Protection Agency	Federal Regulations
Washington State Department of Health	State Regulations
Washington State Department of Ecology	State Regulations
Benton County Commission	County Regulations
Richland City Council	Administrative Policies
American Water Works Association	Design Criteria

These design criteria, laws, and policies guide the City's operation and maintenance of the water system on a daily basis, and it's planning for growth and improvements. The overall objective is to ensure the City can provide high-quality water service at a minimum cost to its users. The design criteria also set standards the City must meet to ensure that the water supply is adequate to meet existing and future water demands. The system's ability to meet these demands is detailed in **Chapter 3**, and the recommended improvements are identified in **Chapter 8**.

The highest three governmental entities – U.S. Government, Washington State, and the Benton County Commission – establish policies and laws in statutes, regulations, or ordinances. The Richland City Council and Mayor adopt policies that cannot be less stringent or in conflict with those established by governments above them. The City's policies take the form of ordinances, memoranda, and operational procedures, many of which are summarized in this chapter.

The policies associated with the following categories are presented in this chapter.

- Supply Policies and Standards
- Facility Design and Construction Policies
- Customer Service Policies
- Financial Policies

SUPPLY POLICIES AND STANDARDS

CROSS-CONNECTION CONTROL

The City has a cross-connection control program for eliminating cross connections. A copy of the City's Cross-connection Control Program is contained in **Appendix V**.

- The City has a responsibility to protect the public water system from contamination due to cross connections.
- Cross connections that can be eliminated will be eliminated. When cross connections cannot be eliminated, they shall be controlled by the installation of an approved backflow prevention assembly commensurate with the degree of hazard.
- The City has staff that are certified for backflow prevention and testing.
- The City will comply with the backflow prevention assembly installation and testing requirements as indicated in Washington Administrative Code (WAC) 246-290-490 and as published in the *Cross Connection Control Manual Accepted Procedure and Practice,* Pacific Northwest Section, American Water Works Association (AWWA).
- Customers are responsible for testing their own backflow assemblies (BFAs) on an annual basis and must hire private backflow assembly testers (BATs) at their own expense. Notices for re-testing are sent out by the City 60 days in advance.
- A copy of the City's cross-connection program summary report, submitted annually to the Washington State Department of Health (DOH), is also contained in **Appendix W**.

QUANTITY

- The City will plan for at least 20 years into the future so that future water resource limitations can be handled efficiently.
- The City will ensure that the capacity of its system, including pump stations, reservoirs, and transmission mains, is sufficient to meet the maximum day demand (MDD) of the water system and shall be sufficient to replenish storage facilities within 3 days of fire or emergency drawdown during MDD conditions.

WATER USE EFFICIENCY

- The City will promote efficient and responsible use of water and will conserve water during a shortage.
- The City has a Water Use Efficiency Program that is contained in **Chapter 4**.
- The City will coordinate with the Cities of West Richland, Kennewick, and Pasco (Quad Cities) to implement a regional water use efficiency program that meets the conditions required under the Quad Cities water right issued under Surface Water Permit No. S4-30976P. The regional water use efficiency program is contained in the *2016 Regional Water Supply Feasibility Study* (RH2 Engineering, Inc.).

REGIONAL PARTICIPATION

- The City participates in regional water forecasting and conservation planning with the Cities of Pasco, Kennewick, and West Richland. These cities share the Quad City water right and update the Regional Water Forecast and Conservation Plan every 6 years, as required by the Washington State Department of Ecology.
- The City's Water Division will supply all customers within the water service area, unless a special agreement with an adjacent purveyor exists due to topography or other limiting factors.

FACILITY DESIGN AND CONSTRUCTION POLICIES

This section describes the planning criteria and policies used to establish an acceptable hydraulic behavior level and standard of quality for the water system. Additional criteria are described in **Chapter 3**, and contained in the City's Water System Construction Standards, a copy of which is included in **Appendix I** of this Comprehensive Water System Plan (WSP).

