We work with others to protect the health of the people of Washington State by ensuring safe and reliable drinking water.

INTRODUCTION TO THE OFFICE OF DRINKING WATER'S NEW WATER SYSTEM PLANNING GUIDEBOOK

Washington State Department of Health
Office of Drinking Water

Introduction

Water System Planning Guidebook

- Key Points
  - Water System Planning Guidebook Format
  - Guidebook's Intended Users
  - Planning Requirement and History
  - Ending Introductory Comments

Northwest Regional Office Presenters

Richard Rodriquez
Regional Planner

Counties: King, Snohomish, Whatcom, San Juan

Jennifer Kropack
Regional Planner

Counties: Pierce, Skagit, Island

Southwest Regional Office Presenters

Mark Mazeski
Regional Planner

Counties: Thurston, Lewis, Pacific, Grays Harbor, Clallam

Fern Schultz
Regional Planner

Counties: Clark, Cowlitz, Kitsap, Jefferson, Mason, Skamania, Wahkiakum

Eastern Regional Office Presenters

Scott Mallery	Brenda Smits	Jamie Gardipe
Assistant Regional Manager	*Regional Planner*	*Regional Planner*
Counties: Spokane, Walla Walla, Columbia, Garfield	Counties: Chelan, Douglas, Ferry, Kittitas, Lincoln, Okanogan, Pen Oreille, Spokane, Stevens	Counties: Adams, Asotin, Benton, Columbia, Franklin, Garfield, Grant, Klickitat, Walla Walla, Whitman, Yakima

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Guidebook Format—Online DOH Website

- Online-only publication
- Contains access to DOH publications, fact sheets, other informational sources
- Living document, updated as needed
- Each chapter's information logically flows into next chapter
- Each chapter begins with objectives and provides citations to specific WAC requirements
- The WHY behind each chapter
  - Context and intent of chapter and requirement

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Guidebook's Intended Users

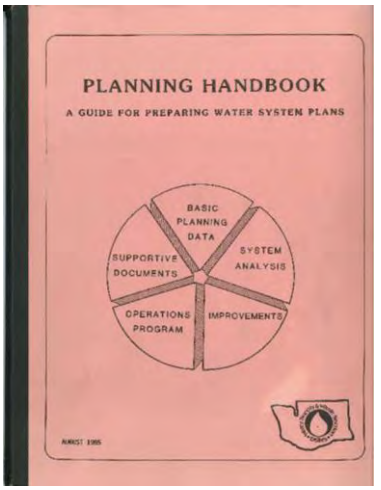
- Water system governing bodies and managers
- Water systems and consultants
- DOH-ODW staff
- Other agencies

Planning Requirement and its History

- WAC 246-290-100
- Water systems required to plan
  - Greater than 1,000 connections
  - Expanding systems
  - Systems in Public Water System Coordination Act areas (WAC 246-293)
  - New systems

Planning Guidance History

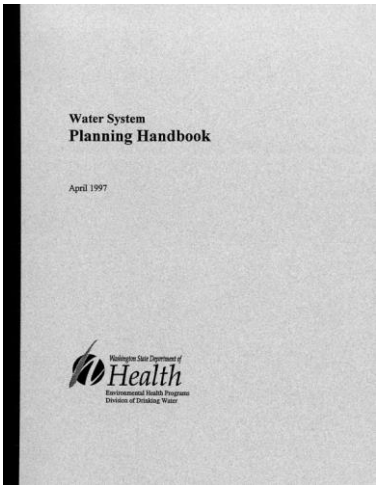
- Planning requirement around since mid 1970s
- Chapter by chapter "How to" approach to organize and present WAC 246-290-100



1985 Planning Handbook

Planning Guidance History *(Continued)*

- Evolves addressing new laws and requirements
  - Growth management Act
  - 1995 Safe Drinking Water Act Amendment—Source Protection requirement
  - Cross connection control
  - Six-year planning horizon vs five-year



1997 Planning Handbook

New 2019 Planning Guidebook

Guidebook updated to include

- Municipal water law (2010), retail service area and duty to serve
- Water use efficiency, distribution system leakage
- Revised total coliform rule (water quality)
- Up to ten year water system plan approval period
- Water system capacity (technical, managerial, financial)
- Asset management
- Emphasis on full cost financial budgeting

Guidebook Introduction—a Summary

- Planning is a dynamic exercise
- Planning Guidebook is dynamic and easily edited as new laws, requirements, and information occur
- Do not rely solely on the guidebook to prepare water system plan
- Pre-plan conference with DOH planner and regional engineer

CHAPTER 1

DESCRIPTION OF THE WATER SYSTEM

Chapter 1

- Objective - Provide basic water system information
- Ownership and Management
- System History and Background

Chapter 1: Related Plans

- Comprehensive plans
- Local land use and zoning
- Coordinated water system plans (abbreviated)
- Sewer and water general plans
- Groundwater management plans and WRIA
- Regional water supply plans
- Other water system plans

Chapter 1: Service Area, Maps, and Land Use

- Service area
- Service area maps
  - Retail service area
  - Service area
  - Future service area
- Land Use

Chapter 1: Duty to Serve

Threshold Factors

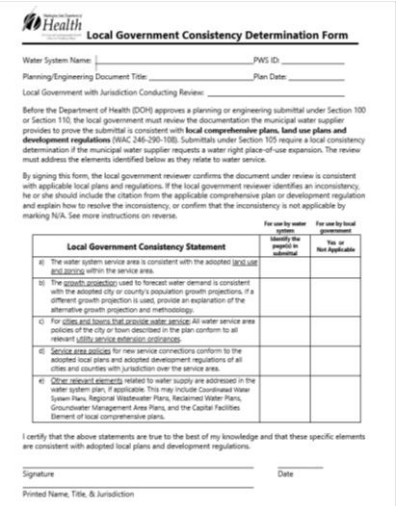
- Capacity
- Consistent
- Sufficient water rights
- Timely and Reasonable

Chapter 1: System Policies

- Service area agreements
- Service area policies
- Annexation
- Conditions of Service
- Satellite management

Chapter 1: Consistency

- Local government consistency
- Water rights place of use consistency



Health

Local Government Consistency Determination Form

Water System Name: _____ PWS ID: _____

Planning/Engineering Document Title: _____ Plan Date: _____

Local Government with Jurisdiction Conducting Review: _____

Before the Department of Health (DOH) approves a planning or engineering submittal under Section 100 or Section 110, the local government must review the documentation the municipal water supplier provides to prove the submittal is consistent with **local comprehensive plans, land use plans and development regulations** (WAC 246-290-108). Submittals under Section 105 require a local consistency determination if the municipal water supplier requests a water right place-of-use expansion. The review must address the elements identified below as they relate to water service.

By signing this form, the local government reviewer confirms the document under review is consistent with applicable local plans and regulations. If the local government reviewer identifies an inconsistency, he or she should include the citation from the applicable comprehensive plan or development regulation and explain how to resolve the inconsistency, or confirm that the inconsistency is not applicable by marking N/A. See more instructions on reverse.

Local Government Consistency Statement	For use by water system: Identify the page(s) in submittal	For use by local government: Yes or Not Applicable
a) The water system service area is consistent with the adopted land use and zoning within the service area.		
b) The growth projection used to forecast water demand is consistent with the adopted city or county's population growth projections. If a different growth projection is used, provide an explanation of the alternative growth projection and methodology.		
c) For cities and towns that provide water service: All water service area policies of the city or town described in the plan conform to all relevant utility service extension ordinances.		
d) Service area policies for new service connections conform to the adopted local plans and adopted development regulations of all cities and counties with jurisdiction over the service area.		
e) Other relevant elements related to water supply are addressed in the water system plan, if applicable. This may include Coordinated Water System Plans, Regional Wastewater Plans, Reclaimed Water Plans, Groundwater Management Area Plans, and the Capital Facilities Element of local comprehensive plans.		

I certify that the above statements are true to the best of my knowledge and that these specific elements are consistent with adopted local plans and development regulations.

