06.18.2015

Report – 2014 Water System Plan Project

Please find attached correspondence received regarding the 2014 Water System Plan Project in May 2015.

Letter:

Dated: May 18, 2015

From: Department of Health, Southwest Drinking Water Regional Operations.

To: William Neal, NBWD

Re: Acknowledgment of receipt of Water System Plan for review. Office of Drinking Water will review and respond within ninety days. The time may be extended up to an additional 90 days, with notification, if the District provides the ODW with new or additional submittals.

Letter:

Dated: May 18, 2015

From: Department of Health, Southwest Drinking Water Regional Operations.

To: Tammy Hall, Washington State Department of Ecology.

Re: Consent with Joint Review Procedures for Planning and Engineering Documents between DOH, ODW and DOE regarding review and approval of water system plans and water right permits. Tammy is asked to forward comments to William Neal within 60 days of the date of the letter.

Local Government Consistency Statement – Pacific County

Required by WAC 246-290-108 "Consistency with local plans and regulations". Consistency with local plans and regulations applies to planning and engineering documents under WAC 246-290-106 "Duty to provide service", 246-290-107 "Place of use expansion", and 246-290-110 "Project report".

WAC 246-290-108(2) Municipal water suppliers must request each local government with jurisdiction over the applicable service area to provide a consistency review.

Tim Crouse, Pacific County Planning Director, on June 6, 2015, certified that the District's 2014 Water System Plan is, to the best of his knowledge, is consistent with adopted local plans and development regulations.

Karl Johnson and Michael Johnson put their seals on the plan on May 7, 2015 and included updated sheets. We received these pages in late May, after the May regular Board meeting.

We are now waiting for the Office of Drinking Water to review and respond to our Plan.

END OF REPORT

STATE OF WASHINGTON
DEPARTMENT OF HEALTH
SOUTHWEST DRINKING WATER REGIONAL OPERATIONS
PO Box 47823, Olympia, Washington 98504-7823
TDD Relay 1-800-833-6388

May 18, 2015

William Neal III
North Beach Water
Post Office Box 618
Ocean Park, Washington 98640

Subject: North Beach Water Water System, ID #63000, Pacific County; Water System Plan, ODW Project #15-0505

Dear William Neal III:

On May 15, 2015, we received documents submitted for review and approval per WAC 246-290. This project has been assigned the unique identification number #15-0505. **Please include this number on all future correspondence or additional submittals pertaining to this project.**

The department's review of your design will not confer or guarantee any right to a specific quantity of water. Our review will be based on your representation of available water quantity. If the Washington Department of Ecology, a local planning agency, or other authority responsible for determining water rights and water system adequacy determines that you have use of less water than you represent, the number of approved connections may be reduced commensurate with the actual amount of water and your legal right to use it.

ODW will review your submittal and respond to you within ninety days. ODW may extend this ninety-day time limitation for new submittals up to an additional ninety days if insufficient time exists to adequately review the WSP. If additional time is needed, I will notify you in writing.

According to our information, you are the owner or authorized representative of the water system described in the WSP submittal. You will also receive an invoice requesting payment for the review fee. Payment is due at that time. The base fee includes two reviews of the project. Additional reviews, if required, will be invoiced separately.

If you have any questions, please contact Regional Planner Mark Mazeski at (360) 236-3038.

Sincerely,

Debbie Phillips
Office of Drinking Water

cc: Karl Johnson, Gray & Osborne
Pacific County Health Department

STATE OF WASHINGTON
DEPARTMENT OF HEALTH
SOUTHWEST DRINKING WATER REGIONAL OPERATIONS
PO Box 47823, Olympia, Washington 98504-7823
TDD Relay 1-800-833-6388

May 18, 2015

Tammy Hall
Department of Ecology – M/S 47775
Post Office Box 47775
Olympia, Washington 98504

Subject: North Beach Water, ID #63000, Pacific County; Water System Plan, Submittal #15-0505

Dear Tammy Hall:

Consistent with the *Joint Review Procedures for Planning and Engineering Documents* between the Department of Health, Office of Drinking Water (ODW) and the Department of Ecology (Ecology) regarding joint review and approval of the water system plans and water right permits, this plan is being forwarded to your office for review and comment.

Please send your comments to William Neal III, Po Box 618, Ocean Park, WA, 98640 within 60 days of the date of this letter and send a copy to us. If your comments indicate there is a discrepancy in the water rights information, we will request the water system respond to your concerns. Any changes to the plan regarding water rights will be forwarded to your office for review.

If you have any questions, please contact Mark Mazeski at (360) 236-3038 or by e-mail at mark.mazeski@doh.wa.gov.

Sincerely,

Debbie Phillips
Office of Drinking Water

Enclosure

cc: William Neal III, North Beach Water
Pacific County Health Department

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

Local Government Consistency Review Checklist

Water System Name: North Beach Water District PWS ID: 63000C

Planning/Engineering Document Title: Water System Plan Plan Date: March 2015

Local Government with Jurisdiction: Pacific County

WAC 246-290-108 Consistency with local plans and regulations:
Consistency with local plans and regulations applies to planning and engineering documents under WAC 246-290-106, 246-290-107, and 246-290-110(4)(b (ii).

1) Municipal water suppliers must include a consistency review and supporting documentation in its planning or engineering document describing how it has addressed consistency with **local plans and regulations**. This review must include specific elements of local plans and regulations, as they reasonably relate to water service as determined by Department of Health (DOH). Complete the table below and see instructions on back.

Local Government Consistency Statement	Page(s) in Planning Document	Yes – No – Not Applicable
a) The water system service area is consistent with the adopted land use and zoning within the applicable service area.	Pg 1-12, Figs 1-13, 1-14	
b) The six-year growth projection used to forecast water demand is consistent with the adopted city/county's population growth projections. If a different growth projection is used, provide an explanation of the alternative growth projection and methodology.	Pgs 2-14 through 2-17	
c) Applies to cities and towns that provide water service: All water service area policies of the city or town are consistent with the utility service extension ordinances of the city or town.	N/A	
d) Service area policies for new service connections are consistent with the adopted local plans and adopted development regulations of all jurisdictions with authority over the service area [City(ies), County(ies)].	N/A	
e) Other relevant elements related to water supply are addressed in the water system plan, if applicable; Coordinated Water System plans, Regional Wastewater plans, Reclaimed Water plans, Groundwater Area Management plans, and Capital Facilities Element of 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.

Tim Crose (signature) 6-4-15
Signature Date

Tim Crose, Planning Director, Pacific County
Printed Name, Title, & Jurisdiction

Consistency Review Guidance

For Use by Local Governments and Municipal Water Suppliers

This checklist may be used to meet the requirements of WAC 246-290-108. When using an alternative format, it must describe all of the elements; 1a), b), c), d), and e), when they apply.

For **water system plans (WSP)**, a consistency review is required for the retail service area and any additional areas where a municipal water supplier wants to expand its water right's place of use.

For **small water system management programs**, a consistency review is only required for areas where a municipal water supplier wants to expand its water right's place of use. If no water right place of use expansion is requested, a consistency review is not required.

For **engineering documents**, a consistency review is required for areas where a municipal water supplier wants to expand its water right's place of use (water system plan amendment is required). For non-community water systems, a consistency review is required when requesting a place of use expansion. All engineering documents must be submitted with a service area map per WAC 246-290-110(4)(b)(ii).

A) Documenting Consistency: Municipal water suppliers must document all of the elements in a consistency review per WAC 246-290-108.

1 a) Provide a copy of the adopted **land use/zoning** map corresponding to the service area. The uses provided in the WSP should be consistent with the adopted land use/zoning map. Include any other portions of comprehensive plans or development regulations that are related to water supply planning.

1 b) Include a copy of the **six-year growth projections** that corresponds to the service area. If the local population growth rate projections are not used, provide a detailed explanation on why the chosen projections more accurately describe the expected growth rate. Explain how it is consistent with the adopted land use.