MINIMUM STANDARDS

All proposed developments within the City's existing and future service areas shall conform to the City's adopted design criteria, construction standards, and specifications.

WSDOT STANDARD SPECIFICATIONS

The Washington State Department of Transportation (WSDOT) *Standard Specifications for Road, Bridge, and Municipal Construction* will supplement the City's construction standards.

PROJECT APPROVAL

Prior to construction of all water system projects and improvements, it is necessary to receive DOH approval of construction documents in accordance with WAC 246-290-120, except for those projects exempted under WAC 246-290-125. The City would like to be eligible for the submittal exception process for distribution system related improvements. Pending eligibility, the City is exempt from having to submit project reports and construction documents pending the approval of the Water System Construction Standards contained in **Appendix I** of this WSP. Current versions of the standard specifications and details are also available on the City's website.

PROJECT COMPLETION

Once construction of a water system project has been completed, a Construction Completion Report Form is required to be submitted to DOH within 60 days of completion and before use of any water system facility. For distribution system related improvements, the forms will not be submitted to the DOH, but will be kept on file and made available to the DOH upon request. The form shall be provided per WAC 246-290-040.

Additional criteria are contained in the City's Water System Construction Standards, a copy of which is included in **Appendix I** of this WSP.

TRANSMISSION AND DISTRIBUTION

- All mains will comply with the generally recognized design criteria from the AWWA and DOH guidelines that follow.
    1. All new construction will be in accordance with the City of Richland Domestic Water System and Improvements Standard Specifications, a copy of which is included in **Appendix I** of this WSP.
    2. Distribution system design assumes that adequately sized service lines will be used. All residential service lines will be 1 inch or larger. Service lines will be the same size as the meter or larger.
    3. All new distribution mains will be sized by a hydraulic analysis.
    4. All new mains providing fire flow will be sized to provide the required fire flow at a minimum residual pressure of 20 pounds per square inch (psi) and maximum pipeline velocity of 10 feet per second (fps) during MDD conditions. In general, new water mains that will carry fire flow in residential areas shall be a minimum of 8 inches in diameter and looped. New water mains in commercial, business park, industrial, and school areas shall be a minimum of 12 inches in diameter and looped.
    5. All new water system construction shall be pressure tested to a minimum of 150 psi for 2 hours or as directed by the City.
    6. Valve installations will satisfy the following criteria.
        a. Blowoff assemblies shall be located at main dead ends where there is not a fire hydrant. The blowoff assembly shall have a valve the same size as the main with concrete thrust blocking.
        b. Individual pressure reducing or check valves must be installed in all new customer service lines in the City. Pressure reducing valves protect customers from high pressures in case a mainline pressure reducing station fails.
        c. Check valves must be installed on hot water tanks to prevent the tanks from emptying into the City's distribution system when a nearby water main is empty or when the pressure in the main is less than the pressure in the tank. The check valves shall protect the water system from possible contamination caused by a cross connection with the customer's pipes and fixtures.
    7. Fire hydrant installations will satisfy the following criteria.
        a. Fire hydrants serving residential dwellings will be located not more than 600 feet on center as measured along the path of vehicular access.
        b. Fire hydrants serving any use other than residential dwellings will be located not more than 300 feet on center as measured along the path of vehicular access, and will be located so that at least one hydrant is located within 200 feet of all new commercial structures as measured along the path of vehicular access.
        c. Culs-de-sac greater than 200 feet in length shall have a hydrant placed before the curb return entering the turn around.
        d. Culs-de-sac greater than 300 feet in length shall have hydrants placed at the entrance and at the end.
        e. A minimum of one fire hydrant shall be installed within 50 feet of each

intersection.

f. Hydrants shall not be located within 40 feet from any structure unless otherwise approved.

g. The Richland Fire Department will review all proposed fire hydrant installations to ensure the correct number and spacing of fire hydrants for each project per the Fire Department's standards.

h. Hydrants shall be dry, barrel type conforming to AWWA C502.