Signature _____ Date _____

Printed Name, Title, & Jurisdiction _____

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CHAPTER 2

BASIC PLANNING DATA

Chapter 2: Basic Planning Data

- Key chapter in preparing water system plan
- Objective of Chapter 2: Create a water use demand forecast

Key Chapter Content

- Current population, service connections, and equivalent residential units (ERUs)
- Water Production
- Water Usage

Chapter 2: Basic Planning Data *(Continued)*

- Distribution system leakage
- Future water demand/demand forecast
- Essential information for Chapter 3—System Inventory and Analysis

Chapter 2: Basic Planning Data *(Continued)*

Current population, service connections, ERUs

- Useful projections depend on accurate accounting of
  - Current service population
  - Number and type of connections served (customer class)
  - Number of ERUs supplied by the system

Chapter 2: Basic Planning Data *(Continued)*

Current water production—municipal water law (MWL) and water use efficiency (WUE)

- Water production obtained from required source metering

Water usage obtained from service meters—MWL and WUE requirement

- Water use by customer class
- Customer classes converted to ERU usage equivalents

Chapter 2: Distribution System Leakage

- Distribution System Leakage (DSL) = annual water production minus annual metered water use
- Expressed as an annual volume and percentage of annual production

Chapter 2: Distribution System Leakage
(Continued)

Future Water Demand/Demand Forecast

- Future water demand consists of current water use, distribution system leakage, and future water use assumptions
- Assumptions: population growth in service area, land use and zoning, and anticipated customer class water use patterns in service area
- Demand forecast on an annual basis for requested planning approval period (up to ten years)

Key Takeaway Information

Annual water use, average day demand, and maximum day demand are necessary factors used in Chapter 3 elements water rights self assessment and hydraulic model analysis

CHAPTER 3

SYSTEM INVENTORY AND ANALYSIS

Chapter 3: Objective

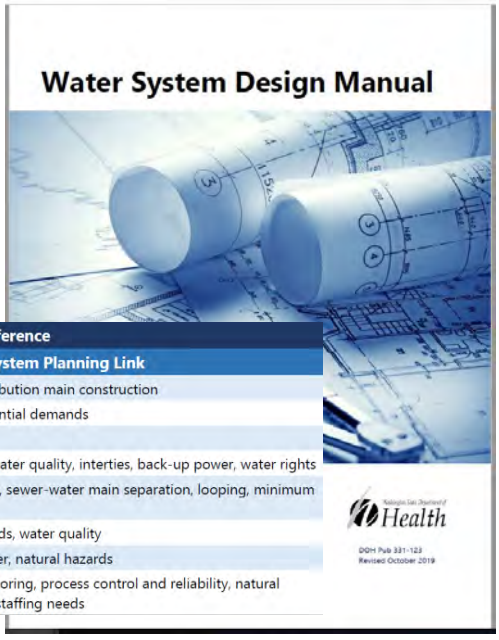
Identify existing facilities and determine their capacity to reliably satisfy current and projected water demands with safe drinking water.

Chapter 3: 3.1 Design Standards

Purpose: The design standards section should include a **discussion** of all standards that apply to the systems, such as

- Water system-adopted design standards, ordinances, standard drawings, and specifications
- WAC 246-290
- WSDM
- Regional supplement of a coordinated WSP
- County/city level of service standards

Chapter 3: WSDM



WSDM Cross-Reference	
WSDM	**Water System Planning Link**
Chapter 2	Design submittal exceptions for distribution main construction
Chapter 3	Estimating residential and non-residential demands
Chapter 4	Physical capacity analysis
Chapter 5	Source development and reliability, water quality, interties, back-up power, water rights
Chapter 6	Distribution system hydraulic analysis, sewer-water main separation, looping, minimum design standards, water quality
Chapter 7	Reservoir sizing criteria, natural hazards, water quality
Chapter 8	Booster pump stations, back-up power, natural hazards
Chapters 10 and 11	Water treatment, water quality, monitoring, process control and reliability, natural hazards, operational complexity and staffing needs

Chapter 3: 3.2 Water Quality

Purpose: Document water quality per standards

Provide

- Describe source water quality (raw and treated). Are there any water quality trends or MCL violations or exceedances?
- Describe distribution system water quality. Describe seasonal water quality changes in the distribution, distribution water quality objectives and optimized goals, any violations and description of actions taken to address violation.

Chapter 3: 3.4 Capacity Analysis

Purpose: Assess capacity of sources, treatment, storage, and distribution components to meet demand and level of service.

Provide

- WSDM Worksheet 4-1
- Water Right Self-Assessment Form
- New Source of Supply Analysis

WORKSHEET 4-1
ERU Capacity Summary

Specific Single-Family Residential Connection Criteria (measured or estimated demands)

Average Day Demand (ADD): _____ gpd/ERU

Maximum Day Demand (MDD) _____ gpd/ERU

Water System Connections Correlated to ERUs			
Service Classification	**Total MDD for the classification, gpd**	**Total # Connections in the classification**	**ERUs**
Residential			
Single-family			
Multifamily			
Nonresidential			
Industrial			
Commercial			
Governmental			
Agricultural			
Recreational			
Other (specify)			
DSL		N/A	
Other (identify)			
Total existing ERUs (Residential + Nonresidential + DSL + Other) =			_____

Service Capacity as ERUs and Gallons Per Day		
Water System Component (Facility)	**ERU Capacity for Each Component**	**GPD Capacity for Each Component**
Source(s)		
Treatment		
Equalizing Storage		
Standby Storage		
Transmission		
Water Rights (Qa and Qi)		
Other (specify)		
Water System Service Capacity (ERUs) = (based on the limiting water system component shown above)		

Notes:

- *Capacity determinations are only for existing facilities that are operational for the water system.*
- *Not shown above are distribution system limitations (Section 4.5.4) on ERUs because these are location-specific within the distribution system. These limits not expected to limit the ERU capacity of the entire water system.*

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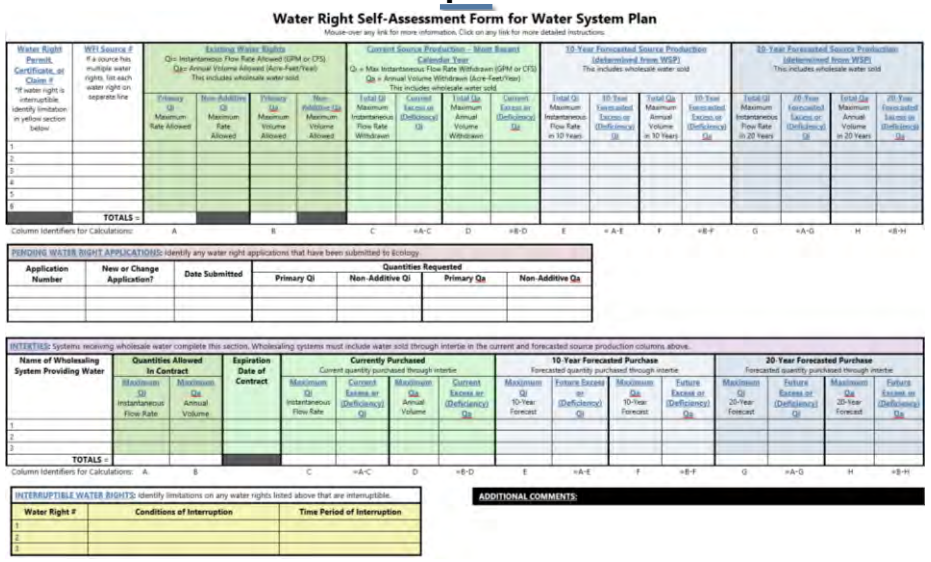
Chapter 3



Water Right Self-Assessment Form for Water System Plan

Mouse-over any link for more information. Click on any link for more detailed instructions.