1c) Include water service area policies and show that they are consistent with the **utility service extension ordinances** within the city or town boundaries. This applies to cities and towns only.

1 d) Include all **service area policies** for how new water service will be provided to new customers.

1 e) **Other relevant elements** related to water supply planning as determined by the department (DOH). See Local Government Consistency – Other Relevant Elements, Policy B.07, September 2009.

B) Documenting an Inconsistency: Please document the inconsistency, include the citation from the comprehensive plan or development regulation, and provide direction on how this inconsistency can be resolved.

C) Documenting Lack of Consistency Review by Local Government: Where the local government with jurisdiction did not provide a consistency review, document efforts made and the amount of time provided to the local government for their review. Please include: name of contact, date, and efforts made (letters, phone calls, and e-mails). In order to self-certify, please contact the DOH Planner.

NORTH BEACH WATER DISTRICT

PACIFIC COUNTY **WASHINGTON**

WATER SYSTEM PLAN

G&O #14222
MAY 2015

Gray & Osborne, Inc.

CONSULTING ENGINEERS

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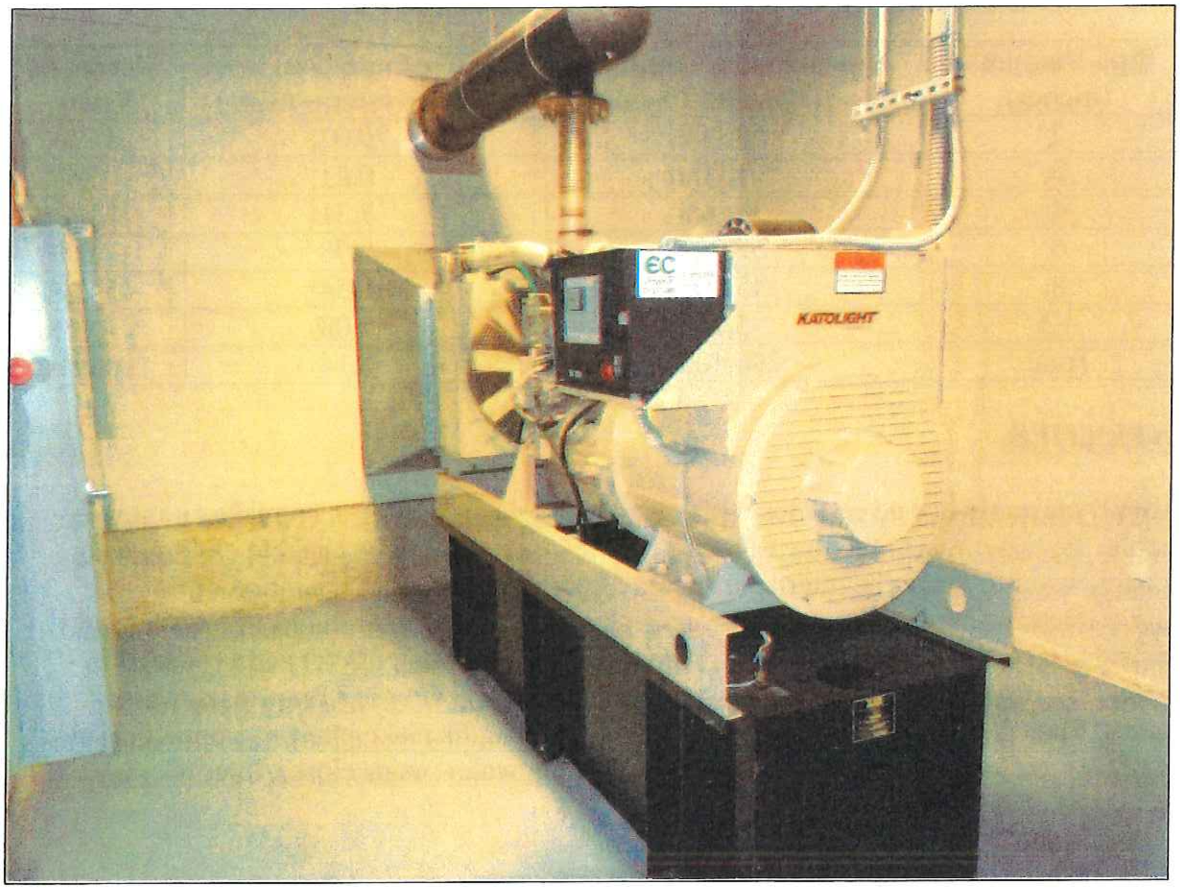
South Wellfield 150 KW Generator



TRANSMISSION AND DISTRIBUTION SYSTEM

Description

Transmission and distributions facilities consist of over 56 miles of pipes ranging in size from 2 inches to 12 inches in diameter. Piping installed prior to 1980 was a combination of asbestos concrete (A-C) pipe and polyvinyl chloride (PVC) pipe. In the early 1980s the standard was changed to a minimum of 160 psi pressure rated PVC pipe. A water system base map showing distribution system facilities is shown in Figure 1-11.

Pipe Inventory

Based on system mapping, the water distribution system consists of slightly more than 56 miles of water main ranging in size from 2-inch to 12-inch. Over half of the system is 2-inch water main. Almost 18 percent is 6-inch and just over 15 percent is 8-inch water main. Table 1-5 summarizes the system water distribution system by size.

TABLE 1-5

Pipe Size and Length

Pipe Diameter (inches)	Approximate Length of Pipe in System (lineal ft.)	Approximate Length of Pipe in System (miles)	Percent of System
2	153,200	29.02	51.7%
3	1,100	0.21	0.4%
4	38,600	7.31	13.0%
6	52,700	9.98	17.8%
8	45,100	8.54	15.2%
12	5,700	1.08	1.9%
Total	296,400	56.14	100.0%

INTERTIES

NBWD currently has no interties with neighboring water utilities. To make an intertie viable, the water mains feeding to the intertie location need to be capable of conveying enough water to make the intertie feasible. Currently, there is a separation of approximately 1.2 miles by road between adequately sized water mains in NBWD and Surfside HOA water system, approximately 2 miles between NBWD and Oysterville Water, and approximately 2.7 miles between NBWD and City of Long Beach water mains. The cost of installing water mains of these lengths make interties impractical at this time. If and when development brings existing water mains closer, interties may become feasible in the future.

RELATED PLANNING DOCUMENTS

PREVIOUS WATER SYSTEM PLANS

In 2007, a Water System Plan for North Beach Water was prepared by TJF & Associates of Olympia, Washington. That Plan was approved by DOH by letter dated November 12, 2008. The 2007 Plan was the first plan prepared for the combined OPWC/PWC water system. Prior to that Plan, water system plans had been prepared separately for OPWC and PWC. According to the 2007 Plan, the first water system plan for OPWC was approved by the State Board of Health January 31, 1966, and the last water system plan prepared by OPWC was dated December 1998. Also according to the 2007 Plan, the first water system plan prepared for PWC was approved on July 23, 1981, and the last water system plan prepared for PWC was completed in August 1994.

states, "Standby and fire suppression storage volumes may be nested with the larger of the two volumes being the minimum available, provided the local fire protection authority does not require them to be additive." Therefore, the Effective Storage Requirement will be either the sum of equalizing, standby and fire suppression, if "nesting" of standby and fire suppression storage is *not* allowed, or it will be the sum of equalizing storage plus the greater of standby or fire suppression storage if nesting of standby and fire storage *is* allowed. **For the NBWD, no local ordinance or authority has required fire storage to be additive, so nesting of standby and fire storage is allowed.**

WATER QUALITY ANALYSIS

The following sections evaluate the record of water quality for NBWD. Water quality analysis is divided into the categories of Source Water Quality, Delivered Water Quality, Water Quality Reporting, and Water Quality Complaints. Water quality standards that apply to the water distribution system, including coliform, lead and copper, disinfectant byproducts, and asbestos are discussed under the heading of Delivered Water Quality. A review of water quality monitoring requirements relative to water quality monitoring completed is included under the heading Water Quality Reporting, and a review of water quality problems and complaints is included under the heading Water Quality Complaints.