SUPPLY AND BOOSTER PUMP STATIONS

- All existing and future supply and booster pump stations will be modified/constructed to comply with the following minimum standards.
    1. All structures will be non-combustible and vandal proof, where practical.
    2. All buildings will have adequate heating, cooling, ventilating, insulating, lighting, and work spaces necessary for safe and efficient operations and maintenance.
    3. Underground vaults shall be avoided if possible.
    4. Sites will be fenced to reduce vandalism and City liability where appropriate.
    5. Each station will be equipped with a flow meter and all necessary instrumentation to assist personnel in operating and troubleshooting the facility.
    6. Emergency power capability will be provided to at least one booster pump station supplying each pressure zone.
- Pumps will be operated automatically with flexibility in pump start/stop settings.
- Stations will be operated with the provision for at least two methods of control to minimize system vulnerability.
- Manual override of stations will be provided for and located at the Operations and Maintenance Office using the City's telemetry and supervisory control system.
- Stations will be monitored with alarms for the following conditions.
    1. Pump started automatically or manually.
    2. Power phase failure.
    3. Power outage/generator running.
    4. Communication failure.
    5. Water in structure.
    6. Low suction pressure.
    7. Low/high discharge pressure.
    8. Intrusion.
    9. Smoke detector.
    10. High and low chlorine levels.
- Stations will have the following indicators.
    1. Local flow indication and totalizing.
    2. Flow indication and totalizing at the Operations and Maintenance Office.

3. Record combined supply flow to the system.

- Stations will be placed wherever necessary to fulfill the following criteria.
    1. Provide supply redundancy to a pressure zone.
    2. Improve the hydraulic characteristics of a pressure zone.
    3. Maximize storage availability and transmission capacity.
    4. Improve water quality (i.e., increase circulation) and quantity.

PRESSURE REDUCING STATIONS

- All pressure reducing valves will be placed in vaults that are large enough to provide ample work space for field inspection and valve repair.
- Vaults will drain to daylight or be equipped with sump pumps to prevent vault flooding.
- Pressure relief valves will be considered for closed pressure zones to prevent over-pressurization if a pressure reducing valve (PRV) fails in the open position.
- Stations shall be installed per City standard details.

CONTROL

The City's control system must be capable of efficiently operating the water system's components in accordance with this WSP and in response to reservoir levels, system pressures, abnormal system conditions, electrical power rate structures, and water costs. The system must be reliable and kept up to date to avoid disruption of customer water service and maintain efficient use of water supplies.

MAINTENANCE

- Facility and equipment breakdown is given the highest maintenance priority. Emergency repairs will be made even if overtime labor is involved.
- Equipment will be scheduled for replacement when it becomes obsolete and as funding is available.
- Worn parts will be repaired, replaced, or rebuilt before they represent a high failure probability.
- Spare parts will be stocked for all equipment items whose failure will impact the ability to meet other policy standards.
- Equipment that is out of service will be returned to service as soon as possible.
- A preventive maintenance schedule will be established for all facilities, equipment, and processes.
- Tools will be obtained and maintained to repair all items whose failure will impact the ability to meet other policy standards.
- Dry, heated shop space will be available for maintenance personnel to maintain facilities.
- All maintenance personnel will be trained to efficiently perform their job descriptions.

- Maintenance will be performed by the water maintenance staff and supervised by the Field Supervisor.
- Written records and reports will be maintained on each facility and item of equipment showing operation and maintenance history.

JOINT USE

- All joint use facilities (with other public water systems) must comply with the City's policy and design standards.
- All joint use facilities will be maintained by the Operations and Maintenance Office.
- Joint use facilities will be pursued in those areas that improve reliability or reduce operating costs.

CUSTOMER SERVICE POLICIES

PROJECT REVIEW PROCEDURES

Water system improvement designs are typically performed by the City design staff or a contract engineer. For maintenance and replacement projects, the design may be performed in-house under the direction of a licensed staff engineer. For other projects, a project report per WAC 246-290-110 will be prepared prior to design by the engineer and submitted to the DOH for review.

The designer shall coordinate with the City Road and Fire departments for placement and sizing of proposed facilities.