Water Right Permit, Certificate, or Claim # *If water right is interruptible, identify limitation in yellow section below	WFI Source # If a source has multiple water rights, list each water right on separate line	Existing Water Rights: Qi= Instantaneous Flow Rate Allowed (GPM or CFS); Qa= Annual Volume Allowed (Acre-Feet/Year); This includes wholesale water sold				Current Source Production – Most Recent Calendar Year: Qi = Max Instantaneous Flow Rate Withdrawn (GPM or CFS); Qa = Annual Volume Withdrawn (Acre-Feet/Year); This includes wholesale water sold				10-Year Forecasted Source Production (determined from WSP); This includes wholesale water sold				20-Year Forecasted Source Production (determined from WSP); This includes wholesale water sold			
		Primary Qi Maximum Rate Allowed	Non-Additive Qi Maximum Rate Allowed	Primary Qa Maximum Volume Allowed	Non-Additive Qa Maximum Volume Allowed	Total Qi Maximum Instantaneous Flow Rate Withdrawn	Current Excess or (Deficiency) Qi	Total Qa Maximum Annual Volume Withdrawn	Current Excess or (Deficiency) Qa	Total Qi Maximum Instantaneous Flow Rate in 10 Years	10-Year Forecasted Excess or (Deficiency) Qi	Total Qa Maximum Annual Volume in 10 Years	10-Year Forecasted Excess or (Deficiency) Qa	Total Qi Maximum Instantaneous Flow Rate in 20 Years	20-Year Forecasted Excess or (Deficiency) Qi	Total Qa Maximum Annual Volume in 20 Years	20-Year Forecasted Excess or (Deficiency) Qa
1																	
2																	
3																	
4																	
5																	
6																	
	TOTALS =																
Column Identifiers for Calculations:		A		B		C	=A-C	D	=B-D	E	= A-E	F	=B-F	G	=A-G	H	=B-H

PENDING WATER RIGHT APPLICATIONS: Identify any water right applications that have been submitted to Ecology.

Application Number	New or Change Application?	Date Submitted	Quantities Requested			
			Primary Qi	Non-Additive Qi	Primary Qa	Non-Additive Qa

INTERTIES: Systems receiving wholesale water complete this section. Wholesaling systems must include water sold through intertie in the current and forecasted source production columns above.

Name of Wholesaling System Providing Water	Quantities Allowed In Contract		Expiration Date of Contract	Currently Purchased: Current quantity purchased through intertie				10-Year Forecasted Purchase: Forecasted quantity purchased through intertie				20-Year Forecasted Purchase: Forecasted quantity purchased through intertie			
	Maximum Qi Instantaneous Flow Rate	Maximum Qa Annual Volume		Maximum Qi Instantaneous Flow Rate	Current Excess or (Deficiency) Qi	Maximum Qa Annual Volume	Current Excess or (Deficiency) Qa	Maximum Qi 10-Year Forecast	Future Excess or (Deficiency) Qi	Maximum Qa 10-Year Forecast	Future Excess or (Deficiency) Qa	Maximum Qi 20-Year Forecast	Future Excess or (Deficiency) Qi	Maximum Qa 20-Year Forecast	Future Excess or (Deficiency) Qa
1															
2															
3															
TOTALS =															
Column Identifiers for Calculations:	A	B		C	=A-C	D	=B-D	E	=A-E	F	=B-F	G	=A-G	H	=B-H

INTERRUPTIBLE WATER RIGHTS: Identify limitations on any water rights listed above that are interruptible.

Water Right #	Conditions of Interruption	Time Period of Interruption
1		
2		
3		

ADDITIONAL COMMENTS:

Chapter 3: 3.3 Asset Inventory

Purpose

Providing a complete and up-to-date inventory of all water system-owned assets to assess system capacity and plan for replacement of assets.

Chapter 3: 3.3 Asset Inventory

Department of Health definition

"Asset management is the practice of managing all utility assets to address the total cost of owning, operating, upgrading, and replacing them, while delivering the appropriate level of service."

Chapter 3: 3.3 Asset Inventory

Components of an Asset Management Program

- Name, capacity, and number of units
- Date of original installation/construction
- Date of any subsequent expansion, rehabilitation, or reconstruction
- Life expectancy of asset (as determined by manufacturer or estimated)
- Condition assessment
- Criticality assessment of the asset
- Replacement cost

Chapter 3: 3.3 Asset Inventory

Provide

- A summary of major components (Table 3-2)

Recommended

- Scaled map of major assets
- Graphically represented hydraulic profile
- Detailed asset management program (spreadsheet, software program, internally-developed program, etc.)

Chapter 3: 3.5 Asset Condition Assessment

Purpose

Evaluate the physical condition of existing assets, their remaining life expectancy, and their criticality to identify any deficiencies and add them to the capital improvement program chapter.

Chapter 3: 3.5 Asset Condition Assessment
(Continued)

Provide

- Source description and condition
- Water treatment description and condition
- Storage description and condition
- Distribution system description and condition

3.3 – Asset Inventory

Table 3-2
Existing Component Inventory
(Add additional rows as required)

Distribution System Inventory Components	Units	Number of Units	Remaining Useful Life	Condition Rating	Criticality Rating	Replacement Cost
Distribution Pipelines ≤ 6 inch	feet					
Distribution Pipelines 8 -10 inch	feet					
Distribution Pipelines 12-14 inch	feet					
Distribution Pipelines 16-20 inch	feet					
Distribution Pipelines 24-30 inch	feet					
Distribution Pipelines 36-42 inch	feet					
Distribution Pipelines 48-60 inch	feet					
Distribution Pipelines 66-84 inch	feet					
Distribution Pipelines 90-96 inch	feet					
Distribution Pipelines > 96 inches	feet					
Service and Intertie Meters ≤ 1.0 inch	Each					
Service and Intertie Meters 1.5 inch	Each					
Service and Intertie Meters 2 inch	Each					
Service and Intertie Meters 3 inch	Each					
Service and Intertie Meters 4 inch	Each					
Service and Intertie Meters 6 inch	Each					
Service and Intertie Meters > 6 inch	Each					
Pressure Reducing Valves ≤ 6 inch	Each					
Pressure Reducing Valves 8-12 inch	Each					
Pressure Reducing Valves 14-16 inch	Each					
Pressure Reducing Valves 18-24 inch	Each					
Pressure Reducing Valves > 24 inches	Each					

Chapter 3: 3.3 Asset Inventory

A-1 Utility	10/3/2019	Number of Units (Connections, ERUs etc.):	1500	Total Equity:	$405,056	Connection Fee:	$270	Monthly Cost Per Unit to Reserves:	$18.10
								Annual $$ to Reserves:	$325,800
Max Payments Occur Thru Year 3; Revenue in year 16 above listed needs:			$2,145,104		Reserve Cash Applied:		$200,000	Payments over 16 years:	$3,440,105

2019	Calculated Replacement Life					Calculated Equity						No Calculation ☐	Replacement Cost		
Asset and Description *RCAC V14*	Install Date	Est. Effective Life	Condition Rating	Critical Number	Calc. Remain Life	Original Cost	Book Value Original $$	Replacement Cost	Infl. Rate	Accum Loss of Value (Dep)	Debt and Grants	Equity	Cash Replace?	Saving Acc't Interest	Future Cost
	Year	Years	1 to 10 Tab A	1 to 5 Tab A	Years	Cost $	Value $	Cost $	%	Loss $	Value $	Value $	X	%	Value $
Well #1	1995	40	1	3	16.0	$50,000	$28,590	$200,000	1.5%	$120,000	$0	$80,000	x	1.0%	$253,797
Well #1 pump	2015	15	1	3	11.0	$5,000	$3,892	$10,000	1.5%	$2,667	$0	$7,333	x	1.0%	$11,779
Well #2	1999	40	5	1	18.0	$75,000	$25,254	$350,000	1.5%	$262,500	$0	$87,500	x	1.0%	$486,389
Well #2 Pump #1	1999	15	5	3	000	$5,000	$0	$10,000	1.5%	$10,000	$0	$0	x	1.0%	$10,000
Well #2 Pump #2	1999	15	5	3	000	$5,000	$0	$10,000	1.5%	$10,000	$0	$0	x	1.0%	$10,000
PVC Pipe	1975	90	7	2	9.2	$250,000	$49,203	$1,000,000	1.5%	$897,778	$0	$102,222	x	1.0%	$1,146,000
Storage tank #1 North	1975	60	3	4	12.8	$120,000	$49,289	$300,000	1.5%	$236,000	$0	$64,000	x	1.0%	$362,983
Storage tank #2 South	1975	60	7	1	3.2	$400,000	$41,074	$1,200,000	1.5%	$1,136,000	$0	$64,000	x	1.0%	$1,258,558

Chapter 3: 3.6 Summary of System Deficiencies

Recommend

Create a table summarizing component deficiencies and the project solution to address each deficiency (Table 3-3)

Optional

Include alternatives analysis for each deficiency (may satisfy the PR requirements of WAC 246-290-110)

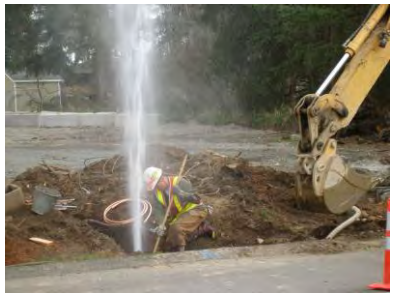
Chapter 3: 3.6 Summary of System Deficiencies

Table 3-3
Component Deficiencies and Project Solution
(Add additional rows as required)

Classification of deficiency[1]	Description of Project Solution	Total project cost[2]	Anticipated source of funding	Location in WSP where deficiency is identified	Location in WSP where the analysis demonstrates deficiency will be addressed by the project

CHAPTER 4

WATER USE EFFICIENCY PROGRAM



Chapter 4: Key Points

- Source and service metering
- Distribution system leakage
- Water use efficiency program
- Water use efficiency savings

Chapter 4: Municipal Water Supply Law

2003—State legislature passed the Municipal Water Supply, Efficiency Requirements Act; dubbed Muni Law.