SOURCE WATER QUALITY

As described in Chapter 1, NBWD has eleven wells. The treatment processes provided for NBWD wells are filtration for removal of iron and manganese at all wells.

Inorganic Chemical and Physical Water Quality

<u>General IOC Tests</u>

NBWD's most recent inorganic chemical and physical (IOC) water quality monitoring results are summarized in Table 3-2. The Maximum Contaminant Level (MCL) for all inorganic chemical and physical water quality parameters for which there are MCLs are listed in the right hand column. All analyses indicating values at or above the MCL are indicated in bold. The only MCL exceedances indicated are arsenic, iron, manganese and color for the Source 12 taken on April 19, 2010. This sample was taken prior to the treatment system. The treatment system removes iron, manganese and arsenic, and iron and manganese were most likely the cause for the color. All samples taken after treatment meet all IOC standards.

TABLE 3-2

Source Inorganic Chemical Sampling Results

Location	Source 6 (1)	Source 11 (1)	Source 12 (2)	Source 10 (1)	Source 6 (1)	MCL (3)
Sample Date	**3/27/2008**	**4/19/2010**	**4/19/2010**	**7/21/2010**	**4/18/2012**	
Primary Contaminants - All results milligrams per liter (mg/L) unless otherwise noted						
Antimony	NA (4)	<0.006	<0.006	<0.006	<0.006	0.006
Arsenic	0.008	0.001	**0.02**	0.008	0.009	0.01
Barium	NA (4)	<0.4	<0.4	<0.4	<0.4	2
Beryllium	NA (4)	<0.0008	<0.0008	<0.0008	<0.0008	0.004
Cadmium	NA (4)	<0.002	<0.002	<0.002	<0.002	0.005
Chromium	NA (4)	<0.02	<0.02	<0.02	0.001	0.1
Copper	NA (4)	<0.02	<0.02	<0.02	<0.02	1.3(5)
Cyanide	NA (4)	<0.01	<0.01	<0.01	<0.01	0.2
Fluoride	NA (4)	<0.5	<0.5	<0.5	<0.5	4(6)
Lead	NA (4)	<0.001	<0.001	<0.001	<0.001	0.015(5)
Mercury	NA (4)	<0.0004	<0.0004	<0.0004	<0.0004	0.002
Nickel	NA (4)	<0.1	<0.1	<0.1	<0.1	0.1
Nitrate-N	<0.2	0.22	<0.2	<0.2	<0.2	10
Nitrite-N	NA (4)	<0.2	<0.2	<0.2	<0.2	1
Total Nitrite/ Nitrate	NA (4)	0.22	<0.5	<0.5	<0.5	10
Selenium	NA (4)	<0.01	<0.01	<0.01	<0.01	0.05
Thallium	NA (4)	<0.002	<0.002	<0.002	<0.002	0.002
Secondary Contaminants - All results milligrams per liter (mg/L) unless otherwise noted						
Chloride	NA (4)	15	17	12	29	250
Fluoride	NA (4)	<0.5	<0.5	<0.5	<0.5	2(6)
Iron	0.062	<0.1	**3.67**	<0.1	0.05	0.3
Manganese	0.02	0.018	**0.86**	0.03	0.017	0.05
Silver	NA (4)	<0.1	<0.1	<0.1	<0.1	0.1
Sulfate	NA (4)	**2.7**	0.8	2	5.1	250
Zinc	NA (4)	<0.2	0.077	<0.2	<0.2	5

summarizes NBWD's lead and copper monitoring results. The data shows that NBWD is in compliance with the lead and copper standards.

TABLE 3-6

Lead and Copper Monitoring Results, 2008 - 2011

Percentile Rank	June – July 2008		Sept. – Oct. 2008		July – Sept. 2011	
	Lead, mg/L	Copper, mg/L	Lead, mg/L	Copper, mg/L	Lead, mg/L	Copper, mg/L
Highest Level	0.005	0.300	0.006	0.287	0.003	0.573
90th Percentile	0.005	0.300	0.006	0.287	0.003	0.361
Action Level	0.015	1.300	0.015	1.300	0.015	1.300

WATER QUALITY MONITORING AND REPORTING

General water quality monitoring requirements are summarized in WAC 246-290-300. NBWD has obtained several water quality monitoring waivers, which affect the monitoring requirements. Table 3-7 summarizes NBWD's monitoring requirements as shown on the Water Quality Monitoring Report for the Year 2014.

TABLE 3-7

Source Monitoring Requirements and Waivers for 2014

Monitoring Parameter	Sampling Requirement	Sampling Location
Coliform	6 per month Jan – Mar 7 per month Nov – Dec 8 per month Apr, May, Oct 9 per month June – Sept	Distribution System per Coliform Monitoring Plan
Asbestos	1 per 9 years	Distribution System
Lead and Copper	1 round per 3 years	Distribution System
Nitrate	1 per year per source	S-06, S-10, S-11
IOC	1 per 3 years	S-10
	1 per 9 years	S-06, S-11
VOC	1 per 6 years	S-06, S-10, S-11
Herbicides, SOC 515.2	1 per 3 years	S-10, S-11
	1 per 9 years	S-06
General Pesticides, SOC 525.2	Waiver Jan 2014 – Dec 2016	S-06, S-10, S-11
EDB and fumigants, SOC 504	Waiver Jan 2014 – Dec 2016	S-06, S-10, S-11
Insecticides, SOC 531.1	Blanket State Waiver	All Sources
Dioxin, SOC 1613	Blanket State Waiver	All Sources

TABLE 3-7 – (continued)

Source Monitoring Requirements and Waivers for 2014

Monitoring Parameter	Sampling Requirement	Sampling Location
Endothall, SOC 548.1	Blanket State Waiver	All Sources
Glyphosphate, SOC 547.1	Blanket State Waiver	All Sources
Diquat, SOC 549.1	Blanket State Waiver	All Sources

WATER QUALITY COMPLAINTS

NBWD handles water quality complaints pursuant to their policy for dealing with complaints as described in Chapter 1. In response to dirty water complaints, a water operator will generally check out the validity of the complaint by an on-site investigation and flush water mains if appropriate.

SYSTEM DESCRIPTION AND ANALYSIS

The following sections evaluate the existing water system facilities in terms of their capacities, physical conditions, and performance capabilities. Facilities are evaluated relative to existing and projected requirements based on growth and demand projections from Chapter 2.

SOURCES

The NBWD wells are described in Chapter 1. Figure 3-2 is a conceptual schematic diagram of how the two well fields, storage tanks and booster pump stations operate.

The north well field and south well field both have filtration systems for iron and manganese, using ozone as an oxidant and polymer as a flocculant and filter aid. Both systems discharge into reservoirs, and both have booster pump stations that pump out of the reservoirs and into the distribution system.

Place. The minimum system pressures listed for 2021 and 2035 account for construction of a booster pump station serving Birch Place south of 227th Street. This booster pump station is required to meet fire flow requirements at the south end of Birch Place.

Fire Flow Modeling Results

Pursuant to WAC 246-290-230 (6) a water system must be designed to provide adequate fire flow under maximum day demand conditions, while maintaining a minimum system pressure of 20 psi. While these conditions can be met throughout most of the system, the model predicts that certain locations are not able meet this fire flow standard. **Table 3-16 provides a list of fire flow deficiencies in the system.** The "Projects" column refers to projects discussed below to improve fire flows. Since maximum day demand in 2021 and 2035 are projected to be less than in 2015, 2015 maximum day demand conditions represent the critical design scenario. Therefore, no deficiencies are listed for either the 2021 or 2035 demand conditions.