Final design review is performed by the Public Works Director and City Field Inspector. Approval of the design is given when the Director signs the plans. For projects other than maintenance and replacement, the construction documents are submitted to the DOH for review prior to construction per WAC 246-290-125.

POLICIES FOR OUTSIDE PARTIES

Outside parties may design distribution and maintenance replacement projects, but all other infrastructure projects (e.g., pump stations, reservoirs, etc.) are designed by the City or the City's contract engineer. The City requires that design work be performed by or directly supervised and reviewed by licensed Professional Engineers.

A pre-application meeting between the proponents and the City occurs prior to any design work so that the proponent is familiar with City requirements.

The City may provide the proponent with a copy of the City's water system construction standards or direct the proponent to the City's WSP.

If applicable, the City may perform a hydraulic analysis to determine the available domestic and fire flow capability of the water system to the proponent's site. If service is deemed deficient for the proponent's needs, recommendations will be provided for system improvements.

Review and approval of plans are performed by the Public Works Director and Water Manager.

WATER SERVICE AND CONNECTION

- The following shall be observed when determining the requirement to connect to the City's water system.
    1. The owner of each house, building, or property within the City's water service boundary is required (at the owner's expense) to connect to the City's water system if the property is within 300 feet of a distribution main.
    2. A private water supply is allowed if the property is beyond 300 feet of a distribution main. Private supplies are allowed only after all applicable permits have been obtained, and must be operated according to state and local health guidelines. When a distribution main becomes available within 300 feet of a property served by a private water supply, direct connection to the City's system must be made within 90 days at the owner's expense.
    3. No person may drill, own, or operate a water well used for domestic, irrigation or other purpose within the service area without a permit issued by the Public Works Department.
- Water service cannot be extended outside of the water service area boundary.
- Water system extensions required to provide water service to proposed developments shall be approved by the Public Works Development and must conform to the City's adopted design criteria, construction standards, and specifications, as shown in the City's Standard Specifications. All costs of the extension shall be borne by the developer or applicant.
- Any person desiring to purchase water from the City is required to complete and submit the application form provided by the City and pay the appropriate fee before service can be provided. After the City has received the application form, the adequacy of the water system capacity to serve the applicant's property will also be evaluated based on available capacity from supply, storage, and transmission. This will be accomplished through the ongoing tracking of equivalent residential units (ERUs) served by the City in comparison to the maximum number of ERUs that can be served by the system.
- For water service applications within City limits, the City will review the availability for water service at the time of land use permitting, site civil review, and building permitting. During the land use permitting process, the City will determine if water is available for the site. During the site civil review, the City will address the sizing and looping of the water main. The formal water service application begins at the time of building permitting, when fire flow and service sizing is evaluated. The complete process takes several months to be completed.
- For water service applications outside of City limits, the applicant must first obtain a water utility service agreement from the City. The City will review the agreement and determine the availability of water. Water availability requests can be processed in approximately 2 weeks.
- Water system capacity, pressure, and fire flow will be considered when providing water availability to applicants.
- Water availability shall expire at the time that the associated permit expires (i.e., land use, site civil, or building permit).

- Time extensions in regards to water availability shall be granted in accordance with the associated permit requirements. When extensions are denied, the disputes are handled through the rules guiding the associated permit process. Disputes can be brought to the City Council for discussion.
- Delays resulting from non-technical conditions that affect the City's ability to provide new water service will be the responsibility of the applicant. These conditions include, but are not limited to, environmental assessments, local ordinances, and annexation procedures.