2007—Office of Drinking Water adopted Water Use Efficiency Rule (WUE Rule) that outlines steps water systems need to take under Muni Law. Source meters now required on all Group A water systems.

2017—Water meters required for all connections to all "**municipal water suppliers**."

Chapter 4: Source Meters

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Chapter 4: Service Meters

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Chapter 4: More Service Meters

Chapter 4: Distribution System Leakage

Pull this data from Chapter 2 calculations

- In essence it is the
  - **Sum of all water produced**, as measured through your production water meter or meters
  - **Minus the sum of all the water sold** to your customers
  - **Divided by the sum of all water produced Times 100** (in order to represent as a percent)

Chapter 4: The Calculation

Percent DSL = ((TP-AC)/(TP)) x 100

Where

DSL = Percent (%) of distribution system leakage

TP = Total Water produced

AC = Authorized consumption (**track** this)

AC = sum of all customer meters + authorized uses that are not metered but are **tracked**

Chapter 4: WUE Annual Report

You must submit the sum of these calculations to DOH on an annual basis as of June 30 each year for the previous calendar year's data.

You must also report this to your consumers on an annual basis. We encourage you to add it to your annual CCR.

Chapter 4

- State standard is 10 percent or less DSL
- Water Loss Control Action Plan (WLCAP) is required if DSL exceeds 10 percent
- In WLCAP
  - Tell us how you will get to 10 percent DSL
    - List projects and timeline
  - Tell us how much it will cost to get to 10 percent DSL
  - Include projects in Capital Improvement Plan
  - Include project costs in your budget

Chapter 4: WUE Program

Goals and Measures

- Goals must be established at a public meeting with notice to the public at large, not just customers
- Measures must be listed in your WSP and range from 1 to 12 measures dependent upon system size
- Show appropriate funding in CIP to achieve WUE Measures

Chapter 4: Customer Demand Measures

Measures to be completed by water system

- Showerhead or faucet replacement
- School education programs
- Advertising
- Water Bills showing consumption history
- Soil moisture sensors/rain gages
- Irrigating with reclaimed water
- Promote low-water use landscaping

Chapter 4: Community Goals

- Reduce average daily demand (ADD) from 300 gallons/day/connection to 260 gallons
- Reduce seasonal outdoor water use by 5 percent by 2025
- Reduce single-family water consumption by 25 gallons per day by 2025
- Reduce total production from wells by 5 percent within six years
- Save five gallons per home per day by 2022

Chapter 4: Water Use Efficiency Savings

- This section addresses, in quantitative data, what the system will save in terms of needing new wells, new water rights or a new water tank for example
- The intent is to show the benefits of water use efficiency in terms of money saved
- Also some analysis should be made to the effect of implementing conservation water rates on total water consumption

CHAPTER 5

SOURCE WATER PROTECTION

Chapter 5: Objective

Purpose

- Develop a program to protect and improve water system source water.

Chapter 5: Objective *(Continued)*

Provide

- Wellhead Protection Program (WHPP) for groundwater source(s)
- Watershed control program (WCP) for each surface water supply.
- Systems with groundwater under the influence of surface water (GWI) must develop both a WHPP and WCP.

Chapter 5: 5.1 Sanitary Control Area (SCA)

Definition

Minimum 100 feet radius from wellheads and 200 feet from springs

Required content

Copy of legal documentation restricting the use of the SCA, that states

Recommended content

Assurance of legal access

"Hi, I'm an SCA with issues."

Chapter 5: 5.2 WHPP

Required content

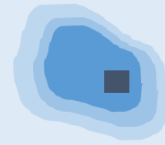
- Overview: History of the system's WHPP
- Susceptibility Assessment: Provide complete susceptibility assessment for each source and information on cost, level of effort, and program successes during the plan approval period

Chapter 5: 5.2 WHPP *(Continued)*

Required content

- Wellhead protection area delineation
  - Provide scaled map of wellhead protection area for each well, wellfield, or spring, including calculated six-month, one-year, five-year, and ten-year time-of-travel zones

Methods

	Modeling Approach		
Calculated Fixed Radius (CFR)	**Analytical Models**	**Hydrogeologic Mapping**	**Numerical Flow/ Transport Models**
			
The calculated fixed radius method draws a circular protection area for each protective zone. This delineation method is inexpensive and requires minimal technical expertise.	Analytical methods use simple calculations, graphical methods, or simple analytical solution based computerized groundwater-flow models to delineate wellhead protection zones. This method can provide reasonable approximation of capture zones for simple groundwater systems, and it is relatively inexpensive.	Hydrogeologic maps rely on geologic maps, aquifer water level mapping, aquifer pumping test data, hydrogeological reports and well reports. This method can be highly accurate, good for settings where nearby geologic features strongly control groundwater flow patterns, and it is typically much less expensive than numerical modeling.	Numerical flow/transport methods use two and three dimensional computer models that approximate groundwater flow. This method is highly accurate, can be used in all groundwater settings, and can be used for other purposes (such as groundwater management).

Increasing reliability, complexity, and cost.

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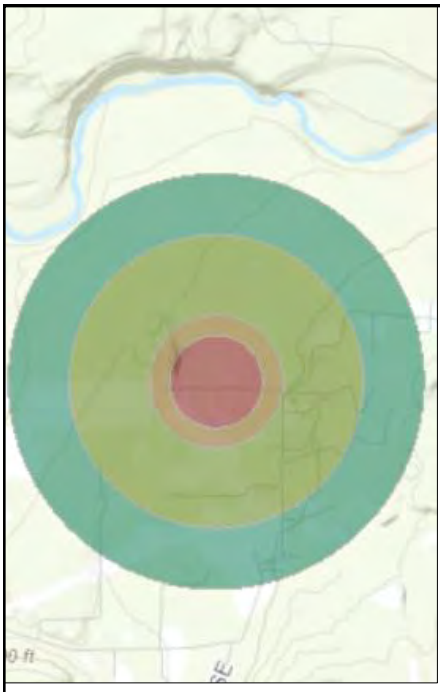

Calculated Fixed Radius (CFR)

- Most common
- Red—6-month TOT
  Tan—1-year TOT
  Green—5-year TOT
  Teal—10-year TOT
- Always a bullseye
- Math formula using operational characteristics
- Theoretical model; doesn't consider topography, soils, groundwater flow, etc.