TABLE 3-16

Fire Flow Deficiencies During 2015 Maximum Day Demand Conditions

Hydrant	Location	Elevation (ft)	Re-quired Fire Flow (gpm)	Avail-able Fire Flow (gpm)	Project or Remedy	Avail-able Fire Flow after Project (gpm)
J1480	Intersection of 205th St. and Birch Place	26	500	209	Project P-1	558
J1482	Southern terminus of Birch Lane	24	500	209	Project P-1	572
J1670	Birch Lane, approximately 600 feet north of the intersection with 212th Place	27	500	283	Deregulate booster station discharge at south wellfield booster station (1)	762
J16	Intersection of SR-103 and 178th Place	27	500	355	Deregulate booster station discharge at south wellfield booster station (1)	594
FH-1	197th Street, 700 feet west of SR-103	29	500	356	Deregulate booster station discharge at south wellfield booster station (1)	592

TABLE 3-16 – (continued)

Fire Flow Deficiencies During 2015 Maximum Day Demand Conditions

Hydrant	Location	Elevation (ft)	Re-quired Fire Flow (gpm)	Avail-able Fire Flow (gpm)	Project or Remedy	Avail-able Fire Flow after Project (gpm)
FH-2	Intersection of SR-103 and 200th Lane	34	500	400	Deregulate booster station discharge at south wellfield booster station (1)	672
J144	Along SR-103, approximately 170 feet north of the intersection with 205th Lane	30	500	425	Deregulate booster station discharge at south wellfield booster station (1)	710
J162	Intersection of SR-103 and 212 Place	33	500	461	Deregulate booster station discharge at south wellfield booster station (1)	764
J242	Terminus of 205th Street	27	500	488	Deregulate booster station discharge at south wellfield booster station (1)	780
J1158	Approximately 250 feet west of the intersection of U Street and 229th Street	27	500	489	Deregulate booster station discharge at south wellfield booster station (1)	775
J190	Intersection of SR-103 and 217th Lane E.	33	500	498	Deregulate booster station discharge at south wellfield booster station (1)	819
J192	Approximately 350 feet east of the intersection of SR-103 and 217th Lane E.	25	500	498	Deregulate booster station discharge at south wellfield booster station (1)	819
J194	Approximately 700 feet south of 217th Lane E., 350 feet east of SR-103.	25	500	498	Deregulate booster station discharge at south wellfield booster station (1)	819

(1) Deregulation of the South Well Field booster pump station will allow the pumps to provide pressure to the distribution system without restraint from a pressure reducing valve.

A color coded map showing available fire flow throughout the distribution system under 2015 and 2021 maximum day demand conditions is included in Appendix F. The available fire flow map corresponding to 2021 maximum day demand conditions includes the operational changes and capital projects identified in Table 3-16. An available fire flow map is not provided for the 2035 maximum day demand scenario since maximum day demand is projected to be less in 2035 than in 2021. Therefore, available fire flow under 2035 maximum day demand conditions will be greater than available fire flow under 2021 maximum day demand conditions.

Distribution Improvements

Various water system improvements were modeled to determine the optimal improvements to alleviate the identified fire flow deficiencies. The following water system improvement was determined to be the most effective option to meet the fire flow requirements. The project listed in Table 3-16 corresponds to the project listed below. This project is discussed in further detail in Chapter 8, Capital Improvement Plan.

> **Project P-1:** Construct a booster pump station at the intersection of 227th Street and Birch Place to serve connections along Birch Street south of 227th Street. For the purposes of this analysis, it has been assumed that the jockey and fire pumps have been sized identically to the south wellfield booster station. The jockey pump has been modeled as discharging through a pressure reducing valve set at a downstream pressure of 60 psi while the fire pump discharges directly into the distribution system.

Fire flow and peak hour node reports and node maps are available in Appendix F.

WATER SYSTEM CAPACITY LIMITS

There are several factors that could limit water system capacity, including source capacity, storage capacity, booster pump capacity, annual water rights and instantaneous water rights capacity.

SOURCE CAPACITY LIMIT

As a planning goal, source capacity should be capable of meeting maximum day demand in 18 hours per day of pumping. From Table 1-4, total installed source capacity is 915 gpm. The installed source capacity limit can be calculated as follows:

$$\text{Source Capacity Connections Limit} = \frac{915 \text{ gpm x } 1{,}080 \text{ min/day}}{278 \text{ gpd per ERU}} = 3{,}554 \text{ ERUs}$$

Existing source capacity is adequate for up to 3,554 ERUs.

INSTANTANEOUS WATER RIGHT CAPACITY LIMIT

From Table 1-2, NBWD has 1,100 gpm of instantaneous water rights. Assuming that use of these rights would also be limited to 18 hours per day, the instantaneous water rights limit can be calculated as follows:

$$\text{Instantaneous Water Rights Connections Limit} = \frac{1{,}100 \text{ gpm x } 1{,}080 \text{ min/day}}{278 \text{ gpd per ERU}} = 4{,}273 \text{ ERUs}$$

Existing instantaneous water rights are adequate for up to 4,273 ERUs.

ANNUAL WATER RIGHT CAPACITY LIMIT

The annual water rights limit from Table 1-2 is 696 ac-ft/yr and the Average Day Demand per ERU from Table 3-1 is 114 gpd. The limit on ERUs due to the annual water right limit can be calculated as follows:

$$\text{Annual Water Rights Connections Limit} = \frac{696 \text{ ac-ft/yr x } 325{,}851 \text{ gal/ac-ft}}{365 \text{ days/year x } 114 \text{ gpd/per ERU}} = 5{,}450 \text{ ERUs}$$

Existing annual water rights are adequate for up to ERUs.

BOOSTER PUMP SYSTEM CAPACITY LIMIT

As discussed above, under the heading *Booster Pump System*, the installed booster pump capacity will meet projected peak hour demands and maximum day demand plus fire flow throughout the 20-year planning horizon, as well as projected buildout demands, with any one pump out of service. The system capacity limit based on installed booster pump capacity and PHD can be estimated by solving the PHD equation for the number of ERUs and setting PHD equal to the installed pumping capacity. The formula for PHD from Table 3-1 is as follows:

$$\text{PHD} = 0.309 * \text{N} + 61$$

Solving for the number of ERUs, N, yields the following:

$$\text{N} = \frac{\text{PHD} - 61}{0.309}$$

Inserting the installed pump capacity of 2,969 gpm with one pump out of service, from Table 1-4, for PHD yields the following:

$$\text{N} = \frac{2{,}969 - 61}{0.309} = 9{,}411 \text{ ERUs}$$

CHAPTER 6

OPERATION & MAINTENANCE PROGRAM

INTRODUCTION

The objective of this chapter is to provide an evaluation of North Beach Water District's (NBWD's) operation and maintenance (O&M) program and its ability to assure satisfactory management of the water system operations in accordance with WAC 246-290. NBWD's Operation and Maintenance Manual and specific component related documentation are maintained by NBWD for use by operations personnel.

The O&M Program includes the following elements:

- Water System Management and Personnel
- Operator Certification
- System Operation and Control
- Water Quality Monitoring
- Preventive Maintenance
- Emergency Response Program
- Cross-Connection Control Program
- Customer Complaint Response Program
- O&M Improvements

WATER SYSTEM MANAGEMENT AND PERSONNEL

NBWD's water system is managed and operated by NBWD staff under general direction of the NBWD Board of Commissioners. Mr. Bill Neal is NBWD General Manager, Mr. Jack McCarty is the NBWD Office Manager, Ms. Lisa Larcom is the NBWD Billing Clerk, Mr. Bob Hunt is the NBWD Field Supervisor, and Mr. Dennis Schweizer is the NBWD Treatment Plant Operator.