CONSTRUCTION CERTIFICATION AND FOLLOW-UP PROCEDURES

- Once plans have been approved by the City, a pre-construction conference is held. Typical attendees include City Engineer, City Inspector, City Operator, Project Designer, Contractor Superintendent, Contractor Foreman, Project Owner, County Representative, and any affected utility representatives.
- The City Inspector will provide periodic inspection. The level of inspection depends on the complexity of the work and the experience of the contractor.
- Pressure testing and disinfection are performed by the contractor to WSDOT/American Public Works Association (APWA) and AWWA standards. The City Inspector verifies the results and performs the purity testing.
- After construction, as-built drawings in hard copy and electronic format are required by the City. Once received, the City transfers this information to the master maps and files the as-builts at the office. As-built records must be submitted to the City before water service will be provided.
- Once the final project is accepted by the City as complete, ownership of the facilities are transferred to the City via Bill of Sale. For applicable projects, a DOH Construction Completion Report is filled out and filed with the DOH and the City.
- If a Latecomer's Agreement is desired, the proponent has 12 months after formal acceptance to prepare and submit an acceptable version of said agreement to the City.

ANNEXATIONS

- Provision of service will be provided per the adopted extraterritorial utility policy. The City will follow state guidelines in the assumption of facilities in annexation areas.

TEMPORARY SERVICES

- Compliance with standards may be deferred for temporary water service.

EMERGENCY SERVICE

- Compliance with standards may be deferred for emergency water service.
- Policy criteria may be waived for emergency service.

PLANNING BOUNDARIES

- For planning purposes, the City will use water service boundaries established by agreement as a result of the regional coordinated water system plan (*Benton County Coordinated Water System Plan*).
- The City will follow State of Washington guidelines in assuming portions of adjacent water systems as a result of annexation.

FINANCIAL POLICIES

GENERAL

- The City will set rates that comply with standards established by the AWWA and state regulations.
- Rates and additional charges established for the City should be:
    1. Cost-based rates that recover current, historical, and future costs associated with the City's water system and services;
    2. Equitable charges to recover costs from customers commensurate with the benefits they receive; and
    3. Adequate and stable source of funds to cover the current and future cash needs of the City.
- Existing customers of the City will pay the direct and indirect costs of operating and maintaining the facilities through user rates. In addition, the user rates will include debt service incurred to finance the capital assets of the City.
- New customers seeking to connect to the water system will be required to pay a connection charge for an equitable share of the historical cost of the system and for the system's capital improvement program (CIP). Connection charge revenues will be used to fund the CIP in conjunction with rate revenue.
- New and existing customers will be charged for extra services through separate ancillary charges based on the cost to provide the services. Ancillary charges can increase equitability, as well as operating efficiency, by discouraging unnecessary demand for services. The charges should be reviewed regularly and updated annually based on increases in the Consumer Price Index. Revenue from ancillary charges will be used to finance annual operations and maintenance.
- The City will maintain information systems that provide sufficient financial and statistical information to ensure conformance with rate-setting policies and objectives.
- User charges must be sufficient to provide cash for the expenses of operating and maintaining the system. To ensure the fiscal and physical integrity of the utility, each year an amount should be set aside and retained for capital expenditures, which will cover some portion of the depreciation of the physical plant. The amount may be transferred from the Maintenance Fund to the Construction Fund for general or specific purposes.

- A Working Capital Reserve will be maintained to cover unanticipated emergencies and fluctuations in cash flow. The City will maintain a cash reserve for the Maintenance Fund.
- Water rates will be based on either the Base-Extra Capacity Method or the Commodity-Demand Method. Both methods strive to equitably charge customers with different service requirements based on the cost of providing the water service. Service requirements relate to the total volume of water used, peak rates of use, and other factors.
- Fees and charges are calculated separately for areas within the City limits and outside the City limits.

CONNECTION CHARGES

- Owners of properties that have not been assessed, charged, or borne an equitable share of the cost of the water system will pay one or more of the following connection charges prior to connection to a water main.
    1. **Latecomers Fees:** Latecomers fees are negotiated with developers and property owners; they provide for the reimbursement of a pro rata portion of the original cost of water system extensions and facilities.
    2. **Connection Charge:** Connection charges will be assessed against any property that has not participated in the development of the water system. Meter charges, or hookup fees, are additional in order to recover the cost of meter and service line installation.
    3. **Developer Extension Charges:** These charges are for the administration, review, and inspection of developer extension projects.