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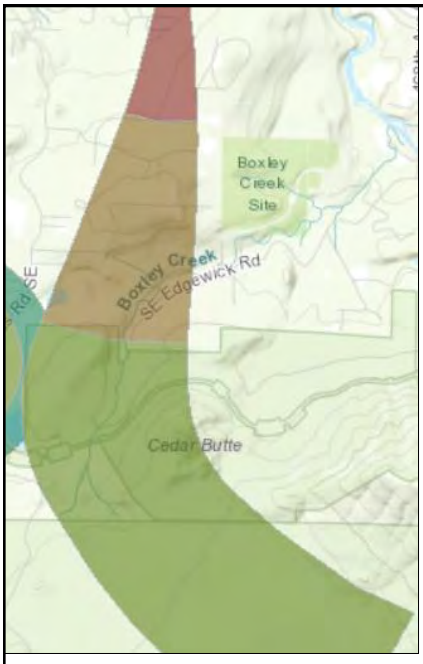
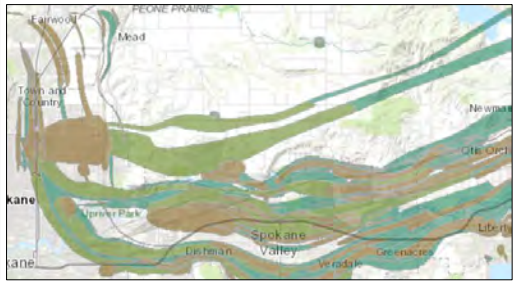


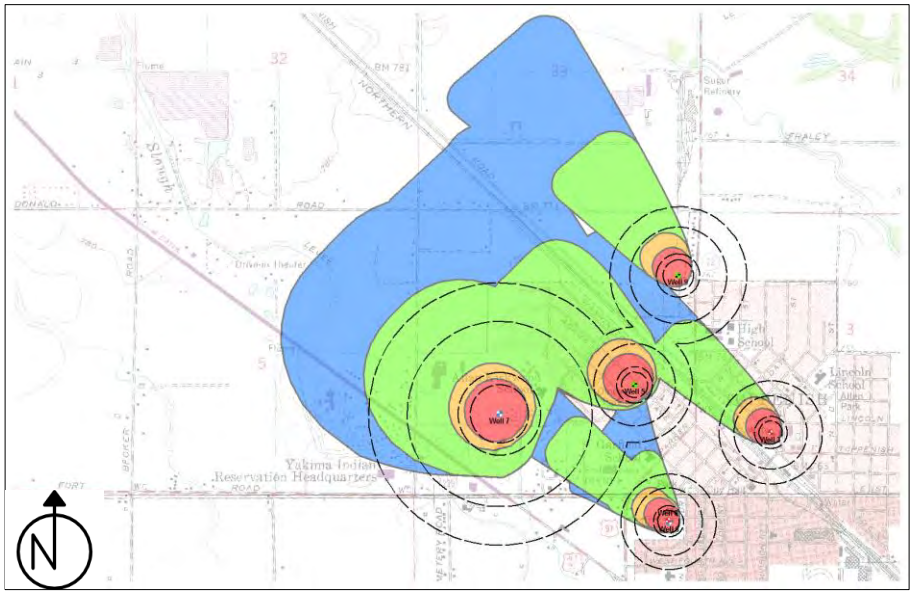
Modeled

Irregularly shaped

Considers physical land and water features

Best available info to protect source water in practice





Analytical

Hydrogeologic

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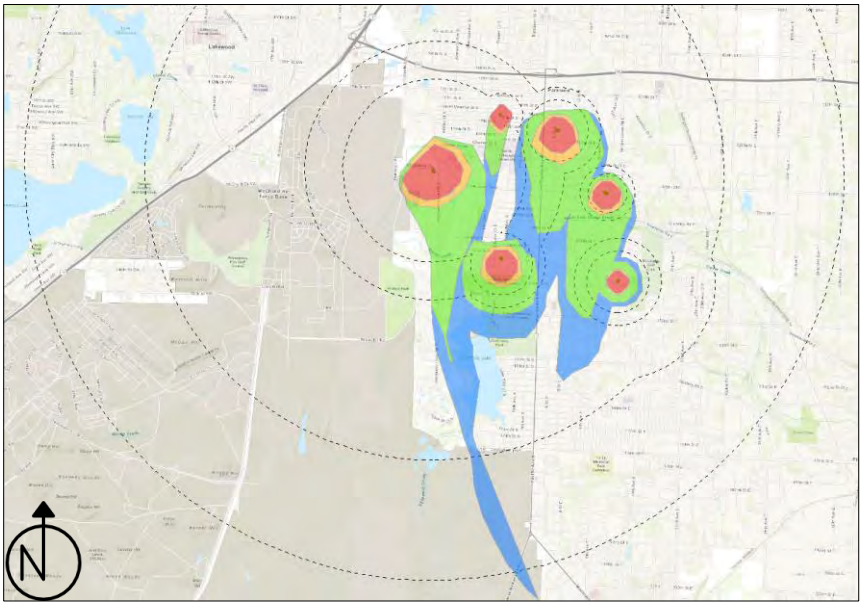

Numerical

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Chapter 5: 5.2 WHPP *(Continued)*

Required content

- Contaminant source inventory (updated every two years)
  - Sorted by time-of-travel zones
  - Letter template to notify landowners with potential contaminant sources
- Notification of Findings: Provide copy of template used to notify state and local agencies of findings
  - Include list of addressees and date letters were sent

Chapter 5: 5.2 WHPP *(Continued)*

Required content

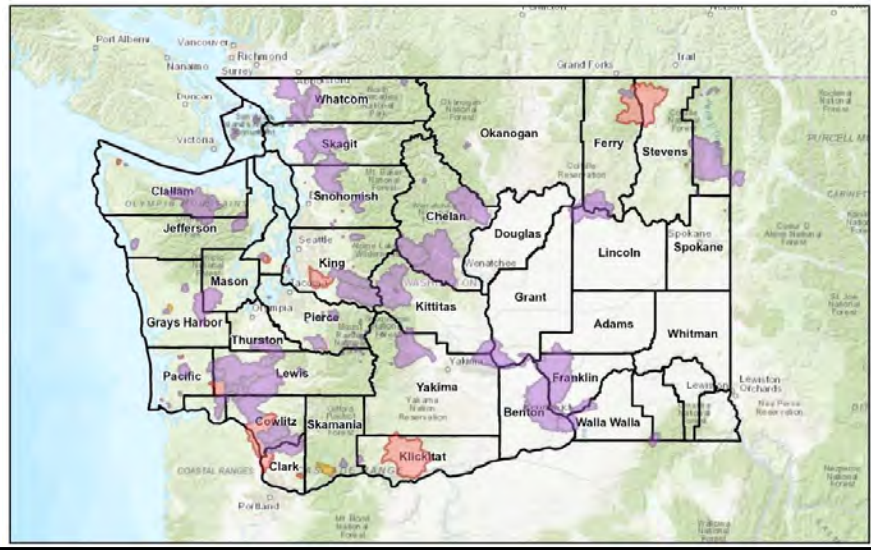
- Contingency Plan: What happens if one or more sources are temporarily or permanently lost due to contamination?
- Notify Emergency Responders: Provide copy of notification sent to emergency responders (state and local) of the wellhead protection area boundaries, results of susceptibility assessment, contaminant source inventory, and contingency plan.

Chapter 5: 5.2 WHPP

Recommended content

- Regional implementation efforts
- Education
- Public engagement strategies
- Local government engagement strategies

Watershed Control Program



Chapter 5: Watershed Control Plan

- **Who**: Water systems with surface water or GWI sources
- **When**: As part of your WSP or WSP update
- **What**: Your watershed control program shall have the following…

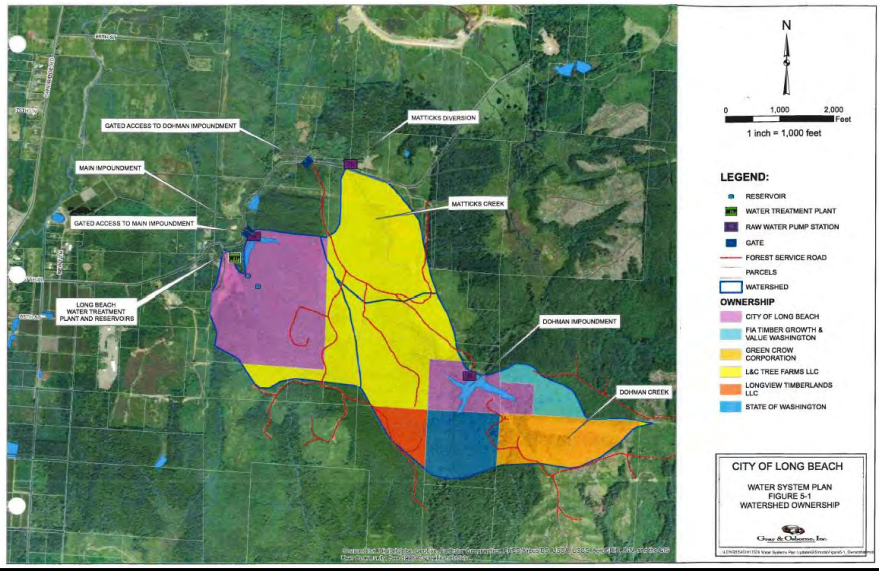
Chapter 5: Content of Watershed Plan

- Watershed description
- Identification of activities and land uses detrimental to water quality.
- Watershed management and control measures
- System operation
- Documentation of water quality trends

Chapter 5: Watershed Description

This section generally describes the landscape, who owns what, the geology, the location etc. This is the foundation of the watershed plan.