OPERATOR CERTIFICATION

Department of Health (DOH) requires all Group A water systems to have at least one certified Water Distribution Manager (WDM) under WAC 246-292-050. The WDM must further be certified at a level equal to or higher than the water system's classification rating as described in Table 6-1 and in accordance with WAC 246-292-040.

TABLE 6-1

Water System Group Classification

Classification	Population Served
Group 1	Less than 1,500
Group 2	1,501 to 15,000
Group 3	15,501 to 50,000
Group 4	Greater than 50,000

NBWD serves between 1,501 and 15,000 people on a full-time basis, and, therefore, is required to have a WDM Level 2. NBWD operates two water treatment facilities, rated by DOH as requiring a Water Treatment Plant Operator 2 (WTPO 2) in charge of the water treatment facility. Additionally, NBWD is required to have a Cross-Connection Control (CCC) Program and must ensure that a Cross-Connection Specialist (CCS) is responsible for overseeing the program and for periodic inspections of premises for cross-connections. Finally, NBWD must ensure that a Backflow Assembly Tester (BAT) is responsible for inspecting, testing, and monitoring backflow prevention assemblies in accordance with WAC 246-290-490. NBWD can have a CCS on staff or have an outside CCS specialist review their CCC program. NBWD can also have a BAT on staff to perform the backflow assembly tests or can allow the customers to have their device tested by an approved BAT. Table 6-2 provides a list of NBWD personnel, positions and certifications.

TABLE 6-2

NBWD Water System Personnel Certifications

Staff	Position	Operator No.	Certifications
Bill Neal	General Manager	012803	WDM 2, WTPO 1, CCS
Robert Hunt	Field Supervisor	011725	WDM 2 WTPO 2
Dennis Schweizer	Treatment Plant Operator	012695	WDM 2 WTPO 2
Jonathan Fleming	Water Service Worker I	013551	WDM 1
Joshua Maxey	Water Service Worker I		

PROFESSIONAL GROWTH REQUIREMENTS

In order to promote and maintain expertise for the various grades of operator certification, Washington State regulations require all certified operators meet professional growth requirements by completing no less than three continuing education units (CEUs) every three years. Programs sponsored by both Washington Environmental Training Resource

Center (WETRC) and the American Water Works Association (AWWA) Pacific Northwest Subsection are the most popular sources of CEUs for certified operators in Washington State. The professional growth requirement may also be met by advancement, by examination, or by certification in a different classification.

The NBWD General Manager monitors the status of staff CEUs and assures that resources to obtain training are provided by NBWD as necessary to maintain these credits.

SYSTEM OPERATION AND CONTROL

MAJOR SYSTEM COMPONENTS

The locations of the major system components are shown on Figure 1-11, the system facilities map. System facilities are described in Chapter 1 of this Plan under the heading Inventory of Existing Facilities. A description of the normal operation of each facility is given in the following sections.

Sources of Supply

Water from the North Wellfield (NWF) is pumped by the individual well pumps through the NWF treatment system and into the NWF Reservoirs. Similarly, water from the South Wellfield (SWF) is pumped by the individual well pumps through the SWF treatment system and into the SWF Reservoirs. Historically, systems were in place to turn the wells on and off based on water levels in the reservoirs. However, those systems are no longer functioning and for the past few years the wells have been operated manually. This has resulted in frequent overflows of the reservoirs and an unknown amount of water loss, which is thought to contribute significantly to Distribution System Leakage (DSL). NBWD is planning to replace the operational control system, which will remedy this problem.

Treatment

Water flows through the treatment systems when the well pumps are running. The aeration systems run when the well pumps run. As discussed in Chapter 1, the treatment system seems to provide adequate treatment with the ozonation system turned off, so NBWD is no longer running the ozonation systems at either wellfield site. Backwash of the filter units is triggered either by volume of water filtered or by elapsed time since the last backwash, whichever comes first. Backwash water is discharged to local infiltration areas where it is allowed to percolate into the ground.

Reservoirs

As described in Chapters 1 and 3, NBWD operates three reservoirs at the NWF site and one reservoir at the SWF site. These reservoirs are depicted in Figures 1-6 and 1-7. Capacity analysis of the reservoirs is provided in Table 3-9. Water from the wells is pumped to the reservoirs through the treatment systems. The water level in the reservoirs is monitored visually based on water level gages on the sides of the reservoirs. Wells are turned on and off manually based on water levels observed on the water level gages. As shown in Table 3-9, the NWF reservoirs are 45 feet tall, and the SWF reservoir is 40 feet tall. This is not enough elevation to provide the pressure required for water system operation, so water from the reservoirs is pumped into the water distribution system to maintain system pressure.

Pumping Facilities

In order to maintain adequate distribution system pressure, there are pumping stations located at both the NWF and the SWF sites. The pumping systems maintain output pressures of 60 psi. The NWF booster pump control system has not been operating properly, so NBWD staff have been turning booster pumps on and off manually. Pump station output pressure is controlled by a pressure reducing valve, so having unneeded pumps on does not create excessive system pressure. However, having an inadequate number of pumps on can result in low system pressure. Therefore, operations staff tend to leave unneeded pumps on rather than risk having an inadequate number of pumps on, which means that the NWF booster pump system uses more energy than is necessary to meet system demands. This also means that operations staff need to go by the pump station in early morning to turn on pumps prior to morning demand, and in late evening to turn off unneeded pumps, and it means that operation staff need to go by the pump stations regularly to check the pumps.

The SWF booster pump system output pressure is controlled by a Variable Frequency Drive (VFD) system, which adjusts the booster pump speed to control distribution system pressure. The system to turn pumps on and off at the SWF booster pump station is also not working properly, and, like the NWF booster pump system, booster pumps are turned on and off manually. When demand is low, the control system slows down the pumps, and when demand is high, the control system speeds up the pumps.

System Control

As discussed above, the control systems for the NWF and SWF facilities are not working properly, resulting in the need to turn wells and booster pumps on and off manually. This results in wasted water, wasted energy, additional staff time costs, and reduced system reliability. In addition, there is no centralized control system. Since both booster pump systems are controlled by output pressure, it is a problem getting both systems to run without one system overpowering the other. A centralized control system could be designed to operate the booster pump systems as needed to meet varying system demand in different parts of the system at different times. In addition, a centralized control system could allow for centralized monitoring and alarm systems at a central location, so that system conditions and system alarms can be better monitored.

As described in Chapter 1, the NBWD water system is a merged composite of two separate systems. This is the major reason why there is currently no centralized control system. It is also a contributing factor as to why the existing control systems at the NWF and SWF facilities are not operating properly. Neither previous owners saw much need to invest in control systems that would soon be the responsibility of the future owner. However, now that the system is under unified and stable ownership, NBWD views improvements and consolidation of the control system as a high priority.

Distribution System

NBWD maintains more than 56 miles of pipeline, which interconnects the wells, storage, and pumping stations with consumer service connections. A list of total pipe by size is presented in Table 1-5. Figure 1-11 shows the location of all distribution pipelines and their size. The majority of the distribution piping system is made up of 2-inch pipe. Chapter 3 identifies water system hydraulic deficiencies. Most of the existing two-inch pipe is adequate for existing demands, but is not adequate for fire flow. There are no existing fire hydrants on two-inch water mains so this does not show as a deficiency in the hydraulic analysis. However, if fire hydrants are to be eventually installed at 900-foot intervals as required by WAC 246-293-640, then significant amounts of 2-inch water main will need to be replaced with larger mains.

Operation and maintenance of the water distribution system includes water quality sampling, water main flushing, valve exercising, and regular inspection and repair of water main leaks and breaks.

WATER QUALITY MONITORING

NBWD receives an annual report from DOH that indicates what water quality tests are required and when they are required. In addition, NBWD is required to prepare a Coliform Monitoring Plan (WAC 246-290-300 (3) (b)), and Inorganic Chemical Monitoring Plan (WAC 246-290-300 (4) (f)), and an Organic Chemical Monitoring Plan (WAC 246-290-300 (7) (e)). Copies of the monitoring requirements for 2014, and the coliform, inorganic chemical, and organic chemical monitoring plans are included in Appendix G. An analysis of NBWD's most current water quality test results can be found in Chapter 3. NBWD is also required to publish a Consumer Confidence Report (CCR) every year to provide customers with water quality data and system information. A copy of the most recent CCR can be found in Appendix H.

PREVENTIVE MAINTENANCE

The most cost-effective method for maintaining a water system is to provide a planned Preventive Maintenance (PM) program. A planned PM program can provide the optimum level of maintenance activities for the least maintenance cost. Typical tasks that are performed on a daily, monthly, or annual basis are listed below in Table 6-3.

TABLE 6-3

Preventive Maintenance Tasks

Preventive Maintenance Tasks and Frequency	
Daily • On-call 24 hours per day. • Respond to customer inquiries. • Respond to service requests. • Monitor for leaks in the system. • Visit well sites to record meter readings and ensure proper operation of disinfection facility and wells. • Monitor water level in the reservoir. • Record production and backwash meter readings.	**Weekly** • Test and record finished water color. • Test and record finished water iron and manganese. • General cleaning and housekeeping. **Monthly** • Collect routine coliform samples. • Inspect reservoir hatches, vents, and screens. **Annual** • Inspect all backflow prevention devices. • Flush distribution system and repair leaks (more often as needed). • Inspect wellhead protection area for contaminant sources. • Inspect and exercise hydrants and valves. **Every 5 Years** • Clean reservoirs (as needed). • Check filter media.

Reservoirs

Improperly maintained reservoirs can cause contamination in public water systems. This can result from contaminants entering the reservoir through cracks or openings at the vent, overflow or drain screens. Deteriorating hatch covers and vandalism can also compromise reservoir water quality. Poorly designed and maintained reservoirs can hamper the emergency operation of a water system. If reservoir drains are not functioning properly, it may be difficult to purge a contaminant from the system. Written documentation of reservoir maintenance must be completed with each inspection and repair, and a copy of the report retained on file.

All four of NBWD's reservoirs received interior inspections and cleaning in 2006 and it was determined no further action was necessary at that time.

One problem that can occur in reservoirs, particularly in tall narrow reservoirs such as the ones at NBWD, is stratification and stagnation of water. Stratification occurs when the water in the reservoir is warmer than the water entering the reservoir. Colder water is denser than warmer water, and sinks to and remains at the bottom of the reservoir until it exits the reservoir. Water above this cold layer can remain in the reservoir for months, potentially growing bacteria. Then when a large water demand occurs that draws this water out of the reservoir, or when colder ambient temperature causes the water in the reservoir to cool to or below the temperature of the water entering the reservoir, bacteria can move into the distribution system, potentially resulting in coliform MCL violations. If this becomes a problem, the common remedy is reservoir mixing.

The NBWD reservoirs have separate inlets and outlets, with the inlets discharging to the reservoirs approximately half way up the sides of the reservoirs. This design may help to prevent water stratification. Also, if ambient temperatures never get high enough to raise water temperature in the reservoirs enough to cause stratification, or if the reservoir materials provide adequate insulation to prevent the temperature differential, then stratification may never occur and water stagnation in the reservoirs may not be a problem.

To determine if stratification and stagnation of water in the NBWD reservoirs is a problem, NBWD will consider conducting stratification studies on the reservoirs toward the middle to end of summer. A temperature profile can be obtained by lowering a temperature probe into each reservoir and recording the temperature at different depths. If these studies show reservoir stratification and/or water stagnation, options will be considered to create reservoir mixing.

Wells

Routine maintenance for the wells includes keeping records of water meter readings, discharge pressures, sounding of static and pumping water levels in each well, and keeping the well facilities clean. Water quality samples are taken at each well as required by DOH. Summaries of the total annual production of each wellfield, as well as peak daily production are maintained.

Distribution System Valves

Good preventive maintenance dictates that all valves be exercised regularly. An important aspect of distribution system valve maintenance and record keeping is to ensure that distribution valves are completely open. A partially closed valve can reduce peak day operation and fire flow. NBWD is currently developing and implementing a plan that exercises valves in the system on an annual basis. NBWD keeps records of valve maintenance.

Hydrants

Hydrants should be inspected regularly and repaired if necessary. It is important to maintain good records of hydrant maintenance. NBWD flushes and inspects fire hydrants annually. The following recommended procedure for testing fire hydrants has been adapted from the American Water Works Association (AWWA) (1989).

- Check appearance of hydrants for visible damage or leaks. Check for residue stains on the hydrant.
- Remove an outlet nozzle cap and sound for leakage.
- Check for presence of water or ice in the hydrant body with a plumb bob.
- Replace the outlet nozzle cap. Open the hydrant a few turns and allow air to vent. Tighten cap.
- Open the hydrant fully.
- Check for leakage at flanges and around outlet nozzles, packing, and seals.
- Partially close the hydrant so the drains open and water flows through under pressure for about 10 seconds, flushing the drain outlets.
- Close the hydrant completely.
- Remove an outlet nozzle cap and attach a fire hose or some other deflector.
- Open the hydrant and flush.
- Close the hydrant and check for operation of the drain valve.
- Check the main valve for leakage.
- Remove all outlet nozzle caps, clean and lubricate threads.
- Check chains and cables for free action.
- Replace caps and tighten.
- Check lubrication of operating nut threads.
- Locate and exercise auxiliary valve. Leave open.

Distribution System Flushing

Distribution system flushing is conducted on an annual basis. A plan is being developed and implemented to routinely flush designated areas to help reduce stagnant water, and prevent water quality problems.

Meters

Accurate water metering is an essential financial and conservation-oriented component of water system infrastructure. Without accurate source meter readings, NBWD cannot determine well pump performance or well output. Without service meters NBWD cannot bill equitably for water usage and cannot determine how much water production is leaking from the distribution system.

NBWD water distribution system is fully metered, per Water Use Efficiency Rule requirements. Tracking of total water sales and regular comparison to total water production is important to monitor the condition of the water distribution system. As water meters age, they tend to under-report usage. Low reading meters can result in lost revenue and artificial inflation of DSL rates. Typical water meter life is approximately ten years. Water meters can generally be replaced for less than the cost of testing and repairing water meters. Therefore, a water meter replacement program on approximately a ten year cycle will help to keep water sales data accurate.

Water Billing

Water billing software has two important functions: Creating water bills and tracking payments to support the operation of the water system, and regular tabulation of total volume of water sold, which by comparison with water produced, is an indicator of the condition of the water distribution system.

EMERGENCY RESPONSE PROGRAM

Water utilities have the responsibility to provide an adequate and reliable quantity and quality of water at all times. To meet this requirement, utilities must reduce or eliminate the effects of natural disasters, accidents, and intentional acts. Although it is not possible to anticipate all potential disasters affecting NBWD's water system, formulating procedures to manage and remedy common emergencies is appropriate.

NBWD will regularly review and practice its emergency response plan. An Emergency Response Planning Guide is available at the following web site:

https://fortress.wa.gov/doh/eh/dw/publications/publications.cfm?action=pubdetail&type=title&PubId=203&CFID=245767&CFTOKEN=36023621

Following is a summary of emergency response information and actions that may be required in typical emergency situations.

WATER SYSTEM PERSONNEL EMERGENCY CALL-UP LIST

Table 6-4 provides phone numbers for emergency contacts including response agencies, governments, and material suppliers.