Chapter 5: Example of Watershed Map



Chapter 5: Identification of Activities and Land Uses Detrimental to Water Quality

This is the utilities' opportunity to take a good look at the watershed and identify those things that have already had or will have the potential to change the water quality or quantity they receive at the intake.

Chapter 5: Watershed Management and Control Measures

In most cases this is an opportunity for the utility to look outside themselves. We must acknowledge that unless the utility owns the watershed, they will depend on others to help with watershed management and control.

Example: Establishing easements along stream corridors. Written agreement to not spray herbicides within a specific distance of the water system, or a written communication strategy when herbicides will be applied.

Chapter 5: System operation

This section should identify how resilient your system is. Not your water system, but how your water system interacts with the watershed system.

If your source is contaminated, has an extremely high turbidity event, or declines significantly, how will you handle the change—what other sources do you have, how capable is your treatment plant, when will you need to go to another source?

Chapter 5: Documentation of Water Quality Trends

The idea behind this section is to evaluate changes in your water quality and associate them to watershed changes.

This section is not about showing your compliance with water quality sampling or submitting reams of water quality data. It is expected that the water quality data the system gathers will be evaluated and compared to changes in the watershed.

This is an opportunity to use water quality data to show degradation or improvement within the watershed.

Chapter 5: More Surface Water Protection Info

- Session S36, 1:45: Protecting Your Drinking Water and How Source Water Protection Grants can Help

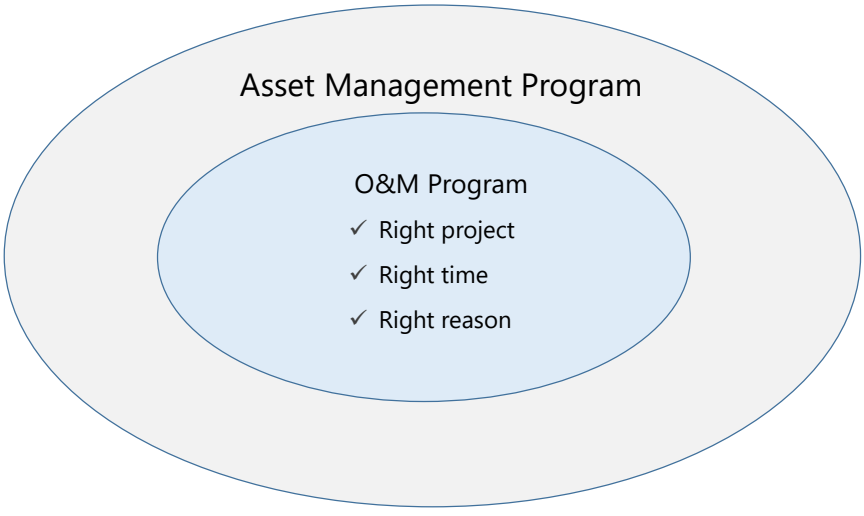
CHAPTER 6

OPERATION AND MAINTENANCE PROGRAM

Chapter 6: Benefits?

- Minimize asset life-cycle costs
- Maintain consistently reliable, high quality water service
- Maximize public health protection

Chapter 6: Successful O&M Program



Chapter 6: An Effective O&M Program

- Clearly outlines roles and responsibilities
- Provides a historical record of water system O & M
- Is easily accessible and adaptable
- Supports asset management goals
- Forms the basis for O&M expenses included in budget & CIP
- Includes and involves water system operators

Chapter 6: WSP Content

- Water system management and personnel
- Operations and preventive maintenance as related to managing asset life-cycle costs
- *Comprehensive water quality monitoring*
- *Emergency response*
- *Cross-connection control*
- *Sanitary survey findings*
- Recordkeeping, reporting, and customer complaint program
- *Surface water treatment (if applicable)*
- Summary of O&M deficiencies

Chapter 6: Include …

- Water system management and personnel
- Operations and preventive maintenance
  - Identify major system components
  - Routine system operation → type and frequency of preventive maintenance
  - Equipment, supplies, and chemical listing

Chapter 6: Example Preventative Maintenance

Table 6-1

Routine O&M Tasks

Task	Individual or Position	Frequency	Applicable SOPs, O&M Manuals, or Other Internal Guidance

Chapter 6: Include…

- *Comprehensive water quality monitoring*
  - Include monitoring plans
  - WQ monitoring schedule
- *Emergency response*
  - Plan now—not during an emergency
    - Storms, wildfires, drought, floods, cyber attack….

Chapter 6: Include …

- *Cross-connection control*
  - Reduce the risk of contamination to your system
  - Do you have legal authority? Program policies and procedures? Public education?
  - Hazard evaluation, ongoing
- *Sanitary Survey Findings*
  - Significant deficiencies, significant findings and observations
  - For unaddressed items, include action plan and budget

Chapter 6: Include …

- Recordkeeping, reporting, and customer complaint program
- *Surface water treatment*
  - Applies to systems using a filtration technology
- Summary of O&M Deficiencies
  - O&M projects identified as requiring capital spending
  - Example summary table provided

Chapter 6: Example

Table 6-2

Summary of O&M Deficiencies, Expenses, and Needed Action

O&M Deficiency	Action to be Taken	Year	Cost (if any)	Source of funding

CHAPTER 7

DISTRIBUTION FACILITIES DESIGN AND CONSTRUCTION STANDARDS

Chapter 7: Objective

This chapter's objective is to provide guidance for inclusion of water system distribution facilities design and construction standards into each water system's WSP.

Such standards are **not a required element in a WSP**.

This chapter describes WSP content required when a **water system intends to opt for the project report and construction document submittal exception under WAC 246-290-125**.

Chapter 7: Two Types of Projects Exception

The following may be exempt from the DOH review and approval process.

Distribution mains. The submittal exemption for ***water distribution main projects*** is commonly pursued by water systems that anticipate distribution main expansions for new development or ongoing water main replacements that don't meet the definition of a "replacement-in-kind" under WAC 246-290-125(1)(c).

Chapter 7: Two Types of Projects Exception *(Continued)*

Other distribution-related projects. The submittal exemption for *other distribution-related projects* are rarely pursued by water systems due to the ***site-specific attributes of new reservoirs and pump stations***.

Typically, water systems limit their information to standards such as ***replacement reservoir coatings***.

Chapter 7: No Submittal Exception

- Source of Supply Projects
  - New or redeveloped wells or springs
  - Refurbished wells
  - Surface water intakes
  - Interties
- Water Treatment Projects
  - Chlorination
  - Corrosion control
  - Filtration
  - Iron and manganese removal
  - UV
  - Ozonation

Chapter 7: Content/Sections

7.1 Project Review Procedures

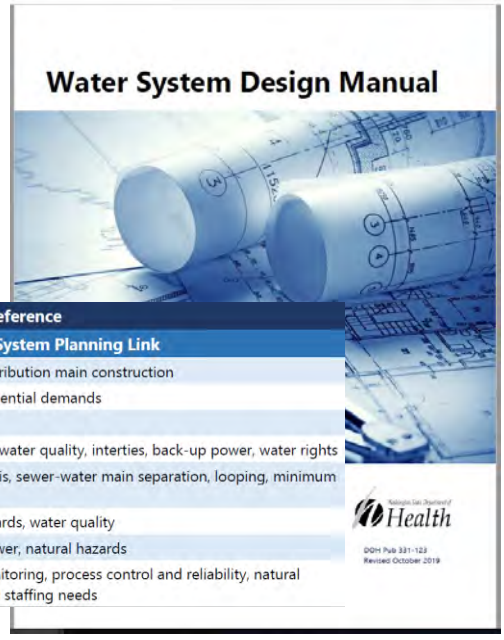
7.2 Policies and Requirements for Outside Parties

7.3 Construction and Design Standards

7.4 Construction Certification

The above sections provide information to satisfy requirements of WAC 246-290-100 (5) and (5) (b)

Chapter 7: WSDM



WSDM Cross-Reference	
WSDM	**Water System Planning Link**
Chapter 2	Design submittal exceptions for distribution main construction
Chapter 3	Estimating residential and non-residential demands
Chapter 4	Physical capacity analysis
Chapter 5	Source development and reliability, water quality, interties, back-up power, water rights
Chapter 6	Distribution system hydraulic analysis, sewer-water main separation, looping, minimum design standards, water quality
Chapter 7	Reservoir sizing criteria, natural hazards, water quality
Chapter 8	Booster pump stations, back-up power, natural hazards
Chapters 10 and 11	Water treatment, water quality, monitoring, process control and reliability, natural hazards, operational complexity and staffing needs

Chapter 7: 7.4 Construction Certification

There are three construction completion report forms. Each form is used for a specific circumstance.