TABLE 6-4

Water System Emergency Phone List

Agency/Group	Contact	Phone Number
Fire/Police		911
NBWD Business Office	Bill Neal, General Manager	Office: (360) 665-4144 Mobile: (360) 244-0068
	Jack McCarty, Office Manager	Office: (360) 665-4144
	Robert Hunt, Field Superintendent	Office: (360) 665-4144
Electrical	Public Utility District No. 2	(360) 642-3191
Telephone Service	Century Telephone	(800) 954-1211
Testing Lab	Columbia Analytical Services, Inc.	(360) 577-7222
Washington State Department of Health	SW Regional Office, Teresa Walker, P.E.	(360) 236-3030 (360) 236-3032
	24-Hour Emergencies	(877) 481-4901
Washington State Department of Ecology	Emergency Spill Response	(360) 407-6300
Pacific County	Emergency Management	(360) 875-9340
	Public Works	(360) 875-9368
	General Information	(360) 875-9300
	Planning Department	(360) 875-9356
	Road Maintenance	(800) 875-9380
State Wide One-Call	Utility Locates	(800) 424-5555
Gray & Osborne, Inc. Engineering Services	Olympia Number	(360) 292-7481
	Seattle Number	(206) 284-0860

EMERGENCY PROCEDURES

Bacterial Contamination of Water Supply

Bacterial contamination of the water supply can result from such items as main breaks, backflow events, or pollution from an isolated source. Any time coliform bacteria are detected in a water system sample, the DOH regional office should be notified as soon as possible. The contact number is listed in Table 6-4. WAC 246-290-320 (2) further specifies specific follow-up procedures in the event coliform bacteria are detected in the water system. Table 6-5 lists additional appropriate actions to be taken in the event of the contamination of the water supply.

TABLE 6-5

Water System Bacterial Contamination Response Actions

Distribution System Contamination	
•	Perform chemical analysis at various locations within the system, including the reservoirs and at system extremities.
•	Disinfect distribution lines as dictated by the nature of the contamination.
Reservoir Contamination	
•	Isolate reservoir from system.
•	Inspect vent screens, hatches, and piping to identify source of contamination.
•	Resample to confirm contamination. Take multiple samples at different locations in Reservoir, if possible.
•	Check distribution system for presence of contamination.
•	If reservoir water is contaminated and, therefore, considered unsuitable for consumption, drain and clean reservoir.
•	Disinfect reservoir if bacteriological standards are exceeded. Follow AWWA Standards. A 50-ppm chlorine solution in the reservoir can be obtained by adding 97 gallons of 5.25 percent chlorine bleach per 100,000 gallons of storage.

Inorganic Chemical/Physical Characteristics Exceedance

Inorganic Chemical/Physical Characteristics (IOC) samples are routinely collected from water supply sources, generally once every three years, unless monitoring waivers have been issued, or a higher frequency has been required. IOC tests include numerous different chemicals. If routine IOC samples detect one or more chemicals in excess of an MCL, additional samples may be collected specifically for that chemical if it reduces follow-up chemical testing costs. If practical, the source of supply that exceeds the IOC MCL should be taken out of service until the cause of the problem is identified and corrected. Follow-up procedures in the event of an Inorganic Chemical/Physical Characteristics MCL violation are specified in WAC 246-290-320 (3). Follow-up actions may vary depending on the specific chemical detected and the level at which it is detected. The DOH regional office should be contacted at the number listed in Table 6-4 to coordinate follow-up sampling and appropriate responses.

Organic Chemical VOC and SOC

Organic Chemical VOC and SOC samples are routinely taken from water supply sources, generally once every three years, unless monitoring waivers have been issued, or a higher frequency has been required. VOC and SOC tests include numerous different chemicals. VOCs and SOCs are generally not detected in water supply sources. Therefore, any detection of VOCs or SOCs may warrant follow-up investigation even if it does not exceed an MCL. If routine VOC or SOC samples detect one or more chemicals, additional samples may be taken specifically for that chemical or possibly for a surrogate such as Total Organic Carbon if it reduces follow-up chemical testing costs. If practical, the source of supply from which the VOCs or SOCs have been detected should be taken out of service until the cause of the problem is identified and corrected. Follow-up procedures in the event of a VOC or SOC detection are specified in WAC 246-290-320 (6). Follow-up actions may vary depending on the specific chemical detected and the level at which it is detected. The DOH regional office should be contacted at the number listed in Table 6-4 to coordinate follow-up sampling and appropriate responses.

Power Failure

Various types of weather can cause a loss of power. These weather conditions include wind, lightning, freezing rain, or snowstorm. Commonly trees or tree branches fall on power lines due to wind, freezing rain or snow, causing power disruptions. Downed trees can also make it difficult to access the location of the power outage to implement repairs. Additionally, power can be lost through traffic accidents.

In the event of a power outage, NBWD staff will first check reservoir levels visually. The possible length of the power outage will be estimated and customers will be notified of the emergency and water conservation will be requested through radio, television, and newspaper and, if needed and available, through a police loudspeaker system.

NBWD has four diesel powered generators with a combined total capacity 480 kW. Automatic transfer switches automatically start the generators on power failure. These generators are adequate to power all facilities at both wellfields.

Severe Earthquake

A severe earthquake can result in distribution system breaks and structural damage to the wells and reservoirs. Table 6-6 provides procedures to follow in the event of a severe earthquake. A severe earthquake can also cause a power failure. See Power Failure, above.

Note: In the event of a large earthquake along the Pacific coast there is a possibility of a resultant tsunami. The possibility of a tsunami should be taken into consideration when determining appropriate follow-up action immediately following a large earthquake. See section on tsunami later in this chapter.

TABLE 6-6

Severe Earthquake Response Actions

System Component	Proposed Actions
Reservoir	• Observe reservoir for visual signs of structural damage. • If structural damage is apparent, drain reservoir and inspect the interior, exterior, and roof of the reservoir. • If leakage is suspected, isolate reservoir and monitor water level.
Distribution Lines	• Close valves to isolate breaks. • Check reservoir level. • Notify water customers of emergency and request water conservation.
Wells	• Inspect wells and treatment for operation. • Inspect well seals to prevent contamination from entering the wellhead. • Inspect for alignment of pump column and casing.
Note:	• In the event of a large earthquake along the Pacific coast, there is a possibility of a resultant tsunami. The possibility of a tsunami should be taken into consideration when determining appropriate follow-up action immediately following a large earthquake. See section on tsunami later in this chapter.

High Wind

High wind can cause downed trees and tree limbs. These, in turn, can block roads and cause power outages. Chain saw, cable, and winch may be necessary to clear downed trees to access facilities. See section on Power Failure, above.

Cold Weather Conditions/Severe Snow Storm

Extended cold weather conditions could cause freezing problems at shallow service connections, valve vaults without an insulating earth cover, reservoirs, and water supply and treatment facilities. Heavy snowfall may impede employees from reaching a problem area and can cause collapse of structures. Water supply should not be interrupted because flowing water is used to prevent pipes from freezing. Heavy snow and/or freezing rain can cause power outages. Commonly, trees or tree branches fall on power lines due to wind, freezing rain or snow, causing power disruptions. Downed trees can also make it difficult to access the location of the power outage to implement repairs. See Power Failure, above. Table 6-7 addresses the possible emergency events and response actions that will be taken in the event of a severe snowstorm.

TABLE 6-7

Severe Freezing/Snowstorm Response Actions

System Component	Proposed Actions
Facilities Access	• Have chains and snow gear ready for maintenance equipment and vehicles. • Contact Pacific County Public Works to expedite plowing to any problem area. • Heavy snow and/or freezing rain can cause downed trees and tree branches, blocking access to some areas. Chain saw, cable, and winch may be necessary to clear downed trees to access facilities.
Reservoir	• Clear snow from roads and walkways. • Clear ice from level gauges, overflows, and vents.
Distribution Lines	• Maintain mapping of valve locations to locate valves as needed. • Frozen lines can be wrapped with heat tape.
Wells	• Clear snow from well access roads. • Inspect wells and treatment for operation. • Install space heater at wells as necessary.

High Water and Flooding

Heavy rains and/or snowmelt can cause the water levels to rise and reach a flood level. Table 6-8 addresses the possible emergency events and response actions that will be taken in the event of high water or flooding. The NBWD area is in the Pacific County Flood Control District #1 which provides flood control facilities including ocean outfalls, surface drains, and pipes that control surface water during the heavy winter storms. Generally, flooding is confined locally as the groundwater level rises above ground level. Onsite septic systems may become flooded and non-operative. Flooded systems could become sources of contamination in the distribution system. If flooding overtops wells, wells should be considered contaminated until sampling indicates acceptable water quality.

TABLE 6-8

High Water/Flooding Emergency Response Actions

System Component	Proposed Actions
Reservoir	• No action should be required as reservoirs are above flood level.
Distribution Lines	• Test for coliform bacteria.
Wells	• Inspect wells and treatment for operation. • Test for coliform bacteria.

Tsunami

The North Beach area is vulnerable to tsunami (tidal wave). A tsunami could be caused by a large earthquake felt locally, or could be caused by a large earthquake at a distant location such as Japan. For tsunamis generated by distant events, a tsunami early warning system is in place. For locally generated tsunamis there may not be time for an early warning system to provide notification. The primary defense against a tsunami is to move to high ground. In the event of a major earthquake all people should move to high ground until the threat of a tsunami has passed.

Damage caused by a tsunami can include flooding of facilities and washing away of structures and water mains. Wells in areas that have been inundated should be considered contaminated until they can be cleaned, disinfected and tested. If storage reservoirs are not over-topped or damaged, water in the reservoirs can most likely be considered safe. If a tsunami were to flood the NBWD wellfields, then the water booster pump systems would most likely be inundated, and would require major repairs to be placed back in service. It is also possible that a tsunami could damage power supply to the entire North Beach Peninsula, so that only emergency power supplies, such as the North Beach backup power generators, may be available. Water from the NBWD reservoirs could be supplied to local residents in need of safe water supply from the piping at the wellfield control buildings. It would be important to maintain the safe supply of water in the NBWD reservoirs until water supply can be restored. Therefore, valves at the reservoir site should be closed as necessary to prevent loss of water from the reservoirs.

CROSS-CONNECTION CONTROL PROGRAM

WAC 246-290-490 (3) establishes the minimum requirements for a cross connection control program. The regulation identifies ten elements that must be addressed in a cross connection control program. These elements are further detailed in the DOH Publication *Guidance Document: Cross-Connection Control for Small Water Systems, March 2004.* These elements are summarized as follows:

1. Instrument of Legal Authority to Implement Program
2. Procedures and Schedules for Evaluating Service Connections
3. Procedures and Schedules for Eliminating and Controlling Cross-Connections
4. Qualified Personnel to Implement Program
5. Ensure that Approved Backflow Preventers Are Operating Correctly
6. Ensure that Backflow Preventers Are Tested Properly
7. Procedures for Responding to Backflow Incidents
8. Consumer Education
9. Cross-Connection Control Record Keeping
10. Additional Requirements if Reclaimed Water Is Used

NBWD Rules and Regulations Part 1.01.100, revised September 16, 2013, state that cross connections are prohibited, identifies authority of NBWD to enforce their cross connection control rules and requires backflow prevention where cross connections cannot be eliminated. A copy of NBWD Rules and Regulations are included in Appendix D. NBWD has also prepared a draft Cross Connection Control Program, which has not yet been adopted by the NBWD Board. Copies of the draft NBWD Cross Connection Control Program are included in Appendix I. The ten required elements of a cross connection control program summarized above are addressed in the draft NBWD Cross Connection Control Program.

PRIORITY SERVICE LIST

There are three categories of business establishments that may pose a hazard to the water system.

Category One Services

Category one services pose the highest degree of hazard and includes the following facilities:

- Printers
- Medical laboratories
- Chemical companies
- Radiator shops
- Battery, fertilizer, and paint manufacturers
- Pest control businesses
- Janitorial companies

Category Two Services

Category two services are considered less hazardous and include the following:

- Doctor, dentist, and veterinarians' offices
- Blood banks
- Drug rehabilitation centers
- Car washes
- Photo labs
- Commercial laundries
- Nursing homes and hospitals

Category Three Services

The least hazardous service category includes the following types of businesses:

- Food processing facilities
- Dairy establishments
- Beverage and candy manufacturers
- Massage and health spas
- Motels and schools with pool, spa, or sauna facilities

NEW AND EXISTING CROSS-CONNECTION DEVICES

NBWD currently has sixteen cross-connection control devices located within the water system. They are located at the following services:

- Ocean Park School
- Free By the Sea
- Port of Peninsula
- Golden Sands
- Queen Fisheries
- Wiegardt Brothers Inc.
- Coast Seafood Company
- Ocean Aire Trailer Park
- Loomis Lake State Park
- Pacific Pines
- Taylor Resources
- Department of Fisheries
- Peninsula Senior Center
- Sunset View Resort [Fire Flow]
- OB School District 101 [Fire Flow]
- Gary McGrew [Residential]

CUSTOMER COMPLAINT RESPONSE

NBWD rarely receives complaints about water service, but when complaints are received, they are taken seriously. Complaints are logged in at the NBWD office and a water system operator is sent to investigate the complaint. Depending on the findings of the complaint investigator, appropriate actions are taken to resolve the complaint. If a customer feels that their complaint is not being addressed properly, all customers of the water system have access to NBWD Board at regularly scheduled meetings to be heard regarding their concerns/complaints.

O&M IMPROVEMENTS

This section reviews operations and maintenance activities, schedules and needs as identified in the first part of this chapter and identifies possible operations or system changes that could improve or streamline operations.

WATER SYSTEM MANAGEMENT AND PERSONNEL

The scope of this Plan does not include a comprehensive evaluation of the staffing needs and adequacy of staffing. Due to complications in merging two separate water systems, problems with control systems at both wellfields, and lack of a centralized control system for the whole system, staff are at times kept busy with manual operation of source, treatment and pumping facilities. Installation of a new, centralized monitoring and control system will reduce requirements for staff to manually operate facilities and focus more on other aspects of system operation, maintenance, and improvements. NBWD Board have been supportive of assuring that adequate staff is provided to accomplish the system operations requirements. NBWD management will continue to monitor staff requirements and adjust staffing levels as needed to assure adequate staffing.

NBWD would like to develop in-house capabilities to complete water main replacement and water main extension projects. Water main construction generally requires a three to four person crew, including a backhoe operator, and equipment including a backhoe for digging and filling trenches and for helping to lift sections of pipe, a dump truck for hauling unsuitable excavation material away and for hauling suitable fill material to the site, and a flat bed trailer for hauling sections of pipe and fittings from stock areas to the construction site. Additional construction crew may also be needed at times for traffic control.

SYSTEM OPERATION AND CONTROL

The existing operations and control systems for both wellfields are in disrepair and need to be rehabilitated and/or replaced. NBWD intends to rehabilitate existing control systems and/or install new control systems at both wellfields, and install a new centralized monitoring and control system at the NBWD business office within the next year.

WATER QUALITY MONITORING

No deficiencies in water quality monitoring have been identified.

PREVENTIVE MAINTENANCE

No deficiencies in Preventative Maintenance have been identified.

EMERGENCY RESPONSE PROGRAM

No deficiencies in Emergency Response Program have been identified.

CROSS-CONNECTION CONTROL PROGRAM

NBWD needs to complete and adopt a cross connection control program. It is also advisable that NBWD staff obtain a BAT certification to improve internal control over the program.

CUSTOMER COMPLAINT RESPONSE PROGRAM

No deficiencies in the Customer Complaint Response Program have been identified.

SUMMARY OF O&M IMPROVEMENTS

- NBWD may need to increase staff as operational demands increase; however, installation of improved automated control at both wellfields and centralized monitoring and control at the NBWD office may alleviate need for additional staff.
- It would be beneficial to have NBWD staff with BAT certifications.
- NBWD may need to increase staff to complete more water main projects in house.