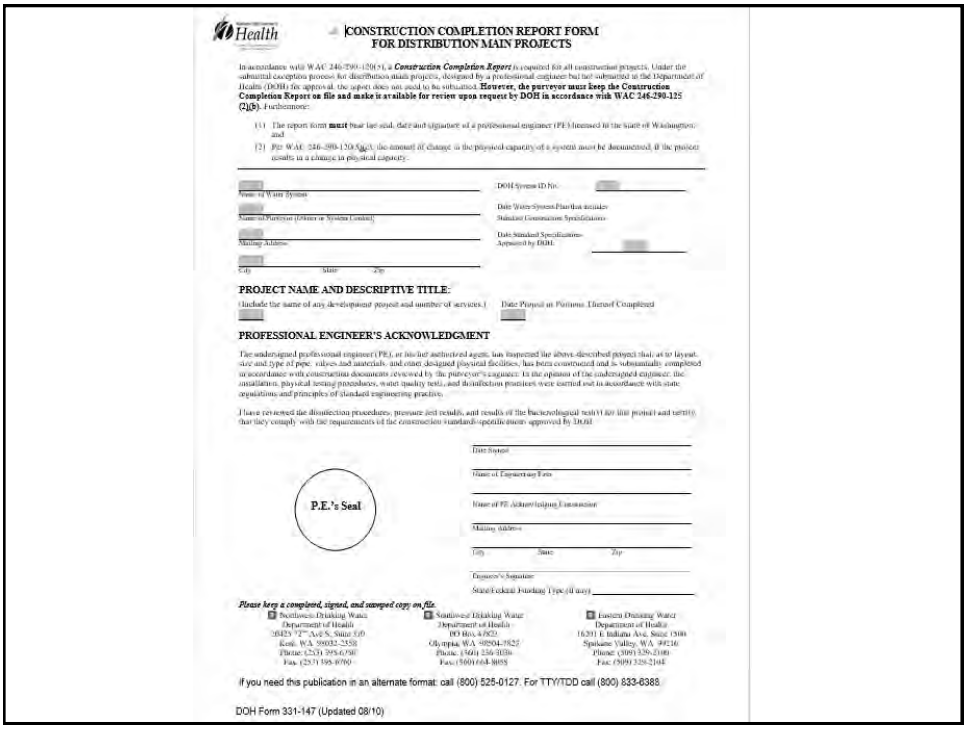
Construction Completion Report Form DOH 331-121. Use this form in the normal process of submitting documentation for a project that underwent our design review and approval and was constructed in accordance with the DOH-approved design. It is the form referenced in WAC 246-290-120(5).

Chapter 7: 7.4 Construction Certification
(Continued)

Construction Completion Report for Distribution Main Projects DOH 331-147. Use this form only for distribution main projects not requiring prior written approval from us. The water system does not have to submit this form to us following construction completion. However, the water system must maintain a completed form on file and make it available to us upon request. This form is referenced in the submittal exception process (see WAC 246-290-125(2)).

Chapter 7: 7.4 Construction Certification
(Continued)

Construction Completion Report Form for Submittal Exception Process DOH 331-146. Use this form only for distribution-related projects not requiring prior written approval from us. Distribution-related projects include booster pump stations, storage tanks, internal tank coatings, and transmission mains. Submit this report to us after constructing new storage tanks or booster pump stations, but only maintain a completed form on file for other distribution-related projects (WAC 246-290-125(3)(f)). This form is used in the submittal exception process (see WAC 246-290-125(3)).



CONSTRUCTION COMPLETION REPORT FORM
FOR DISTRIBUTION MAIN PROJECTS

In accordance with WAC 246-290-120(5), a ***Construction Completion Report*** is required for all construction projects. Under the submittal exception process for distribution main projects, designed by a professional engineer but not submitted to the Department of Health (DOH) for approval, the report does not need to be submitted. **However, the purveyor must keep the Construction Completion Report on file and make it available for review upon request by DOH in accordance with WAC 246-290-125 (2)(b).** Furthermore:

(1) The report form **must** bear her seal, date and signature of a professional engineer (PE) licensed in the state of Washington; and

(2) Per WAC 246-290-120(5)(c), the amount of change in the physical capacity of a system must be documented, if the project results in a change in physical capacity.

Name of Water System

DOH System ID No.

Name of Purveyor (Owner or System Contact)

Date Water System Plan has been Standard Construction Specifications

Mailing Address

Date Standard Specifications Approved by DOH

City State Zip

PROJECT NAME AND DESCRIPTIVE TITLE:

(Include the name of any development project and number of services.)

Date Project or Portions Thereof Completed

PROFESSIONAL ENGINEER'S ACKNOWLEDGMENT

The undersigned professional engineer (PE), or his/her authorized agent, has inspected the above-described project that, as to layout, size and type of pipe, valves and materials, and other designed physical facilities, has been constructed and is substantially completed in accordance with construction documents reviewed by the purveyor's engineer. To the opinion of the undersigned engineer, the installation, physical testing procedures, water quality tests, and disinfection practices were carried out in accordance with state regulations and principles of standard engineering practice.

I have reviewed the disinfection procedures, pressure test results, and results of the Bacteriological test(s) for this project and certify that they comply with the requirements of the construction standards specifications approved by DOH.

P.E.'s Seal

Date Signed

Name of Engineering Firm

Name of PE Acknowledging Construction

Mailing Address

City State Zip

Engineer's Signature

State/Federal Funding Type (if any)

Please keep a completed, signed, and stamped copy on file.

Southwest Drinking Water Operations
Department of Health
20425 72nd Ave S, Suite 310
Kent, WA 98032-2358
Phone: (253) 395-6750
Fax: (253) 395-6760

Southwest Drinking Water Operations
Department of Health
PO Box 47825
Olympia, WA 98504-7825
Phone: (360) 236-3030
Fax: (360) 664-9698

Eastern Drinking Water Operations
Department of Health
16201 E Indiana Ave, Suite 1500
Spokane Valley, WA 99216
Phone: (509) 329-2100
Fax: (509) 329-2104

If you need this publication in an alternate format, call (800) 525-0127. For TTY/TDD call (800) 833-6388.

DOH Form 331-147 (Updated 08/10)

Chapter 7: Outcome

"Standard Construction Specifications for distribution main extensions have been approved as part of this WSP. With this approval and consistent with WAC 246 290 125(2), the City of Othello may proceed with the installation of distribution main extensions without additional DOH approval provided that the City maintains on file completed construction completion reports (a copy of which is attached) in accordance with WAC 246 290 125(2) and makes them available for review upon request by DOH."

Chapter 7: Summary/Questions

- Distribution mains and/or other distribution-related projects
- Needed in WSP
  - Project Review Procedures
  - Policies and Requirements for Outside Parties
  - Construction and Design Standards
  - Construction Certification

CHAPTER 8

CAPITAL IMPROVEMENT PROGRAM

Chapter 8

Capital Improvement Program/CIP

= A capital project road map

- Create your CIP list by summarizing and prioritizing the findings from earlier chapters such as
  - Asset management
  - Engineering analysis to address vital needs and deficiencies
  - Identify projects, costs, schedule, and source of funding

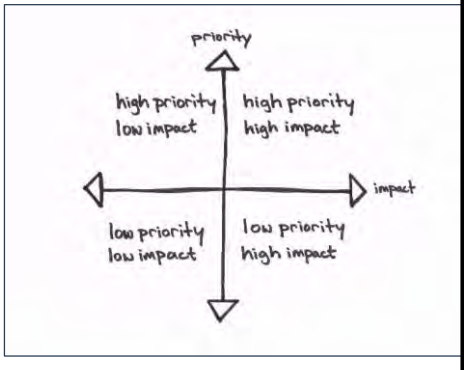
Chapter 8: Section 8.1

Prioritization

In the world of limited resources, identify the most important projects first!

Assess your projects (see page 80)

Do a criticality analysis to help you think through needs to create the project list in priority order



Chapter 8: Section 8.1

- Value Planning
  - "Is this the right order?" Is your community a YES?
  - "Are there dependencies?
  - "What's the right scale, complexity, solution?"
- See Commerce's SYNC website
  - Legislature directed state agencies to improve and maximize funding programs
- The Value Planning Guide is one of the accomplishments

Chapter 8: Section 8.2

- Capital Project Summary and Schedule
- Factors to consider
  - Asset management
  - Current identified deficiencies
  - Ongoing capital programs such as main replacement
- Fixed and variable dates

Chapter 8: Table 8-1

Table 8-1

Capital Improvement Program Summary and Schedule

Project	Project Type[1]	Year	Total project cost[2]	Anticipated source of funding[3]	Classification of deficiency[4]

1. Select from among, all that apply: Source, treatment, storage, distribution, transmission, pumping, operations, maintenance, equipment.
2. Include total project costs, including engineering design, financing, state taxes, contingency, and construction. State whether the cost is in current dollars or inflated dollars. Describe all assumptions about costs.
3. If "grant", include in the appendix a copy of the grant application and grant award.
4. Select from among, all that apply: Enforcement, water quality, water quantity, end of useful life (replacement), pressure, reliability, resiliency, growth, public safety/fire flow, energy efficiency, and other

Chapter 8: Section 8.3

Additional Resources

- Some of the best tips and industry help identified for you
  - American Water Works Association manuals
  - Environmental Finance Center training videos, blogs, financial dashboards

CHAPTER 9

FINANCIAL PROGRAM

Chapter 9: Section 9.1

- Financial viability—demonstrates financial discipline while creating financial resilience
  - Do you have sufficient funds?
  - Are your rates covering the full cost of water service?
  - Are you in full compliance with federal, state and local requirements?

Chapter 9: Section 9.2

- Past income and expenses
- The past will give you clues, only…the future is ahead and you need to consider the factors driving cost increases
- Staff—most important asset!
  - Rising costs for healthcare and benefits
  - Rising costs to keep them as good staff are in really high demand

Chapter 9: Section 9.3

- Balanced operational budget
- Summarize past income and expenses
- Consider an annual inflation factor as the norm, and build it into water rates to stay "in the game" and not get behind

Chapter 9: Section 9.4

- Reserve Funds
- What is there besides annual O&M costs?
- The path to stability and generational equity
  - The Fearsome Four – "Superheroes" in Finance
    1. Operating cash reserves
    2. Emergency reserves
    3. Debt coverage reserves
    4. Replacement reserves for "big ticket" assets

Chapter 9: Section 9.5

- Debt financed capital improvements
- Your water system plan needs to identify in the budget how much debt is owed, assets involved, and annual repayment amount
- Tip: Add a note to identify the number of years left for repayment

Chapter 9: Section 9.6

Water Rate Evaluation

- 9.6.1 Affordability
  - **Customer affordability**
    - Relative impact of rate for all rate-payers
    - Current methodology has limitations
  - **Consumer affordability**
    - Can each individual afford the water rate?
    - Customer assistance programs can help
      - Lifeline rates, payment plans, one time aid

Chapter 9: Section 9.6 continued

Water Rate Evaluation

- 9.6.2 Rate Structures to meet requirements of municipal water law, water use efficiency
- Benefits
  - Price water as a commodity, the more you use, the more you pay
  - Collect additional revenue
  - Demonstrate water resource stewardship and the value of water by price signals
  - Tiered rate structures need evaluation and "realness"

Chapter 9: Section 9.7

- Water Systems regulated by the State Utilities & Transportation Commission (UTC)
- Privately owned investors with > 100 connections
  - Rates > $557/year or $46.42/month
  - "Gold Standard" process for shutting off water for lack of payment

Chapter 9: Section 9.8

- Additional Resources
- Reminder
  - There are really excellent resources for you!
    - Aides and advice
    - Tips and talking points
    - Philosophy and processes

CHAPTER 10

MISCELLANEOUS DOCUMENTS

Chapter 10: Miscellaneous Documents

- The objective of this chapter is to provide documentation on
  - State Environmental Policy Act (Chapter 43.21 RCW)
  - Various agreements referenced in the WSP
  - Any correspondence or comments from federal, state, and local government entities, adjacent water systems, or the governing board/owner of the water system
  - Appendices

Chapter 10: SEPA

- Satisfies WAC 246-290-100(4)(k)(i)
- Include in Chapter 10
  - SEPA checklist
  - SEPA determination
    - Determination of Non-significance (DNS) or Mitigated DNS
    - Non-project action form
    - Final Environmental Impact Statement (EIS)
  - SEPA register documentation

Chapter 10: Agreements

- Wholesale and wheeling agreements
- Financial and cost sharing agreements
- Satellite management agency contract
- Service area and franchise agreements
- Mutual aid, Inter-local, and Joint-use agreements
- Regional agreements
  - Emergency supply/preparedness
  - Sampling program
  - Watershed or wellhead

CHAPTER 10: CORRESPONDENCE

- Local governments
- Other state agencies
- Watershed or regional planning entities
- Water system governing board
  - Resolution approving and adopting WSP
- Tribal government
- Fire authority

Chapter 10: Appendices

- Standard construction specs and design details
- Standard operating procedures
- Hydraulic modeling information
- Water quality monitoring results
- Water quality monitoring summary
- Water right documents (a completed water right self-assessment form is required)
- Most recent rate study
- Recent expense and income annual reports
- Easement and land ownership documents

Chapter 10: Appendices *(Continued)*

- Cross connection control annual summary reports
- Water use efficiency report
- Facility inspection reports
- Consumer confidence report
- Consumer alerts or public notices issued
- Water treatment plant operational reports
- Water quality monitoring summary
- Unmetered authorized water use
- Operator certification

Chapter 10: Appendices *(Continued)*

- Water facilities inventory
- Consumer informational meeting notification and minutes
- Notification to adjacent utilities that WSP is available for review
- Monthly annual water production and consumption totals
- Susceptibility assessment

Chapter 10: Appendices *(Continued)*

- Contaminant inventory and notification to land owners (wellhead protection)
- Notification of state and local agencies, and emergency responders, of the wellhead protection program source inventory findings and wellhead protection boundaries

Comments/Suggestions?

We welcome your feedback!

Fill out the comments and suggestions survey by **December 11, 2019**

Where can I find it?

Our Water System Planning Requirements webpage

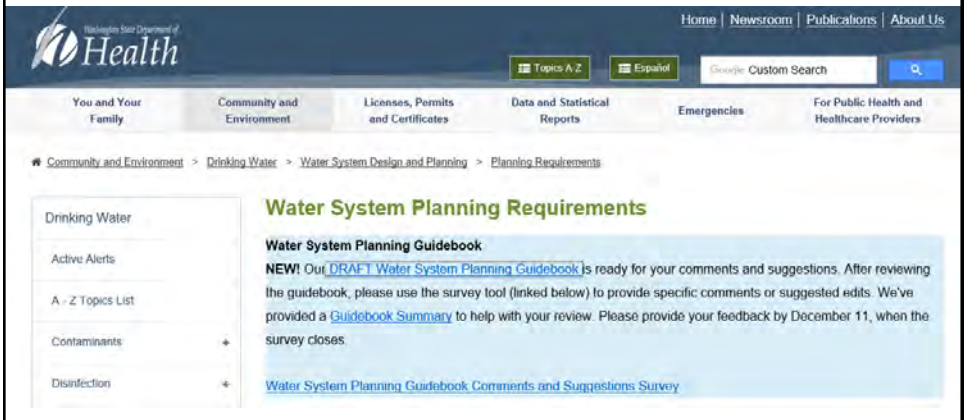
doh.wa.gov/DrinkingWater then search for Water System Planning Guidebook

- or -

doh.wa.gov/CommunityandEnvironment/DrinkingWater/WaterSystemDesignandPlanning/PlanningRequirements

- or –

Contact any DOH regional planner



Planning and Financial Viability

Water System Planning Guidebook

331-068 • Revised [Publish Date]

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Water System Planning Guidebook Comments and Suggestions

1. Your Name
2. Your Title
3. Your Email Address
4. Your Organization
5. List the WSPG Section Number/Appendix reference in the box below. Add your comments to the textbox in the next question. This format allows us to sort the answers.
6. Enter your comment/question/edit/suggestion for the section/appendix referenced above.

Questions?